FLEXIHEAT UK LTD
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ELECTRIC BOILERS FOR CENTRAL HEATING

ThermoExtra 28-96kW

INSTRUCTIONS FOR INSTALLATION AND USE

Contents

We reserve the right of alternations

General

Read this document carefully before carrying out any installation, adjustment or service and follow the instructions

- **Keep these instructions close to the boiler!**
- **The boiler must not be modified, changed or rebuilt.**
- **The correct settings are important for economical heating.**
- **The type and serial number of the boiler must be quoted whenever you contact manufacturer or service, see the identification plate.**

General safety instructions!!

- Children shall not play with the appliance.
- Cleaning and user maintenance shall not be made by children without supervision.
- Children should be supervised to ensure that they do not play with the appliance.
- Boiler is not intended for outdoor use.

Technical safety instructions!!

- Keep the water pressure between recommended limits – see chapter 3.4.3, page 7. - Do not install boiler close the heat source (for instance, fireplace, wood stove etc…).
- Incompetent repairs can cause serious danger to users.
- Defective parts may be replaced only by the original or approved by the manufacturer,
- Switch off main power by MCB before opening the boiler.
- Boiler has built-in frost protection. When the boiler is not in use, leave the main power active that protection stay active.

1. Introduction

Thank you for the confidence you have shown to us by purchasing our central heating boiler.
In order to use the boiler to the utmost correctly and safely, and above all economically, read thoroughly these instructions before continuing with installation.

The appliances must be installed by a competent person, who is responsible for adhering to the existing regulations, rules and guidelines.

1.1. Applicable documents

The following additional documents are provided with the appliance:

For the owner of the system:
Instructions for use
Warranty card

For the qualified technician:
Instructions for installation
Electrical drawing for the appliance

1.2. Retention of documents

Please pass on this installation manual to the owner of the system. The owner should retain the manuals so that they are available when required.

1.3. Introduction

ThermoExtra are economical central heating boilers that may be used as an independent or additional source of heat.
ThermoExtra boilers offer you a possibility to reduce the power of the heater if necessary. The power may be switched on automatically when necessary with built-in step regulator or manually with switches on the control board. In this way it is possible to adapt the boiler to the utmost to circumstances on the spot.
The boiler operates on a principle of rapid heating smaller water quantities, so that exploiting energy is already 100%.

They are particularly suitable for heating smaller business premise, where you are short of space (small apartments, efficiency apartments, representation offices, smaller coffee-shop spaces etc.) or for heating larger spaces in early season when the main boiler is over dimensioned.
ThermoExtra are manufactured with upper and bottom connections so costumer would be able to choose which of them will be used for system connection. Temperature operation area is from 20 °C to 90 °C.
ThermoExtra boilers are designed in such a way that in apartment-contained central heating they can fit well with your furniture.

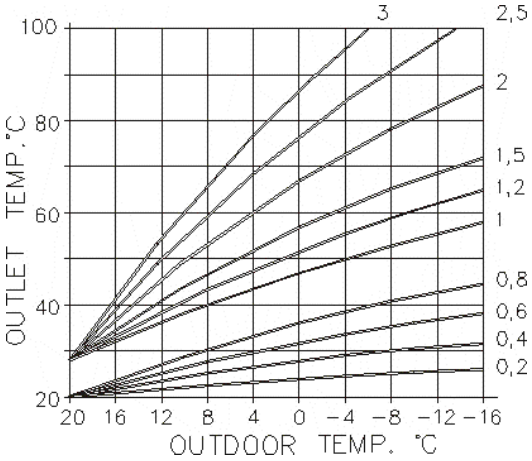
1.4. Heating curves

1.4.1. Availability of heating curves

Use of heating curves, temperature compensation, is limited to ThermoExtra boilers with option **C and V**.

1.4.2. About Heating curves

The modern way of heating is based on energy saving and automatic adjustments to warm up the space.
To achieve the required temperature electric boiler with electronic control panel heats the water in the boiler automatically depending on the external temperature. There is no need to look after the minimal working temperature because electric boilers do not dew and that means that the temperature of the water in the boiler is at the same time the temperature in the heating elements (for example in radiators, convectors etc.).
To achieve the desired room temperature, the characteristic heating curve has to be chosen depending on the characteristics of the object and the heating system.



Factory defined curves

If the heating curve is set optimally for heating of your apartment or house, corrections will not be necessary.

1.4.3. Why does the characteristic heating curve have to be set?

After the first settings of the heating curve authorized person can adjust, correct that curve if necessary.
Every heating room is built up differently. Different heating elements and heating systems can be used (radiators, under floor or combined heating) and every building has a different thermal insulation.
For the maximum exploitation of the heating and maximum energy savings, characteristic heating curve has to be set using the parameter on the control panel, in a way that the chosen heating curve is suitable for the heating system and for the quality of the building.

1.4.4. Corrections of the room temperature

Based on the experience, factory settings of the device are for the average insulated object and room temperature of 22°C. If factory settings are not adequate for achieving the desired room temperature, supplemental adjustments of the standard heating curves can be made.

Changing the inclination

When changing the heating curve, inclination is changing too, and in that way the temperature of water in the boiler is changing when the external temperature is low (below+ 5°C).

Level changes - offset

By offsetting the heating curve for the chosen value the temperature of water in the boiler is changing without changing the shape of the curve.
Values in the table below are used for the orientation and the user can change them any time as he/she wishes to.

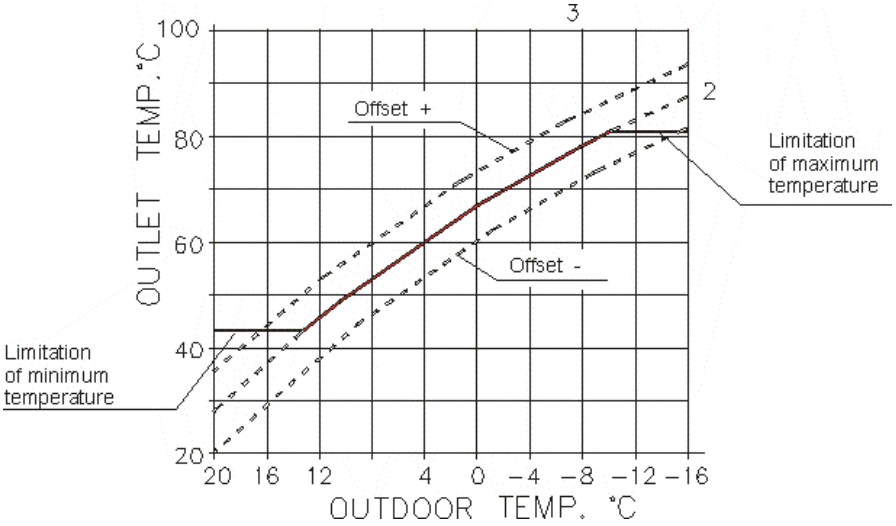
Experience has shown the following (for the average building quality):
when the temperature of water for heating changes from 5 to 7°C that will change the room temperature by approximately 2°C.

Thermal (heating) processes are slow, all corrections function after a period of time. It would be better if further corrections were made a day or two later.

To gain experience, we suggest that you should write all corrections (within a period of searching for the right parameters) in the *protocol of the corrections*.

In the table below you can find instructions how to correct the heating curve for the radiator heating depending on the achieved room temperature.

	Inclination of the curve	Offset
Factory settings	**1,5**	**0**
Room temperature is too low if the external temperature is **above + 5ºC**	Change with the first lower curve	Add with offset + 6ºC
Room temperature is too low if the external temperature is **between + 5ºC and - 5ºC**	Leave the curve 1,5	Add with offset + 3ºC
Room temperature is too low if the external temperature is **below - 5ºC**	Change with the first higher curve	Leave offset 0ºC
Room temperature is too high if the external temperature is **above + 5ºC**	Change with the first higher curve	Lower with offset - 6ºC
Room temperature is too high if the external temperature is **between + 5ºC - 5ºC**	Leave the curve 1,5	Lower with offset - 3ºC
Room temperature is too high if the external temperature is **below - 5ºC**	Change with the first lower curve	Leave offset 0ºC



Sample of modified curve

In a combined heating system, radiator and under floor heating, or other heating elements, the temperature of water in the boiler has to be chosen in a way to achieve the highest desired temperature. On the parts of heating where temperature of the primary flow has to be lower, one element has to be built in such as motorized three-way valve that is controlled by room thermostat, thermostat valve for limiting the temperature of the return flow or something similar.

1.4.5. Limiting the minimum and maximum temperature of water in the boiler

If the heating curves and offset are selected correctly and room temperature is falling, *in transitional period in heating seasons (autumn*, spring) minimal temperature of water in the boiler has to be changed.
If a building cannot accumulate heat (sudden and short warming during the day) necessary temperature of water in the boiler will be too low and will not keep up the desired room temperature.

Limitation of the maximum temperature of water in the boiler serves more as a protection. Factory setting is at 90ºC, and we suggest lowering it at approximately 80ºC. Limitation of the maximum temperature of water in the boiler is also used in central heating and domestic water preparation system, and because of that it is not advisable to lower that temperature too much because the domestic water will warm up slowly on higher temperatures.

1.5. Functionality of hot domestic water

1.5.1. Availability

It is possible to produce domestic hot water in an indirect water cylinder with heat exchanger by using Thermo Extra.

1.5.2. Description

Domestic water production has a priority order over central heating. At the moment of signaling the need for heating up the domestic water cylinder by the domestic water temperature sensor, the central heating circulation pump is switched off and the circulation pump for domestic hot water is switched on.

Heaters regulate the desired water temperature in the boiler that is by 25°C higher than set values of a desired domestic water temperature (independent of the central heating curve).

The circulation pump for domestic water cylinder is activated until the desired temperature of domestic water is reached, upon which, it is switched off with the previously described and programmed time delay.

If the central heating is off, at the moment of reaching the desired domestic water temperature, the desired water temperature in a boiler is set to the minimum value of water temperature in the boiler (stand by).

At repeated request for heating the domestic water cylinder the desired water temperature in the boiler is set to 25°C higher than set values of the desired domestic water temperature.

The domestic hot water circulation pump is switched on as late as the water temperature in the boiler reaches the same or higher temperature than the desired value of domestic water temperature. The 5°C difference for warm water conditioning is programmed. It means that if the desired temperature of domestic water tank is 60°C, then central heating will be switched off and domestic water conditioning switched on as late as domestic water temperature is lower than 55°C, and heating will be switched on and domestic water conditioning switched off when the temperature in domestic water tank reaches 60°C and when the programmed time of supplemental operation of domestic water circulation pump has passed.

If the time for domestic hot water production is longer than 30 min, especially if the desired temperature of the domestic water cylinder is not reached within 30 min, the process will be automatically interrupted and will switch to the heating regime, which in this case lasts for at least 30 mins.

1.6. Frost protection

1.6.1. Avaliability

Frost protection can be also provided by the use of an appropriate room thermostat. When frost protection is controlled by room thermostat, please consult room thermostat manuals for more details.

1.6.2. Domestic water

If the boiler is on for supply and only domestic hot water production is on or only heating or both, the protection from freezing of water in the indirect cylinder switches on automatically when the temperature sensor of indirect cylinder reads the value below 7°C, signaling switching on by blinking display, as well as the LED diode of the heater and warm water conditioning, regulating the domestic hot water cylinder temperature to 7°C.

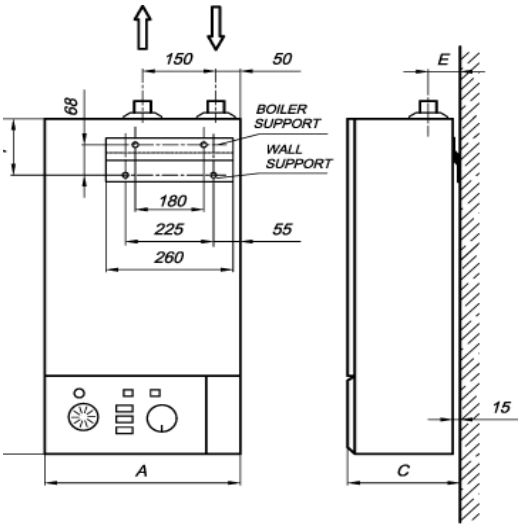
1.6.3. Central heating

If the boiler is on for supply and heating or both (heating and DHW production) are off, the protection from freezing of water in the central heating system switches automatically on if the water temperature sensor in the boiler reads the value below 8°C. In this case the temperature of water in the boiler is maintained at 8°C, until the conditions of possible freezing disappear. Switching on is signaled by the blinking display, as well as by the LED diode of the heater and the boiler.
In this case, domestic water conditioning has priority.
In order for the freezing protection system of central heating to operate, the room thermostat should be in the position of freezing protection, too (otherwise, the circulation pump of central heating would not operate).

2. Boiler specifications

2.1 Dimensions

Thermo Extra



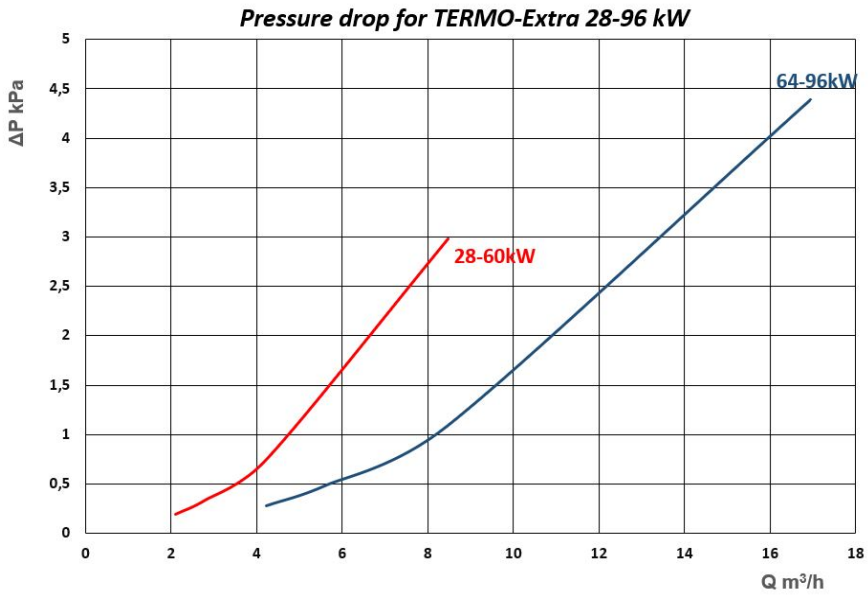
BOILERS 28 - 96 kW

TECHNICAL DATA FOR THERMO EXTRA BOILERS

Power kW	Capacity Lit.	Dimensions mm	Weight kg	Maximum operating pressure BAR	CONNECTIONS BSP MALE F & R	Power supply
28	19	A 400 B 930 C 310 D 162 E 115 F 109	45	2.5	1½”	400V 3N ~ 50/60 Hz
32						
36						
40						
44						
48						
52						
56						
60						
64	32	A 550 B 930 C 310 D 316 E 115 F 175	72		2”	
72						
80						
88						
96						

2.2 Hydraulic pressure drop and recommended flows

Pressure drop for ThermoExtra



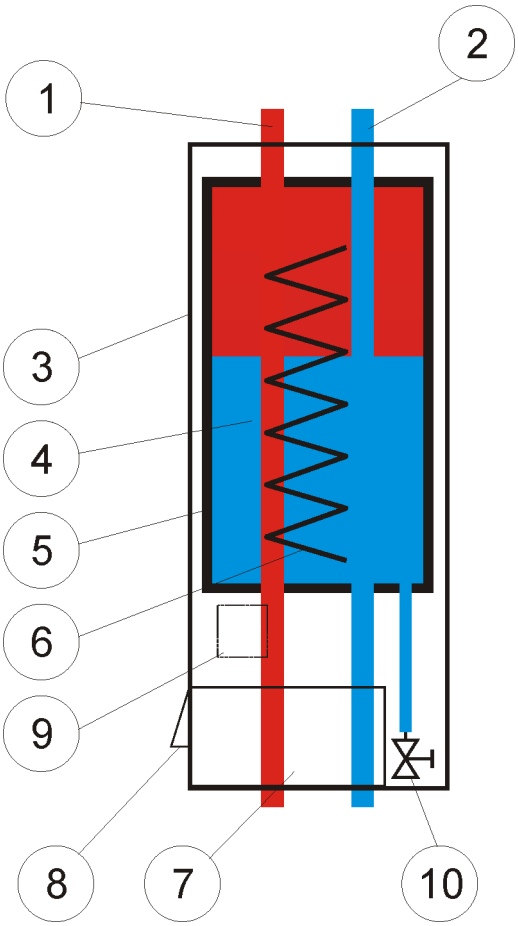
2.4. Power supply characteristics

POWER	Nominal current	Fuse current	Rated short-circuit breaking capacity I_{cn} (EN 60898)	Rated short-circuit breaking capacity I_{cn} (IEC 947-2)	Min. conductor's cross-section	Fuse type	RCCB switch type
400V 3N ~ 50/60 Hz							
28 kW	40,58 A	50 A			5 x 10 mm²	B50-3	63 / 0.03 A (0.3A Thermo Extra)
32 kW	46,38 A	63 A				B63-3	
36 kW	52,17 A				5 x 16 mm²		
40 kW	57,97 A						
44 kW	63,77 A	80 A	50 kA	105 kA	5 x 25 mm²	NH 160 A	0.3A
48 kW	69,57 A						
52 kW	75,36 A	100 A					
56 kW	81,16 A				5 x 35 mm²		
60 kW	86,96 A						
64 kW	92,75 A	125 A					
72 kW	104,35 A				5 x 50 mm²		
80 kW	115,94 A	160 A					
88 kW	127,54 A				5 x 70 mm²		
96 kW	139,13 A						

min. conductor's cross-section in mm² is based on maximum length of 20 m.

2.5. Function elements of Thermo boilers

ThermoExtra

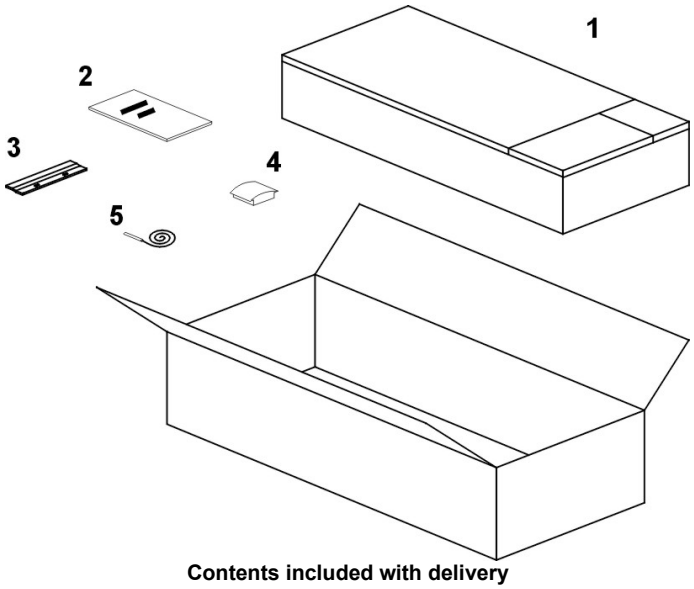


1. Primary flow
2. Return flow
3. External boiler jacket
4. Boiler
5. Heat insulation
6. Electrical heaters
7. Control panel
8. Inducers for el. Connections
9. Contactors
10. Charge and discharge valve

3. General requirements

3.1 Contents included in delivery

ThermoBlok and ThermoBlok PTV boilers are delivered pre-mounted in a package unit. Make sure that all parts have been delivered intact. For the exact list of parts see the figure and table below. If parts are damaged or missing, please consult our local sales office.



Contents included with delivery

Item	Quantity	Description
1	1	ThermoExtra boiler
2	1	Instructions for installation Instructions for use Electrical drawing Warranty card Pump's manual
3	1	Hanging bracket
4	1	External temperature sensor (optional)
5	1	Water cylinder temperature sensor (optional)

Table of contents included with delivery

Note:
Item 4 is only delivered with ThermoExtra option O or V. Item 5 is only delivered for ThermoExtra option V

3.2 Preliminary remarks

When connecting the appliance to the fixing wiring, the means for disconnection (MCB) must be incorporated in fixing wiring in accordance with the local wiring rules.

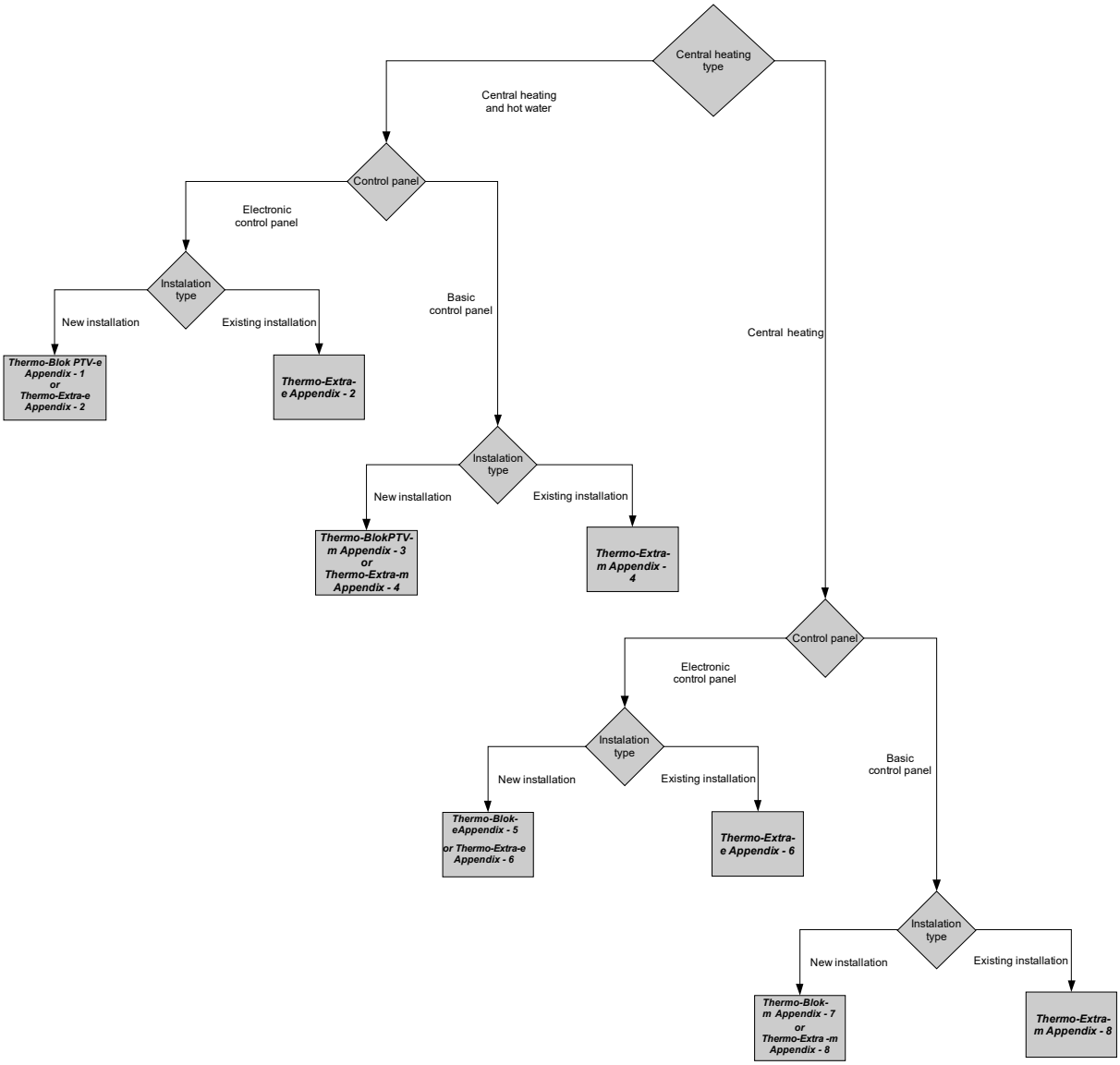
If safety valve 2.5 Bar is not located in the existing installation,a safety valve provided must be installed.

If boiler is not connected to room thermostat or boiler is out of function during winter time, there is a danger of installation freeze. In this case the should be filled with antifreeze liquid for central heating, if this is not possible water should be drained out of the system with the help of charge and discharge.

Recommended pressure of central heating installation is 0.15 Mpa (1.5 Bar), maximum pressure is 0.25 Mpa (2.5 Bar) and minimum 0.08 Mpa (0.8 Bar).

3.3. Recommendations for various installation types

Following flow chart is provided in order to help installers choosing the right type of boiler for desired installation type. At the end of each tree is the number of corresponding appendix. Each appendix consists of the following: the hydraulic drawing, a typical electrical drawing, the description of connection plate, the description of control panel, and the description of the complete central heating system.



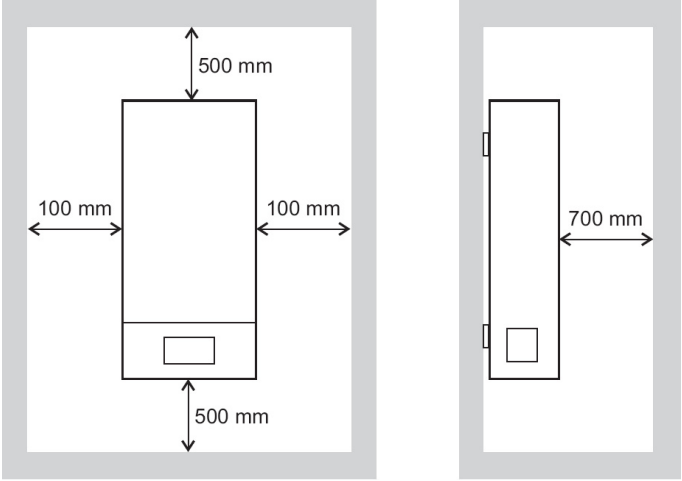
Note:
These installation samples should not be used as the detailed installation plan. Before installation observe the local regulations.

3.4. Installation site

3.4.1. Position of a boiler

The location must provide adequate space for servicing and air circulation around the boiler. The boiler may be installed in any room, although particular attention is drawn to the local regulations in respect to the installation of a boiler in a room containing a bath or a shower. The boiler must be mounted on a flat, vertical wall, which must be sufficiently robust to bear the weight of the boiler. The boiler may be installed on a combustible wall, subject to the requirements of the Local Authorities and Building Regulations.

Following figure shows the recommended minimal distances.



Minimal distances

It is possible to reduce recommended minimal distances, but the following requirements must be met:

- Power supply connection, located at the left bottom side of boilers must be accessible
- Bottom part of boiler must be accessible to allow change of heater
- Control panel on bottom side of boiler must be accessible
- Basic air circulation must be maintained

3.4.2. Power supply

The boiler is rated as a high-power appliance and fixed wiring must be used. Please observe chapter 2.4. about fuse and conductor requirements. When connecting the appliance to the fixing wiring the means for disconnection (MCB) must be incorporated in fixed wiring in accordance with the local wiring rules.

The house installation to which this device is connected must contain an electric differential protection switch (RCCB), which must be protected by the device itself. Also, the device must be protected from electrical overload and short circuit by selecting an element from the table in Chapter 2.4.

Note:
In some cases, additional measures must be taken, subject to the requirements of the Local Authorities.

Note:
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3.5. System requirements

3.5.1. Pipe work

Pipe work that is not a forming part of the useful heating surface should be insulated to help prevent heat loss and possible freezing, particularly where pipes are run through roof spaces and ventilated under floor spaces. Draining taps must be located in accessible positions, which permit the draining of the whole system including the boiler and the hot water system. All capillary joints in all DHW pipe work must be made with lead free solder.

3.5.2. Cleansing and flushing the system

Flushing of system is highly recommended, this will prevent damage to the appliance made by dirt from the system.

Particularly where a new boiler is to be fitted to an existing system, it is a good practice that the system is thoroughly cleansed.

To prevent the formation of deposits and to prevent serious damage to the appliance and system, cleansers must be used carefully and must be completely removed by thoroughly flushing the system. Cleansers should only be left in systems for the maximum of 24 hours.

3.5.3. Filling and preparing heating system

The system can be filled using the built-in filling valve or via a separate filling point fitted at a convenient position on the heating circuit. The connection must be removed when filling is completed. Where local Water Authority regulation does not allow temporary connection, a sealed system filler pump with break tank must be used. The heating system will not be filled automatically from the domestic hot water side.

Note:
For the heating system to operate properly the indicator of manometer must be between 1.2 and 1.5 bar when system is cold. It is very important to use soft water or fluids for central heating.

Do not fill the system with water from private source.

3.5.4. Pressure relief valve

A pressure relief valve is provided with the boiler. This safety device is required on all sealed C.H. systems and is preset at 2.5 bar and provided with a 15 mm compression connection for a discharge pipe, which must be of no less than 15 mm in diameter. The pressure relief valve must not be used for draining purposes.

3.5.5. Expansion vessel

ThermoExtra boilers are not equipped with an expansion vessel.

3.5.6. Circulating pumps

A circulation pump is not included in ThermoExtra boilers.
On the electrical switchboard mounted inside of ThermoExtra boilers, there are terminals prepared to pump connection (CH pump and/or DHW pump). *See electrical diagram for more details.*

4. Boiler installation sequence

4.1. Transporting the appliance

Important:
The following lift operation exceeds the recommended weight for a one-man lift.

General recommendations when handling
Clear the route before attempting the lift. Safe lifting techniques are used – keep back straight – bend using legs. Keep load as close to body as possible. Do not twist – reposition your feet. If 2 persons are performing the lift, ensure coordinated movements during lift. Avoid upper body/top heavy bending - do not lean forward/sideways. It is recommended to wear suitable cut resistant gloves with good grip to protect against sharp edges and ensure good grip. Always use assistance if required.

Positioning of Appliance for Final Installation
Fit bracket securely onto wall before lifting appliance into position. Ensure that stable balance is achieved and lift upwards to drop into place onto bracket. Ensure coordinated movements during a two-person lift to ensure equal spread of weight of load It is recommended to wear suitable cut resistant gloves with good grip to protect against sharp edges and ensure good grip when handling appliance.

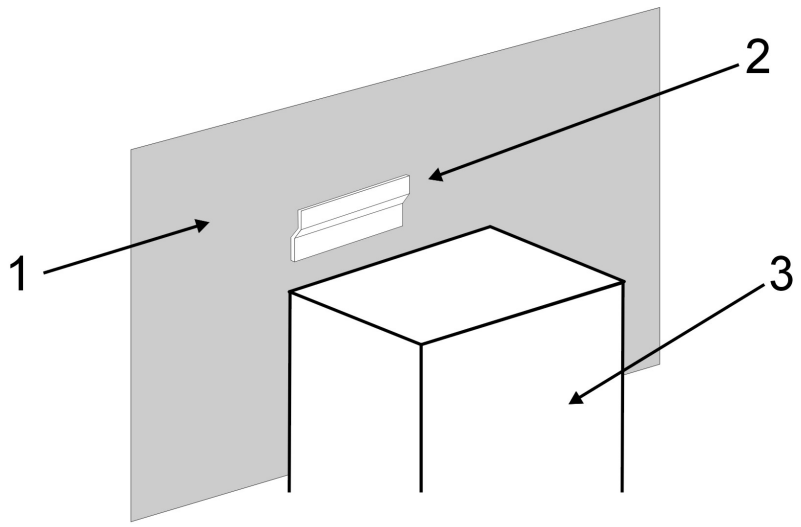
4.2. Select position for boiler

Refer to chapter **3.4.1.** for information regarding the appliance position. In general, the boiler must be positioned in such manner that:

- There is enough space around the boiler for service and maintenance
- There is no chance for boiler to be submerged into water
- There is no chance for boiler to be poured with significant amount of water
- Normal level of air circulation can be maintained
- All necessary pipe work can be connected

4.3. Fitting the boiler hanging bracket

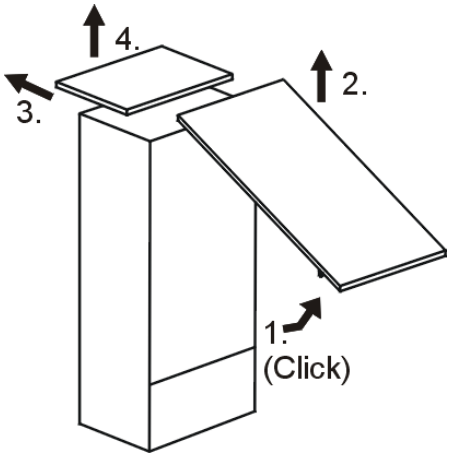
Fix the hanging bracket (2) to the wall (1) using the plugs and M8 or M10 screws. Lift up boiler (3) above hanging bracket (2), gently lean it to the wall (1) and slide it down to the hanging bracket (2).



Wall mounting

Note:
If the boiler is to be fitted in a timber framed building ensure that the bracket is secured to a substantial part of the timber frame capable of bearing the weight of the boiler.

4.4. Removing/fixing the front and top case



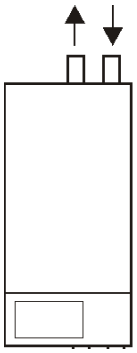
Grasp the front case by its sides, pull it towards the front and remove it by lifting it of the unit, push top cover towards back and lift it of the unit.

4.5. Pipe work connection

Note:
Observe chapter 3.5. for the system requirements before proceeding.
System flushing is necessary in order to prevent damage to appliance.

It is recommended to fit valves on flow and return pipe work in order to enable easy disconnection/separation of boiler from the central heating system.

The following figure indicates flow and return for the central heating on ThermoExtra boilers.



Flow and return on ThermoExtra boilers

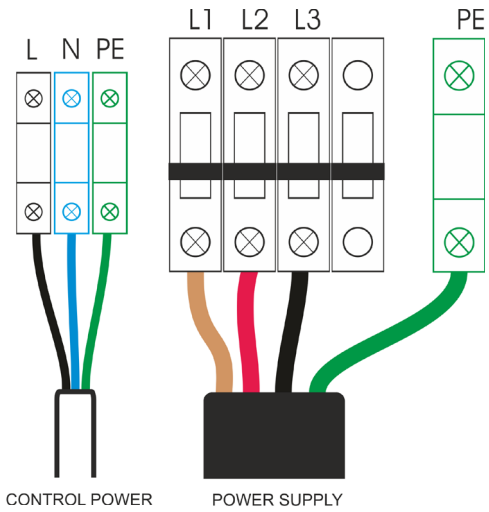
4.6. Power supply connection

Note:
Before working on the boiler, turn off the power (e.g. MCB, switches) and secure against accidental switching on. Tightening torque for MCB is 2.0 Nm.

A boiler is rated as a high power appliance and fixed wiring must be used. Please observe chapter 2.4. about fuse and conductor requirements. When connecting the appliance to the fixing wiring, the means for disconnection (MCB) must be incorporated in fixing wiring in accordance with the local wiring rules.

This device must be earthed.

Power connection (main power terminals):



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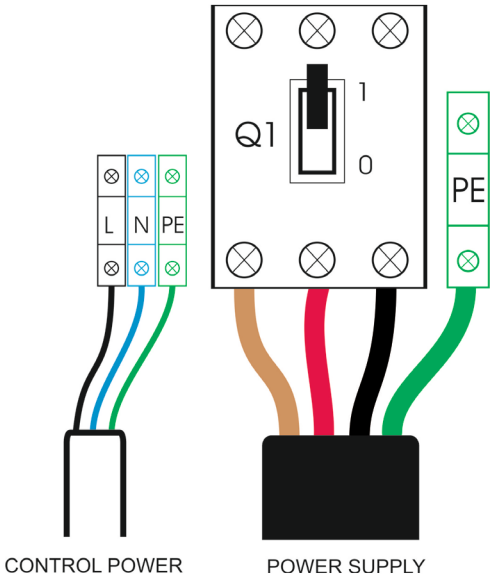


Thermo Extra 44 - 96kW

Connection way to the main power terminal may be vary depending on elements installed inside the boiler.

Note:
The power cable of the intersection from Ø6 mm to Ø21 mm must be connected with the bottom of the boiler, with the help of a special introducetor (located on the boiler).
All wires inside the electrical connection place must be tighted.

Pay attention when connecting the power cable so that the phase conductor is not mistakenly connected to the remote shunt release marked by "-KF11", to the right of the MCB.

4.7. Connecting temperature sensors or external electrical controls

4.7.1. Accessing sensor terminals

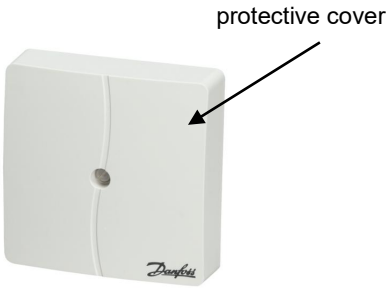
In order to access sensor terminals, main and control power supply must be disconnected.
After power supply is disconnected remove front panel according to chapter 4.4.

4.7.2. Connecting external temperature sensor

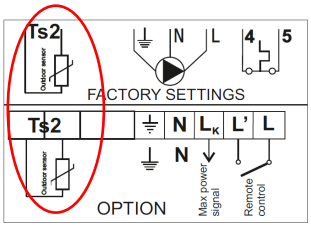
This is applicable only to Thermo Extra boilers with option "O" and "V" control panel upgrades

External temperature sensor (delivered with boiler) must be fitted in such manner that it is not affected by sudden temperature changes (exposure to direct sunlight). When fitting sensor please observe the arrow marking top position (it can be seen when protective cover is removed).

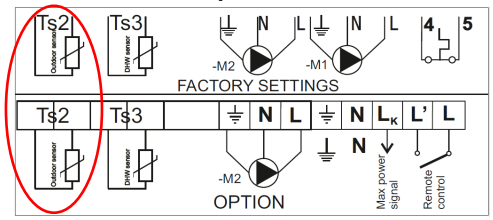
Connector for outdoor temperature sensor has factory mounted resistor for testing boiler at -13ºC. After installation and initial testing, resistor must be removed and wires from external temperature sensor must be connected.



External temperature sensor



Label below terminals on switchboard – option O



Label below terminals on switchboard – option V

Note:

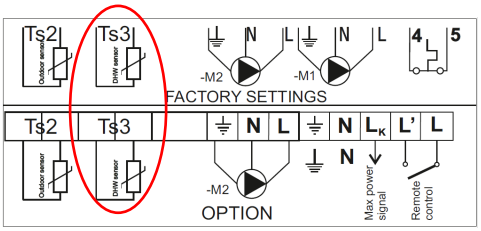
For connecting external temperature sensor two-wire cable can be used, of diameter from 0.6mm^2 to 1.5 mm^2.

4.7.3. Connecting domestic hot water temperature sensor

This is applicable only to Thermo Extra boilers with optional "V" control panel upgrade

Domestic hot water temperature sensor (delivered with the boiler) must be fitted in such manner that reading of correct cylinder temperature is ensured. Water cylinder usually has a spot provided for inserting temperature sensor. If this is not the case temperature sensor must have contact with metal part of the cylinder (under the insulation).

Water Cylinder temperature sensor

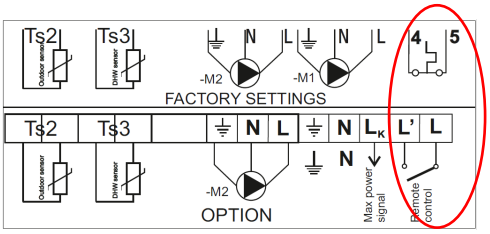


Label below terminals on switchboard – option V

Note:
For connecting water cylinder temperature sensor, two-wire cable of diameter from 0,6mm^2 to 0,75 mm^{2}can be used

4.7.4. Connecting room thermostat and time switch

The terminals 4, 5 on user environment of switchboard are predicted for connecting room thermostat or other external control unit (like Danfoss TP9). Terminals 4 and 5 are linked together factory. If external control unit is used this link must be removed.



Label below terminals on switchboard – option V

Note:
For more details see selected appendix from chapter 3.3.

4.8. Filling the heating system

For the heating system to operate properly the indicator of pressure gauge must be between 1.2 and 1.5 bar when the system is cold. It is very important to use soft water or fluids for central heating.

5. Commissioning

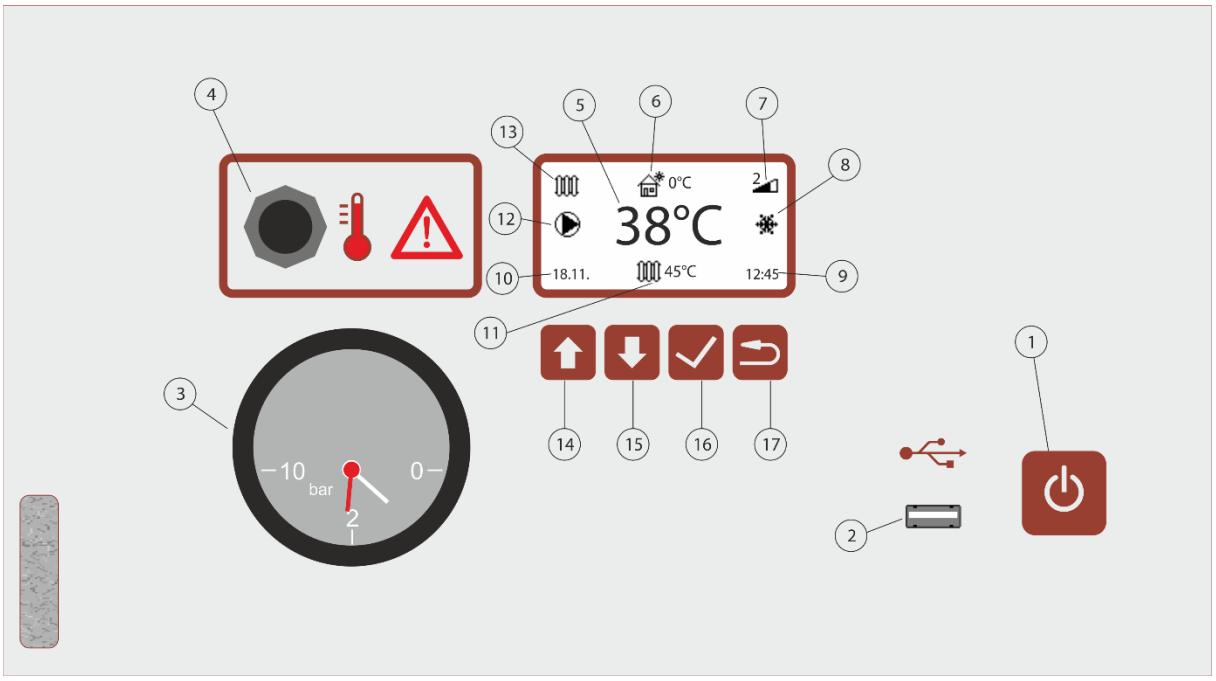
5.1. Central heating system check

Check for pressure in the system, it should be from 1.2 to 1.5 bar when the system is cold. Vent all heating elements and installation.

5.2. Preliminary electrical check

- Check if power cable is tightened on terminals
- Check the presence of each phase on MCB input terminals inside boiler
- Measure exact voltage between L1 – L2, L1 – L3, L2 – L3, L1 –N. If there is no voltage between any combinations of phases one phase is missing and the heating elements inside the appliance can be damaged. If the voltage between phases is 10% higher than nominal voltage of the appliance, the appliance itself can be damaged
- Check if fixed wiring system is used and that overcurrent protection device is installed, and conform to chapter 2.3. or 2.4.
- Check if the used power cable conforms to chapter 2.3 or 2.4
- Test the overheating system as described in appendix 9

5.3. Graphic control panel (all options)

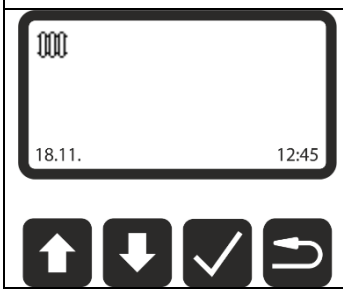


Number	Description
1	ON / OFF switch
2	USB port for service access
3	Pressure gauge
4	Cutout thermostat with manual deactivation
5	Current temperature in boiler
6	External temperature, visible only if external temperature sensor is installed and enabled
7	Number of active heating steps
8	Boiler is running in anti-frost protection mode
9	Current time
10	Current date
11	Active mode and desired temperature - Radiator heating - Underfloor heating - Domestic hot water cylinder heating, (*option "Z"*)
12	- Cental heating pump is active

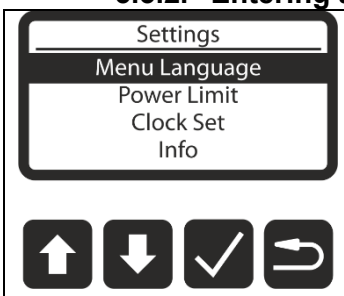
	- Domestic hot water cylinder pump is active (*option "Z"*)

13	Enabled modes - Radiator heating - Underfloor heating - Radiator and domestic hot water heating - Underfloor and domestic hot water heating
14	Multifunction key • Home screen with heating curves disabled, used to change desired temperature • Home screen with heating curves enabled, used to offset current curve • Inside menu, used for menu navigation and changing values
15	Multifunction key • Home screen with heating curves disabled, used to change desired temperature • Home screen with heating curves enabled, used to change desired temperature • Inside menu, used for menu navigation and changing values
16	Multifunction key • Home screen, press 5 seconds for user menu • Inside menu, used for selecting menu items and confirming values
17	Escape key

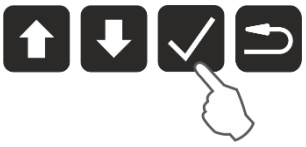
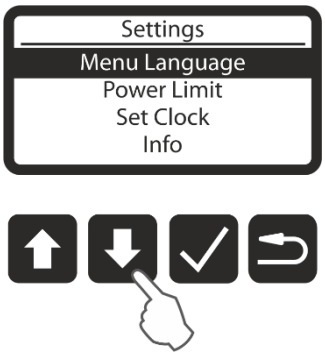
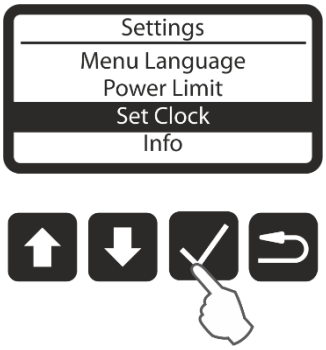
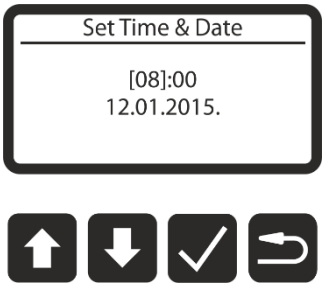
5.3.1. Control panel display

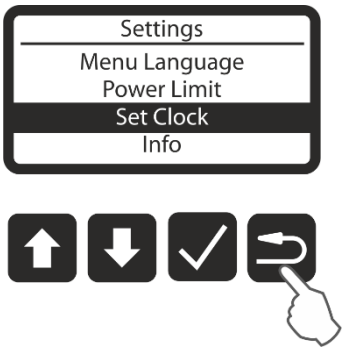
	Active mode
	Stand-by mode

5.3.2. Entering and navigating user menu

	Press and hold for 5 seconds to enter user menu. Press and to navigate through options and set desired value. Press to select option and confirm values. Press to exit either from menu or option inside menu.

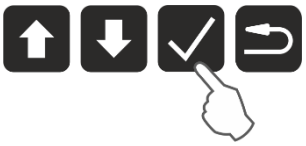
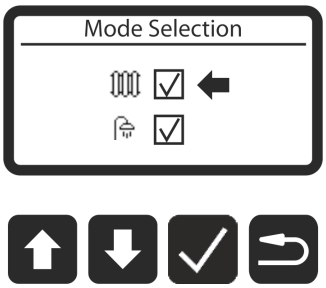
5.3.3. Example how to change date and time

	Press and hold for 5 seconds to enter user menu.
	Press in order to navigate to “Clock Set” menu option.
	Press to enter “Clock Set” option.
	Press and to change value. Press for next value. When time and date are set press for returning to user menu.

	Press for exiting user menu.

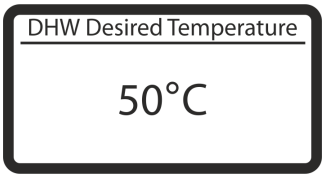
5.3.4. Selecting active modes

Available only with option V.

	Press to access list of operating modes.
	Press and to navigate through modes. Press to activate ☑ or deactivate ☐ mode. Press to exit “Mode Selection”.

5.3.5. Selecting domestic hot water temperature

Available only with option V.

	Press to enter mode.
	Press and to set desired domestic hot water temperature. Press to accept selected value, or to exit without change.

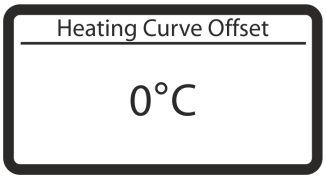
5.3.6. Temporary override heating curves (Turbo Mode)

Available only with external temperature sensor enabled.

	Press and hold for 5 seconds to enter mode. Press and to set desired fixed temperature in boiler. Press to activate mode, or to exit without change.
	When activated 0°C will blink. Mode is automatically deactivated when desired room temperature is reached.

5.3.7. Offsetting Heating curve

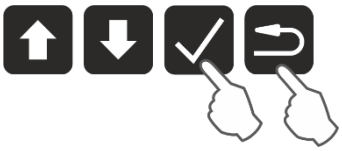
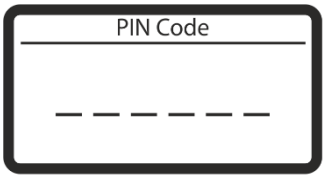
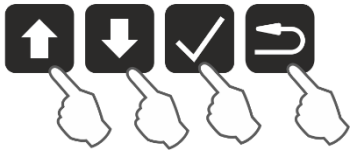
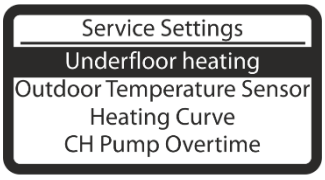
Available only with external temperature sensor enabled.

	Press to enter mode.
	Press and to set desired curve offset. Press to accept selected value, or to exit without change.

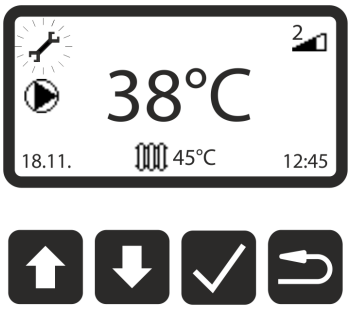
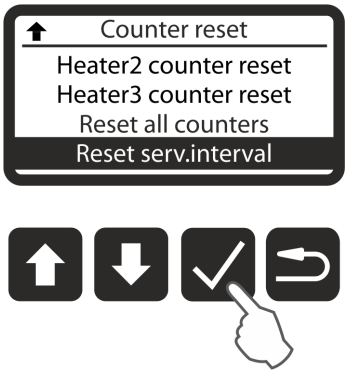
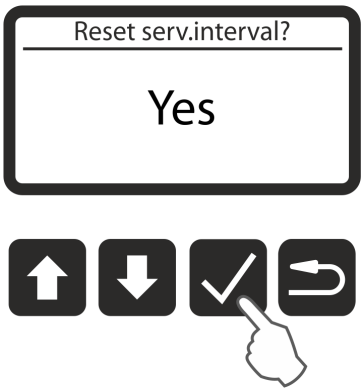
5.3.8. User menu options

Menu Language	Select language for menus and messages
Power Limit	Limit boiler's power stages refer to table *2.3 Power stages* for more details.
Clock Set	Set time and date.
Info	Display various information about boiler, including serial number, software version and counters for heating groups.

5.3.9. Entering and navigating service menu

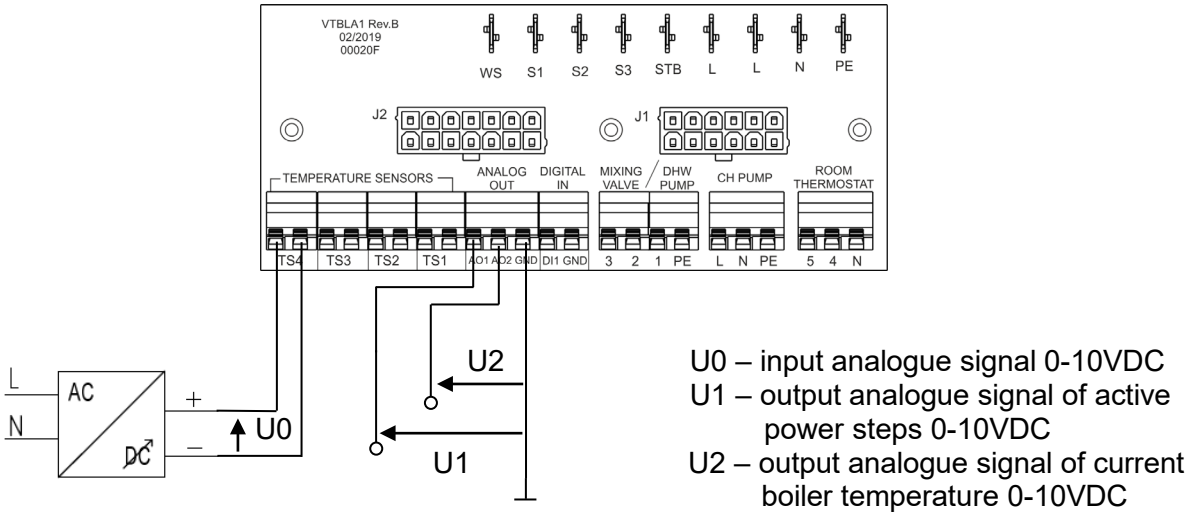
	Press and hold ✓ and ↩ simultaneously for 5 seconds to enter service menu.
 	Enter service PIN by pressing combination of keys ↓, ↑, ✓ and ↩. Service PIN is available for Number related to each key: ↓ - 1 ↑ - 2 ✓ - 3 ↩ - 4
 	Press ↓ and ↑ to navigate through options and set desired value. Press ✓ to select option and confirm values. Press ↩ to exit either from menu or option inside menu.

5.3.10. Reset service interval

	When time for service declared by manufacturer expires, service symbol will blink.
	Navigate to “Reset serv.interval” and press to reset option.
	Choose “Yes” and press to reset service interval to default value.

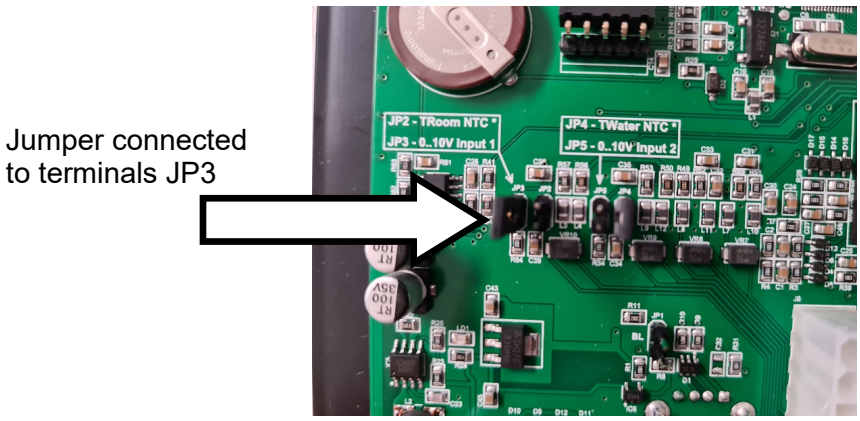
5.4. Control mode (0-10V analogue signal)

5.4.1. Connection to PCB

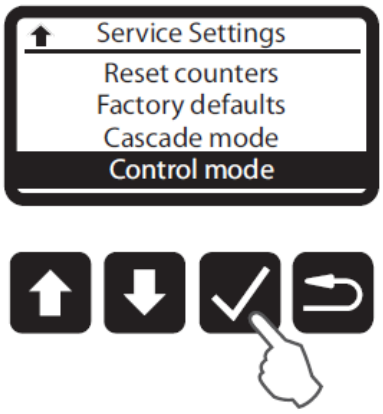
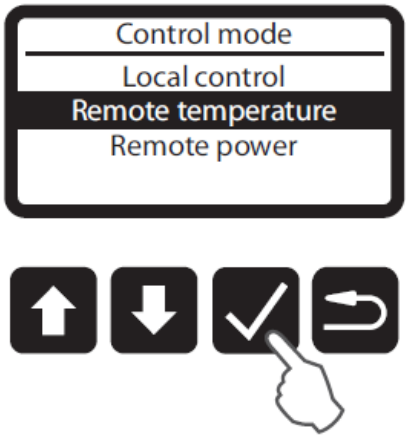


5.4.2. Remote control settings

The first condition to enable remote control is connect jumper to terminals JP3 on control panels back. If jumper is connected to JP2, it's necessary to move him to JP3, and JP2 must be unconnected, as shown on picture below.



After the jumper is connected to JP3 terminals, remote control is enabled and it's necessary to select desired mode from service menu, as shown in the further instructions.

	Enter service menu and navigate to “Control mode” then press ✓ to enter control mode menu.
	Navigate to desired option, then press ✓ to select mode.

5.4.3. Remote control instructions

If remote control is activated, all local functions as temperature or power stages adjustment will be disabled.

Available modes:

1. **Local control** – remote control disabled. Local control of desired temperature and power limit

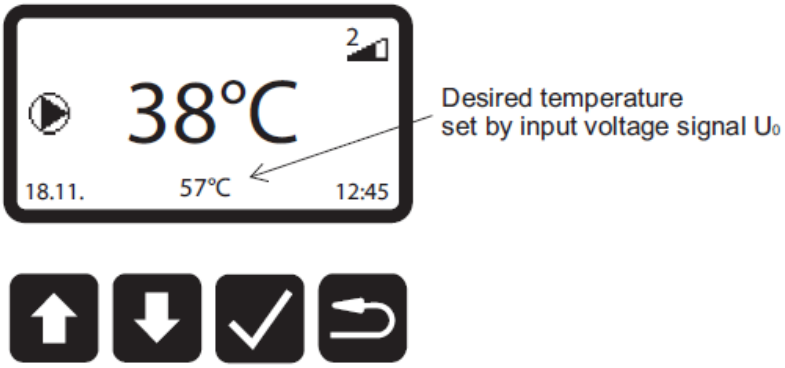
2. **Remote temperature** – remote control of desired boiler temperature by using analogue signal in range of 0-10VDC.

The input signal range (0-10VDC) is approximated to desired temperature in range of 0ºC to 100ºC, according to formula below.

$$U_0 = 10V * \frac{T_D}{100^0C}\ [V]$$

U_0 – input direct voltage signal [V]
T_D – desired boiler temperature [^{O}C]

Boiler will be inactive until input signal value is greater than value which corresponding to set minimum boiler temperature, and operation is enabled only in range between set minimum and maximum temperature.



Remote temperature control

3. **Remote power** – remote control of active power steps by using analog signal in range of 0-10VDC

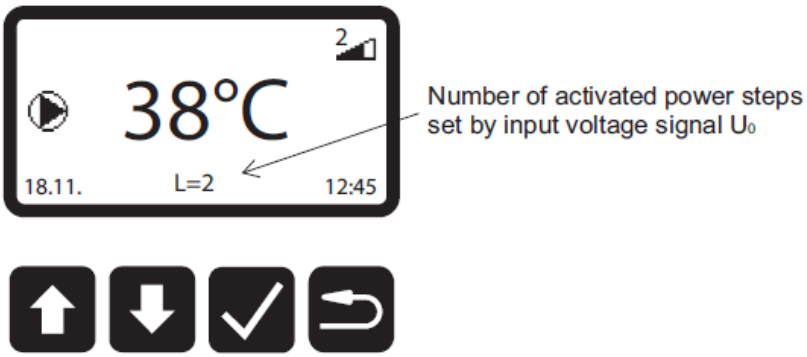
The input signal range (0-10VDC) is approximated to power steps in range regarding to minimum and maximum values according to formulas below:

$$U_{0min} = 10V * \frac{L_D}{1 + L_M}\ [V] \quad ; \quad U_{0max} = 10V * \frac{L_D + 1}{1 + L_M}\ [V]$$

U_{0min} – minimum value of input direct voltage signal [V]
U_{0max} – maximum value of input direct voltage signal [V]
L_D – desired number of active power steps
L_M – maximum number of power steps depending on type of boiler (3, 7 or 15)

Value of input signal must be in range of U_{0min} and U_{0max} for desired power steps.

In this mode boiler will run according to set power limit, adjusted by input voltage value, until boiler reaches maximum set temperature. It's not allowed to set desired temperature in this mode.



Remote power control

5.4.4. Analog output signals

According to picture from chapter 5.6.1., two output signals are used.

AO1 – analog signal of active power steps (0-10VDC)

The output signal value is approximated to currently active number of power steps.
Number of active power steps corresponding to measured output value according to formula below:

$$L = L_M * \frac{U_1}{10V} \; [\,°C]$$

U_1 – output direct voltage signal value [V]
L – number of active power steps
L_M – maximum number of power steps depending on type of boiler (3, 7 or 15)

AO2 – analog signal of current boiler temperature (0-10VDC)

The output signal value is approximated to current temperature in range of 0ºC to 100ºC.
Current temperature corresponding to measured output value according to formula below:

$$T_b = 100°C * \frac{U_2}{10V} \; [\,°C]$$

U_2 – output direct voltage signal value [V]
T_b – current boiler temperature [^{O}C]

5.5. Service menu options

Option	Description	Availability
Underfloor heating	Switch off or on underfloor heating. Switching underfloor heating on or off will reset Heating Curve, heating minimal and maximal temperature to factory defaults. **Default: Off**	All control panels
Outdoor Temperature Sensor	Switch on or off use of external temperature sensor. When on Heating Curves will be used to calculate boiler temperature. **Default: On**	Options O, V
Heating Curve	Select heating curve for underfloor or radiator heating. **Default for radiator heating: 1.5** **Default for underfloor heating: 0.6**	Options O, V
CH Pump Overtime	Set time in seconds central heating pump will run after room temperature has been reached. **Default: 60 seconds**	All control panels
DHW Pump Overtime	Set time in seconds, domestic hot water pump will run after temperature in cylinder has been reached. **Default: 60 seconds**	Option V
Stand-by Temperature	Minimal temperature that will be maintained inside boiler when in standby. **Default: 15 °C**	All control panels
CH Minimal Temperature	Limit minimal temperature in boiler that can be calculated by heating curves. **Default for radiator heating: 40 °C** **Default for underfloor heating: 15 °C**	All control panels
CH Maximum Temperature	Limit maximum temperature in boiler that can be calculated by heating curves. **Default for radiator heating: 80 °C** **Default for underfloor heating: 40 °C**	All control panels
Stage turn-on delay	Time delay between power steps activation.	All control panels
Set Date&Time	Set time and date	All control panels
Manual Pump Run	Using this option pump controlled by boiler can be started manually. During manual pump run heaters are switched off. This option is useful for manual venting of heating system.	All control panels

Reset Counters	Reset counters for heating groups. Counter information is displayed in *User Menu -> Info*	All control panels
Reset service interval *(Service Menu -> Reset Counters -> Reset serv.interval)*	Reset service interval to factory defaults. **Default:** - 12 months (home used boilers) - 6 months (industrial used boilers)	All control panels
Apply Factory Settings	- Reset control panel to factory settings	All control panels
Cascade mode	Without central heating pump. Maximum power signal.	All control panels
Control mode	Desired temperature or power remote control by using 10V analog inputs.	Optional

6. Periodic checking

We recommend the inspection of the device once a year by the authorized service provider (before heating season). This service is not included in the warranty. **During the inspection all electric and water connections should be tightened, the system should be vented and – if necessary – filled up, valves and general functionality of the device should be checked.**

Safety thermostat – we recommended to check safety thermostat before every heating season by heating up the sensor with heating fan or lighter over 110°C must actuate overheating protection by switching off the main MCB or disconnection switch inside the boiler.

Safety valve should be checked once a year (before the beginning of heating season) to ensure proper functioning and avoiding appearance of water calculus.

If the boiler is not connected to the room thermostat or if the boiler is out of function during the winter time, there is a danger of installation freezing.
In this case the system should be filled with antifreeze liquid for central heating, and if this is not possible water should be drained out.

Cleaning:

It is not permitted to use aggressive media (e.g. gasoline, kerosene or solvent) for cleaning the product. Media for cleaning plastics or dishwashing media can be used for the external shell and decorative cover. Control panel should be cleaned with dry or moist cloth (not wet).

7. Survey of possible malfunctions and irregularities in operation

7.1. General list

MALFUNCTION	***CAUSE***	***ELIMINATION***
- there is no voltage on the control panel at switching on	- there is no power supply from the power net on one or more phases - fuse 100mA on the control panel is burned through - there is no control power	- replace fuse 100mA and check the cause of burning - **contact authorized service personnel to resolve the problem**
- By switching on, the switches on the control panel display the voltage, but the boiler does not heat	- check the adjustment of the room thermostat, - limiting thermostat is activated - indicator of air presence in the boiler blocked the operation, - defective switch, - heaters are burned through	- check the set temperature on the room thermostat, replace batteries, or the room thermostat is faulty, - vent the boiler in order to turn off the lamp “air in boiler”
- temperature in boiler is on desired value, but radiators do not heat	- circulation pump does not operate, - air stopper on central heating installation prevents circulation	- vent installation
- boiler does not provide enough heat	- one phase is missing on supply - a part of heater is burned through - in a three-phase system the three different phases are not brought to the boiler	- check fuses on the main panel, - **contact authorized service personnel to resolve the problem**
- the switcher can be heard while operating (it buzzes) radio and TV-interferences	- poor voltage in the net - defective relay	- **contact authorized service personnel to resolve the problem**
- boiler in operation “roars”	- the system is not well vented, - defective heater	- vent the system - **contact authorized service personnel to resolve problem**
- pressure in the system varies	- defective expansion vessel, - the vessel pressure is too low or too high	- **contact authorized service personnel to resolve the problem**
- the actual temperature in the boiler is higher than the desired temperature and the safety thermostat is activated	- defective relays	- **contact authorized service personnel to resolve the exact source of the problem**
- RCCB switch disconnects (in home fuse box)	- defective heater, - humidity on conductors, - safety thermostat is activated	- check leakage, - **contact authorized service personnel to resolve the exact source of the problem**

- MCB cannot be reset	- safety thermostat is activated	- pre-reset safety thermostat and then the MCB switch - **contact authorized service personnel to resolve the exact source of the problem**

7.2. List of errors

MALFUNCTION	***CAUSE***	***ELIMINATION***
Air in Boiler	Air is present inside boiler's reservoir and heating is not active. Even if boiler is equipped with automatic venting valve, manual venting is advisable if large amount of air is present inside reservoir. When boiler is properly vented error will be automatically dismissed and boiler will continue with normal operation.	- vent installation - **contact authorized service personnel to resolve the problem**
Low Mains Voltage	Power supply voltage is below 175 V per phase. Heating is not active in order to protect contactors / power relays. When power supply voltage raises above 185 V per phase error will be automatically dismissed and boiler will continue with normal operation.	- check power supply voltage - **contact authorized service personnel to resolve the problem**
Boiler Temperature Sensor open	Boiler's temperature sensor is not properly connected. When sensor is operational, error will be automatically dismissed and boiler will continue with normal operation.	- check sensor wiring - **contact authorized service personnel to resolve the problem**
Boiler Temperature Sensor shorted	Boiler's temperature sensor is not properly connected or short circuit is present on sensor's wiring. When sensor is operational, error will be automatically dismissed and boiler will continue with normal operation.	- check sensor wiring - **contact authorized service personnel to resolve the problem**
Outdoor Temperature Sensor open	Outdoor temperature sensor is not properly connected. When sensor is operational, error will be automatically dismissed and boiler will continue with normal operation.	- check sensor wiring - **contact authorized service personnel to resolve the problem**
Outdoor Temperature Sensor shorted	Outdoor temperature sensor is not properly connected or short circuit is present on sensor's wiring. When sensor is operational, error will be automatically dismissed and boiler will continue with normal operation.	- check sensor wiring - **contact authorized service personnel to resolve the problem**

DHW Temperature Sensor open	Domestic hot water cylinder temperature sensor is not properly connected. Check sensor's wiring. When sensor is operational, error will be automatically dismissed and boiler will continue with normal operation.	- check sensor wiring - **contact authorized service personnel to resolve the problem**
DHW Temperature Sensor shorted	Domestic hot water cylinder temperature sensor is not properly connected or short circuit is present on sensor's wiring. Check sensor's wiring. When sensor is operational, error will be automatically dismissed and boiler will continue with normal operation.	- check sensor wiring - **contact authorized service personnel to resolve the problem**
Overheating	Safety thermostat is activated.	- Wait until temperature inside the boiler drops below at least 90ºC, reset safety thermostat and switch on miniature circuit breaker –F11 inside the boiler. - **contact authorized service personnel**
38°C 18.11. 45°C 12:45	Blinking of service symbol indicates that time for service declared by manufacturer has expired.	- make service on the boiler - reset service interval after performing the boiler service - **contact authorized service personnel**

Possible malfunctions – graphic control panel

After reseting the thermal fuse, make sure the MCB or disconnection switch inside the boilers is switched on.
The control and energy power circuits are separated and the boiler control can be active if energy part is disfuncioned.