

BALI B

BTNE 25 - BTNE 32 - BTNE 42
BTFSE 24 - BTFSE 32 - BTFSE 36

GB

aquaPremium
SYSTEM



**INSTALLATION, USE
AND MAINTENANCE**



Dear Customer,

Thank you for choosing and buying one of our boilers. Please read these instructions carefully in order to install, operate, and maintain this equipment properly.

General information for the installer, maintenance technicians and users

This INSTRUCTION MANUAL, which is an integral and indispensable part of the product, must be delivered to the user by the installer and must be kept in a safe place for future reference. The manual must accompany the boiler should it be sold or its possession transferred.

The boiler must be used for the purposes for which it has been intended. Any other use shall be considered incorrect and therefore dangerous.

The boiler must be installed in compliance with applicable laws and standards and according to the manufacturer's instructions given in this manual. Incorrect installation may cause injury to persons and/or animals and damage to property. The manufacturer shall not be held liable for any such injury and/or damage.

Damage and/or injury caused by incorrect installation or use and/or damage and/or injury due to non-observance of the manufacturer's instructions shall relieve the manufacturer from any and all contractual and/or extra-contractual liability.

Before installing the boiler, check the technical data to be compatible with the requirements for its operation in the system.

Check that the boiler is intact and it has not been damaged during transport and handling. Do not install equipment which is damaged and/or faulty.

Do not obstruct the air suction and/or heat dissipation openings.

Only manufacturer-approved accessories and optional kits are to be installed.

Properly dispose of the packaging as all the materials can be recycled. The packaging must therefore be sent to specific waste management sites.

Keep the packaging out of the reach of children as by its nature it may represent a hazard.

In the event of failure and/or faulty functioning, switch off the boiler. Do not attempt to repair it and contact a qualified service technician.

Manufacturer-approved parts must be used for all repairs to the boiler.

Non-observance of the above requirements may affect the safety of the boiler and endanger people, animals and property.

The manufacturer recommends our Customers to have the boiler serviced by an Authorized Service Centre.

In order to guarantee efficient and correct functioning of the equipment it is legally binding to have the boiler serviced once a year, according to the schedule specified in the relevant section of this manual.

In the event of long periods of inactivity of the boiler, disconnect it from power mains and close the gas tap (Warning: the boiler anti-frost function is disabled).

Should there be a risk of freezing, add antifreeze: it is not advisable to empty the system as this may result in damage; use specific anti-freezing products suitable for multi-metal heating systems.

IMPORTANT

Should gas smell be perceived proceed as follows:

- **do not turn on or off electrical switches and do not turn on electrical appliances;**
- **do not ignite flames and do not smoke;**
- **close the main gas tap;**
- **open doors and windows;**
- **contact a Service Centre, a qualified installer or the gas supply company.**

Never use a flame to detect gas leaks.

WARNING

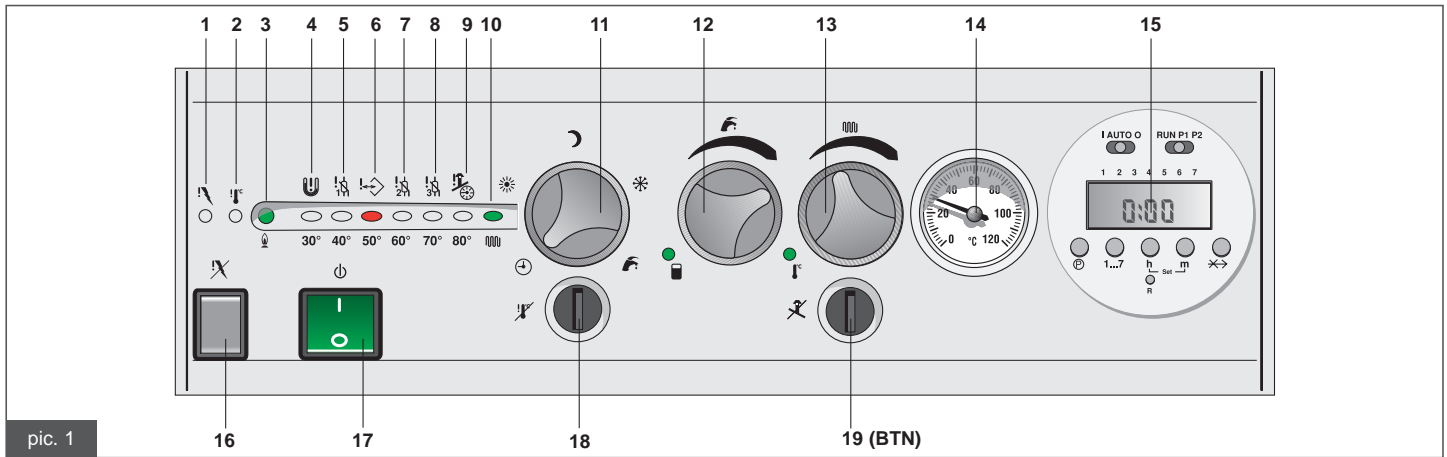
This boiler has been built for installation in the country indicated on the technical data plate: installation in any other country may be source of danger for people, animals and property.

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1. INSTRUCTIONS FOR THE USER

1.1 Control panel



pic. 1

1. Indication light (red): when the light is on, it indicates that the flame detection electronics have shut down the boiler. Boiler reset is operated through switch no. 16.

2. Indication light (red): when the light is on, it indicates that the safety thermostat has shut down the burner. The boiler will automatically resume operation by resetting the safety thermostat through button no. 18.

3. Indication light (green): when the light is on and fixed, it indicates that power is supplied to the flame detection pcb (flame might still not be present).

4. Indication light (red): when the light is on and fixed, it indicates that the temperature of the water in the heating system is between 25°C and 35°C.

When the light is blinking, it indicates that the water pressure switch has detected insufficient water pressure. When operational water pressure is restored, the water pressure switch will resume boiler operation and the led will turn off.

5. Indication light (red): when the light is on and fixed, it indicates that the temperature of the water in the heating system is between 36°C and 45°C.

When the light is blinking, it indicates that the temperature probe no. 1 (CH flow) is faulty (interrupted or out of range). The burner is shut down, pumps still operate. As soon as the probe is replaced, the led will turn off and the boiler will resume operation.

When indication lights no. 4 and no. 5 flash simultaneously, it indicates that the external temperature probe (optional equipment) is faulty or disconnected. Once the probe is replaced or re-connected, the lights will turn off.

6. Indication light (red): when the light is on and fixed, it indicates that the temperature of the water in the heating system is between 46°C and 55°C.

When the light is blinking, it indicates that the connection between boiler and remote control is interrupted or there are signal passage difficulties. Once the connection is restored the light will turn off and the boiler will resume operation.

7. Indication light (red): when the light is on and fixed, it indicates that the temperature of the water in the heating system is between 56°C and 65°C.

When the light is blinking, it indicates that the temperature probe no. 2 (water tank) is faulty (interrupted or out of range). The boiler operates in CH and instantaneous DHW supply mode only. As soon as the probe is replaced, the boiler will resume operation.

8. Indication light (red): when the light is on and fixed, it indicates that the temperature of the water in the heating system is between 66°C and 75°C.

When the light is blinking, it indicates that the temperature probe no. 3 (plate heat exchanger) is faulty (interrupted or out of range). The boiler operates in CH supply mode only. As soon as the probe is replaced, the boiler will resume operation (including DHW supply).

9. Indication light (red): when the light is on and fixed, it indicates that the temperature of the water in the heating system is between 76°C and 85°C.

When the light is blinking, it indicates that CH water temperature has exceeded 85°C.

The led can also be turned on by the flue gas thermostat (BTN boiler model). Reset of the flue gas thermostat is to be performed through button no. 19.

10. Indication light (green): when the light is on and fixed, it indicates that the boiler is operating in CH mode.

11. Boiler mode selector: this selector allows to choose the boiler mode (please, refer to paragraphs 1.2.2.3. and 1.2.2.4.).

12. DHW supply knob: the knob allows for DHW supply mode management (please, refer to 1.2.2.3 and 1.2.2.4 paragraph).

13. CH water temperature knob: the knob allows for CH mode management (please, refer to 1.2.2.3 and 1.2.2.4 paragraph).

14. Water pressure gauge: it shows water pressure in the heating system.

15. Programmer: the programmer can be set for CH and DHW supply scheduling (please, refer to 1.2.2.3 and 1.2.2.4 paragraph).

16. Reset button: press the button to restore boiler operation after shut down due to flame non-detection.

17. Power switch: when the switch is in position I, power is supplied to the boiler and the switch is lit. When the switch is in position O, power is not supplied to the boiler and the switch light is off.

18. Reset button: press the button to restore boiler operation after shut down due to safety thermostat intervention.

19. Reset button (BTN model only): press the button to restore boiler operation after shut down due to flue gas safety thermostat intervention (BTN boiler model).

In case of malfunction or pressure switch intervention (BTFS boiler model) the burner is shut down. Boiler operation will resume as soon as normal pressure range values are restored.

1.2 Operating the boiler

1.2.1 Switching on

- Open the gas stop cock.
- Turn power mains switch to **ON**.
- Set boiler power switch no. **17** (pic.1) to **ON** (the switch lights up)
- Choose boiler mode through knob no. **11**, no. **12** and no. **13** and the programmable programmer no. **15** (please, refer to 1.2.2.3 and 1.2.2.4 paragraph).
- Adjust room temperature through room thermostat (when available).
- When CH is required, no. **10** light comes on (pic. 1).
- When the burner is on, no. **3** light comes on (the light comes on when the flame detection electronics are powered, therefore even if the light is on, flame might still not be present).

WARNING

should the boiler be left inactive for a long time, particularly when boiler is fired by LPG, ignition might be difficult. Before starting the boiler, switch on a different gas fired device (e.g. kitchen range, oven, etc.). Beware that even by following this procedure, the boiler might still experience some starting difficulties and shut down once or twice. Reset boiler by acting on no. 16 button (pic. 1).

1.2.2. Operation

The boiler is equipped with patented AQUA PREMIUM system.

1.2.2.1 AQUA PREMIUM system

The boiler is equipped with a 60 l stratification water tank and a secondary plate heat exchanger.

The boiler can either function as a standard instantaneous boiler, when the water tank is deactivated, or through the innovative AQUA PREMIUM system when the water tank is switched ON.

Water tank activation and deactivation can be operated by the user via knob no. **12** and programmer on the control board (please, refer to 1.2.2.3 paragraph, DHW section).

When the water tank is switched ON (AQUA PREMIUM mode), and DHW is requested, the flow switch detects the water stream; the boiler turns ON, the cut-off valve is opened and the DHW pump is turned ON (the pump flow rate is fixed). When DHW demand is smaller than DHW pump flow rate, DHW to the tap is supplied by the secondary exchanger only and the excess DHW produced is deviated to the water tank.

When DHW demand is larger than DHW pump flow rate, DHW produced by the secondary exchanger is joined by DHW from the water tank; the combined DHW flow rate is larger than the one that can be produced by instantaneous boilers of identical thermal output or standard system boilers with same capacity water tank.

The boiler can also be operated as a standard instantaneous boiler, when the water tank is disabled.

1.2.2.2 Instantaneous DHW production

While the water tank is disabled, the boiler operates as a standard instantaneous boiler: the cut-off valve is closed and the DHW pump is always off. In this instance DHW supply is granted by the secondary heat exchanger only and maximum available DHW flow rate depends exclusively on the boiler thermal output.

DHW flow rate in liters per minute relies upon the boiler thermal output and water main supply temperature, according to the following formula:

$$I = \text{DHW in liters per minute} = K / \Delta T$$

K represents:

- 344 for BTFS 24 model
- 459 for BTFS 32 model
- 523 for BTFS 36 model
- 358 for BTN 25 model
- 450 for BTN 32 model
- 610 for BTN 42 model

ΔT = DHW temperature – water mains supply temperature

E.g. In BTFS 24 model, should water mains supply temperature be 8°C and DHW required to 38°C, the value of ΔT is:

$$\Delta T = 38^\circ\text{C} - 8^\circ\text{C} = 30^\circ\text{C}$$

and DHW liters per minute available at the required temperature of 38°C are:

$$I = \frac{344}{30} = 11.5 \text{ [liters per minute]}$$

The boilers, both BTN and BTFS modes, are divided in two families:

- a) Thermal unit managing one high temperature CH area and DHW supply
- b) Thermal unit managing one mixed CH water area, one high temperature CH area and DHW supply ("V" version) \\\quad q>.

1.2.2.3 Thermal unit managing one high temperature CH area and DHW supply

Position no. **17** switch to I: power is connected to the boiler and the switch lights up.

Boiler operation mode is selected through knob no. **11**. In detail:

"Programmer" position

The boiler electronics manage the program set via the two-channel programmer no. **15**. The user manages CH boiler operation through channel 1 (please, see CH section). The user manages DHW boiler operation through channel 2 (please, see DHW section).

- CHANNEL 1 without external temperature probe.

When the programmer is **OFF**, CH is **OFF**. When the programmer is ON, CH is managed through the room thermostat.

- CHANNEL 1 with external temperature probe.

Please, see "SLIDING" TEMPERATURE OPERATION section.

- CHANNEL 2

When the programmer is **OFF**, DHW is supplied by the plate heat exchanger only. The boiler operates as a standard "instantaneous" boiler. DHW supply is not largest and enough to shower, dishwashing, etc. When the programmer is **ON**, DHW is supplied both by the plate heat exchanger and the water tank. DHW is largest in this instance.

The programmer can host up to 8 **ON** daily times and 8 **OFF** daily times. Five programmable time areas are available in each day for repetition of **ON/OFF** programs within the same week (1: single day; 2: Mon-Fri; 3: Sat-Sun; 4: Mon-Sat; 5: Mon-Sun).

"Comfort" position.

QBoiler CH operation management only. Programmer is considered as always turned **ON**, regardless of its programs.

CH is turned **ON** or **OFF** by the room thermostat or thermoregulation control unit. "Comfort" position with external temperature probe: please, see "SLIDING" TEMPERATURE OPERATION section.

"Reduced" position

Boiler CH operation management only. Programmer is considered as always turned **OFF**, regardless of its programs. CH is always **OFF** regardless of the room thermostat or thermoregulation control unit signals.

NOTE : boiler operation in this position without external temperature probe is the same of that in "Summer" position. "Reduced" position is desirable only when the boiler is equipped with an external temperature probe (please, see "SLIDING" TEMPERATURE OPERATION section).

❄️ “Anti-frost” position

Boiler is in stand-by mode. All boiler functions are inactive besides “Anti-frost”. “Anti-frost” function protecting CH flow: when the flow probe detects a temperature below 5°C, the boiler turns ON until the flow temperature reaches 50°C or 15 mins.

“Anti-frost” function protecting DHW: when the water tank probe detects a temperature below 5°C, the boiler turns ON until the water in the tank reaches 10°C or 15 mins.

☀️ “Summer” position

Boiler operates in DHW supply mode only.

DHW

DHW supply supersedes any other boiler function.


The user might set DHW parameters through knob **12**, programmer **15** and the mixing valve (pic. 2).


- knob **12** allows for selection of DHW production mode (with AQUA PREMIUM SYSTEM or “instantaneous production”) and to set DHW temperature in the water tank (50°C to 65°C); it is recommended to set storage tank water temperature around 60°C (turn knob clockwise almost fully);


- programmer **15** allows for selection of automatic water tank switching on and off;

- mixing valve (pic. 2) allows to set DHW temperature to the tap.

In detail the user might choose to have DHW supplied in “instantaneous” or “AQUA PREMIUM” system mode.

By turning knob **12** fully counter-clockwise, after a couple of seconds LED  will switch on or off.


-  led ON indicates “enabled water tank” mode (AQUA PREMIUM system).

-  led OFF indicates disabled water tank (“instantaneous mode boiler”).

In AQUA PREMIUM mode, setting channel 2 through the programmer, it is possible to select automatic switching on/off programs for the water tank (see sect. 1.2.3 “Electronic programmer setup”).

NOTE

When the boiler is set to AQUA PREMIUM system mode, channel 2 settings of programmer **15** manages DHW also.

When the programmer is ON, the boiler is in “enabled water tank” mode (AQUA PREMIUM system), when the programmer is OFF, the boiler operates as a standard “Instantaneous” boiler ( led is always ON).

DHW flow temperature is to be adjusted through the thermostatic valve located in the rear area of the boiler (pic. 2).

Turn valve knob counter-clockwise (+ position) to increase DHW temperature, turn valve knob clockwise (- position) to decrease DHW temperature.

In order to adjust DHW flow temperature to approximately 50°C, shut the valve off by turning its knob fully clockwise, then turn it three and a half rotations counter-clockwise.

CH


Boiler electronics manage temperature and operation of the radiators through adjusting knob **13** and mode selecting knob **11**. Knob **13** sets CH flow temperature and “warm boiler ON” – “warm boiler OFF” functions.


In addition to that, when the boiler is equipped with an external temperature probe, the user sets a fictitious room temperature value via knob **13** (please, see “SLIDING” TEMPERATURE OPERATION section).

Knob **13** is used to adjust two settings:

1. CH flow temperature (50°C to 90°C range).
2. Set boiler to “warm boiler ON” – “warm boiler OFF” mode.



When the boiler is in “warm boiler ON” mode ( led ON), the primary heat exchanger, when CH or DHW are not required, is kept to a constant 50°C temperature.

When the boiler is in “warm boiler OFF” mode ( led OFF), the primary heat exchanger, when CH or DHW are not required, is not heated and the boiler stays OFF.

In order to select “warm boiler ON” – “warm boiler OFF” mode, proceed as follows.

- Turn CH temperature adjusting knob fully counter-clockwise.
- Wait for two seconds until the led which indicates the boiler operation mode changes its status (from ON to OFF or vice-versa) (please, see above instructions).
- Now CH temperature can be set through the adjusting knob.

NOTE

It is convenient to set the boiler to “warm boiler ON” mode, particularly during summer and when the boiler is set to “instantaneous” mode, because, being the boiler heat exchanger already warm, it supports the plate heat exchanger in providing DHW more promptly.

1.2.2.4 Thermal unit managing one mixed water CH area, one high temperature CH area and DHW supply (V version)

Boiler operation indications, malfunction diagnosis, and DHW supply mode are identical to the thermal unit managing one high temperature CH area and DHW supply; CH operation mode is different.

The following instructions refer to what changes in boiler without mixed water CH area management.

Position no. **17** switch to **I**: power is connected to the boiler and the switch lights up.

Boiler operation mode is selected through knob **11**. In detail:

⌚ “Programmer” position

The boiler electronics manage the program set via the two-channel programmer **15**. The user manages CH boiler operation through channel 1 (please, see CH section). The user manages DHW boiler operation through channel 2 (please, see DHW section).

- CHANNEL 1 with external temperature probe.

Channel 1 **ON**: CH flow temperature (high and low temperature areas) is managed in order to maintain the COMFORT room temperature set through knob **13**.

Channel 1 **OFF**: CH flow temperature (high and low temperature areas) is managed in order to maintain the REDUCED room temperature.

REDUCED room temperature = COMFORT room temperature minus 4°C; when CM4 jumper is positioned to **0** – please, see wiring diagram section;

REDUCED room temperature = COMFORT room temperature minus 2°C; when CM4 jumper is positioned to **1**).

Room thermostats turn ON or OFF the relevant zone pumps, and when all room thermostats are set to **OFF**, CH demands terminate.

- CHANNEL 2

As described in the “thermal unit managing one high temperature CH area and DHW supply” section.

The programmer can host up to 8 **ON** daily times and 8 **OFF** daily times. 5 programmable time areas are available for each day, for repetition of ON/OFF programs within the same week (1: single day; 2: Mon-Fri; 3: Sat-Sun; 4: Non-Sat; 5: Mon-Sun).

☀ “Comfort” position.

Boiler CH operation management only. Programmer is considered as always turned **ON**, regardless of its programs. Room temperature is the one set as “COMFORT”.

Room thermostats turn ON or OFF the relevant zone pumps, and when all room thermostats are set to **OFF**, CH demands terminate.

☾ “Reduced” position

Boiler CH operation management only. Programmer is considered as always turned **OFF**, regardless of its programs. Room temperature is the one set as “REDUCED”.

Room thermostats turn ON or OFF the relevant zone pumps, and when all room thermostats are set to **OFF**, CH demands terminate.

Knob **13** is disabled for CH flow temperature adjusting, it sets the fictitious room temperature (please, see “SLIDING” TEMPERATURE OPERATION section).

“SLIDING” TEMPERATURE

The boiler adjusts the temperature of CH flow to the high temperature zone (temperature of the radiators) and the temperature of the low temperature zone (floor heating) following the signals from:

- external temperature readings from the external probe
- desired room temperature to be set through knob **13**. 12°C to 28°C range.

Knob **13** turned fully counter-clockwise correspond to 12°C room temperature; knob **13** set to 09:00 hours correspond to 15°C; knob **13** set to 12:00 hours correspond to 20°C; knob **13** set to 03:00 hours correspond to 25°C; knob **13** turned fully clockwise correspond to 28°C; for best CH curve setup, turn knob **13** to position corresponding to 20°C;



1.2.2.5 Anti-Legionella function

Anti-Legionella function is activated every 15 days, it consists in heating up the water tank to 65°C for 30 mins,

regardless of all other setups.

1.2.2.6 Pump anti-seizure function

When the pumps or electric valves are left inactive for 24 hours, the pump anti-seizure function operates the pumps and electric valves for 3 mins.

1.2.2.7 Phone operation function

When a phone operation module is connected to the boiler pcb, the “COMFORT” function and the loading of the boiler can be remotely activated regardless of knob **11** position.

1.2.3 Electronic programmer setup

A. Initialization

When setting up the programmer for the first time or re-programming it, it is advisable to reset it by turning selector **2** to **RUN** and pressing the reset micro-switch **R**: Time, ON and OFF programs will be deleted (time display will flash 0:00).

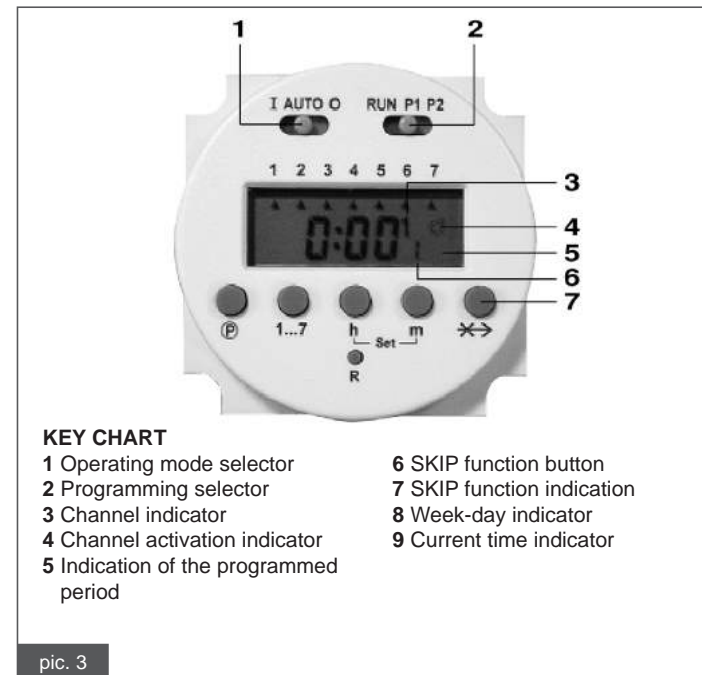
In order to set the day of the week, current time, ON and OFF programs, please see below sections **B** and **C**.

B. Setting the day of the week and current time

Position selector **2** to **RUN** and press **h** and **m** buttons at the same time, until the two dots dividing hours and minutes display stop flashing (If the reset micro-switch **R** was previously pressed, the

time display stops flashing also); press button **1...7** in order to set the day of current week (displayed by indicator **8**), press button **h** in order to set current hour, press button **m** in order to set current minutes (when **h** and **m** are simultaneously pressed, the digital display runs fast).

Wait for approximately ten seconds until the two dots dividing hours and minutes display start flashing. Now the day of the week and current time setup procedure is completed.



C. ON and OFF program setup

Set selector **2** to **P1** in order to program channel **1** and to **P2** in order to program channel **2** (display **3** indicates the number of chosen channel, indication **4** displays ☀ symbol to indicate that we are setting an ON time, display **5** indicates **1** as the first program is being set; up to **8** ON and OFF intervals are available for programming, that is 16 times).

Follow the below described procedure in order to set the ON time:

- press button **1...7** in order to set the desired of the week (or days of the week ⁽¹⁾);
- press button **h** and then button **m** in order to set hour and minutes of the ON time;

- press button **(P)** in order to confirm the programmed ON time and proceed to the programming of the OFF time (indicator **4** is off and it indicates that an OFF time is being set; indicator **5** displays **2** indicating the second time is being set).

Follow again the above described procedure, in order to set the OFF program and after that, press **(P)** button.

Now one boiler operation interval is set through its ON and OFF programmed times, indicator **5** displays **3**; In order to set an additional ON time, follow the above instructions, or move selector **2** to **RUN** in order to terminate the programming procedure.

⁽¹⁾By repeatedly pressing button **1...7**, the following programmable time areas are available in order to automatically repeat the ON and OFF programs within the same week:

No. 1 programmable time area: single week day

No. 2 programmable time area: Monday through Friday

No. 3 programmable time area: Saturday and Sunday

No. 4 programmable time area: Monday through Saturday

No. 5 programmable time area: Monday through Sunday


When programming an ON time in a multi-day programmable time area (e.g. no. 2), the OFF time must be set in the same programmable time area in order to make it effective to all days included in the area.

D. Programmer operation modes

Selector **1** on the programmer sets the following boiler operation modes:

- I** permanently **ON** mode (the selected channel or channels are always active)
- AUTO** operation through programmed setup (the two channels, 1 and 2, are activated or deactivated following the programmed setup; please see paragraph **C** for programming procedure)
- O** permanently **OFF** mode (the selected channel or channels are always off)

Permanently ON mode (I)

In order to have one channel always active, proceed as follows: Position selector **1** to position **I**, press once button **6** to activate channel **1**, press it twice to activate channel **2**; the selected channel will flash for 3 secs (indicator **3**), after that it will be displayed fixed and  symbol will be displayed (indicator **4**), now the channel will remain permanently active.


Selector **1** must remain set to position **I**.

In order to have both channel active, repeat the above described procedure, by selecting the channel not previously activated. Indicator **3** will display 1 and 2, confirming activation of both channels. When only one of the channel is permanently activated, the other channel is operative following its programmed setup (please, see paragraph **C** for detailed programming procedure).

In order to cancel the permanent activation of channels, set selector **1** to **AUTO**.

Operation through programmed setup (AUTO)

This mode allows for channels to be active or inactive following the programming setup (please, see paragraph **C** for programming procedure).

When an ON/OFF interval is active,  symbol (indicator **4**) and the number of the active channel are displayed (indicator **5**).

Permanently OFF mode (O)

When one channel is to be always inactive, proceed as follows:

Set selector **1** to position **O**, press once button **6** in order to select channel 1, press it twice in order to select channel 2; the selected channel will flash (indicator **3**), do not press any button for 3 secs, now the channel will be permanently inactive (indicator 3 will keep flashing the selected channel).

Selector **1** is to be kept in position **O**.

In order to set both channel inactive, repeat the above described procedure by selecting the channel that was not previously chosen.


Indicator **3** will flash 1 and 2, confirming de-activation of both channels.

When one channel is permanently deactivated, the other channel operates following its programmed setup (please, see paragraph **C** for detailed programming procedure).


In order to cancel the permanent de-activation of channels, set selector **1** to **AUTO**.

It is also possible to permanently activate one channel and permanently de-activate the other.


In order to implement the above described program, proceed as follows:

set selector **1** to position **I**, press once button **6** in order to activate channel 1, press it twice in order to activate channel 2; the selected channel will flash for 3 secs (indicator **3**), after it will be displayed fixed and  symbol will be displayed (indicator 4), now the channel will be permanently active.

Rapidly set selector **1** to position **O**, without stopping in position **AUTO**, press once or twice button **6** to select the channel to be permanently deactivated; the selected channel will flash (indicator **3**), while the previously activated channel will continue to be displayed

fixed, and  symbol will remain on (indicator **4**), do not press any button for 3 secs, now the channel will remain permanently deactivated (indicator **3** will keep flashing the selected channel).

E. SKIP function programming procedure

The SKIP function (program skipping) allows to change the operational status of the programmer from **ON** to **OFF** and vice-versa, after pressing button **6**. the SKIP function stays active until the next programmed intervention. The activation of the function is displayed by the  symbol.

In order to deactivate the SKIP function, press again button **6**. The SKIP function is active only when the programmer is set to AUTO mode.

The  symbol is displayed to show the boiler ON status (indicator **4**).

Technical characteristics

Power supply: 220-240V approx. 50/60Hz

Relay output: 2 x 5A; 250V approx. single poled contact

Lithium battery maintaining program memory for 5 years

Minimum commutation intermission: 1 minute

1.2.4. Boiler shutdown

When the boiler malfunctions, the burner is automatically shutdown.

Please, see the troubleshooting section in this manual, for possible shutdown cause detection.

1.2.5 Burner shutdown

When the burner malfunctions, the boiler automatically shuts down and light **1** turns on.

Should this happen, proceed as follows:

- check the gas stopcock to be open, and the presence of gas in the network pipes, by lighting the burner of a kitchen stove.
- after verifying gas supply availability, reset the burner by pressing button **16** on the control panel: should the boiler not resume operation within the third attempt, have the boiler serviced by an Authorized Service Centre or qualified personnel.

Should the burner shut down frequently, showing a recurring malfunction, have the boiler serviced by an Authorized Service Centre or qualified personnel.

1.2.6 Shutdown due to overheating

Should the overheating red light **2** come on, signalling the safety thermostat intervention due to a malfunction, contact an Authorized Service Centre or qualified personnel for service.

1.2.7 Shutdown due to air/flue gas system malfunction

Should a malfunction occur, causing air intake and/or flue gas discharge system failure, the boiler stops operating.

Natural draught boiler model (BTN) shuts down, no. **9** red light starts flashing, and this boiler status continues until correct air/flue gas system correct operation is restored and reset button **19** is pressed.

Forced draught boiler model (BTFS) stands-by, and this boiler status continues until correct air/flue gas system correct operation is restored.

WARNING

The only solution to this condition is accessible by having the boiler serviced by qualified personnel or an Authorized Service Centre.

1.2.8 Shutdown due to insufficient water pressure

In the event of boiler shutdown due to water pressure switch intervention, no. 4 red light starts blinking, signalling insufficient water pressure in the CH system.

In order to restore water pressure, proceed as follows (see pic. 4):

- open the loading tap by rotating it counter-clockwise in order to allow water in the boiler, and keep it open until the water pressure gauge (14 in pic.1) displays a pressure of 1-1,3 bars; close the loading tap by rotating it clockwise.

WARNING

Once the loading procedure is completed, fully close the inlet tap. Should the tap not be properly closed, as pressure increases, boiler CH safety valve may open and water flow out.

Should boiler frequently shut down due to insufficient water pressure, **have it serviced by an Authorized Service Centre or qualified personnel.**

1.2.9 Shutdown due to malfunction of temperature probes

Should the burner shut down due to malfunctioning of temperature probes, the following lights turn on and flash:

- red light 5 (pic.1) for probe 1 (CH)
- red light 7 for probe 2 (water tank)
- red light 8 for probe 3 (plate heat exchanger)

In this instance, contact an Authorized Service Centre or qualified personnel for service.

1.3 Maintenance

The user may only clean the external boiler casing, by means of commonly marketed household products.

Do not use water!

As provided by law, the boiler is to be serviced once a year. Correct maintenance ensures boiler to function efficiently, environmentally friendly, preventing any danger to people, animals or property.

Only qualified personnel are lawfully allowed to service the boiler.

The manufacturer recommends Customers to contact an Authorized Service Centre for maintenance and repairs.

1.4 Information for the User

The user may only access boiler parts that can be reached without using technical equipment and/or tools: the user is not authorized to remove boiler housing and operate on any internal part. No one, including qualified personnel, is authorized to modify the boiler.

The manufacturer shall not be held responsible for damage to people, animals, or property, due to tampering with the boiler or improper intervention.

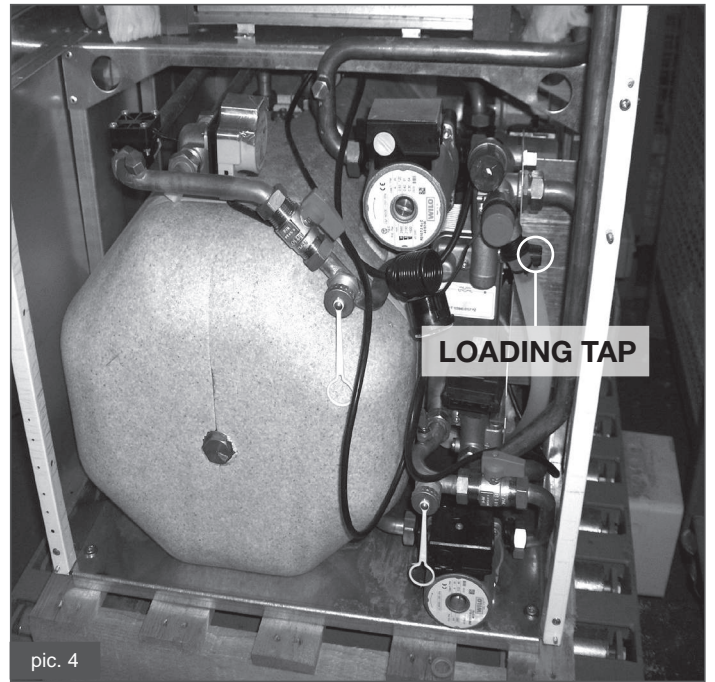
Should the boiler be left inactive for a long time and power main supply disconnected, it might be necessary to unlock the pump.

Pump service includes boiler housing dismounting and access to boiler internal parts, therefore only qualified personnel may perform it.

Pump blockage may be avoided by mixing to water, filming additives suitable for multi-metal systems.

CH system can be properly protected from frost by using specific anti-frost additives suitable for multi-metal systems. Do not use automotive products and verify the additive efficiency over time.

The boiler is equipped with a thermometer allowing for water temperature verification.



2. TECHNICAL CHARACTERISTICS AND DIMENSIONS

2.1 Technical characteristics

The boiler is equipped with a high output cast iron heat exchanger and atmospheric gas burners.

All versions are equipped with electronic ignition, ionization flame detection device, AQUA PREMIUM system for DHW supply employing a 60 ltrs stainless steel stratification water tank and a plate secondary heat exchanger.

The following versions are available:

BTN E 25: open chamber, natural draught boiler with 25.1 kW heat output;

BTN E 32: open chamber, natural draught boiler with 31.4 kW heat output;

BTN E 42: open chamber, natural draught boiler with 42.5 kW heat output.

BTFS E 24: sealed chamber, forced draught boiler with 24.0 kW heat output;

BTFS E 32: sealed chamber, forced draught boiler with 32.0 kW heat output;

BTFS E 36: sealed chamber, forced draught boiler with 36.5 kW heat output.

All models are available in V version, equipped with collector, mixing valve and two additional pumps for management of one high temperature zone and one low temperature zone.

In addition, the boiler is manufactured in accordance to laws and standards in force in the country named on the boiler technical data plate.

Installation in a different country from the one mentioned might endanger people, animals and cause damage to property.

The main technical characteristics of the boiler are listed below:

Manufacture characteristics

- High-output cast iron heat exchanger
- Stainless steel plate DHW heat exchanger
- Stainless steel horizontal stratification 60 l water tank with sacrificial magnesium anode
- Glass wool, aluminium layered, high thickness (50mm) insulation

- Plastic layered, metal sheet casing
- Gas valve
- Motorized deviating valve
- Three-speed CH circulation pump
- Single-speed DHW circulation pump
- 12 lt. CH expansion vessel (18 lt. for BTN E 42 model)
- 5 lt. DHW expansion vessel
- CH water, water tank and plate heat exchanger temperature probes
- Adjustable by-pass
- CH system air purging device
- DHW priority flow switch
- Safety limit thermostat (110°C)
- Air pressure switch (BTFS model)
- Flue gas thermostat (BTN)
- DHW filter
- CH system loading tap
- CH system unloading tap
- Insufficient water pressure safety switch
- Electronics ready to host an additional pcb for management of three different CH zones (optional kit).

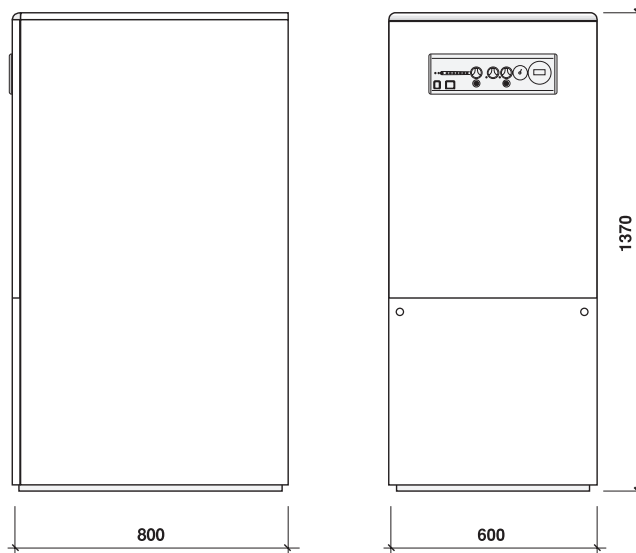
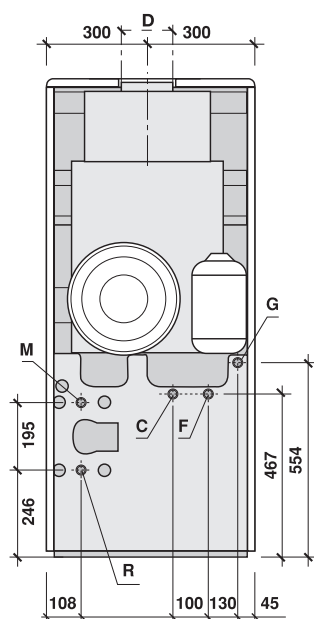
User interface

- Selector managing the following functions: PROGRAMMER, COMFORT TEMPERATURE, REDUCED TEMPERATURE, ANTI-FROST, SUMMER
- CH water temperature adjusting knob
- DHW water temperature adjusting knob
- Power switch with light
- Led thermometer
- Pressure gauge
- Control panel with lights indicating:
 - Power supply
 - CH water supply
 - Communication to remote control error
 - Flame detecting device shutdown
 - Overheating shutdown
 - Low water pressure shutdown
 - Temperature probe malfunction shutdown
 - Air inlet/flue gas system malfunction shutdown.

2.2. Dimensions

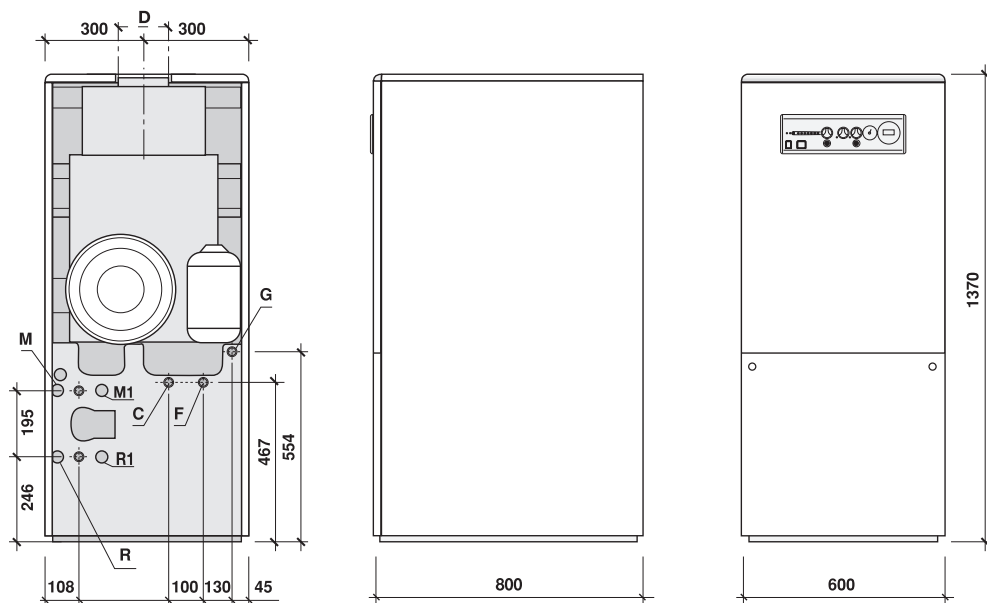
Model BTN E

G: Gas inlet
C: DHW flow
F: Cold water inlet
M: CH flow
R: CH return
D: Flue gas outlet
(130 mm for BTN 25,
150 mm for BTN 32 and BTN 42)



Model BTN EV

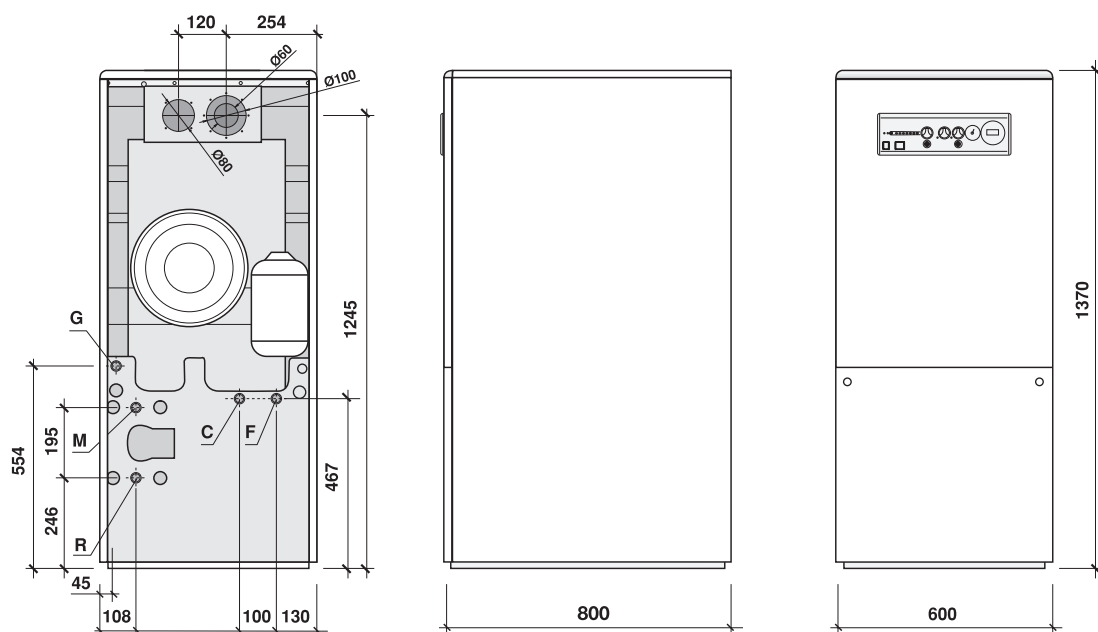
G: Gas inlet
C: DHW flow
F: Cold water inlet
M: CH flow
R: CH return
M1: Low temperature zone flow
M2: Low temperature zone return
D: Flue gas outlet
(130 mm for BTN 25,
150 mm for BTN 32 and BTN 42)



pic. 5B

Model BTFS E

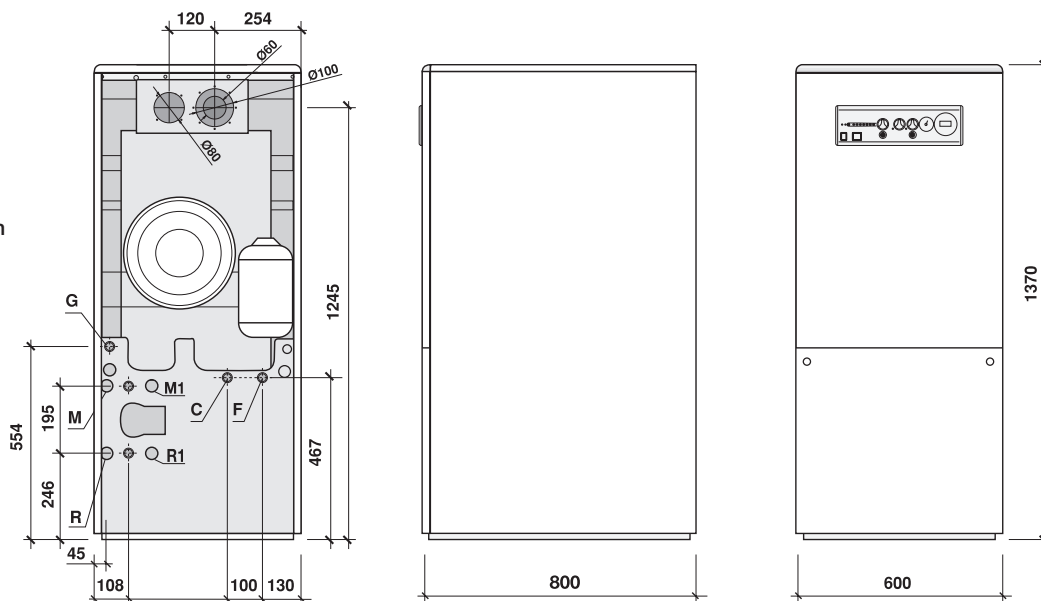
G: Gas inlet
C: DHW flow
F: Cold water inlet
M: CH flow
R: CH return



pic. 5C

Model BTFS EV

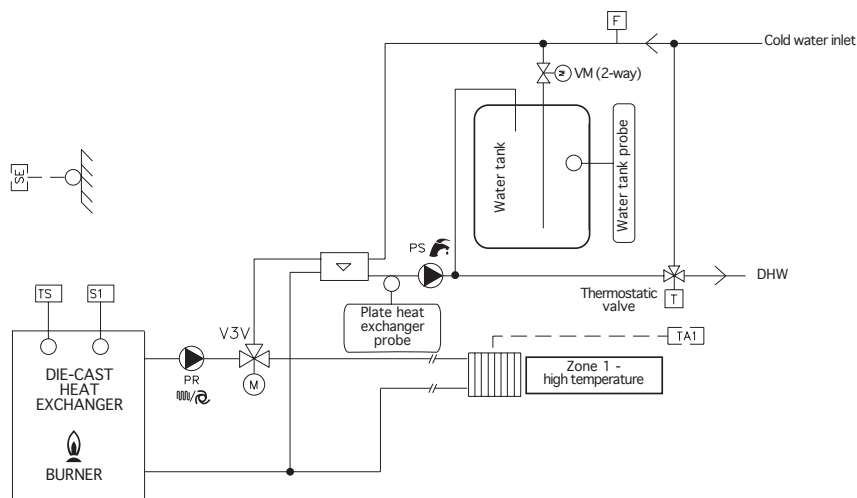
G: Gas inlet
C: DHW flow
F: Cold water inlet
M: CH flow
R: CH return
M1: Low temperature zone flow
M2: Low temperature zone return



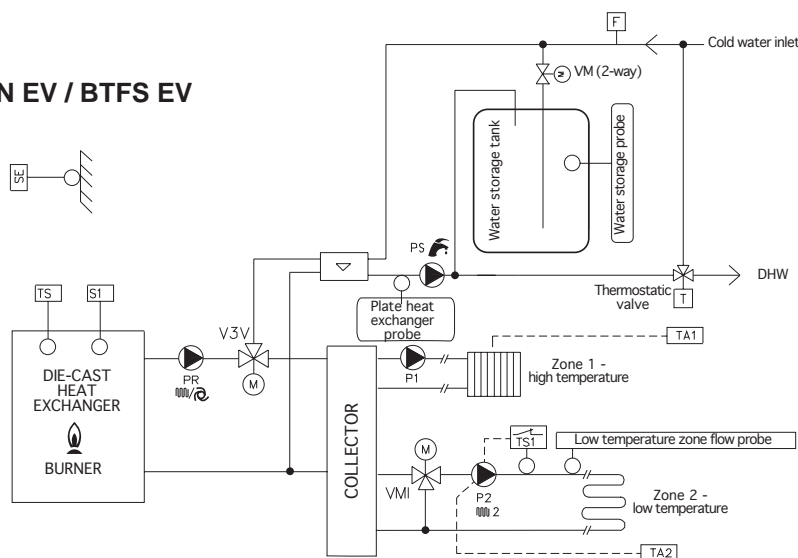
pic. 5D

2.3. Boiler layout

Boiler layout BTN E / BTFS E



Boiler layout BTN EV / BTFS EV



S1: CH PROBE
TS: LIMIT THERMOSTAT
V3V: 3-WAY MOTORIZED VALVE

VM: 2-WAY MOTORIZED VALVE
PR: CH PUMP WITH AIR PURGING DEVICE

PS: DHW PUMP
F: PRIORITY FLOW METER
SE: EXTERNAL PROBE (OPTIONAL EQUIPMENT)
VM: MIXING VALVE
TS1: LOW TEMPERATURE ZONE SAFETY THERMOSTAT

pic. 6

2.4. Operational data

Burner pressures must be verified after a three minute boiler operation time

		BTN 25	BTN 32	BTN 42	BTFS 24	BTFS 32	BTFS 36
Category	-	II2H3+	II2H3+	II2H3+	II2H3+	II2H3+	II2H3+
Type	-	B11BS			C12 - C32 - C42 - C52 - C82		
Number of elements of primary heat exchanger	-	4	5	6	3	4	4
Number of nozzles of burner	-	3	4	5	3	3	3
Max heat input	kW	27.87	34.80	47.00	26.6	34.4	39.2
Max heat output	kW	25.05	31.40	42.54	24.0	32.0	36.5
Max output efficiency rate	%	89.9	90.22	90.51	90.20	93.10	93.10
Reduced output efficiency rate (30% of max output)	%	89.0	90.00	89.75	89.23	92.08	92.14
92/42/CEE efficiency rating	-	★★	★★	★★	★★	★★★	★★★★
Casing heat loss	%	0.40	0.50	0.50	2.20	1.90	1.50
Flue gas heat loss with burner on	%	9.7	9.28	8.99	7.6	5	5.4
CH min. flow rate	l/h	540	690	900	520	690	780
Min. CH water pressure	bar	0.8	0.8	0.8	0.8	0.8	0.8
Max CH water pressure	bar	3	3	3	3	3	3
Max CH water temperature	°C	90	90	90	90	90	90
Min. CH water temperature	°C	40	40	40	40	40	40
Capacity of expansion vessel	l	12	12	18	12	12	12
Max CH system capacity	l	240	240	360	240	240	240
Water content	l	16.4	19.8	23	13	16.4	16.4
Water tank capacity	l	60	60	60	60	60	60
DHW supply $\Delta T=30K$ EN 625	l/10'	220	242	280	215	245	253
prEN 13203 efficiency rating	-	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★
Min. DHW flow rate	l/min	3	3	3	3	3	3
Min. DHW pressure	bar	1	1	1	1	1	1
Max DHW pressure	bar	6	6	6	6	6	6
Max DHW water temperature	°C	65	65	65	65	65	65
Min. DHW water temperature	°C	50	50	50	50	50	50
Capacity of DHW expansion vessel	l	5	5	5	5	5	5
CH Flow/return pipe diameter	inches	G1	G1	G1	G1	G1	G1
DHW inlet/outlet pipe diameter	inches	G3/4	G3/4	G3/4	G3/4	G3/4	G3/4
Gas inlet diameter	inches	G1/2	G1/2	G1/2	G1/2	G1/2	G1/2
Flue gas pipe diameter	mm	130	150	150	--	--	--
Air/flue gas coaxial pipe system diameter	mm	--	--	--	100/60	100/60	100/60
Air/flue gas split pipe system diameter	mm	--	--	--	80+80	80+80	80+80
Voltage/frequency	V/Hz	230/50	230/50	230/50	230/50	230/50	230/50
Power consumption	W	160	200	200	200	250	250
Power fuse	A	4	4	4	4	4	4
Control panel protection rating	IP	X4D	X4D	X4D	X4D	X4D	X4D
Height	mm	1370	1370	1370	1370	1370	1370
Length	mm	600	600	600	600	600	600
Depth	mm	800	800	800	800	800	800
Net boiler weight	Kg	172	189	206	189	223.5	223.5

G20 gas

		BTN 25	BTN 32	BTN 42	BTFS 24	BTFS 32	BTFS 36
CO2 content	%	5.1	4.5	6	7.6	8.3	8.2
Flue gas temperature	°C	111	103	121	120/130	110/120	120/130
Flue gas mass flow rate	kg/h	101.16	133.56	162	55	67	76
Max output gas consumption	stm ³ /h	2.95	3.7	4.97	2.81	3.64	4.15
Gas pressure	mbar	20	20	20	20	20	20
Gas to burner pressure	mbar	11.5	9.5	11.5	11	9.5	12
Main burner nozzle diameter	mm	2.6	2.6	2.6	2.4	2.9	2.9
Pilot burner nozzle diameter	mm	2 x 0.27	2 x 0.27	2 X 0.27	2 x 0.27	2 x 0.27	2 x 0.27

G30 gass

CO2 content	%	6.2	5.4	7.1	9.8	9.7	11.1
Flue gas temperature	°C	110	105	122	120/130	120/130	120/130
Flue gas mass flow rate	kg/h	101.16	133.56	162	55	67	76
Max output gas consumption	kg/h	2.2	2.76	3.7	2.1	2.7	3.1
Gas pressure	mbar	29	29	29	29	29	29
Gas to burner pressure	mbar	26.5	26.5	26.5	26	25.5	26
Main burner nozzle diameter	mm	1.55	1.55	1.55	1.5	1.7	1.8
Pilot burner nozzle diameter	mm	1 x 0.22	1 x 0.22	1 X 0.22	1 x 0.22	1 x 0.22	1 x 0.22

3. INSTRUCTIONS FOR THE FITTER

3.1. Installation standard

The boiler is to be installed in compliance with the country applicable standards, laws and regulations which are intended as fully transcribed to this manual.

3.2. Installation

3.2.1. Packaging

The boiler is packaged in a strong cardboard box fixed by two screws to a wooden pallet. Once the cardboard box is removed, check the boiler to be undamaged. The packaging material can be recycled and it must be disposed of accordingly.

Keep the packaging out of the reach of children as it may represent a hazard.

The manufacturer shall not be held liable for injury to persons and animals or damage to property resulting from non-observance of the above.

The packaging contains:

- Installation, use and maintenance instruction manual
- Four legs with threads

3.2.2 Choosing where to install the boiler

When choosing where to install the boiler, follow the instructions below:

- indications in paragraph 3.2.5 Air/flue gas system configuration
- leave a 50 cm clearing on each side of the boiler to facilitate maintenance operations
- do not install the boiler in a high humidity room
- do not install a natural draught boiler (BTN model) in a corrosive vapor or dusty air room like hairdressers', laundrettes etc. as boiler components life span might result considerably shorter than average,
- Boiler room is not to be accessible by people, children and animals

3.2.3 Positioning the boiler

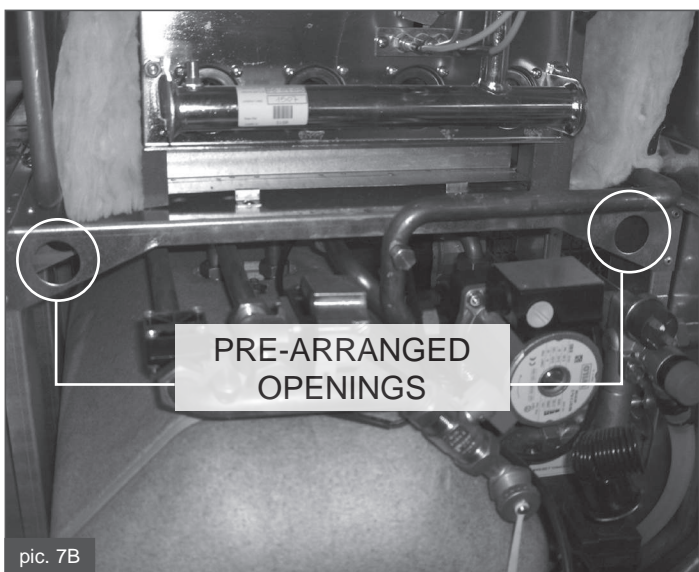
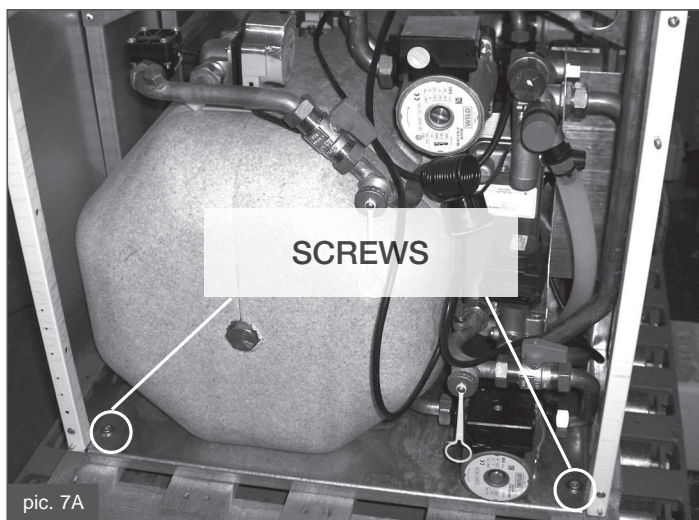
Before connecting the boiler to DHW and CH system pipes, clean the pipes removing any trace of metal from processing and welding as well as any oil and grease which could damage the boiler or interfere with its operation.

NB: Do not use solvents which could damage the components.

The manufacturer shall be waived from all liabilities for injury to persons and animals or damage to property resulting from non-observance of the above.

In order to install the boiler, after laying it where is to be positioned, proceed as follows:

- detach the front panel
- detach the two screws fixing it to the wooden pallet (pic. 7A)
- In order to remove the boiler from the wooden pallet it is necessary to raise it: proceed carefully and delicately. Insert two 2" thick metal bars in the openings under the boiler chassis which supports the heat exchanger (pic. 7B), raise the boiler avoiding to damage the hydraulic connections and position it on the ground.
- fix the four threaded legs to the boiler and adjust them for best installation stability;
- connect the boiler to CH flow, CH return, cold water network, DHW flow, and gas network pipes
- connect the boiler to air and gas flue pipes as needed
- connect the boiler electronics to the room thermostat (when available)
- connect the boiler to the power main supply



3.2.4. Boiler room ventilation

The boiler is to be installed in an adequate room according to law requirements, which are considered as fully transcribed in this manual.

BTN, open combustion chamber boiler model is to be connected to a chimney system: combustion air is taken from the boiler room. An air replenishment opening is to be provided according to law requirements.

BTFS, sealed combustion chamber boiler model does not take combustion air from the boiler room, therefore no air replenishment opening is to be provided.

3.2.5. Air/flue gas system configuration

As far as flue gas system exhaust to the atmosphere is concerned, comply with current laws which are considered as fully transcribed in this manual.

NATURAL DRAUGHT BOILER (BTN)

BTN boiler model is equipped with a flue gas coupling which is ready to be connected to a flue gas exhaust system, which diameter is specified in the technical data tables.

As far as flue gas system exhaust to the atmosphere is concerned, comply with current laws which are considered as fully transcribed in this manual.

The flue gas pipe is to be connected to a chimney system in compliance with current laws which are considered as fully transcribed in this manual.

The following mandatory requirements for air/flue gas system ducts are to be followed:

- Their diameter is not to be not less than that of the boiler outlet.
- They are to be made of water proof material that can withstand flue gas temperature and related acid condensate.
- They are to have low thermal conductivity, sufficient mechanical strength, be properly sealed, and bear proper height and cross-section dimensions.
- The vertical inclination (chimney system) and section are to be constant, without any bottlenecks.
- Where horizontal flue gas pipe are installed, these must bear an inclination toward the ground of at least 5%.
- The terminal is to ensure efficient, constant evacuation of flue gas in any weather condition.
- The flue gas terminal is to stand at least 0.5 m above any adjacent structure within a 5 m radius.

FORCED DRAUGHT BOILER (BTFS)

BTFS boiler model is equipped with air and flue gas couplings which are to be connected to 80mm diameter pipes.

As far as flue gas system exhaust to the atmosphere is concerned, comply with current laws which are considered as fully transcribed in this manual.

Type C12

This boiler is designed for horizontal air/flue gas terminals, connected to the outside by means of a coaxial or split pipe system. The distance between the air intake pipe and the flue gas exhaust pipe is to be at least 250 mm and both terminals are to be positioned within a square having sides of 500 mm.

- Air / flue gas coaxial pipe system, 60/100 mm diameter.

Allowable configuration:

- 1 flanged stub pipe
- 3 meter long coaxial pipe
- 1 air/flue gas terminal.

Notes:

- Reduce the maximum length by 1 meter for each 90° elbow.
- Reduce the maximum length by 0.5 meter for each 45° elbow.
- **BTFS 24** model: in installations with an equivalent length of less than 1 meter, install a 75 mm diaphragm.
- **BTFS 32** model: in all installations, install a 78 mm diaphragm.
- **BTFS 36** model: in installations with an equivalent length of less than 1 meter, install a 78 mm diaphragm.

- Air / flue gas 80 mm diameter split pipes

Allowable configuration:

- 2 flanged stub pipes
- 19 meter long air intake pipe
- 19 meter long flue gas pipe
- 1 air intake terminal
- 1 flue gas terminal

Notes:

- Reduce maximum length by 1 meter for each 90° elbow.
- Reduce maximum length by 0.5 meter for each 45° elbow.
- **BTFS 24** model: for installations with an equivalent length of less than 2+2 meters, install a 42 mm diaphragm on the air intake.
- **BTFS 32** and **BTFS 36** models: for installations with an equivalent length of less than 9+9 meters, install a 40 mm diaphragm on the air intake.

Type C32

This boiler is designed for vertical air/flue gas terminals, connected to the outside by means of coaxial or split pipes.

The distance between the air intake pipe and the flue gas pipe is to be at least 250 mm and both terminals are positioned within a square having 500 mm sides.

- **Air / flue gas coaxial pipe, 60/100 mm diameter.**

Allowable configuration:

1 flanged stub pipe
4 meter long coaxial pipe
1 air/flue gas roof terminal.

Notes:

- Reduce maximum length by 1 meter for each 90° elbow.
- Reduce maximum length by 0.5 meter for each 45° elbow.

- **Air / flue gas 80 mm diameter split pipes**

Allowable configuration:

2 flanged stub pipes
19 meter long air intake pipe
19 meter long flue gas pipe
1 air intake terminal
1 flue gas terminal

Notes:

- Reduce maximum length by 1 meter for each 90° elbow.
- Reduce maximum length by 0.5 meter for each 45° elbow.
- **BTFS 24** model: in installations with an equivalent length of less than 2+2 meters, install a 42 mm diaphragm on the air intake.
- **BTFS 32** and **BTFS 36** models: in installations with an equivalent length of less than 9+9 meters, install a 40 mm diaphragm on the air intake.

Type C42

This boiler is designed for a collective flue gas exhaust system consisting of two pipes, one for air intake and the other for flue gas, by means of a coaxial or split pipes.

The collective flue gas exhaust system must comply with current laws.

- **Air / flue gas 80 mm diameter split pipes**

Allowable configuration:

2 flanged stub pipes
2 meter long air intake pipe
2 meter long flue gas pipe

Notes:

- Reduce maximum length by 1 meter for each 90° elbow.
- Reduce maximum length by 0.5 meter for each 45° elbow.
- **BTFS 24** model: install a 42 mm diaphragm on the air intake.
- **BTFS 32** and **BTFS 36** models: install a 40 mm diaphragm on the air intake.

Type C52

This boiler is to be connected to a split pipe system.

The pipes can operate at different pressure. Terminals cannot be placed on walls facing each other.

- **Air intake/ flue gas 80 mm diameter split pipes**

Roof mounted flue gas terminal.

Allowable configuration for max length of split pipes:

2 flanged stub pipes
1 meter long air intake pipe
30 meter long flue gas pipe
1 air intake terminal
1 roof-mounted smoke flue terminal

Notes:

- 1 meter of air intake pipe is equivalent to 2 meters of vertical flue gas pipe.
- Reduce maximum length by 1 meter for each 90° elbow.
- Reduce maximum length by 0.5 meter for each 45° elbow.
- **BTFS 24** model: in installations with an equivalent vertical flue gas pipe length, less than 18 meters, install a 40 mm diaphragm on the air intake.
- **BTFS 32** and **BTFS 36** models: in installations with an equivalent vertical flue pipe length, less than 4 meters, install a 42 mm diaphragm on the air intake.

Wall-mounted flue gas pipe

Allowable configuration for max length of split pipes:

2 flanged stub pipes
19 meter long air intake pipe
19 meter long flue gas pipe
1 air intake terminal
1 flue gas terminal

Notes:

- 1.6 meters long air intake pipe is equivalent to 1 meters horizontal flue gas pipe.
- Reduce maximum length by 1 meter for each 90° elbow.
- Reduce maximum length by 0.5 meter for each 45° elbow.
- **BTFS 24** model: in installations with an equivalent length of less than 9+9 meters, install a 40 mm diaphragm on the air intake.
- **BTFS 32** and **BTFS 36** models: in installations with an equivalent length of less than 2+2 meters, install a 42 mm diaphragm on the air intake.

Type C82

This boiler is designed to be connected to a terminal for intaking of combustion air and an individual or collective flue gas system.

The flue gas system is to comply with current standards.

- **Air / flue gas 80 mm diameter split pipes**

Allowable configuration for max length of split pipes:

2 flanged stub pipes
4 meter long air intake pipe
1 meter long flue gas pipe
1 air intake terminal

Notes:

- 1.6 meter long air intake pipe is equivalent to 1 meter long horizontal flue gas pipe.
- Reduce maximum length by 1 meter for each 90° elbow.
- Reduce maximum length by 0.5 meter for each 45° elbow.
- **BTFS 24** model: install a 42 mm diaphragm on the air intake.
- **BTFS 32** and **BTFS 36** models: install a 40 mm diaphragm on the air intake.

3.2.6. Verifying combustion efficiency

In order to determine combustion efficiency, the following measurements are to be performed:

- combustion air temperature
- flue gas temperature and CO₂ concentration, from the relevant opening on the flue gas pipe.

Perform the above measurements when the boiler has reached working temperature.

3.2.7. Gas main connection

Gas supply pipe section must be equal or larger than boiler's. The applicable section of the pipe depends on its length, path, and flow rate. Its section is to be calculated.

Refer to applicable installation standards and laws. They shall be considered as incorporated in full in this manual.

An internal, brand new gas supply network, before supplying any gas or being connected to the gas meter, is to be checked for leaks.

When sections of the network are concealed, the leak test must be carried out prior to covering the pipes.

The leak test must not be conducted using fuel gas: use air or nitrogen.

When gas is flowing through the pipes, gas leaks should never be detected using an open flame device. Use appropriate products, readily available on the market.

3.2.8. Power main connection

The boiler is to be connected to a 230V-50Hz power main supply via a triple-poled wiring (not included). The wires are to be connected to position **5** (EARTH), **6** (PHASE), and **7** (NEUTRAL) of **M** terminal board in picture 9 (BTN E and BTFS E models), or to position **12** (EARTH), **13** (PHASE), and **14** (NEUTRAL) of **M** terminal board in picture 10 (BTN E V and BTFS E V models).

Verify phase, neutral and ground connections are correctly performed, following the instructions in this manual.

When installing the boiler, comply with applicable standards which shall be considered fully incorporated to this manual.

A bipolar switch, with 3 mm minimum distance between the contacts, in an easy to reach position, must be installed externally to the boiler to enable interruption of power supply and to ensure maintenance operations to be carried out safely. The power main line to the boiler must be protected by a differential thermal-magnetic switch with the adequate interruption power.

Power mains is to be properly earthed.

The above instruction is an indispensable safety requirement and is to be verified prior to operating the boiler; in case of doubt, ask for a professionally qualified technician to check the electrical system.

The manufacturer shall not be held liable for damage or injury caused by failure to properly earth the power main. Gas lines, DHW and CH pipes are not suitable for earthing purposes.

3.2.9. Hydraulic connections

Before connecting the boiler it is advisable to clean the pipes in order to remove any alien material that could damage boiler components such as pump and heat exchanger.

CENTRAL HEATING

Central heating flow and return must be connected to their relevant 1" connections, marked **M** and **R** in pic. 5 and 5B).

When size dimensioning central heating pipes, it is necessary to consider load losses induced by radiators, presence of thermostatic valves, radiator cut-off valves and general configuration of the central heating system.

It is advisable the discharge of the safety valve to be conveyed into the sewer.

If this precaution is not taken, activation of the safety valve may result in flooding of the room where the boiler is installed.

The Manufacturer shall not be held responsible for damage caused by omission of the above mentioned technical precaution.

DOMESTIC HOT WATER

DHW flow and water main inlet pipes must be connected to the their 3/4" connections, marked **C** and **F** (pic. 5A and pic. 5B).

Hardness of water increases frequency of service to the secondary plate heat exchanger.

WARNING

Should water hardness be far above average, it is advisable to install a water softener device.

Water showing 20°F or more hardness should be treated.

WARNING

Due to its pH value, water supplied from normal water softeners may not be compatible with some components of the heating system.

3.2.10. Room thermostat connection

The boiler can be connected to a room thermostat: **its contacts must be properly sized in consideration of a 5 mA load at 24 Vdc.**

Room thermostat wirings must be connected to positions **1** and **2** of **M** terminal board shown in pic. 9 (BTN E and BTFS E models), after removing the jumper supplied as standard to the boiler.

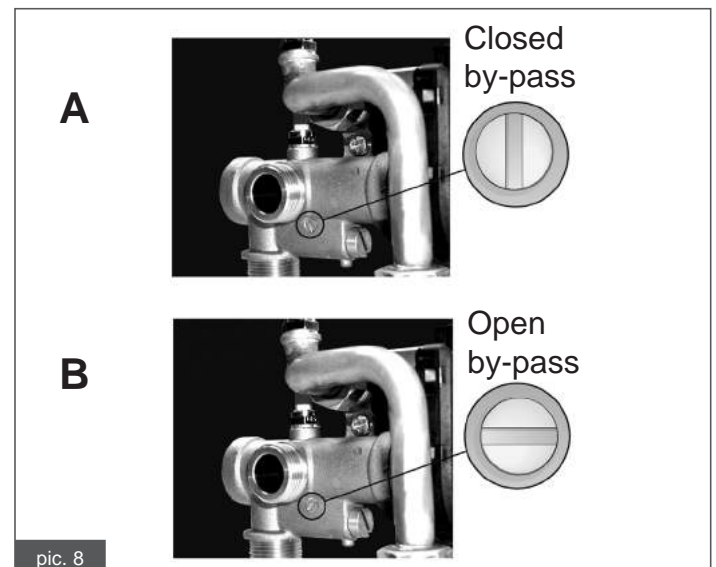
Room thermostat wires are NOT to be grouped together with power main supply cables.

BTN E V and BTFS E V models can be connected to two room thermostats: one managing a high temperature CH area to no. **8** and no. **9** positions of **M** terminal board, one managing a low temperature CH area to no. **6** and no. **7** positions of **M** terminal board.

3.2.11. Adjustable by-pass

The boiler is equipped by an adjustable by-pass (located on the three-way motorized valve hydraulic assembly). By-pass operation can also be inhibited.

Pic. 8A shows the adjusting by-pass screw, set for by-pass operation preclusion, pic. 8B shows the adjusting by-pass screw set for by-pass operation.



pic. 8

3.2.12. Installation of original kits

The manufacturer provides original kits for thermoregulation control unit installation.

The kits are to be installed as described in their relevant instruction manuals.

3.3. Loading the system

After completion of all hydraulic connections the central heating system is ready for loading.

Water filling procedure must be performed as follows:

- open air purging valves on the radiators and check operation of the boiler automatic air purging valve
- gradually open the boiler water main inlet tap and check operation of all air purging valves in the system
- close the air purging valves on the radiators as soon as water comes out
- check the water pressure gauge on boiler, its reading is not to exceed 1-1.3 bars
- close the water main inlet tap and purge any air still in the system through the radiator valves
- turn the boiler on and wait for the CH system to reach working temperature. Stop the pump and purge any left air
- allow the CH system to cool and adjust water pressure to 1-1.3 bars.

WARNING

For best performance, safe, trouble-free and long lasting operation of boiler and its components, in order to minimise energy consumption, thus complying with standards and laws, it is essential to treat the water using specific products compatible with multi-metal systems.

Note

The boiler is equipped, in its front lower section, with a tap for unloading water from the system.

WARNING

A low water pressure safety switch prevents burner to ignite when water pressure is lower than 0.4 / 0.6 bar. Water pressure in the central heating system should not be lower than 1-1.3 bar; restore correct pressure through water mains inlet tap on the boiler as necessary.

Water pressure adjustment must be performed when the system is cold. The thermo-manometer gauge on the boiler allows for checking the pressure in the system.

IMPORTANT:

After a period of inactivity the pumps could be blocked.

Before switching on the boiler it may be necessary to unlock the pumps as follows: loosen the protective screw on the pump motor housing, insert a screwdriver in the hole and then manually rotate the pump shaft clockwise.

After restoring pump operation, tighten the protective screw and check for water leaks.

WARNING

When removing the pump protective screw a little water may leak out. Before replacing the cover of the boiler dry any wet surfaces.

3.4 Starting the boiler

3.4.1 Preliminary checks

Prior to starting the boiler verify the following:

- correct installation of flue gas outlet duct and terminal section: **when the boiler is operating, no flue gas leaks are to be detected.**
- power supply to the boiler must be 230 V- 50 Hz;
- system is correctly filled with water (manometer reading is to be 1-1.3 bars);
- any cut-off taps in the system are to be open;
- the gas type supplied matches the gas type for which the boiler has been calibrated: otherwise, convert the boiler to the gas type available (see section 3.6: "SWITCHING TO DIFFERENT GAS AND BURNER ADJUSTMENT"): this operation is to be performed by qualified technicians;
- the gas supply tap is open;
- **no gas leaks are detected;**
- the power switch external to the boiler is on;
- no water leaks are detected
- the pumps are not blocked
- the boiler's safety valve is not locked;

WARNING

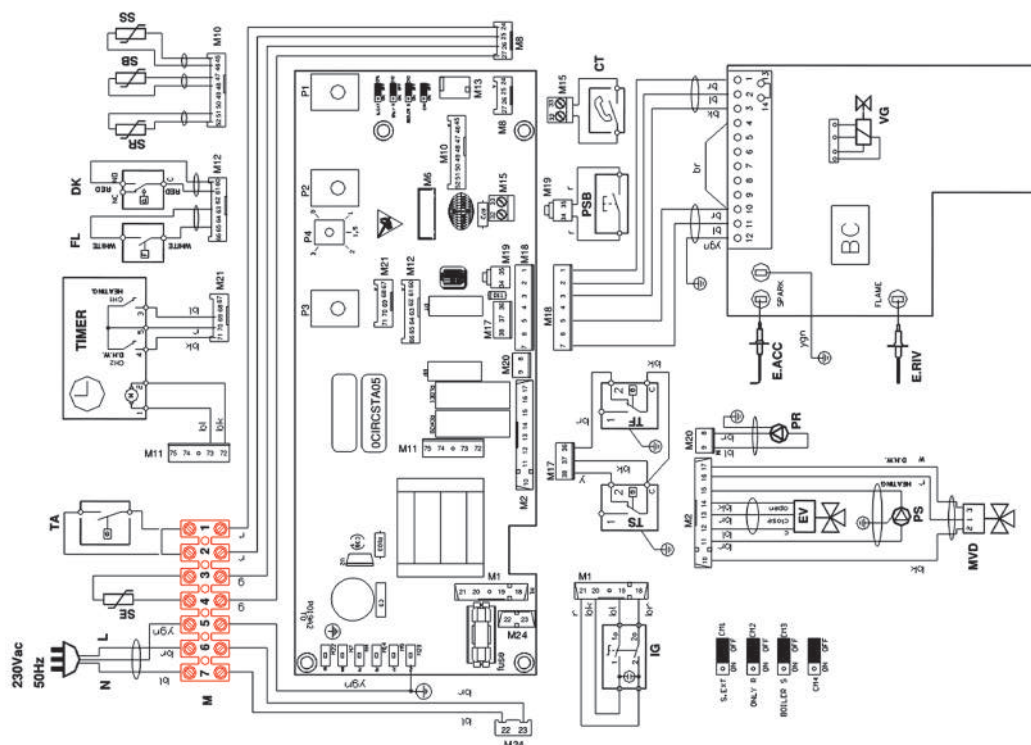
The boiler pump is factory set to III speed and the by-pass is closed. Adjust them following the system requirements.

3.4.2 On/Off switching

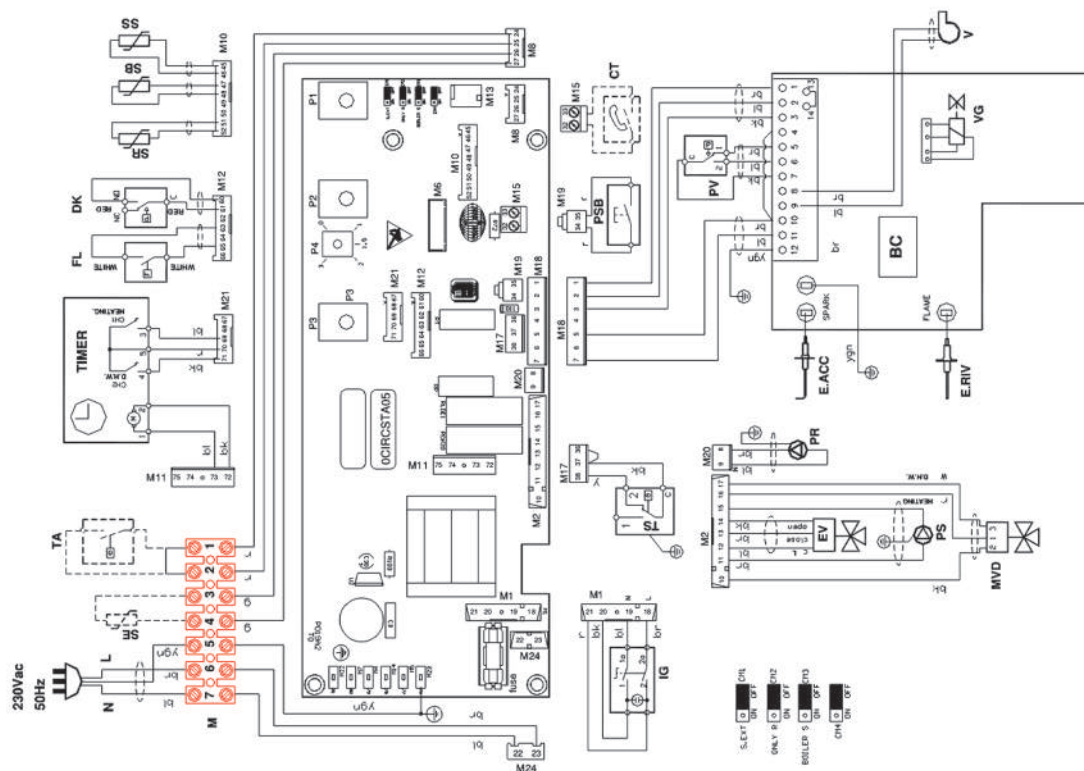
To switch the boiler on and off follow the indications in the **"Instructions to the user"**.

3.5. Wiring diagrams

Model BTN E



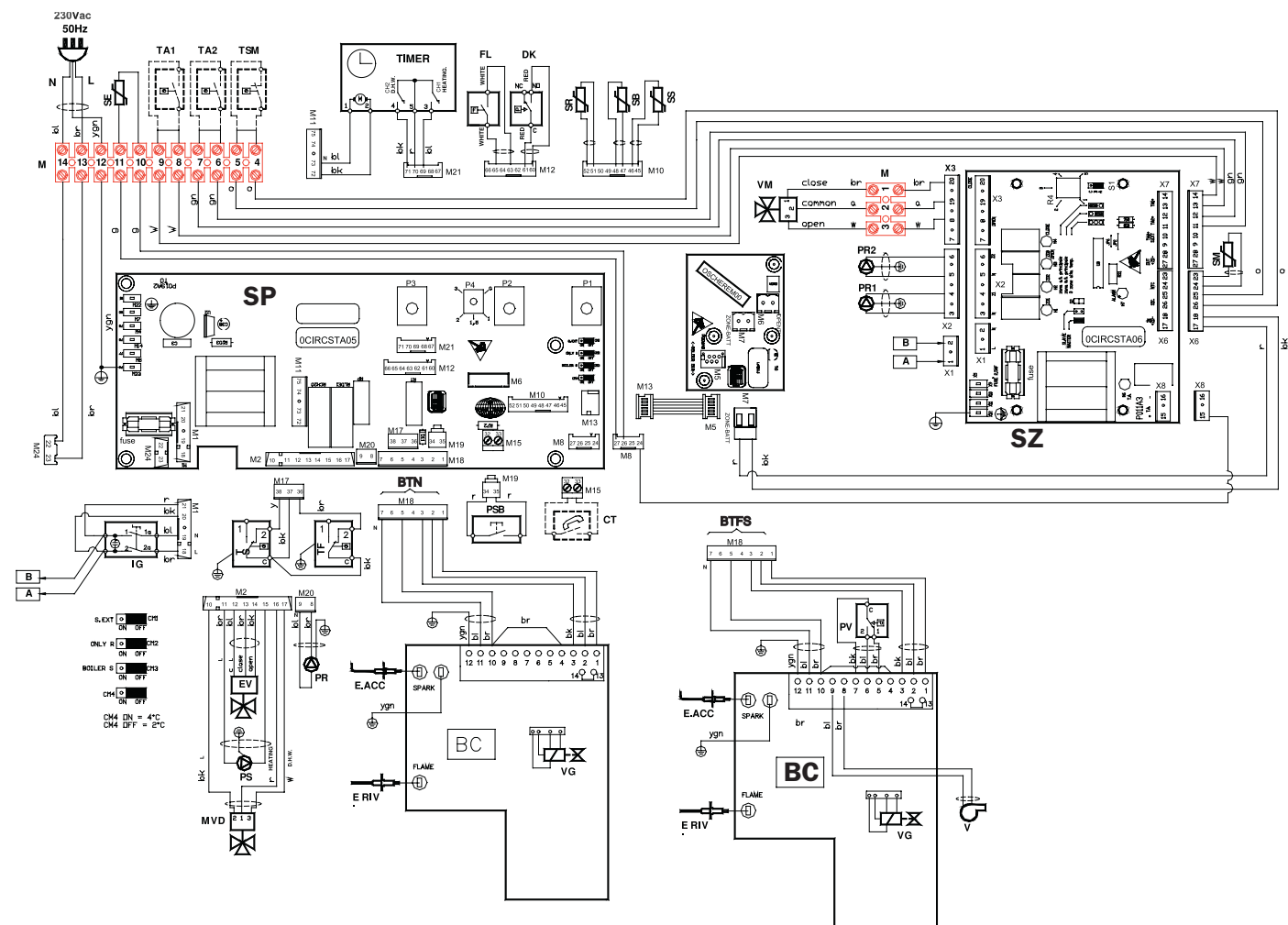
Model BTFS E



M: TERMINAL BOARD FOR CONNECTION TO POWER MAINS, EXTERNAL TEMPERATURE PROBE, ROOM THERMOSTAT
M6: TELEMETRY CONNECTION
M1-M24: AVAILABLE CONNECTORS
TA: ROOM THERMOSTAT
SE: 10k Ohm B = 3977 EXTERNAL TEMPERATURE PROBE (OPTIONAL EQUIPMENT)
CT: PHONE CONNECTION DEVICE (OPTIONAL EQUIPMENT)
FUSE: 2AF 250 VAC FUSE
P4: CH CURVE SELECTION POTENTIOMETER
P3: BOILER OPERATING MODE SELECTOR
P2: DHW TEMPERATURE ADJUSTING POTENTIOMETER
P1: CH TEMPERATURE ADJUSTING POTENTIOMETER
IG: TWO-POLED MAIN POWER SWITCH
BC: FLAME DETECTION PCB
VG: GAS VALVE
E, RIV: FLAME DETECTION ELECTRODE

E. ACC: IGNITION ELECTRODE
PSB: RESET BUTTON
TS: SAFETY THERMOSTAT
TF: FLUE GAS THERMOSTAT
DK: LOW WATER PRESSURE SAFETY SWITCH
FL: FLOW METER
PR: RECIRCULATION PUMP
PS: DHW PUMP
EV: TWO-WAY WATER TANK INTERCEPTING VALVE
MVD: THREE-WAY MOTORIZED VALVE
TIMER: TIMER
SB: 10k Ohm B = 3435 WATER TANK PROBE
SR: 10k Ohm B = 3435 CH PROBE
SS: 10k Ohm B = 3435 DHW PROBE

MOD. BTN E V and BTFS E V



SP: MAIN PCB
SZ: ZONE PCB
IG: TWO-POLED MAIN POWER SWITCH
BC: FLAME DETECTION PCB
VG: GAS VALVE
V: FAN
PV: FAN PRESSURE SWITCH
E.RIV: FLAME DETECTION ELECTRODE
E.ACC: IGNITION ELECTRODE
PSB: RESET BUTTON
TS: SAFETY THERMOSTAT
TF: FLUE GAS THERMOSTAT
DK: LOW WATER PRESSURE SAFETY SWITCH
FL: FLOW METER
PR: RECIRCULATION PUMP
PS: DHW PUMP
EV: TWO-WAY WATER TANK INTERCEPTING VALVE
MVD: THREE-WAY MOTORIZED VALVE
VM: CIRCUIT 2 MOTORIZED MIXING VALVE
PR1: CIRCUIT 1 CH PUMP (HIGH TEMPERATURE)
PR2: CIRCUIT 1 CH PUMP (LOW TEMPERATURE)
M: TERMINAL BOARD FOR CONNECTION TO EXTERNAL TEMPERATURE PROBE, THERMOSTATS

SE: 10k Ohm B=3977 EXTERNAL TEMPERATURE PROBE
TA1: ZONE 1 THERMOSTAT (HIGH TEMPERATURE) (OPTIONAL EQUIPMENT)
TA2: ZONE 2 THERMOSTAT (LOW TEMPERATURE) (OPTIONAL EQUIPMENT)
TSM: LOW TEMPERATURE SAFETY THERMOSTAT (OPTIONAL EQUIPMENT)
M6: TELEMETRY CONNECTION
M1-M24: AVAILABLE CONNECTORS
X1-X8: AVAILABLE CONNECTORS
CT: PHONE CONNECTION DEVICE (OPTIONAL EQUIPMENT)
FUSE (SP): 2 AF 250 Vac FUSE
FUSE (SZ): 2.5 AF 250 Vac FUSE
P4: HIGH TEMPERATURE CH CURVES ADJUSTING POTENTIOMETER
R4: LOW TEMPERATURE CH CURVES ADJUSTING POTENTIOMETER
P3: BOILER OPERATING MODE SELECTOR
P2: DHW TEMPERATURE ADJUSTING POTENTIOMETER
P1: CH TEMPERATURE ADJUSTING POTENTIOMETER
TIMER: TWO-CHANNEL TIMER (CHANNEL 1 CH - CHANNEL 2 = DHW)
SB: 10k Ohm b=3435 WATER TANK PROBE
SR: 10k Ohm b=3435 CH PROBE
SS: 10k Ohm b=3435 DHW PROBE
SM: LOW TEMPERATURE ZONE PROBE ON FLOW 10k Ohm b=3435

pic. 10

T (°C)	0	2	4	6	8
0	27203	24979	22959	21122	19451
10	17928	16539	15271	14113	13054
20	12084	11196	10382	9634	8948
30	8317	7736	7202	6709	6254
40	5835	5448	5090	4758	4452
50	4168	3904	3660	3433	3222
60	3026	2844	2674	2516	2369
70	2232	2104	1984	1872	1767
80	1670	1578	1492	1412	1336
90	1266	1199	1137	1079	1023

Relation between temperature (°C) and nominal resistance (Ohm) of CH probe (SR), DHW probe (SS), water tank probe (SB) and low temperature zone probe on flow (SM).

3.6. Switching to different gas and burner adjustment

Boiler conversion from natural gas to LPG and vice-versa is strictly to be implemented by qualified personnel.

In order to verify nozzle and gas inlet pressure, connect a manometer to check on the gas valve.

Boilers are factory-set according to gas type requested upon order. Any later conversion must be performed by qualified technicians, employing the conversion kit (supplied with boiler) and the instructions for conversion and adjustment.

Converting the boiler from natural gas to LPG

Follow the instructions below:

- remove the pilot burner natural gas nozzle after removing the bi-cone fixing bolt and removing the pilot burner gas supply pipe;
- install the LPG nozzle, verifying its compliance with the technical data table and, after re-installing the gas supply pipe, tighten the bi-cone fixing bolt;
- remove the main burner natural gas nozzles and install the LPG ones verifying their compliance with the technical data table;
- unscrew the cap of the pressure adjuster of the gas valve and fully tighten the screw of the pressure adjuster;
- screw the cap of the pressure adjuster of the gas valve back on and seal it (e.g. by means of paint or self-sticking label);
- check for gas leaks, especially from the gas connections that were part of the above procedure;
- position the self-sticking label provided with the conversion kit, indicating the type of gas and pressure for which the device was adjusted;

Converting the boiler from LPG to natural gas

Follow the instructions below:

- remove the pilot burner LPG nozzle after removing the bi-cone fixing bolt and removing the pilot burner gas supply pipe;
- install the natural gas nozzle, verifying its compliance with the technical data table and, after re-installing the gas supply pipe, tighten the bi-cone fixing bolt;
- remove the main burner LPG nozzles and install the natural gas ones verifying their compliance with the technical data table;
- unscrew the cap of the pressure adjuster of the gas valve and untighten the screw of the pressure adjuster so to obtain the pressure value compliant with technical data table;
- screw the cap of the pressure adjuster of the gas valve back on and seal it (e.g. by means of paint or self-sticking label);
- check for gas leaks, especially from the gas connections that were part of the above procedure;
- position the self-sticking label provided with the conversion kit, indicating the type of gas and pressure for which the device was adjusted.

4. MAINTENANCE

The boiler is to be yearly serviced to ensure efficient and trouble-free operation following to the below described plan.

Maintenance (and repair) operations are to be exclusively performed by qualified personnel.

The manufacturer recommends Customers to have an Authorized Service Center implement any maintenance and repair procedure. Disconnect the boiler from power mains prior to performing any maintenance procedure either involving replacement of components and/or internal cleaning.

Maintenance plan

Routine maintenance must include **the following checks**:

- boiler general integrity;
- leak test involving the boiler gas pipes and the gas network;
- boiler ignition sequence;
- boiler combustion parameters test, through flue gas analysis (to be performed on a two-year basis if boiler is individually installed. Annually to cascade-installed boilers);
- integrity and leak test of flue gas pipe system;
- general integrity of boiler safety devices;
- water leak check and presence of oxide deposit on boiler connection pipes;
- water pressure switch efficiency;

the following cleaning operations (the boiler is to be cool):

- general internal cleaning;
- burner cleaning and adjustment as necessary;
- heat exchanger flue gas side cleaning: to be performed by means of a swab or vacuum cleaner in order to remove combustion leftovers from the heat exchanging surfaces and fins.

As an alternative, specific chemical products may be employed, following their use instructions.

When cleaning the heat exchanger, do not employ petrol, solvents or similar substances.

In the event of boiler first maintenance operation, verify:

- boiler room characteristics according to boiler requirements;
- room ventilation grilles;
- flue gas system dimensions, diameters and lengths of ducts;
- correct installation of the boiler in compliance with the instructions in this manual.

Should the boiler not be correctly operating, and in no immediate hazard to people, animals and property, notify the system supervisor, both verbally and in writing.

5. TROUBLESHOOTING

BOILER STATUS	MALFUNCTION	PROBABLE CAUSE	SOLUTION
The boiler has shut down, the red light no. 1 is on.	Burner does not ignite. Reset by pressing no. 16 button	Gas supply failure	Check gas network pressure Check gas network safety valves to be open
		Gas valve is disconnected	Reconnect gas valve
		Gas valve is faulty	Replace it
		PCB is faulty	Replace it
	Burner does not ignites, there is no spark. Reset by pressing no. 16 button.	Spark electrode is faulty	Replace the electrode
		Flame detection PCB is faulty	Replace PCB
	Burner ignites for a few seconds and turns off. Reset by pressing no. 16 button.	PCB does not detect flame: inverted phase and neutral	Verify correct neutral and phase connections
		Flame detection electrode wire is disconnected or faulty	Connect flame detection electrode wire or replace it
		Flame detection electrode is faulty	Replace electrode
		Flame detection PCB does not detect flame: it is faulty	Replace flame detection PCB
		P ACC Ignition value set point is too low	Adjust P ACC ignition value set point
		Min heat input in not set correctly	Check burner adjustment
The boiler has shut down and red light no. 2 is on. Reset by pressing no. 18 button.	Safety thermostat has shut the boiler down	Water is not flowing in the CH system: pipes are clogged, thermostatic valves are closed, intercepting valves in the system are closed	Check CH system
		Pump is blocked or faulty	Check the pump
		Plate heat exchanger is clogged	Check the plate heat exchanger
The boiler has shut down and red light no. 4 is flashing. Restore correct water pressure	Insufficient water pressure	Possible water leaks	Check system for leaks
		Pressure switch is disconnected	Reconnect it
		Water pressure switch is faulty	Replace it
The boiler has shut down, red light no. 5 is flashing. Boiler will automatically resume operation as soon as the problem is solved	Flow probe is faulty	Flow probe is disconnected	Reconnect it
		Flow probe is faulty	Replace it
The boiler has shut down and red light no. 6 is flashing. Boiler will automatically resume operation as soon as the problem is solved	Boiler communication to and from remote control is faulty	Connecting wire is faulty	Check connecting wire
The boiler has shut down, red light no. 7 is flashing. Boiler will automatically resume operation as soon as the problem is solved	Water tank is faulty	Water tank probe is disconnected	Reconnect it
		Water tank probe is faulty	Replace it
The boiler has shut down, red light no. 8 is flashing. Boiler will automatically resume operation as soon as the problem is solved	Plate heat exchanger probe is faulty	Plate heat exchanger probe is disconnected	Reconnect it
		Plate heat exchanger probe is faulty	Replace it
The boiler has shut down, red light no. 9 is flashing (BTN model only). Reset by pressing no. 19 button.	Flue gas thermostat is not consenting to boiler operation	Flue gas thermostat is faulty	Check flue gas thermostat operation: replace when faulty
		Air inlet or flue gas discharge flow is not adequate	Check air inlet/flue gas discharge ducts: clean or replace as necessary

BOILER STATUS	MALFUNCTION	PROBABLE CAUSE	SOLUTION
Red light no. 9 is flashing and the boiler has not shut down. Boiler will automatically resume operation as soon as the problem is solved	Boiler water temperature has exceeded 85°C	Water is not flowing in the system: pipes are clogged, thermostatic valves are closed, intercepting valves in the system are closed	Check the system
		Pump is blocked or faulty	Check the pump
		Plate heat exchanger is clogged	Check the plate heat exchanger
Boiler is not supplying DHW	Flow meter is not operating	The system has not sufficient pressure or flow rate	Check DHW system Check flow meter filter
		Flow meter sensor is faulty or disconnected	Replace or reconnect it
		Flow meter is blocked	Replace it
Burner does not ignite and the boiler has not shut down (BTFS model only)	Flue gas pressure switch is not consenting to boiler operation. Boiler will automatically resume operation as soon as the problem is solved	Flue gas pressure switch is faulty	Check flue gas pressure switch operation: replace when faulty
		Silicone pipes are disconnected or damaged	Reconnect or replace as necessary
		Air inlet or flue gas discharge flow is not adequate	Check air inlet/flue gas discharge ducts: clean or replace as necessary
		Fan is faulty	Replace it
		PCB is faulty	Replace it



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