



## *ELECTRIC BOILERS FOR CENTRAL HEATING*

# **Thermo Blok Thermo Extra Thermo Blok PTV**

### *INSTRUCTIONS FOR INSTALLATION*

#### **Please note**

- This manual covers 3 types of boilers

**Thermo Blok** is a heating boiler with fitted circulation pump and system expansion vessel.

**Thermo Extra** is a heating boiler - no circulation pump - no expansion vessel.

**Thermo PTV** - 2 pumps and expansion vessel ( 1 for space heating and 1 for water heating in separate cylinder)

**Please look at the information relating to your specific boiler requirements**



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## 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 3.3, page 17.
- 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 and ThermoBlok are economical central heating boilers that may be used as an independent or additional source of heat.

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ThermoExtra and ThermoBlok 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 boilers are manufactured only with upper connections. Temperature operation area is from 20 °C to 90 °C.

ThermoExtra and ThermoBlok 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

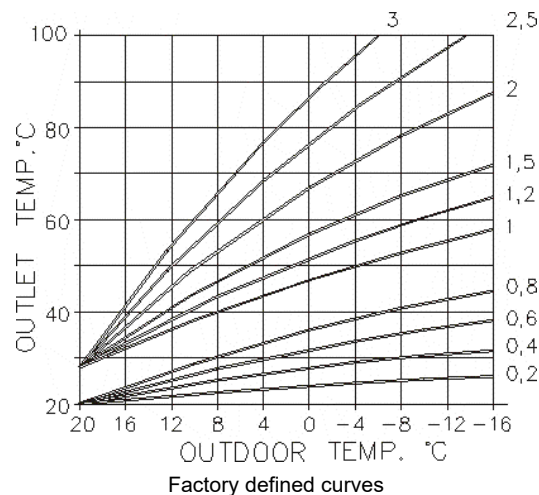
Use of heating curves, temperature compensation, is limited to Thermo Extra boilers with options **C** and **W**, Thermo Blok boilers with option **C** and Thermo Blok PTV boilers.

### 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.



**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.

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#### 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.

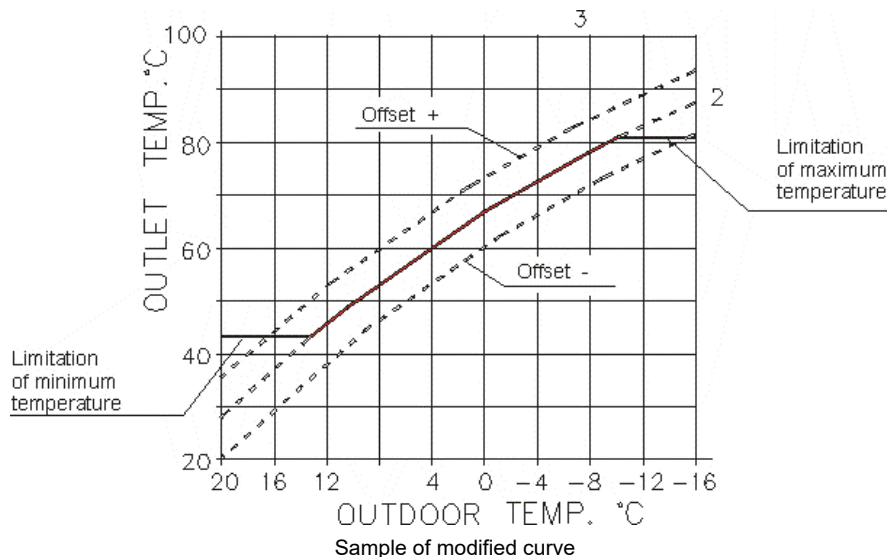
**Experience has shown the following (for the average building quality): when the temperature of water for heating changes from 5 to 7°C that will change the room temperature by approximately 2°C.**

**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
<b>Factory settings</b>	<b>1,5</b>	<b>0</b>
<b>Room temperature is too low</b> if the external temperature is <b>above + 5°C</b>	Change with the first lower curve	Add with offset + 6°C
<b>Room temperature is too low</b> if the external temperature is <b>between + 5°C and - 5°C</b>	Leave the curve 1,5	Add with offset + 3°C
<b>Room temperature is too low</b> if the external temperature is <b>below - 5°C</b>	Change with the first higher curve	Leave offset 0°C
<b>Room temperature is too high</b> if the external temperature is <b>above + 5°C</b>	Change with the first higher curve	Lower with offset - 6°C
<b>Room temperature is too high</b> if the external temperature is <b>between + 5°C - 5°C</b>	Leave the curve 1,5	Lower with offset - 3°C
<b>Room temperature is too high</b> if the external temperature is <b>below - 5°C</b>	Change with the first lower curve	Leave offset 0°C



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* (fall, 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 90°C, and we suggest lowering it at approximately 80°C. 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 prepare hot water in separate water storage with heat exchanger by using the Thermo Extra boilers with options W, and ThermoBlok PTV boilers.

#### 1.5.2. Description

Domestic water conditioning has a preference order over central heating. At the moment of signaling the need for warming up the domestic water container by the domestic water temperature sensor, the circulation pump of central heating is switched off and the circulation pump for domestic water conditioning 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).

Circulation pump for domestic water conditioning supplies container 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, either floor or radiators heating, 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).



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

Circulation pump for domestic water conditioning 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 water conditioning is longer than 30 min., especially if the desired temperature of domestic water tank is not reached within 30 min., the process will be automatically interrupted and it switches to the heating regime, which in this case lasts for at least 30 min.

## **1.6. Frost protection**

### **1.6.1. Availability**

Frost protection, as boiler's function, is limited to ThermoExtra boilers with options **E**, **C** and **W**, ThermoBlok boilers with option **E** and **C** and ThermoBlok PTV boilers. In the case of other versions of boilers frost protection can be provided by the usage of appropriate room thermostat. When frost protection is controlled by room thermostat, please consult room thermostat manuals for more details.

Following topics explain how frost protection is working when it is a boiler controlled function (options C,W).

### **1.6.2. Domestic water**

If the boiler is on for supply and only warm water conditioning is on or only heating or both, the protection from freezing of water in warm water container switches on automatically when the temperature sensor of warm water container 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 warm wear container temperature to 7°C.

### **1.6.3. Central heating**

If the boiler is on for supply and heating or both (heating and warm water conditioning) 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.

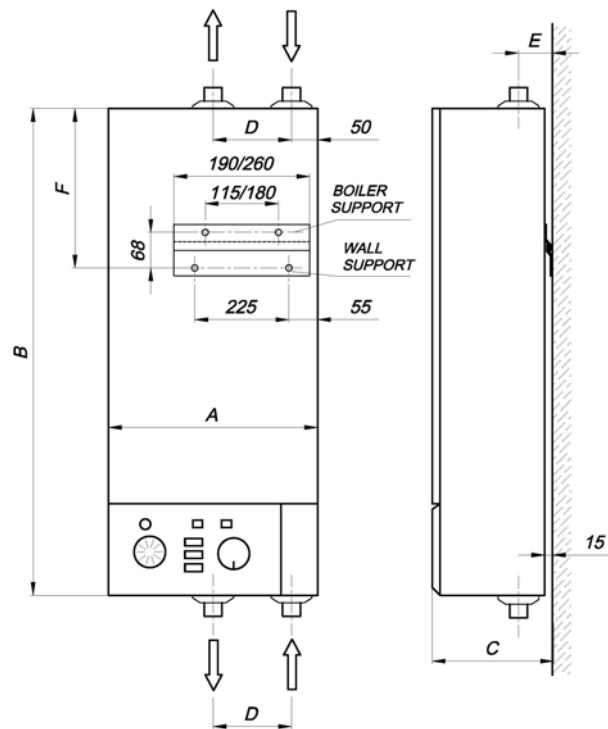
In this case, domestic water conditioning has priority.

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

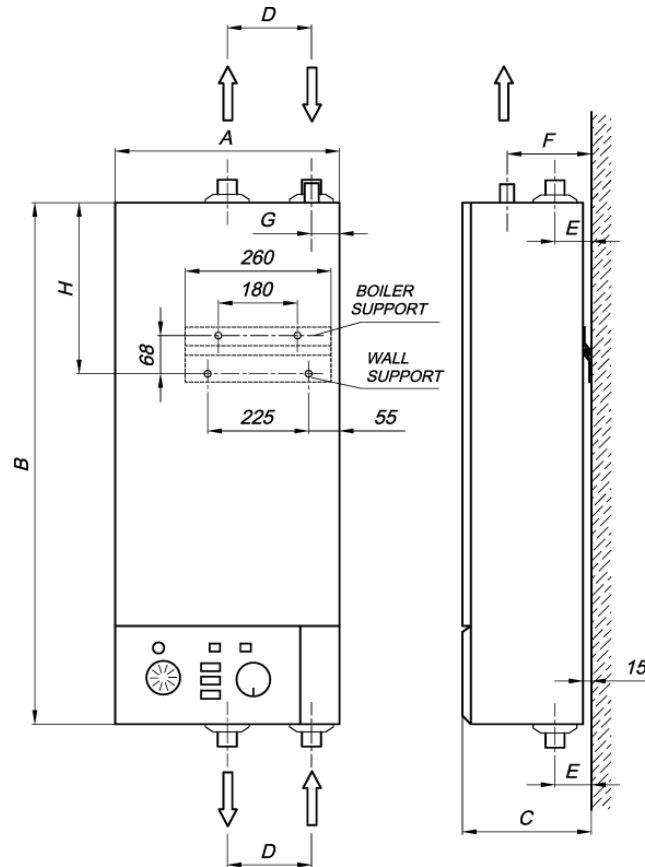
#### THERMOBlok



#### TECHNICAL DATA FOR ThermoBlok BOILERS

Power kW	Capacity Lit.	Expansion vessel L/bar	Dimensions mm	Weight kg	Maximum operating pressure MPa (bar)	Pipes BSP male	Power supply
6	6	8 / 0.8	A	330	40	3/4"	400V 3N ~ 50/60 Hz
9			B	930			
12			C	290			
14			D	100			
16			E	65			
18	10	10 / 0.8	A	400	0,25 (2,5)	1"	
20			B	930			
22			C	290			
24			D	150			
28	22	12 / 0.8	A	474	53	1"	
32			B	930			
36			C	290			
40			D	226			
			E	65			
			F	305			

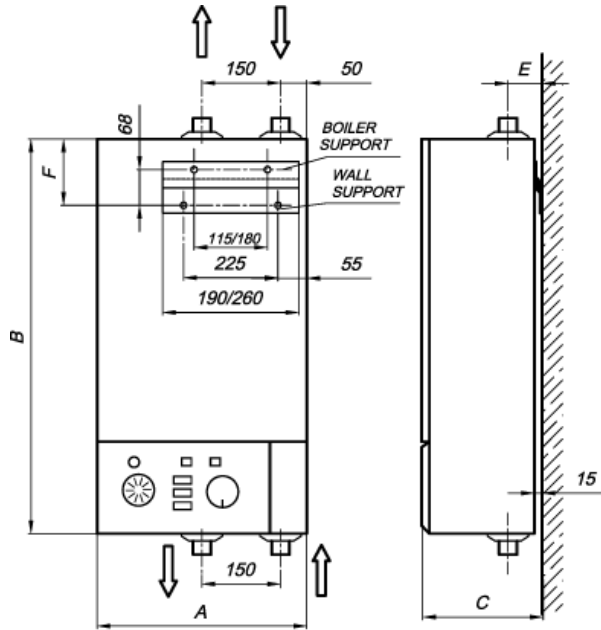
## ThermoBlok PTV



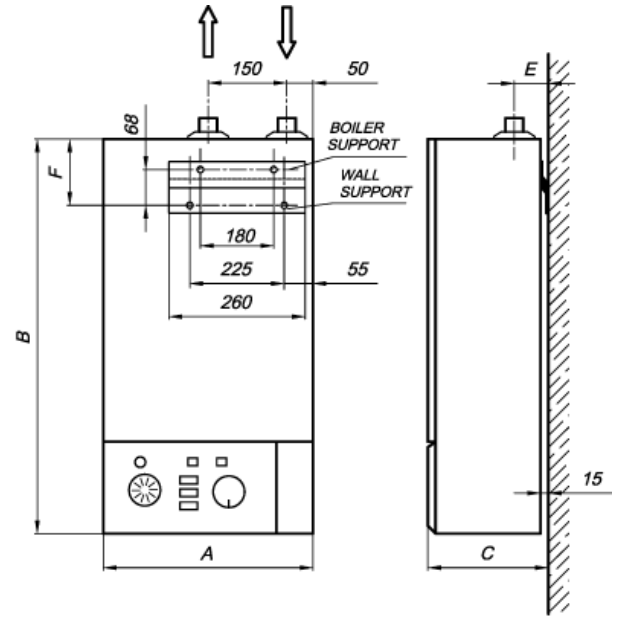
### TECHNICAL DATA FOR Thermo Blok PTV BOILERS

Power kW	Capacity L.	Expansion vessel L/bar	Dimensions mm	Weight kg	Maximum operating pressure MPa (bar)	Pipes BSP male	Power supply
6	10	8 / 0.8	A 400	48	0.25 (2.5)	3/4" DHW cylinder 1" heating	400V 3N ~ 50/60 Hz
9			B 930				
12			C 290				
15			D 150				
18		10 / 0.8	E 65				
22			F 150				
24			G 50				
28	22	12 / 0.8	A 480	55			
32			B 930				
36			C 290				
			D 226				
40			E 65				
	F 150						
	G 50						
	H 305						

## ThermoExtra



BOILERS 4,5 - 24 kW



BOILERS 28 - 96 kW

### TECHNICAL DATA FOR ThermoExtra BOILERS

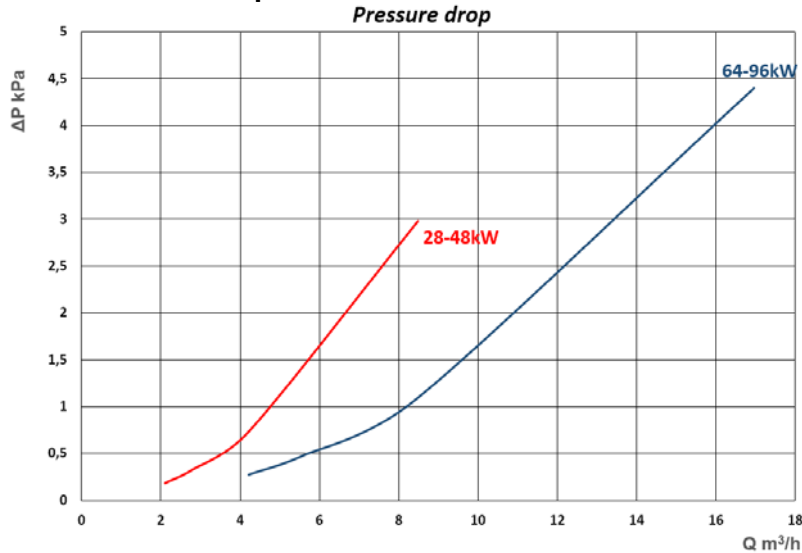
Power kW	Capacity Lit.	Dimensions mm	Weight kg	Maximum operating pressure MPa (bar)	Pipes BSP male	Power supply
6	6	A 330 B 750 C 230 D 100 E 57 F 126	26	0.25 (2.5)	3/4"	400V 3N ~ 50/60 Hz
9						
12						
14						
16						
18	10	A 400 B 750 C 230 D 150 E 57 F 126	32		1"	
22						
24						
28	19	A 400 B 930 C 310 D 162 E 115 F 109	45		1 1/2"	
32						
36						
40						
44						
48						

## TECHNICAL DATA FOR ThermoExtra BOILERS

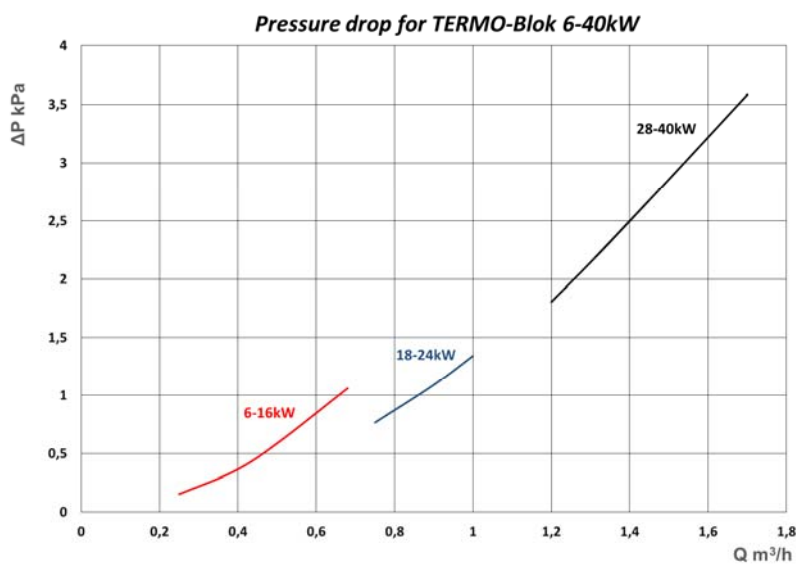
Power kW	Capacity Lit.	Dimensions mm	Weight kg	Maximum operating pressure MPa (bar)	Pipes BSP male	Power supply
52	19	A 400	45	0.25 (2.5)	1 1/2"	400V 3N ~ 50/60 Hz
56		B 930				
60		C 310				
		D 162				
64	32	A 550	72		2"	
72		B 930				
80		C 310				
88		D 316				
96		E 115				
		F 175				

## 2.2 Hydraulic pressure drop and recommended flows

### 2.2.1. Pressure drop for ThermoExtra

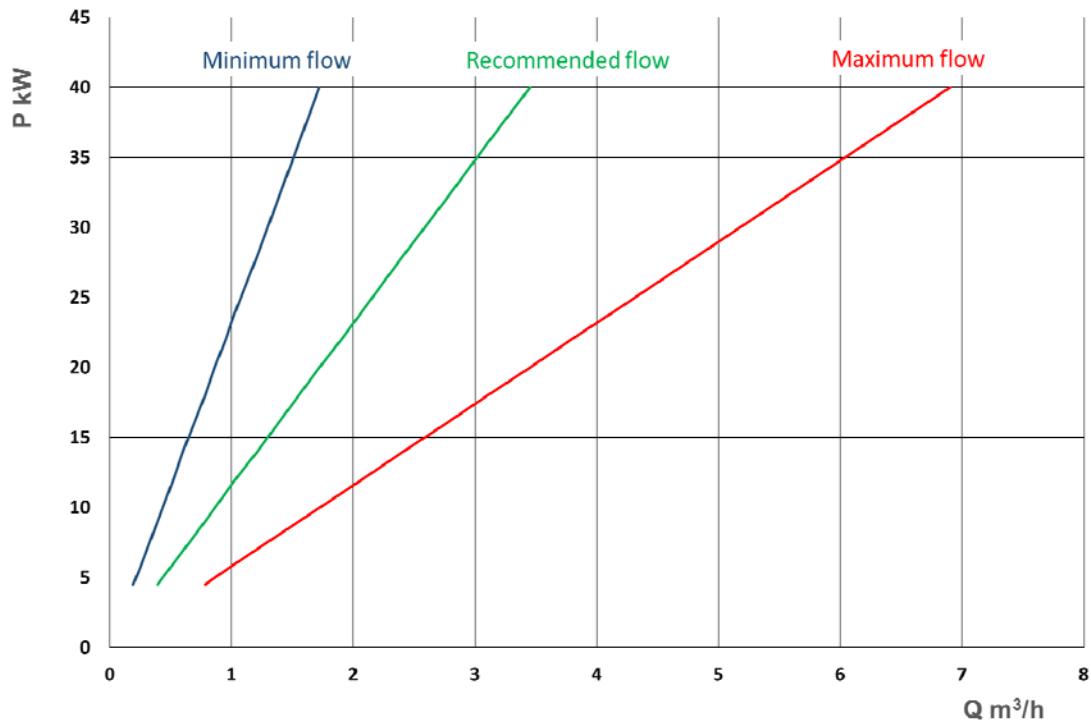


### 2.2.2 Pressure drop for ThermoBlok



## 2.2.3 Recommended flows for ThermoExtra and ThermoBlok up to 40kW

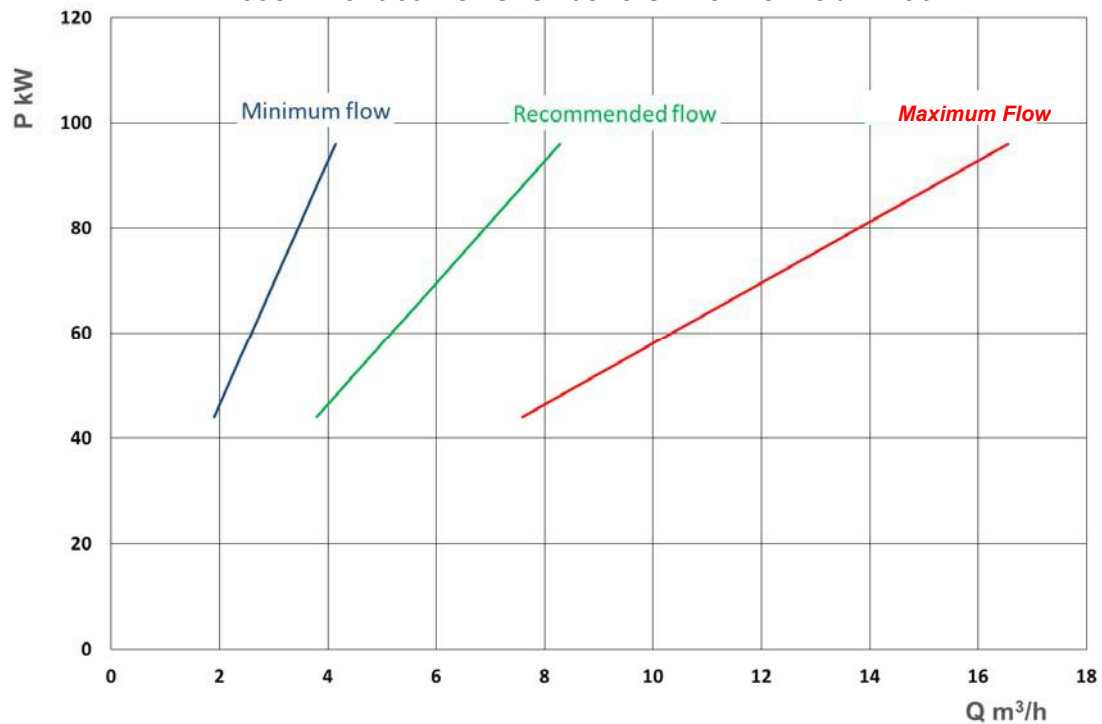
*Recommended flows for boilers ThermoExtra and ThermoBlok 4.4 - 40kW*



**The maximum flow rate is based on a delta T of 5°C ,minimum flow rate is based on 20°C**

## 2.2.4 Recommended flows for ThermoExtra 44-96 kW

*Recommended flows for boilers ThermoExtra 44-96kW*



**The maximum flow rate is based on a delta T of 5°C ,minimum flow rate is based on 20°C**

## 2.3 Expansion Vessel Characteristics (ThermoBlok and ThermoBlok PTV Boilers)

Volume of Expansion Vessel	Maximum Expansion Vessel Pressure	Filling Pressure	Maximum Pressure In the Heating System	Height Of the Central Heating System	Effective Capacity Of Expansion Vessel	Adsorption Capacity	Maximum Amount of Water in the System	Maximum Power of Boiler
L	MPa (bar)	MPa (bar)	MPa (bar)	m	L	%	L	kW
6	0.4 (4)	0.08 (0.8)	0.3 (3)	10	3.0	50%	86	12
8					4.0		114	16
10					5.0		143	20
12					6.0		172	25

Values are related to working temperature range from 10°C to 90°C.

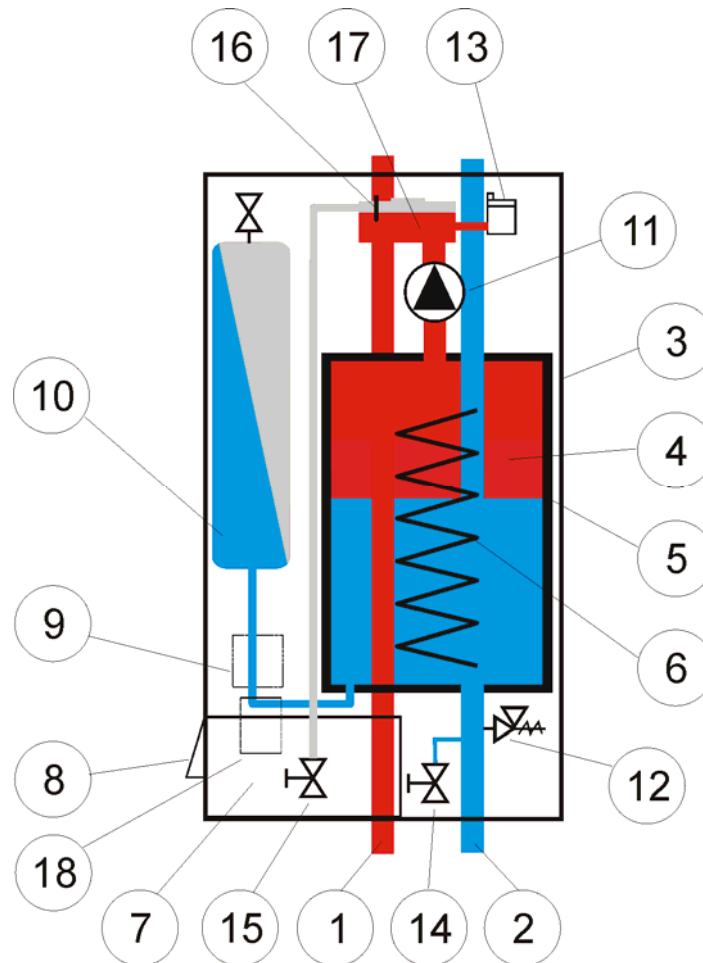
## 2.4. Power supply characteristics 230V/400V

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	
<b>400V 3N ~ 50/60 Hz</b>								
6 kW	8,70 A	10 A	10 kA	15 kA	5 x 2,5 mm <sup>2</sup>	B10-3	25 / 0,03 A	
9 kW	13,04 A	16 A				B16-3		
12 kW	17,39 A	25 A				5 x 4 mm <sup>2</sup>		B25-3
14 kW	20,29 A							
16 kW	23,19 A	32 A			5 x 6 mm <sup>2</sup>	B32-3		40 / 0,03 A
18 kW	26,09 A							
20 kW	28,99 A	40 A			5 x 10 mm <sup>2</sup>	B40-3		
22 kW	31,88 A							
24 kW	34,78 A	50 A			5 x 16 mm <sup>2</sup>	B50-3	63 / 0,03 A (0,3A Thermo Extra)	
28 kW	40,58 A							
32 kW	46,38 A	63 A			5 x 25 mm <sup>2</sup>	NH 160 A		0,3A
36 kW	52,17 A							
40 kW	57,97 A	80 A	5 x 35 mm <sup>2</sup>					
44 kW	63,77 A							
48 kW	69,57 A							
52 kW	75,36 A	100 A	5 x 50 mm <sup>2</sup>					
56 kW	81,16 A							
60 kW	86,96 A	125 A	5 x 70 mm <sup>2</sup>					
64 kW	92,75 A							
72 kW	104,35 A	160 A						
80 kW	115,94 A							
88 kW	127,54 A							
96 kW	139,13 A							
<b>230V N ~ 50/60 Hz</b>								
6 kW	26,1 A	32 A	10 kA	15 kA	3 x 6 mm <sup>2</sup>	B32	40 / 0,03 A	
9 kW	39,2 A	50 A	10 kA	15 kA	3 x 10 mm <sup>2</sup>	B50	63 / 0,03 A	

min. conductor's cross-section in mm<sup>2</sup> is based on maximum length of 20 m.

## 2.5. Function elements of Thermo boilers

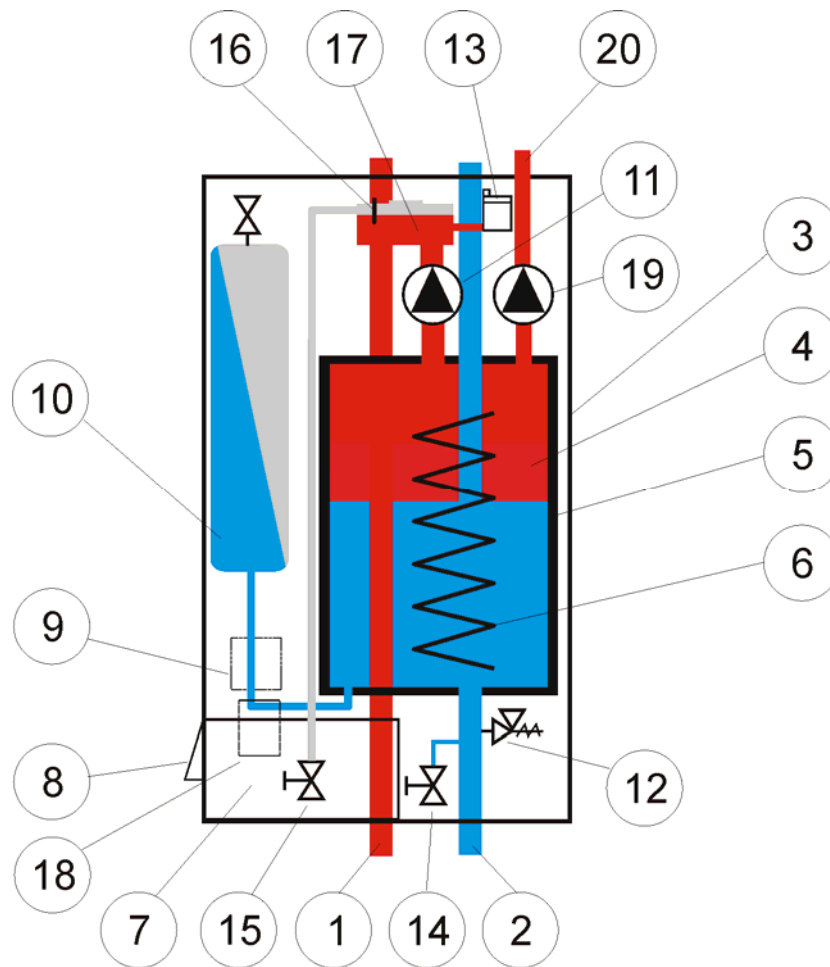
### ThermoBlok



- |                                 |                                |
|---------------------------------|--------------------------------|
| 1. Primary flow                 | 10. Expansion vessel           |
| 2. Return flow                  | 11. Circulation pump           |
| 3. External boiler jacket       | 12. Safety valve on 2,5 bars   |
| 4. Boiler                       | 13. Automatic venting pot      |
| 5. Heat insulation              | 14. Charge and discharge valve |
| 6. Electrical heaters           | 15. Boiler venting valve       |
| 7. Control panel                | 16. Air-indicator              |
| 8. Inducers for el. connections | 17. Splitter                   |
| 9. Contactors                   | 18. RCCB switch                |



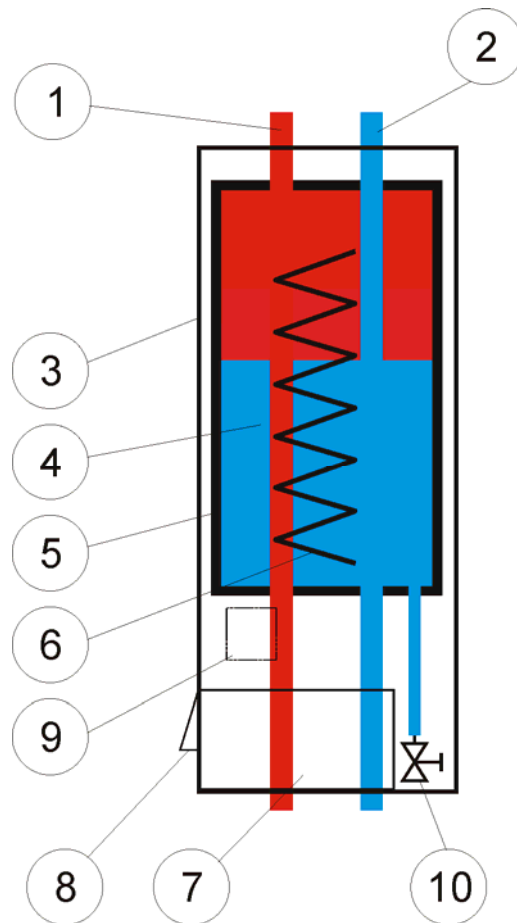
ThermoBlok PTV



- |                                 |  |
|---------------------------------|--|
| 1. Primary flow                 | 11. Circulation pump                         |
| 2. Return flow                  | 12. Safety valve on 2,5 bars                 |
| 3. External boiler jacket       | 13. Automatic venting valve                  |
| 4. Boiler                       | 14. Charge and discharge valve               |
| 5. Heat insulation              | 15. Manual venting valve                     |
| 6. Electrical heaters           | 16. Air-indicator                            |
| 7. Control panel                | 17. Splitter                                 |
| 8. Inducers for el. connections | 18. RCCB switch                              |
| 9. Contactors                   | 19. Pump for domestic water cylinder         |
| 10. Expansion vessel            | 20. Primary flow for domestic water cylinder |

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## ThermoExtra



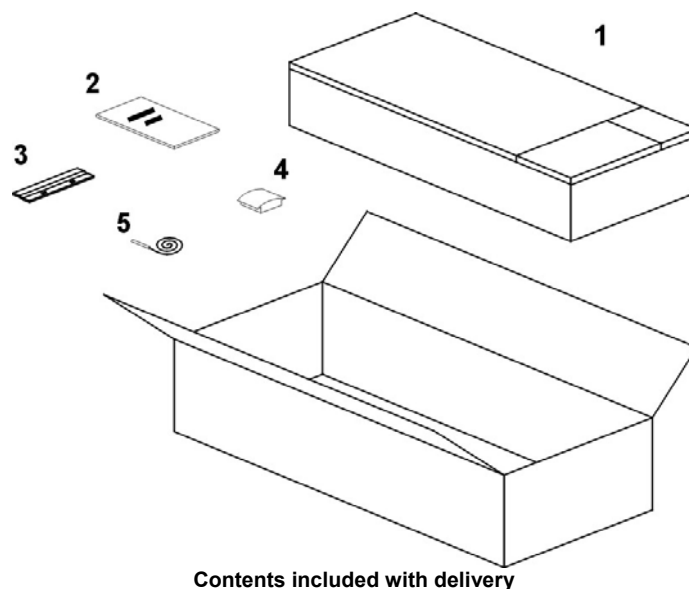
- 1. Primary flow
- 2. Return flow
- 3. External boiler jacket
- 4. Boiler
- 5. Heat insulation

- 6. Electrical heaters
- 7. Control panel
- 8. Inducers for el. Connections
- 9. Contactors
- 10. Charge and discharge valve

## 3.0 General requirements

### 3.1. Contents included in delivery

ThermoExtra, 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.



Item	Quantity	Description
1	1	Thermo Extra / Thermo Blok / Thermo Blok PTV boiler
2	1	Instructions for installation Instructions for use Electrical drawing Warranty card
3	1 (2)	Hanging bracket
4	1	External temperature sensor (optional)
5	1	Water cylinder temperature sensor (optional)

Table of contents included with delivery

**Note:**

**Item 3 has quantity of two for Thermo Extra boilers with power greater than 36 kW**

**Item 4 is only delivered for Thermo Extra boilers with options C, W and Thermo Blok boilers with option C.**

**Item 5 is only delivered for Thermo Extra boilers with option W and Thermo Blok PTV boilers.**

**In the case of boilers with the power of 6/7 kW, additional jumpers are provided in order to enable single phase power supply connection for the boiler.**

### 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.

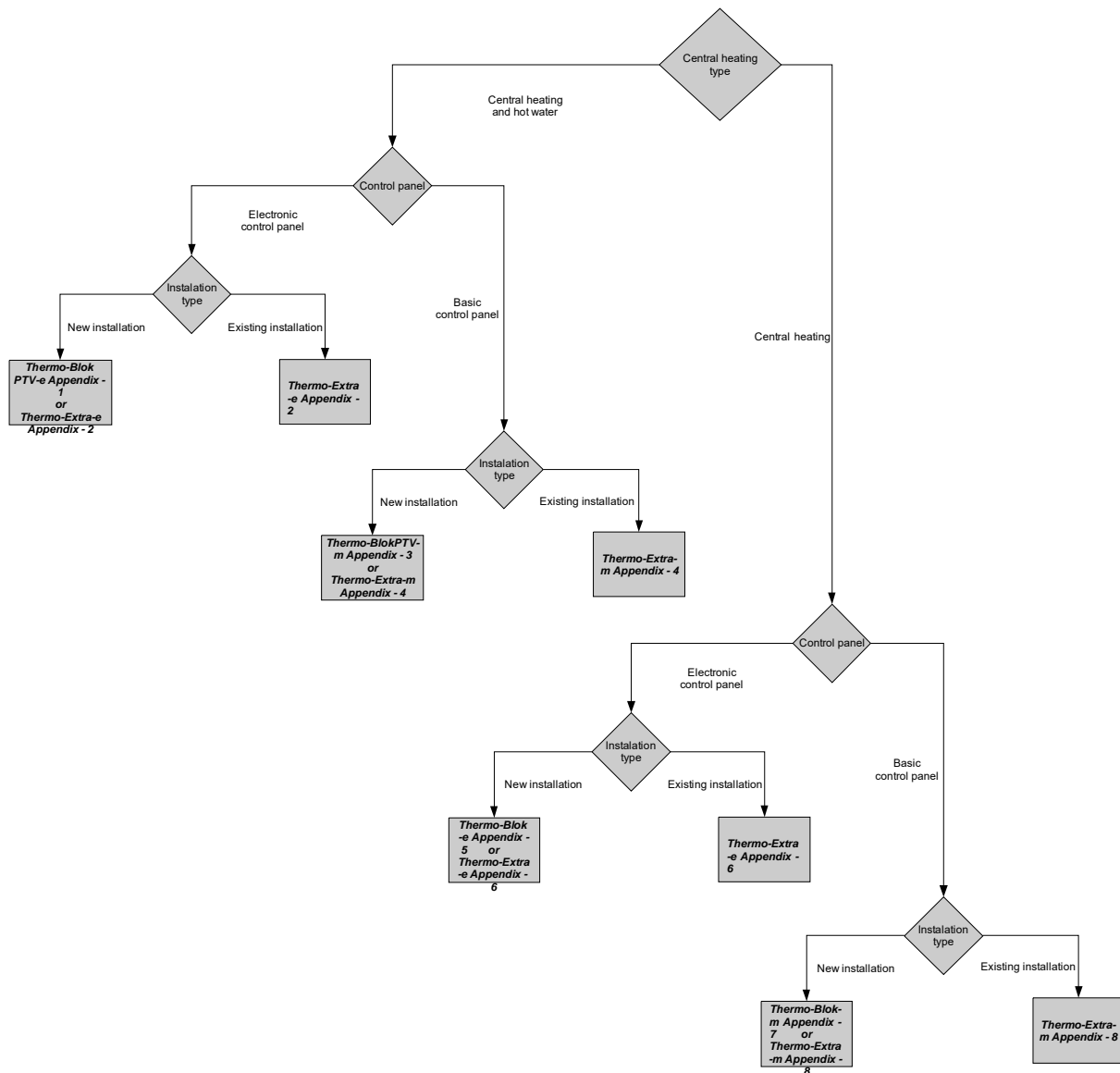
A safety valve is not supplied with the Thermo Extra boilers. A 2.5 BAR safety valve must be installed on the system - (supplied by others)

If the boiler is not connected to room thermostat (Thermo boilers without C or W option) 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

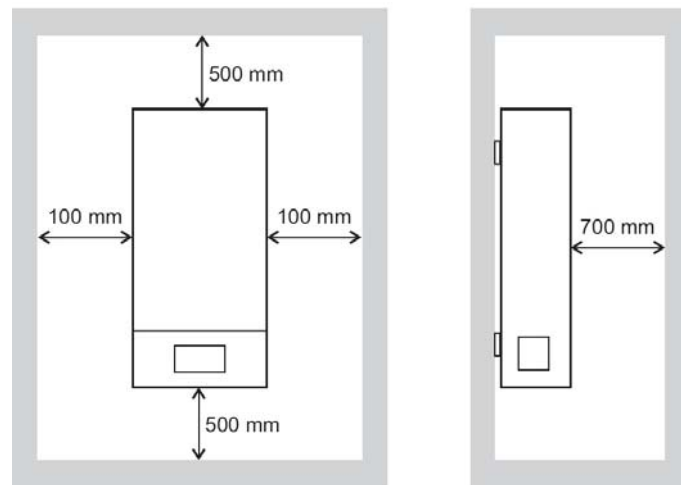
#### 3.4.1. Position of a boiler

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

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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 chapters **2.3.** and **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.

RCCB (RCD) switch 0.03A sensitivity is fitted inside a boiler.

#### **Note:**

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

## **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. Pressure gauge**

This is factory fitted to the ThermoBlok and ThermoBlok PTV boiler and indicates the primary circuit pressure to facilitate filling and testing. In the case of ThermoExtra boiler pressure gauge must be fitted to the installation.

### **3.5.6. Expansion vessel**

ThermoBlok and ThermoBlok PTV boilers incorporate an expansion vessel. Refer to chapter 2.1 for more information about incorporated expansion vessel. Expansion vessel is not incorporated within ThermoExtra boilers and it must be fitted in the system.

If the nominal capacity of the built in expansion vessel is not sufficient for the heating system (for instance in the case of modernization of old open systems) an additional expansion vessel can be installed externally to the boiler. It should be fitted in the return pipe as close as possible to the boiler.

### **3.5.7. Circulating pump**

The circulation pump is included in ThermoBlok and ThermoBlok PTV boilers. For ThermoExtra boilers pump is not incorporated within the boiler and it must be mounted separately. The following figure represents pump characteristics.

### **3.5.8. Venting**

The boiler is fitted with an automatic and manual air vent. Additionally boiler is fitted with the air detector that will stop boiler in the case of air presence.

---

## 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.

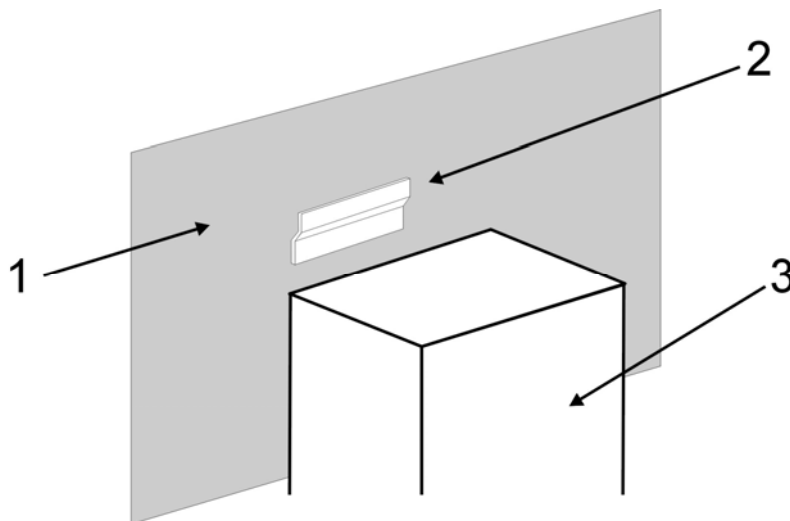
### 4.2. Select position for boiler

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).



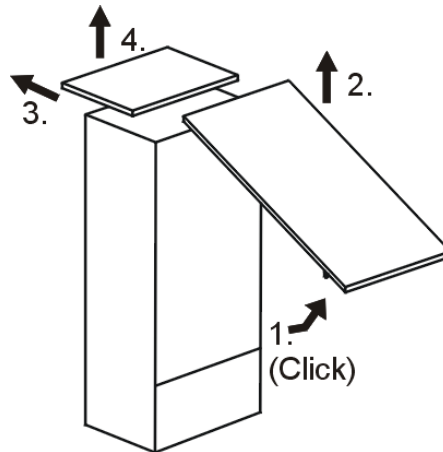
Wall mounting

**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 off the unit, push top cover towards back and lift it off 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 Thermo Extra, Thermo Blok and Thermo Blok PTV boilers.



ThermoExtra



ThermoBlok, ThermoBlok PTV



Flow and return on ThermoExtra, ThermoBlok and ThermoBlok PTV boilers



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## 4.6. Power supply connection

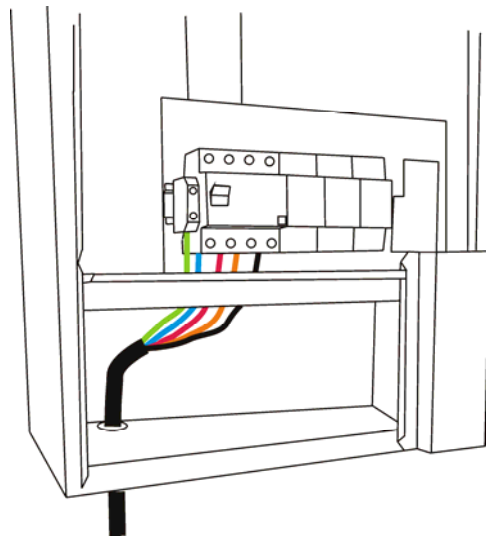
### Note:

Before working with the appliance, turn off the power supply (MCB) and secure against restart.

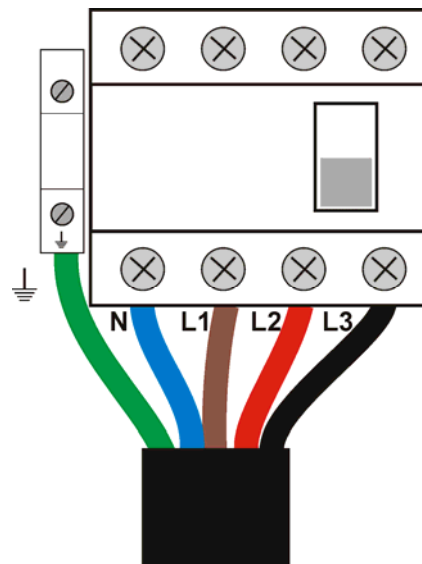
A boiler is rated as a high power appliance and fixed wiring must be used. Please observe chapters 2.3. and 2.4. about fuse and conductor requirements. When connecting the appliance to the fixing wiring, the means for disconnection (MCB) must be incorporated in fixing wiring in accordance with the local wiring rules.

**This device must be earthed.**

In order to connect power supply cable power connection protection cover (1) must be removed by unwinding two nuts M6 and pulling protection cover out. Power cable must be connected directly to RCCB (RCD), earth must be connected to separate terminal (3). After connecting power cable, protective cover (1) must be put in place and tighten.



Power supply connection



RCCB (RCD) connection close-up

### Note:

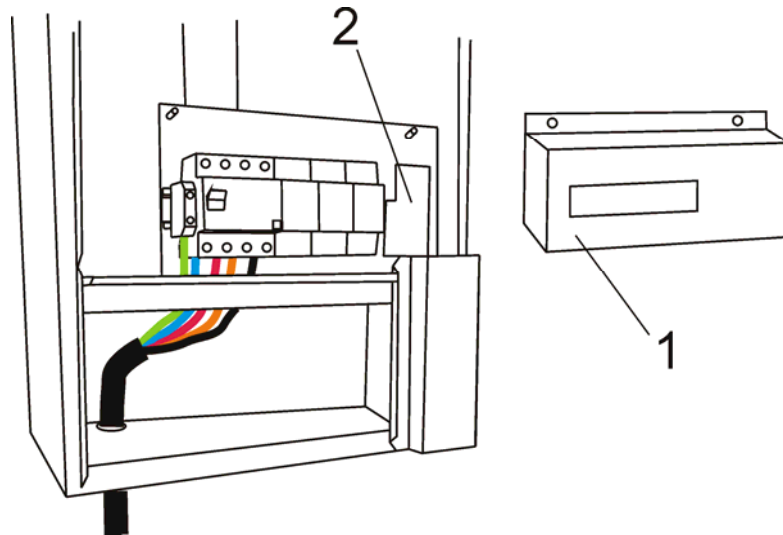
Power cables from  $\varnothing 12$  mm to  $\varnothing 20$  mm must be connected from bottom side of boiler with the use of provided plastic inducer for electric cable.

Ensure that the wires are securely fixed.

## 4.7. Connecting temperature sensors or external electrical controls

### 4.7.1. Accessing connection plate

In order to access connection plate (2) power connection protection cover (1) must be removed by unwinding two nuts M6 and pulling protection cover out. After connecting the power cable, protective cover (1) must be put in place and tightened.



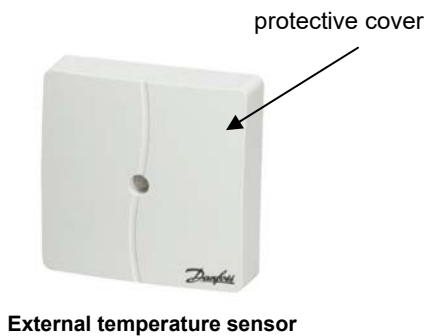
Accessing connection plate

#### 4.7.2. Connecting external temperature sensor

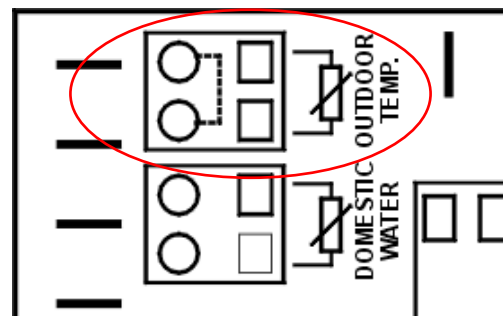
**This is applicable only to ThermoExtra boilers with option C or W, ThermoBlok boilers with option C and ThermoBlok PTV boilers.**

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  $-13^{\circ}\text{C}$ . After installation and initial testing, resistor must be removed and wires from external temperature sensor must be connected.



External temperature sensor



External temperature sensor connection point on boiler's connection plate

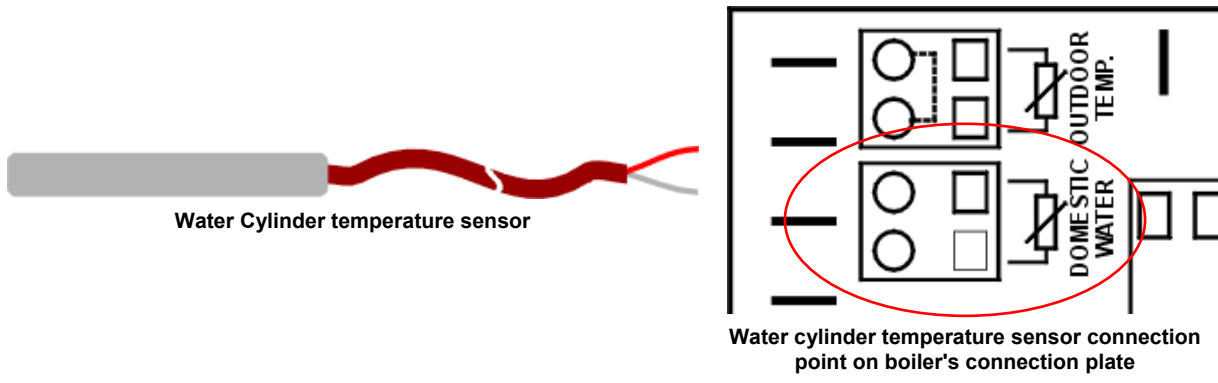
**Note:**

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

#### 4.7.3. Connecting domestic hot water temperature sensor

**This is applicable only to ThermoExtra boilers with option C and ThermoBlok PTV boilers.**

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).

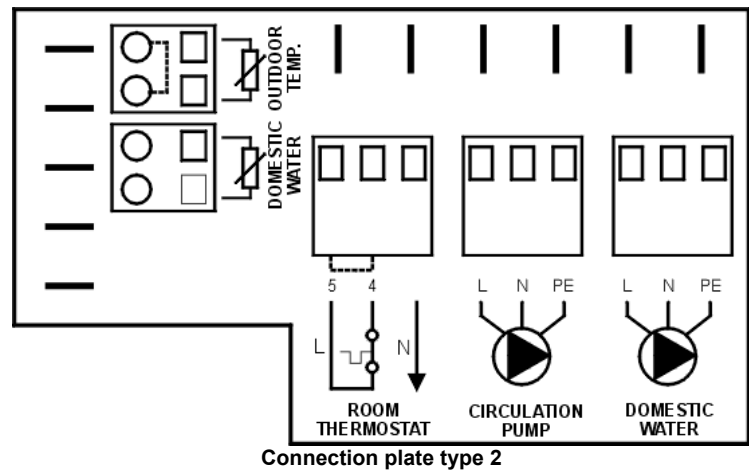
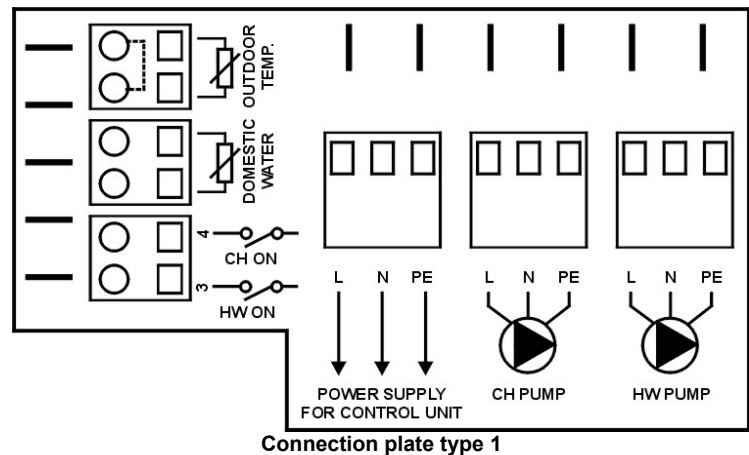


**Note:**  
 For connecting water cylinder temperature sensor, two-wire cable of diameter from 0,6mm<sup>2</sup> to 0,75 mm<sup>2</sup> can be used

**4.7.4. Connecting room thermostat and time switch**

The boiler's terminals 3, 4 and L N PE (power supply for control unit) are for connecting room thermostat or other external control unit (like Danfoss TP9). Terminals 4 and L (power supply for control unit) are linked together. If external control unit is used this link must be removed.

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



The Thermo combi has connection points for connecting a thermostat / room programmer.

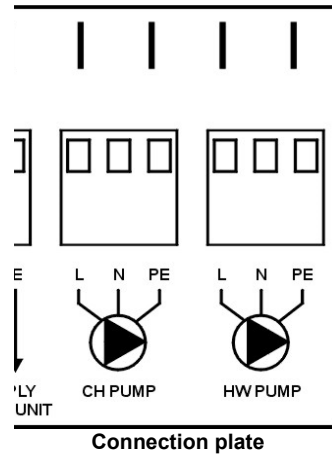
As standard the unit comes with a link (between 5 and 4) for control of the boiler by the control panel.

When connecting a room stat / programmer this link must be removed, otherwise the controller / thermostat won't work

**It is important to note that any thermostat or controller must be Volt free contact type**

#### 4.7.5. Connecting external pump on ThermoExtra boilers

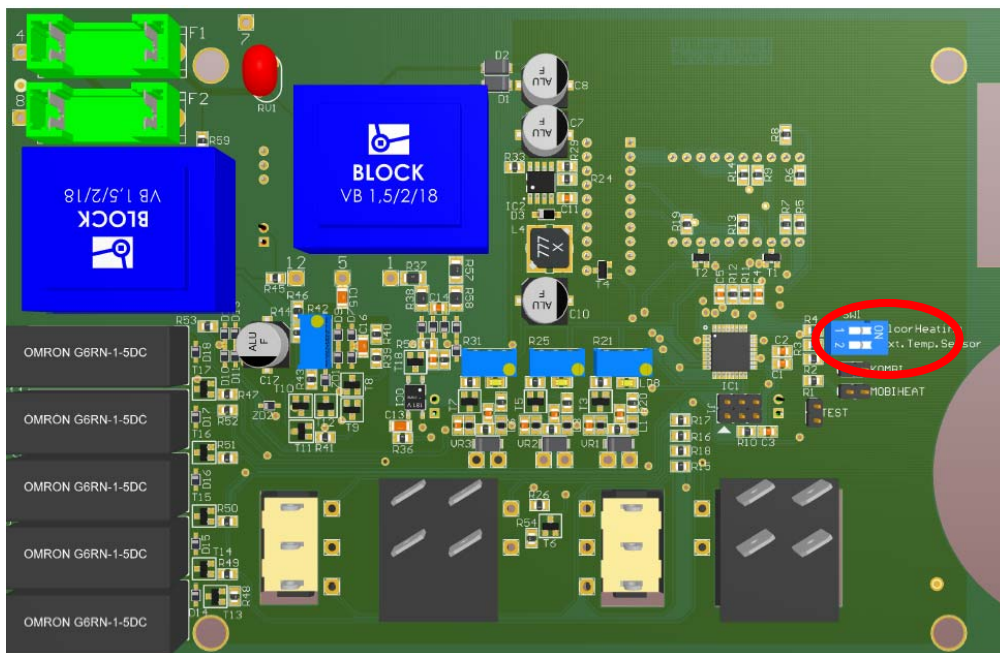
Terminals L, N, PE for external pump connection (HW PUMP) are located on connection plate.



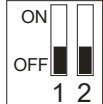
#### 4.8. Selecting set of heating curves

This is applicable only to ThermoExtra boilers with option C or W, ThermoBlok boilers with option C and ThermoBlok PTV boilers.

Selection of heating type (heating curve subset) or disabling external temperature compensation can be made by using a dip switch located on the back side of the control panel, as shown on the picture below.



Position of dip switch on the back side

	<b>Function</b>
Pin 1 – ON	Set heating type to under floor, curves from 0.1 to 0.9 are active, minimum boiler temperature is set at 15°C, maximum boiler temperature is set at 45°C
Pin 1 – OFF (Factory settings)	Set heating type to radiator, curves from 1 to 3 are active, minimum boiler temperature is set at 25°C, maximum boiler temperature is set at 90°C
Pin 2 – OFF	Disable outdoor temperature compensation, the user must manually select temperature in boiler
Pin 2 – ON (Factory settings)	Enable outdoor temperature compensation, default curve for radiator heating is 1,5 and 0,6 for under floor heating

### **WARNING**

**BEFORE MAKING CHANGES WITH DIP SWITCH DISCONNECT POWER FROM BOILER AND CONTROL PANEL, OTHERWISE DAMAGE TO CONTROL PANEL CAN BE MADE**

#### **4.9 Filling the heating system**

For the heating system to operate properly the indicator of manometer 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

For single phase system:

- Check if power cable is tightened on RCCB (RCD) terminals
- Check the presence of phase on RCCB (RCD) input terminals inside boiler
- Measure exact voltage between L and N lines, if it is 10% higher than nominal voltage on the appliance, the appliance itself can be damaged.

For three phase system:

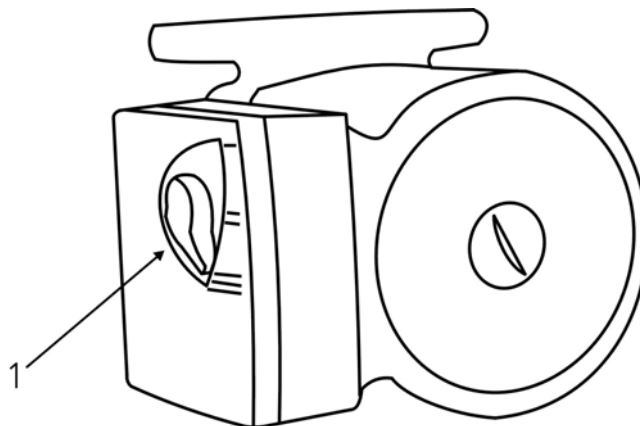
- Check if power cable is tightened on RCCB (RCD) terminals
- Check the presence of each phase on RCCB (RCD) input terminals inside boiler
- Measure exact voltage between L1 – L2, L1 – L3, L2 – L3, L1 –N. If there is no voltage between any combinations of phases one phase is missing and the heating elements 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

For all systems:

- Check if fixed wiring system is used and that MCB 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 RCCB (RCD) switch by pressing T button on it
- Test the overheating system as described in appendix 9

### 5.3. Changing the speed of pump for central heating

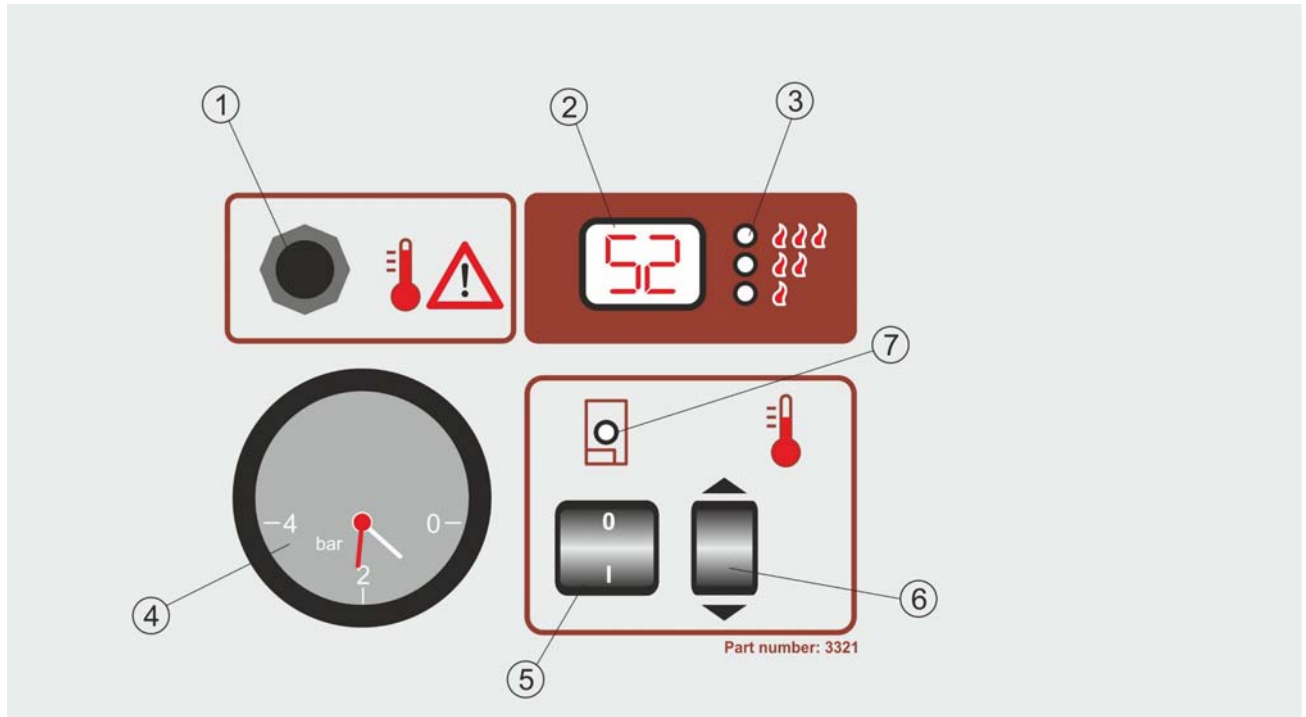
For ThermoBlok and ThermoBlok PTV: open the cover of boiler as described in chapter 4.4. and locate the central heating pump; use chapter 2.4. for assistance. Move speed slider (1) to desired mark. For ThermoExtra boilers an external pump is fitted, so consult the pump manuals for guidance.



Selecting pump speed

## 5.4. Working with electronic control panels type A (option E)

### Control panel Type A



- |  |  |
|--|--|
| 1. Thermal fuse (STB)  | 4. Pressure indicator                              |
| 2. Multipurpose – temperature indicator (temperature of boiler, adjustment of temperature) | 5. Switch for central heating switching on and off |
| 3. Signalization of operation degree of heaters (1, 2, 3)                                  | 6. Adjustment of temperature in boiler             |
|  | 7. Signalization of boiler operation (green light) |

#### Switching on of central heating

By switching the switch (5) to the position 1, the central heating system is switched on. Upon switching on the desired water temperature in boiler is displayed for 5 seconds, signalization of boiler operation is twinkling (7). After 5 seconds the real temperature in the boiler is displayed (2); if the current temperature in the boiler meets the desired one, the signalization lamp of the boiler operation (7) is switched off.

#### Adjustment of desired temperature of central heating

By pressing the key for temperature adjustment (6) the desired temperature in the boiler appears, the signalization lamp of the boiler operation (7) is twinkling. By repeated pressing upwards or downwards it is possible to increase or decrease the desired water temperature. When the temperature is adjusted it is sufficient to wait for 5 seconds (signalization lamp of the boiler operation (7) does not twinkle) in order for the boiler to memorize new temperature.

#### Air in the boiler "LU"

If air appears in the boiler, the signalization of air in the boiler "LU" is shown on display (2) and the boiler stops the operation. In this way the boiler is protected against burning through because of appearance of air. To continue the operation, the boiler should be vented. If the boiler is correctly vented, the operation of boiler continues automatically.

### Voltage drop "SP"

If the voltage in the network line drops below 180V by phase, the signalization of under voltage protection "SP" is shown on display (2), the boiler automatically switches off in order to protect electronics and contactors inside the boiler. The boiler will automatically continue the operation when the network voltage reaches values above 180V.

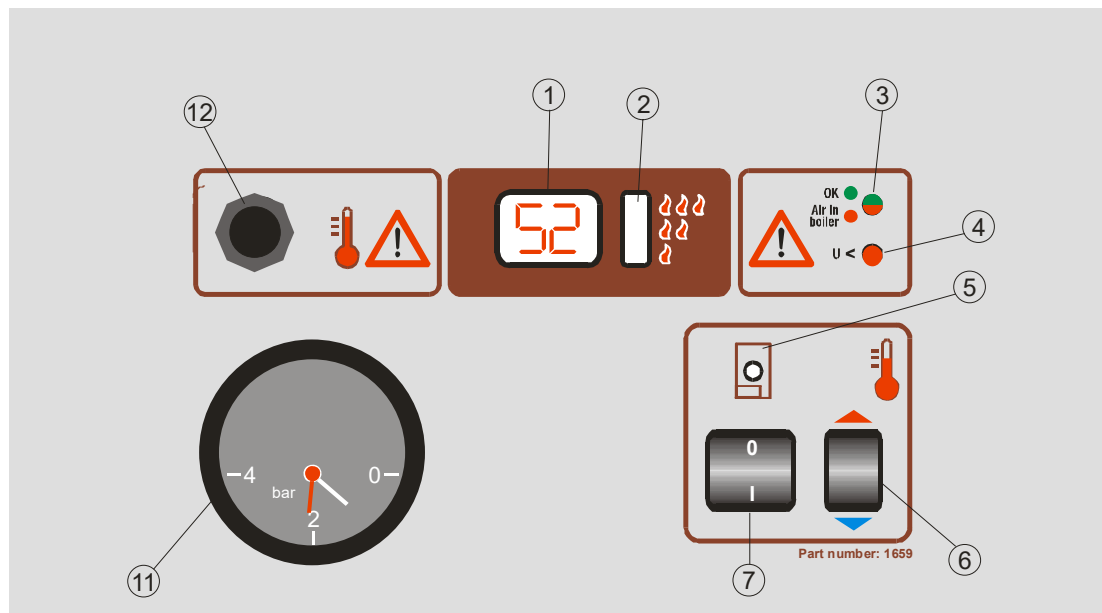
### Cutout thermostat - turning on

Cutout thermostat (safety thermostat) (1) protects the boiler against rapid increase of temperature above 115°C. The fuse turns off the boiler and ejects the RCCB (RCD)-switch.

To continue the operation, it is necessary to take off the protection cover from the cutout thermostat and press the red key, after which the RCCB (RCD)-switch should be switched on again.

## 5.5. Working with electronic control panels type B (option E)

### Control panel Type B



Electronic control panel without external temperature compensation

- |  |  |
|--|--|
| 1. Multipurpose – temperature indicator (temperature of boiler, adjustment of temperature) | 5. Signalization of boiler operation (green light) |
| 2. Indication of operation degree of heaters (1., 2., 3.....7)                             | 8. Adjustment of temperature in boiler             |
| 3. Signalization of air appearance in the boiler (red light)                               | 7. Switch for central heating switching on and off |
| 4. Signalization of under voltage protection (red light)                                   | 8. Thermal fuse                                    |

### Putting on central heating

By switching the switch (7) to the position 1, the central heating system is switched on. Upon switching on, a desired water temperature in boiler is displayed for 5 seconds, signalization of boiler operation is twinkling (5). Upon 5 seconds real temperature in the boiler is displayed (1); if the current temperature in boiler meets the desired one, the signalization lamp of boiler operation (5) is switched off.

### Adjustment of desired temperature of central heating

By pressing the key for temperature adjustment (6) the desired temperature in the boiler appears, the signalization lamp of boiler operation (5) is twinkling. By repeated pressing upwards or downwards it is possible to increase or decrease the desired sanitary water temperature. When the temperature is



adjusted it is sufficient to wait for 5 seconds (signalization lamp of boiler operation (5) does not twinkle) in order for the boiler to memorizes a new temperature.

### Air in the boiler (3), red light

If the air appears in the boiler, the signalization of air in the boiler turns on (3) and the boiler operation stops. In this way the boiler is protected against malfunction caused by the appearance of air. For the continuation of operation, the boiler should be vented. If the boiler is correctly vented, the operation of boiler continues automatically.

### Voltage drop (4), red light

If the voltage in the network line drops below 180V by phase, the signalization of under voltage protection (4) turns on, the boiler automatically switches off in order to protect the electronics and contactors inside the boiler. The boiler will automatically continue the operation when the network voltage reaches values above 180V.

### Cutout thermostat - turning on

Cutout thermostat (safety thermostat) (8) protects the boiler against rapid increase of temperature above 115°C. The fuse turns the boiler off and ejects the RCCB (RCD)-switch.

For the continuation of operation it is necessary to take off the protection cover from the cutout thermostat and press the red key, upon which the RCCB (RCD)-switch should be switched on again.

## 5.6. Working with electronic control panels (option C and W and ThermoBlok PTV)

### 5.6.1. General

Regardless of the selected regulation curve the maximum water temperature in the boiler is limited to 90°C for radiator heating and 50°C for floor heating.

Factory setting of the curve is 1,5 for radiator heating.

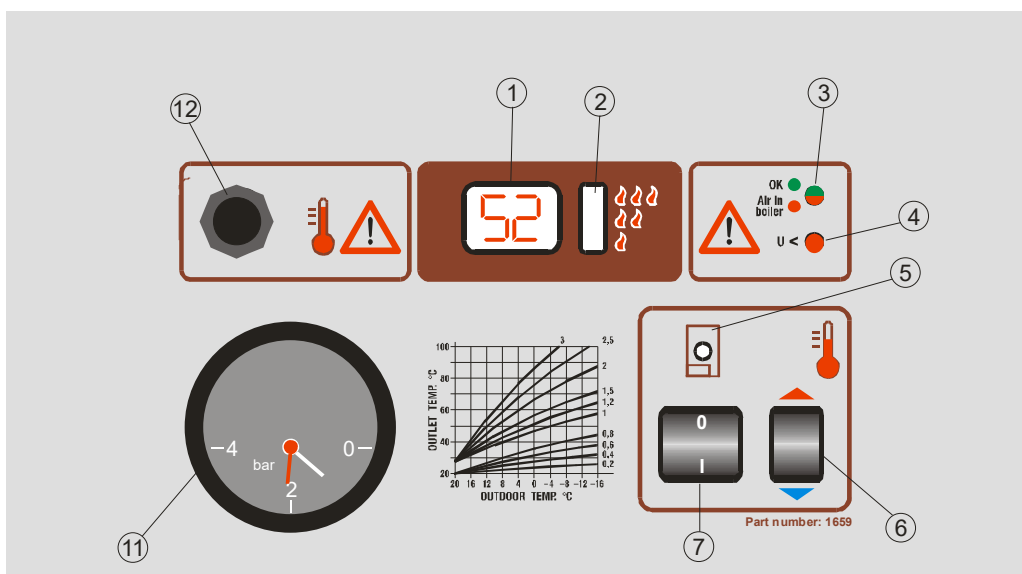
Factory setting of the curve is 0,6 for underfloor heating.

Refer to chapter 1.4. for detailed description of heating curves.

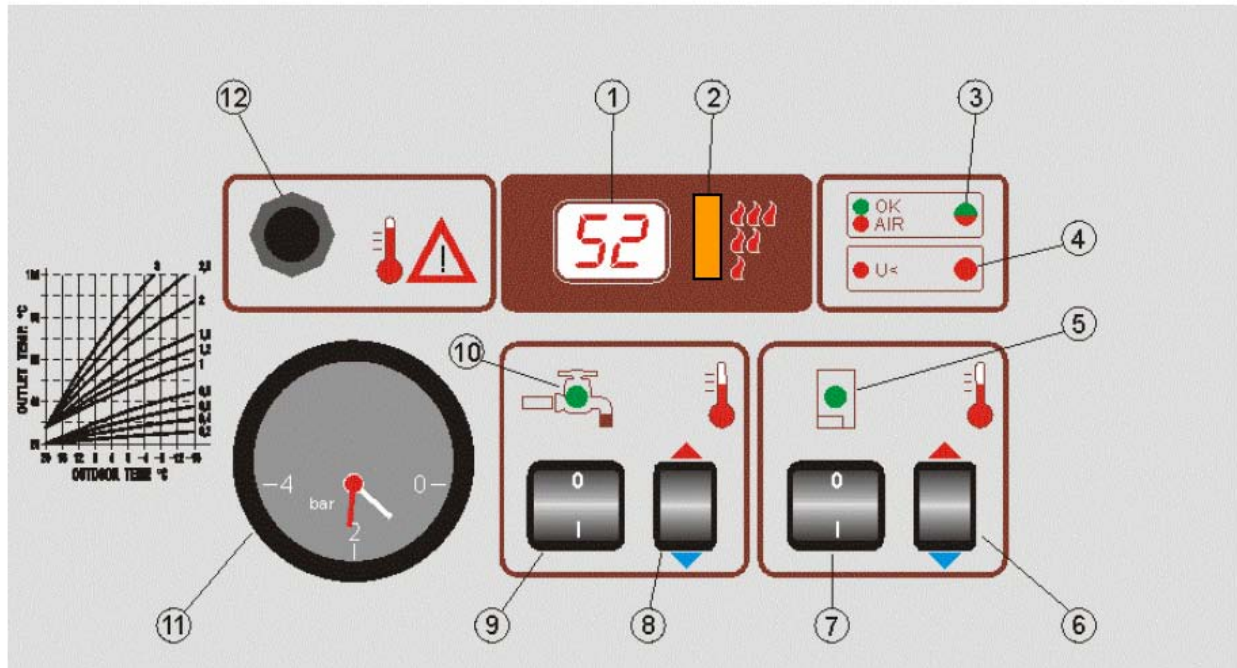
Refer to chapter 1.5. for detailed description of DHW functions.

Refer to chapter 1.6. for detailed description of frost protection.

Refer to chapter 4.8 for detailed description of selecting a desired set of heating curves.



Type 1 – Outdoor temperature compensation



### Type 2 – Outdoor temperature compensation and sanitary water on ThermoExtra or ThermoBlok PTV

#### 1. Display

- temperature reading from KTY probes from – 19°C (below -19°C the display shows --) up to +99°C (above +99°C display is blinking),
- display of the desired temperature or curve during setup.

Following warnings can be displayed:

- PF – power line voltage too low or air in the boiler
- P1 – frost protection for sanitary water is active
- P2 – frost protection for central heating is active
- o1 or c1 – thermal sensor for boiler temperature is not connected or it is short-circuited
- o2 or c2 – thermal sensor for external temperature is not connected or it is short-circuited
- o3 or c3 – thermal sensor for DHW temperature is not connected or it is short-circuited
- when heating function is turned off, every 24 hours controller will activate circulation pump for period of 10 seconds, in order to prevent pump bearings corrosion. That will be indicated on the display as a "running light"

#### 2. Led diodes of heaters stages

The number of lighted diodes corresponds to the number of currently active heater stages (up to seven)

#### 3. Led diode OK/air in boiler

If there is no air in the boiler, the diode lights green. If the air appears in the boiler, the diode lights red and at the same time the operation of the device is stopped. After venting, the diode automatically changes the color to green and the operation of the boiler is continued.

#### 4. Led diode too low supply voltage

If the net voltage falls below 170 V red light appears and at the same time the operation of the device is stopped.

#### 5. Led diode indication for central heating

Indicates that the pump of central heating is active

#### 6. Push button for adjustment of heating characteristics

#### 7. Switch – heating on/off

#### 8. Push-button for adjusting characteristics of sanitary water conditioning

#### 9. Sanitary water conditioning on/off

#### 10. Led diode indication for sanitary water conditioning,

It indicates the circulation pump operation for sanitary warm water conditioning.

#### 11. Indicator of water pressure in heating system.

#### 12. Safety thermostat



Red dot in lower right corner of display is showing - boiler is off on control panel but main power (RCCB switch) is in ON position



Display is showing real temperature in boiler - red dot is illuminate



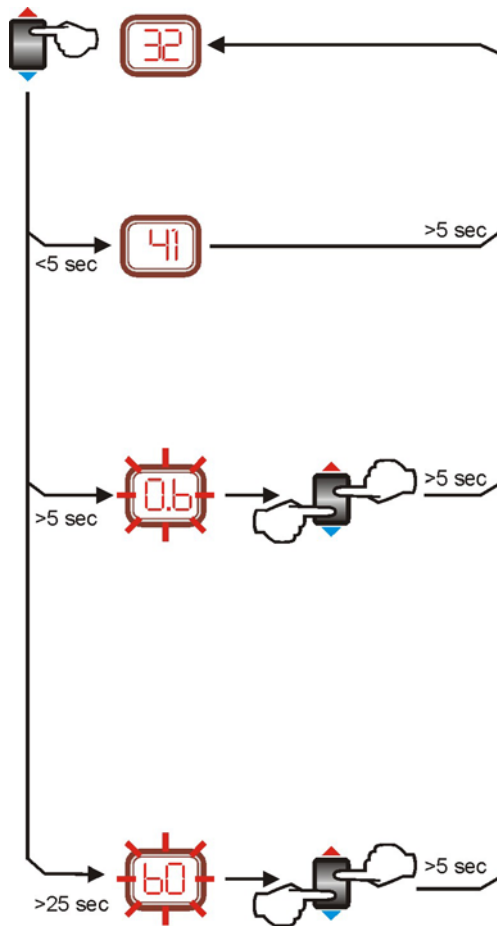
Display is showing real temperature in boiler, red dot is blinking - in cascade mode boiler wait cascade signal for start from previous boiler



Display show settings parameter during programming - without red dot

#### Clarification of LED display layout

### 5.6.2. Central heating functions



#### Display of wanted boiler temperature

By pressing the key (6) user can see the wanted boiler temperature.(calculated from the selected correction curve)

Display shows wanted boiler temperature. The value is displayed for 5 s, after which display returns to indication of the actual temperature of water in the boiler.

#### Correction curve selection

By pressing the key (6) user can enter curve selection menu.

By pressing the key, curve number changes in increment of 0,1 within the set, according to the diagram on the front panel. If the key is depressed for more than 5s, value on the display will be memorized and becomes active.

**Radiator heating: Adjustment range 1..3, factory default 1,5**

**Underfloor heating: Adjustment range 0,2..0,9 factory default 0,6**

#### Manual setting of wanted boiler temperature

By pressing the key (6) user can set wanted boiler temperature and override curve correction.

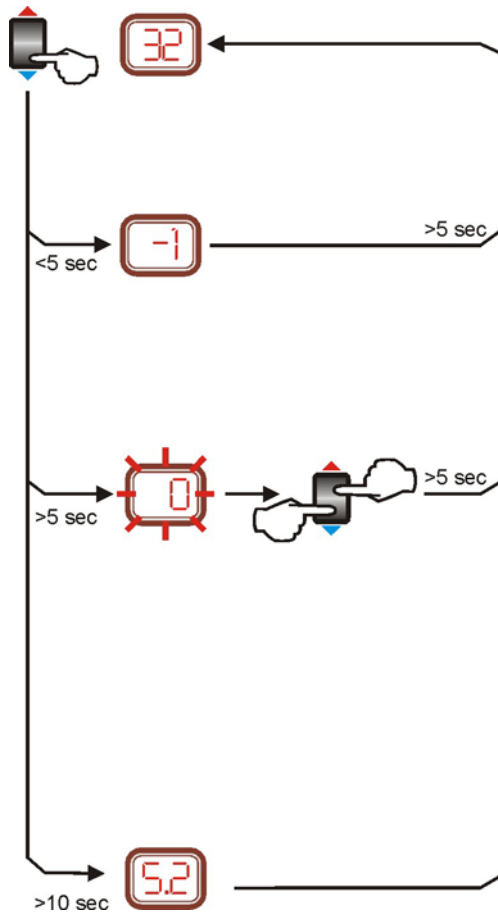
By pressing the key up or down user can select fixed temperature in the boiler. If the key is depressed for more than 5s, value on the display will be memorized and becomes active.

**When boiler is in fixed temperature mode, the LED display blinks while displaying current boiler temperature and all correction curves are ignored. To return to the correction curve mode, the boiler must be switched off and back on using ON/OFF switch. User can further adjust temperature by pressing key(6) again if necessary.**

**Radiator heating: Adjustment range 27°C-80°C, factory default 60°C**

**Underfloor heating: Adjustment range 20°C-45°C, factory default 40°C**

Continuation...



#### Display of external temperature

By pressing the key (6) user can see external temperature.

The Display shows the external temperature. The value is displayed for 5 s, after which display returns to indication of the actual temperature of water in the boiler.

#### Offset of currently selected correction curve

By pressing the key (6) user can enter the curve selection menu.

The LED display will show current offset in °C. Offset does not affect maximal or minimal temperature, they are set in absolute values

By pressing the key (6) it is possible to change offset in steps of 1°C.

**Adjustment range: -9 to +20°C.**

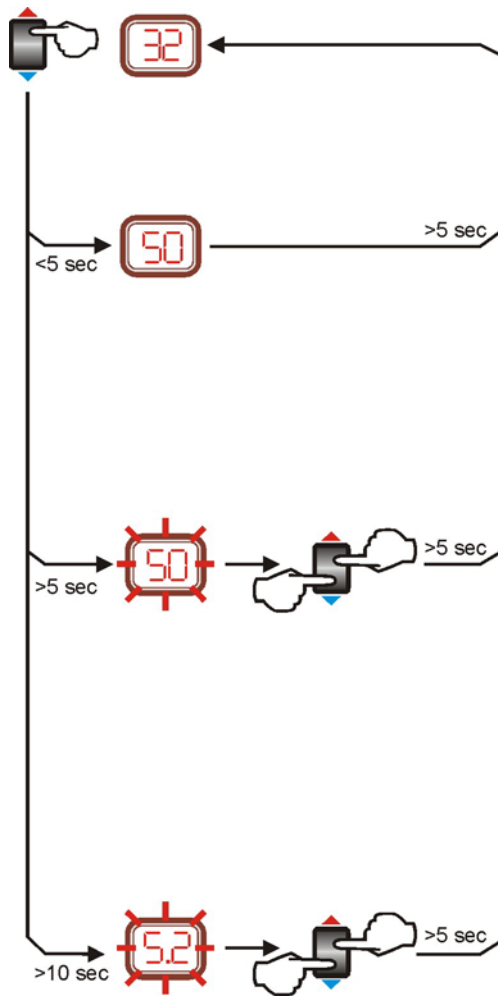
**Factory default 0°C.**

If the key is depressed for more than 5s, value on the display will be memorized and becomes active..

#### Reset to factory settings

By pressing the key (6) longer than 10 seconds, all parameters will return to the factory default values and controller will be reset.

### 5.6.3. Domestic water functions (control panel type 2)



#### Display of desired temperature of domestic water

If the key is held pressed less than 5 s the LED display will show the desired temperature in domestic water storage. The value is displayed for 5 seconds, after which the display normally shows the real temperature of water in the boiler.

#### Setting the desired temperature in domestic water storage

By pressing the key (8) user can enter the domestic water temperature menu.

The desired water temperature in domestic water storage is blinking.

By pressing the key (8) the value of desired domestic water temperature in domestic water storage is changing in steps of 1°C. If the key is held pressed less than 5 s the value from the display becomes the desired domestic water temperature.

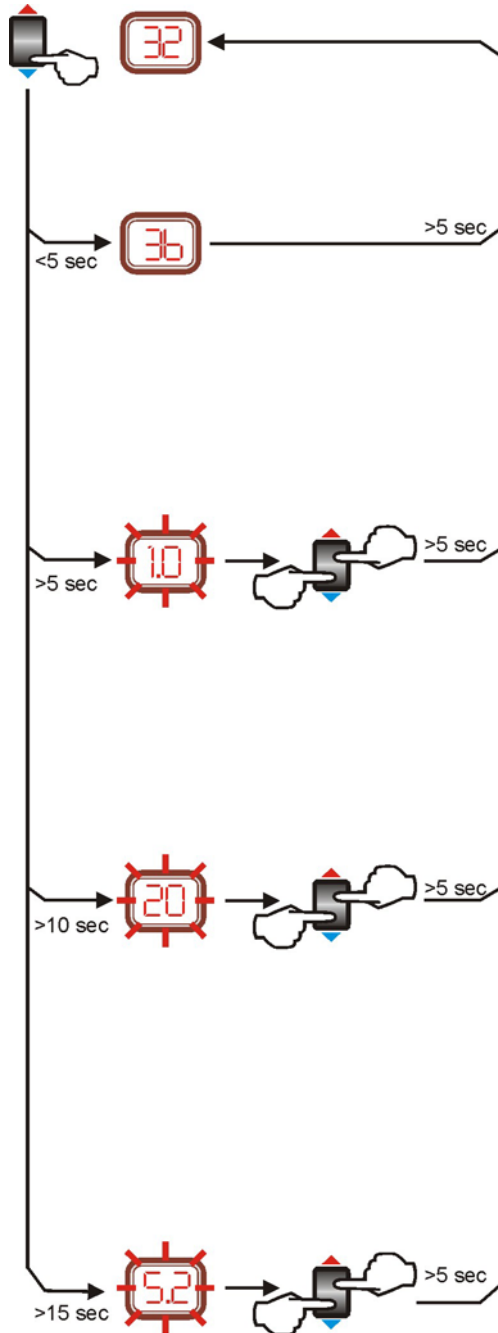
**Possible adjustment is from 10°C up to 65°C.**

**Factory adjustment is 50°C.**

#### Displaying software version and factory reset

By pressing the key (8) longer than 15 s, the LED will show the software version and the factory reset of central heating parameters will occur.

Continuation...



#### Display of current temperature in the domestic water storage

By pressing the key down (8) user can select the display of current temperature in the domestic water storage. The value is displayed for 5 s, after which display returns to indication of the actual temperature of water in the boiler..

#### Setting additional working time of domestic water pump

By pressing the key (8) user can setup additional working time of domestic water pump.

The time of supplemental operation of circulation pump operation for domestic water conditioning is blinking.

By pressing the key the time is changing from 0,1 min up to 19 min. In increment of 0,1. If the key is depressed for more than 5s, value on the display will be memorized and becomes active.

**Factory default: 1 min.**

#### Setting standby boiler temperature

By pressing the key (8) user can setup stand by boiler temperature

Display will show current standby boiler temperature.

Pressing the key (8) will change standby temperature by 1°C. If the key is depressed for more than 5s, value on the display will be memorized and becomes active.

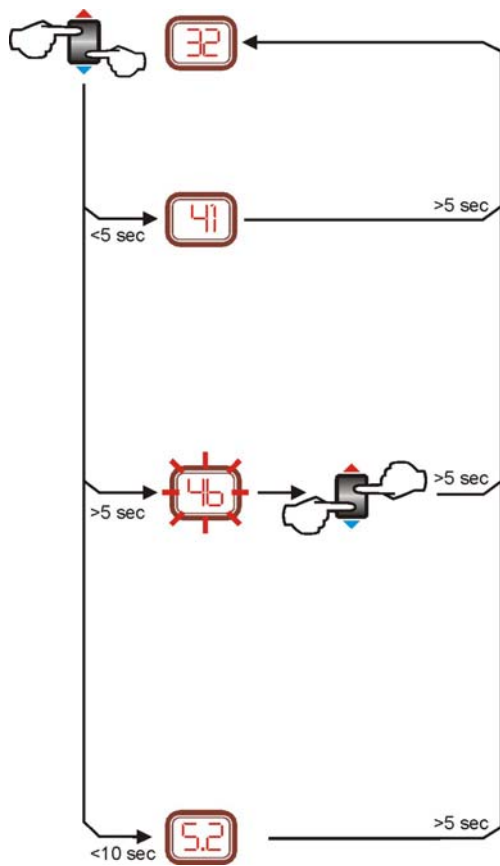
**Adjustment range: 10°C - 50°C**

**Factory default: 15°C**

#### Reset to factory defaults

By pressing the key (8) longer than 15 seconds, all parameters will return to the factory default values and controller will be reset.

## 5.6.4. Central heating functions with heating curves disabled



### Display of desired temperature in the boiler

If the key (6) is held pressed less than 5 s the LED display will show the desired temperature in the boiler. The value is displayed for 5 seconds, after which the display normally shows the real temperature of water in the boiler.

### Setting the desired temperature in the boiler

By pressing the key (6) user can enter the boiler temperature menu.

The desired boiler temperature is blinking.

By pressing the key (6) UP or DOWN, the desired boiler temperature can be set in steps of 1°C.

If the key is held pressed less than 5 s the value from the display becomes the desired boiler temperature.

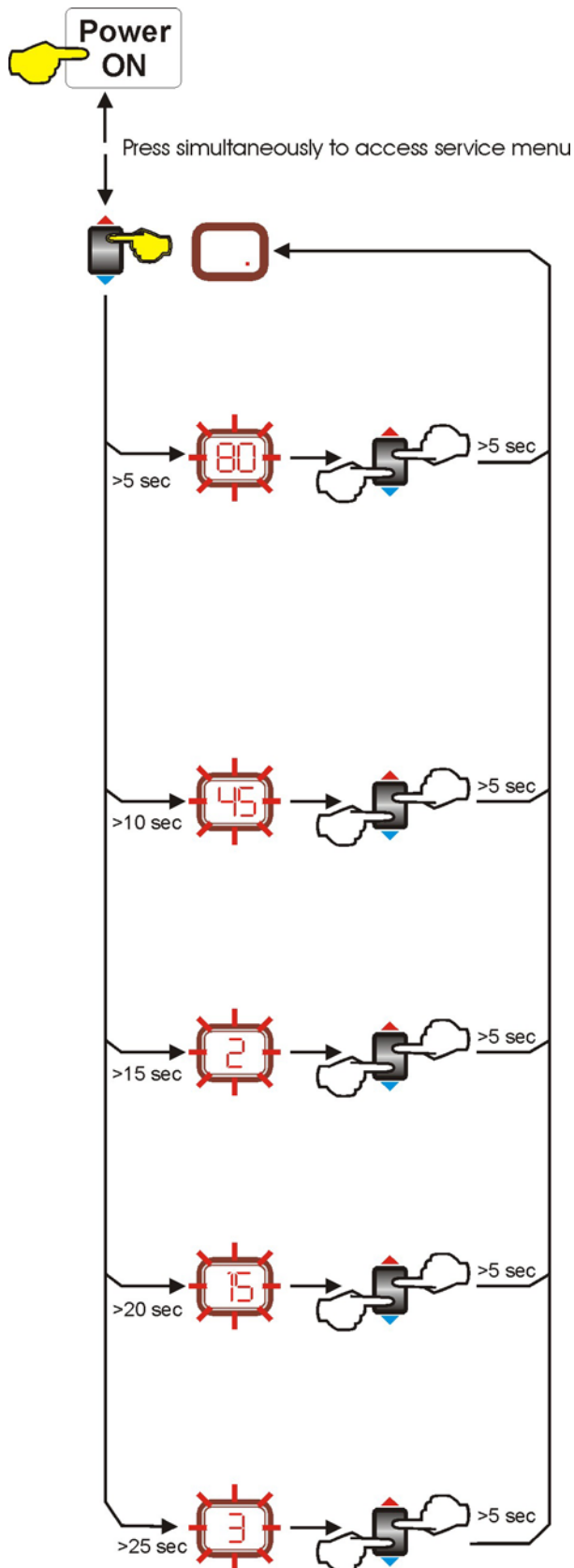
**Possible adjustment is from 20°C up to 90°C for radiator heating.**

**Possible adjustment is from 15°C up to 45°C for under floor heating.**

### Reset to factory defaults

By pressing the key (6) longer than 15 seconds, all parameters will return to the factory default values and controller will be reset.

### 5.6.4.1 Access to special service menu



#### Access to special service menu

To access in special service menu press simultaneously key (6) during switching ON main switch on boiler - RCCB (in that moment key (7) **must** be turned off)

#### Limiting maximum boiler temperature

By pressing the key (6) user can limit maximum boiler temperature.

Factory defined maximum temperature starts to blink. By pressing up or down user can set new maximum temperature. If the key is depressed for more than 5s, value on the display will be memorized and becomes active.

**Radiator heating: Adjustment range 60°C-90°C, factory default 80°C**

**Underfloor heating: Adjustment range 30°C-50°C, factory default 45°C**

#### Setting the minimal boiler temperature

By pressing the key (6) user can set minimal boiler temperature.

Minimal boiler temperature starts blinking.

By pressing the key user can select the desired minimal boiler temperature. Temperature changes in steps of 1°C. If the key is depressed for more than 5s, value on the display will be memorized and becomes active.

**Radiator heating: Adjustment range 20°C-45°C, factory default 45°C**

**Underfloor heating: Adjustment range 15°C-30°C, factory default 30°C**

#### Setting the central heating pump delay

By pressing key (6) user can change pump delay time between 0 - 15 min. Factory settings is 0.

#### Selecting the time delay between steps for power regulation

By pressing the key (6) user can change the time delay between step for power regulation in the range from 5 to 60 seconds. Default value depends on the number of stages for power regulation – each stage will add 5 seconds. For example, 3 stages will have  $3 \times 5 = 15$  seconds between successive stages turn-on, 7 stages will have  $7 \times 5 = 35$  seconds between successive stages turn-on. Turn of delay is fixed to 1 second.

#### Selecting the number of steps for power regulation

By pressing the key (6) servicer can change the number of steps for power regulation.

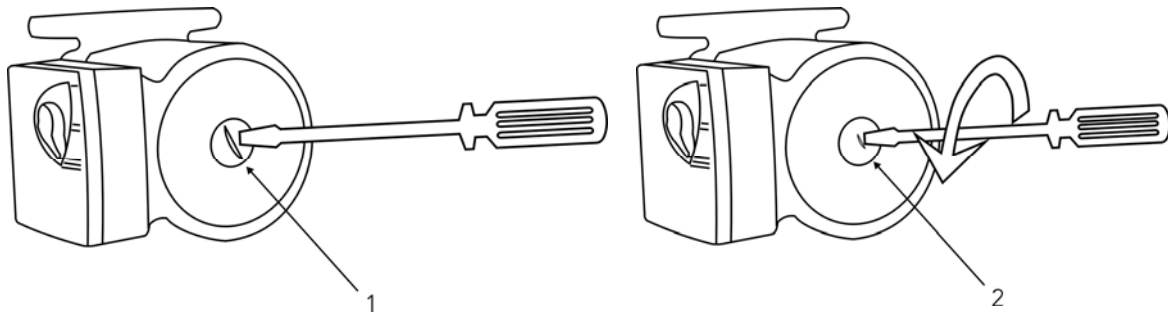
By pressing the key it is possible to select 2 to 7 steps for power regulation. Default settings: - boilers from 4,5 to 16 kW have only two power levels, boilers from 18 to 24 kW have three power levels and boilers from 28 up to 96 kW have seven power levels. Change in the number of stages will cause time delay parameter to be changed (see below) !



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## 5.7. Starting the pump manually – only for non-electronic pumps.

To start the pump it is necessary to turn off the protection plug on its front side (1), below which there is an axis with the groove for screwdriver. Using the screwdriver, the pump (2) should be turned several times in the direction of the arrow on the pump head and the boiler should be put on again.



When the pump starts the operation the temperature of water in the boiler and the temperature of sanitary water should be selected. The optimal temperature for central heating is between 50 and 60°C.

If the room thermostat is connected to the boiler, the desired room temperature should be adjusted according to the instructions of the producer of the room thermostat.

## 6. Maintenance

### 6.1. 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.**

**RCCD switch - pressing the TEST button must disconnect the RCCD switch. This testing procedure insures that switch is functioning properly. We recommend this test once or twice in heating season.**

**Safety thermostat – we recommended to check safety thermostat before every heating season by heating up the sensor with heating fan or lighter over 100°C must actuate overheating protection by switching off the RCCD switch.**

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.

### 6.2. 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

<b>MALFUNCTION</b>	<b>CAUSE</b>	<b>ELIMINATION</b>
- there is no voltage on the control panel at switching on	<ul style="list-style-type: none"> <li>- there is no power supply from the net on one or more phases</li> <li>- fuse 2,5A on the control panel is burned through</li> <li>- RCCB switch is disconnected</li> </ul>	<ul style="list-style-type: none"> <li>- replace fuse 2,5A and check the cause of burning</li> <li>- <b>contact authorized service personnel to resolve the problem</b></li> </ul>
- By switching on, the switches on the control panel display the voltage, but the boiler does not heat	<ul style="list-style-type: none"> <li>- check the adjustment of the room thermostat,</li> <li>- limiting thermostat is activated</li> <li>- indicator of air presence in the boiler blocked the operation,</li> <li>- defective switch,</li> <li>- operation thermostat is defective,</li> <li>- heaters are burned through</li> </ul>	<ul style="list-style-type: none"> <li>- check the set temperature on the room thermostat, replace batteries, or the room thermostat is faulty,</li> <li>- deaerate the boiler in order to turn off the lamp "air in boiler"</li> </ul>
- temperature in boiler is on desired value, but radiators do not heat	<ul style="list-style-type: none"> <li>- circulation pump does not operate,</li> <li>- air stopper on central heating installation prevents circulation</li> </ul>	<ul style="list-style-type: none"> <li>- start mechanical pump (CHAPTER 4.)</li> <li>- deaerate installation</li> </ul>
- boiler does not provide enough heat	<ul style="list-style-type: none"> <li>- one phase is missing on supply</li> <li>- in two-stage thermostats the second stage is not functioning</li> <li>- the second or the third stage is not manually turned on,</li> <li>- one switcher is defective,</li> <li>- a part of heater is burned through</li> <li>- in a three-phase system the three different phases are not brought to the boiler</li> </ul>	<ul style="list-style-type: none"> <li>- check fuses on the main panel,</li> <li>- <b>contact authorized service personnel to resolve the problem</b></li> </ul>
- the switcher can be heard while operating (it buzzes) radio and TV-interferences	<ul style="list-style-type: none"> <li>- poor voltage in the net</li> <li>- defective switcher</li> </ul>	<ul style="list-style-type: none"> <li>- <b>contact authorized service personnel to resolve the problem</b></li> </ul>
- when turning on or off the operation thermostat, radio and TV-interferences occur	<ul style="list-style-type: none"> <li>- defective operation thermostat,</li> <li>- defective blockade (RC – protection)</li> </ul>	<ul style="list-style-type: none"> <li>- <b>contact authorized service personnel to resolve the problem</b></li> </ul>
- boiler in operation "roars"	<ul style="list-style-type: none"> <li>- the system is not well deaerated,</li> <li>- defective heater</li> </ul>	<ul style="list-style-type: none"> <li>- deaerate the system</li> <li>- <b>contact authorized service personnel to resolve problem</b></li> </ul>
- pressure in the system varies	<ul style="list-style-type: none"> <li>- defective expansion vessel,</li> <li>- the vessel pressure is too low or too high</li> </ul>	<ul style="list-style-type: none"> <li>- <b>contact authorized service personnel to resolve the problem</b></li> </ul>

<ul style="list-style-type: none"> <li>- the actual temperature in the boiler is higher than the desired temperature and the safety thermostat is activated</li> </ul>	<ul style="list-style-type: none"> <li>- defective contactors</li> <li>- defective operation thermostat</li> </ul>	<ul style="list-style-type: none"> <li>- <b>contact authorized service personnel to resolve the exact source of the problem</b></li> </ul>
<ul style="list-style-type: none"> <li>- RCCB switch disconnects</li> </ul>	<ul style="list-style-type: none"> <li>- defective heater,</li> <li>- humidity on conductors,</li> <li>- safety thermostat is activated</li> </ul>	<ul style="list-style-type: none"> <li>- check leakage,</li> <li>- <b>contact authorized service personnel to resolve the exact source of the problem</b></li> </ul>
<ul style="list-style-type: none"> <li>- RCCB switch cannot be reset</li> </ul>	<ul style="list-style-type: none"> <li>- safety thermostat is activated</li> </ul>	<ul style="list-style-type: none"> <li>- pre-reset safety thermostat and then the RCCB switch</li> <li>- <b>contact authorized service personnel to resolve the exact source the of problem</b></li> </ul>