Instruction Manual

Installation, Operation and Maintenance

celebrating 40 years of excellence

Xboiler™ **BD 23, BD 38**

X Boiler BD Series

Gas-fired condensing central heating boilers

DO NOT REMOVE
AUSTRALIA AND NEW ZEALAND GAS SAFETY CERTIFICATION

ISO 9001 · 14001

Devex® systems
heating eXcellence

Dear Customer,

Congratulations on choosing the X Boiler BD series.

We are pleased to offer you a modern economical and environmentally friendly product that meets our particular high Australian standard requirements. Please read this instruction manual carefully as the following instruction manual will explain in detail the manufacturer's recommendation for a reliable, efficient and safe operation of your boiler. We would also urge you to keep this instruction manual for the operational life of the boiler.

We hope that your new X Boiler meets your expectations.

IMPORTANT INFORMATION

- Read this instruction manual carefully before you install and operate the boiler.
- The instruction manual is an integral part of the boiler and should be kept throughout the operational life of the boiler. It contains all the warnings and important information to be adhered to for safety during installation, use, and maintenance.
- Reliable and efficient operation of the boiler depends to a large extent on the appropriate performance of systems that the boiler is connected to such as:
    - gas system
    - flue gas-air system
    - central heating system
    - domestic hot water system
- Flue gas-air installations for C type boilers should be made of approved gas-air systems. Adaptors connecting the boiler with a pipe system must have measuring points. The flue gas-air system must meet the specifications set out in section 3.8 of this manual.
- Flue gas-air system connections must be tight. Leaks from the flue gas pipes can result in flooding of the boiler by condensate. The manufacturer is not liable for damages or malfunctions resulting from a flooded boiler.
- **Installation of the boiler should be performed only by a qualified person*, to all specifications in this manual, the requirements of AS/NZS 5601.1 and the local authority-gas or electricity etc. Make sure the installer confirms in writing that the tightness of the gas installation has been checked and approved after connecting the boiler to the system.**
- The boiler may be installed and operated only in a room where all building works have been completed. Building works are potential sources of dust, debris, and harsh solvents or vapours which have a negative effect on the boiler's lifespan.
- The cleanliness of air in a room where the boiler will be installed must meet the same requirements as for rooms designed for people.
- Install appropriate filters in the central heating system (C.H.) and gas system. Filters are not included as part of the basic boiler equipment.
- All defects caused by inadequate filtering in the central heating or gas supply will not be repaired under warranty.
- The process of connecting the boiler to a water heating system is discussed in Section 3.5
- The central heating system must be thoroughly cleaned and rinsed before installation. The procedure is described in section 3.5.2.
- To avoid malicious calcification of the flue gas - water heat exchanger and also to reduce the risk of other components being damaged:
    - water used in the Central Heating (C.H.) circuit should be prepared properly according to section 3.5.2. Using the correct water parameters of the C.H. system will promote the long-term operation of the boiler, while maintaining its high efficiency, leading to reduced gas consumption and lower costs,
    - all connections in the central heating system should be tightened properly
- Issues caused by gas-water heat exchanger calcification will not be repaired under guarantee.
- The initial start-up of the boiler as well as its repairs, adjustments, and maintenance, must be performed only by an AUTHORISED SERVICE COMPANY.
- Do not perform any repairs or modifications to the boiler by yourself.

** Qualified person' - a person that has all the required technical qualifications to perform according to local regulations, the work necessary in connecting appliances to the gas mains, central heating system, and flue gas duct.*

- A boiler is a complicated appliance as it contains numerous precise mechanisms. The boiler must be operated only by an adult.
- Do not cover any ventilation grills.
- DO NOT USE OR STORE FLAMMABLE, AGGRESSIVE AND CORROSIVE MATERIALS OR OTHER SIMILAR SUBSTANCES IN OR NEAR THIS APPLIANCE.
- Any failures that are the result of operation discordant to recommendations included in this instruction manual cannot be subject to warranty claims.
- The manufacturer is not responsible for any failures resulting from faulty installation and non-observance of regulations and instructions given by the manufacturer.
- Complying with recommendations given in this instruction manual will ensure a long, reliable and safe operation of the boiler.
- This appliance is unsuitable for use as a pool heater.
- DO NOT SPRAY AEROSOLS IN THE VICINITY OF THIS APPLIANCE WHILE IT IS IN OPERATION.
- DO NOT PLACE ARTICLES ON OR AGAINST THIS APPLIANCE.
- DO NOT MODIFY THIS APPLIANCE.

When you smell gas:
- do not use any electrical switches that could cause a spark,
- shut down the main gas valve,
- open doors and windows,
- immediately contact your gas supplier.

In case of any failure you should:
- disconnect the boiler from the power source,
- turn off the gas supply valve,
- cut off the water supply and drain the water from the boiler (in case of leakage that could cause the boiler to flood) and the whole central heating system (especially when there is any risk of freezing the system),
- contact the nearest AUTHORISED SERVICE COMPANY or the manufacturer.

WARNING!

Read this instruction manual carefully.

This manual is intended to guide the installation, maintenance, and operation of the X Boiler BD Series.

Failure to adhere to these guidelines can result in severe personal injury or substantial damage to property.

The manufacturer cannot accept responsibility for any damages and losses resulting from:

- incorrect installation of the boiler
- technical modifications to the boiler beyond the scope of instructions found in this manual
- incorrect use of the boiler or work done by an unqualified person

Fig. 1

INSTRUCTIONS FOR FILLING THE BOILER WITH WATER

These instructions should be followed before the start up of the condensing boiler connected to a Central Heating System (C.H.)

1. Fill the heating circuit with water and vent the radiators before start up.
2. Check that the connection of the electrical cord to the boiler is correct (network 23V/50 Hz)

   L – brown; N – blue; PE – yellow/green.
   Do not swap the L & N cords! If the L & N cords are changed, the boiler will enter failure mode and the error code E01 will be displayed.
3. Close the gas cut-off valve!
4. Open valves which cut-off the boiler from the C.H. circuit.
5. Remove the front cover of the boiler by unscrewing the relevant fixing screws (Fig. 1).
6. Remove the front cover of the combustion chamber (Fig. 2).
7. Loosen the stopper on the automatic air-vent of the pump. In order to protect the pressure transducer from water, point the outlet of the stopper to the right (Fig. 3).
8. Turn on the boiler. Wait until the start up procedure ends (during that time, the boiler is testing the internal assembly and the ventilation system), this takes about 10-30 seconds.
9. Fill the boiler with water by using the filling valve mounted on the C.H installation. It is important to open the filling valve slowly to protect the boiler and the components of the C.H. system against hydraulic shock.

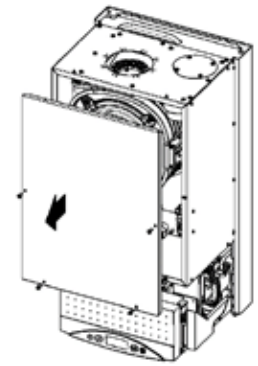


Fig. 2

10. While filling the boiler with water, check and control the pressure using the analogue pressure gauge on the boiler's front cover, or the electronic manometer on the controller display (depending on the boiler's type). Shut off the filling valve after reaching a pressure of 1.0-1.5 bar.

Note: in some boiler models, at the end of the start up procedure, the "support the venting of boiler" function starts. This function is signalised on the controller display by "Po" and lasts 3 minutes. The "support the venting" function requires the water pressure to be above 0.5 bar, therefore, it is best to maintain the water pressure in the boiler in the range 1.0-1.5 bar.

11. Set the operating mode to WINTER according to the boiler instruction. If the boiler controller has been connected to the room thermostat, then increase the desired temperature; the boiler should start operating in C.H. mode.
12. Because the gas valve outside the boiler is closed, the boiler will stop operating (E01 error code – a lack of gas). The pump will continue to operate, removing air flowing in with water from the installation and providing continuous water flow through the heat exchanger. Leave the boiler in this state for 2-3 min.

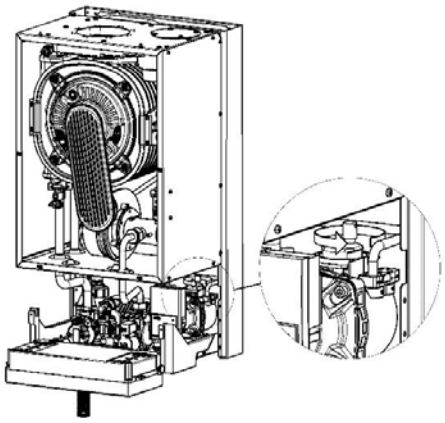


Fig. 3

13. Remove E01 error code by using the “reset” button and set the boiler controller on pressure reading mode (in the version without an analogue manometer). During the first days of a boiler’s operation, it is recommended to set the water pressure in the C.H. circuit between 1.8 – 2.0 bar. This will facilitate the work of the air-vent on the boiler pump and on the components of the C.H. circuit. **
14. Unscrew the gas valve and delete the E01 code again.
15. Set the desired operating parameters of the boiler according to the instruction manual. ***
16. Check the water pressure in the C.H. circuit and if necessary, fill the pressure up to the right level.

* *Depending on the size of the C.H. circuit, the time required to fill the boiler with water can be different. It is recommended to fill the C.H. installation with water beforehand.*
** *In residential C.H. circuits, the nominal operating pressure should be set between 1.2-1.6 bar.*
*** *Note! The X Boiler is factory set for operating with underfloor heating. For use with radiator heating,, the boiler control system will be adopted to other operating parameters. This action is performed by an Authorised Service Company.*

1. INTRODUCTION

The X Boiler BD Series is a condensing gas-fired boiler designed for the central heating (C.H.) of residential buildings and for heating domestic hot water (DHW). Condensing boilers are more efficient, using less fuel (contributing to lower running costs) than non-condensing boilers. Their increased efficiency means less carbon dioxide is emitted, making them better for the environment compared to their noncondensing counterparts.

The X Boiler BD Series comes in two types: X Boiler BD 23 and X Boiler BD 38. These boilers can be adapted for use with a storage tank by an AUTHORISED SERVICE COMPANY.

In C-TYPE installations, the combustion circuit of the boiler is sealed. That is, the boiler is set up to take air needed for combustion from outside the building. Installations that take the air for combustion from inside the room where the boiler is installed must meet the stringent conditions required by law. For further information about installations see section 3.8 and PN-EN 15502-2-1: 2013-04.

2. BOILER DESCRIPTION

The X Boiler BD Series with its components labelled is illustrated in Fig. 2.2.1.2 and Fig. 2.2.1.3. Below are the technical specifications of the boiler:

2.1 TECHNICAL SPECIFICATIONS OF THE BOILER

- Electronic fluent flame modulation for the central heating system and domestic hot water;
- Electronic ignition with ionisation flame control;
- Adjustable boiler power;
- Regulation of heating water and domestic water temp.;
- Soft ignition function;
- Inlet gas pressure stabilisation;
- Adopted to connect with a closed circuit C.H. system;

2.2. COMPONENTS OF THE BOILER AS ILLUSTRATED IN FIG. 2.2.1.2 AND FIG. 2.2.1.3

5. Fan
7. Pump
8. Gas unit
10. Flame control/ Ignition electrode,
11. Burner
12. 3-way valve
13. Flue gas-water heat exchanger
15. Temperature limiter as a protection against exceeding the water temperature upper limit
16. Thermal fuse of flue gas
17. Expansion vessel
18. NTC sensor of heating water supply
19. Heating water pressure transducer
20. Air -vent
21. Plate water-water heat exchanger
22. Filling valve of installation
25. Safety valve - 3 bar
26. Domestic water flow sensor
27. NTC sensor of domestic water temperature
28. NTC temperature sensor of heating water - return (only in boilers with PWM pumps)
29. Siphon
30. Mixing unit
33. Drain valve

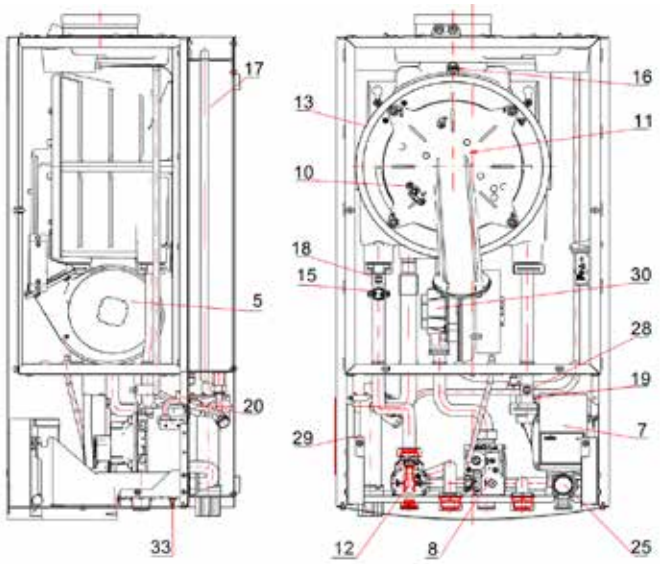
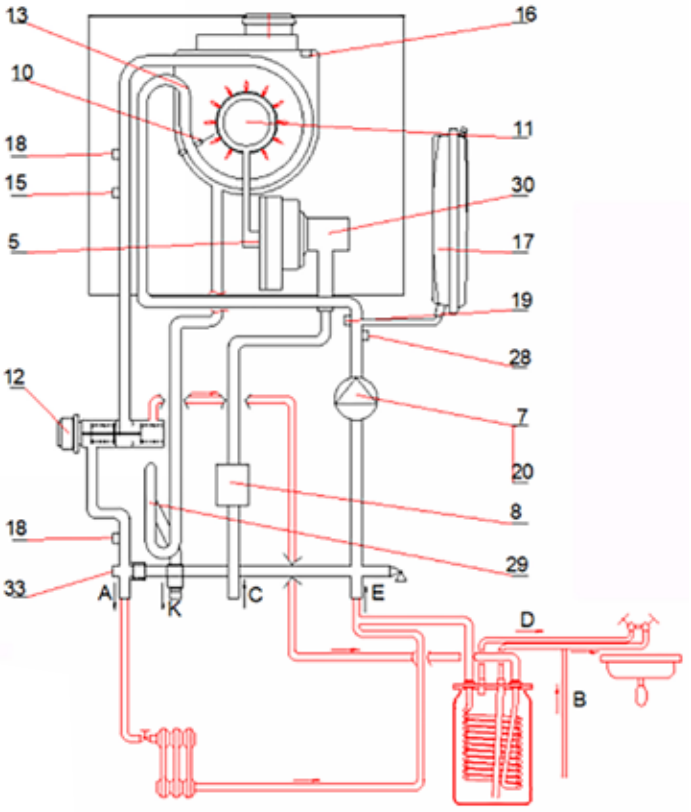
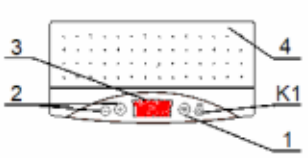


Fig. 2.2.1.2. Location of elements in system boiler: X BOILER BD Series

1. The boiler is fitted with a control panel (illustrated in Fig. 2.2.1.3) possessing a display that continuously provides information on the operating status of the boiler. The system's parameters, e.g., temperature set points are easy to adjust and configure. Any operational problems are immediately signalled by the display and, in certain cases will be corrected automatically.





1 Boiler function selection button/switch
2 Temperature selector (C.H. or DHW)
3 Heating water, domestic water, and static pressure and temperature display with error codes diagnostic
4 Control panel Kt.
K1 ON/OFF, reset

A Central heating system and a storage tank supply
B Domestic cold water
C Gas
D Domestic hot water
E Return from central heating system and from a storage tank

Fig .2.2.1.3. Scheme of boiler operation
for Australia and New Zealand please refer to settings in Table 4.3.2.1 on p21

2.2.2 Technical data

Parameter	Unit	X BOILER BD	
		23	38
Energetic Parameters			
Boiler thermal power at 80/60°C (modulated)(natural gas)	kW	3.1 ÷ 23.0	4.5 ÷ 38.0
Boiler thermal power at 50/30°C (modulated) (natural gas)	kW	3.2 ÷ 25.3	5.0 ÷ 41.8
Boiler thermal power at 80/60°C (modulated)(LPG)	kW	3.4 ÷ 25.8	4.5 ÷ 38.0
Boiler thermal power at 50/30°C (modulated) (LPG)	kW	3.7 ÷ 28.4	5.0 ÷ 41.8
The efficiency of the boiler at nominal load and average boiler water temp. 70°C	%	97.6	98.0
The efficiency of the boiler at partial load and return water temperature 30°C	%	107.9	109.0
Modulation range	%	13-100	12-100
Seasonal space heating energy efficiency η_s	%	94	94
Seasonal space heating energy efficiency class		A	
Nominal Gas consumption: natural: 2E-G20 liquid: ULPG	MJ/ h	 94 106.0	 157.5 157.5
Nominal kinetic pressure in front of the boiler for gas: 2E-G20 ULPG	Pa (mbar)	2000 (20); 2500 (25); 2000 (20); 1300 (13); 1130 (11,3) 2800 ÷ 3000 (28 30); 3000 (30); 3700 (37); 5000 (50)	
Maximum water pressure	MPa (bar)	0,3 (3)	
Max temperature (central heating)	°C	95	
Standard adjustable temperature Reduced adjustable temperature	°C	40 ÷ 80 25 ÷ 55	
Lift of the pump at flow 0	kPa (bar)	95	
Parameters of flue gas			
Fan characteristics		→ section 4.4 of this manual	
Flue gas mass flow at full load	kg/h	34.7	59.0
Flue gas mass flow at partial load	kg/h	5.2	8.7
The minimum flue gas temperature at minimum thermal power	°C	44	34.3
The maximum flue gas temperature at maximum thermal power	°C	61	66.7
Fan characteristics			
Time parameters			
Time of central heating pump rundown	s	180	
Time preventing the anti-cyclical startup of the boiler (Anti-cycling time)	minutes	1÷ 60	
Time of domestic hot water pump rundown	s	→ section 4.4 of this manual	
Protection against pump and valve blocking	h /s	the pump turns on for 180 seconds every 24 hours the pump and three way valve turns on for 15 seconds every 48 hours	
Assembly dimensions			
Connection to the chimney duct (section 3.8. and table 7.1.)	mm	Coaxial Ø80/Ø125 or Coaxial Ø60/Ø100	
Connection of heating water (CH) and gas	inch	G3/4	
Dimensions (internal boiler)	mm	740x400x340	740x400x340
Dimensions (external boiler with outdoor casing)	mm	1220x540x350	1220x540x350
Boiler weight	kg	31.5	37.5
Environmental protection			
Emissions of nitrogen oxides	mg/kWh	21	29
Emission of NO (natural gas)	class	6	
The pH of the condensate		natural gas - 5	
Sound power level L_{WA}	dB	48	48
Hydraulic parameters			
Expansion vessel capacity	dm	6	
Water pressure in expansion vessel	MPa (bar)	$0.08_{\pm 0.02}$ $(0.8)_{\pm 0.2}$	

Electric parameters			
Type and supply voltage	V	~ 230 ±10%/50Hz	
Degree of protection		IPX4D	
Power consumption	W	110	
Standby mode power consumption PSB	kW	0.005	
Electricity consumption : - at full load - at part load	 kW kW	 0.05 0.02	 0.05 0.02
Maximum nominal current value of output terminals	A	2	
Type of flame sensor		ionization	

For Australia and New Zealand, please refer to settings in Table 4.3.2.1 on page 24.

The manufacturer reserves the right to make changes to the construction of the boiler, which are not mentioned herein and have no influence on the technical and functional characteristics of the boiler.

2.3 EQUIPMENT PROTECTION

The X Boiler BD Series is made up of many intricate components that require protection. The following protective measures ensure the boiler's safety and longevity in response to different negative scenarios it could be subjected to during the course of its operation:

- Protection against gas outflow
- Protection against explosive gas switching on
- Protection against exceeding the max temperature in the heating water system
- Protection against exceeding the upper limit of heating water temperature
- Protection against water pressure increase (1st degree) - electronic
- Protection against water pressure increase (2nd degree) - mechanical
- Protection against drop of water pressure
- Protection against water overheating
- Anti-freezing protection of the boiler
- Protection against pump blockage
- Monitoring of correct fan operation. Fan failure is detected if the current fan speed is different from that expected by the driver of the boiler.
- Protection against exceeding the upper limit temperature of flue gas (115°C).

Errors which do not require manual reset will cause the boiler to return to normal operation after automatic disappearance of failure. See section 5.8 for boiler diagnostics.

NOTE! In case of repeated emergency boiler shut-downs in response to equipment protection measures, it is necessary to contact an Authorised Service Company for diagnosis and repair. It is forbidden to make any unauthorised modifications to the protection system.

2.4 OPERATION DESCRIPTION

2.4.1 Heating water in a central heating system

The boiler switches on if the heating water temperature drops about 5 degrees below the set temperature - as described in section 5.5.1. The room thermostat gives the boiler the signal to heat and the following conditions occur simultaneously:

- power supply of the three-way valve (item 12 towards the central heating installation),
- pump supply (item 7),
- fan supply (item 5),
- the sequence of ignition,
- the driver starts the fan speed regulation in order to obtain the desired temperature of heating water

The boiler switches off when the room temperature control unit is signalising the desired temperature in the room or when the heating water temperature is higher than desired (by value of hysteresis see P20). In this case, "L3" is shown on the display. After switching off the burner, the pump continues to run for about 180 s and the fan for 15 s.

Restart of the boiler takes place automatically under the following conditions simultaneously:

- heating water temperature is 5°C lower than the set temperature,
- room temperature control unit shows the signal "HEAT",
- waiting time controlled by parameter P25 has passed (default is 3 minutes) after L3 was displayed.

The list of driver parameters can be found in Table 5.6.

NOTE! Signal occurs: If RT regulator contacts are closed or due to operating in the weather function mode without a room thermostat (P26=2).

2.4.2 Temperature regulation dependent on external temperature

When an external temperature sensor is connected, the boiler controller detects it automatically and switches to the weather function mode. In this mode, the controller adjusts the heating water temperature according to the relationship described by the heating curves in Fig. 2.4.2.1 and Fig. 2.4.2.2. The graphs show that the heating water temperature is a function of the outside temperature, the coefficient of the slope of the heating curve K_t and the value of parameter P22. A flat heating curve means that if the outdoor temperature changes by a large value, the heating water temperature leaving the boiler will only need to change by a small value (e.g., a well-insulated house). On the other hand, for a steep curve, a small change in outdoor temperature needs a correspondingly large change in the heating water temperature (e.g., a poorly insulated house).

Changing the value of the coefficient Kt (the slope of the heating curve) is explained in section 5.5.1.1.

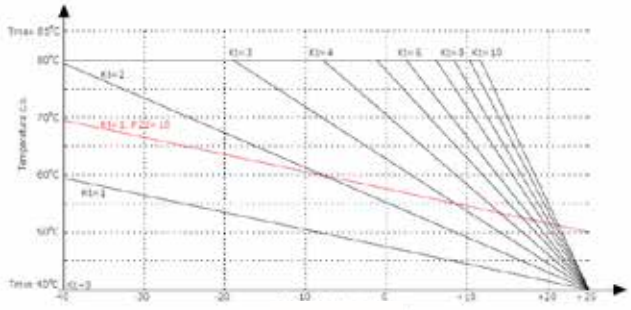


Fig.2.4.2.1 Diagram of the heating curve (standard heating)

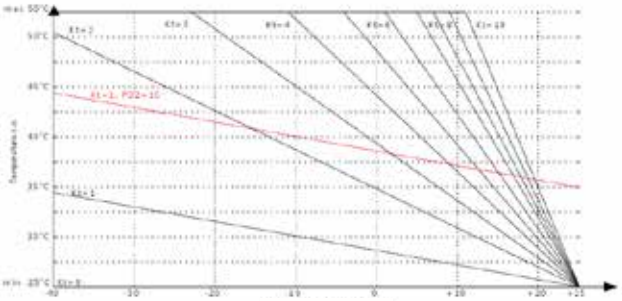


Fig.2.4.2.2 Diagram of the heating curve (floor heating)

NOTE!

1. For value T_{out} = 25°C and P22=0, the calculated temperature, T.C.H. is always equal to Tmin. At Kt_{max}. and P22=0, T_{max} is reached when T_{out} is 10°C.
2. T_{max} will not exceed 80°C for standard heating and 55°C for floor heating regardless of the value P22.
3. In situations where the boiler operates in weather function mode without a room thermostat (parameter P26=2), the room temperature regulator (RT) input is treated as an input for the choice of time of day: DAY (contact open), NIGHT (contact closed). During NIGHT time, the calculated temperature, T.C.H is reduced by the P28 parameter value. The boiler starts heating C.H. water if the outdoor temperature is lower than the P27 parameter value. The boiler stops heating C.H. water if the outdoor temperature is higher than the P27 parameter value for at least 3 hours.
4. If P26=0, the weather function is not activated. It is only an outdoor temperature measurement.
5. Parameter P29 controls maximum C.H. water temperature.

2.4.3 Heating water with the X Boiler BD Series connected to a domestic water tank

The X Boiler BD Series is factory designed to connect with a domestic hot water tank. The domestic water temperature is displayed and can be adjusted with the control panel of the boiler.

The heating process for domestic water:
When the water temperature sensor of the hot water tank detects that the temperature is 5°C lower than the set value (see section 5.5.2), the process of pumping water to the central heating system is stopped. The process for heating domestic water with a boiler connected to the domestic hot water tank starts as follows:

- the water temperature sensor detects that the temperature is 5°C lower than the set value (for example, as a result of opening a tap);
- the boiler controller switches the three-way valve to pump water to the hot water tank circuit while giving a signal to the spark generator and gas valve (item 8);
- heating water with temperature described by parameter P21 (default 75°C) flows through the coil of the tank (short circuit);
- after exceeding the set water temperature in the tank by 1°C, the boiler controller switches the 3-way valve to the hydronic heating circuit. After meeting the below-mentioned conditions, the heating water is pumped into the central heating system:
  - heating water temperature is 5°C lower than the set temperature
  - room temperature regulator gives a signal "HEAT".

The temperature of hot water at the point of consumption may be different from the set value, and therefore it is advisable to install a mixing/ tempering valve for domestic hot water systems.

Water heating in the hot water tank is active when the electrical bridge is mounted on the TANK-TIMER input (Fig. 3.9.1.) and when the set temperature value is higher or equal to the minimum value. If the value is set lower than the minimum, the hot water tank circuit is closed. This does not apply for frost protection function.

NOTE! To eradicate Legionella bacteria in the storage tank, the boiler is turned on every 168 h and the water in the tank is heated to 65°C. If the Legionella function does not work in automatic mode, the user at any time can manually initiate a single cycle of tank heating to 65°C.

2.4.3.1 Manual initiation of domestic tank overheating - Anti-Legionella function in manual mode
** (applies to the boilers with tanks):*

If the boiler is operating in SUMMER mode:
Press the button twice. The first press of the button shows (ready to modify) option C.H. setting on the control panel's display. Pressing the button a second time displays the symbols characteristic of Legionella Function; a flashing key symbol on the right of the display, on the left side, you can see the DHW temperature and the symbol MAX placed above it. See Fig. 5.2.1 for an illustration of the control panel display.

If the boiler is operating in WINTER MODE:
Press the button three times. Pressing the button the first time shows (ready to modify) option C.H. setting on display. Pressing the button a second time displays the symbols characteristic of the Service Function. The third press of the button displays the symbols characteristic of the Legionella Function.

In both modes of operation:
To activate the Legionella function, hold the "+" button for 2 seconds. After activation, the symbol 'key' will light up with a solid light. You have about 3 seconds to complete the Legionella function activation. After this time, or when you press the reset button, the system goes to the "selection of operation mode" (winter or summer).

During the implementation of Legionella Function, the temperature field (on the left side) is dimmed.

2.4.4 Operation of the pump with adjustable speed.

For boilers equipped with a variable speed pump (PWM) while operating in DHW mode the pump speed is determined by parameter P19.

For conventional PWM pump operation (parameter P15=0)
The PWM pump (activated by parameter P12) works with a modulated speed in the C.H. system activated by the signal from the room temperature regulator (RT). The rotational speed is adjusted in such a way in cooperation with the modulator to achieve the value of delta T defined by parameter P13 (the difference between outgoing and return temperature of the central heating system). Achieving and maintaining the set temperature of the central heating system is the priority. The minimum allowable rotational pump speed is determined by parameter P14. The maximum allowable rotation of the pump is determined by parameter P18.

ECO mode (parameter P15 = 1)
The PWM Pump (selection using parameter P12) works with a modulated speed in the C.H. system and is activated by the signal from RT. The pump's rotational speed is adjusted in such a way in cooperation with the modulator to achieve the expected delta T value, the difference between outgoing and return temperature of the central heating system (calculated on the basis of the preset ratio ECO.

The ECO factor can be changed using the boiler controller between the range 0.1 to 0.9. The default value (optimal in most cases) is 0.5. Selecting lower values results in lower gas consumption leading to reduced heat energy being transferred into the room. The user benefits by being able to regulate the boiler to achieve the desired thermal comfort at minimum cost (less gas consumption, lower power consumption).

An ECO factor value of 0.5 is the maximum for which the control seeks to meet the conditions promoting condensation (C.H. return temperature <=55 C) regardless of the water temperature setting in C.H.. It is recommended to operate the C.H. system with an ECO ratio within the range of 0.1 to 0.5. If increasing the set C.H. heating water temperature does not produce adequate thermal comfort, the value of the ECO factor should be increased gradually. An ECO factor equal to 0.9 practically corresponds to the traditional work of a pump without speed control.

Irrespective of the mode of operation:
It is a priority to achieve and maintain the set C.H. temperature of water. The minimum allowable rotational speed of the pump is determined by parameter P14. The maximum is determined by parameter P18.

NOTE! If the temperature sensor of the return water from central heating is damaged or is not connected, the pump works at a constant speed.

2.4.4.1 Expected T value depending on the C.H. water setting and the ECO coefficient

The expected value of T depending on the C.H. water setting and the ECO coefficient.

Standard heating (P8 = 0): Setting of C.H. water									
Eco	40°C	45°C	50°C	55°C	60°C	65°C	70°C	75°C	80°C
0,1	24	30	35	35	35	35	35	38	42
0,2	21	26	30	30	30	30	30	33	37
0,3	18	22	26	26	26	26	26	28	31
0,4	15	19	22	22	22	22	22	24	26
0,5	12	15	17	17	17	17	17	19	21
0,6	9	11	13	13	13	13	13	14	15
0,7	6	7	8	8	8	8	8	9	10
0,8	3	3	4	4	4	4	4	4	5
0,9	0	0	0	0	0	0	0	0	0

Floor heating (P8 = 1): Setting of C.H. water					
Eco	35°C	40°C	45°C	50°C	55°C
0,1	16	24	30	35	35
0,2	14	21	26	30	30
0,3	12	18	22	26	26
0,4	10	15	19	22	22
0,5	8	12	15	17	17
0,6	6	9	11	13	13
0,7	4	6	7	8	8
0,8	2	3	3	4	4
0,9	0	0	0	0	0

3. BOILER INSTALLATION

The boiler must be installed by an authorised service company and according to local regulations. Installation of the boiler must be done so that its position is unaffected by any tension arising from increased work volumes (noise, vibrations, and stresses). After installation is complete, check the tightness of all gas, water, and flue gas connections in the system.

3.1 REQUIREMENTS FOR BOILER INSTALLATION

3.1.1 The installation regulations for the water, gas and the flue gas system

The use of gas appliances, flues and ventilation should be consistent with AS/NZS 5601 and local requirements relating to the technical conditions of their use in residential buildings.

Before installing the boiler, check whether the consent from the District Department of Gas, Chimney Sweep Company and Building Administration must be obtained.

NOTE!

Gas appliances supplied with liquefied gas must not be installed in rooms with a floor below ground level.

If liquefied gas 3B/P is used, it is recommended that the room temperature where the gas cylinder will be operated is not less than 15°C.

3.1.2 Regulations related to the room

Requirements for premises where gas appliances are installed should be in accordance with local regulations. The room where the boiler is to be installed should meet the air supply and venting system requirements for gas combustion, according to regulations. In addition, the room's temperature should be higher than 6°C and the location of the ventilation system should not cause the freezing of water.

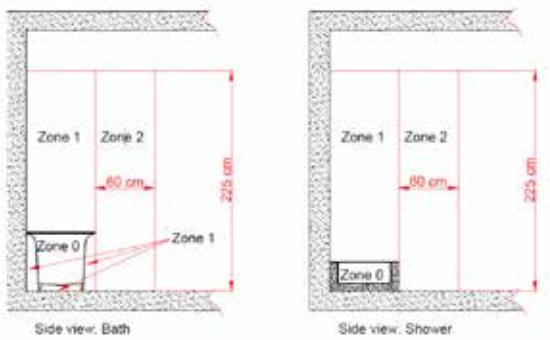


Fig. 3.1.2.1. The zones dimensions in areas containing a bath or shower with a pool

The room should also be free from dust and aggressive gases. It is forbidden to install the boiler in laundry rooms, drying rooms, or rooms where varnish, cleaners, solvents, and sprays are stored.

The device covered by this instruction manual has a Zone 1 degree of electrical protection provided by the housing - IPX4D. A boiler equipped with a power cord and plug can be installed in Zone 2 or further - but must not be installed in Zone 1, unless it is permanently connected to a power source, in accordance with HD 60364-7-701.

3.1.3 Requirements for electrical installation

The boiler has been designed for operation with single-phase alternating current with a rated voltage of 230 V/50 Hz.

The boiler has been designed as a "class I" device and must be connected to an electrical outlet with ground terminal in accordance with PN- IEC 60364-4-41.

NOTE! The main socket through which the boiler is powered must comply with PN-IEC-60364-6-61:2000

Be careful to connect the power cord correctly. If done incorrectly:

- the boiler enters into failure state
- E01 (error) will show on the display (see section 5.8.3)

In case of an incorrect connection, change cords “L” and “N” in the socket. When the correct connection is detected, the boiler unlocks automatically. The X Boiler has a degree of electrical protection provided by the housing - IPX4D.

In situations where the boiler is permanently connected to the power supply, the electrical installation should be equipped with a means of disconnecting the boiler from the power source, in the form of a junction box. The junction box must be equipped with protection to the degree appropriate for the defined assembly zone. In order to connect the boiler to the junction box, it is recommended to:

- cut the power cord to a suitable length for connection to the box
- pull off cable insulation
- use cable end-sleeves with appropriate diameter and connect everything according to the following diagram:

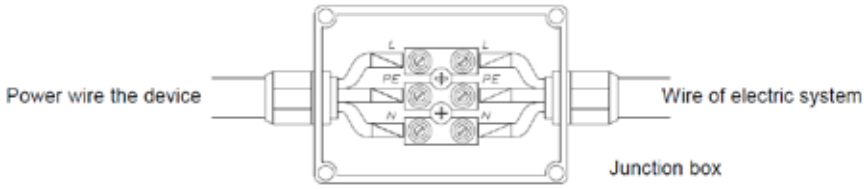


Fig 3.1.3.1 Wire colors: L – brown; N – blue; PE – yellow-green

3.2 PRELIMINARY CHECK ACTIVITIES

Before starting the installation, check:

- whether the boiler is factory designed for the type of gas supplied from the gas system. The type of gas which the boiler is designed for is specified on the rating plate on the cover of the boiler;
- whether the water system and radiators have been properly rinsed with water to remove rust, fillings scale, sand and other dusts that could pollute the heat exchanger or affect the boiler’s operation negatively (such as increasing the water flow resistance in the central heating system),
- whether the mains voltage has a value of 230 V and that the socket has an efficient safety contact (complies with PN-IEC-60 364-6-61: 2000).

3.3 MOUNTING THE BOILER ON THE WALL

Hang the boiler on hooks fastened durably into the wall using a beam placed in the upper part of the boiler. The boiler’s location should permit its eventual repair without any need to dismantle from the installation position.

For outdoor installations ensure the same clearances from the outer casing.

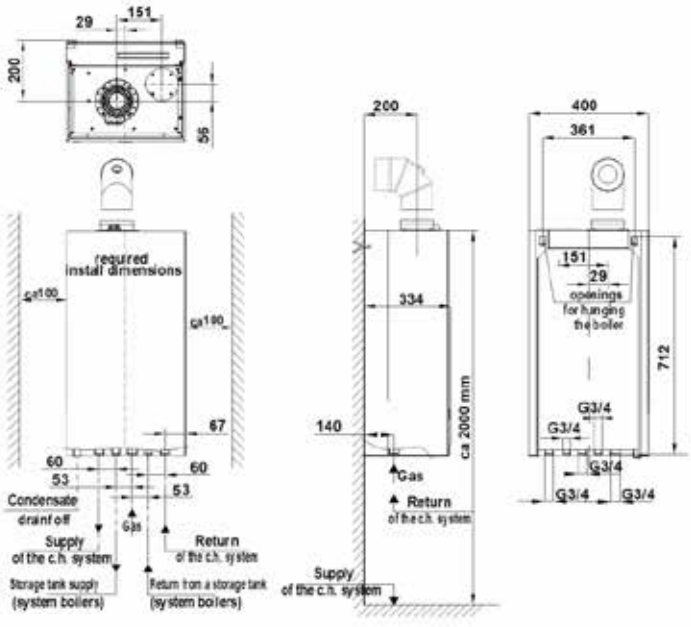
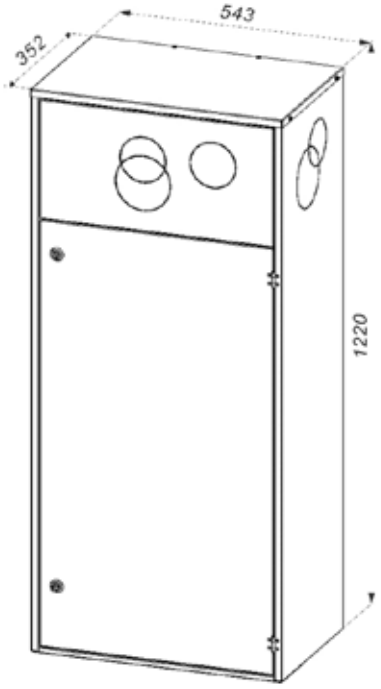


Fig. 3.3.1 Installation dimensions of the X boiler

3.4 MOUNTING THE OUTDOOR CASING

Set includes:

- Outdoor casing for boiler
- Set of keys for casing locks – 2 pcs.
- Mounting dowel set with screws – 4 pcs.

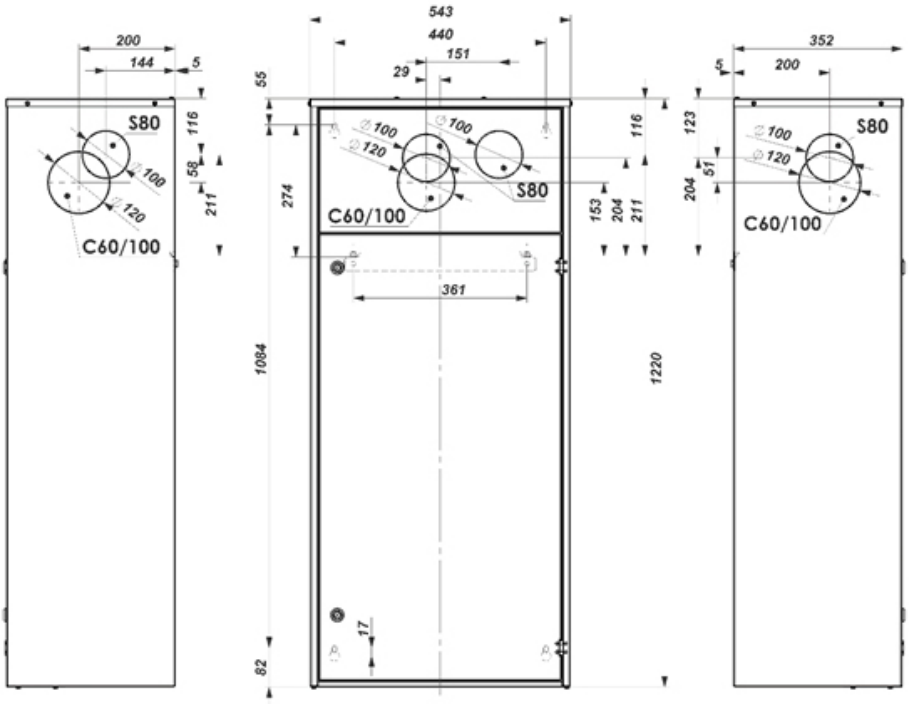


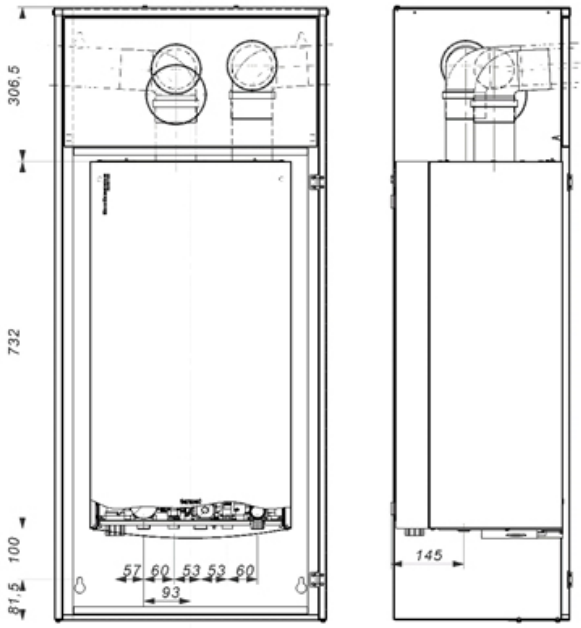
Intended use

The outdoor casing is designed for installation of the boiler in partially sheltered places, protecting the boiler from the influence of atmospheric factors and the interference of unauthorized persons.

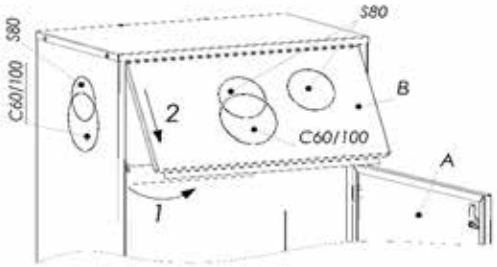
Warning:

The place of installation must be pre-protected against rain. Protection of the boiler against frost -according to the operating instructions of the device.

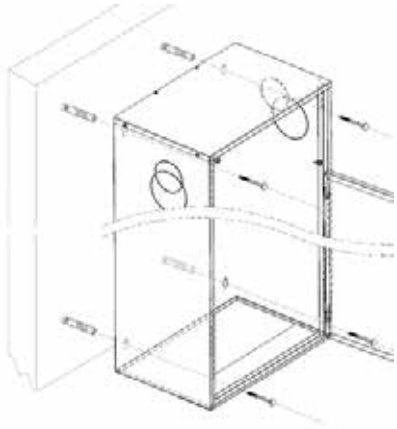




Installation of the boiler in the outdoor casing



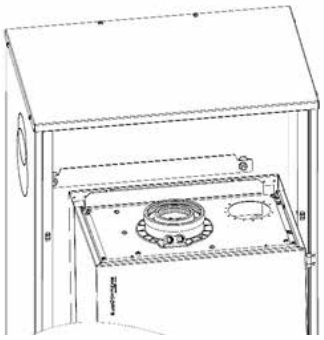
- In order to facilitate access to the mounting holes, open the casing door (A) using the enclosed keys, then remove the front cover (B).
- Before mounting the casing on the wall, break through holes for the flue gas system. Holes are described as:
  - C60/100 - are intended for a coaxial system ø60/ø100
  - S80 - are intended for a separate system ø80/ø80.
- Mount the outdoor casing on the wall using the enclosed expansion bolts (4 pcs.).



Warning:

Different substrates require a specific mounting system. Before starting the installation of the casing, it is necessary to check whether the enclosed mounting dowels are suitable for the installation location.

- Hang the boiler on a hanger inside the casing.
- Connection of the boiler to the gas and hydraulic system, as well as installation of the flue gas exhaust system and supply of combustion air, should be performed according to the instruction provided with the device.



Warning:

In case of installation of the boiler as a type B device - taking air from the room where it is located, the outdoor casing has appropriate ventilation to ensure the supply of air in the appropriate amount.

- After all necessary installation activities, install the front cover (B).

3.5 CONNECTION TO THE GAS INSTALLATION

Connect a gas supply pipe directly to the gas connection of the boiler using a connector with subassembly no 0696.00.00.00 (in boiler equipment).

NOTE! It is necessary to install a gas filter on the gas supply pipe to prevent harmful deposits from interfering with the boiler, ensuring the proper operation of the gas unit and burner. This filter is not included with the standard boiler equipment. It should be purchased separately.

Install a cut-off valve on the gas pipe in an accessible location.

3.6 CONNECTION OF THE BOILER TO A CENTRAL HEATING WATER SYSTEM

- Power supply and return connectors of the central heating boiler should be screwed to the installation. See Figure 3.3.1 for the location of the connectors.
- Install a water filter on the return water from the central heating system (in front of the connection with the pump). The filter is not included with the standard boiler equipment.
- The C.H. system should be thoroughly rinsed out before the boiler is connected. It is permitted to use a suitable antifreeze fluid as a heat carrier in the winter season.
- Cut-off valves need to be installed between the boiler and the C.H. system so that the boiler can be dismounted without draining the system. Do not install any thermostatic valves on radiators in the room where a thermostat is installed as their operation and communication with the boiler will be in conflict with one another.
- It is recommended to lead water out from the safety valve (item 25, 3 bar) to a floor drain using a tube or hose to reduce the risk of flooding during the safety valve activation (excluded of manufacturer's liability if flooding occurs).

Selection of expansion vessel
The X Boiler can be connected to a central heating system that has a maximum capacity of 105 liters. Connecting the boiler to a C.H. installation which requires a larger capacity is acceptable only after connecting an additional expansion vessel to the boiler. The vessel should be selected with reference to the design of the C.H. system and installed by an approved contractor in accordance with applicable regulations.

NOTE! Before installing the boiler, thoroughly flush the central heating system to free it from any solid impurities. It is recommended after the first start up of the boiler and heating of the installation to drain the water from the system to remove any residues of a metallurgical nature. This precautionary measure would benefit the device's operation and promote the effective long-term use of its components.

After boiler installation:
- It is recommended to drain the water from the system first to remove residues and dirty water after the 1st start up of the boiler and heating up of the installation. Install a filling valve from the installation. The pressure in cold installation should be in the range 1,0 to 1,5 bar (indicated by manometer).
- Vent the installation of the central heating and boiler;
- Check the tightness of the boiler connections in the central heating system.
- Install a filling valve and fill the heating system with water.

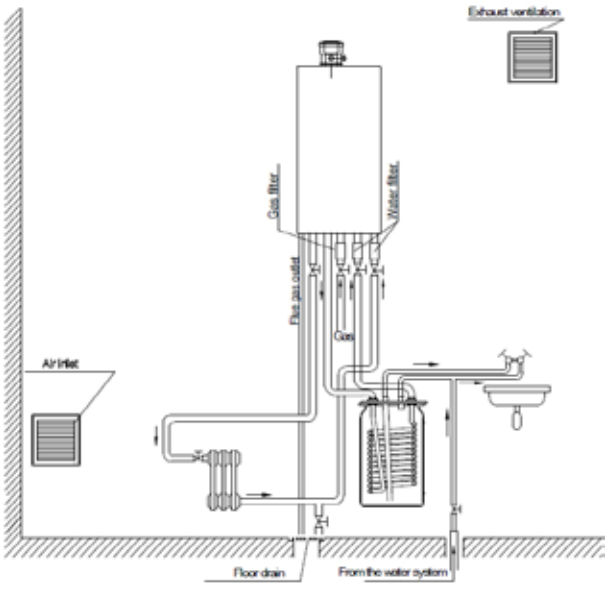


Fig. 3.5.1 Boilers installation requirements

3.6.2 System cleaning and the treatment of water for filling the C.H. system

The boiler is the most expensive part of the C.H. system. It is, therefore, necessary to protect components of the system like heat exchangers and other parts against harmful conditions such as limestone deposition and corrosion of internal walls and surfaces. Correct C.H. circuit preparation relies on performing two operations: cleaning the C.H. system and treating the water that fills the system.

System cleaning
In a new boiler installation, it is possible to find remains from industrial process soldering and welding, and residues from flux, oil, and grease among others. Older installations usually have products of corrosion in them. It is necessary to clean up the C.H. system with water first to remove any remains before the boiler is mounted. Afterward, the system should be cleaned with appropriate chemicals. For example, Cleaner F3 from Fernox in new installations and cleaner F5 for old and contaminated systems. Following that, the installation should be rinsed out with water.

Treatment of water for filling the central heating system
For filling the C.H. system, it is recommended to use water with parameters: pH 6,5- 8,5, hardness < 10 n (~ 18 F). Do not use demineralised or distilled water. To protect against limescale deposition and corrosion, it is recommended to use a special inhibitor. Heat transfer fluid HP-5 or antifreeze liquid can also be used. If the water hardness is very high, HP-5 effectively reduces the risk of heat exchanger calcification.

Low-temperature circuits
In low-temperature areas, it is recommended to treat the filling water using a heat transfer fluid such as HP-5 or Fernox AF10 biocide.

Filtration technique
Additionally, in order to ensure the quality of the heating system's operation, it is recommended to mount modern filters, which work on the principle of magnetic and cyclone effect, for example, Fernox TF1 filter.

NOTE!

- The method and amounts of specific products used for system cleaning and water treatment should be in accordance with the product manufacturer's instruction.
- The above steps should be performed by an authorised installer or service technician.

3.7 CONNECTION OF THE BOILER TO A DOMESTIC HOT WATER SYSTEM

It is recommended to install cut-off valves on a domestic hot water system which will enable easier maintenance and service.

NOTE! It is recommended to install a water filter in the connection with the domestic water supply. This filter is not included in the standard boiler equipment.

3.8 CONDENSATE OUTLET

Condensation formed during the combustion process must be drained according to the following requirements:

- Installed condensate drain must be made of corrosion-resistant material.
- Connection for draining the condensate cannot be blocked.
- To facilitate the draining of water condensing from the flue gas, all horizontal flue pipes must be installed with a fall of 3° (52mm / m).

3.9 FLUE GAS OUTLET

The X Boiler can be installed as a B-type appliance, for which the air needed for combustion is taken from the room where the boiler is installed. If installed as a C-type appliance, the air needed for combustion is taken from outside the building. Regardless of the source of air, provision needs to be made for the flue gas produced after combustion to escape. The flue gas outlet system installation depends on the type of combustion.

Depending on local regulations, some types of flue gas installations might not be allowed. Therefore, the regulations should be consulted before undertaking any flue gas projects. To ensure the boiler functions properly with the flue-gas outlet system installed, the appropriate pipe dimensions in terms of diameter, maximum length, and elbow resistance should be used. See Tables 3.8.1.1. and 3.8.2.1 for appropriate pipe dimensions depending on the installation.

Fig. 3.9.2 illustrates the different flue gas-air system installations. For the X boiler, the types of flue gas-air systems possible: coaxial system Ø80/Ø125 and Ø60/Ø100. Note that the flow resistance in each elbow is dependent on the bending angle. The related reduction of the maximum pipe length is given in section 3.8.5. The individual components of the flue gas-air systems are given in Table 7.1.

In addition, the flue gas-air system should be installed with a windproof outlet to protect against external factors.

Before turning on the boiler, make sure all connections associated with the flue outlet are tight.
After turning on the boiler, check the combustion parameters by noting the concentration of CO_2 and/or O_2 in the flue gas to be sure the boiler is operating properly.

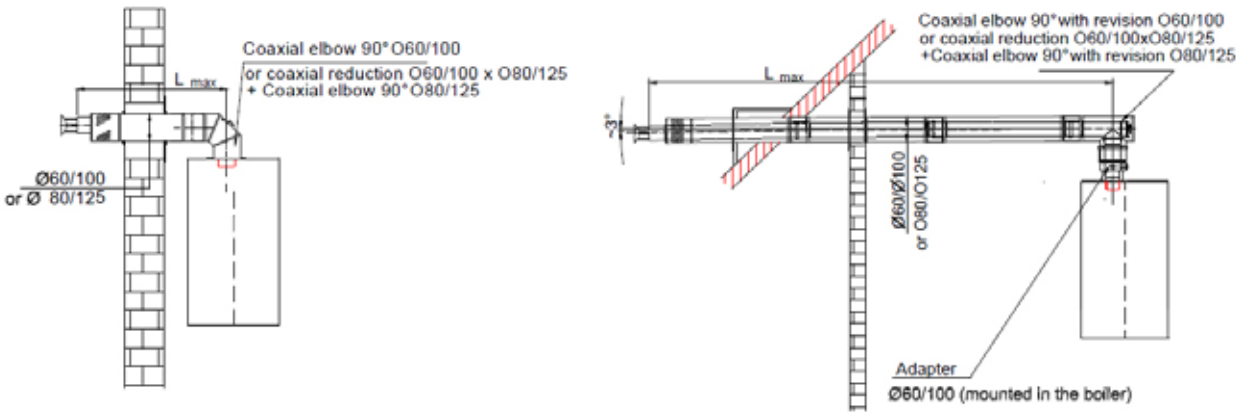
NOTE!

- The boiler is factory fitted with a coaxial exhaust system Ø60/Ø100 with a maximum pipe length 3m + elbow. Settings O2: 5%. For use with other flue gas-air systems and longer pipes, adjust the boiler as specified in section 4.2
- When using coaxial flue gas-air pipe Ø80/Ø125, apply a coaxial reduction Ø60/Ø100 x Ø80/Ø125 to adaptor Ø60/Ø100 mounted in the boiler; or replace the mounted adaptor Ø60/Ø100 and a reduction ring Ø60/Ø80 with adaptor Ø60/Ø100 (insert to resistance the exhaust pipe Ø80 directly to the heat exchanger). Adaptors connecting the boiler with the pipe system must have measuring points.
- The X Boiler meet the requirements for use in multi-story, flue gas-air systems (LAS).

3.9.1. Horizontal outlet of flue gas-air system through the wall or the roof

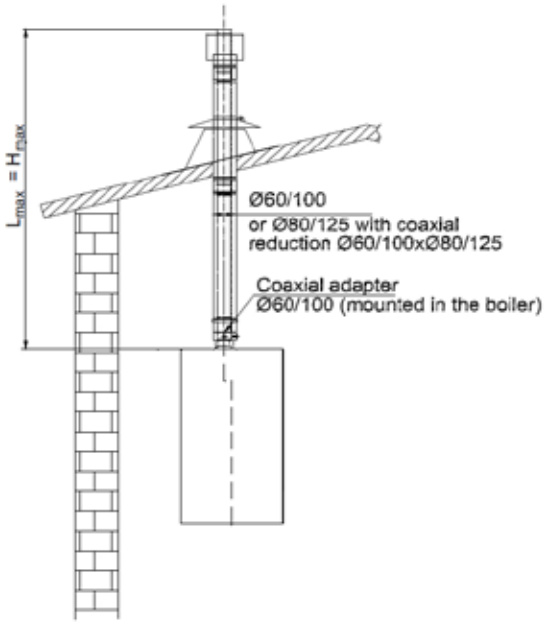
Table 3.8.1.1

Type of boiler	Coaxial system Ø60/Ø100
X BOILER BD 23	Maximum length of chimney flue L_{max} = 15 m
X BOILER BD 38	Maximum length of chimney flue L_{max} = 12 m
	Coaxial system Ø80/Ø125
X BOILER BD 23	Maximum length of chimney flue L_{max} = 25 m
X BOILER BD 38	Maximum length of chimney flue L_{max} = 20 m



3.9.2 Vertical outlet of air- flue gas system through the roof

Table 3.8.2.1



Type of boiler	Coaxial system Ø60/Ø100
X BOILER BD 23	Maximum length of chimney flue L_{max} = 15 m
X BOILER BD 38	Maximum length of chimney flue L_{max} = 12 m
	Coaxial system Ø80/Ø125
X BOILER BD 23	Maximum length of chimney flue L_{max} = 25 m
X BOILER BD 38	Maximum length of chimney flue L_{max} = 20 m

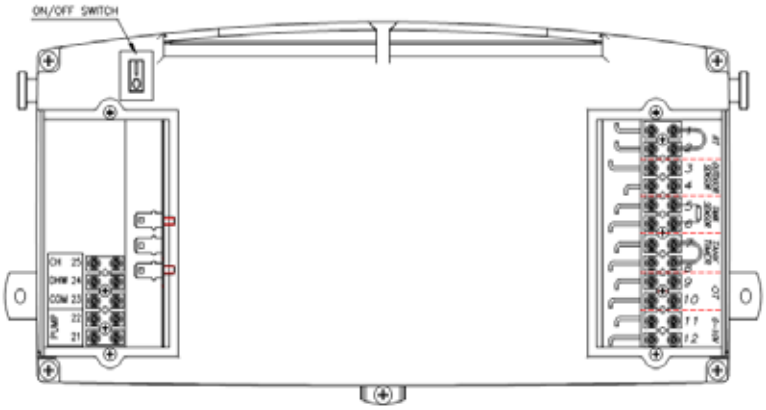
3.9.3 Reduction of the maximum length of the air-flue system by changing the flow direction

Type of Fitting		
15°	**45°**	**90°**
0.25m	**0.5m**	**1m**

3.10 CONNECTION OF ADDITIONAL DEVICES

Access to the electrical terminals of the controller can be found at the back of the controller, under the two flaps.

To connect an additional device, unscrew the appropriate flap, put the cable through the bushing in the flap and connect the ends of the wire to the correct terminals.



RT – room temperature controller

OUTDOOR-SENSOR – outdoor temperature sensor

OT –OpenTherm regulator

0-10V - control signal in the range of 0 do 10V

TANK-SENSOR – tank temperature sensor

TANK-TIMER- tank time regulator

Fig 3.9.1. Electrical terminals at the back of the controller

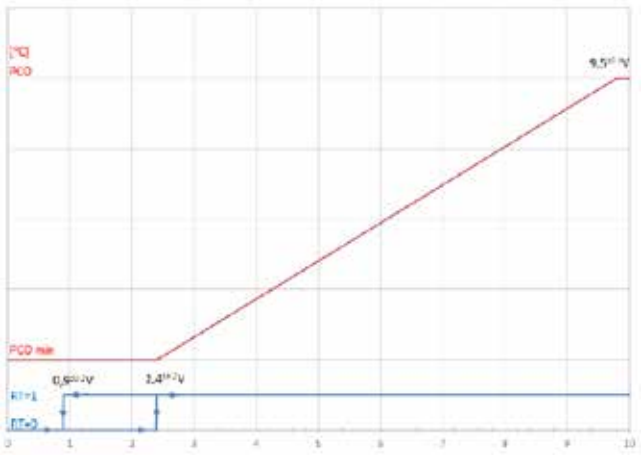
3.10.2 Connection of a room temperature regulator

3.9.2.1 Room regulator with contact.
The X boiler has been designed to cooperate with a room temperature control unit (thermostat) which has its own power supply source and control contact free from potential. Connection to the boiler must be made according to the instructions provided by the room regulator's manufacturer. An appropriate length of two-core cable (2x0,5mm^2 50m max) is used to connect the thermostat to terminals 1 and 2. We advise that an AUTHORISED SERVICE COMPANY or AUTHORISED INSTALLER perform the connection between the room temperature regulator and the boiler.

3.10.2.2 Outside temperature sensor
- Use a two-core cable (2x0,5mm^2 50m max) to connect an outside temperature sensor, to terminals 3 and 4 (OUTDOOR-SENSOR) located under the right flap. (Fig. 3.9.1)
- The connection must be made according to instructions provided by the sensor's manufacturer. It is best to place the outside temperature sensor on the north wall of the building and it should not be exposed to direct sunlight.

3.10.2.3 A room regulator with a 0-10V signal
- The boiler can be connected to a regulator with a 0-10V signal. The signal is translated into RT high state and target value of modulation temperature (SETP).
- The range of SETP values can change depending on the value of the set minimum for C.H. temperature (PCOmin) and the currently set C.H. temperature (PCO) value according to the graph.

If the weather regulator is active (parameter P26>0), then based on the outdoor temperature and Kt factor, it modifies the upper boundary value of C.H. circuit temperature.



NOTE! While using the 0-10V regulator, RT connectors must be free from the electrical bridge and stay disconnected.

4. BOILER ADJUSTMENT AND PRELIMINARY SETTING

4.1 INTRODUCTORY REMARKS

The purchased boiler is factory adjusted with parameters set for the type of gas that is printed on the boiler's rating plate and in the boiler's instruction manual. Only an AUTHORISED SERVICE COMPANY can perform changes to the boiler's parameter settings if it becomes necessary to do so or to adjust the boiler to another type of gas.

4.2 ADJUSTING THE BOILER TO COMBUST ANOTHER TYPE OF GAS

The boiler can be adjusted to combust another type of gas, provided that it is a gas for which the boiler is certified. The types of gases certified for use in the boiler are given on the rating plate - in the index designation.

Category II_{2E3P}, $II_{2E3B/P}$

Group 2 – naturalgases:
2E-G20 (2H)

Group 3– liquefied gases
3B/P-G30
3P-G31

Setting for the gas:	liquefied
Gas symbol:	**3B/P**
Gas pressure [mbar]	**30**
Set the nominal heatload ..... [kW]	

After adapting the boiler to combust another type of gas:
- Cross out on a rating plate the type of gas to which the boiler was adapted by the manufacturer,
- Write down the symbol of the gas, to which the boiler has been adjusted and the set heat load on the appropriate label that is attached bulk to the user manual. The entry must be written legibly and indelibly.

NOTE! Adapting the boiler to combust another type of gas must be performed only by a QUALIFIED SERVICE COMPANY. This service is not included in the warranty repairs.

After adjusting the boiler to combust a different type of gas, check if:
- the tightness of the gas system connections was confirmed with the signature and stamp of the installer after the boiler installation,
- the electrical installation was made in accordance with applicable regulations,
- the connection between the boiler and the chimney is tight and confirmed by a qualified chimney service as correct.

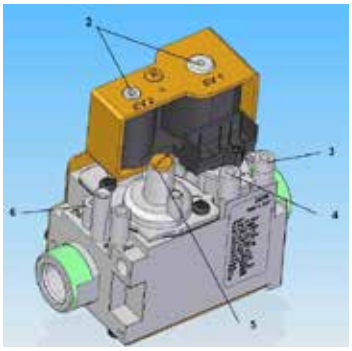


Fig. 4.2.1 Gas valve

2. Gas valve coils EV1-EV2,
3. Measuring point of inlet gas pressure,
4. Measuring point of outlet gas pressure,
5. A minimum pressure adjustment screw,
6. A maximum pressure adjustment screw

4.3 BOILER ADJUSTMENT

The below-described gas flow regulations are only necessary when the gas unit is to be replaced. The flow regulations are for boilers with power ratings given in Table 4.3.1. and 4.3.2.

Before adjusting the boiler, activate the service function of the boiler in the following way:
- set the mode: WINTER; see section 5.3
- press the ||||| button twice
- on the control panel display, the appropriate symbol flashes. The left field shows the fan rotational speed with the max symbol placed above it. The right field shows the C.H. temperature.
- Within 5 seconds, press the "+" button for 2s; after service function activation, the symbol stops flashing
- use the "+" button to increase the fan speed to maximum (defined by parameter P05)
- use the "-" button to decrease the fan speed to minimum (defined by parameter P04)
- The service function remains activated for 10 min. To terminate early, press the reset button.

4.3.1. Gas flow regulation in the boiler (without using the flue gas analyser)

Maximum power adjustment	Minimum power adjustment
• Set the maximum fan speed according to section 4.3.1. Check the gas flow rate on the gas meter for compliance with Table 4.3.2.1. If you need to change the gas flow, turn the screw (item 6, Fig. 4.2.1.). • Turn the screw to the left to increase the flow, turn the screw to the right to decrease it. Use the gas meter to read and set the gas flow value.	• Set the minimum fan speed according to 4.3.1 • During the boiler's operation, measure the gas inlet pressure at the measuring point (item 3, Fig. 4.2.1). The pressure depending on the type of gas is given in Table 4.3.2.1, • Remove the cap from the measuring point (item 5, Fig.4.2.1.) • Set the minimum gas flow according to the values given in Table 4.3.2.1 by using the adjusting screw (item 5, Fig. 4.2.1), • Turn the screw to the right to increase the flow, turn the screw to the left to decrease it.

4.3.2 Adjustment of the boiler with a gas analyser

Maximum power adjustment	Minimum power adjustment
• Set the maximum fan speed according to section 4.3.1 • During the boiler's operation, measure the gas inlet pressure at the measuring point (item 3, Fig. 4.2.1). The pressure depending on the type of gas is given in Table 4.3.2.1 • Connect the flue gas analyser • Using the adjusting screw (item 6, Fig.4.2.1), set the gas flow to obtain the required composition of the flue gas provided in Table 4.3.2.1.	• Set the minimum fan speed according to section 4.3.1 • During the boiler's operation, measure the gas inlet pressure at the measuring point (item 3, Fig. 4.2.1.) The pressure depending on the type of gas is given in Table 4.3.2.1 • Connect the flue gas analyser • Remove the cap from the measuring point (item 5, Fig.4.2.1.) • Using the adjusting screw (item 5, Fig.4.2.1), set the gas flow to obtain the required composition of the flue gas provided in Table 4.3.2.1.

NOTE!

- Check the settings for the maximum and minimum gas flow. If the adjustment is complete, close all measuring points, check for tightness and re-seal where necessary. The data in Table 4.3.2.1 is specified for gases at normal conditions (15°C , 1013 mbar), with respect to a boiler efficiency of 97.4%.
- When commissioning the X Boiler, make sure that the cover of the heat exchanger. If this cover is not on, or not properly screwed, it can affect the readings of the gas analyser
- Run the X Boiler for about 15 minutes before commissioning it.

Table 4.3.2.1 The control parameters of the boiler

Gas type		Unit	BD 23		BD 38	
			Min Power	Max Power	Min Power	Max Power
Natural Gas	Inlet pressure	kPa	1.13 – 3.00			
	Parameters	-	P04 =12 P06 =12	P01 = 35 P05 = 66	P04 = 12 P06 = 12	P01 = 40 P05 = 63
	Flue gas content	%	$CO_2 = 10.0^{\pm 0.2}$ $0_2 = 4.1^{\pm 0.4}$	$CO_2 = 9.5^{\pm 0.2}$ $0_2 = 5.2^{\pm 0.4}$	$CO_2 = 10.0^{\pm 0.2}$ $0_2 = 2.3^{\pm 0.4}$	$CO_2 = 9.5^{\pm 0.2}$ $0_2 = 4.5^{\pm 0.4}$
	Gas flow rate	l/min	$5.0^{+0.5}$	40.0^{+1}	$9.0^{+0.5}$	$66.0^{+0.5}$
LPG	Inlet pressure	kPa	2.75 – 3.00			
	Parameters	-	P04 = 12 P04 = 12	P01 = 40 P05 = 74	P04 = 12 P06 = 12	P01 = 40 P05 = 77
	Flue gas content	%	$CO_2 = 11.3^{\pm 0.2}$ $0_2 = 3.6^{\pm 0.4}$	$CO_2 = 11.6^{\pm 0.2}$ $0_2 = 2.6^{\pm 0.4}$	$CO_2 = 11.5^{\pm 0.2}$ $0_2 = 3.5^{\pm 0.4}$	$CO_2 = 11.0^{\pm 0.2}$ $0_2 = 4.4^{\pm 0.4}$
	Gas flow rate**	l/min	$2.5^{+0.5}$	15.0^{+1}	$3.2^{+0.5}$	26.2^{+1}

** Regulation settings for closed combustion chamber. Flue analyzer connected to test connectors on the flue adapter.*
*** Parameters of gas flow in above table are indicative only.*

- *Concentrations of CO2 and O2 are measured with reference gas.*
- *Boiler regulation should be performed at minimum and maximum power*
- *Factory default speed settings of the fan at minimum power (parameter P4) are 1500 RPM. If flow resistance of flue-gas system is low (such as short chimney or large cross-section of the chimney) it is possible to use speed settings below 1500 RPM. It allows to achieve lower minimum power. Minimum fan speed is 1200 RPM. If fan RPM is changed gas valve must be regulated again according to the table.*
- *If flue-gas system flow resistance is high (very long chimney, corrugated pipe) it might be necessary to increase minimum fan RPM.*
- *Power of the boiler connected to a tank should be adjusted for DHW circuit according to power of the coil inside the tank (parameter P2)*

4.4 FAN CHARACTERISTICS

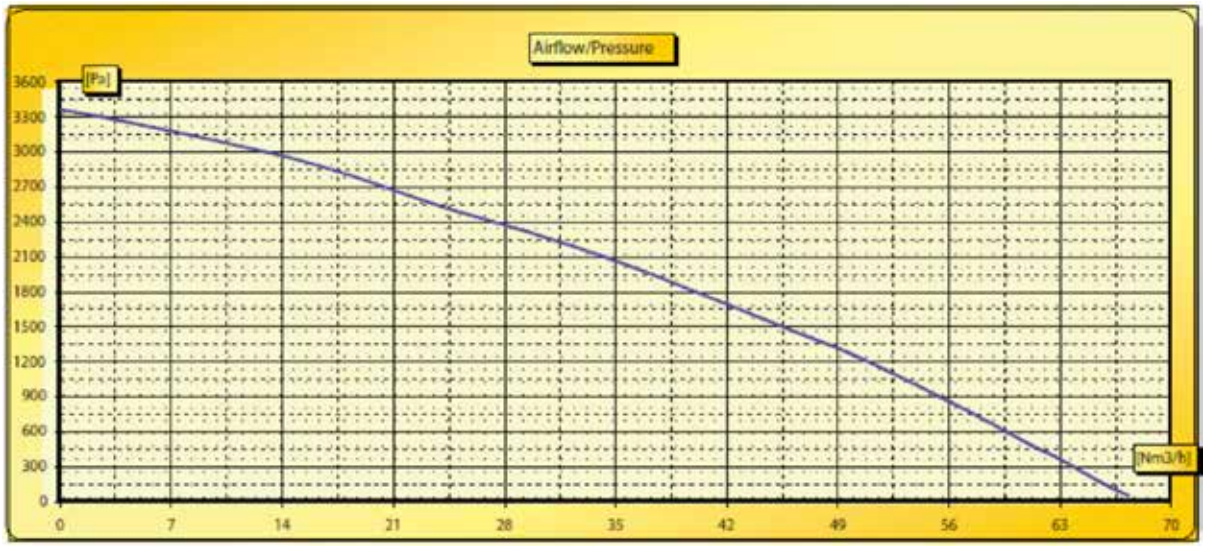


Fig.4.4.1. Characteristics of the fan-type NG40m

5. START UP AND OPERATION OF THE X BOILER BD SERIES

5.1 INITIAL START UP OF THE X BOILER BD SERIES

The X Boiler's BD first commissioning and user training to operate the boiler and its safety devices should be done only by an AUTHORISED SERVICE COMPANY. Their qualified person will ensure that:

- The boiler connections are tight
- The boiler's electrical connections are correct
- There are no leaks after filling the system with water
- The operation of all safety and control devices is verified as accurate
- The operation of the boiler is in accordance with this instruction manual and appropriate regulations.

5.2 OPERATION OF THE X BOILER BD SERIES

All boiler functions are performed by the boiler's electronic control panel. From the illustration in Fig. 5.2.1, changing the boiler's operating mode and settings is achieved using 4 buttons. The LCD display shows the current operating status.

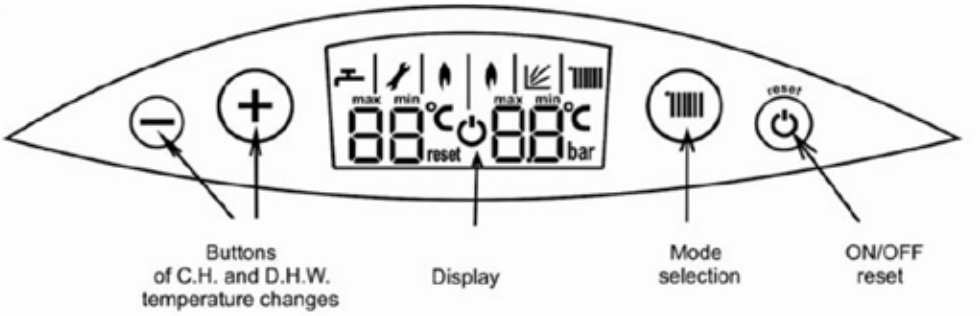


Fig. 5.2.1. Control panel

- Turn on the boiler by using the switch located on the back face of the controller, on the left-hand side (Fig. 2.2.1.1 and Fig. 3.9.1)
- Open the gas valve and water valves,
- Check the pump (see section 6.1.6),
- Wait until the boiler enters auto-diagnosis mode,
- Set the mode to WINTER or SUMMER (section 5.3)

Turning on the boiler in the heating season (winter)

- Set the desired temperature of the heating water using buttons: {+ / - C.H.} with values in the range from 40°C to 80°C
- The spark generator will cause outflowing gas from the burner to ignite
- Set the desired water temperature using buttons (pos.6) with values in the range 30°C to 60°C. Remember! The priority is always to obtain domestic hot water during operation of the boiler
- When the room temperature controller (e.g. thermostat) is connected, set the desired room temperature on the controller.

5.3 OPERATING MODES OF THE CONTROLLER

Mode	Display	Changing the operating mode	Performed functions
STAND-BY		To turn on /turn off the controller press the RESET button for about 2 seconds	• anti-freezing function: the boiler is switched on when the boiler water temp. drops below 8°C and heats the water as long as the temperature reaches 20°C • protection against pump blocking (pump is switched on 180 seconds every 24 hours) • 3-way valve blocking protection (valve is switched on 15 sec. every 48 hours)
WINTER		Press button for about 1 second - changing the operating mode to mode WINTER	• CH and DHW heating, • Service function, • Anti-legionella function - active only for boilers with tanks
SUMMER		Press button for about 1 second - changing the operating mode to mode SUMMER	• D.H.W. heating, • Anti-legionella function - active only for boilers with tanks,

5.4 BOILER ADJUSTMENT

When the controller restarts operation after a power loss, the display shows a flashing symbol . The symbol disappears when the control system is ready to accept user commands.

Symbol on the display	Signalization	Remarks
	BURNER IS OPERATING	Left flame: DHW mode operation. Right flame: CH mode operation.
	WEATHER FUNCTION IS ACTIVE	During the CH setting changing, instead of the temperature the value of Kt parameter is displayed for example: 5.2 without symbol: C.
	CHANGING C.H. SETTING	During changing the CH setting symbol flashes with the set value.
	CHANGING DHW SETTING	During changing the DHW temperature setting symbol flashes with the set value.
MAX	MAXIMUM SETTINGS	Maximum setting value is reached. If you exit the setting changes mode the symbol is blanked.
MIN	MINIMUM SETTINGS	Minimum setting value is reached. If you exit the setting changes mode the symbol is blanked.
L3	PAUSE IN C.H. HEATING	Displayed L3 symbol means a pause in C.H. heating in time determined by parameter P25 (default 3 min) for heat exchanger cooling when C.H. temperature exceeds the hysteresis value (parameter P20, default 5°C) of the setting. Pump operation will be stopped if the following conditions are met: • no signal "HEAT" from room temperature regulator, • heating water temperature dropped by 5°C from the set value • 180 sec. have passed after burner switching off.

	• SERVICE FUNCTION • PARAMETERS CHANGING • SYGNALISATION OF EMERGENCY SITUATIONS	This symbol can indicate different situations. It appears: • when service function is active 4.3.1 • during controller configuration 5.7.1 • during signalisation of emergency situations 5.8.2
RESET	SWITCHING OFF THE BOILER WITH LOCK	After removing the cause of the failure to restart the boiler operation, use the reset button. Anti-freezing function is performed only by pump operation.
Po	SUPPORT THE VENTING OF HEATING SYSTEM	Venting procedure can be stopped manually at any time by pressing the buttons '+' and '-'at the same time.

5.4.1 Signalisation of the start of heating in C.H. or DHW system
At the start of heating in the C.H. system or DHW system, the set temperature of C.H. or DHW flashes for 4 seconds on the controller display.

5.4.2 Signalisation of anti-freezing function in STANDBY mode
When the anti-freezing function in the C.H. standby mode is on, the pressure value on the controller display is replaced by the temperature value in the C.H. circuit. When the anti-freezing function is activated in the DHW circuit, the display shows the temperature value in the DHW circuit.

5.4.3 Displaying the water pressure in C.H. installation
When the boiler is set to STANDBY mode, the controller display shows the water pressure of the C.H. circuit. In SUMMER or WINTER mode, a temporary pressure value is displayed after pressing the reset button for a few seconds.

5.4.4 Displaying parameters
To display additional parameters (in a different mode other than STANDBY), press the reset button.
1. At first, the display shows the C.H. water pressure for 2.5 sec.,
2. In the next 2.5 sec, the following will happen in quick succession:
   - when the C.H. circuit is heated and in WINTER mode, the left field display shows "In" and the right field shows the value of return C.H. temperature. If the sensor is not connected, the display shows "—",
   - when the DHW circuit is heated and in SUMMER mode, the left field display shows "Ch" and the right field shows the value of C.H. temperature,
3. For another 2.5 sec., the left field display shows "Pr" and the right field, the value of % pump flow (for traditional pumps display shows "--"),
4. For the last 2.5 sec., the display shows "Fr" on the left field and the value of % fan flow on right field.
5. Display stops showing parameters automatically or after pressing the reset button.

5.4.5 DHW heating lock out indicator for X Boiler.
During DHW heating lock out, the X Boiler do not release hot water to the tank and will display the symbol '-' on the left field when the timer TZ- tank terminals are open (see section. 3.9).

5.4.6 Venting support for the heating system
After voltage supply and completion of the fan calibration procedure, the controller automatically starts a special sequence to support venting of the heating system. It consists of six successive cycles: switching on the pump for 15 sec. and switching off the pump for 15 sec. alternately in C.H. and DHW circuit. Heating is locked during the procedure, signaled by the Po code, key symbol and C.H. pressure indication. The control system activates the standard pump cycle in C.H. circulation for a specified period after the procedure (180 sec.). After pressure increases, the venting procedure is activated with heating locked during its implementation. If the boiler is in operation, the C.H. pressure drops below the allowed lower bound (which will be signaled by E9 code alternately with pressure indication).

5.5 CHANGING THE C.H. OR DHW TEMPERATURE SETTINGS

5.5.1 Temperature settings in C.H. circuit
1. Press button (1 in the control panel illustration) for a few seconds and the controller switches to the C.H. settings mode. The C.H. temperature flashes on the right side of the display.
2. Buttons +/- are used to make changes to the C.H. parameter values. After 5 seconds of inactivity, the "change in settings mode" ends automatically (assumes changes are complete). Pressing the reset button also ends the settings mode.

5.5.1.1 Changing the value of the K_t coefficient

When the weather function is active (outside temperature sensor is connected), while changing parameter values in the C.H. setting, the value of the K_t parameter is displayed instead of temperature. For example, displaying 5.2 without C

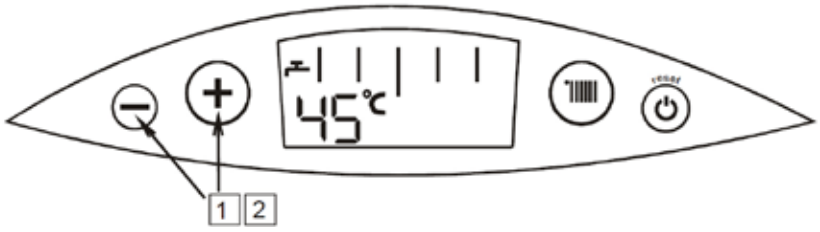
5.5.1.2 Changing the ECO factor

If the boiler is equipped with an adjustable speed pump, you can change the value of the ECO factor. (section 2.4.5),

In WINTER operation mode, hold the + / - button for 2 seconds. The symbol 'Ec' will appear flashing on the left side while the ECO factor value (e.g., 0.5) will appear flashing on the right side. Use the + / - buttons to change the ECO factor parameter value. Exit of "parameter change mode" happens automatically after 3 seconds of inactivity or after pushing the reset button.

5.5.2 Temperature settings in the DHW circuit

1. Briefly press the buttons + / - to enter the DHW mode. The DHW temperature will be flashing on the left side of the display.
2. Use the buttons +/- to adjust the DHW parameter values
3. The DHW mode will exit automatically after 5 seconds of inactivity or after pressing the reset button.



NOTE!

1. Reducing the set parameter values for heating water in the DHW circuit to a value less than that indicated on the display by symbol "MIN" will stop the water heating process in the tank. On the left field of the controller display, the symbol "—" will be seen. To resume water heating in the tank, ensure the DHW settings are at the minimum values or higher.
2. When the controller is in STANDBY mode, service function mode, or in the emergency lock out state, the C.H. or DHW settings cannot be changed.

5.6 CONTROLLER CONFIGURATION – BOILER PARAMETERS SETTING

It is possible to change the following parameters of the boiler through programming:

	Name	Values	Factory default values	Remarks
P01	Start power	0 ÷ 99 (100 steps from min to max)	see Table 4.3.2.1	-
P02	Max power for DHW	0 ÷ 99 (100 steps from min to max)		-
P03	Max power for CH	0 ÷ 99 (100 steps from min to max)		-
P04	Minimum speed limit	1000 ÷ 2000 [rotations/min] (1 step = 100 rotations/min)	1500	Boiler minimum power at 1200 rotation/minute
P05	Maximum speed limit	2500 ÷ 9500 [rotations/min] (1 step = 100 rotations/min)	→ see Table 4.3.2.1	-
P07	Type of CH circuit	1 – closed	1	Boiler adapted for closed central heating system
P08	Type of heating	0 / 1 (0 – radiator heating, 1 – floor heating)	1	-
P09	Type of CH pressure transducer	0 / 1 (0 – type: 0,5 3,5 V; Uz = 18V, 1 – type: 0,5 2,5 V; z=5V;	1	Transducer connection: 0 – socket M10 1 – socketM12
P10	"Anti-legionella" mode	0/1 (0– manual mode, 1– automatic mode)	0	important only in case of boilers with water tanks
P11	The number of pulses per rotation	1/2/3/4 [pulses / rotation]	2	-
P12	Type of pump	0 / 1 (0 – standard, 1 – with PWMsignal)	Depending on boiler type	-

P13	Δ T for pump with PWM signal	5 ÷ 25 C	6	Parameter is visible when P12=1 and P15=0 and P07=1
P14	Min pump flow	15 ÷ 99%	50	Parameter is visible for P12=1 and P07=1
P15	ECO mode	0/1 (1–ON,0–OFF)	0	Parameter is visible for P12=1 and P07=1
P16	Time period during operation in CH mode when boiler power is reduced between 0 and 25% (power range is set by P17)	0 ÷ 5min	0	
P17	Reduced power range during operation in CH mode during time defined in parameter P16	0÷ 25%	10	Parameter is visible when P16 > 0
P18	Max speed limit for modulating pump in CH Mode	25 ÷ 99%	99	Parameter is visible when P12=1
P19	Max speed limit for modulating pump in DHW mode (if P6=1)	25 ÷ 99%	99	Parameter is visible when P12=1 and P6=1
P20	Hysteresis for the condition of switching off at work in CH circuit	0÷ 10	5	
P21	CH temperature during heating the DHW in tank (if P6=1)	70÷ 89	75	Parameter is visible when P6=1
P22	Heating curve shift for weather function	0÷ 20	0	Parameter visible for P26=1 or 2
P23	fan type selection	0 1(0–FIME, HONEYWELL FPE4200A; 1–SITNG40)	1	
P24	Operating time at the start power in CH circuit after flame detection	2 ÷ 30 sec	20	
P25	L3 pump overrun time	1 ÷ 60 min	3	
P26	Operating mode of the weather function	0÷ 3 (0-off, 1 operation with room thermostat, 2-operation without room thermostat, 3-operation with room thermostat without possilibity of weather function deactivation via room thermostat	1	
P27	Outdoor temperature for activate CH	10 ÷ 21 °C Outdoor temperature value below which CH is activated when the weather function operates in mode 2	18	Parameter visible for P26=2
P28	Nighttime water temperature decrease	0 ÷ 20 °C Value by which the CH water temperature will be decreased when the weather function operates in mode 2 and the controller's RT input is open	5	Parameter visible for P26=2
P29	Limit value for setpoint temperature of central heating or maximum flow temperature (Tmax) for weather function	40 ÷ 80 °C (for P08=0) 25 ÷ 55 °C (for P08=1) Upper range for setpoint temperature of central heating water, which can be set by means of buttons, and limitation of central heating water temperature value (Tmax) resulting from the heating curve	85	Parameter visible for P26=1 or 2

P30	Selection of switch-off and switch-on point for DHW	0 - 1 0 - Switch off point: Domestic water temperature ≥ 65 °C Switch-on point: Domestic water temperature ≥ 64 °C 1 - Switch-off point: Domestic water temperature ≥ domestic water setpoint +5 °C Switch-on point: Domestic water temperature ≥ domestic water setpoint - 1 °C	0	Parameter available starting from controller software version no. 12
P31	Selection of activation source - Tank Timer	0 - 1 0 - from input on control board or command fromt he LIN interface 1 - only from input on control board	0	Parameter available starting from controller software version no. 12

NOTE!

Some parameters may not be visible in the programming mode if the clamp on the control board CMUNI-02 is shorted. To access the missing parameters, turn off the power, remove the CM clamp, and re-power the device.

5.6.1 Programming Mode entering

To activate the programming mode:

1. Set the operating mode: STANDBY (see Table/section 5.3)
2. Turn off the boiler power.
3. Turn on the boiler power again. Wait until the flashing symbol " disappears from the screen.
4. Press and hold reset together with the " button for over 8 sec.
5. The display shows the parameter number and the symbol " no longer flashes but maintains a constant light.
6. Release the buttons.
7. Using + / - buttons, select the desired parameter to change.
8. By pressing button ", it is possible to edit the selected parameter. Use the +/- buttons to change the parameter values
   - Parameters P01 and P03 activate the boiler with the desired power of the C.H. circuit
   - Parameter P02 activates the boiler with the desired power of the DHW circuit, if the flow sensor of DHW is working.
   - At the end of the gas ignition process, the burner power will be the same as the displayed value
9. Accept changes with button "; to cancel the change use the reset button.

To save parameters and exit the programming mode: hold down the reset button for about 2 seconds, or wait. Programming mode switches off automatically after a set period of inactivity.

5.7 PAUSING BOILER OPERATION

- leave the boiler connected to the power supply,
- leave the gas valve and water valve of C.H. open,
- set the boiler mode to STANDBY (section 5.3)
- in the paused state, the controller of the boiler has a protective function described in section 5.3 - "Performed functions".

If you decide to discontinue using the boiler for a long time, you should:

- set the mode on STANDBY (section 5.3)
- drain the boiler's water system and also the C.H. system using the drain valve (item 33 Fig 2.2.1.1 and 2.2.1.2) if freezing is a possibility
- close the water and gas valves and disconnect the boiler from the power supply.

NOTE! During winter (because of the risk of water freezing in the system), disconnecting the boiler from the electrical system is forbidden, if there is still water in the boiler's water system.

5.8 DIAGNOSIS

5.8.1 Signalisation of error codes during the emergency procedures implementation

During the implementation of emergency procedures, a constant error code is displayed consisting of letter “E” and two digits. Symbols and “RESET” are blanked. If the emergency procedure is completed successfully, the boiler will automatically return to normal operation and the error code disappears. Unsuccessful completion of the emergency procedure results in an emergency lock out.

5.8.2 Signalisation of error codes in emergency situations without locking

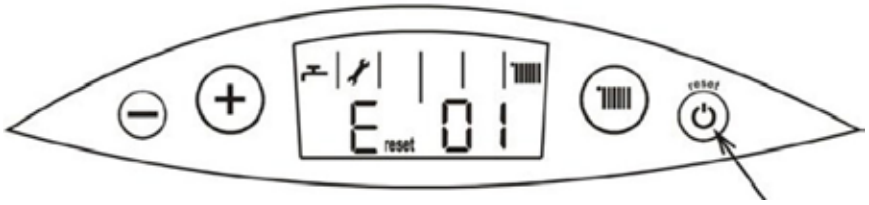
In emergency situations without lock out, the flashing symbols and the error code are displayed. Symbol “RESET” is blanked.

In particular cases, the error code can be displayed alternately with the temperature or pressure value in the C.H. circuit. After removing the cause of failure, the boiler will automatically return to normal operation and the error code disappears.

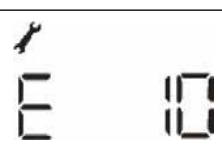
5.8.3 Signalisation of emergency switch off with locking

An emergency lock is indicated by displaying the error code, flashing symbols, and “RESET” (see the figure below). A return to normal operation is possible after removing the cause of failure and after pressing the reset button.

If after pressing the reset button the boiler remains locked, we advise you to contact an AUTHORISED SERVICE COMPANY.



The figure above shows an example of a display with error code E 01 with symbols reset and

Error code	Error cause	Way of error removing
	**No flame on the burner:** 3 automatic re-ignition attempts are taken. Each attempt is preceded by 15 sec. break for ventilation of the boiler. After the failure of attempts follows: switching off the boiler with blockade, displaying the symbol E RESET 01	The boiler is in the process of gas ignition tests and will return to normal operation.
	**No flame on the burner:** Turning off the boiler with blockade after unsuccessful attempts of gas ignition. The reason of failure may be: 1. Lack of gas.	Check if the gas cocks are opened and if the gas reaches the boiler. **Press reset button**
	2. Erroneous connection to power source (phase detection)	To fix: - turn off power - switch lines of power cable
	**The water temperature in the gas-water heat exchanger** exceeds 90°C. The one-time thermal fuse was burned off and the boiler was switched off with blockade.	Call Authorised Service Company
	**The flue gas temperature has exceeded the permitted value.** The one-time thermal fuse was burned off and the boiler was switched off with blockade.	Call Authorised Service Company
	**Damage in the circuit of NTC sensor of heating water temperature.** The burner is turned off.	Call Authorised Service Company
	**Failure in the electronic system of the boiler.** The burner is turned off	Call Authorised Service Company
	**Failure of the measuring system of fan speed or failure of the fan.**	Call Authorised Service Company
	**Failure of water pressure transducer (in CH system)** The burner is turned off, the pump operates for 180 sec.	Call Authorised Service Company
	**Incorrect pressure in CH system.** if: P>2.8 bar - controller turns off the burner, the pump operates for 180 secs, if: P<0.5bar - controller turns off the burner, the pump operates for 180 secs, P <= 2.5 bar - return to the normal operation. P >= 0.5 bar - return to the normal operation.	When the pressure in CH is higher than 2.8 bar some water should be drained from installation. The pressure may be too high if there has been too high initial pressure in the system or if there occurred damage in the compression vessel. If the pressure in the CH system is below 0.5 bar you should fill in the system with water and check for leaks
	Failure in the circuit of NTC temperature sensor (in DHW system). The burner is turned off.	Call Authorised Service Company

E 13	Overrun of the maximum number of consecutive emergency situations E1 after earlier detection of flame.	Press reset button
E 14	Missing or damaged sensor heating water (return) during the water heating in the CH circuit with active mode of PWM pump. Error code is displayed alternately with the temperature of heating water leaving the boiler.	Call Authorised Service Company

6. MAINTENANCE, INSPECTIONS, AND OPERATIONAL CHECKS

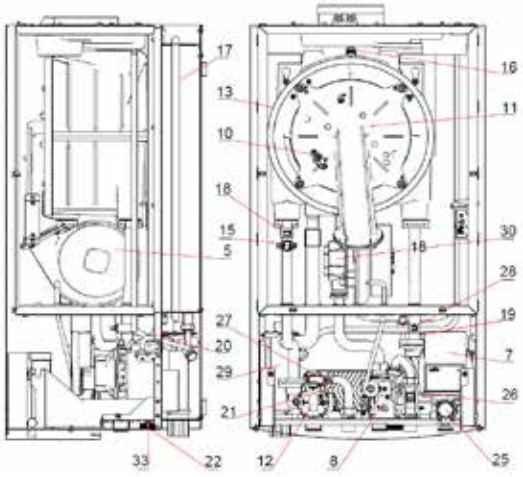
6.1 INSPECTION AND MAINTENANCE

- The boiler should be serviced regularly, at least once a year, and subjected to a maintenance schedule.
- The boiler's performance and all components of the heating system should be reviewed before the heating season.
- All service and maintenance works should be performed by an Authorised Person. Only original parts should be used for boiler repairs. At every service and maintenance procedure, the tightness of the gas units and gas installations, and the correctness of the protective systems should be checked. The X Boiler warranty does not cover the above-mentioned maintenance and service operations.

6.1.1 Maintenance of the combustion chamber, burner, and electrode.

The interior of the combustion chamber, burner surface, and the electrode should be checked by visual inspection: a contaminated burner and combustion chamber interior may be cleaned with a plastic brush.

- visible gaps and deformations on the surface of the burner qualify the burner as unusable. It should be replaced,
- clean the electrode with a plastic brush,
- a deformed electrode should be replaced,
- check the condition of the electrode's insulator,
- a dirty insulator should be cleaned,
- a visibly damaged insulator should be replaced.



NOTE! A dirty burner or dirty combustion chamber interior means that boiler maintenance is required.

In order to get access to the combustion chamber, burner, and electrode:

- close the gas valve,
- unscrew the front part of the combustion chamber,
- remove the wires from the end of the electrode,
- remove the cover fixing screw of the flue gas-water heat exchanger,
- remove the cover of the heat exchanger,
- once maintenance is complete, assemble in reverse order.

NOTE! The tightening torque for the nuts of the burner door should be 5Nm (+1/0Nm).

Pay attention not to damage the seals:

- check the tightness of connections.

6.1.2 Cleaning the condensate siphon

The condensate siphon should be inspected at least twice a year. If purging is necessary:

- unscrew the siphon,
- clean the siphon of any dirt,
- reassemble and tighten the siphon.

Check the patency of the siphon (for example, by blowing the tube which drains the condensate). In situations where the siphon is difficult to clean in the above-mentioned way, it should be removed from the boiler and cleaned with a strong stream of water. To avoid the possibility of flue gas leakage through the siphon as a result of the condensation of water vapour in it (flooding), pour a little water to flood the siphon.

6.1.3 The pressure in the expansion vessel

Check the pressure in the expansion vessel (item 17 in Fig. 2.2.1.2) by using a pressure meter (for example automotive) connected to the fan on the vessel. See Table 2.2.2 for acceptable pressure values. If it becomes necessary to adjust the pressure in the expansion vessel, a simple pump can be used (for example a car pump)

NOTE! When checking the pressure in the expansion vessel, the central heating water pressure in the boiler must be zero.

6.1.4 Maintenance of the flue gas-water heat exchanger, item 21.

The heat exchanger design provides turbulent water flow over the entire heat exchanger surface, minimizing the contamination of the exchanger's internal surfaces. However, when conditions favour the formation of solid impurities, these must be removed. To do this, select one of the decontamination methods recommended by heat exchanger manufacturers such as Alfa Laval or SWEP.

6.1.5 Checking the temperature sensors

(Table 6.1.5.1)

Temperature [°C]	NTC (DHW) and NTC (CH) sensor resistance, NTC tank sensor and temperature sensor resistance Sensor: ß=3977
-10	55218 [Ω] ±0.75%
0	32624 [Ω] ±0.75%
10	19897 [Ω] ±0.75%
20	12.480 [Ω] ±0.75%
30	8.060 [Ω] ±0.75%
60	2.490 [Ω] ±0.75%
80	1.210 [Ω] ±0.75%

Table 6.1.5.1 Resistance of NTC sensor, outside temperature sensor and tank NTC sensor, depending on the temperature

NTC sensor of C.H. water, DHW, and central heating

- Remove the sleeves from the NTC sensors,
- Measure the sensor resistance

Outside temperature sensor

- Disconnect the sensor cable from the terminals under the flaps of the control panel
- Measure the sensor resistance

Tank temperature sensor

- Disconnect the sensor cable from the terminals under the flaps of the control panel
- Measure the sensor resistance

6.1.6 Checking the water pump operation

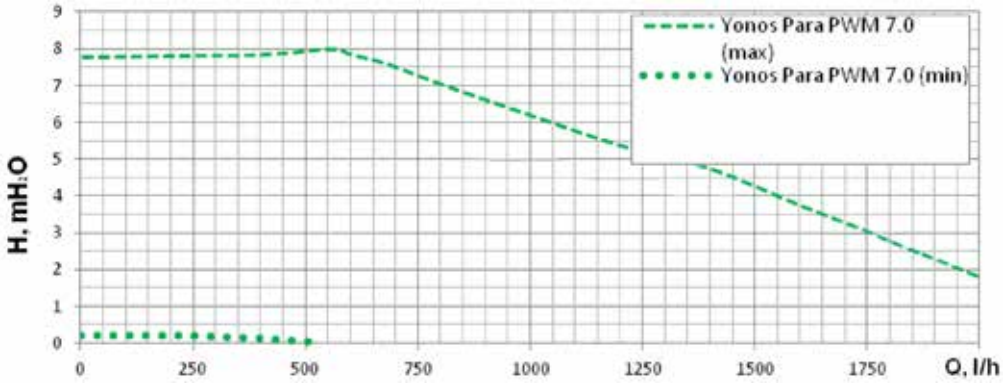


Fig. 6.1.6.1 Pump characteristic

Checks should be done at the first start up of the boiler and when the following events occur:

- the pump does not work after turning on the boiler (does not raise the pressure in the C.H. system)
- starting the pump impeller by hand (not applicable to PWM pumps).

6.1.7 Ionisation current measurement

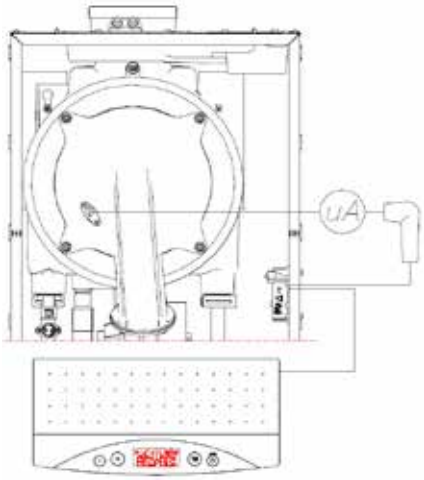


Fig. 6.1.7.1 Wiring diagram for ionisation current measurement

To measure ionisation current, perform the following actions:

- switch boiler to STANDBY mode
- disconnect the cable from the electrode
- connect an ammeter (µA range) according to the illustration in Fig. 6.1.7.1
- switch the boiler to C.H. mode
- read the value of the ionisation current

NOTE! The ionisation current should be equal to or higher than 2 µA.

6.2 REPLACING A DAMAGED CONTROL BOARD IN THE CONTROL PANEL

If the control board needs to be replaced, follow the installation instructions attached to each board assigned as a spare part.

Parameters of components for X BOILER 23 and 38			
Item on the scheme	**Name**	**Parameters**	**Supply voltage from the controller**
5	Fan NG40m	Power:75W(max)	230V AC
7	Pump Yoyos Para PWM	Power: 45W	230V AC
8	Gas unit SIT SIGMA 848	Valve coil resistance: 3-4EV1: 0,9kΩ 1-3EV2: 6,4 kΩ	230V AC
18	NTC sensor of CH water temperature	10K@25°C ß=3977	SELV
19	Heating water pressure transducer	The output voltage: 0,5V to 2,5V (0 bar - 4 bar)	5V DC
26	Domestic water flow sensor	pin	SELV
27	NTC sensor of DHW water temperature	10K@25°C ß=3977	SELV
28	NTC sensor of CH water temperature - return	10K@25°C ß=3977	SELV
42	NTC sensor of out door temperature	10K@25°C =3977	SELV
15	Temperature limiter 95C	pin	SELV
16	Thermal fuse	pin	SELV
12	3-way valve	3-way valve	230V AC

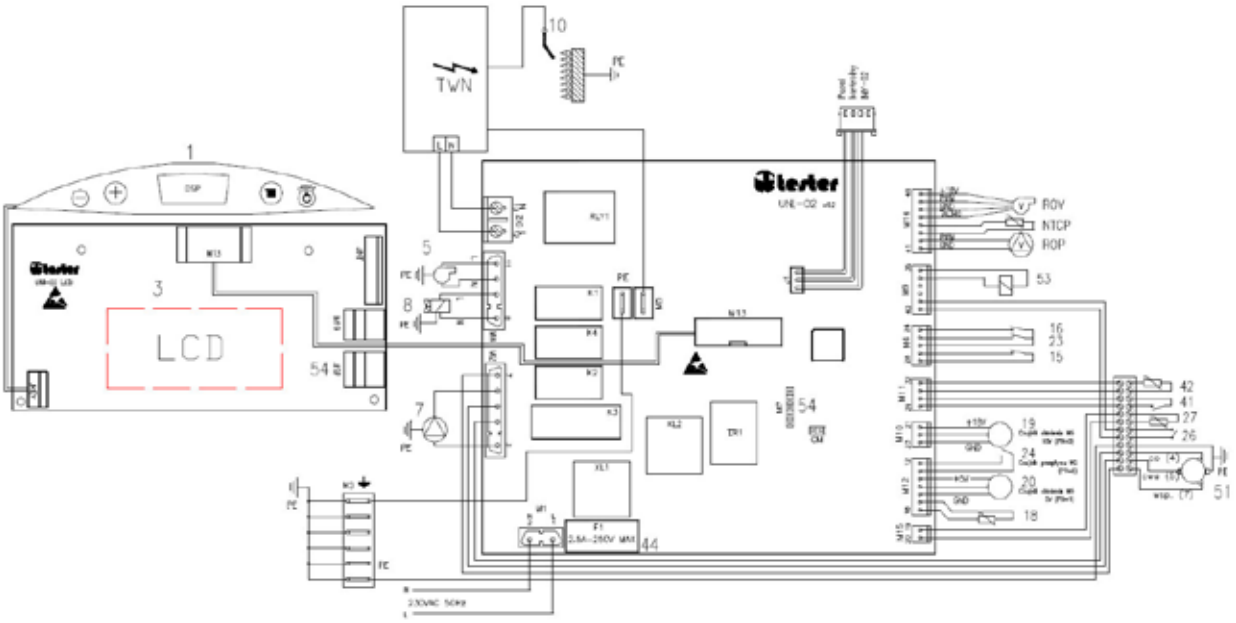


Fig. 6.2.1. Schematic diagram of the electrical connections

No	Description	No	Description	No	Description	No	Description
1	User interface (foil)	10	Ignition/Flame control electrode	26	D.H.W. flow sensor/ Tank time regulator	54	Connector " In System Programming"- microprocessor programming
3	User interface (control board)	15	Heating water temperature limiter	27	NTC sensor of D.H.W. temperature	P1	Button OFF/RESET
5	Fan	16	Fumes temperature limiter	41	Room temperature regulator	P2	Buttons SET
7	Pump	18	NTC sensor of heating water temperature	42	NTC sensor of outside temperature	P3	Button+
8	Gas unit	20	Heating water pressure sensor 5V	44	Fuse	P4	Button-
9	Flame control electrode	24	Heating water flow sensor	51	3-way valve	CM	Blockade of extended mode of control system configuration
M3	Connector coupling PE	M5	Flame control connector	JKEY	User interface connector (foil)	ROP	Pump speed regulator
TWN	Spark generator	NTCP	NTC sensor of heating water temperature (return)	M13	User interface connector	ROV	Fan speed regulator

6.3 THE MAINTENANCE OPERATIONS TO BE PERFORMED BY THE USER

The user should:

- clean filters periodically, preferably before the heating season (filters should be replaced when worn out),
- clean the domestic water filter if a decrease in water flow is observed,
- refill the central heating system with water if a decrease in water pressure is observed,
- vent (bleed) radiators if it is observed that their entire surface does not heat up completely (an indication that there is trapped air),
- periodically clean the boiler cover with water and detergent (avoid cleaners that cause scratches).

6.4 RANGE OF TECHNICAL MAINTENANCE OPERATIONS PERFORMED BY THE SERVICE COMPANY

- Maintenance of the combustion chamber, burner, ignition electrode and ionisation electrode
- Cleaning the condensate siphon
- Adjusting the pressure in the expansion tank
- Maintenance of the water-water heat exchanger
- Checking the temperature sensors (table)
- Replacing a damaged control board in the control panel
- Checking the water pump operation according to section. 6.1.6

7. BOILER EQUIPMENT

Table 7.1 is a list of the components required to install the boiler for its correct operation, and other accessories that will enhance the boiler's ease of use. Some of these items are supplied together with the boiler (as standard equipment), others are available to purchase separately.

TABLE 7.1

Name	Part Code
Accessories included in the boiler	
Hook for wood 8 x 70	-
Sparing Sleeve (x2)	-
Adhesive spacer EPDM	-
Tank NTC Sensor	-
Subassembly of Gas Connector	-
Flue components - Coaxial Ø60/Ø100 - Polypropylene PP	
Flue Kit Horizontal 60/100 PP	A2Y003
Flue Adapter - Elbow 90 Inspection 60/100 SS	A2Y011
Flue Adapter - Vertical Inspection 60/100 SS	A2Y013
Flue Extension 1m 60/100 PP	A2Y021
Flue Extension 0.5m 60/100 PP	A2Y023
Flue Extension 0.25m 60/100 PP	A2Y025
Flue Elbow 90deg 60/100 PP	A2Y027
Flue Bend 45deg 60/100 PP	A2Y029
Flue Elbow 90deg Inspection 60/100 PP	A2Y031
Flue Extension Inspection 60/100 PP	A2Y033
Vertical Termination - Black 60/100 PP	A2Y035
Vertical Termination - Red 60/100 PP	A2Y037
Horizontal Termination 60/100 PP	A2Y139
Flue Support bracket for Elbow 90deg Dia 100	A2Y319
Flue components - Coaxial Ø80/Ø125 - Polypropylene PP	
Flue Adapter - Elbow 90 Inspection 80/125 SS	A2Y012
Flue Adapter - Vertical Inspection 80/125 SS	A2Y014
Flue Adapter - Vertical Inspection 80 SS	A2Y015
Flue air Adapter - Vertical Air Inspection 80 SS	A2Y016
Flue Extension 1m 80/125 PP	A2Y022
Flue Extension 0.5m 80/125 PP	A2Y024
Flue Extension 0.25m 80/125 PP	A2Y026
Flue Elbow 90deg 80/125 PP	A2Y028
Flue Bend 45deg 80/125 PP	A2Y030
Flue Elbow 90deg Inspection 80/125 PP	A2Y032
Flue Extension Inspection 80/125 PP	A2Y034

Vertical Termination - Black 80/125 PP	A2Y036
Vertical Termination - Red 80/125 PP	A2Y138
Horizontal Termination 80/125 PP	A2Y140
Flue Support bracket for Elbow 90deg Dia 125	A2Y320
Flue components - Other	
Flue Reduction 80/125 to 60/100 PP	A2Y141
X boiler BD Outdoor Casing	A2Y401
Flue Roof Plate with air intake Dia 80	A2Y201
Flue Angular Roof Plate 25-50 Deg Dia 125	A2Y202
Flue Location Bracket Dia 60	A2Y205
Flue Location Bracket Dia 80	A2Y206
Flue Rosette Dia 80	A2Y207
Flue Rosette Dia 100	A2Y208
Flue Rosette Dia 125	A2Y209
Flue Gasket Dia 60	A2Y210
Flue Gasket Dia 80	A2Y211
Flue Gasket Dia 100	A2Y212
Flue Gasket Dia 125	A2Y213
Other Accessories	
Outdoor casing for X Boiler BD23 and BD 38	A2Y201

Devex Systems specialises in heating solutions for new or existing buildings in residential, commercial and industrial environments.

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