

# DELFI Bi-thermal

INSTALLATION, USE AND MAINTENANCE



EN

Translation of the  
original instructions (in  
Italian)

Dear Sirs,

Thank You for choosing and buying one of our products. Please read these instructions carefully in order to properly install, operate, and maintain the product.



## **WARNING**

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- **We inform users that:**
  - **Boilers shall be installed by an authorised company under the requirements set forth by the prevailing rules, in full compliance with the prevailing regulations and standards.**
  - **Anyone entrusting installation to an unqualified installer will be subject to administrative sanctions.**
  - **Boilers must be maintained by qualified personnel only, under the requirements set forth by the prevailing rules.**
- 

**We hereby inform you that certain models, versions and/or accessories relevant to the products this manual refers to, might not be available in some countries.**

**Therefore, it is recommended to contact the manufacturer or the importer in order to get the necessary information about the actual availability of such models, versions and/or accessories.**

**The manufacturer reserves the right to modify the products and/or its components as deemed necessary, in any moment and without prior notice.**

**This instruction manual is available in two languages, Italian and English, without prejudice to the prevalence of Italian language in case of differences in translation and/or dispute on construction of the text.**

## General notes for installing and maintenance technicians, and users

This instruction manual is an integral and essential part of the product. It shall be supplied by the installer to the user who shall keep it carefully to consult it whenever necessary.

This document shall be supplied together with the equipment in case the latter is sold or transferred to others.



### DANGER

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**This equipment has been manufactured to be connected to a room heating system and to a DHW distribution system.**

**Any other use shall be considered unsuitable and dangerous for people, animals, and/or property.**

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The equipment shall be installed in compliance with the prevailing standards and in accordance with the manufacturer's instructions specified in this manual: the manufacturer will not be held responsible for injuries to people and animals and/or damages to property resulting from an incorrect installation.

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 release the manufacturer from any and all contractual and extra-contractual liability.

Before installing the boiler, check that the technical data correspond to the requirements for its correct use 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 clearly damaged and/or faulty.

Do not obstruct the air intake openings.

Only original accessories or optional kits (including the electric ones) 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.

After removing the packaging, make sure that its elements (clips, plastic bags, foam polystyrene etc.) are not left within the reach of children as they are potential hazard sources.

In the event of failure and/or faulty functioning, switch off the boiler. Do not attempt to make repairs: contact qualified technicians.

Original parts must be used for all repairs to the boiler.

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



### WARNING

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**The boiler must be serviced periodically as indicated in the relevant section of this manual.**

**Appropriate boiler maintenance ensures efficient operation, environment preservation, and safety for people, animals and objects.**

**Incorrect and irregular maintenance can be a source of danger for people, animals and property.**

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The user is strongly advised to have the system serviced and repaired by qualified personnel, satisfying all prevailing law requirements, and trained to properly carry out these operations.

In the event of long periods of inactivity of the boiler, disconnect it from the electrical power mains and close the gas cock. **The electronic antifreeze function will not be operative with the device disconnected from the electric power supply and gas cock closed.**

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



## **DANGER**

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**With gas fired boilers, take the following measures if you smell gas:**

- Do not turn on or off electric switches and do not turn on electric appliances.
- Do not ignite flames and do not smoke.
- Close the main gas cock.
- Open doors and windows.
- Contact a Service Centre, a qualified installer or the gas supply company.

**Never use a flame to locate a gas leak.**

**The boiler is designed for installation in the countries indicated on the technical data plate: installation in any other country may be a source of danger for people, animals and/or property.**

**The manufacturer will bear no contractual and tortious liability for failure to comply with all the instructions above.**

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<b>1.</b>	<b>Instructions for the user .....</b>	<b>8</b>
1.1	Control panel.....	8
1.2	Interpreting boiler status from display indications.....	10
1.3	Boiler operation .....	11
1.4	Boiler shut-down .....	13
1.5	Maintenance .....	15
1.6	Notes for the user.....	15
<b>2.</b>	<b>Technical features and dimensions .....</b>	<b>16</b>
2.1	Technical features .....	16
2.2	Dimensions .....	18
2.3	Boiler layouts.....	20
2.4	Operating data .....	22
2.5	General Characteristics.....	23
<b>3.</b>	<b>Instructions for the installer .....</b>	<b>24</b>
3.1	Installation standards .....	24
3.2	Choosing where to install the boiler .....	24
3.3	Positioning the boiler .....	25
3.4	Installing the boiler .....	27
3.5	Boiler room ventilation .....	28
3.6	Air intake and flue gas venting system .....	28
3.7	Checking combustion efficiency.....	36
3.8	Connection to gas mains.....	37
3.9	Hydraulic connections .....	37
3.10	Connection to electrical mains .....	38
3.11	Connection to ambient thermostat (optional) .....	38
3.12	Installation and operation with Open Therm Remote Control (optional) .....	39
3.13	TSP parameters.....	40
3.14	Filling the system.....	42
3.15	Starting up the boiler.....	43
3.16	Available head .....	43
3.17	Wiring diagrams.....	44
3.18	Adaptation to other gas types and burner adjustment .....	46
<b>4.</b>	<b>Testing the boiler.....</b>	<b>48</b>
4.1	Preliminary checks .....	48
4.2	Switching on and switching off .....	48
<b>5.</b>	<b>Maintenance .....</b>	<b>49</b>
5.1	Maintenance schedule.....	49
5.2	Combustion analysis .....	50
<b>6.</b>	<b>Troubleshooting .....</b>	<b>51</b>
6.1	Troubleshooting .....	51

Fig. 1 Control panel .....	8
Fig. 2 Filler cock .....	14
Fig. 3 CTFS model dimensions .....	18
Fig. 4 Model CTN dimensions .....	19
Fig. 5 Boiler layout (model CTFS) .....	20
Fig. 6 Boiler layout (model CTN) .....	21
Fig. 7 Paper template .....	26
Fig. 8 Connections to the chimney of open chamber models .....	29
Fig. 9 Dimensions for connection to the flue gas system of the open chamber models .....	29
Fig. 10 OKITCONC00 (100/60 mm) .....	33
Fig. 11 Dimensions for coaxial pipe .....	33
Fig. 12 OSDOPPIA13 .....	35
Fig. 13 Dimensions for split pipes .....	35
Fig. 14 Air intake and flue gas venting examples .....	35
Fig. 15 Air intake and flue gas venting example .....	35
Fig. 16 Examples of flue gas testing points .....	36
Fig. 17 Connection to gas mains .....	37
Fig. 18 Available head CTFS 24 AF .....	43
Fig. 19 Available head CTN 24 AF .....	43
Fig. 20 Wiring diagram .....	44
Fig. 21 SIEMENS VGU56 .....	47
Fig. 22 SIT 845 .....	47
Fig. 23 SIEMENS VGUS56 .....	47

Tab. 1 CTFS 24 AF Adjustment rates .....	22
Tab. 2 CTN 24 AF Adjustment rates .....	22
Tab. 3 General specifications .....	23
Tab. 4 CTFS 24 AF Combustion data .....	23
Tab. 5 CTN 24 AF Combustion data .....	23
Tab. 6 Table indicating coaxial pipes 100/60 C12 type .....	32
Tab. 7 Table indicating coaxial pipes 100/60 C32 type .....	32
Tab. 8 Table indicating coaxial pipes 125/80 C12 type .....	32
Tab. 9 Table indicating coaxial pipes 125/80 C32 type .....	33
Tab. 10 Table indicating split pipes 80+80 C42-C52-C82 types .....	34
Tab. 11 Limits to be set for TSP parameters and default values in relation to boiler type (TSP0) - I .....	40
Tab. 12 Limits to be set for TSP parameters and default values in relation to boiler type (TSP0) - II .....	41
Tab. 13 Relationship between "Temperature and Nominal resistance" for temperature probes .....	45

## 1. Instructions for the user

### 1.1 Control panel

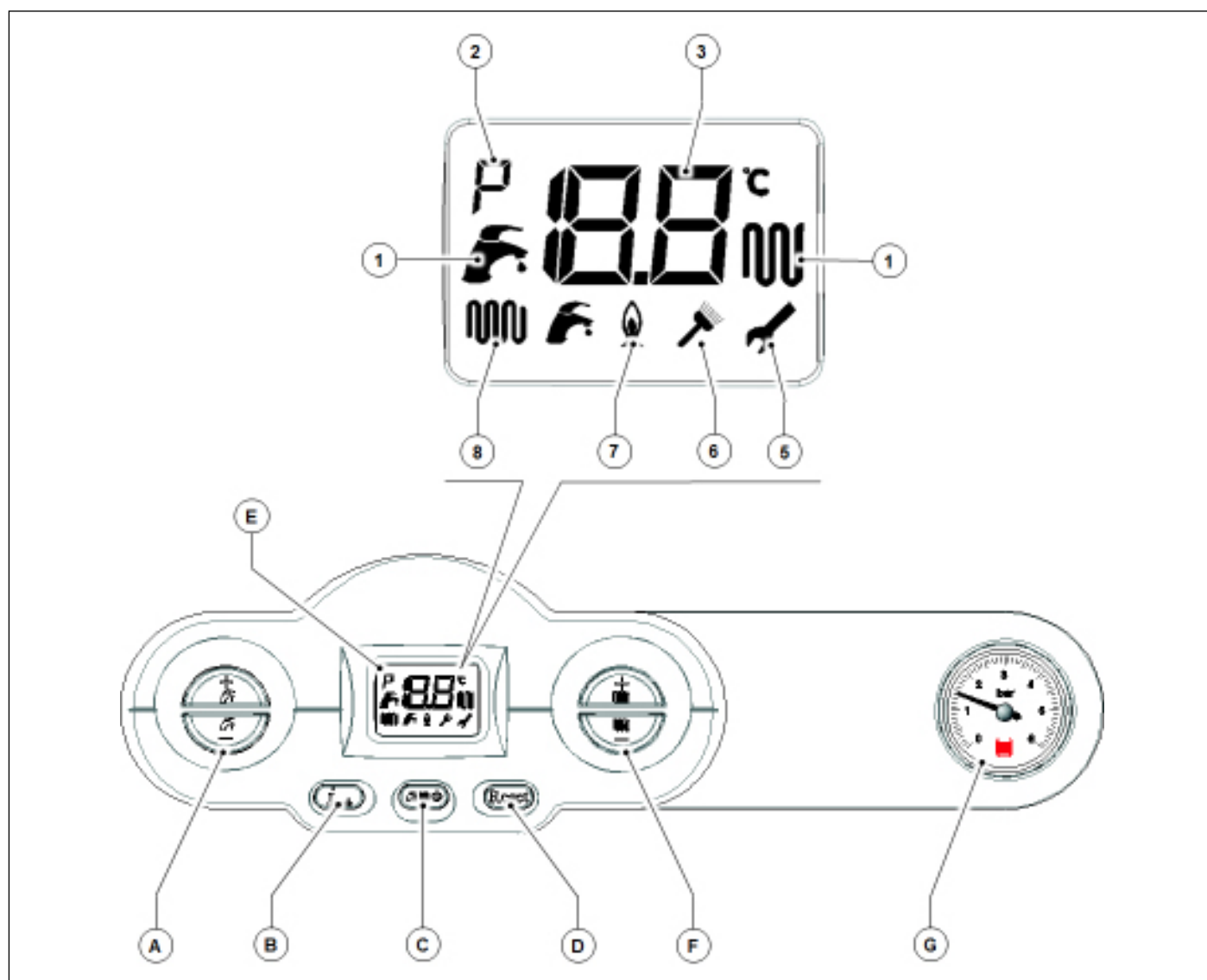


Fig. 1 Control panel

- A. DHW setting (+/- **DHW**).
- B. Parameter confirmation and information request.
- C. Operating status selection.
- D. Alarm reset and back to the starting page during parameter selection.
- E. LCD display.
- F. CH water temperature (+/- **CH**) and parameter settings.
- G. Heating system water pressure gauge.

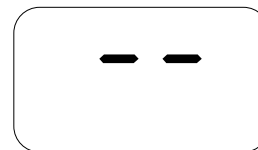


Ref.	Description	Steady on	Flashing
1	DHW indicator	Boiler is in DHW mode.	Displaying of the DHW temperature set-point.
2	Parameter indicator	Indication of "parameter" inside the parameter menu.	Not used.
3	Alphanumeric indicator	Temperature, value, parameter and fault indication.	Not used.
4	Central heating indicator	Boiler is in heating mode.	Displaying of the heating temperature set-point.
5	Parameter editing indicator	During parameter editing, the wrench symbol stays on until the set datum is confirmed.	When edited parameter value is confirmed.
6	Flue cleaning function indicator (for the installer)	Flue cleaning function active.	Indicates that you are accessing the flue cleaning function.
7	Flame lighting indicator	Lit flame indication.	Not used.
8	Boiler status indicator	DHW and/or heating function active.	Not used.

## 1.2 Interpreting boiler status from display indications

### 1.2.1 Normal operation

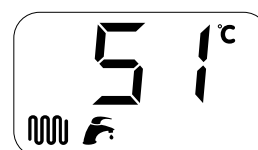
Boiler in STANDBY mode



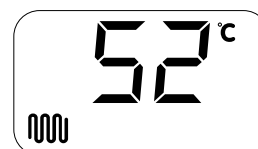
Boiler in SUMMER mode  
No active function  
Flow temperature displayed



Boiler in WINTER mode  
No active function  
Flow temperature displayed



Boiler in CENTRAL HEATING ONLY mode  
No active function  
Flow temperature displayed



Boiler in SUMMER mode  
DHW temperature outlet  
DHW temperature displayed



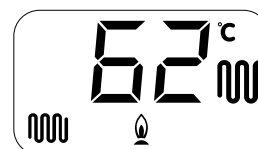
Boiler in WINTER mode  
DHW temperature outlet  
DHW temperature displayed



Boiler in WINTER mode  
CH function active  
Flow temperature displayed



Boiler in CENTRAL HEATING ONLY mode  
CH function active  
Flow temperature displayed



### 1.2.2 Malfunction

To identify any malfunctions, refer to paragraph *Troubleshooting* on page [51](#).

## 1.3 Boiler operation

### 1.3.1 Switching on



#### DANGER

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**It is presumed that the boiler has been installed by a qualified installer, it has been commissioned and is ready to operate correctly.**

---

- Open the gas shut-off cock.
- Turn the master switch installed ahead of the boiler to ON.
- The display turns on and indicates the function currently active (see *Interpreting boiler status from display indications* on page 10).
- Select the boiler operating mode: OFF/SUMMER/WINTER/CH ONLY (see button (C) in Fig. 1 Control panel on page 8).
- Set desired CH temperature (see *CH function* on page 11).
- Set desired DHW temperature (see *DHW function* on page 12).
- Set the desired room temperature on the ambient thermostat inside the home (if installed).



#### WARNING

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**After a prolonged period with the boiler not in use, and with LPG fired boilers in particular, some starting difficulty may be encountered.**

**Before starting the boiler switch on another gas powered device (e.g. kitchen range).**

**Beware that even by following this procedure, the boiler might still experience some starting difficulties and shut down once or twice. Press the "RESET" button to restore boiler operation.**

---

### 1.3.2 Selecting the operating mode

To select the boiler operation mode press **C** Operating mode selection.

Whenever button is pressed, the following modes are enabled in sequence: "SUMMER", "WINTER", "CH ONLY", "OFF".

"SUMMER" operating status

When the "SUMMER" mode is enabled, only the DHW production function is active.

"WINTER" operating status

When the "WINTER" mode is enabled, both DHW and CH functions are active.

"CH ONLY" operating status

When the "CH ONLY" mode is enabled, only the heating water production function is active.


"OFF" operating status


When the "OFF" mode is enabled, no function is active.

### 1.3.3 CH function

To set the heating water temperature, press +/- **CH** buttons.

The CH temperature setting range is from 35°C to 78°C.

During temperature setting, the  symbol flashes on the screen and the CH current temperature setting is displayed.

When the CH system requests heat from the boiler, the LCD displays the CH symbol  and the current CH flow water temperature.

The waiting time between one boiler ignition and the following one, used to prevent boiler frequent turning on and off, ranges between 0 and 10 minutes (default value: 4 minutes), and can be edited with the **P3** parameter.


Should water temperature in the CH system fall below set minimum value, between 35°C and 78°C (default value 40°C) to be edited with the **P18** parameter, the waiting time is reset and the boiler re-ignites.

The burner ON symbol  shows while the burner is operating.

### 1.3.4 DHW function

Boiler electronics always gives priority to DHW over CH supply.

To set the domestic hot water temperature, press **DHW +/-** buttons.

During temperature setting, the  symbol flashes on the screen and the DHW current temperature setting is displayed.

The burner ON symbol  shows while the burner is operating.

The DHW temperature setting range is from 35°C to 50°C.

Available DHW litres per minute at the desired temperature depend on boiler heat output and water mains supply temperature, and can be calculated according to the following formula:

$$l = \text{DHW litre per min.} = K/\Delta T$$

where:

K = 309 for model CTN 24

K = 333 for model CTFS 24

$\Delta T$  = hot water temperature – cold water temperature

For instance, with model CTFS 24, if the cold water is at 8°C and you want hot water at 38°C for a shower, the value of  $\Delta T$  is:

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

and the number of DHW litres per minute available at 38°C is:

$$l = 333/30 = 11.1 \text{ [litres per minute] (mixed water at the tap)}$$

### 1.3.5 Freeze protection function

This boiler is fitted with a freeze protection system, which works when the following functions are activated: OFF/SUMMER/WINTER/CH ONLY.

When the heating water temperature sensor detects a water temperature of +5 °C, the boiler switches on and stays on at its minimum heat output until the temperature reaches +30 °C or 15 minutes have elapsed.

If the boiler is in the OFF mode, only the circulation pump will be activated.

The pump continues to operate even if the boiler shuts down.



#### **DANGER**

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**The freeze protection function only protects the boiler, not the whole heating system.**

**A room thermostat must be used to provide freeze protection for the CH system. However, the thermostat is disabled when the boiler is in OFF mode.**

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The central heating system can be effectively protected against icing by using specific anti-freeze products that are suitable for multi-metal systems.



#### **WARNING**

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**Do not use anti-freeze products for car engines, and check the effectiveness of the product used over time.**

---

In case burner cannot be ignited due to the lack of gas, the freeze protection functions are anyway enabled through the circulation pumps.

### 1.3.6 Anti-seize function

If the boiler remains inactive and connected to the power mains, the circulation pump will be shortly enabled every 24 hours so as to avoid any shut-down.

### 1.3.7 Timed post-circulation function

After each central heating, DHW or freeze protection request, the pump continues to be powered for 30 seconds.

If a new central heating, DHW or freeze protection request is received during this period, the post-circulation function is cancelled in order to fulfil the request.

### 1.3.8 Timed post-ventilation function

After each central heating, DHW or freeze protection request, the fan continues to work for 10 seconds.

If a new operating request is received during this period, the post-ventilation function is cancelled in order to fulfil the request.

### 1.3.9 Operation with (optional) remote control

The boiler can also be connected to a Remote Control (optional - not compulsory, supplied by the manufacturer) so as to manage several boiler parameters, such as:

- boiler status selection.
- ambient temperature selection.
- CH system water temperature selection.
- DHW temperature selection.
- CH system activation time programming.
- boiler diagnostics display.
- boiler reset and other parameters.

To connect the Remote Control, see *Installation and operation with Open Therm Remote Control (optional)* on page 39.



## WARNING

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**Only use original Remote Control Units supplied by the manufacturer.**

**The use of non-original remote controls, not supplied by the manufacturer, may affect Remote Control and boiler operation.**

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## 1.4 Boiler shut-down

The boiler shuts down automatically if a malfunction occurs.

To determine the possible causes of malfunction (see *Troubleshooting* on page 51).

Below is a list of shut-down types and the procedure to follow in each case.

### 1.4.1 Burner shut-down

Fault code **E01** is displayed flashing on the display in the event of burner shut-down due to missing flame.

If this happens, proceed as follows:

- check that the gas cock is open and light a kitchen gas ring for example to check the gas supply;
- once having checked if the fuel is available, press the **Reset** button to restore burner operation: if, after two starting attempts, the boiler still fails to start and enters the shut-down mode again, contact a service centre or qualified personnel for maintenance.



## WARNING

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**If the burner shuts down frequently, there is a recurring malfunction, so contact a service centre or a qualified service engineer.**

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#### 1.4.2 Shut-down due to overheating

Fault code **E02** is shown on the LCD display in the event of flow water temperature overheating. Contact a service centre or a qualified service engineer to carry out the maintenance.

#### 1.4.3 Shut-down due to incorrect air/flue gas system draught

The boiler is equipped with a safety device for flue gas exhaustion check.

Should an air/flue gas system malfunction occur, the control device will shut-down the boiler by interrupting the gas supply to the boiler and the LCD will display the **E03** code.

To resume the operation press **Reset** (see Fig. 1 Control panel on page 8).

In case of repeated stops, it is necessary to have the boiler and the air intake/flue gas venting ducts checked by a service centre or a qualified service engineer.

#### 1.4.4 Shut-down due to low water pressure

Fault code **E04** is displayed on the LCD display in the event of shut-down triggered by the water pressure switch.

Fill the system by working on filler cock (A) (see Fig. 2 Filler cock).

Water pressure must be 1-1.3 bars while the boiler is cold.

In order to restore water pressure, proceed as follows:

- Turn the filler cock anticlockwise to allow water to enter the boiler;
- Keep the filler cock open until the pressure gauge shows a value of 1÷1.3 bar;
- Turn cock clockwise to close it.

Should boiler shuts down frequently occur it means there is boiler malfunction in progress. Contact qualified personnel or an authorised service centre for maintenance.



### DANGER

**Make sure you close filler cock (A) carefully after filling procedure is completed.**

**If you do not, when the pressure increases, the safety valve may activate and discharge water.**

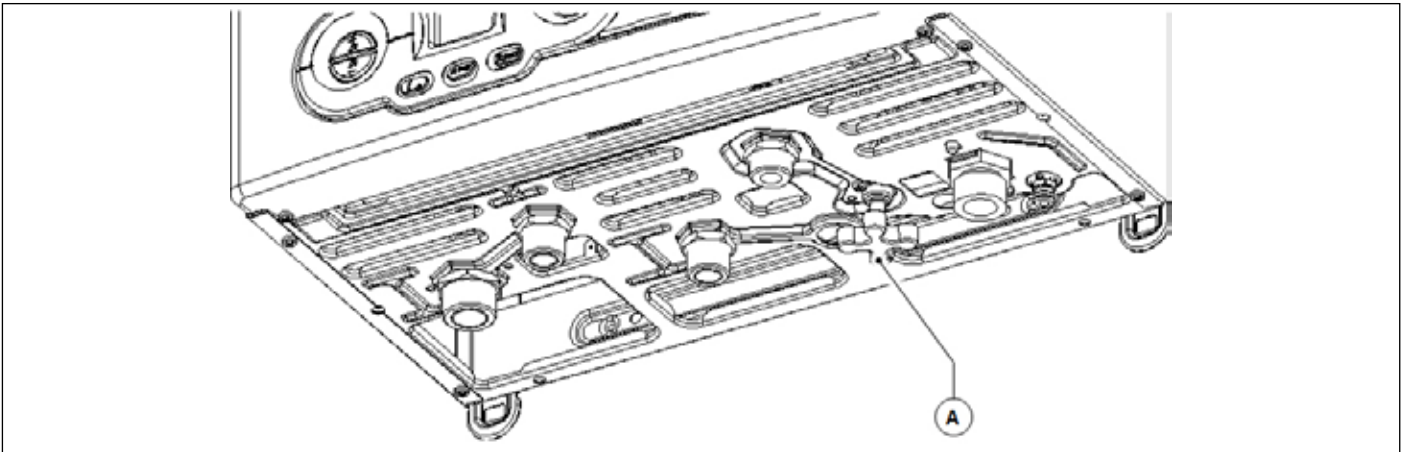


Fig. 2 Filler cock

#### 1.4.5 Alarm due to temperature probe malfunction

The following fault codes are shown on the display in the event of burner shut-down due to a temperature probe fault:

- **E05** for the central heating water probe; in this case, the boiler functions in DHW mode only, and the central heating function is disabled.
- **E06** for the DHW probe; in this case, the boiler functions in central heating mode only, and the DHW function is disabled.
- **E15** for the return probe; in this case the boiler functions normally.



#### **WARNING**

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**In any case, contact a service centre or qualified personnel for maintenance.**

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#### 1.4.6 Alarm due to (optional) Remote Control connection malfunction

The boiler recognises whether or not there is a Remote Control (optional).

If the boiler does not receive information from the Remote Control after the Remote Control itself is connected, the boiler attempts to re-establish communication for 60 seconds, after which the fault code **E31** is shown on the remote control display.

The sealed combustion chamber boiler does not need any specific recommendations to be applied concerning the boiler room or openings and ventilation provided to the boiler room.



#### **WARNING**

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**Contact a service centre or a qualified service engineer to carry out the maintenance.**

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The remote control can indicate faults or shutdown conditions and can also restore boiler operation after shutdown up to a maximum of 3 times in a 24 hour period.

If the maximum number of attempts is reached, fault code **E99** is shown on the boiler display.

To reset error **E99**, disconnect and re-connect again boiler from/to power mains.

#### 1.5 Maintenance



#### **WARNING**

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**The boiler must be serviced periodically as indicated in the relevant section of this manual.**

**Appropriate boiler maintenance ensures efficient operation, environment preservation, and safety for people, animals and objects.**

**Boilers must be maintained by qualified personnel only, under the requirements set forth by the prevailing rules.**

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#### 1.6 Notes for the user



#### **WARNING**

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**The user may only access parts of the boiler that can be reached without using special equipment or tools. The user is not authorised to remove the boiler casing or to operate on any internal parts.**

**No one, including qualified personnel, is authorised to modify the boiler.**

**The manufacturer shall not be held responsible in case of damage to people, animals, or property due to failure to follow the above mentioned instructions.**

**If the boiler remains inactive and the power supply is switched off for a long time, it may be necessary to reset the pump.**

**This involves removing the casing and accessing internal parts, so it must only be carried out by suitably qualified personnel.**

**Pump failure can be avoided by adding to the water filming additives suitable for multi-metal systems.**

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## 2. Technical features and dimensions

### 2.1 Technical features

The boiler is equipped with an integrated gas atmospheric burner. The following models are available:

- **CTFS** sealed chamber, forced draught boiler with electronic ignition for heating and instantaneous DHW supply.
- **CTN** open chamber, natural draught boiler with electronic ignition for heating and instantaneous DHW supply.

The following power rates are available:

- **CTFS 24 AF**: with heat input 25.5 kW
- **CTN 24 AF**: with heat input 24.5 kW

All models are equipped with electronic ignition and ionisation flame sensing device.

The boilers meet local applicable Directives enforced in the country of destination, which are stated on their rating plate.

Installation in any other country may be a source of danger for people, animals and property.

The key technical features of the boilers are listed below.

#### 2.1.1 Manufacturing characteristics

- IPX4D electrically protected control panel.
- Integrated, modulating electronic safety board.
- Electronic ignition and ionisation flame detection device.
- Stainless steel, atmospheric burner that can run on several gases.
- Bi-thermal, high performance, copper heat exchanger.
- Twin shutter modulating gas valve.
- CH circulation pump with built-in air purging device.
- Safety pressure switch, preventing low water pressure operation.
- DHW priority flow switch.
- Flue gas pressure switch (CTFS).
- Flue gas thermostat (CTN).
- 7 litre expansion vessel.
- System filler cock.
- System water discharge tap.
- Heating flow water temperature probes.
- CH return water temperature probes.
- Domestic hot water temperature probe.
- 10 litre/min DHW flow-limiting device.
- Limit thermostat.



### **2.1.2 User interface**

- Liquid crystal LCD interface showing the boiler operating status: OFF, SUMMER, WINTER and CH ONLY.
- CH water temperature setting buttons: 35-78 °C.
- DHW water temperature setting buttons: 35-50 °C.
- System water pressure gauge.

### **2.1.3 Operating features**

- Electronic flame modulation in CH mode, with timed rising ramp.
- Electronic flame modulation in DHW mode.
- Flow freeze protection function: ON 5°C; OFF 30°C or after 15 minutes of operation if CH temperature > 5 °C.
- CH Maximum heat input parameter adjustment.
- Ignition heat input adjustment parameter.
- Ignition flame propagation function.
- CH thermostat timer: 240 seconds (adjustable).
- Heating pump post-circulation function in CH, freeze protection and flue cleaning modes: 30 seconds (adjustable).
- Pump post-circulation function in DHW (6 seconds in winter mode, 1 second in summer mode)
- Post-ventilation function after working: 10 seconds (CTFS).
- Post-ventilation function for heating temperature > 95°C (CTFS).
- Circulation pump and deviating valve anti shut-down function: 30 seconds of operation after 24 hours of inactivity.
- Ready for connection to an ambient thermostat.
- Ready for operation with an OpenTherm remote control (optional, supplied by the manufacturer).
- Anti-water hammer function: can be set from 0 to 3 seconds.
- DHW function priority.

## 2.2 Dimensions

### CTFS

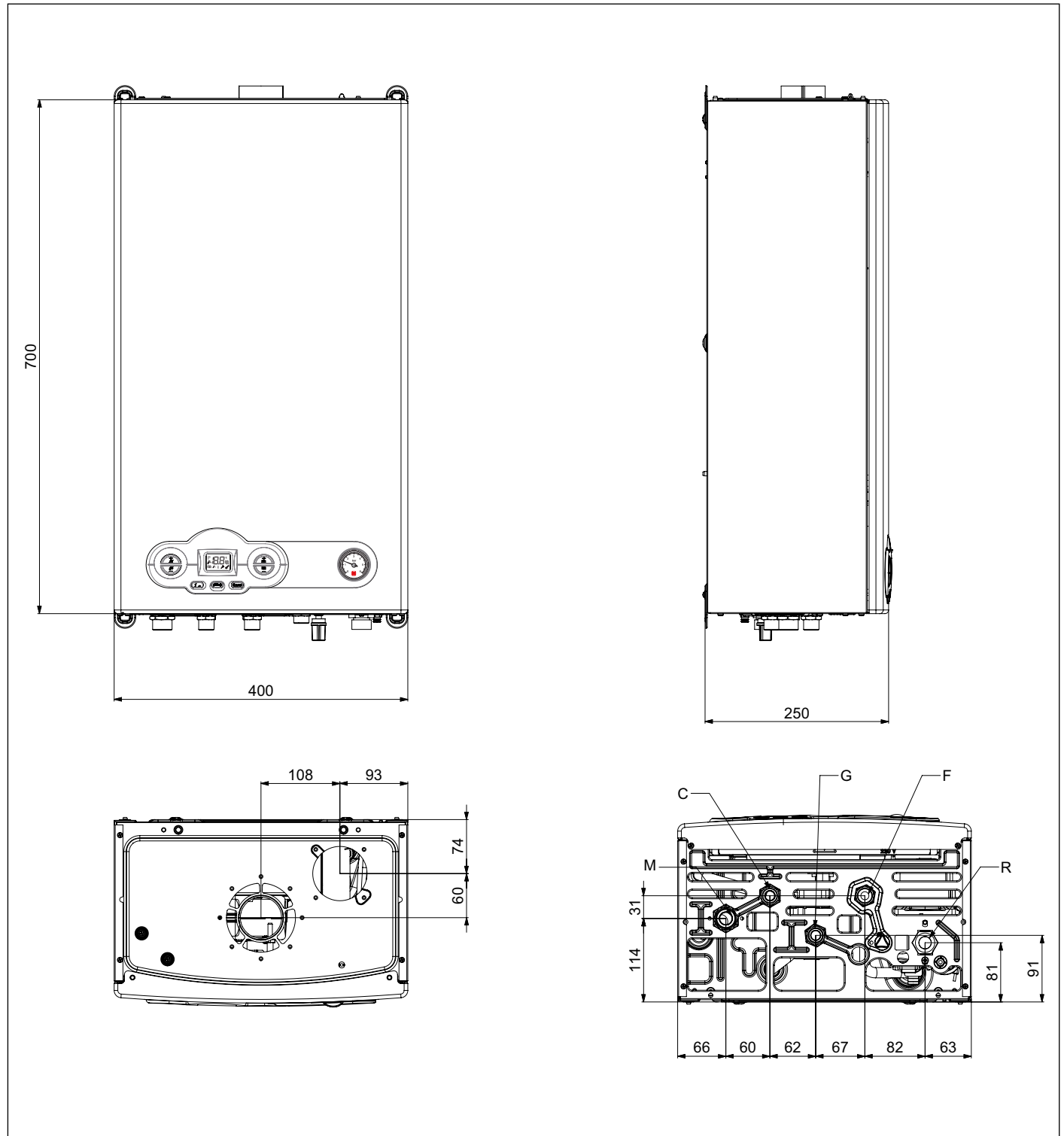


Fig. 3 CTFS model dimensions

- F** Cold water inlet (1/2")
- G** Gas inlet (1/2")
- M** CH system flow (3/4")
- C** DHW outlet (1/2")
- R** CH system return (3/4")

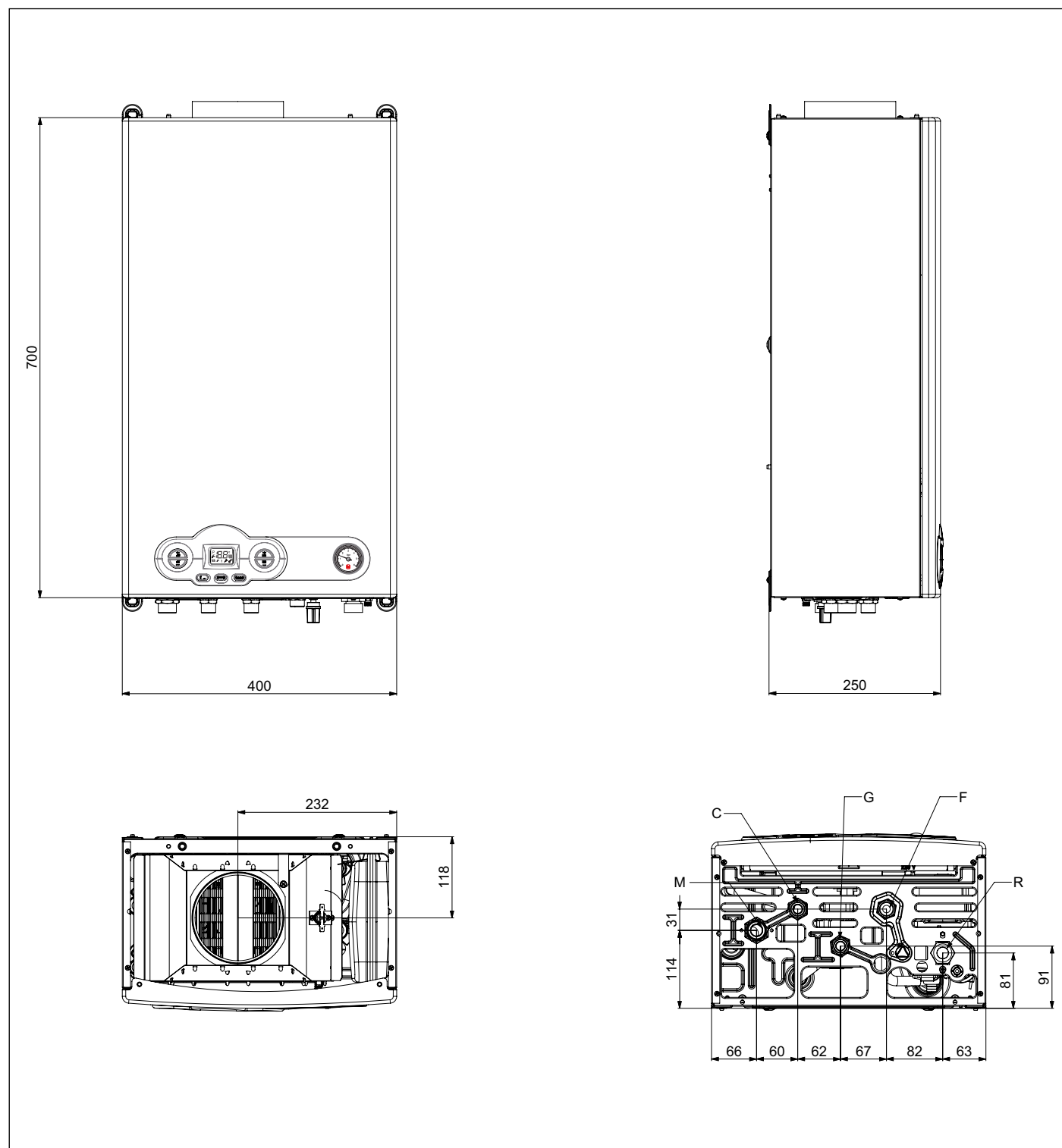


Fig. 4 Model CTN dimensions

- F** Cold water inlet (1/2")
- G** Gas inlet (1/2")
- M** CH system flow (3/4")
- C** DHW outlet (1/2")
- R** CH system return (3/4")

## 2.3 Boiler layouts

### CTFS

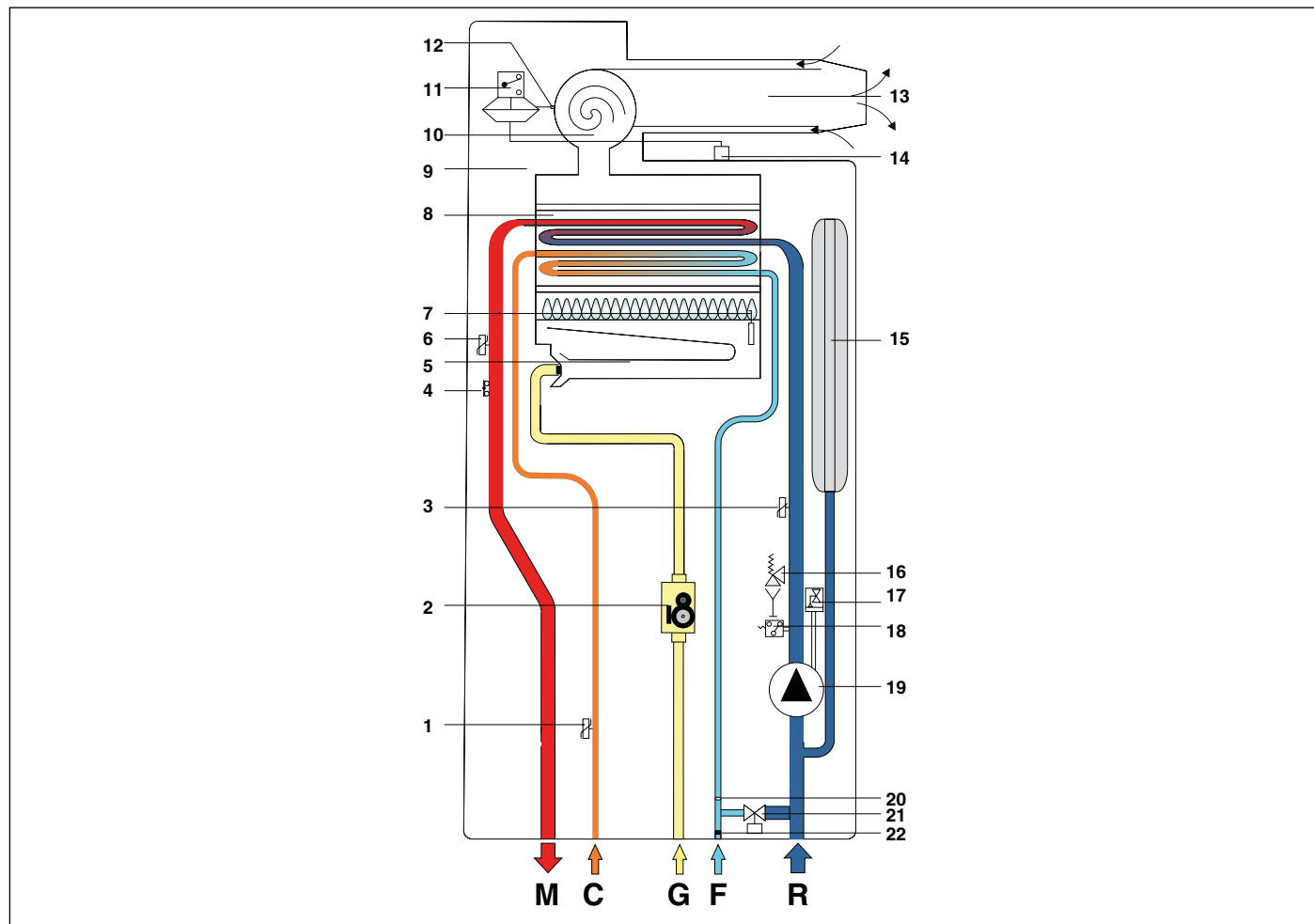


Fig. 5 Boiler layout (model CTFS)

1. DHW temperature probe
2. Modulating gas valve
3. CH return water temperature probe
4. Safety thermostat on CH flow
5. Burner
6. CH flow water probe.
7. Ignition/detection electrode
8. Bi-thermal heat exchanger
9. Sealed combustion chamber
10. Flue gas extraction fan
11. Flue gas circuit safety pressure switch
12. Pressure testing point on flue gas duct
13. Air intake and flue gas venting duct
14. Pressure testing point on flue gas duct
15. Expansion tank
16. 3-bar safety valve
17. Air-purging device
18. Minimum pressure switch
19. Circulation pump
20. 10 l/min flow-limiting device
21. Filler cock
22. Cold water flow switch with filter

- G** Gas inlet  
**M** CH system flow  
**C** DHW outlet  
**F** Cold water inlet  
**R** CH system return

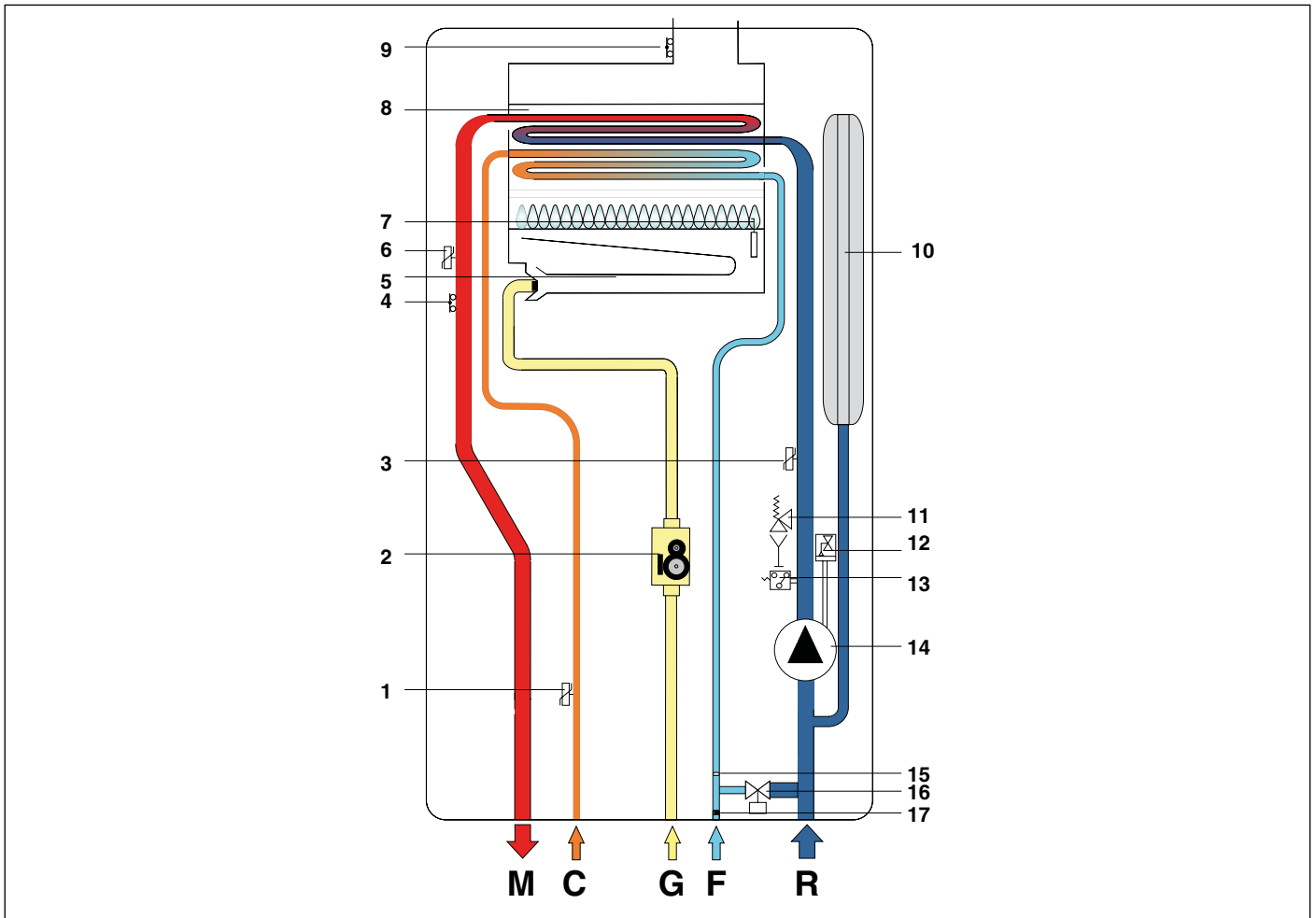


Fig. 6 Boiler layout (model CTN)

1. DHW temperature probe
2. Modulating gas valve
3. CH return water temperature probe
4. Safety thermostat on CH flow
5. Burner
6. CH flow water probe.
7. Ignition/detection electrode
8. Bi-thermal heat exchanger
9. Flue gas thermostat
10. Expansion tank
11. 3-bar safety valve
12. Air-purging device
13. Minimum pressure switch
14. Circulation pump
15. 10 l/min flow-limiting device
16. Filler cock
17. Cold water flow switch with filter

- G** Gas inlet  
**M** CH system flow  
**C** DHW outlet  
**F** Cold water inlet  
**R** CH system return

## 2.4 Operating data

Burner pressures reported in the following page must be verified after the boiler has been operating for 3 minutes.

Fuel	Gas mains pressure [mbar]	Nozzle [mm/100]	Min pressure at the burner [mbar]	Max pressure at the burner [mbar]
Natural gas G20	20	1,35	3,0	11,9
Butane gas G30	29	0,80	6,8	26,4
Propane Gas G31	37	0,80	8,6	33,9

Tab. 1 CTFS 24 AF Adjustment rates

- DHW production with  $\Delta T$  45°C = 7.4 l/min
- DHW production with  $\Delta T$  40°C = 8.4 l/min
- DHW production with  $\Delta T$  35°C = 9.6 l/min
- DHW production with  $\Delta T$  30°C = 11.1 l/min (water mixed at tap)
- DHW production with  $\Delta T$  25°C = 13.4 l/min (water mixed at tap)

Fuel	Gas mains pressure [mbar]	Nozzle [mm/100]	Min pressure at the burner [mbar]	Max pressure at the burner [mbar]
Natural gas G20	20	1,27	3,2	12,4
Butane gas G30	29	0,77	7,2	27,1
Propane Gas G31	37	0,77	9,2	35,0

Tab. 2 CTN 24 AF Adjustment rates

- DHW production with  $\Delta T$  45°C = 6.9 l/min
- DHW production with  $\Delta T$  40°C = 7.8 l/min
- DHW production with  $\Delta T$  35°C = 8.9 l/min
- DHW production with  $\Delta T$  30°C = 10.3 l/min (water mixed at tap)
- DHW production with  $\Delta T$  25°C = 12.4 l/min (water mixed at tap)

## 2.5 General Characteristics

Description	um	CTFS 24 AF	CTN 24 AF
Appliance category	-	II2H3+	
Burner nozzles	no.	11	11
Nominal heat input	kW	25,5	24,5
Minimum heat input	kW	12,5	12,0
Max heat output	kW	23,7	22,1
Min heat output	kW	11,1	10,5
Minimum CH system pressure	bar	0,5	0,5
Maximum CH system pressure	bar	3,0	3,0
DHW circuit min. pressure	bar	0,5	0,5
DHW circuit max. pressure	bar	8,0	8,0
DHW specific flow rate ( $\Delta T=30$ K)	l/min	11,1	10,3
Electric power supply – voltage / frequency	V - Hz	230 - 50	
Power mains supply fuse	A	3,15	3,15
Maximum power consumption	W	98	69
Pump absorption	W	66	66
Electric protection rating	IP	X4D	X4D
Net weight	kg	25,16	22,74
Natural gas consumption (*)	cu. m/h	2,70	2,59
Butane gas consumption	kg/h	2,01	1,93
Propane gas consumption	kg/h	1,98	1,90
Maximum CH working temperature	°C	83	83
Maximum DHW working temperature	°C	58	58
Total capacity of expansion vessel	l	7	7
Maximum recommended system capacity (**)	l	100	100

Tab. 3 General specifications

(\*) Value referred to 15 °C - 1013 mbar

(\*\*) Maximum water temperature 83°C, expansion vessel pressure 1 bar

Description	um	Max. output	Min. output	30% load
Heat loss from the boiler casing	%	1,01	2,04	-
Flue system heat loss with burner on	%	5,89	10,26	-
Flue system mass capacity	g/s	14,18	15,21	-
Flue temp. – air temp.	°C	110	87	-
CO2 value (natural gas/butane gas/propane)	%	7.2 / 8.6 / 6.8	3.0 / 3.6 / 3.0	-
Maximum heat output efficiency rating (60/80°C)	%	93,1	87,7	90,5
Efficiency rating (according to 92/42/EC)	-	* * *		

Tab. 4 CTFS 24 AF Combustion data

Description	um	Max. output	Min. output	30% load
Heat loss from the boiler casing	%	3,92	4,45	-
Flue system heat loss with burner on	%	5,98	8,15	-
Flue system mass capacity	g/s	16,72	14,98	-
Flue temp. – air temp.	°C	83	62	-
CO2 value (natural gas/butane gas/propane)	%	5,7 / 6,7 / 7,3	3,0 / 3,5 / 3,7	-
Maximum heat output efficiency rating (60/80°C)	%	90,1	87,4	89,2
Efficiency rating (according to 92/42/EC)	-	* *		

Tab. 5 CTN 24 AF Combustion data

### 3. Instructions for the installer

#### 3.1 Installation standards

This boiler must be installed in compliance with the laws and standards in force in the country of installation, which are herein considered as entirely transcribed.

To find out about the gas category and technical specifications, refer to operation data and general features specified in the previous pages.



#### **DANGER**

---

**Accessories and spare parts for installation and service procedures are to be supplied by the Manufacturer.**

**Should non original accessories and spare parts be employed, boiler proper performance is not guaranteed.**

---

##### 3.1.1 Packaging

Boiler is shipped in a sturdy cardboard box.

Remove boiler from cardboard box and check its integrity.

The packing materials can be recycled. Disposal must be managed via appropriate waste collection sites.

Keep packaging out of reach of children, as it may be dangerous.

The manufacturer shall not be held responsible in case of damage to people, animals, or property due to failure to follow the above mentioned instructions.

Packaging includes one plastic bag containing:

- boiler installation, use and maintenance manual;
- the template for mounting the boiler on a wall (see Fig. 7 Paper template).
- 2 screws and relevant wall blocks for fixing the boiler to the wall;
- 3 diaphragms for flue gas venting: diameters 39.8, 44 and 49 mm (CTFS only);
- one blanking cap with gasket (only CTFS).

#### 3.2 Choosing where to install the boiler

The following must be taken into account when choosing where to install the boiler:

- indications contained in paragraph *Air intake and flue gas venting system* on page 28 and its sub-paragraphs.
- check the wall for sturdiness, avoiding weak areas;
- do not install the boiler over appliances which may affect boiler operation (e.g. cookers, which produce steam and grease, washing machines etc.).
- Do not install natural draught boilers in locations with a corrosive or very dusty atmosphere, such as hairdresser salons, laundries etc., as this may severely reduce the lifespan of the components of the boiler.



### 3.3 Positioning the boiler

Each boiler is supplied with a paper template, found inside the packaging (see Fig. 7 Paper template).

The template allows you to ensure that the pipes connected to the CH system, the DHW system and the gas mains, and the air intake/flue gas venting ducts are all laid out correctly during the realisation of the water system and before installation of the boiler.

This template is made of heavy-duty paper and must be fixed, with the help of a level, onto the wall where the boiler is to be mounted.

The template provides all the indications required to drill the boiler mounting holes to the wall, procedure which is done using two screws and wall blocks.

The lower area of the template shows where to mark the exact point at which the couplings are to be positioned for boiler connection to the gas supply pipe, cold water mains supply pipe, hot water outlet, CH flow and return pipes.

The upper area of the template shows where air intake and flue gas ducts are to be positioned.



#### **DANGER**

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**Since the temperature of the walls on which the boiler is mounted and external temperature of coaxial air/flue gas system do not exceed 60°C, no minimum distance from flammable walls is to be accounted for.**

**For boilers with split air intake and flue gas venting ducts, in the case of proximity with flammable walls and passages through walls, apply insulating material between the wall and the flue gas venting duct.**

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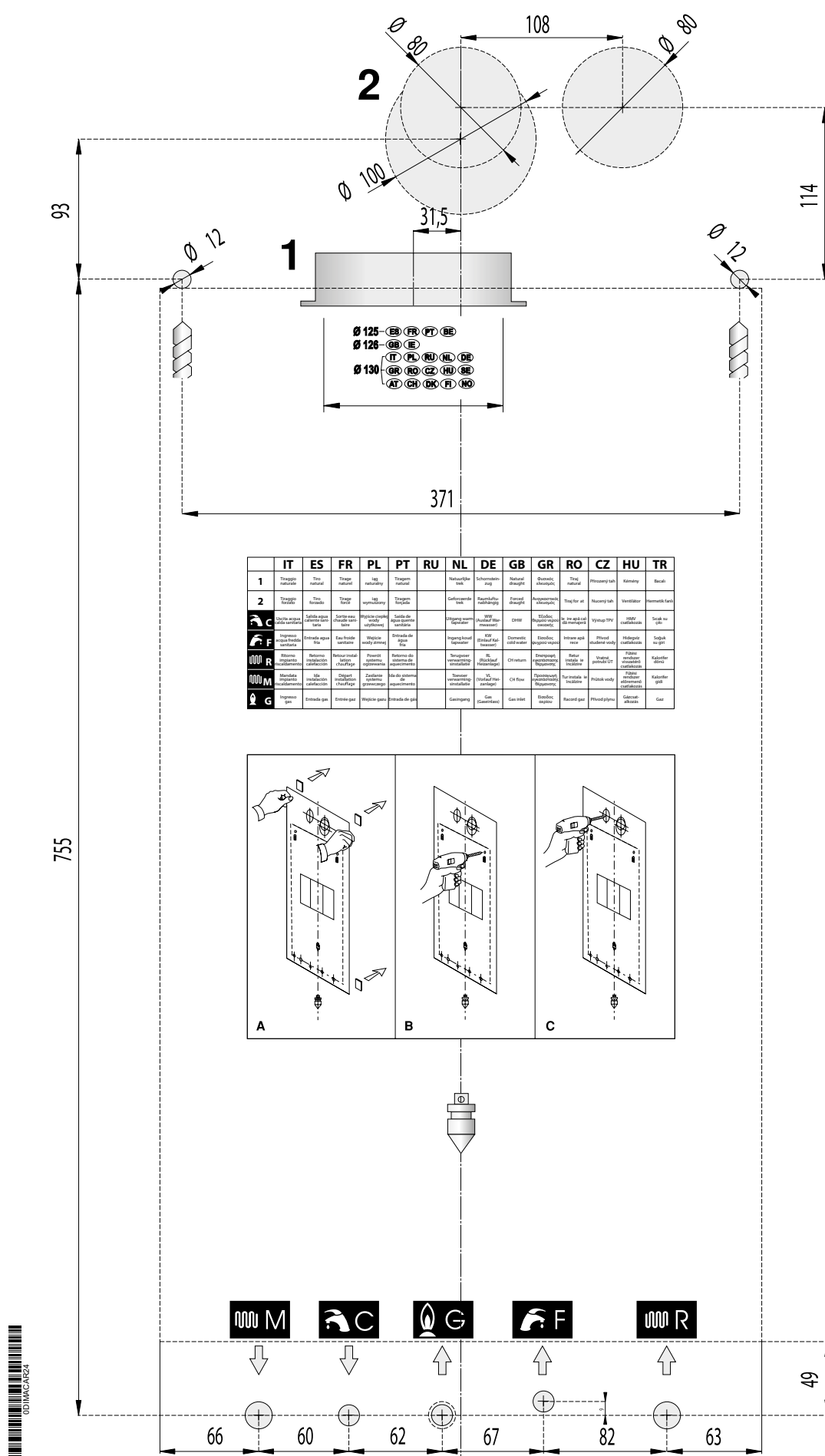


Fig. 7 Paper template

### 3.4 Installing the boiler



#### **DANGER**

**Before connecting the boiler to CH and DHW networks, clean the pipes carefully.**

**Before commissioning a NEW system, clean it to remove any metal chips due to machining and welding, and any oil and grease that might negatively affect boiler operation or even damage it in case they get inside it.**

**Before commissioning a RECONDITIONED system (where radiators have been added, the boiler has been replaced, etc.) thoroughly clean it to remove any sludge and residues.**

**Clean the system using standard non acid products, available on the market.**

**Do not use solvents as they could damage system components.**

**Furthermore, in the central heating system (either new or reconditioned), it is always advisable to add to water a suitable percentage of corrosion protectants for multi-metal systems that will create a protective film onto all internal surfaces.**

**The manufacturer shall not be held responsible in case of damage to people, animals, or property due to failure to follow the above mentioned instructions.**

In order to install the boiler proceed as follows:

- affix the template to the wall.
- Check that 1 cm to the right and 1 cm to the left of the boiler is left for casing removal;
- Drill two 12 mm diameter holes in the wall for the wall plugs, insert the wall plugs supplied with the boiler and apply and tighten the screws;
- If necessary, provide holes in the wall to allow air intake and/or flue gas venting pipes to pass through it;
- Position the connections for the gas mains pipe **G**, the cold water inlet pipe **F**, the hot water outlet pipe **C**, and the central heating flow **M** and return pipes **R** as indicated at the bottom of the template;
- Hook the boiler to the previously fitted screws;
- Connect the boiler to the feed pipes (see *Hydraulic connections* on page [37](#));
- Connect the boiler to the air intake and flue gas venting system (see *Air intake and flue gas venting system* on page [28](#));
- connect power supply, ambient thermostat (when available) and other available accessories (refer to the following paragraphs).

### 3.5 Boiler room ventilation

The open combustion chamber boiler is designed to be connected to a chimney.  
The combustion air is sucked directly from the room it is installed in.



#### **DANGER**

---

**The boiler must be installed in a room that is compliant with the legislation and standards in force in the country of installation, which are herein considered as entirely transcribed.**

---

### 3.6 Air intake and flue gas venting system

Flue gas discharge into the atmosphere and air intake/flue gas venting systems must comply with applicable laws and standards in the country of installation that are considered as fully transcribed herein.



#### **DANGER**

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**The boiler is equipped with a safety device for flue gas exhaustion check.**

**It is strictly forbidden to tamper with and/or prevent operation of such safety device.**

**Should an air/flue gas system malfunction occur, the device will shut-down the boiler by interrupting the gas supply to the boiler and the LCD will display the E03 code.**

**In this case it is necessary to have safety device, boiler and the air intake/flue gas venting ducts promptly checked by a service centre or a qualified service engineer.**

**In case of repeated stops, it is necessary to have safety device, boiler and the air intake/flue gas venting ducts checked by a service centre or a qualified service engineer.**

**After each operation on the safety device or the air suction/flue gas exhaust system, it is necessary to perform a functional test of the boiler.**

**In case it is necessary to replace the safety device use only original spare parts supplied by the Manufacturer.**

**On the open chamber model, the actual waiting time for the automatic reset of the combustion gas exhaust control device is equal to 10 minutes. To reset the device before this time it is necessary to press "Reset".**

**On the sealed chamber model, to reset the combustion gas exhaust control device operation it is necessary to press "Reset".**

---



#### **DANGER**

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**Damage and/or injury caused by incorrect installation and/or incorrect use and/or unauthorized changes to the boiler and/or non-observance of the manufacturer's instructions and/or of the relative standards/laws in force in the country of installation, shall release the manufacturer from any and all liability.**

---

### 3.6.1 Natural draught boiler

#### Connection to the chimney

The chimney is indispensable for correct boiler operation; it must therefore comply with the following requirements:

- it must be made of waterproof material and be resistant to flue gas temperature and related condensate;
- it must have appropriate mechanical characteristics and low thermal conductivity;
- it must be perfectly sealed;
- it must be as vertical as possible and the roof terminal is to have a cap ensuring efficient and constant flue gas exhaustion;
- it must not be less wide than the boiler flue gas outlet diameter; squared or rectangular section chimneys must bear an internal section, 10% larger than the section connected to the boiler draught excluder device;
- starting from the boiler, the duct connecting to the chimney is to follow a vertical direction and must be long not less than twice its diameter before joining the chimney.

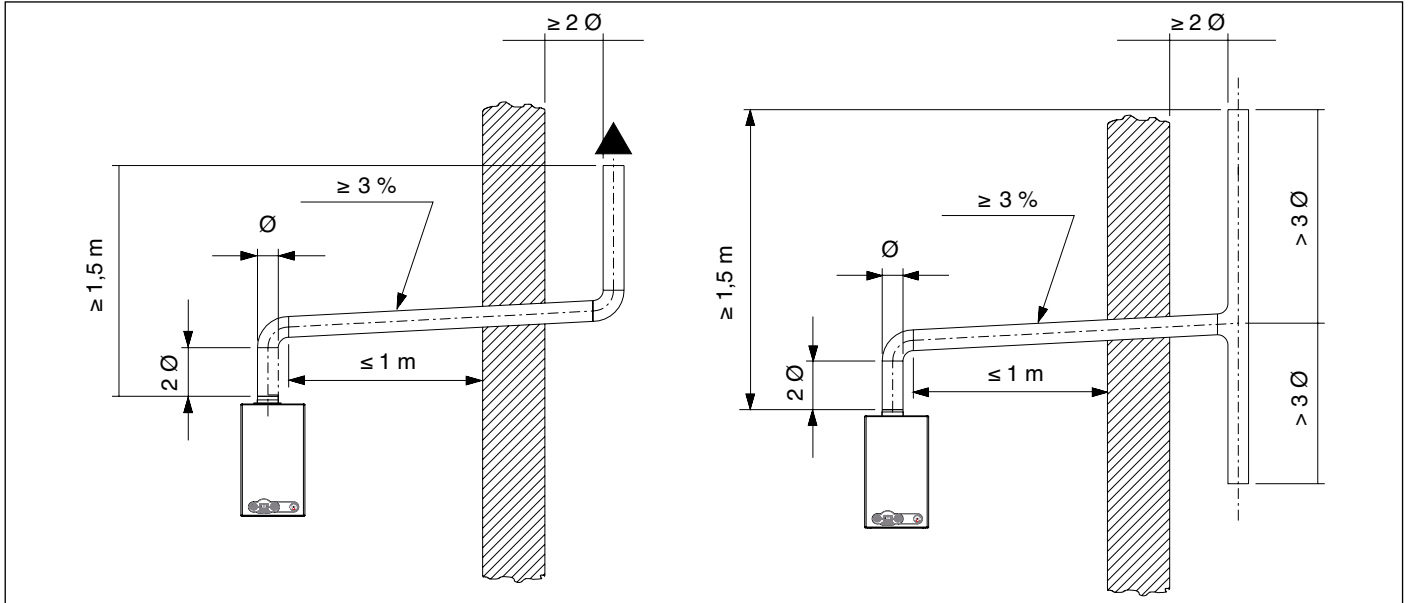


Fig. 8 Connections to the chimney of open chamber models

#### Direct emission into the atmosphere

Natural draught boilers can vent flue gas directly into the atmosphere via a duct which goes through the outside walls of the building and ends with an anti-wind gust device terminal.

The flue gas exhaust duct is to comply with the following requirements:

- its sub-horizontal part inside the building must be as short as possible (not longer than 1,000 mm);
- It is not to have more than 2 direction changes;
- it can host only one single boiler flue gas exhaust system;
- its section, which is passing through the wall is to be protected by a sheath duct; the part of the sheath duct facing the inside of the building is to be sealed, while the part facing outwards is to be left open;
- its end section, on which the draught terminal is to be installed, is to protrude from the wall of the building for a length of at least twice the diameter of the duct;
- the terminal must be no less than 1.5 meters above the connection for the flue gas venting duct on the boiler.

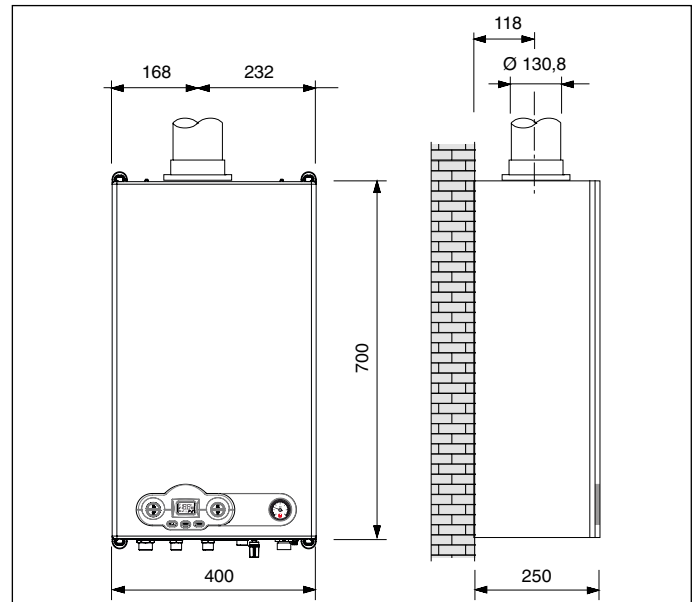


Fig. 9 Dimensions for connection to the flue gas system of the open chamber models

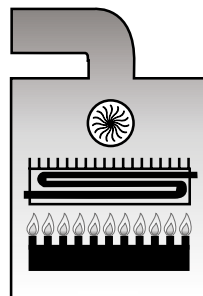
### 3.6.2 Forced draught boiler

When positioning the boiler exhaust terminals onto the wall, comply with the distances specified in the applicable standards and regulations in force in the Country of installation, which are herein considered as entirely transcribed.

### 3.6.3 Possible configuration of air intake and flue gas venting ducts

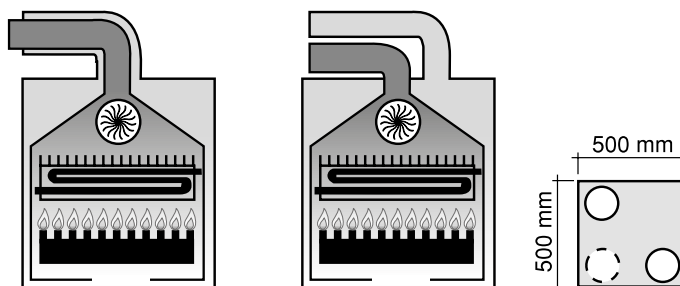
#### Type B22

- Boiler intended for connection to a chimney pipe or a device for flue gas venting external to the boiler room.
- Combustion air is taken directly from the boiler room itself while flue gas is conveyed to the outside.
- The boiler is not to be fitted with anti-wind gust device; it has to be equipped with a fan mounted downstream of the combustion chamber/heat exchanger.



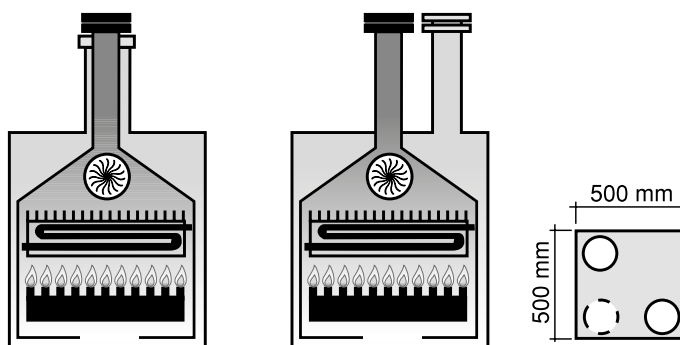
#### Type C12

- Boiler intended for connection to horizontal outlet and intake ducts connected to the outside by means of coaxial or split ducts.
- The minimum distance between the air intake duct and the flue gas venting duct must be at least 250 mm (see figure opposite), whereas both terminals must be contained within a square measuring 500 x 500mm.



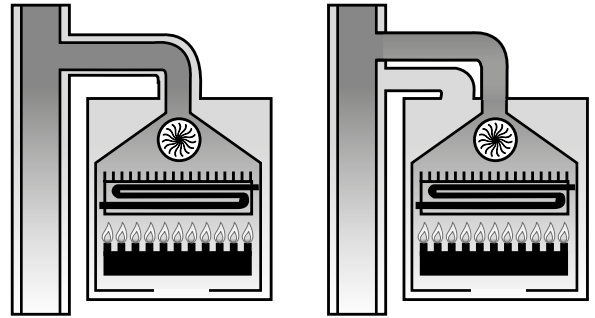
#### Type C32

- Boiler intended for connection to vertical outlet and intake ducts connected to the outside by means of coaxial or split ducts.
- The minimum distance between the air intake duct and the flue gas venting duct must be at least 250 mm (see figure opposite), whereas both terminals must be contained within a square measuring 500 x 500mm.

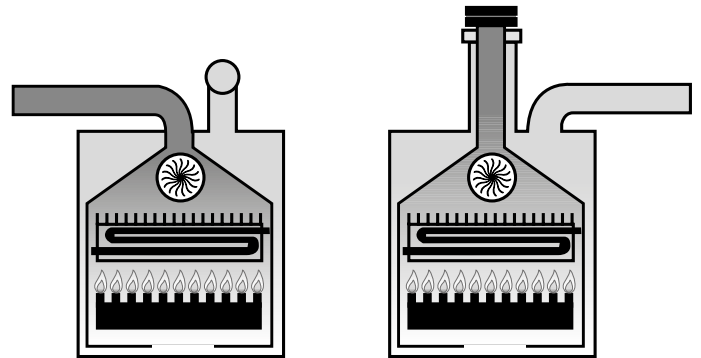


**Type C42**

- Boiler intended for connection to collective chimney pipe system that includes two ducts, air intake and flue gas venting.
- The chimney must be compliant with applicable legislation and standards.

**Type C52**

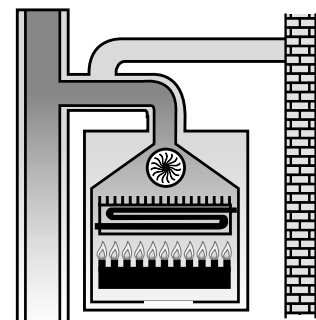
- Boiler with separate pipes for combustion air intake and flue gas evacuation.
- These flues may discharge in areas at a different pressure.
- The terminals may not face each other from opposed walls.

**Type C62**

- Boiler designed to be sold without air intake or flue gas venting ducts.
- Flue gas venting and air intake to be ensured by using commercially available pipes, which are to be certified separately (in compliance with the legislation and standards in force in the country of installation).

**Type C82**

- Boiler intended to be connected to combustion air terminal and to a single flue gas terminal or collective chimney.
- The chimney must be compliant with applicable legislation and standards.



### 3.6.4 Air intake and flue gas venting via 100/60 mm coaxial pipes

#### Type C12

- Minimum permissible length of horizontal coaxial pipes is 1 meter.
- Maximum permissible length of horizontal coaxial pipes is 6 metres.
- For each additional 90° elbow, maximum permissible length is to be reduced by 1 meter.
- For each additional 45° elbow, maximum permissible length is to be reduced by 0.5 meter.
- The duct is to be tilted down by 1% toward its outlet, to prevent rain water from entering the boiler.
- The flow resistance of the first elbow shall not be taken into account to calculate maximum permissible length.

Use the diaphragms supplied with the boiler (see Fig. 10 0KITCONC00 (100/60 mm)).

Pipe length (m)	Flue gas venting diaphragm diameter
$1 \leq L < 3^*$	Ø 39.8
$3 \leq L \leq 6^*$	Ø 44

Tab. 6 Table indicating coaxial pipes 100/60 C12 type

(\*) first curve included.

#### Type C32

- Minimum permissible length for vertical coaxial pipes is 1 metre, equal to the length of the chimney.
- Maximum permissible length for vertical coaxial pipes is 6 metres, including the chimney.
- For each additional 90° elbow, maximum permissible length is to be reduced by 1 meter.
- For each additional 45° elbow, maximum permissible length is to be reduced by 0.5 meter.

Use the diaphragms supplied with the boiler (see Fig. 10 0KITCONC00 (100/60 mm)).

Pipe length (m)	Flue gas venting diaphragm diameter
$1 \leq L < 3$	Ø 39.8
$3 \leq L \leq 6$	Ø 44

Tab. 7 Table indicating coaxial pipes 100/60 C32 type



### WARNING

The pipe length information refers to air intake/flue gas venting ducts made from smooth, rigid pipes approved and supplied by the manufacturer.

### 3.6.5 Air intake and flue gas venting via 125/80 mm coaxial pipes

#### Type C12

- Minimum permissible length of horizontal coaxial pipes is 1 meter.
- Maximum permissible length of horizontal coaxial pipes is 11 metres.
- For each additional 90° elbow, maximum permissible length is to be reduced by 3 meters.
- For each additional 45° elbow, maximum permissible length is to be reduced by 0.5 meter.
- The duct is to be tilted down by 1% toward its outlet, to prevent rain water from entering the boiler.
- The flow resistance of the first elbow shall not be taken into account to calculate maximum permissible length.

Use the diaphragms supplied with the boiler.

Pipe length (m)	Flue gas venting diaphragm diameter
$1 < L \leq 5^*$	Ø 39
$5 < L \leq 6^*$	Ø 39.8
$6 < L \leq 7^*$	Ø 42
$7 < L \leq 9^*$	Ø 44
$9 < L \leq 10^*$	Ø 47
$10 < L \leq 11^*$	Ø 49

Tab. 8 Table indicating coaxial pipes 125/80 C12 type

(\*) first curve included.



### Type C32

- Minimum permissible length for vertical coaxial pipes is 1 metre, equal to the length of the chimney.
- Maximum permissible length for vertical coaxial pipes is 11 metres, including the chimney.
- For each additional 90° elbow, maximum permissible length is to be reduced by 3 meters.
- For each additional 45° elbow, maximum permissible length is to be reduced by 0.5 meter.

Use the diaphragms supplied with the boiler.

Pipe length (m)	Flue gas venting diaphragm diameter
$1 < L \leq 5$	Ø 39
$5 < L \leq 6$	Ø 39.8
$6 < L \leq 7$	Ø 42
$7 < L \leq 9$	Ø 44
$9 < L \leq 10$	Ø 47
$10 < L \leq 11$	Ø 49

Tab. 9 Table indicating coaxial pipes 125/80 C32 type



### WARNING

The pipe length information refers to air intake/flue gas venting ducts made from smooth, rigid pipes approved and supplied by the manufacturer.

The illustrations are indicative only. When installing accessories, refer to the instructions supplied with the accessories themselves.

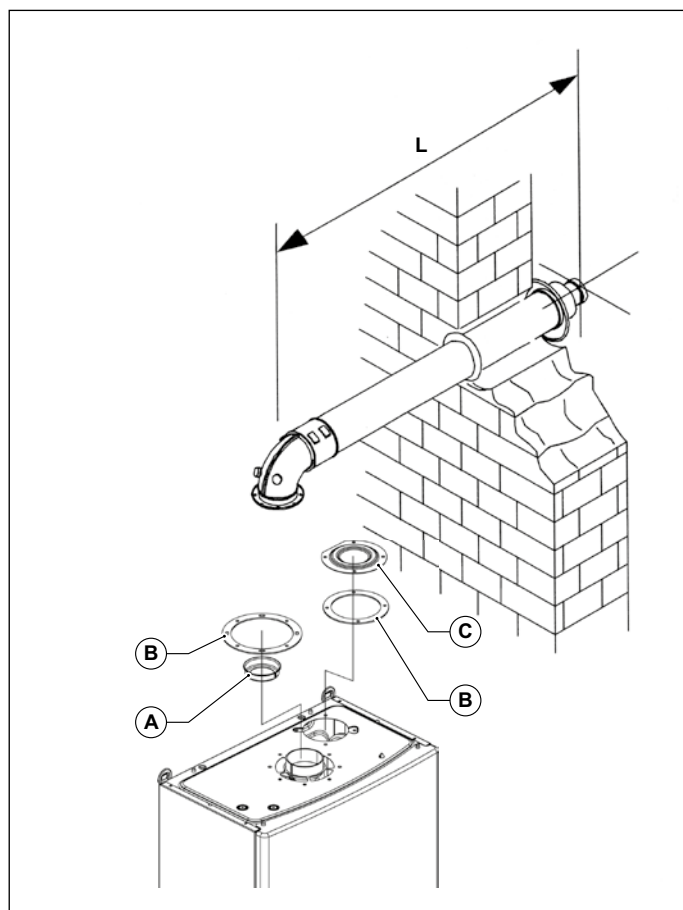


Fig. 10 KITCONC00 (100/60 mm)

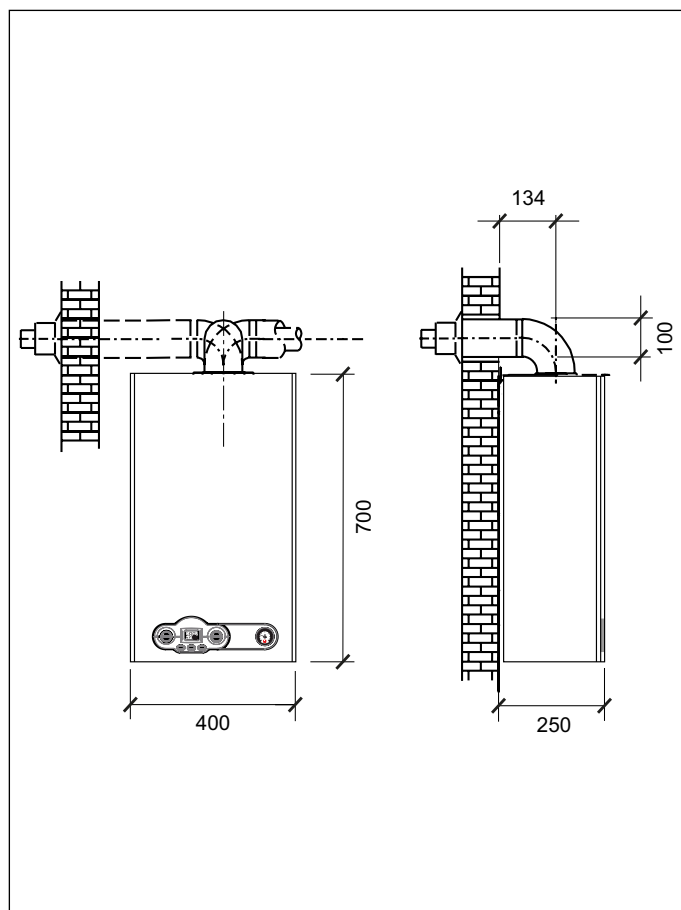


Fig. 11 Dimensions for coaxial pipe

- A. Diaphragm
- B. Neoprene gasket
- C. Blanking cap
- L = from 1 m to 6 m

### 3.6.6 Air intake and flue gas venting via Ø 80 mm split pipes

For all systems with separate air intake and flue gas venting ducts, the suitable standard split ducts kit (OSDOPPIA13) must be used, it includes the following parts:

- A. a female flanged stub pipe Ø 80 mm for connecting flue gas venting duct with relevant deflector;
- B. a female flanged stub pipe Ø 80 mm for connecting air intake duct;



#### **DANGER**

**If the original standard split ducts kit is not used, correct boiler operation is not guaranteed.**

### **C42 – C52 – C82 installation categories**

#### **Air intake**

- Minimum permissible length of air intake pipe is 1 meter.
- Each wide radius 90° air-intake duct elbow (R=D) is equivalent to a 0.8 metre long straight pipe section.
- Each narrow radius 90° air-intake duct elbow (R<D) is equivalent to a 1.6 metre long straight pipe section.
- Every air intake duct length of one metre is equivalent to a 0.6 metre long straight pipe section.
- Every split pipe chimney at intake is equivalent to a 4.1 metre long straight pipe section.
- air intake duct flow resistance shall not be considered.
- Install the standard air deflector.

#### **Flue gas vent**

- Minimum permissible length of flue gas venting pipe is 0.5 metre.
- Each wide radius 90° elbow (R=D) in flue gas vent equals a 1.3 m long straight pipe section.
- Each narrow radius 90° elbow (R<D) in flue gas vent equals a 2.7 m long straight pipe section.
- Every flue gas venting duct length of one metre is equivalent to a 1.0 metre long straight pipe section.
- Every split pipe chimney at flue gas vent is equivalent to a 5.6 metre long straight pipe section.
- The wall-hung exhaust terminal corresponds to 4.3 m of equivalent linear length.

Use the diaphragms supplied with the boiler (see Fig. 12 OSDOPPIA13).

Pipe length (m)	Flue gas venting diaphragm diameter
$0,5 \leq L < 26^*$	Ø 44
$26 \leq L < 40^*$	Ø 49
$40 \leq L < 47^*$	-

Tab. 10 Table indicating split pipes 80+80 C42-C52-C82 types

(\*) first curve included.



#### **WARNING**

**The pipe length information refers to air intake/flue gas venting ducts made from smooth, rigid pipes approved and supplied by the manufacturer.**

The illustrations are indicative only. When installing accessories, refer to the instructions supplied with the accessories themselves. Configurations for 80 mm split air intake/flue gas venting pipes.

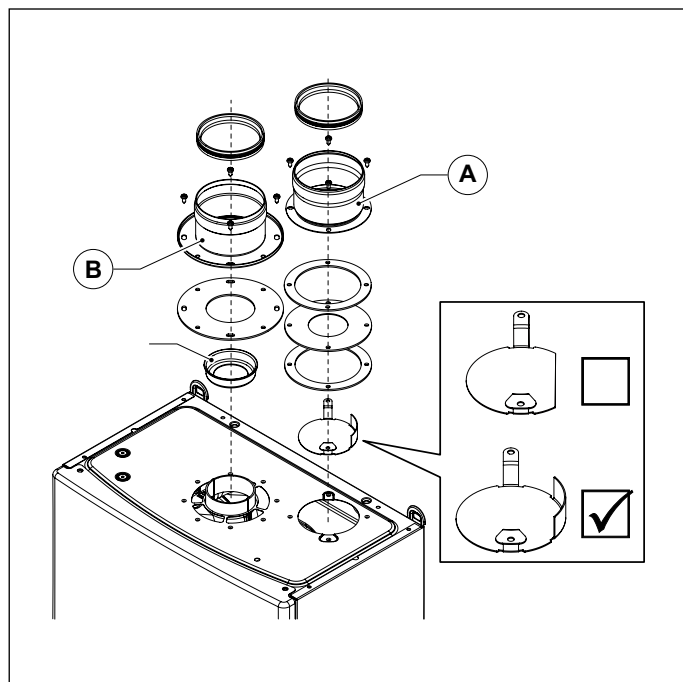


Fig. 12 OSDOPPIA13

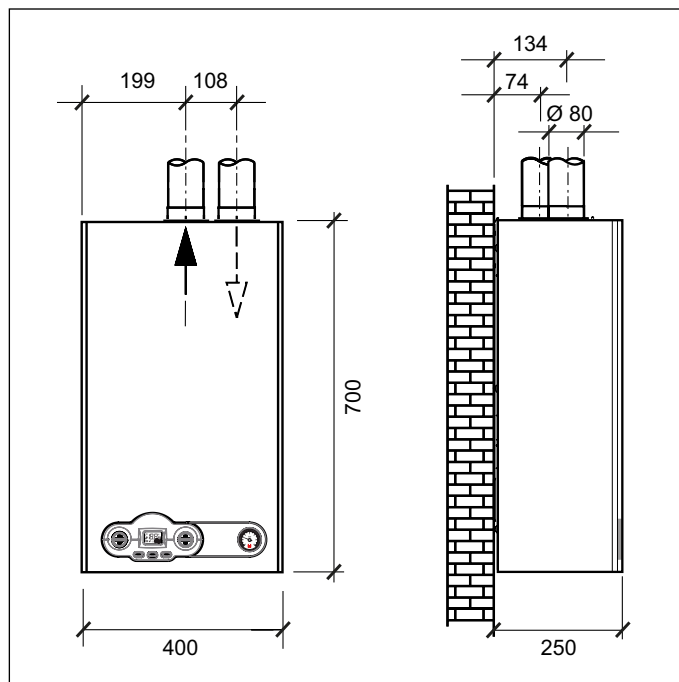


Fig. 13 Dimensions for split pipes

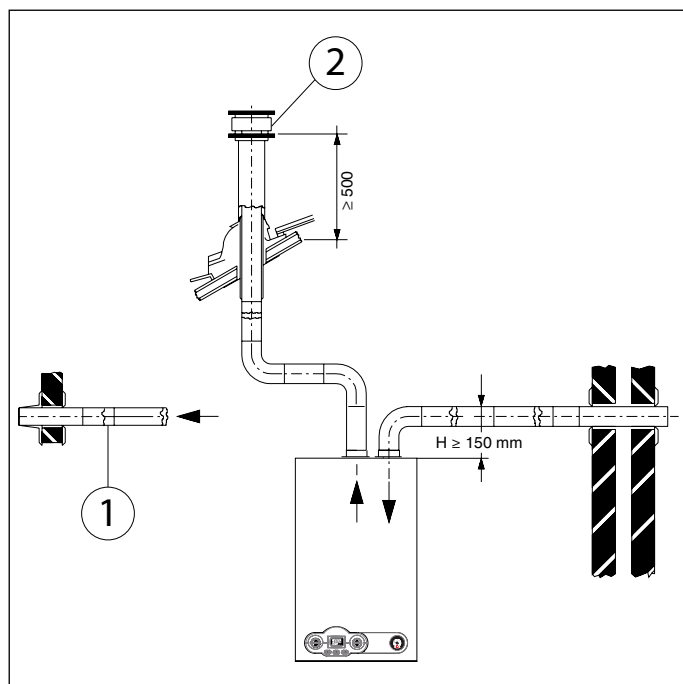


Fig. 14 Air intake and flue gas venting examples

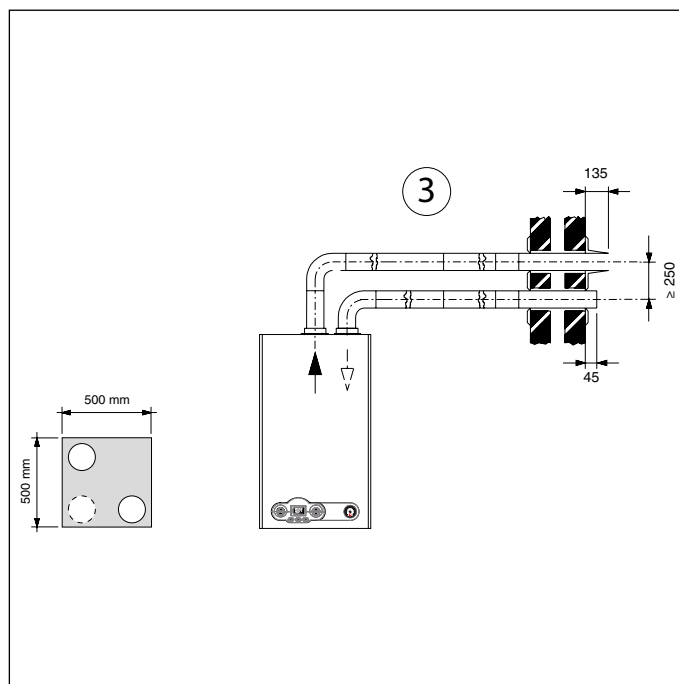


Fig. 15 Air intake and flue gas venting example

**Example 1**.....Primary air intake and flue gas venting via two opposite external perimeter walls.

**Example 2**.....Primary air intake via perimeter wall and flue gas vent on roof.


**Example 3**.....Primary air intake via perimeter wall and flue gas vent via same external perimeter wall.

#### Installation type: C62

- Maximum chimney residual head (intake-venting): 105 Pa.
- Avoid condensate build-up inside the equipment.
- Maximum flue gas recirculation: 10%.

## 3.7 Checking combustion efficiency

### 3.7.1 Flue cleaning function

- The boiler features a flue cleaning function which must be used to measure combustion efficiency during operation and to adjust the burner.
- To activate the flue cleaning function, press and hold the buttons "Info" and "Reset" simultaneously for 5 seconds. The flow temperature and the  symbol are shown on the LCD.
- When the flue cleaning function is activated with the boiler in "WINTER" or "HEATING ONLY" mode, the boiler performs the ignition sequence and then operates at a fixed power output predetermined by the parameter **P1** (maximum CH output).
- To exit the flue cleaning mode, press "Reset" or wait 15 minutes.

### 3.7.2 Measurement procedure

#### **coaxial duct system**

In order to verify combustion efficiency the following measurements must be implemented:

- assess combustion air temperature from opening 1 (see ref. (A) Fig. 16 Examples of flue gas testing points , for sealed chamber boilers provided with pipes with preset holes).
- assess flue gas temperature and CO<sub>2</sub> quantity from no. 2 opening (see ref. (A) Fig. 16 Examples of flue gas testing points , for sealed chamber boilers provided with pipes with preset holes).

**Allow boiler to reach working temperature before taking any measurement.**

#### **split ducts system**

In order to verify combustion efficiency the following measurements must be implemented:

- assess combustion air temperature from opening 2 (see ref. (B) Fig. 16 Examples of flue gas testing points , for sealed chambers provided with pipes with preset holes).
- assess flue gas temperature and CO<sub>2</sub> quantity from no. 1 opening (see ref. (B) Fig. 16 Examples of flue gas testing points , for sealed chamber boilers provided with pipes with preset holes).

**Allow boiler to reach working temperature before taking any measurement.**

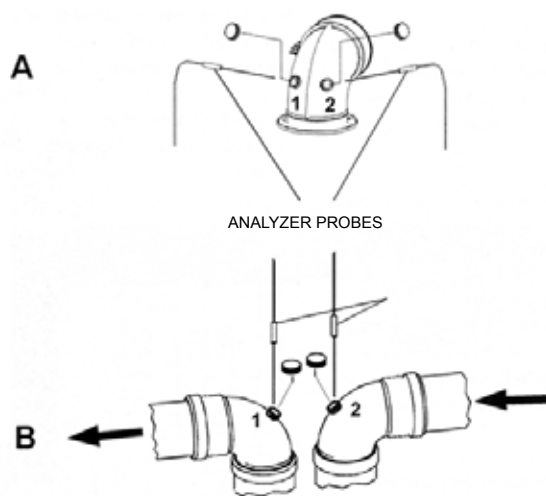


Fig. 16 Examples of flue gas testing points

### 3.8 Connection to gas mains

Cross-section gas pipe size must be chosen depending on its length, layout pattern, gas flow rate.  
Gas supply pipe cross-section must be equal or greater than boiler gas pipe.



#### **DANGER**

**Comply with installation standards enforced in the country where the boiler is installed which are considered as fully transcribed in this booklet.**

**Remember that before operating an indoor gas distribution system and before connecting it to a meter, it must be checked for leaks.**

**If some system parts are not visible, the leak test is to be carried out before the pipes are covered.**

**Leak test is NOT to be carried out employing flammable gas: use air or nitrogen for this purpose.**

**Once gas is in the pipes, leak test by a naked flame is forbidden; use specific products available on the market.**

**When connecting the boiler to gas supply network, it is COMPULSORY to install an appropriately sized gasket (A) made from suitable material (see Fig. 17 Connection to gas mains).**

**The boiler gas inlet coupling is NOT suitable for hemp, teflon tape or similarly made gaskets.**

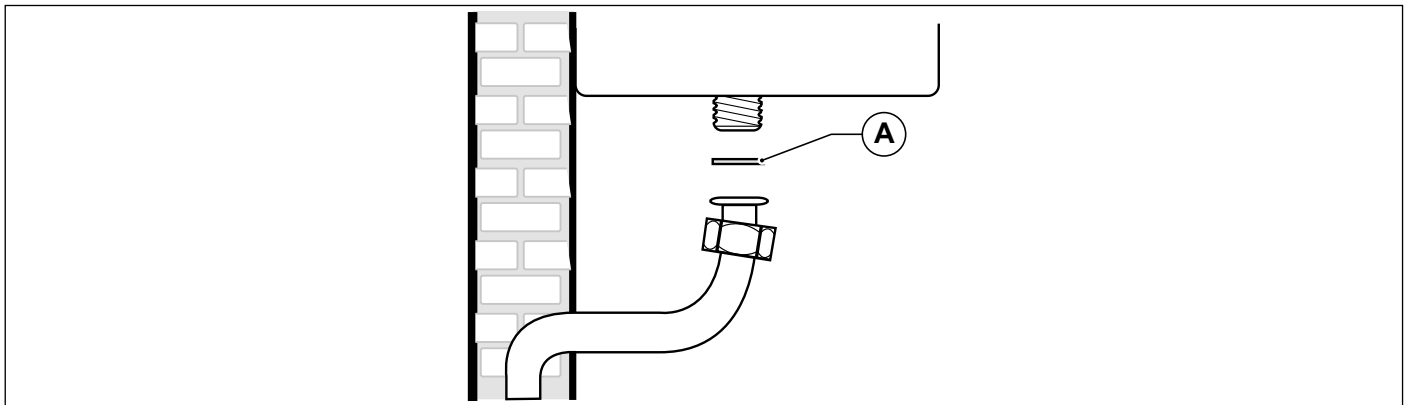


Fig. 17 Connection to gas mains

### 3.9 Hydraulic connections

#### 3.9.1 Central heating

Prior to installing the boiler, the hydraulic system is to be cleaned in order to remove impurities; they could be present in system components and damage the pump and the heat exchanger.

The CH flow and return pipes must be connected to the respective 3/4" connectors (M) (R) on the boiler (see Fig. 7 Paper template).

When calculating the cross section of CH system pipes, bear in mind load losses induced by radiators, thermostatic valves, radiator gate valves, and the configuration of the system itself.



#### **WARNING**

**It is advisable to convey the discharge flow of boiler safety valve to the sewer system. Should the above precaution not be implemented and the safety valve be activated, boiler room flooding may occur.**

**The manufacturer shall not be held responsible in case of damage to people, animals, or property due to failure to follow the above mentioned instructions.**

### 3.9.2 DHW

Prior to installing the boiler, the hydraulic system is to be cleaned in order to remove impurities; they could be present in system components and damage the pump and the heat exchanger.

Cold water inlet and DHW outlet shall be connected to the boiler through the special 1/2" (C) and (F) fittings (see Fig. 7 Paper template).

Hardness of water supplied to the boiler may increase the plate heat exchanger cleaning/replacement intervals.



#### WARNING

---

**Depending on the hardness of the mains water supply, ascertain whether or not to install appropriate domestic water treatment systems using water treatment products suitable for drinking water and compliant with the regulations and standards in force in the country of installation.**

**Water treatment is always advisable when water supplied to the boiler is more than 20°F hard.**

**Water supplied by commonly marketed water softeners, due to PH level induced in water, may not be compatible with some components in the system.**

---

### 3.10 Connection to electrical mains

The boiler is supplied with a three-poled power cable, already connected to the electronic board and it is provided with a safety clamp.

The boiler is to be connected to a 230V-50Hz electrical power supply.

**When connecting it to power mains, follow correct phase / neutral polarity sequence.**

Installation standards must be complied with and they are herein considered as entirely transcribed.

An easily accessible two-poled switch, with a minimum 3 mm distance between contacts, is to be installed ahead of the boiler. The switch is to allow power supply cut-off in order to safely perform maintenance and service procedures.

Power supply to the boiler must be fitted with a residual-current circuit breaker having suitable disconnection capacity. Electric power supply must be properly earthed.

The above mentioned safety measure must be verified. If in doubt, ask a qualified technician to thoroughly check the power network.



#### WARNING

---

**The manufacturer cannot be held responsible for any damage caused by failure to earth the system correctly: gas, water, or CH system pipes are not suitable for grounding power networks.**

---

### 3.11 Connection to ambient thermostat (optional)

The boiler is designed to be connected to an ambient thermostat (optional, not compulsory).

Ambient thermostat contacts must be properly sized in compliance with a load of 5 mA at 24 Vdc.

The ambient thermostat cables must be connected to terminals (1) and (2) of the electronic board (see Fig. 20 Wiring diagram) after eliminating the jumper supplied as a standard with the boiler.

**The ambient thermostat cables are not to be grouped together in the same sheath as power mains supply cables.**

### 3.12 Installation and operation with Open Therm Remote Control (optional)



#### WARNING

---

**Only use original Remote Control Units supplied by the manufacturer.**

**The correct operation of the Remote Control itself and of the boiler is not guaranteed if non original Remote Control units not supplied by the manufacturer are used.**

---

The boiler may be connected to an Open Therm Remote Control (non-compulsory optional accessory supplied by manufacturer).

The Remote Control must only be installed by qualified personnel.

To install the Remote Control, refer to the instructions provided with the Remote Control itself.

The Remote Control must be installed on an indoor wall at a height of approximately 1.5 m from the floor and in a suitable location for measuring ambient temperature: do not install in recess or corners, behind doors or curtains, and install away from heat sources, direct sunlight, air draughts and water sprays.

The Remote Control cables must be connected to terminals 3 and 4 of the electronic board.

The Remote Control connector is protected against inverted polarity, and the connections may be inverted.



#### WARNING

---

**Do not connect the remote control to mains electrical power 230 V ~ 50 Hz.**

**The remote control wiring must not be grouped together in the same sheath as the power cables: if the cables are sheathed together, electrical interference from the power cables may compromise the functions of the Remote Control;**

---

For complete instructions on how to program the Remote Control, refer to the instruction manual included in the Remote Control kit.

Board and Remote Control communicate in each operating mode: OFF, SUMMER, WINTER, CH ONLY.

Boiler display layout corresponds to the setting made from the Remote Control, as for the operating mode.

The remote control may be used to view and set a number of special parameters denominated **TSP** parameters and reserved solely for qualified technicians.

**TSP0** parameter sets default data table and restores all factory settings, cancelling all preceding modifications on single parameters.

If a single parameter is found to be incorrect, the value given in the default value table is restored.

If the user attempts to set a value not within the permissible range for the parameter, the new value is rejected and the existing value is maintained.


### 3.13 TSP parameters

The boiler operation is controlled by several parameters.

To modify parameters press buttons **Reset** e - **CH** together for 3 seconds.

Scroll through the parameters by pressing **CH +/-** buttons.

As soon as you reach the one to be modified, press **ok**.

The  symbol turns on to indicate that you can edit the parameter value.

The parameter value can be edited using **CH +/-** buttons.

To confirm modification press **Ok**.

To exit the parameter editing mode press button **Reset**.

Parameter	Description	Configurable value range	Default values	Notes
P0 - TSP0	Fuel gas type	0 ÷ 1	According to the model	0 = methane 1 = lpg
P1 - TSP1	CH maximum output	0 ÷ 100%	100%	n.a.
P2 - TSP2	Ignition power setting	0 ÷ 100%	0%	If P2=0, ignition ramping is implemented. If P2≠0, the boiler operates at the power set (P2=1 minimum power ÷ P2=100 maximum power)
P3 - TSP3	Heating thermostat timing	0 ÷ 10 min.	4	n.a.
P4 - TSP4	CH power rising ramp timer	0 ÷ 10 min.	4	n.a.
P5 - TSP5	Timer for CH post-circulation, freeze protection and flue cleaning function	0 ÷ 180 sec.	30	n.a.
P7 - TSP7	Water hammer protection delay, configurable	0 ÷ 3 sec.	0	n.a.
P8 - TSP8	Ambient/remote control thermostat reading delay	0 ÷ 199 sec.	0	n.a.
P18 - TSP18	Heating timer reset temperature	35 ÷ 78 °C	40 °C	n.a.
P19 - TSP19	Maximum ΔT between flow and return	0 ÷ 78 K	30 K	0 = function disabled
P20	Default parameter setting (with the exception of P0)	0 ÷ 1	0	0 = user's parameters 1 = default parameters

Tab. 11 Limits to be set for TSP parameters and default values in relation to boiler type (TSP0) - I



Parameter	Description	Configurable value range	Default values	Notes
P21	Display of flow temperature	n.a.	n.a.	n.a.
P22	Return temperature displaying	n.a.	n.a.	n.a.
P23	DHW temperature displaying	n.a.	n.a.	n.a.
P27	Display of boiler type	n.a.	According to the model	C = forced draught B = natural draught
P28	Display of most recent boiler shut-down	n.a.	Fault code	n.a.
P29	Display of penultimate boiler shut-down	n.a.	Fault code	n.a.
P30	Display of third last boiler shut-down	n.a.	Fault code	n.a.
P31	Display of fourth last boiler shut-down	n.a.	Fault code	n.a.
P32	Display of fifth last boiler shut-down	n.a.	Fault code	n.a.
P33	Display of reset shut-down and fault	0 ÷ 1	n.a.	0 = OFF 1 = shut-downs and faults reset
P34	Number of faults since last reset	n.a.	n.a.	n.a.
P35	Modulation percentage indication	n.a.	n.a.	0 ÷ 100%
P36	Board use month displaying	n.a.	n.a.	n.a.

Tab. 12 Limits to be set for TSP parameters and default values in relation to boiler type (TSP0) - II

### 3.14 Filling the system

Once all boiler connections have been completed, CH system can be filled.

The procedure is to be cautiously carried out, following each step:

- Open the bleeding valves on all radiators and verify the boiler automatic valve operation.
- Gradually open the relevant filler cock, checking any automatic bleeding valves installed in the system properly work (see Fig. 2 Filler cock).
- Close all radiator bleeding valves as soon as water starts coming out.
- Check on pressure gauge that water pressure reaches the 1÷1.3 bar reading.
- Shut the filler cock and bleed any air out again, by opening the air bleeding valves on radiators.
- Start the boiler and bring the system to working temperature, stop the pump, and repeat air bleeding procedure.
- Allow the system to cool and restore water pressure to 1÷1.3 bars.



#### **WARNING**

**After long inactivity of the boiler, its pump may be stuck.**

**Before starting up the boiler, make sure that the pump is operating, with the following procedure:**

- Remove the boiler outer casing.
- Unscrew the protective cap at the centre of the pump motor.
- When the protection cap is removed, some water may flow out.
- Put a screwdriver into the hole and manually rotate the circulation pump shaft clockwise.
- Once the unblocking operation is completed, screw the protective cap back on and check for water leaks.
- Once the unblocking operation is completed, screw the protective cap back on and check for water leaks.



#### **WARNING**

**The low water safety pressure switch will not electrically enable the burner ignition when water pressure is below 0.4-0.6 bar.**

**The CH system water pressure must not be lower than 1 bar. Otherwise, fill the heating system.**

**The procedure is to be followed while the system is cold.**

**Pressure gauge is used to read pressure inside the heating circuit.**



#### **WARNING**

**As for water treating in the domestic heating systems in order to optimise efficiency and safety, ensure a long life, trouble-free operation of auxiliary equipment, minimise power consumption, thereby integrating the standards and rules in force in the country of installation, it is recommended to use specific products suitable for multi-metal heating systems.**

## 3.15 Starting up the boiler

### 3.15.1 Preliminary checks

Before starting the boiler, check that:

- the flue gas venting duct and the relative terminal are installed in conformity with the instructions: when the boiler is working there must be no leakage of combustion by-products from any of the gaskets;
- the supply power to the boiler must be 230 V ~ 50 Hz;
- the heating system is correctly filled with water (pressure gauge reading  $1 \div 1,3$  bar);
- Any shut-off cocks in the system pipes are open.
- the mains gas type is correct for the boiler calibration: convert the boiler to the available gas if necessary (see *Adaptation to other gas types and burner adjustment* on page 46). This operation is to be exclusively carried out by qualified personnel.
- The gas supply cock is open.
- There are no fuel gas leaks.
- The pump has not seized.
- The 3-bar safety valve is not stuck.
- There are no water leaks.
- The pump has not seized.

### 3.15.2 Switching on and switching off

To switch the boiler on and off, refer to the “**Instructions for the User**” (see *Instructions for the user* on page 8).

## 3.16 Available head

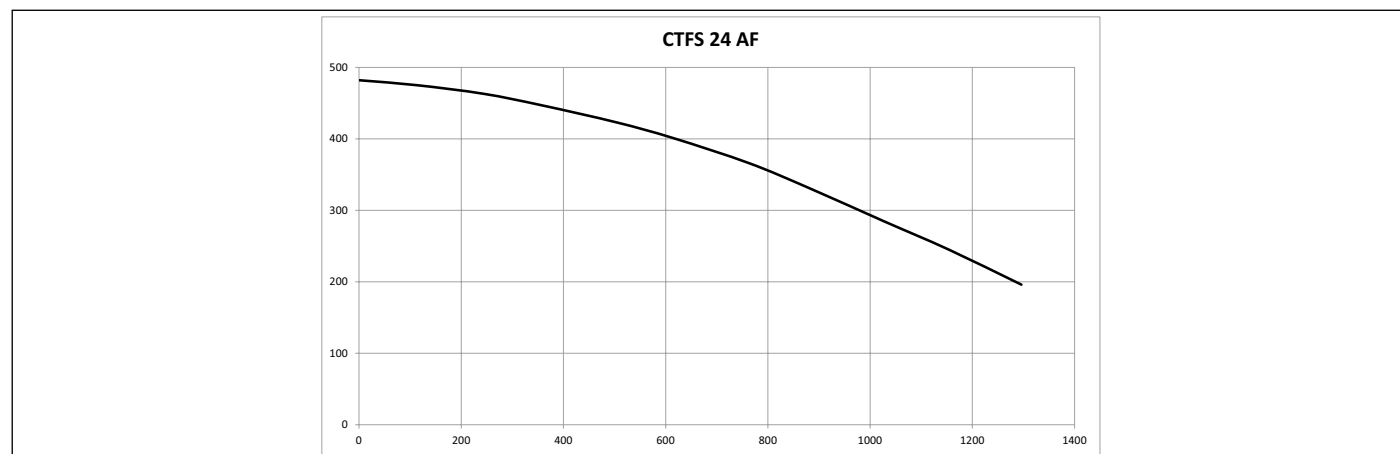


Fig. 18 Available head CTFS 24 AF

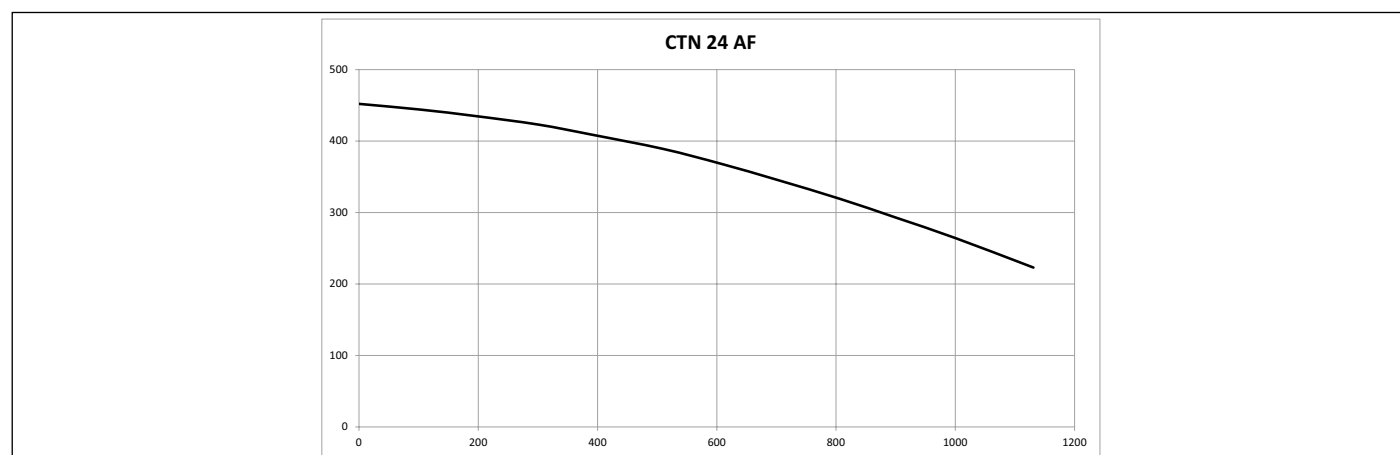


Fig. 19 Available head CTN 24 AF

### 3.17 Wiring diagrams

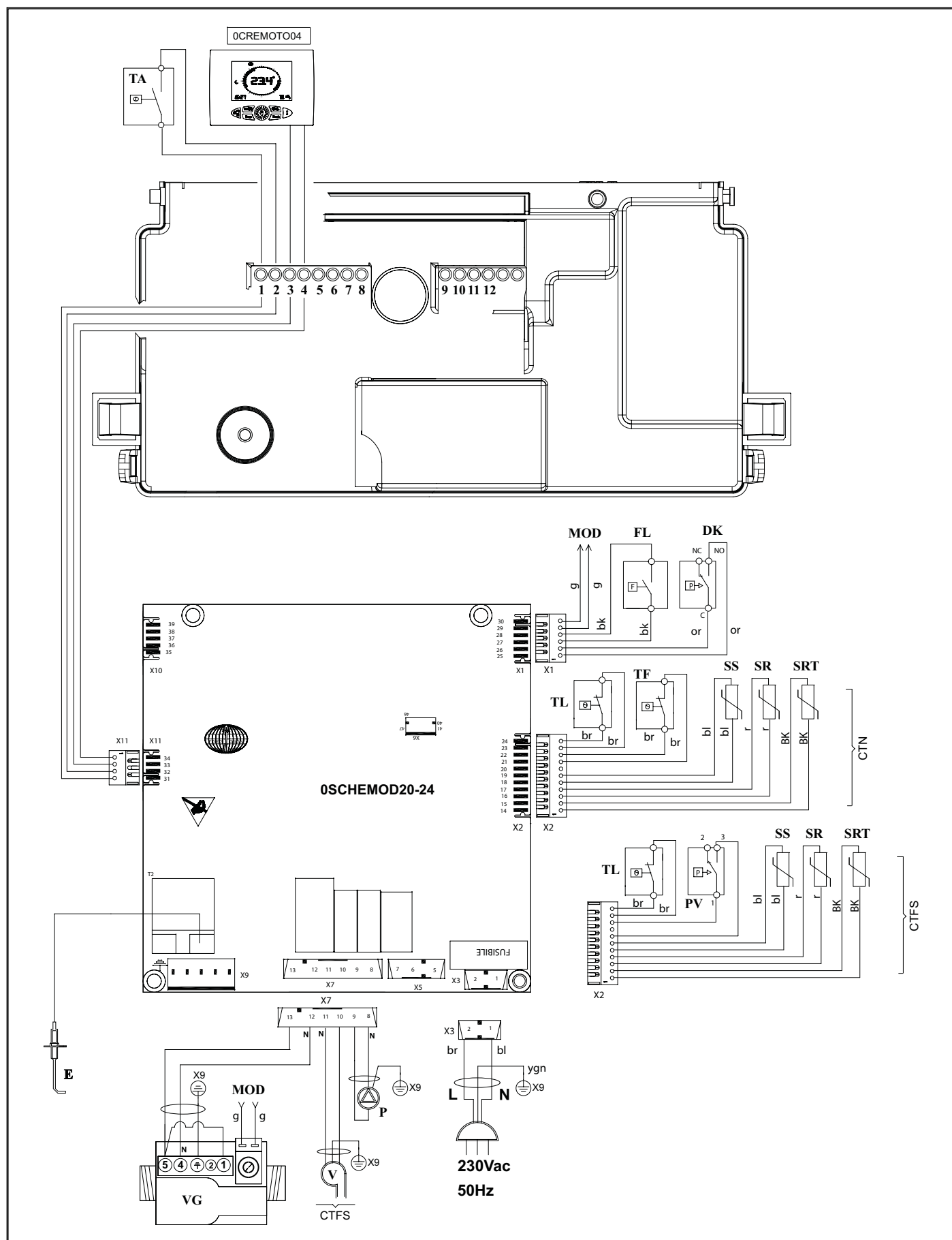


Fig. 20 Wiring diagram

### Internal connections

**DK** : ..... low water pressure switch  
**SR** : ..... CH NTC flow probe 10k Ohm at 25°C B=3435  
**SRT** : ..... DHW NTC return probe 10k Ohm at 25°C B=3435  
**SS** : ..... NTC DHW probe 10k Ohm at 25 °C B=3435  
**FL** : ..... flow switch  
**VG** : ..... gas valve  
**TL** : ..... Limit thermostat.  
**E** : ..... ignition/flame detection electrode  
**P** : ..... Boiler pump  
**V** : ..... asynchronous fan (only CTFS)  
**PV** : ..... Air pressure switch (only CTFS)  
**TF** : ..... flue gas thermostat (only CTN)  
**0SCHEMOD20** : ... PCB  
**0CREMOTO04** : ... OpenTherm Remote Control (optional)  
**TA** : ..... room thermostat (option)

### Connections performed by the installer

**1-2** : ..... room thermostat (TA)  
**3-4** : ..... OpenTherm Remote Control

#### 3.17.1 Relationship between temperature and nominal resistance of all NTC probes

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

Tab. 13 Relationship between "Temperature and Nominal resistance" for temperature probes

### 3.18 Adaptation to other gas types and burner adjustment



#### WARNING

This boiler is built to run on the type of gas specified on the packaging and on the boiler rating plate.

Any later transformation is to be exclusively carried out by qualified personnel, using manufacturer designed accessories and following the procedure and adjustment instructions for an accurate boiler setting-up.

#### 3.18.1 Conversion from METHANE to LPG

- remove the main burner;
- remove nozzles from main burner replacing them by new gas type correct diameter ones;



#### WARNING

The copper gaskets must be installed.

- reinstall the main burner;
- edit the value of parameter **P00** from 0 to 1.



#### 3.18.2 Conversion from LPG to METHANE

- remove the main burner;
- remove nozzles from main burner replacing them by new gas type correct diameter ones;



#### WARNING

The copper gaskets must be installed.

- reinstall the main burner;
- edit the value of parameter **P00** from 1 to 0.



### 3.18.3 Gas valve setting

#### 3.18.3.1 Maximum heating output adjustment

- Check the flow pressure value (see *Operating data* on page 22);
- Remove the plastic cover (A) at the top of the modulation coil, protecting the pressure regulator adjuster screws;
- Connect a pressure gauge to the pressure measurement point **IN** to check the input **OUT** and the output pressure;
- Press the button "+ DHW" until a value of 50°C is shown on the LCD display and open one or two domestic hot water taps to allow the boiler to operate at full power;
- Turn the brass maximum pressure adjuster nut (B) CLOCKWISE to increase the pressure at the nozzles, turn it ANTICLOCKWISE to reduce the pressure at the nozzles;
- For LPG operation, turn nut (B) fully CLOCKWISE.

#### 3.18.3.2 Minimum heating output adjustment

- Disconnect electric wiring of modulation coil (D);
- Switch on the burner and check that the "MINIMUM" pressure value matches the value indicated (see *Operating data* on page 22);
- Adjust pressure as follows: hold brass nut (B) with a 10 mm wrench, then turn plastic screw (C) CLOCKWISE to increase pressure, COUNTER CLOCKWISE to decrease it;
- Re-connect the electrical wiring to modulation coil.

#### 3.18.3.3 Final settings

- turn the boiler on and check its correct operation;
- Measure the minimum and maximum gas valve pressures again.
- Adjust as necessary.
- install protective plastic cap (A);
- Close gas pressure test points.
- Check for gas leaks.

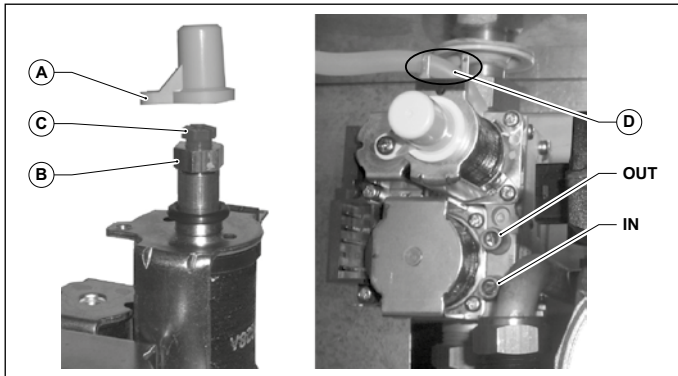


Fig. 21 SIEMENS VGU56

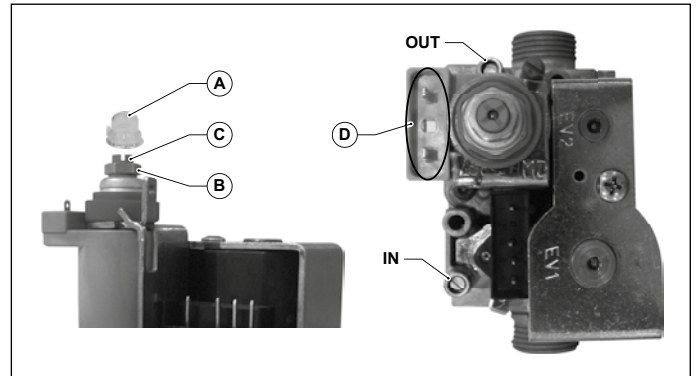


Fig. 22 SIT 845

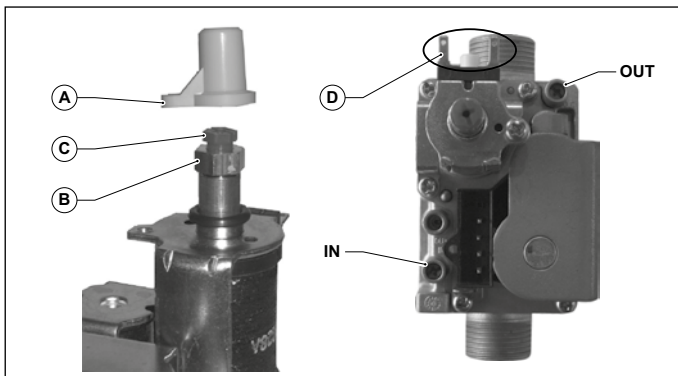


Fig. 23 SIEMENS VGUS56

## 4. Testing the boiler

### 4.1 Preliminary checks

Before testing the boiler, it is recommended to check the following:

- The flue gas venting duct and the relevant terminal are installed in conformity with the instructions: with the boiler operating, there must be no leakage of combustion by-products from any of the gaskets.
- the supply power to the boiler must be 230 V ~ 50 Hz;
- The system is correctly filled with water (pressure gauge reading 1 to 1.3 bar).
- any shut-off cocks in the system pipes are open;
- The mains gas type is correct for the boiler calibration: convert the boiler to the available gas when necessary; this operation must only be performed by qualified technical personnel.
- the gas supply cock is open;
- there are no fuel gas leaks;
- the main switch installed ahead of the boiler is turned on;
- The 3-bar safety valve is not stuck.
- there are no water leaks;
- The pump has not seized.



### **WARNING**

---

**Should the boiler not be installed in compliance with the prevailing laws and standards, notify the system supervisor and do not test the boiler.**

---

### 4.2 Switching on and switching off

To switch the boiler on and off, refer to the "Instructions for the User".



## 5. Maintenance



### WARNING

---

**Any maintenance (and repair) work must only be carried out by qualified personnel.**

---

The user is strongly advised to have the product serviced and repaired by a service centre or qualified personnel. Appropriate boiler maintenance ensures efficient operation, environment preservation, and safety for people, animals and objects.

**The boiler must be serviced at least once every year.**



### WARNING

---

**Disconnect electric power supply before starting any maintenance procedure, involving replacement of components and/or cleaning inside parts of boiler.**

---

### 5.1 Maintenance schedule

Maintenance operations include check and cleaning procedures. In particular:

#### ***Inspections and checks***

- Check general integrity of the boiler.
- Check boiler and network gas supply for leakage.
- Check gas supply pressure to boiler.
- Check minimum and maximum gas pressures to boiler nozzles.
- Check boiler ignition sequence.
- Check the condition and seal integrity of the flue gas venting ducts.
- Check air intake pressure switch operation (TFS).
- Check operation of safety thermostat installed on the draught excluder (TN);
- Check the condition of the draught excluder (TN).
- Check that there is no flue gas return into the room and that the flue gases are vented correctly (TN);
- Check integrity of safety devices of the boiler in general.
- Check for water leaks and oxidised areas on the boiler's couplings.
- Check efficiency of the system safety valve.
- Check expansion vessel filling pressure.
- Check water pressure switch efficiency.

***The following cleaning is to be done***

- Clean the general interior of the boiler.
- Clean the gas nozzles.
- Clean the air intake and flue gas venting circuits (TFS).
- Clean the draught excluder (TN).
- Clean the ventilation grille in the room in which the boiler is installed (TN).
- Clean the heat exchanger.

***When checking the boiler for the very first time, also verify:***

- Boiler room suitability.
- The ventilation apertures in the room in which the boiler is installed (TN).
- Diameter and length of flue gas system ducts.
- Boiler installation in accordance to this "Installation use and maintenance" manual instructions.



**WARNING**

---

**Should the boiler not operate correctly, while not posing danger to people, animals or property, notify the system supervisor both verbally and in writing.**

---

## **5.2 Combustion analysis**

The combustion parameters of the boiler, which have to be checked in order to determine efficiency and emissions, must be measured in compliance with applicable legislation and standards.

## 6. Troubleshooting

### 6.1 Troubleshooting

BOILER STATUS	MALFUNCTION	PROBABLE CAUSE	USER'S TASKS	QUALIFIED PERSONNEL'S TASKS
E01*	Burner does not ignite.	Gas supply failure.	Check gas supply. Check gas supply cock or gas network safety valve intervention.	
		Gas valve is disconnected.	Contact qualified personnel	Reconnect it.
		Gas valve is faulty.	Contact qualified personnel	Replace it.
		The board is faulty.	Contact qualified personnel	Replace it.
	Burner does not ignite: no spark.	Ignition/detection electrode faulty.	Contact qualified personnel	Replace the electrode.
		Electronic board does not ignite. It is faulty.	Contact qualified personnel	Replace electronic board.
	Burner ignites for a few seconds and goes off.	Electronic board does not detect flame: inverted phase and neutral.	Contact qualified personnel	Verify correct neutral and phase connection.
		Ignition/detection electrode wire is interrupted.	Contact qualified personnel	Reconnect or replace wire.
		Ignition/detection electrode faulty.	Contact qualified personnel	Replace the electrode.
		Electronic board does not detect flame: it is faulty.	Contact qualified personnel	Replace electronic board.
		Ignition heat input setting is too low.	Contact qualified personnel	Increase it.
		Minimum heat input is not set correctly.	Contact qualified personnel	Check burner setting.
E02*	The safety thermostat has shut the boiler down.	CH water does not flow in the system: pipes might be clogged, thermostatic valves might have shut, system stopcocks might be closed.	Contact qualified personnel	Check system status.
		Circulation pump is blocked or faulty.	Contact qualified personnel	Check the circulation pump.
E03*	Flue gas pressure switch is not operating (TFS).	Flue gas exhaust pressure switch is faulty	Contact qualified personnel	Check pressure switch: replace it if faulty.
		The silicone pipes are disconnected or damaged.	Contact qualified personnel	Connect or replace silicone pipes
		Air intake or flue gas vent flow is not correct.	Contact qualified personnel	Check air intake/flue gas venting ducts: clean or replace if necessary.
		Fan is faulty.	Contact qualified personnel	Replace it.
	Flue gas pressure switch triggering (CTN)	Poor flue draught.	Contact qualified personnel	Check air intake or flue gas venting system and vent grilles in the boiler room.
		Flue gas thermostat is faulty.	Contact qualified personnel	Replace it.

BOILER STATUS	MALFUNCTION	PROBABLE CAUSE	USER'S TASKS	QUALIFIED PERSONNEL'S TASKS
E04**	CH system water pressure is low.	The system is leaking.	Check system.	
		Water pressure switch is disconnected.	Contact qualified personnel	Reconnect it.
		Water pressure switch is not operating: it is faulty.	Contact qualified personnel	Replace it.
E05**	Flow probe not working.	Flow probe disconnected.	Contact qualified personnel	Reconnect it.
		Flow probe faulty.	Contact qualified personnel	Replace it.
E06**	DHW probe is not working.	DHW probe is disconnected.	Contact qualified personnel	Reconnect it.
		DHW probe faulty.	Contact qualified personnel	Replace it.
E15**	Return probe not working.	Return probe disconnected.	Contact qualified personnel	Reconnect it.
		Return probe is faulty.	Contact qualified personnel	Replace it.
Boiler is not supplying DHW.	DHW flow switch is not working.	System insufficient pressure or flow rate.	Contact qualified personnel	Check DHW system. Check DHW flow switch filter.
		DHW flow switch probe is faulty or disconnected.	Contact qualified personnel	Replace or reconnect it.
		DHW flow switch is blocked.	Contact qualified personnel	Replace it.
E31**	No communication possible with Remote Control.	Connector cable between boiler and remote control disconnected.	Contact qualified personnel	Reconnect it.
		Remote control faulty.	Contact qualified personnel	Replace it.
E76**	Gas valve modulation coil is not working.	Electronic board and gas valve link is electrically disconnected or faulty.	Contact qualified personnel	Check connection to the gas valve.
		Gas valve modulation coil is faulty.	Contact qualified personnel	Replace gas valve modulation coil.
E78**	Flow water temperature gradient is too high.	Circulation pump is blocked.	Contact qualified personnel	Check the circulation pump.
		Cut-off valves (if any) are closed.	Contact qualified personnel	Check system.
E99	The max. number of resets from the Remote Control has been reached.	The user has reached the max. number of resettable values from the Remote Control.	Press RESET button	

# MANUFACTURER'S COMPLIANCE STATEMENT

Gas Directive 2009/142/EC  
Efficiency Requirements Directive 92/42/EC  
Electromagnetic Compatibility Directive 2004/108/EC  
Low Voltage Directive 2006/95/EC

**FONDITAL S.p.A.**  
having its registered office in  
**Via Cerreto 40 - 25079 Vobarno (BS), Italy**

## STATES

that the products

**Delfis CTFS 24 AF, Delfis CTFS 24 AF Esterna, Delfis CTFS 24 AF Incasso,  
Delfis CTFS 24 AFS, Delfis CTFS 24 AFS Esterna, Delfis CTFS 24 AFS Incasso**

are manufactured in conformity

1. With the Type described in the CE-Type Examination Certificate **51CL3998**  
and in the CE-Type Examination Certificate **51CL3999 DR**

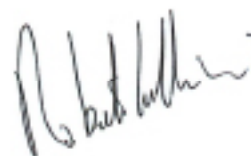
following the provisions of the Directives  
**Gas Directive 2009/142/EC**  
**Efficiency Requirements Directive 92/42/EC**  
which satisfy the essential requisites.

2. With the provisions of the **Electromagnetic Compatibility Directive 2004/108/EC.**
3. With the provisions of the **Low Voltage Directive 2006/95/EC.**

**Fondital S.p.A.**

For management  
Officer i/c Technical Office

Eng. Roberto Cavallini



Vobarno, date of issue or of postal mark

Dichiarazione di conformità caldaie

Delfis Edizione 2 del 31 agosto 2011

# MANUFACTURER'S COMPLIANCE STATEMENT

Gas Directive 2009/142/EC  
Efficiency Requirements Directive 92/42/EC  
Electromagnetic Compatibility Directive 2004/108/EC  
Low Voltage Directive 2006/95/EC

**FONDITAL S.p.A.**  
having its registered office in  
**Via Cerreto 40 - 25079 Vobarno (BS), Italy**

## STATES

that the products

**Delfis CTN 24 AF, Delfis CTN 24 AFS**

are manufactured in conformity

1. With the Type described in the CE-Type Examination Certificate **51CL3996**  
and in the CE-Type Examination Certificate **51CL3997 DR**

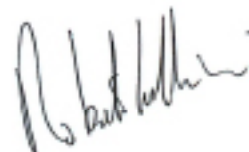
following the provisions of the Directives  
**Gas Directive 2009/142/EC**  
**Efficiency Requirements Directive 92/42/EC**  
which satisfy the essential requisites.

2. With the provisions of the **Electromagnetic Compatibility Directive 2004/108/EC**.
3. With the provisions of the **Low Voltage Directive 2006/95/EC**.

**Fondital S.p.A.**

For management  
Officer i/c Technical Office

Eng. Roberto Cavallini

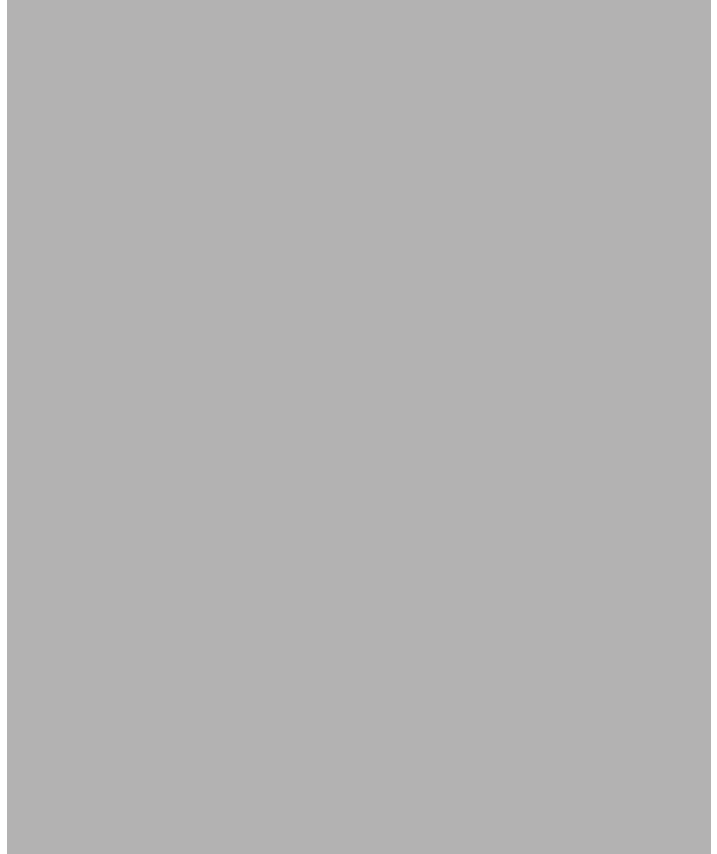


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Delfis CTN Edizione 2 del 31 agosto 2011

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The manufacturer reserves the right to modify his/her  
products as deemed necessary, without altering the basic  
characteristics of the products themselves.

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