

TAHITI DUAL *Line*

GB

High quality
Italian product



**INSTALLATION
USE AND MAINTENANCE**



MADE IN ITALY



Dear Customer,

Thank you for choosing and buying one of our boilers. Please read these instructions carefully in order to install, operate and service the boiler properly.

The Manufacturer recommends that Customers contact authorized qualified personnel only for maintenance and repair operations.

General information for fitters, maintenance technicians and users

This INSTRUCTION MANUAL, which is an integral and indispensable part of the product, must be handed over to the user by the fitter 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.



This boiler is designed for connection to a central heating system (all models) and to a hot domestic water system (models CTN and CTFS only). Any other use is considered incorrect and therefore dangerous.

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

Damage or injury caused by incorrect installation or use, or by failure to follow the manufacturer's instructions will relieve manufacturer of 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 has not been damaged during transport and handling. Do not install equipment which is damaged or faulty.

Do not obstruct the air intake or heat dissipation openings.

Only Manufacturer-approved accessories or optional kits must be installed.

All the packaging materials can be recycled and must be disposed of correctly. They must be sent to a specific waste management site. Keep the packaging out of the reach of children as it may represent a hazard.

In the event of failure or faulty operation, switch off the boiler. Do not attempt to make any repairs and contact a qualified technician.

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

Failures to comply with the above requirements may affect the safety of the boiler and endanger people, animals and property.

The Manufacturer recommends that Customers contact an authorized Service Centre for maintenance and repairs.



Routine boiler maintenance should be performed according to the schedule in the relevant section of this manual. Appropriate boiler maintenance ensures efficient operation, preservation of the environment, and safety for people, animals and property. Incorrect and irregular maintenance can be a source of danger for people, animals and property.

If the boiler is to remain inactive for a long time, disconnect it from the power mains and close the gas tap. Warning! If the boiler is disconnected from the mains, the electronic anti-freeze function will not operate.

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



If you smell gas:

- do not touch any electrical switches and do not turn on electrical appliances;
 - do not ignite flames and extinguish any cigarettes;
 - close the main gas tap;
 - open doors and windows;
 - contact a Service Centre, a qualified fitter or the gas supply company.
- Never use a flame to detect a gas leak.**



WARNING

This boiler has been built for installation in the country indicated on packaging and the rating plate. Installation in a country other than the specified one may be a source of danger for people, animals and property.

The Manufacturer cannot be held contractually or extra-contractually liable in the event of failure to comply with the above.

RAPID OPERATING INSTRUCTIONS



These instructions can be followed for rapid ignition, regulation and immediate use of the boiler, provided it has been installed by an authorized fitter, started up for the first time and set up for correct operation.

If the boiler is equipped with other accessories, these instructions are not sufficient to ensure correct operation.

Reference must be made to the full instructions for the boiler and all mounted accessories.

For a detailed description of how the boiler operates and safety instructions during operation, refer to the instructions shown in this manual.

1. Open the gas shut-off valve upstream of the boiler.
2. Turn on the main electric switch upstream of the boiler: the green mains light on the control panel (1, pic. 1) comes on.



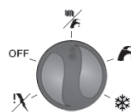
Mains light

3. If you do not want to activate the CH function, turn the selector (9, pic. 1) to SUMMER. Only the DHW function is now active.



Boiler status on SUMMER position

4. If you want to activate the CH function, turn the selector (9, pic. 1) to WINTER. Both the DHW and CH functions are now active.



Boiler status on WINTER position

5. To regulate the DHW temperature, move the DHW regulation knob (10, pic. 1) to the intermediate position (approx. 45°C). Then regulate as required.



DHW temperature regulation knob

6. To regulate the CH temperature, move the CH regulation knob (11, pic. 1) to 3 o'clock (approx. 70°C). Then regulate as required.



CH temperature regulation knob

7. Enter the desired room temperature on the thermostat in the room (if present). The boiler is now ready to operate.

If the boiler shuts down, you can restart it by moving the selector (9, pic. 1) to the RESET position for a few seconds and then to the desired position.



Boiler status on RESET position

CONTENTS

Warning	page	2
General information for fitters, maintenance technician and users	page	3
Rapid operating instructions	page	4
1. Instructions for the user	page	7
1.1 Control panel	page	7
1.2 Operating the boiler	page	8
1.2.1 Switching on	page	8
1.2.2 Operation	page	9
1.2.3 External temperature probe operation (optional)	page	10
1.3 Boiler shut-down	page	11
1.3.1 Burner shut-down	page	11
1.3.2 Shut-down due to overheating	page	11
1.3.3 Shut-down due to incorrect draught (clogging) of the flue system	page	11
1.3.4 Shut-down due to low water pressure	page	11
1.3.5 Shut-down due to temperature probe malfunction	page	11
1.4 Maintenance	page	12
1.5 Notes for the user	page	12
2. Technical characteristics and dimensions	page	12
2.1 Technical characteristics	page	12
2.2 Dimensions	page	14
2.3 Plumbing layout and gas connections	page	16
2.4 Operating data	page	18
2.5 General characteristics	page	19
3. Instructions for the fitter	page	20
3.1 Installation standards	page	20
3.2 Installation	page	20
3.2.1 Packaging	page	20
3.2.2 Deciding where to install the boiler	page	20
3.2.3 Positioning the boiler	page	20
3.2.4 Installing the boiler	page	22
3.2.5 Boiler room ventilation	page	22
3.2.6 Air intake/flue gas system of natural draught boilers	page	22
3.2.7 Air intake/flue gas system of forced draught boilers	page	23
3.2.7.1 Configuration of air/flue system pipes types: B22, C12, C32, C42, C52, C82	page	24
3.2.7.2 Ø 100/60 diameter coaxial pipe air/flue system	page	25
3.2.7.3 Ø 80 mm diameter split pipe air/flue system	page	26
3.2.8 Testing boiler efficiency	page	28
3.2.8.1 "Chimney sweep" function	page	28
3.2.8.2. Checking combustion performance	page	29
3.2.9 Gas mains connection	page	29
3.2.10 Plumbing connections	page	30
3.2.11 Adjustable by-pass	page	30
3.2.12 Power mains connection	page	30
3.2.13 Room thermostat connection (optional)	page	31
3.2.14 <i>Open Therm</i> remote control connection (optional)	page	31
3.2.15 External temperature probe installation (optional) and "sliding temperature" operation	page	31
3.2.16 Installation of the phone operation device (optional)	page	32
3.3 Loading the system	page	32
3.4 Starting the boiler	page	33
3.4.1 Preliminary checks	page	33
3.4.2 Switching on and off	page	33
3.5 Wiring layout	page	34
3.6 Adaptation for use with other gases and burner adjustment	page	35
4. Testing the boiler	page	36
4.1 Preliminary checks	page	36
4.2 Switching on and off	page	36
5. Maintenance	page	36
5.1 Maintenance schedule	page	36
5.2 Analysis of combustion parameters	page	37
6. Troubleshooting	page	38

LIST OF PICTURES

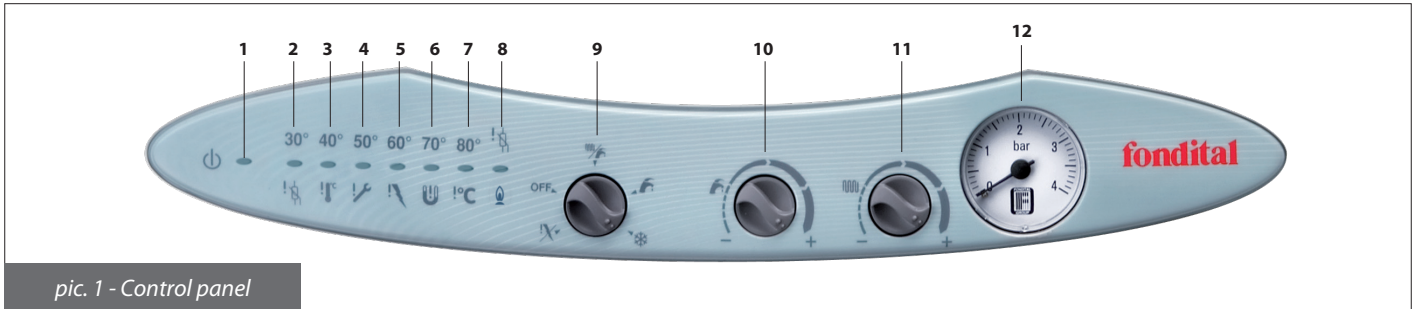
pic. 1 - Control panel	page 7
pic. 2 - Temperature regulation curves	page 10
pic. 3 - Filling tap	page 11
pic. 4 - Dimensions mod. CTN and RTN	page 14
pic. 5 - Dimensions mod. CTFS and RTFS	page 15
pic. 6 - Plumbing diagram for CTN 24	page 16
pic. 7 - Plumbing diagram for CTFS 24/28	page 16
pic. 8 - Plumbing diagram for RTN 24	page 17
pic. 9 - Plumbing diagram for RTFS 24/28	page 17
pic. 10 - Boiler template	page 21
pic. 11 - Connection to the chimney for CTN and RTN	page 23
pic. 12 - Dimensions for connecting to the flue gas pipe for CTN	page 23
pic. 13 - Air intake / flue gas discharge with coaxial ducts (CTFS and RTFS)	page 25
pic. 14 - Dimensions for connecting to the coaxial air intake/flue gas discharge pipe (CTFS and RTFS)	page 25
pic. 15 - Split kit 0SSDOPPIA03 (CTFS 24 and RTFS 24)	page 26
pic. 16 - Split kit 0SSDOPPIA06 (CTFS 28 and RTFS 28)	page 26
pic. 17 - Air intake / flue gas discharge with split ducts (CTFS and RTFS)	page 27
pic. 18 - Dimensions for connecting to the split air intake/flue gas discharge pipes	page 27
pic. 19 - Examples of installation of split air intake / flue gas discharge pipes	page 28
pic. 20 - Examples of installation of split air intake / flue gas discharge pipes	page 28
pic. 21 - Opening the panel	page 28
pic. 22 - "Chimney-sweep" function	page 29
pic. 23 - Examples of combustion efficiency measuring points	page 29
pic. 24 - Gas mains connection	page 29
pic. 25 - Adjustable by-pass	page 30
pic. 26 - Installation of the <i>Open Therm</i> remote control	page 31
pic. 27 - P6 trimmer position – thermoregulation curves	page 32
pic. 28 - Central heating curves in operation with external probe	page 32
pic. 29 - Electric layout	page 34
pic. 30 - Gas conversion – gas selection jumper	page 35
pic. 31 - Gas conversion – gas valve modulation coil	page 35
pic. 32 - Gas conversion – pressure test point	page 35
pic. 33 - Gas conversion – control panel settings	page 35
pic. 34 - Gas conversion – gas valve adjustment	page 35

LIST OF TABLES

No. 1 table - Colour displayed by Light in relation to boiler operation status	page 8
No. 2 table - Colour displayed by Light in relation to boiler malfunction status	page 8
No. 3 table - Calibration data for CTN 24 and RTN 24	page 18
No. 4 table - Calibration data for CTFS 24 and RTFS 24	page 18
No. 5 table - Calibration data for CTFS 28 and RTFS 28	page 18
No. 6 table - General data for each model	page 19
No. 7 table - Combustion data for CTN 24 and RTN 24	page 19
No. 8 table - Combustion data for CTFS 24 and RTFS 24	page 19
No. 9 table - Combustion data for CTFS 28 and RTFS 28	page 19
No. 10 table - Relation between temperature (°C) and nominal resistance (Ohm) of CH probe SR and DHW probe SS	page 34

1. INSTRUCTIONS FOR THE USER

1.1. Control panel



1. Power mains connection light (green)

This light indicates that the power supply to the boiler is on.

2. Indicator light (red)

When this light is on, it means the temperature of the water in the heating system is between 25°C and 35°C.

When this light is flashing, it means the boiler has shut down due to a malfunction.

3. Indicator light (red)

When this light is on, it means the temperature of the water in the heating system is between 36°C and 45°C.

When this light is flashing, it means the boiler's safety thermostat has shut the boiler down.

4. Indicator light (red)

When this light is on, it means the temperature of the water in the heating system is between 46°C and 55°C.

When this light is flashing, it means there is a fault in the exhaust system (CTN and RTN models) or in the air intake and/or flue discharge piping (CTFS and RTFS models).

5. Indicator light (red)

When this light is on, it means the temperature of the water in the heating system is between 56°C and 65°C.

When this light is flashing, it means the burner has shut down.

6. Indicator light (red)

When this light is on, it means the temperature of the water in the heating system is between 66°C and 75°C.

When this light is flashing, it means the water pressure in the boiler is too low.

7. Indicator light (red)

When this light is on, it means the temperature of the water in the heating system is between 76°C and 85°C.

When this light is flashing, it means the CH temperature is above 85°C.

8. Indicator light (yellow)

When this light is on, it means the flame is present on the burner.

When this light is flashing, it means the boiler has shut down due to a malfunction.

9. Boiler mode

When the knob is in the OFF position the boiler is in stand-by mode.

When the knob is in the SUMMER position , the boiler supplies DHW only.

When the knob is in the WINTER position , the boiler supplies both CH and DHW.

When the knob is in the ANTI-FREEZE position , only the boiler anti-freeze function is active.

When the knob is turned to the RESET position and back , the boiler resumes operation.

10. DHW temperature regulator

This knob is used to set the DHW temperature within the range 35 - 57°C.

WARNING

The boiler has a special built-in regulator that limits DHW flow up to 10 litres per minute. In addition to the DHW temperature set on this regulator, the DHW temperature also depends on the amount of water requested by the user and the supply temperature.

11. CH temperature adjustment

This knob is used to set the temperature of the water in the heating system. The setting range is 35 - 78°C.

12. Water pressure gauge

The water pressure gauge indicates the pressure of the water in the heating system.

COLOUR DISPLAY ACCORDING TO BOILER STATUS

Regular Working	LIGHT 1	LIGHT 2	LIGHT 3	LIGHT 4	LIGHT 5	LIGHT 6	LIGHT 7	LIGHT 8
Power connected to boiler	Green	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Burner on	Green	n/a	n/a	n/a	n/a	n/a	n/a	Yellow
CH temperature < 25°C	Green	OFF	OFF	OFF	OFF	OFF	OFF	n/a
26°C < CH temperature < 35°C	Green	Red	OFF	OFF	OFF	OFF	OFF	n/a
36°C < CH temperature < 45°C	Green	OFF	Red	OFF	OFF	OFF	OFF	n/a
46°C < CH temperature < 55°C	Green	OFF	OFF	Red	OFF	OFF	OFF	n/a
56°C < CH temperature < 65°C	Green	OFF	OFF	OFF	Red	OFF	OFF	n/a
66°C < CH temperature < 75°C	Green	OFF	OFF	OFF	OFF	Red	OFF	n/a
76°C < CH temperature < 85°C	Green	OFF	OFF	OFF	OFF	OFF	Red	n/a

No. 1 table – Colour displayed by Light in relation to boiler operation status

Malfunction	LIGHT 1	LIGHT 2	LIGHT 3	LIGHT 4	LIGHT 5	LIGHT 6	LIGHT 7	LIGHT 8
Power is missing	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Safety thermostat shutdown	Green	OFF	Red L	OFF	OFF	OFF	OFF	OFF
Flue gas thermostat shutdown (CTN) Air/flue gas pressure switch shutdown (CTFS)	Green	OFF	OFF	Red L	OFF	OFF	OFF	OFF
Shutdown due to flame absence	Green	OFF	OFF	OFF	Red L	OFF	OFF	OFF
Water pressure switch shutdown	Green	OFF	OFF	OFF	OFF	Red L	OFF	OFF
Gas valve alarm	Green	OFF	Red L	OFF	OFF	OFF	OFF	Yellow L
Water temperature switch alarm (>85 °C)	Green	OFF	OFF	OFF	OFF	OFF	Red L	OFF
DHW flow probe alarm	Green	Red L	OFF	OFF	OFF	OFF	OFF	OFF
CH flow probe alarm	Green	Red L	OFF	OFF	OFF	OFF	OFF	Yellow L
External cylinder probe alarm	Green	Red LA	OFF	OFF	OFF	OFF	OFF	Yellow LA
Remote control malfunction	Green	OFF	OFF	Red L	OFF	OFF	OFF	Yellow L

No. 2 table – Colour displayed by Light in relation to boiler malfunction status

KEY TO ACRONYMS

OFF	LIGHT off
RED	LIGHT on, displaying the colour shown on the table
L RED	LIGHT or lights flashing, displaying the colour shown on the table
LA RED	LIGHTS flashing, displaying in sequence the colours shown on the table
n/a	LIGHT status not relevant

1.2. Operating the boiler

1.2.1. Switching on



These instructions presuppose that the boiler has been installed by an authorized fitter, started up for the first time and set up for correct operation.

- Open the gas stop cock.
- Connect the boiler to the mains power supply (LIGHT 1 on the control panel comes on).
- Choose boiler mode by operating the “OFF/SUMMER/WINTER/ANTI-FREEZE” selector (9).
- Turn the CH temperature adjustment knob (11) to set the temperature required for the heating system.
- Turn the DHW temperature knob (10) to set the temperature required for the DHW (CTN, CTFS).
- Set the room temperature on the thermostat, if there is one.

WARNING: If the boiler is not used for a long time, particularly if it runs on LPG, ignition may be difficult.

Before operating the boiler, switch on another gas-powered device (e.g. kitchen range or oven). Be aware that even if this procedure is followed, the boiler may still experience some starting difficulties and shut down once or twice.

Reset the boiler by operating knob X (9), then turn the knob back to the required position.

1.2.2. Operation

CENTRAL HEATING

Use the regulation knob (**11**, pic. 1) to set the temperature in the central heating system.

The temperature setting range is 35-78°C (from the counter-clockwise limit position to the time limit position).

The CH temperature can be read from lights 2÷7 (pic. 1) on the control panel.

To prevent frequent ignition and switching off in heating mode, the boiler has a 4-minute waiting time between subsequent ignitions. If the water temperature in the system fall below 40°C, waiting procedure is aborted and the boiler re-ignites (*Antifast* function).

DHW

The domestic hot water supply function is active on models CTN and CTFS, and on models RTN and RTFS with an (optional) external water heater. This function always has priority over central heating water.

For models CTN and CTFS, the temperature setting range is 35-57°C (from the counter-clockwise limit position to the time limit of regulation knob **10**).

For models RTN and RTFS with an (optional) external water heater with an NTC probe (10 kΩ @ β=3435; refer to the water heater specifications), the temperature setting range is 35-57°C (from the counter-clockwise limit position to the time limit of regulation knob **10**).

For models RTN and RTFS with an (optional) external water heater with thermostat probe, the desired HDW temperature must be set on the water heater (refer to the attached instructions). Regulation knob **10** has no effect on this configuration.

The boiler is fitted with a flow-limiting device that allows a maximum DHW flow of 10 litres per minute.

The DHW flow rate depends on the boiler's thermal capacity and the mains water supply temperature, and can be calculated from the following formula:

$$I = \text{DHW litres per min.} = \frac{K}{\Delta T}$$

K represents:

- 334 (CTN 24)

- 341 (CTFS 24)

- 410 (CTFS 28)

ΔT = DHW temperature – mains water supply temperature

E.g. In model CTFS 24, if the mains water supply temperature is 8°C and DHW is required at 38°C, the value of ΔT is:

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

and DHW litres (l per minute) available at the required temperature of 38°C is

$$I = 341 / 30 = 11.4 \text{ [litres per minute - mixed water to the tap]}$$

ANTI-FREEZE

This boiler is fitted with an anti-freeze protection system, which works when the following functions are activated: SUMMER, WINTER and ANTI-FREEZE.



The anti-freeze function only protects the boiler, not the whole heating system.

The heating system must be protected using a room thermostat, although this is disabled when the selector is set to the ANTI-FREEZE or OFF mode.

Therefore, if you want to protect both the boiler and the system, turn to WINTER mode  on selector 9.

When the heating water temperature sensor detects a water temperature of 5°C, the boiler switches on and stays on at its minimum thermal power until the temperature reaches 30°C or 15 minutes have elapsed. The pump continues to operate even if the boiler shuts down.

In models CTN and CTFS, anti-freeze function also protects the DHW circuit.

When the DHW temperature sensor detects a temperature of 5°C, the boiler switches on and stays on at its minimum thermal power until the temperature reaches 10°C or 15 minutes have elapsed (the deviating valve is in the DHW position). The pump continues to operate even if the boiler shuts down.

In boilers with an external heater for the supply of domestic hot water, which have a thermostat-type temperature sensor, the anti-freeze function does NOT protect the water heater. It can be protected by setting the boiler to Summer  or Winter  , or by setting a value above 0°C on the water heater thermostat.

In CH boilers with an external water heater for the supply of domestic hot water, which have an NTC temperature sensor (10 kΩ @ β=3435; refer to the boiler specifications), the anti-freeze function protects the water heater as well.

When the external cylinder temperature sensor detects a water temperature of 5°C, the boiler switches on and stays on at its minimum thermal power until the temperature of the water in the external cylinder reaches 10°C or 15 minutes have elapsed. The pump continues to operate even if the boiler shuts down.

The CH system can be protected effectively against freezing by means of specific anti-freeze additives suitable for use in multi-metal systems.

Do not use car engine anti-freeze products, and periodically check the effectiveness of the anti-freeze product.

PUMP ANTI-BLOCKING FUNCTION AND DEVIATING VALVE

If the boiler remains inactive for long time and

- knob **9** is not on OFF,
 - the boiler is not electrically disconnected from the mains,
- the circulation pump (for all models) and the deviating valve (for models CTN and CTFS only) are automatically activated for a while every 24 hours to prevent them from blocking.

1.2.3. External temperature probe operation (optional)

The boiler can be equipped with an (optional) external temperature probe, by means of which the boiler adjusts the CH water temperature according to the outdoor temperature, in other words, increasing the CH water temperature when the outdoor temperature decreases, and vice-versa. This increases energy-saving operation (this boiler mode is called “sliding temperature operation”).

The boiler microprocessor program determines CH water temperature variations.

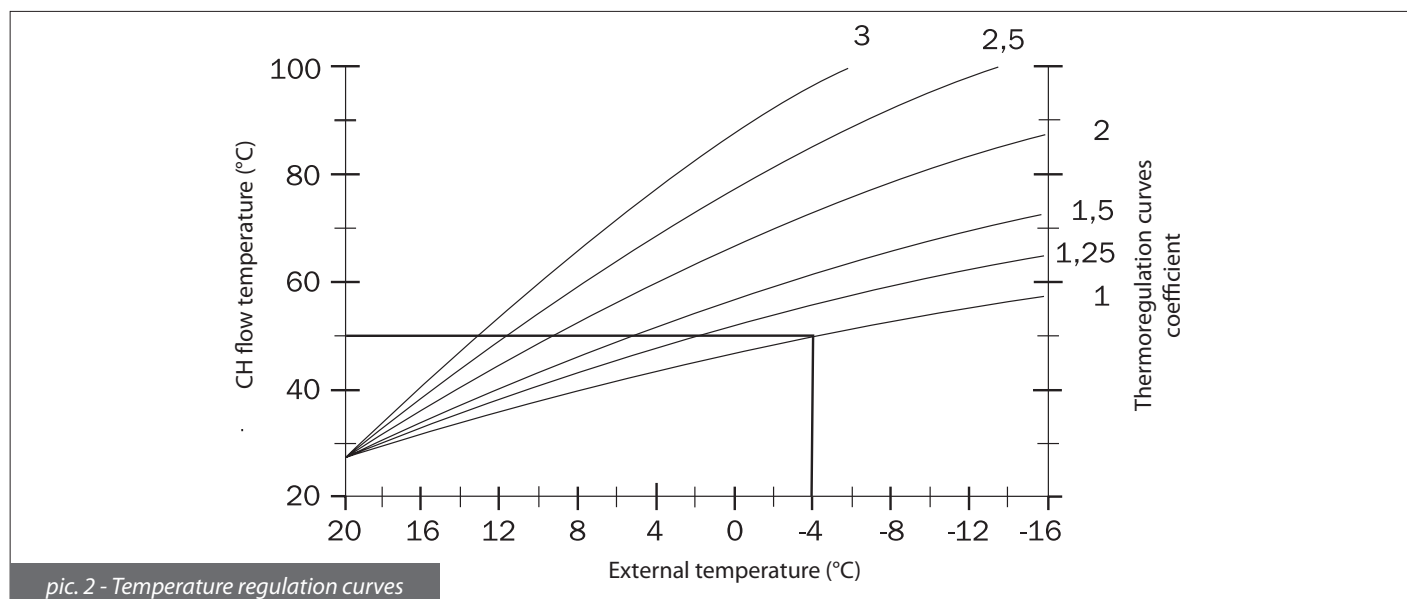
When an external temperature probe is connected to the boiler, the CH water temperature adjusting knob (**11**, pic. 1) loses its function and becomes a room temperature control device.

When knob **11** is turned fully counter-clockwise, the room temperature setting is 15°C; when set to 9 o'clock, the temperature is 18°C; when set to 12 o'clock, the temperature is 25°C; when set to 3 o'clock the temperature is 32°C; when it is turned fully clockwise the temperature is 35°C.

For the best curve setting, it is advisable to set the temperature at around 20°C.

Picture 2 shows the curves for a room temperature of 20°C. As this value is increased via the regulation knob **11**, the curves move upwards. With this setting, if for example you select the curve corresponding to coefficient 1, with an outdoor temperature of -4°C, the flow temperature will be 50°C.

Refer to subsection 3.2.15 for detailed sliding temperature operation.



1.3. Boiler shut-down

If a malfunction occurs, the boiler automatically shuts down.

Refer to tables 1 and 2 for boiler status.

In order to determine the probable causes of the malfunction, refer to section 6 - Troubleshooting - at the end of this manual (in addition to tables 1 and 2).

Follow the procedure described for the type of shut-down.

1.3.1. Burner shut-down

When the burner shuts down because the flame has gone out, light 5 (red) starts flashing. If this happens, proceed as follows.

- Check that the gas stopcock is open, and make sure the gas main is actually providing service by lighting a gas-powered kitchen appliance such as a kitchen range or oven.
- Once the presence of gas has been verified, reset the burner by turning knob 9  to the RESET position for 2 seconds, and then to the desired operating mode. If the boiler does not shut down, and you have performed the reset procedures three times, contact an authorized Service Centre or a qualified service engineer.

Should frequent burner shut-down occur, a recurrent malfunction may be present. Contact an authorized Service Centre or a qualified service engineer.

1.3.2. Shut-down due to overheating

When the CH water gets too hot, the boiler shuts down, and light 3 (red) starts flashing.

If this happens, contact an authorized Service Centre or a qualified service engineer.

1.3.3. Shut-down due to incorrect draught (clogging) of the flue system

If the burner shuts down due to a malfunction of the flue system (models CTN and RTN) or the air intake and/or flue discharge piping (models CTFS or RTFS), light 4 starts to flash. If this happens, contact a Service Centre or a qualified service engineer.

1.3.4. Shut-down due to low water pressure

If red shut-down light 6 comes on, it indicates low water pressure and intervention of the low water pressure switch.

Fill the boiler by opening tap A (pic. 3): the water pressure must be 1÷1.3 bar when the boiler is cold.

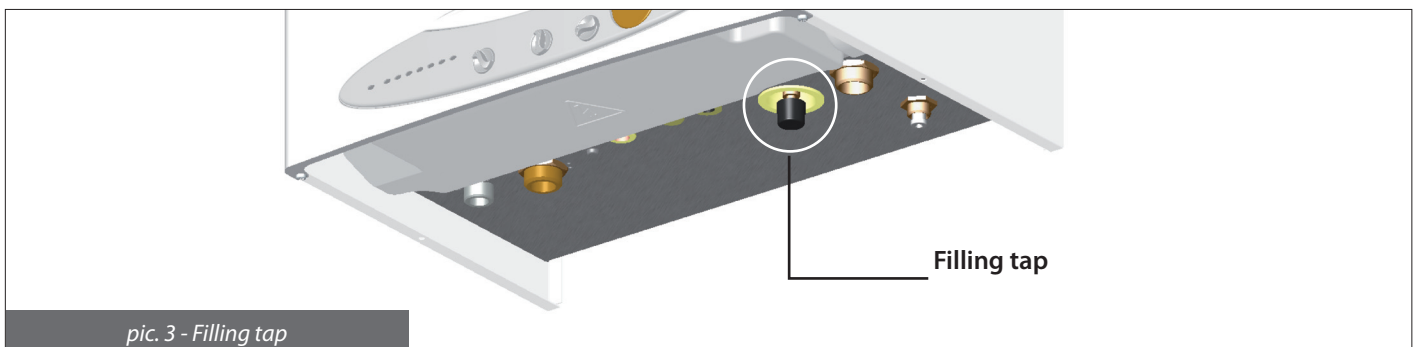
In the event of low water pressure shut-down, proceed as follows:

- Turn the filling tap (pic. 3) counter-clockwise in order to let the water in.
- Leave the tap on until the water pressure gauge reads 1÷1.3 bar.
- Turn the tap off clockwise.
- Reset the burner by turning knob 9  to the RESET position for 2 seconds, and then to the desired operating mode.

If boiler shuts down frequently, it means the boiler is malfunctioning. Contact an authorized Service Centre or a qualified service engineer.



Once the loading procedure has been completed, turn of the filling tap properly. If this isn't done, the boiler CH safety valve may open and water will flow out as the pressure increases.



pic. 3 - Filling tap

1.3.5. Shut-down due to temperature probe malfunction

If the burner shuts down due to temperature probe malfunction, the following lights start to flash:

- Red light no. 2 and yellow light no. 8 when CH probe malfunction occurs.
- Red light no. 2 when DHW probe malfunction occurs.
- Red light no. 2 and yellow light no. 8 (flashing alternately) for external cylinder probe (models RTN and RTFS with external boiler and NTC temperature probe).

If this happens, contact a Service Centre or a qualified service engineer.

1.4. Maintenance

Routine boiler maintenance must be provided according to the applicable laws in the country of installation and following the instructions given in the relevant section in this manual. Correct maintenance ensures that the boiler operates efficiently, is environmentally friendly, and is not a danger to people, animals or property.

By law, only qualified personnel are allowed to service the boiler.

The Manufacturer recommends that Customers contact an authorized Service Centre for maintenance and repairs.

For maintenance interventions, refer to section 5 – Maintenance.

The external boiler housing must only be cleaned with standard household cleaning products.

Do not use water!

1.5. Notes for the user

The user may only access boiler parts that can be reached without using any technical equipment or tools. The user is not authorized to remove the boiler housing or touch any of the internal parts.

No one, including qualified service engineers, is authorized to modify the boiler.

The manufacturer can not be held liable for damage to people, animals, or property due to tampering or improper work done to the boiler.

If the boiler remains inactive and the power supply disconnected for a long time, the pump may not operate.

Pump servicing includes removing the boiler housing and accessing the internal parts of the boiler, so this must only be done by a qualified service engineer.

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

2. TECHNICAL CHARACTERISTICS AND DIMENSIONS

2.1. Technical characteristics

The boiler is equipped with an atmospheric burner. All versions are equipped with electronic ignition and ionization flame control.

The following models of boiler are available:

- **CTN 24:** open chamber and natural draught, electronic ignition and instant DHW supply (23.31 kW)
- **RTN 24:** open chamber and natural draught, electronic ignition, CH supply only (23.31 kW)
- **CTFS 24:** sealed chamber and forced draught, electronic ignition and instant DHW supply (23.77 kW)
- **RTFS 24:** sealed chamber and forced draught, electronic ignition, CH supply only (23.77 kW)
- **CTFS 28:** sealed chamber and forced draught, electronic ignition and instant DHW supply (28.6 kW)
- **RTFS 28:** sealed chamber and forced draught, electronic ignition, CH supply only (28.6 kW)

All models comply with the Directives issued in the country of destination indicated in the rating plate.

Installation in a country other than the specified one may be a source of danger for people, animals and property.

The main technical characteristics of the boiler are listed below:

Construction characteristics

- IPX4D electrically protected control panel
- Modulating electronic safety board
- Electronic ignition with external separate transformer and ionization flame detection
- Stainless steel multi-gas atmospheric burner
- Modulating gas valve with double shutter
- Mono-thermal, high performance, copper heat exchanger
- Stainless steel DHW heat exchanger (models CTN and CTFS)
- Motorized deviating valve (models CTN and CTFS)
- Three-speed circulation pump, equipped with a de-aerator
- Low water safety pressure switch
- 8-litre expansion vessel
- DHW priority flow switch (models CTN and CTFS)
- 10 litres/min DHW flow limiting device (models CTN and CTFS)
- Adjustable by-pass
- Boiler filling and draining taps
- CH (all models) and DHW (models CTN and CTFS) temperature probes
- Safety limit thermostat
- Flue thermostat (models TN)
- Flue pressure switch (models TFS)

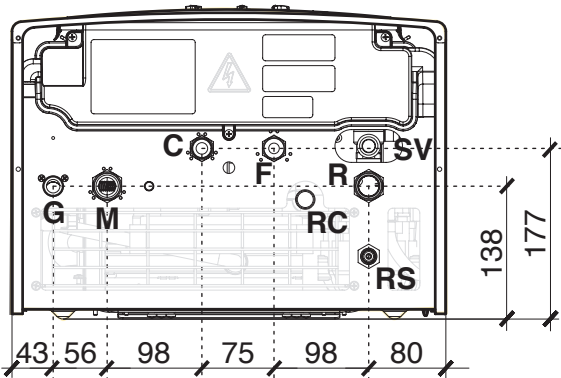
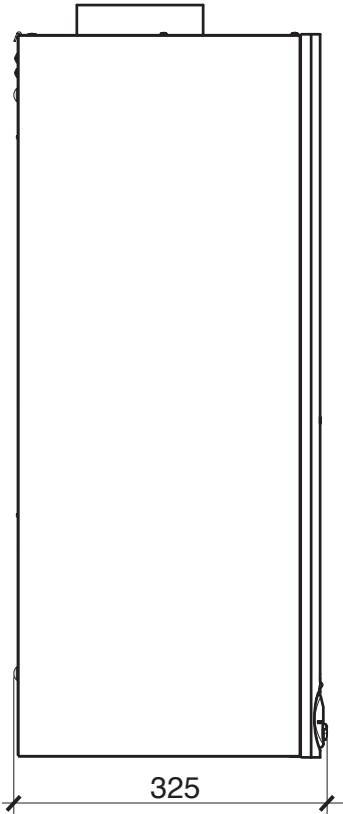
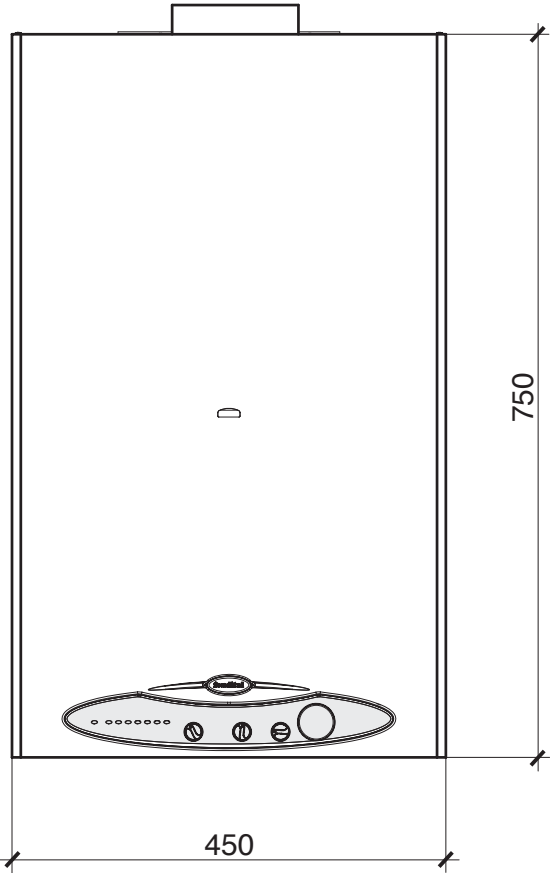
User interface

- RESET, STAND-BY, SUMMER/WINTER, SUMMER and ANTI-FREEZE function selector
- CH temperature switch (35 - 78°C)
- DHW temperature switch for models C and R equipped with external cylinder and NTC temperature probe (35 - 57°C)
- Leds indicating water temperature
- Water pressure gauge
- Lights indicating:
 - Mains power connection
 - Flame presence
 - Burner shut-down
 - Burner shut-down due to overheating
 - Burner shut-down due to incorrect flue draught (models TN)
 - Burner shut-down due to flue pressure switch intervention (models TFS)
 - Low water pressure
 - CH or DHW temperature probe fault
 - Remote control connection fault

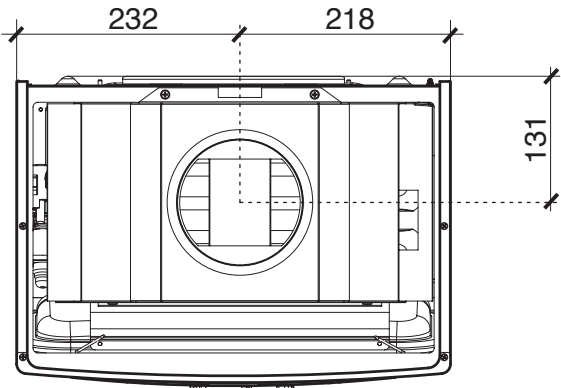
Operating characteristics

- CH mode electronic flame modulation, timer-controlled flame rising ramp (50 seconds)
- DHW mode electronic flame modulation, timer-controlled flame rising ramp (for models C and R equipped with external cylinder and NTC temperature probe)
- DHW priority function
- CH flow anti-freeze function (ON: 5°C, OFF: 30°C or after 15 min. operation)
- DHW flow anti-freeze function (ON: 5°C, OFF: 10°C or after 15 min. operation; for models C and R equipped with external cylinder and NTC temperature probe)
- External boiler anti-freeze function (ON: 5°C, OFF: 10°C or after 15 min. operation; only for model R equipped with external cylinder and NTC temperature probe)
- "Anti-Legionnaires' disease" function (only for model R equipped with external cylinder and NTC temperature probe)
- Timer-controlled "chimney sweep" function (15 minutes)
- Flame propagation function during ignition
- CH max heat output adjusting trimmer
- Ignition heat output adjusting trimmer
- Timer-controlled room thermostat (240 seconds when CH flow temperature > 40°C)
- Pump post-circulation function in CH, anti-freeze or chimney sweep mode (180 seconds)
- Pump post-circulation function in DHW (30 seconds)
- CH temperature post-circulation function: > 85°C: 30 seconds
- Safety post-circulation function (ON: 95°C; OFF: 90°C – models TFS)
- Pump and deviating valve anti-locking function (180 seconds operation after 24 hours of boiler inactivity)
- Can be connected to a room thermostat (optional)
- Can be connected to an external temperature probe (optional supplied by the Manufacturer)
- Can be connected to an *Open Therm* remote control (optional supplied by the Manufacturer)
- Can be connected to a cylinder timer connection (only for model R equipped with external cylinder and NTC temperature probe)

CTN and RTN models



bottom view

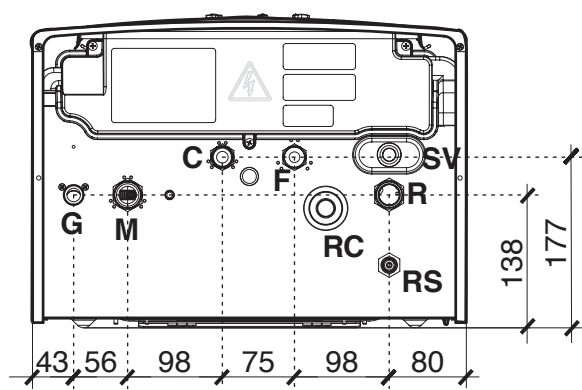
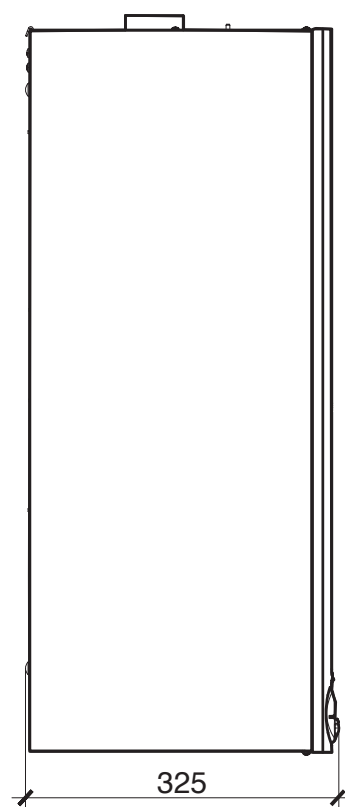
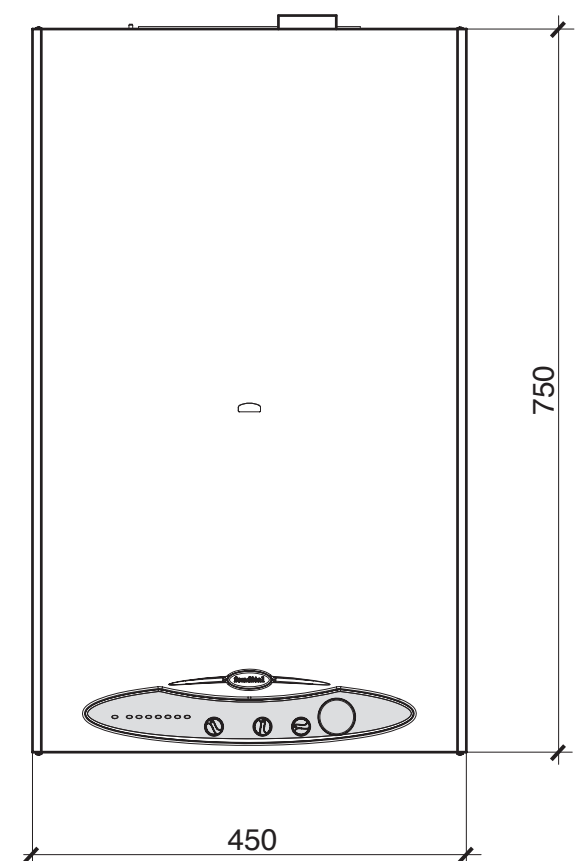


top view

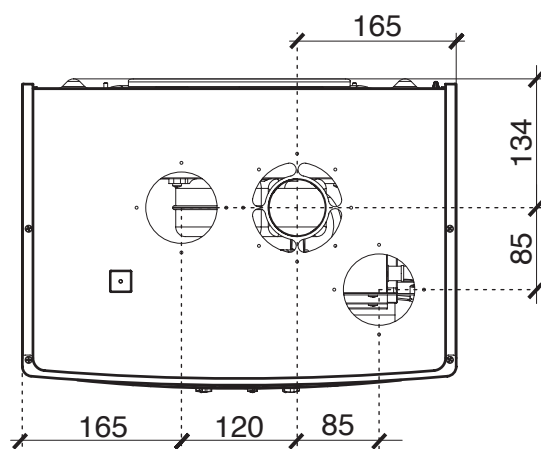
- | | |
|----|---------------------------------|
| G | Gas intake |
| M | CH flow |
| C | DHW flow (CTN only) |
| F | Mains water intake |
| R | CH return |
| RC | Filling tap |
| RS | Discharge tap |
| SV | 3bar safety valve discharge tap |

pic. 4 - Dimensions mod. CTN and RTN

CTFS and RTFS models



bottom view

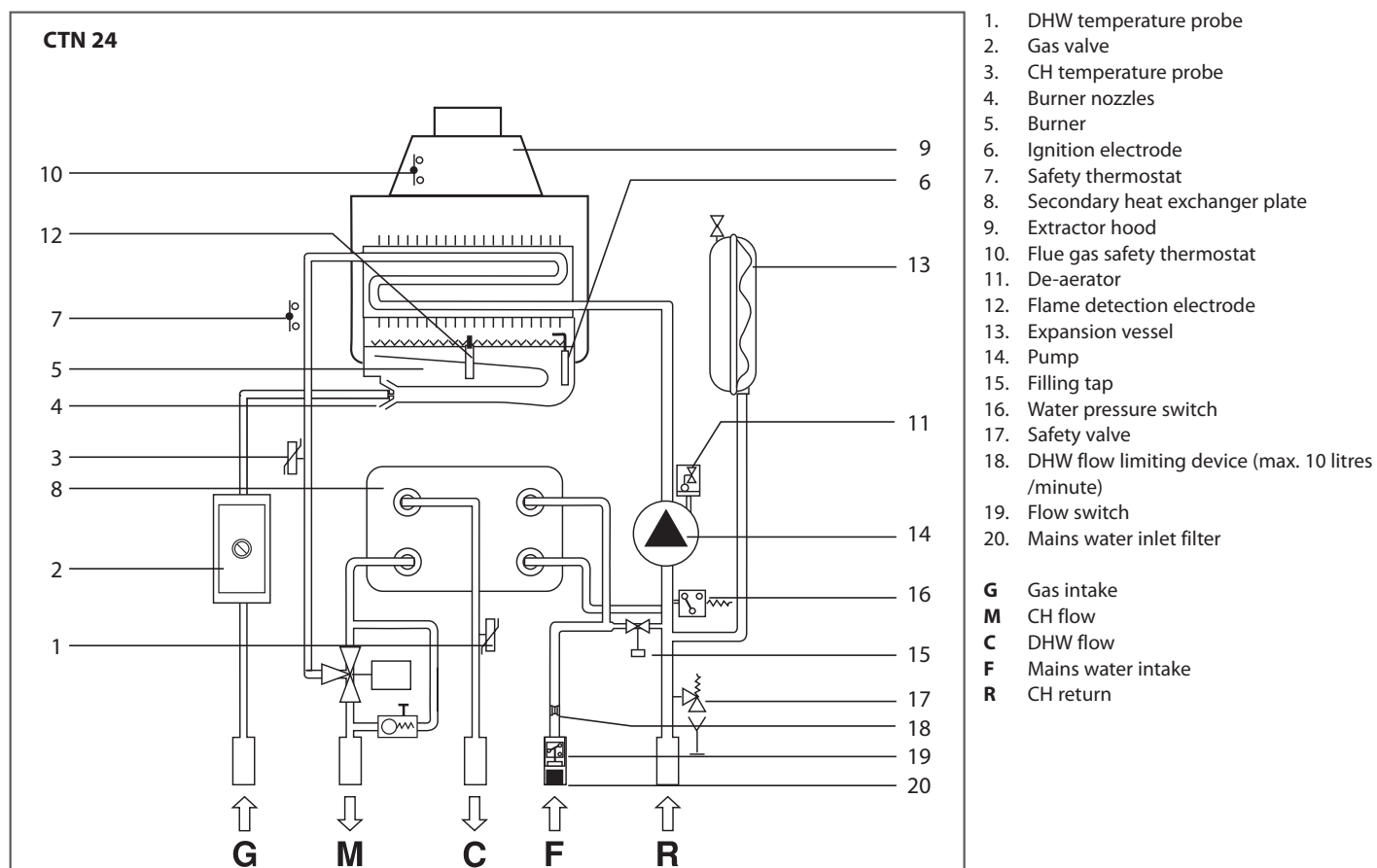


top view

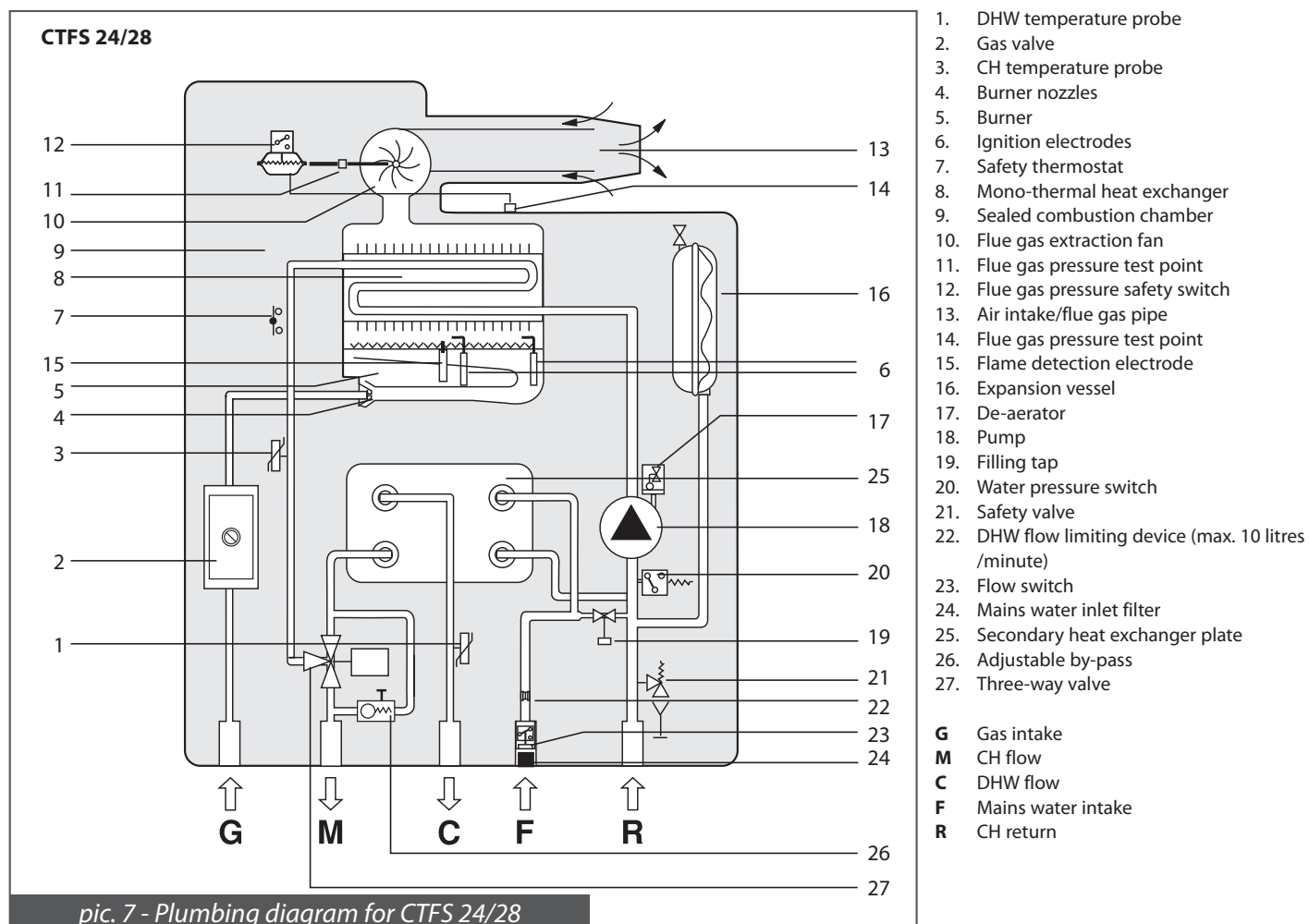
- | | |
|----|---------------------------------|
| G | Gas intake |
| M | CH flow |
| C | DHW flow (CTFS only) |
| F | Mains water intake |
| R | CH return |
| RC | Filling tap |
| RS | Discharge tap |
| SV | 3bar safety valve discharge tap |

pic. 5 - Dimensions mod. CTFS and RTFS

2.3. Plumbing layout and gas connections

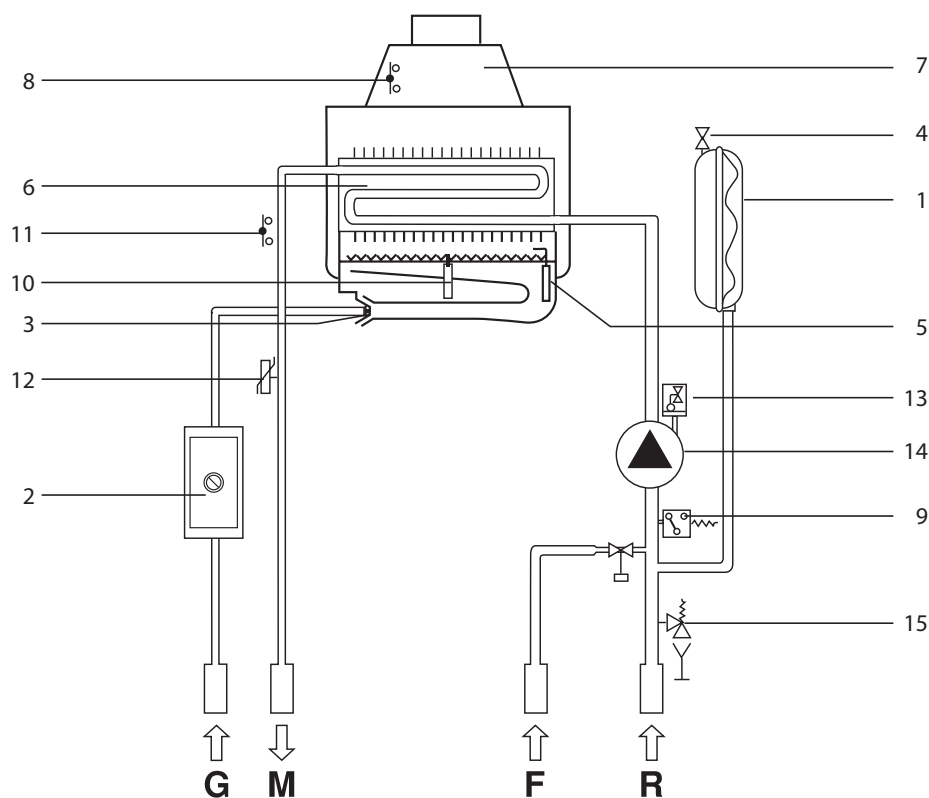


pic. 6 - Plumbing diagram for CTN 24



pic. 7 - Plumbing diagram for CTFS 24/28

RTN 24

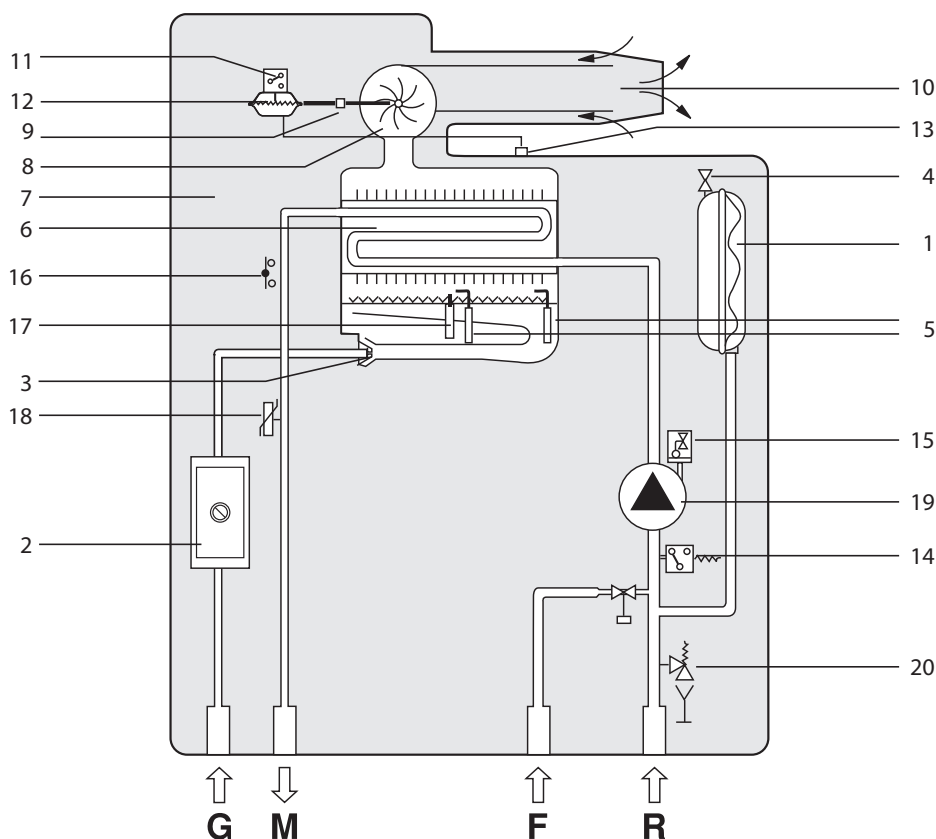


1. Expansion vessel
2. Gas valve
3. Burner nozzles
4. Expansion vessel filling tap
5. Ignition electrode
6. Heat exchanger
7. Extractor hood
8. Flue gas safety thermostat
9. Water pressure switch
10. Flame detection electrode
11. Safety thermostat
12. CH temperature probe
13. De-aerator
14. Pump
15. CH safety valve

G Gas intake
M CH flow
F Mains water intake
R CH return

pic. 8 - Plumbing diagram for RTN 24

RTFS 24/28



1. Expansion vessel
2. Gas valve
3. Burner nozzles
4. Expansion vessel filling tap
5. Ignition electrode
6. Heat exchanger
7. Sealed combustion chamber
8. Flue gas extraction fan
9. Flue gas pressure test point
10. Air intake/flue gas pipe
11. Flue gas pressure micro-switch
12. Flue gas pressure safety switch
13. Flue gas pressure test point
14. Water pressure switch
15. De-aerator
16. Safety thermostat
17. Flame detection electrode
18. CH temperature probe
19. Pump
20. CH safety valve

G Gas intake
M CH flow
F Mains water intake
R CH return

pic. 9 - Plumbing diagram for RTFS 24/28

2.4. Operating data

Burner pressures must be checked after the boiler has been operating for three minutes.

CTN 24 - RTN 24							
Gas type	Max. heat input	Max. heat output	Min. heat output	Mains gas pressure	Nozzle diameter	Burner pressure	
	(kW)	(kW)	(kW)	(mbar)	(mm)	(mbar)	
						min	max
Natural gas G 20	25.7	23.31	9.85	20	1.25	2.5	13.0
Butane gas G 30	25.7	23.31	9.85	29	0.77	5.3	27.0
Propane gas G 31	25.7	23.31	9.85	37	0.77	6.6	35.5

No. 3 table - Calibration data for CTN 24 and RTN 24

Hot water supply $\Delta T 45^{\circ}\text{C} = 7.4 \text{ l/min}$

Hot water supply $\Delta T 40^{\circ}\text{C} = 8.4 \text{ l/min}$

Hot water supply $\Delta T 35^{\circ}\text{C} = 9.6 \text{ l/min}$

Hot water supply $\Delta T 30^{\circ}\text{C} = 11.1 \text{ l/min} *$

Hot water supply $\Delta T 25^{\circ}\text{C} = 13.4 \text{ l/min} *$

***mixed water to the tap**

CTFS 24 - RTFS 24							
Gas type	Max. heat input	Max. heat output	Min. heat output	Mains gas pressure	Nozzle diameter	Burner pressure	
	(kW)	(kW)	(kW)	(mbar)	(mm)	(mbar)	
						min	max
Natural gas G 20	25.5	23.77	9.9	20	1.25	2.5	13.5
Butane gas G 30	25.5	23.77	9.9	29	0.77	5.3	27
Propane gas G 31	25.5	23.77	9.9	37	0.77	6.6	35.5

No. 4 table - Calibration data for CTFS 24 and RTFS 24

Hot water supply $\Delta T 45^{\circ}\text{C} = 7.6 \text{ l/min}$

Hot water supply $\Delta T 40^{\circ}\text{C} = 8.5 \text{ l/min}$

Hot water supply $\Delta T 35^{\circ}\text{C} = 9.7 \text{ l/min}$

Hot water supply $\Delta T 30^{\circ}\text{C} = 11.4 \text{ l/min} *$

Hot water supply $\Delta T 25^{\circ}\text{C} = 13.6 \text{ l/min} *$

***mixed water to the tap**

CTFS 28 - RTFS 28							
Gas type	Max. heat input	Max. heat output	Min. heat output	Mains gas pressure	Nozzle diameter	Burner pressure	
	(kW)	(kW)	(kW)	(mbar)	(mm)	(mbar)	
						min	max
Natural gas G 20	30.5	28.6	12.3	20	1.35	2.6	12.0
Butane gas G 30	30.5	28.6	12.3	29	0.80	4.7	28.9
Propane gas G 31	30.5	28.6	12.3	37	0.80	6	33.4

No. 5 table - Calibration data for CTFS 28 and RTFS 28

Hot water supply $\Delta T 45^{\circ}\text{C} = 9.1 \text{ l/min}$

Hot water supply $\Delta T 40^{\circ}\text{C} = 10.2 \text{ l/min} *$

Hot water supply $\Delta T 35^{\circ}\text{C} = 11.7 \text{ l/min} *$

Hot water supply $\Delta T 30^{\circ}\text{C} = 13.7 \text{ l/min} *$

Hot water supply $\Delta T 25^{\circ}\text{C} = 16.4 \text{ l/min} *$

***mixed water to the tap**

2.5. General characteristics

		CTN 24	RTN 24	CTFS 24	RTFS 24	CTFS 28	RTFS 28
Category	-	II2H3+		II2H3+		II2H3+	
Burner nozzles	no.	12		12		13	
Minimum CH flow rate	l/h	550		550		670	
Minimum CH pressure	bar	0.5		0.5		0.5	
Maximum CH pressure	bar	3		3		3	
Minimum DHW pressure	bar	0.3	-	0.3	-	0.3	-
Maximum DHW pressure	bar	8	-	8	-	8	-
DHW specific capacity (Δt 30 °C)	l/min	11.1	-	11.4	-	13.7	-
Electrical power supply – voltage / frequency	V ~ Hz	230 ~ 50		230 ~ 50		230 ~ 50	
Power mains supply fuse	A	2		2		2	
Maximum power consumption	W	90		130		150	
Net weight	kg	36.5	34.5	40.3	38.0	41.0	38.5
Natural gas consumption (*)	m³/h	2.72		2.70		3.23	
Butane gas consumption	kg/h	2.02		2.01		2.40	
Propane gas consumption	kg/h	1.99		1.98		2.36	
Maximum CH working temperature	°C	83		83		83	
Maximum DHW working temperature	°C	62	-	62	-	62	-
Total capacity of expansion vessel	l	8		8		8	
Maximum recommended CH system capacity (**)	l	160		160		160	

No. 6 table - General data for each model

(*) Value related to 15°C – 1013 mbar condition

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

CTN 24 - RTN 24		max heat output	min heat output	30% heat output
Boiler casing heat loss	%	0.8	0.8	-
Flue system heat loss with burner on	%	8.5	9.7	-
Flue system mass capacity	g/s	16.2	13.7	-
Flue temp.– air temp.	°C	85	50	-
CO ₂	%	6.2	3.0	-
Boiler efficiency rate	%	90.7	89.5	88.7
Efficiency rating (according to 92/42/CE)	-	★★		
NO _x emission class	-	2		

No. 7 table - Combustion data for CTN 24 and RTN 24

CTFS 24 - RTFS 24		max heat output	min heat output	30% heat output
Boiler casing heat loss	%	0.23	0.23	-
Flue system heat loss with burner on	%	6.57	9.27	-
Flue system mass capacity	g/s	12.9	14.0	-
Flue temp.– air temp.	°C	98	60	-
CO ₂	%	7.7	2.9	-
Boiler efficiency rate	%	93.2	90.5	90.2
Efficiency rating (according to 92/42/CE)	-	★★★		
NO _x emission class	-	2		

No. 8 table - Combustion data for CTFS 24 and RTFS 24

CTFS 28 - RTFS 28		max heat output	min heat output	30% heat output
Boiler casing heat loss	%	0.2	-	-
Flue system heat loss with burner on	%	6.1	8.5	-
Flue system mass capacity	g/s	17.7	19.1	-
Flue temp.– air temp.	°C	86	57	-
CO ₂	%	7.1	2.7	-
Boiler efficiency rate	%	93.7	91.5	91.2
Efficiency rating (according to 92/42/CE)	-	★★★		
NO _x emission class	-	3		

No. 9 table - Combustion data for CTFS 28 and RTFS 28

3. INSTRUCTIONS FOR THE FITTER

3.1. Installation standards

This is a II2H3+ boiler which must be installed in compliance with the applicable laws and standards in the country of installation.

3.2. Installation



Accessories and spare parts for installation and service procedures must be supplied by the Manufacturer.

The boiler cannot be guaranteed to operate properly if non-original accessories or spare parts are used.

3.2.1. Packaging

The boiler is delivered in a sturdy cardboard box. Remove the boiler from the box and check it for damage. The packing materials can be recycled and should be disposed of at an appropriate waste collection site. Keep all packaging out of reach of children, as it can be a health risk.

The Manufacturer can not be held liable for injury to people or animals or damage to property due to failure to follow the above instructions.

The following is delivered together with the boiler:

- copper pipe kit for plumbing and gas connections;
- metal template for fixing the boiler to the wall;
- one plastic bag containing:
 - a) this installation, use and maintenance manual;
 - b) paper template for wall mounting the boiler (pic. 10);
 - c) two screws and wall plugs for fixing the boiler to the wall;
 - d) with model TFS 24: three diaphragms for flue gas exhaust (40, 42, and 45 mm diameters);
 - e) with model TFS 28: five diaphragms for flue gas exhaust (41, 44, 45, 47 and 49 mm diameters);
 - f) with model TFS: two closing caps with gaskets.

3.2.2. Deciding where to install the boiler

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

- Refer to Subsections 3.2.6 and 3.2.7.
- Check the wall is strong enough to support the weight of the boiler.
- Do not fit the boiler above any equipment that may affect operation (kitchen appliances that emit steam or greasy vapour, washing machines, etc.).
- Do not install natural draught boilers in corrosive or very dusty atmosphere areas, such as hairdressing salons or laundries as this would greatly reduce the boiler's lifespan.

3.2.3. Positioning the boiler

Each boiler is supplied with a paper "TEMPLATE" (pic. 10) for positioning the pipes for connecting the CH system, DHW system and gas supply to the boiler and to the air intake/flue gas pipes before installing the boiler itself.

The TEMPLATE is made of heavy-duty paper and must be fixed onto the wall where the boiler is to be mounted. During installation it is advisable to use a spirit level. The template provides all the indications required for drilling the holes for fixing the boiler to the wall, which is done using two screws and wall plugs.

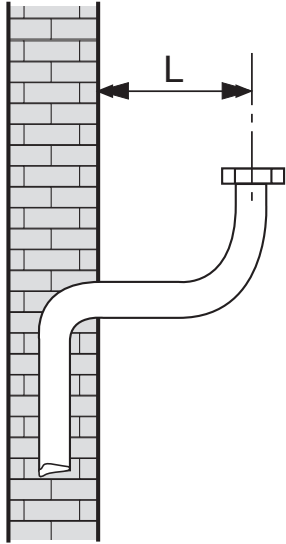
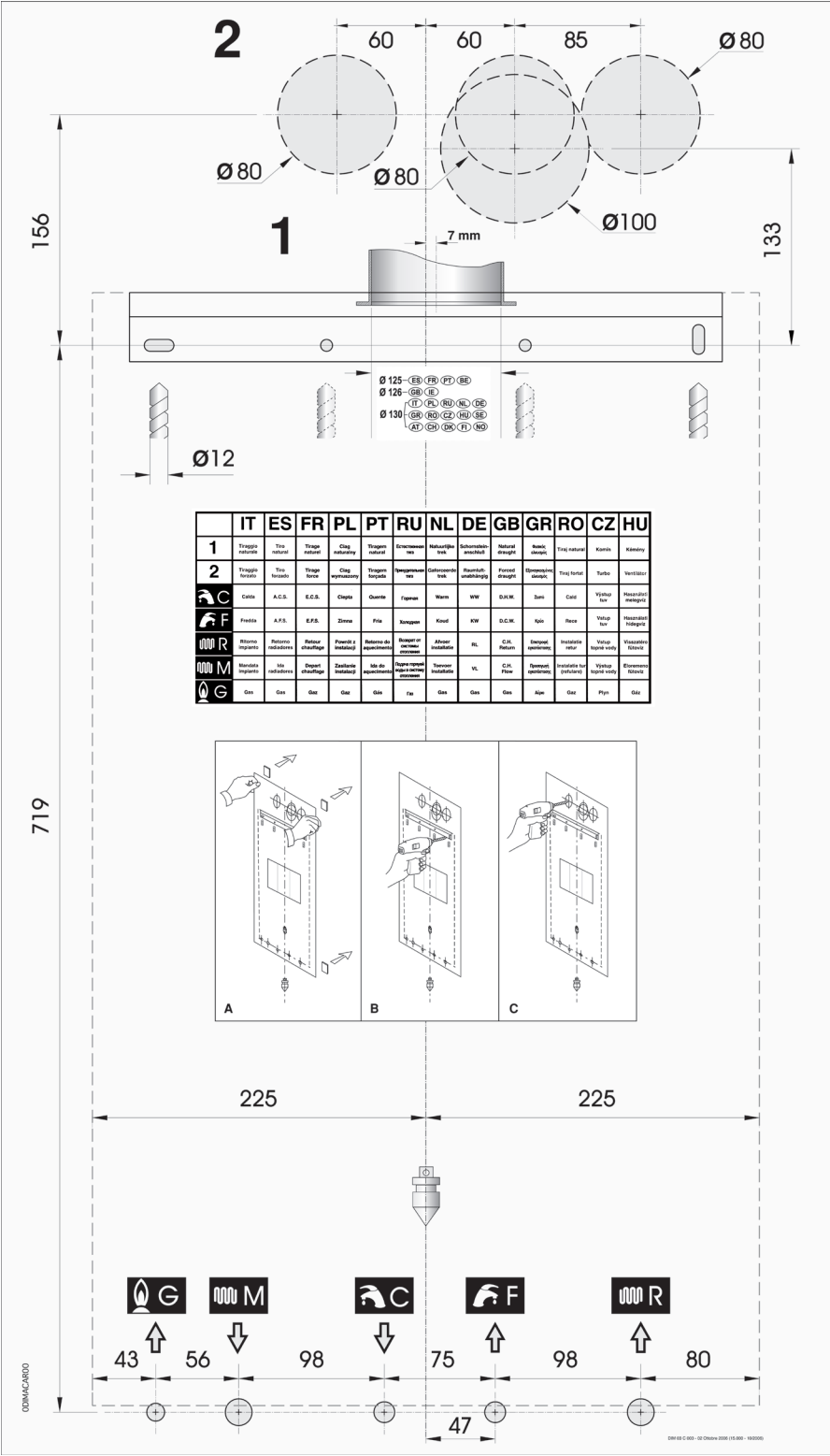
The lower part of the TEMPLATE shows where to mark the exact point at which the couplings must be positioned for connecting the boiler to the gas supply pipe, mains water supply pipe, DHW flow pipe, CH flow and return pipe.

The upper part shows the coupling positions for the air intake/flue gas pipes.



Since the temperature of the walls on which the boiler is mounted and the temperature of the coaxial flue system do not exceed 60°C, there is no need to keep to a minimum distance from flammable walls. For boilers with split pipe flue system, in the presence of flammable walls and a flue gas system through such walls, ensure proper insulation between wall and flue gas pipes.

BOILER WALL-HANGING TEMPLATE



	coupling Ø	copper pipe Ø (mm)	L (mm)
M = CH flow	3/4"	18	138
C = DHW flow	1/2"	14	177
G = Gas intake	1/2"	18	138
F = Mains water intake	1/2"	14	177
R = CH return	3/4"	18	138

pic. 10 - Boiler template

3.2.4. Installing the boiler



Before connecting the boiler to the CH and DHW systems, clean the pipes carefully.
Prior to operating a NEW system, eliminate any metallic leftover during manufacturing and welding process, and any oil or grease deposits, which might get into the boiler and damage it or affect operation.
Prior to operating an UPGRADED system (addition of radiators, boiler replacement, etc.), clean it thoroughly to remove all sludge and foreign particles. Clean the system using a non-acid product available on the market.
Do not use solvents as they could damage the components of the system.
In the (new or upgraded) central heating system, it is always advisable to add to the water, in a suitable concentration, a corrosion inhibiting product for use in multi-metal systems to produce a protective film on internal metal surfaces.
The Manufacturer can not be held liable for injury to people or animals or damage to property resulting from failure to follow the above instructions.

Proceed as follows to install the boiler:

- Fix the template (pic. 10) onto the wall.
- Drill two 12 mm Ø holes in the wall to accommodate the boiler bracket wall plugs.
- Arrange air intake/flue gas system in the wall as needed.
- Secure the boiler bracket to the wall using the wall plugs supplied.
- Position the gas supply fitting (G), the mains water fitting (F), the DHW flow fitting (C, only in model C), the CH flow fitting (M) and the CH return fitting (R) as shown on the template (refer to the lower part).
- Provide a disposal system for relieving the 3-bar safety valve.
- Hang the boiler on the bracket fixed onto the wall.
- Connect the boiler to the mains pipes using the kit supplied with the boiler (refer to subsections 3.2.9. and 3.2.10).
- Connect the boiler to the air intake and flue gas exhaust system (refer to subsections 3.2.6. and 3.2.7).
- Connect the power supply, room thermostat (optional) and other accessories (refer to the following subsections).

3.2.5. Boiler room ventilation



It is mandatory to install the boiler in a suitable room in accordance with the applicable laws and standards in the country of installation, which are considered as fully transcribed in this manual.

Model TN boilers have an open combustion chamber and can be connected to a chimney. Combustion air is drawn from the room where the boiler is installed.

Model TFS boilers have a sealed combustion chamber. Combustion air is not drawn from the boiler room, so it is not necessary to follow specific recommendations concerning openings and ventilation, which are required in the event of depleted room air, or boiler room requirements.

3.2.6. Air intake/flue gas system of natural draught boilers

Flue gas discharge into the atmosphere must comply with applicable laws and standards in the country of installation.

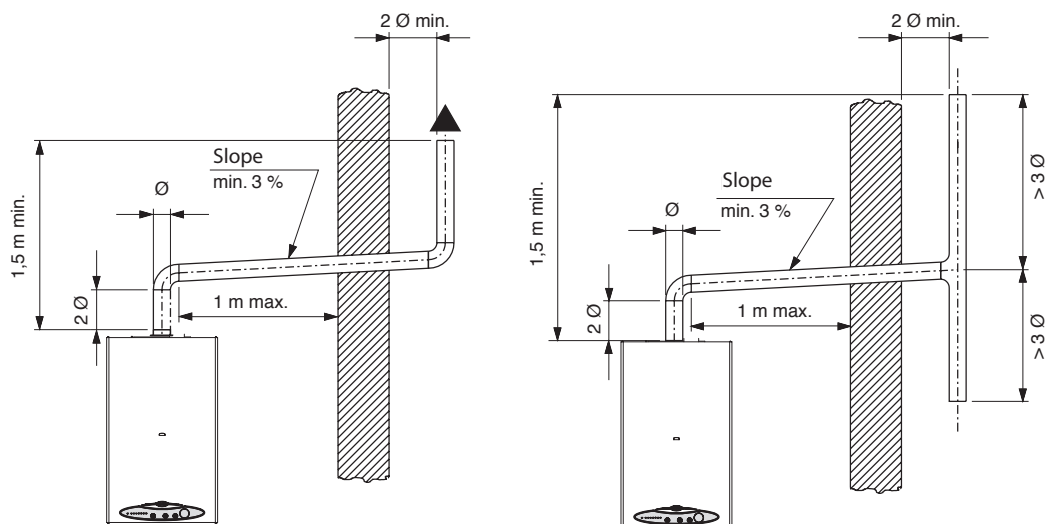


The boiler is fitted with an automatic reset safety device that prevents flue gas leakage into the boiler room (see subsection 1.3.3).
Tampering with and deactivating the safety device are absolutely forbidden.
If the boiler shuts down frequently due to a malfunction, check the flue gas discharge system.
It may be clogged or inappropriate for discharging flue gas into the atmosphere.

Connection to the chimney

The chimney is an essential component 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 condensate;
- it must have appropriate mechanical characteristics and low thermal conductivity;
- it must be perfectly sealed;
- it must be positioned as vertical as possible and the roof terminal must have a cap ensuring efficient and constant flue gas discharge;
- the chimney diameter must be as large as the diameter of the boiler flue gas outlet; square or rectangular section chimneys must have an internal cross-section 10% larger than that of the boiler flue gas outlet;
- the pipe connecting the boiler to the chimney must be vertical and the length must be no less than twice its diameter before joining the chimney.



pic. 11 - Connection to the chimney for CTN and RTN

Direct emission into the atmosphere

Natural draught boilers can discharge flue gas directly into the atmosphere by means of a pipe passing through the outside walls of the building and ending with a terminal.

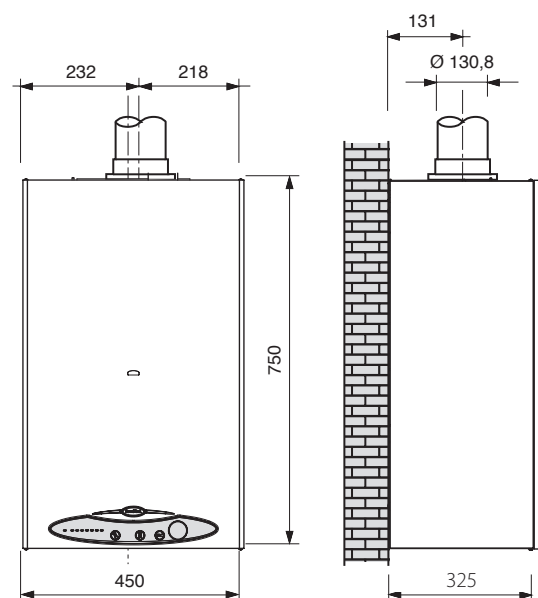
The flue gas discharge system must comply with the following requirements:

- the horizontal part inside the building must be as short as possible (max length 1,000 mm);
- no more than 2 direction changes can be implemented;
- it can host only one single boiler flue pipe;
- the pipe through the wall must be protected by a sheath; the part of the sheath facing the inside of the building must be closed, the part facing outward open;
- the end section, on which the terminal is to be installed, must protrude from the wall of the building at least twice the diameter of the pipe;
- the terminal must be positioned at least 1.5 metres higher than the first pipe connected to the boiler (pic. 11).

The MANUFACTURER can not be held liable for damage resulting from incorrect installation, use or modification of the boiler, or failure to follow manufacturer's instructions or the applicable installation standards for the product.

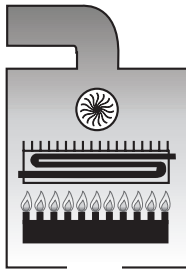
3.2.7. Air intake/flue gas system of forced draught boilers

When positioning the boiler exhaust terminals onto the wall, comply with laws and standards applicable in the country of installation, which are considered as an integral part of this manual.

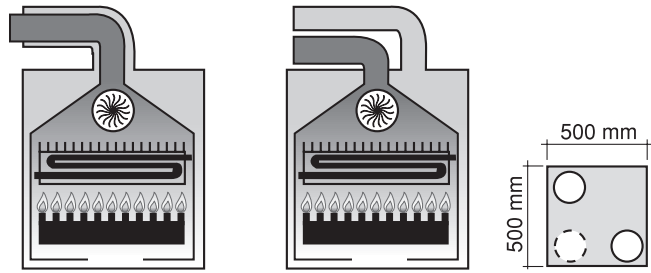


pic. 12 - Dimensions for connecting to the flue gas pipe for CTN

**type
B22**



**type
C12**



3.2.7.1. Configuration of air/flue system pipes: types: B22, C12, C32, C42, C52, C82

B22 This boiler is intended for connection to an existing flue system either inside or outside the boiler room. Combustion air is drawn straight from the boiler room itself and flue gas is conveyed to the outside.

The boiler **must not** be fitted with an anti-wind gust system; it must be equipped with a fan mounted after the combustion chamber.

C12 This boiler is intended for connection to horizontal flue gas and air-intake pipes connected to the outside by means of coaxial or split pipes.

The distance between the air intake pipe and the flue gas pipe must be at least 250 mm and both terminals must be positioned in a 500mm-side square area.

C32 This boiler is intended for connection to vertical flue gas and air-intake pipes connected to the outside by means of coaxial or split pipes. The distance between the air intake pipe and the flue gas pipe must be at least 250 mm and both terminals must be positioned in a 500mm-side square area.

C42 This boiler is intended for connection to a common chimney pipe system that includes two pipes, one for the air intake and the other for flue gas discharge.

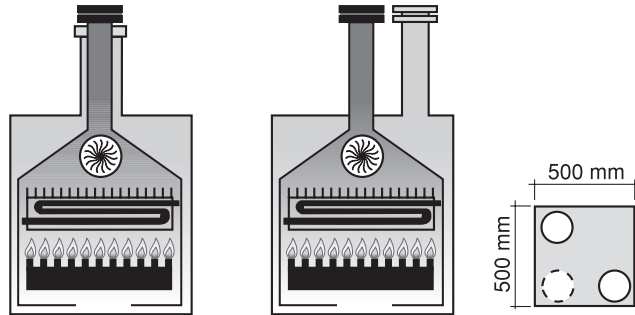
These pipes may be coaxial or split.

The flue gas chimney system must comply with current standards.

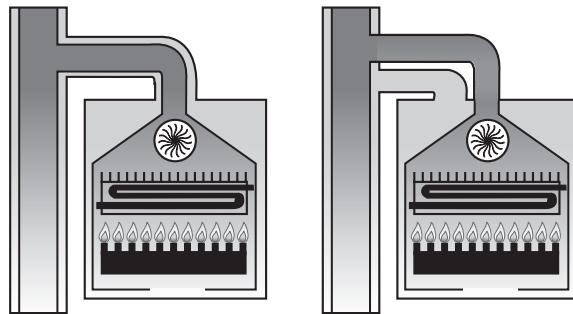
C52 Boiler with separate pipes for air intake and flue gas.

Air and flue gas may have different discharge pressures. Air and flue gas terminals must not face each other from opposite walls.

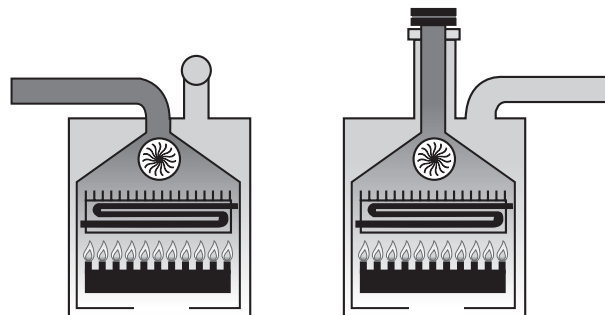
**type
C32**



**type
C42**



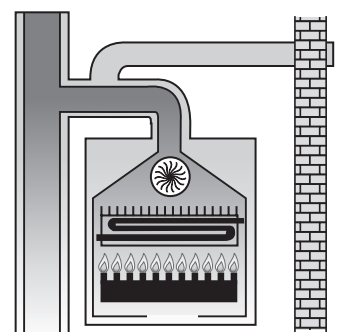
**type
C52**



C82 This boiler is intended to be connected to a combustion air-intake terminal and to a single flue gas terminal or to a common chimney.

The flue gas chimney system must comply with current standards.

**type
C82**



3.2.7.2. 100/60 mm diameter coaxial pipe air/flue system

Type C12

The minimum permissible length of horizontal coaxial pipes is 0.5 metre, not including the first elbow connected to the boiler.

The maximum permissible length of horizontal coaxial pipes is 4 metres, not including the first elbow connected to the boiler.

For each additional elbow, the maximum permissible length must be reduced by 1 metre. In addition, the pipe must have a 1% slope to prevent rainwater entering it.

Choosing the applicable diaphragm supplied with the boiler (pic. 13)

RTFS 24 and CTFS 24

Pipe length (m)	Flue gas discharge diaphragm (mm)
$0.5 < L < 1^*$	Ø 40
$1 < L < 2^*$	Ø 42
$2 < L < 4^*$	Ø 45

* excluding the first elbow connected to the boiler

RTFS 28 and CTFS 28

Pipe length (m)	Flue gas discharge diaphragm (mm)
$0.5 < L < 1^*$	Ø 41
$1 < L < 2^*$	Ø 44
$2 < L < 3^*$	Ø 45
$3 < L < 4^*$	Ø 47

* excluding the first elbow connected to the boiler

Type C32

The minimum permissible length of vertical coaxial pipes is 1 metre, equal to the length of the chimney.

The maximum permissible length of vertical coaxial pipes is 4 metres, including the terminal.

For each additional elbow, the maximum permissible length must be reduced by 1 metre.

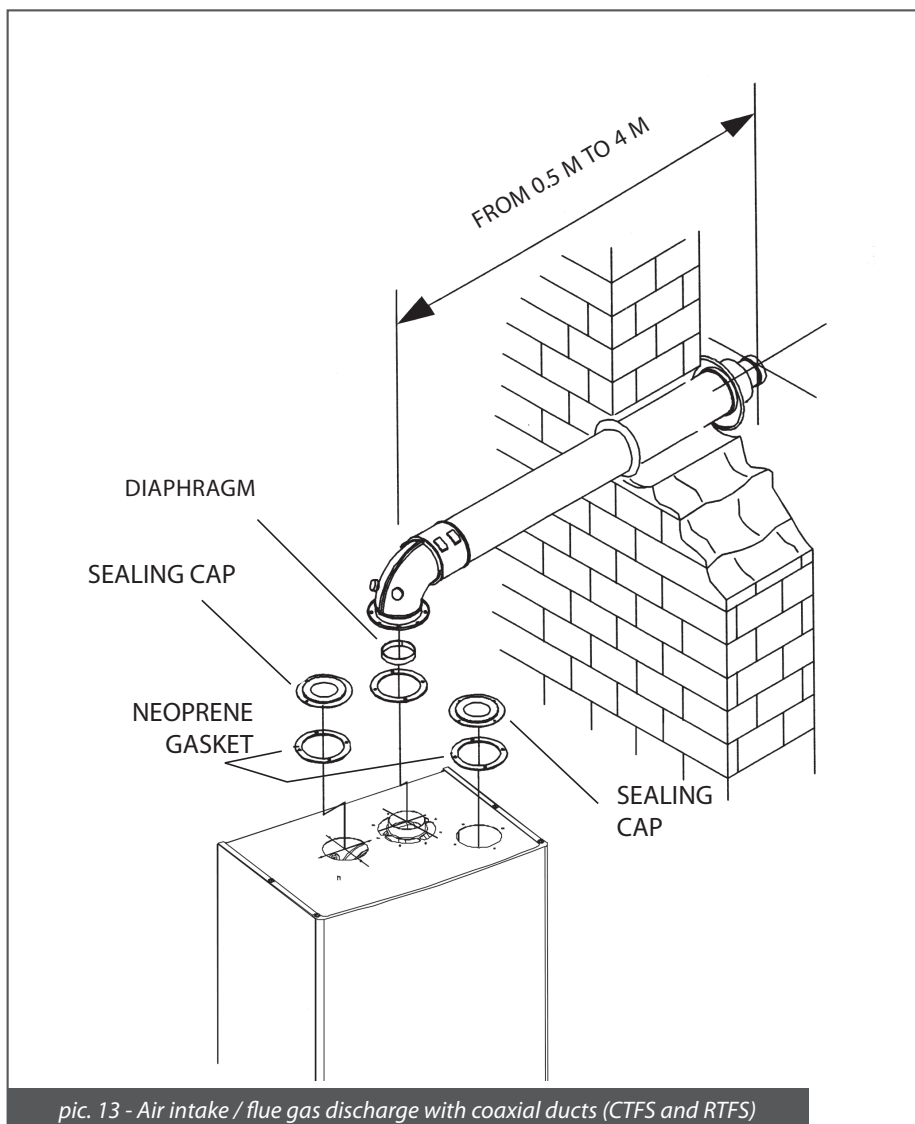
Choosing the applicable diaphragm supplied with the boiler (pic. 13)

RTFS 24 and CTFS 24

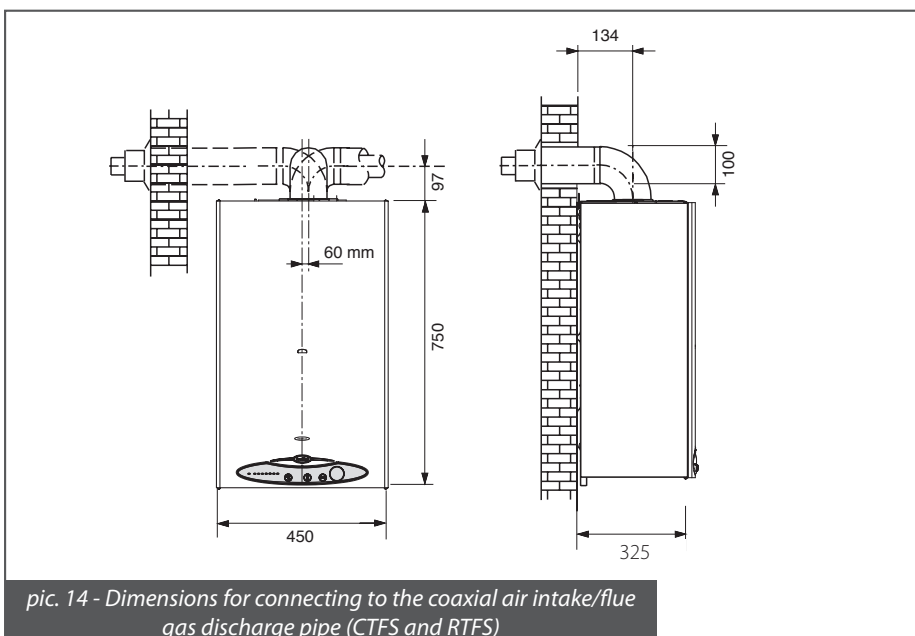
Pipe length (m)	Flue gas discharge diaphragm (mm)
$1 < L < 2$	Ø 42
$2 < L < 4$	Ø 45

RTFS 28 and CTFS 28

Pipe length (m)	Flue gas discharge diaphragm (mm)
$1 < L < 2$	Ø 44
$2 < L < 3$	Ø 45
$3 < L < 4$	Ø 47



pic. 13 - Air intake / flue gas discharge with coaxial ducts (CTFS and RTFS)



pic. 14 - Dimensions for connecting to the coaxial air intake/flue gas discharge pipe (CTFS and RTFS)



The boiler is equipped with a device for controlling the emissions of the products of combustion. If the flue gas and/or combustion air intake system fails, the device sets the equipment in the safety configuration (subsection 1.3.3).

These pictures are merely an indication. For installation of optional fittings please refer to the instruction enclosed to the same fittings.

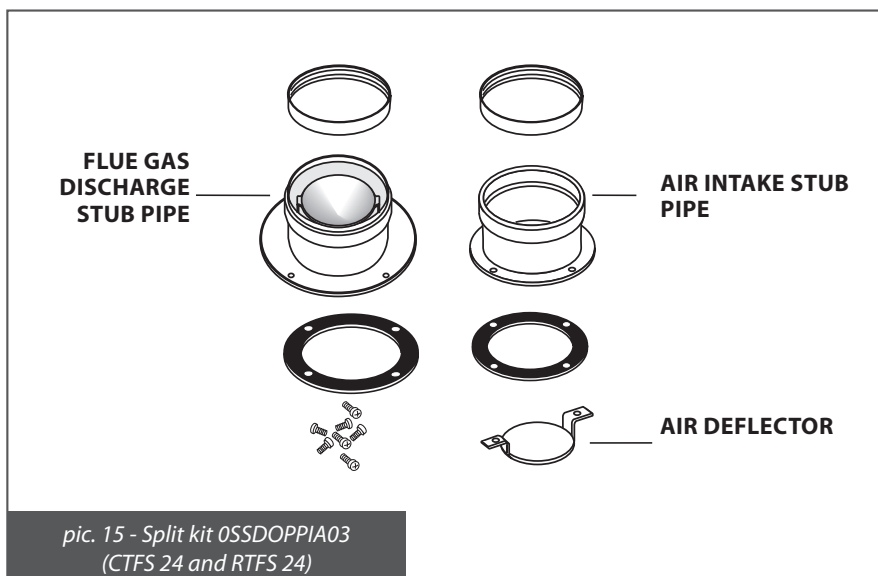
3.2.7.3. 80 mm diameter split pipe air/flue system

Installation types C12-C32-C42-C52-C82

RTFS 24 and CTFS 24

For installations with separate air intake and flue gas discharge pipes the split base kit (code OSDOPPIA03) must be used. The kit consists of the following components (pic. 15):

- no. 1 Ø 80 mm female stub pipe with flange for connection to the flue gas discharge pipe (flue gas deflector included);
- no. 1 Ø 80 mm female stub pipe with flange for connection to the air intake pipe;
- no. 1 standard air deflector;
- fixing screws and seals.



The boiler may not work properly if a non-original split base kit is installed.

Air intake

The minimum length of the air intake pipe is 1 metre.

Each wide-radius 90° elbow (R=D) installed on the air intake pipe is equal to 1 m linear length.

Each narrow-radius 90° elbow (R<D) installed on the air intake pipe is equal to 1.5 m linear length.

The load loss of the air intake terminal is not to be taken into consideration.

A standard air deflector MUST be installed.

Flue gas system

Each wide-radius 90° elbow (R=D) installed on the flue pipe is equal to 1.5 m linear length.

Each narrow-radius 90° elbow (R<D) installed on the flue pipe is equal to 3.5 m linear length.

Pipe length (m)	Flue gas discharge diaphragm (mm)
$L < 2$	Ø 45
$2 < L < 17$	Ø 49
$17 < L < 33$	-



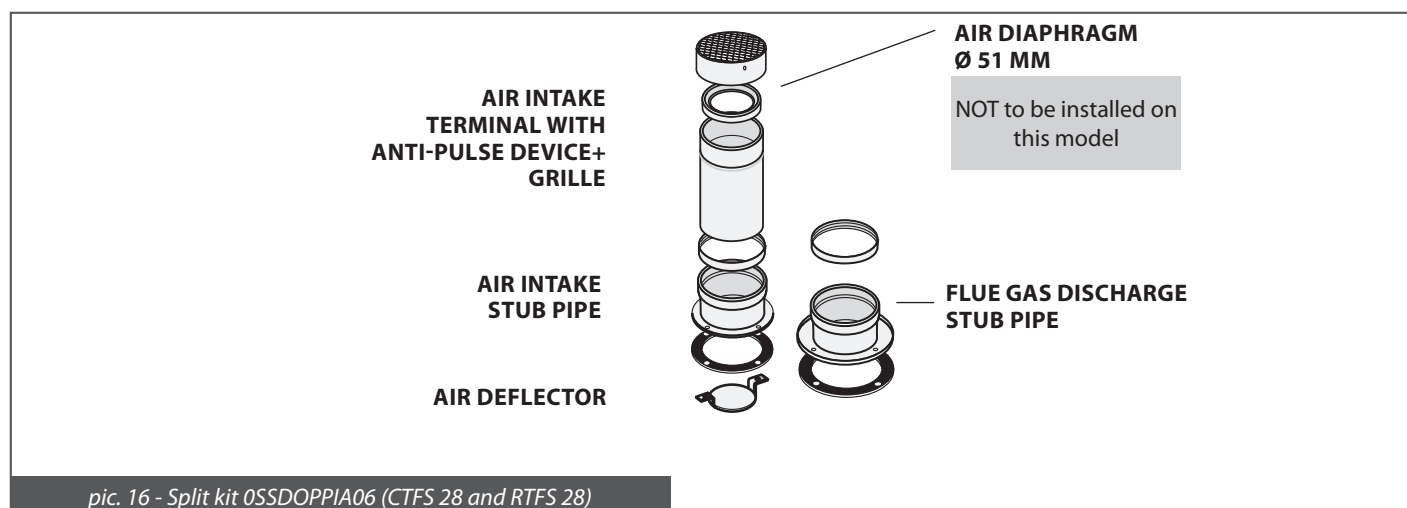
A flue pressure switch is fitted to the boiler. It controls the flue gas discharge flow rate.

If the flue gas discharge and/or air intake system malfunctions, the device shuts down the boiler to prevent unsafe operation (see subsection 1.3.3).

RTFS 28 and CTFS 28

For installations with separate air intake and flue gas discharge pipes, the split base kit (code OSDOPPIA06) must be used. The kit consists of the following components (pic. 16):

- no. 1 Ø 80 mm female stub pipe with flange for connection to the flue gas discharge pipe;
- no. 1 Ø 80 mm female stub pipe with flange for connection to the air intake pipe;
- no. 1 standard air deflector;
- air intake terminal provided with grille and anti-pulse device;
- no. 1 Ø 51 air diaphragm to be used for the air intake terminal in accordance with the specifications given below;
- fixing screws and seals.



**WARNING**

The boiler may not work properly if a non-original split base kit is installed.

Air intake

The minimum length of the air intake pipe is 1 metre.

Each wide-radius 90° bend ($R=D$) installed on the air intake pipe is equal to 1 m linear length.

Each narrow-radius 90° bend ($R<D$) installed on the air intake pipe is equal to 1.5 m linear length.

The load loss of the air intake terminal is not to be taken into consideration.

The air intake terminal provided with the anti-pulse device contained in the split base kit **must be installed without the Ø 51 mm air diaphragm**.

Pipe length (m)	Flue gas discharge diaphragm (mm)
$1 < L < 5^*$	Ø 47
$5 < L < 10.5^*$	Ø 49
$10.5 < L < 21.5^*$	No diaphragm

* excluding the first elbow connected to the boiler

Flue gas system

Each wide-radius 90° bend ($R=D$) installed on the flue pipe is equal to 2 m linear length.

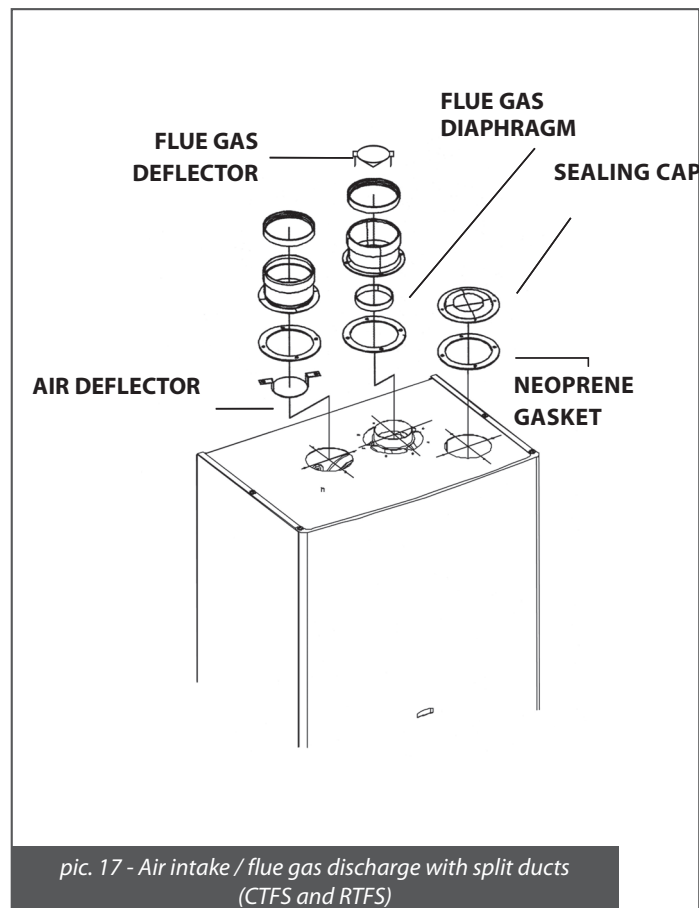
Each narrow-radius 90° bend ($R<D$) installed on the flue pipe is equal to 4 m linear length.



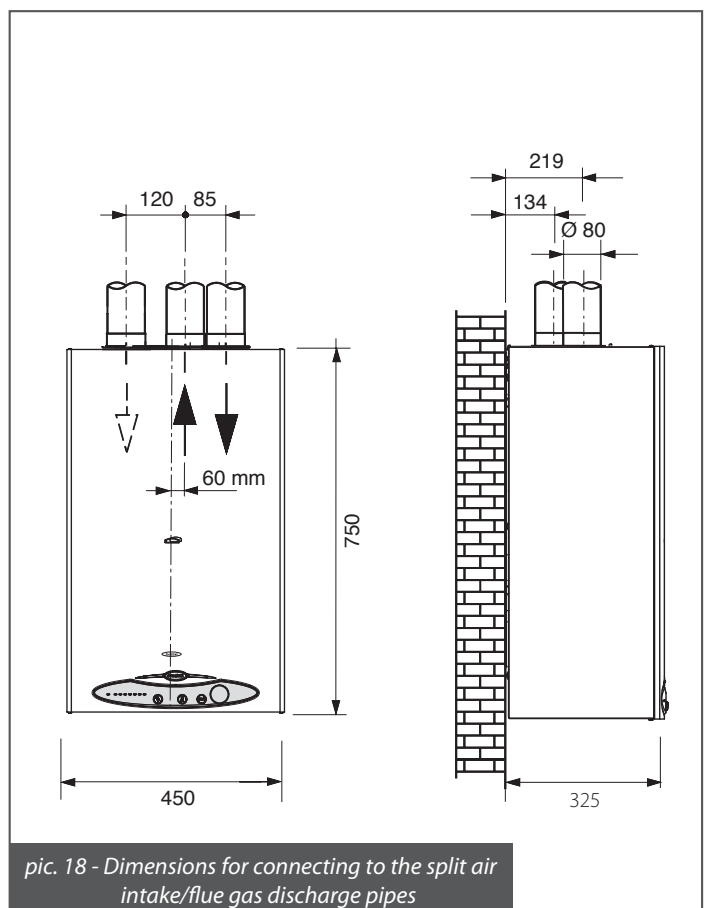
A flue pressure switch is fitted to the boiler. It controls the flue gas discharge flow rate.

If the flue gas discharge and/or air intake system malfunctions, the device shuts down the boiler to prevent unsafe operation (see subsection 1.3.3)

The following are merely an indication. For installation of optional fittings please refer to the instruction enclosed to the same fittings.



pic. 17 - Air intake / flue gas discharge with split ducts (CTFS and RTFS)



pic. 18 - Dimensions for connecting to the split air intake/flue gas discharge pipes

Configuration of Ø 80 mm flue gas discharge and air intake pipes**Example no. 1 (pic. 19)**

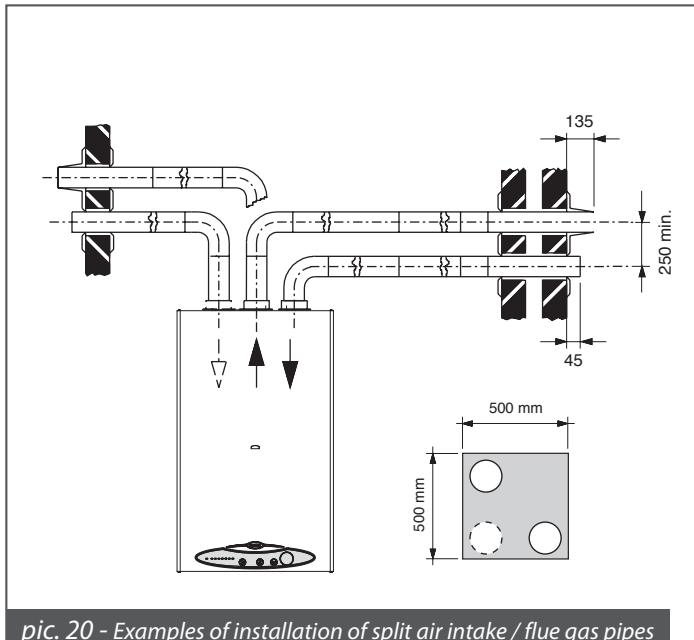
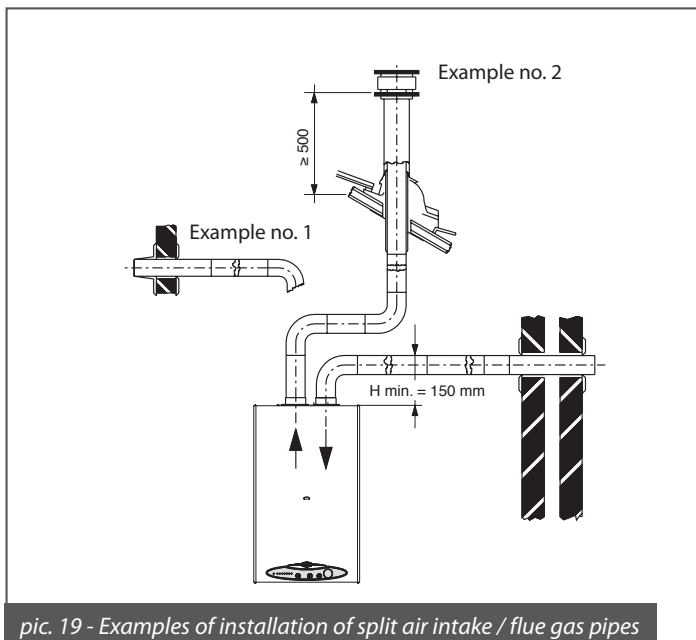
Primary air intake and flue gas discharge through two opposing outside walls.

Example no. 2 (pic. 19)

Primary air intake through outside wall and flue gas discharge through the roof.

Example no. 3 (pic. 20)

Primary air intake through outside wall and flue gas discharge through the same wall.



3.2.8. Testing boiler efficiency

3.2.8.1. "Chimney sweep" function

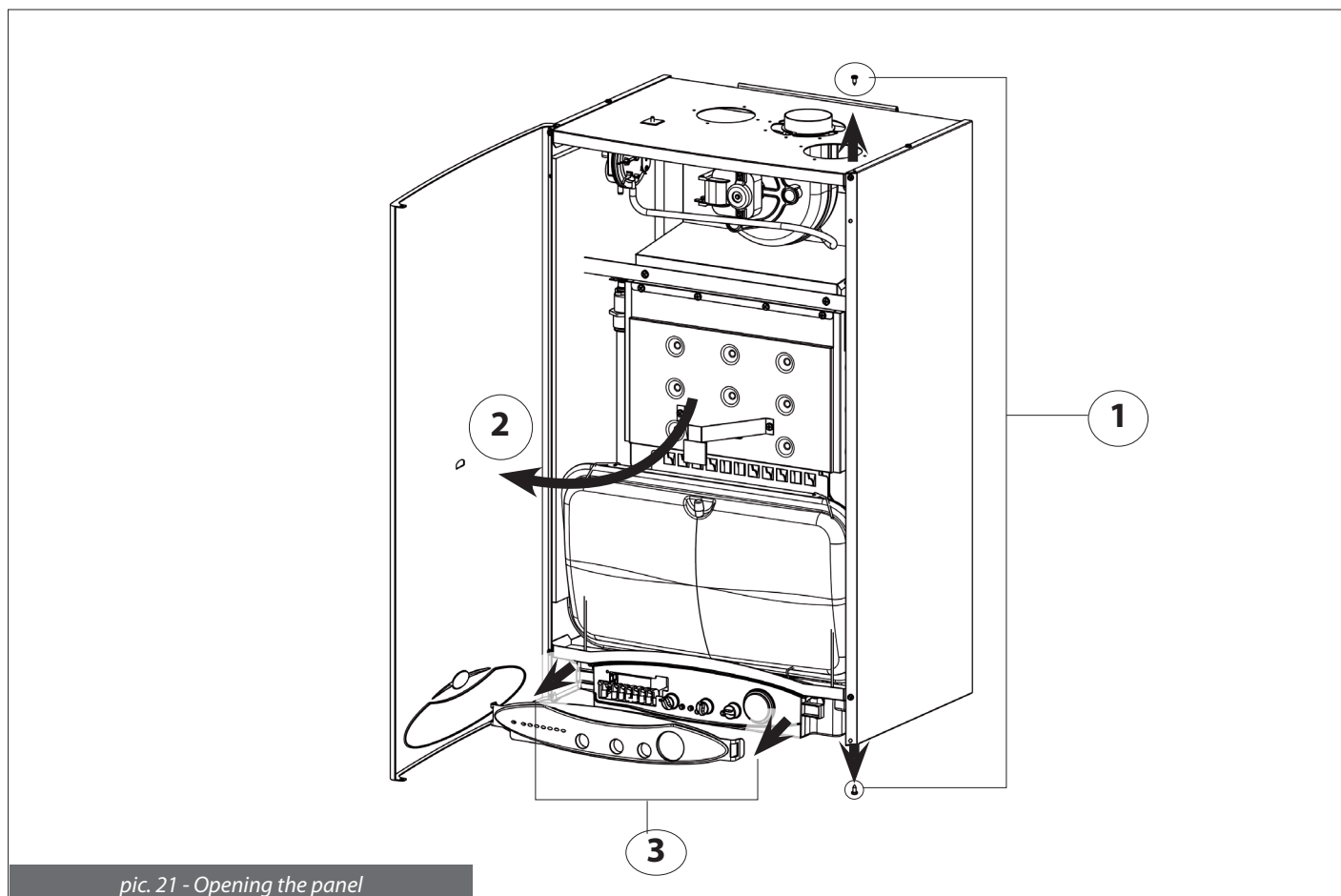
The boiler has a "chimney sweep" function, used to test its efficiency and adjust burner performance.

The boiler comes with the chimney-sweep function, which must be used to measure combustion efficiency and regulate the burner.

To activate the chimney-sweep function, you need to open the front panel to access the controls. To do this, follow the sequence below:

- unscrew two of the four screws securing the panel (right or left – 1, pic. 21) and open it, but without removing it from the boiler (2, pic. 21);
- remove the control panel template by widening the right and left hooks and pulling it outwards (3, pic. 21).

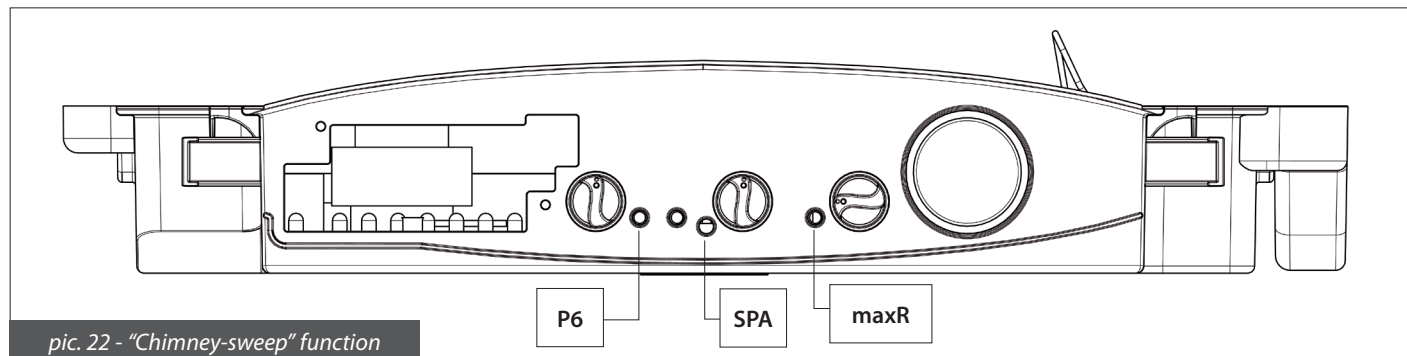
The control panel is like shown in pic. 22.



Turn knob **9** (pic. 1) to WINTER and the room thermostat (if there is one) to ON.

While the boiler is operating, press the **SPA** button for a few seconds (A, pic. 22). The boiler will turn off and then resume the ignition sequence, starting again at the max power. Maximum boiler power output **MAX R** is as much as set point **MAX R** (B, pic. 22).

The “Chimney sweep” function remains active for 15 minutes. To deactivate this function, turn selector **9** to any position other than WINTER.



3.2.8.2. Checking combustion performance

Coaxial pipe system

Proceed as follows to verify combustion performance.

- Measure air intake through hole 2 (A, pic. 23).
- Measure flue gas and CO₂ temperature through hole 1 (A, pic. 23).

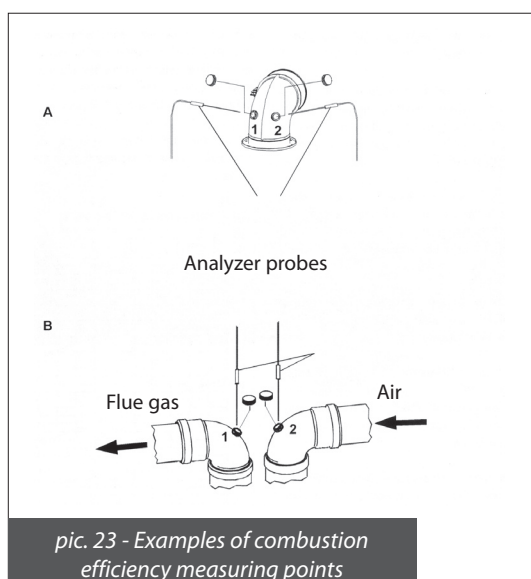
Allow the boiler to reach working temperature before taking the readings.

Split pipe system

Proceed as follows to verify combustion performance.

- Measure air intake through hole 2 (B, pic. 23).
- Measure flue gas and CO₂ temperature through hole 1 (B, pic. 23).

Allow the boiler to reach working temperature before taking the readings.



3.2.9. Gas mains connection

The cross-section of the gas supply pipe must be equal to or greater than that of the boiler gas pipe. Calculation of the cross-section of the gas pipe depends on the length, layout pattern and gas flow rate. The size of the gas pipe must be dimensioned accordingly.

Comply with the applicable laws in the country of installation. They are considered as an integral part of this booklet.



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

If any part of the gas system is inaccessible, a leak test must be carried out before the pipes are covered.

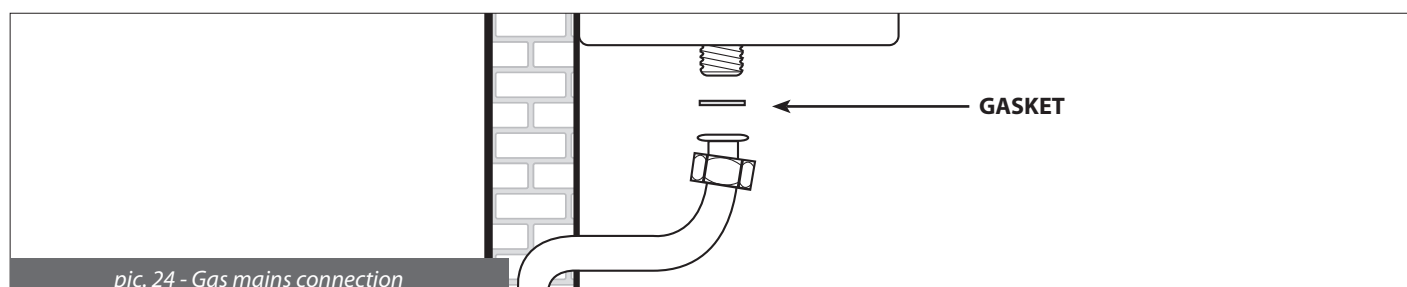
Leak tests must not be carried out using flammable gas. Use air or nitrogen for this purpose.

When boiler supply gas is already in the pipes, checking for leaks with a naked flame is strictly forbidden.

Use a specific products available on the market.

IT IS MANDATORY when connecting the boiler to gas mains, to use a gasket of an appropriate size and make (A).

The configuration of the boiler gas inlet thread is not appropriate for hemp, plastic tape or similarly made gaskets.



3.2.10. Plumbing connections

Prior to installing the boiler, the hydraulic system must be cleaned thoroughly to remove any impurities that are present in the system components and would damage the pump and the heat exchanger (see subsection 3.2.4.).

CENTRAL HEATING

The CH flow and return pipes must be connected to the relevant 3/4" fittings on the boiler (pics. from 4 to 10).

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



The boiler safety valve must be discharged into the sewage system.

If this precaution is not taken and the safety valve activates, boiler room flooding may occur.

The MANUFACTURER cannot be held liable for damage resulting from failure to follow this technical precaution.

DOMESTIC HOT WATER (for models CTN and CTFS)

DHW flow and mains water inlet pipes must be connected to the 1/2" fittings on the boiler (pics. from 4 to 10).

The hardness of the water supplied to the boiler may increase the cleaning frequency for the secondary plate-heat exchanger.



If the water is particularly hard, it may be necessary to install a suitable water treatment device for domestic use that complies with the applicable laws and standards.

Water treatment is always advisable when the hardness of the water supplied to the boiler is more than 20°f.

Water treated using standard water softeners may not be compatible with some components in the system.

3.2.11. Adjustable by-pass

The boiler is equipped by an adjustable by-pass. By-pass operation can be inhibited.

Pic. 25a shows an adjusting by-pass screw set for by-pass operation preclusion.

Pic. 25b shows an adjusting by-pass screw set for by-pass operation.

The boiler is supplied with by-pass set to closed by-pass.

3.2.12. Power mains connection

The boiler is supplied with a three-wire power cable connected to the electronic board, and it is provided with an anti-rupture firming clamp.

This boiler must be connected to a 230V-50Hz power supply.

When connecting the boiler to the power mains, keep the phase / neutral polarity sequence.

Installation standards must be complied with and are considered an integral part of this manual.

An easily accessible two-pin switch must be installed outside the boiler. The minimum distance between the contacts of the switch is 3 mm. The switch must allow power supply interruption so that maintenance and servicing can be performed safely.

The power supply to the boiler must be fitted with a differential magneto-thermal automatic switch of appropriate shut-down capacity.

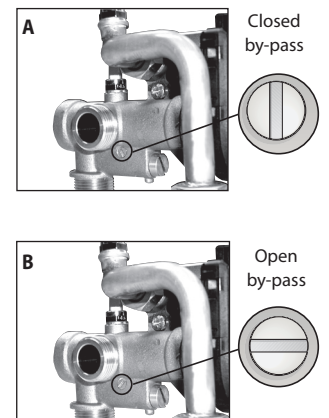
The electricity supply must be appropriately earthed.

This safety precaution must be verified. If in doubt, ask a qualified electrician to check the electricity supply.



The MANUFACTURER cannot be held liable for damage due to failure to earth the system.

Gas, hydraulic or CH system pipes are not suitable for earthing electricity supplies.



pic. 25 - Adjustable by-pass

3.2.13. Room thermostat connection (optional)

The boiler can be connected to a room thermostat (not provided with the boiler).

Room thermostat contacts must be properly sized for 5 mA at 24 V D.C.

The room thermostat wiring must be connected to the M9 terminal shown in pic. 29, after removing the jumper supplied as a standard fitting.

The room thermostat wiring must NOT be grouped together with mains cables.

3.2.14. Open Therm remote control installation (optional)

The boiler can be connected to an *Open Therm* remote control device (optional).

Install as follows:

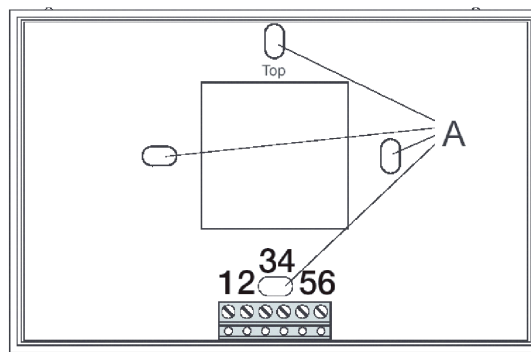
- Install the REMOTE INTERFACE printed circuit board included in the Remote Control Kit (required for connecting the remote control to the boiler), following the instructions provided with the kit.
- Position the remote control on a wall inside the premises, far from sources of heat or draughts.
- Separate the rear part of the housing (grey) from the front part (white) using a screwdriver and secure the rear part to the wall via the openings A (pic. 26).
- Connect the remote control up to the boiler, connecting positions 1 and 2 of the remote control (pic. 26) to the terminal board OPENTH M6 of REMOTE INTERFACE printed circuit board. The BUS connection is protected against false polarity, which means the connections can be switched;
- use a two-wire power cable for the connection, with the following characteristics:
 - maximum length: 40 metres;
 - maximum impedance: $2 \times 4\Omega/\text{m}$;
 - interlaced or sheathed wires can be installed to prevent disturbance;
- **remote control wires must not be routed together with power supply cables.**



The remote control must not be connected to a 230V power supply.

- If an external probe or phone operation device does not need to be installed, close the remote control housing, otherwise follow the instructions given in the following subsections.

Refer to the manual supplied with the *Open Therm* remote control kit for programming instructions.



pic. 26 - Installation of the Open Therm remote control

3.2.15. External temperature probe installation (optional) and “sliding temperature” operation

The boiler can be connected to an external temperature probe (optional), which adjusts CH flow temperature for sliding temperature operation.

The manufacturer supplies two models of probe:

- OKSONEST00: external probe for connection to the remote control;
- 0SONDAES01: external probe for direct connection to the boiler.

When the *Open Therm* remote control is employed, it is advisable to install the external probe for connection to the remote control, code OKSONEST00.

For trouble-free operation of the boiler, use only external probes supplied by the Manufacturer.

External temperature probe has to be connected by means of a double insulated wire, minimum cross-section 0.35 sq.mm.

External temperature probe code OKSONEST00 must be connected to positions 5 and 6 on the remote control (pic. 26).

External temperature probe code 0SONDAES01 must be connected to position M8 on the boiler's printed circuit board (pic. 29).

External temperature probe wiring must NOT be grouped together with power mains supply cables.

The external temperature probe must be installed on an outside wall facing north or north-east.
Do not install near a window or next to ventilation openings or sources of heat.

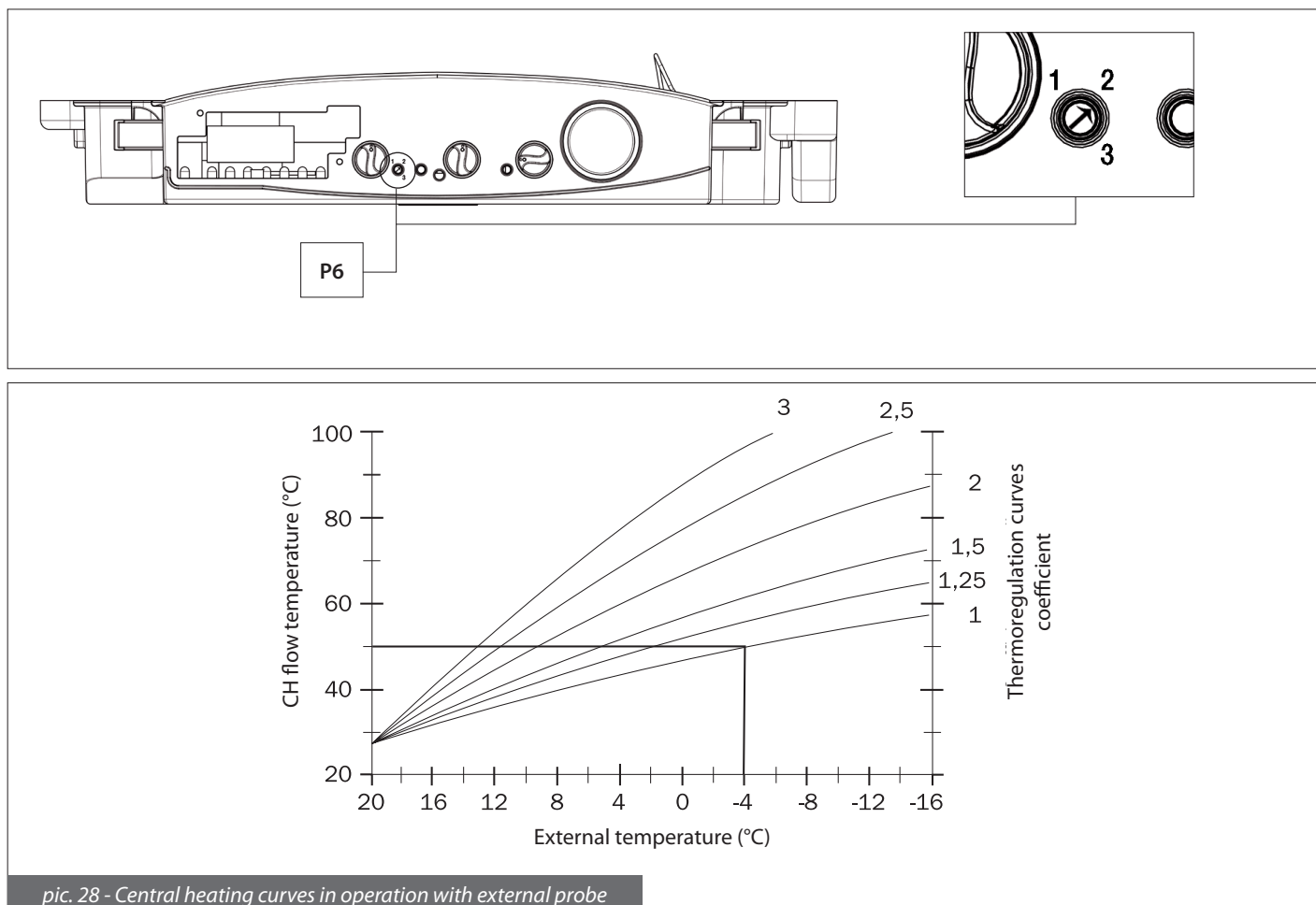
The external temperature probe automatically modifies CH flow temperature in relation to:

- sensed outdoor temperature;
- selected thermoregulation curve;
- selected fictitious room temperature.

The thermoregulation curve is selected via trimmer P6.

It is important for trimmer P6 to be set to a value of 1-3 (pics. 27 and 28).

The fictitious room temperature is set via adjuster **11** (pic. 1), which, when the external temperature probe is installed, loses its capability to set CH flow temperature (see subsection 1.2.3.).



3.2.16. Installation of the phone operation device (optional)

The boiler can be connected to a phone operation device (not provided with the boiler), allowing CH mode activation via phone. The phone operation device must be connected to positions 3 and 4 on the remote control (pic. 26). For installation and use of the phone operation device refer to specifications given in the enclosed manual.

3.3. Loading the system

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

This procedure must be carried out carefully, following all the steps indicated below:

- Open the bleed valves on all the radiators and check automatic valve operation.
- Gradually turn on the filling tap to fill the system (pic. 2), checking that all automatic bleed valves installed work properly.
- Close all the radiator bleed valves as soon as water starts to come out.
- Check the boiler water pressure gauge to see when the pressure reaches $1 \div 1.3$ bar.
- Turn off the boiler filling tap and bleed any air out by opening the bleed valves on all the radiators.
- Start the boiler, and as soon as the system reaches working temperature, stop the pump and repeat the bleed procedures.
- Allow the system to cool and the water pressure to return to $1 \div 1.3$ bar.

WARNING

As regards treating water in domestic heating systems, it is advisable to use specific products that are suitable for multi-metal plants, in order to optimize performance and safety, preserve these conditions over time, ensure regular operation of auxiliary equipment as well, and minimize energy consumption, in compliance with the applicable laws and standards.

WARNING

The low water pressure safety switch will prevent the burner from being started when the water pressure is below 0.4÷0.6 bar.

The water pressure in the CH system must not be below 1÷1.3 bar. Restore the correct value as needed and while the water in the system is cold.

The boiler pressure gauge shows the water pressure in the system.

WARNING

If the boiler is not used for a long time, the pump may not work.

BEFORE STARTING UP THE BOILER, PERFORM THE FOLLOWING PROCEDURE TO MAKE SURE THAT THE PUMP WORKS.

- Unscrew the protection bolt in the centre front section of the pump motor.
 - Insert the tip of a screwdriver in the hole and rotate the circulation unit shaft clockwise.
 - Once the unblocking operation has been completed, screw the protection bolt back on and check for water leaks.
- When the protection bolt is removed, some water may flow out. Before re-installing the external housing of the boiler, check that all internal surfaces are dry.

3.4. Starting the boiler

3.4.1. Preliminary checks

Before starting the boiler, perform the following checks:

- The flue gas exhaust pipe and terminal must be installed as instructed. When the boiler is running, no combustion products must leak from any of the gaskets.
- Supply power to the boiler must be 230 V – 50 Hz.
- The system must be filled with water (pressure reading on water gauge 1÷1.3 bar).
- All the stopcocks on the pipes must be open.
- The gas supplied to the boiler must be of the type for which the boiler is designed. If necessary, convert the boiler following the instructions in subsection 3.6 - ADAPTATION TO OTHER GASES AND BURNER ADJUSTMENT. This operation must be carried out by a qualified service engineer.
- The gas supply stopcock must be open.
- There must be no gas leaks.
- The main power switch must be on.
- The boiler safety valve must not be blocked.
- There must be no water leaks.
- The pump must not be blocked.

The boiler is equipped with a three-speed circulation pump corresponding to three different residual heads. It is delivered with the circulation pump on the third speed setting.



If you wish to set a different speed, taking account of the water circulation requirements in the boiler (assured by the water pressure switch) and the resistance properties of the system, check operation of the boiler in all the conditions dictated by the features of the system (e.g. closure of one or more heating zones or of thermostat-controlled valves).

3.4.2. Switching on and off

To switch the boiler on and off, refer to the Instructions for the User, in section 1.

RTFS - CTFS

RTFS/RTN models only, equipped with bulb probe external cylinder and temperature adjustment on cylinder (optional)

RTFS/RTN models only, equipped with NTC probe external cylinder and temperature adjustment on boiler

Component	Description
F1 BIT	Bi-thermal heat exchanger boiler
F2 PIA	Mono-thermal heat exchanger boiler and AQUA PREMIUM boiler
F3 RIS	CH only boiler
F4 BOL	System boiler
F5 MIC	Micro-reservoir boiler
F6 MAC	"AQUA PREMIUM" boiler (encased models only)
M3:	Power supply connector
M8:	External probe
M9:	TA (room thermostat)
M16:	Tele-metering connector
M2-M15:	Boiler component connectors
E.RIV:	Detection electrode
E.ACC:	Ignition electrode
P :	Water pump
V:	Fan (model TFS only)
MVD:	Three-way valve motor
DK:	Low water pressure switch
SR:	CH probe (10 Ohm B = 3435)
SE:	External temperature probe (10 Ohm B = 3977 - Optional)
SS:	DHW probe (10 Ohm B = 3435 max. length three metres)
TA:	Room thermostat (Optional)
CM1-CM2:	Boiler type selection jumpers
FL:	Flow sensor
VG:	Gas valve
TL:	Limit thermostat
PV:	Fan pressure switch (model TFS only)
TF:	Flue gas leak detection thermostat (model TN only)
B:	Probe-equipped external cylinder (remove R1)
B1:	Bulb probe-equipped external water cylinder (remove P1)
TIMER:	DHW programmer (remove P1 when timer is installed)
P1:	Timer priority jumper
R1:	10k Ohm resistance
S:	Bulb probe
TRACC:	Ignition transformer

pic. 29 - Electric layout

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

No. 10 table - Relation between temperature (°C) and nominal resistance (Ohm) of CH probe SR and DHW probe SS

3.6. Adaptation for use with other gases and burner adjustment

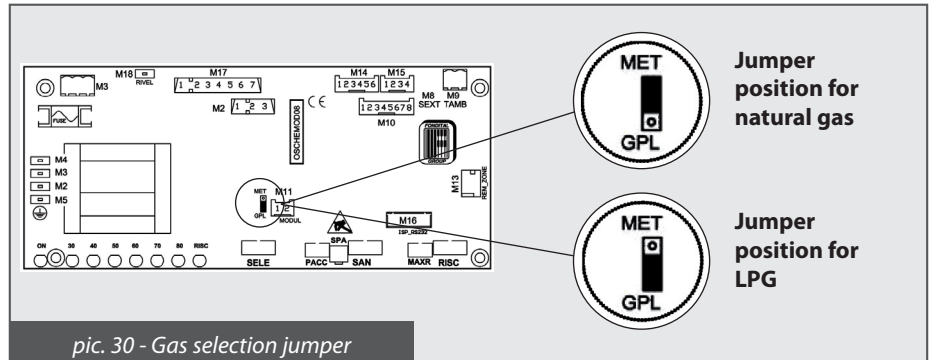


These boilers are manufactured for the type of gas specified on the order, which is shown on the packaging label and the boiler rating plate.

Adaptations after delivery must only be made by a qualified service engineer, using manufacturer-supplied accessories and implementing the modifications and adjustments for the necessary boiler set-up.

Switching the boiler from natural gas to LPG

- Remove the main burner.
- Remove the main burner nozzles from the main burner and replace with suitable new gas nozzles of the correct diameter.
- WARNING! Always install copper gaskets.**
- Re-install the main burner.
- On the electronic board, switch the MET-LPG jumper to the LPG position (pic. 30)
- See subsections A, B and C.



Switching the boiler from LPG to natural gas

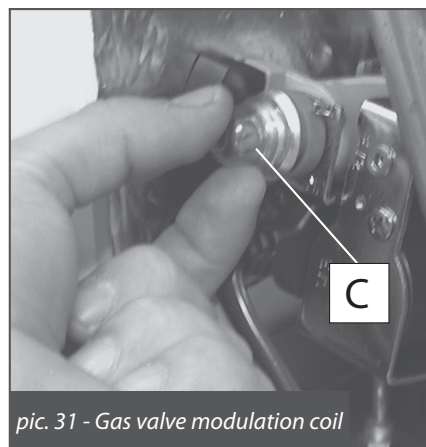
- Remove the main burner.
- Remove the main burner nozzles from the main burner and replace with suitable new gas nozzles of the correct diameter.
- WARNING! Always install copper gaskets.**
- Re-install the main burner.
- On the electronic board, switch the MET-LPG jumper to the MET position (pic. 30)
- See subsections A, B and C.

A) Max power adjustment

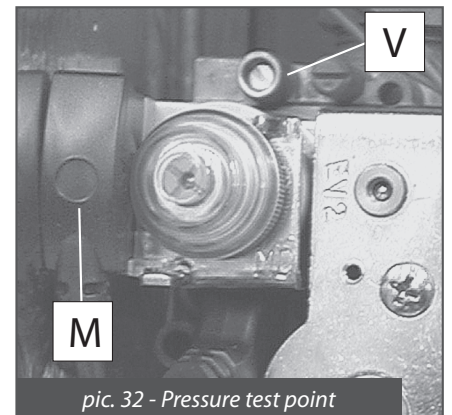
- Check the gas supply pressure (refer to tables 3, 4 and 5)
- Remove the plastic cap (C, pic. 31), which is positioned on top on the modulating coil and protects the gas valve pressure adjusting nut and screw.
- Connect a manometer to V test point in pic. 32.
- Adjust the screw (maxR, pic. 33) to MAX by rotating fully clockwise.
- Select WINTER boiler operation on switch 9 (pic. 1).
- Start the boiler in "chimney sweep" mode (subsection 3.2.8.1).
- Turn (external) nut K clockwise to increase nozzle pressure or vice versa (pic. 34).
- In LPG-fuelled boilers, turn the brass nut K fully clockwise.

B) Min power adjustment

- Disconnect the electrical wiring from the modulation coil (M, pic. 32).
- Turn the burner on and check MIN pressure according to tables 3, 4 and 5.
- To adjust the pressure, hold nut K still using a 100 mm tool, and turn screw W clockwise to increase or counter-clockwise to decrease the gas pressure (pic. 34).
- Re-connect the electrical wiring to the modulation coil.



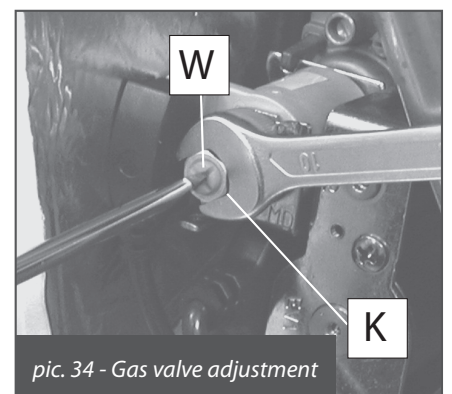
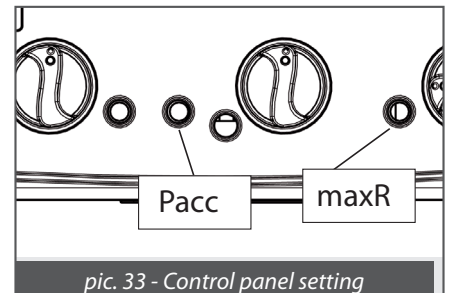
pic. 31 - Gas valve modulation coil



pic. 32 - Pressure test point

C) Final settings

- Turn the Pacc screw (pic. 33) to the middle set point, exit "chimney sweep" mode (subsection 3.2.8.1.) and make sure the burner works correctly and silently. If necessary, increase or decrease ignition power via the Pacc adjuster (clockwise to increase, counter-clockwise to decrease).
- Re-check the min and max gas valve pressure values.
- Adjust as necessary.
- Fit on plastic protective cap C.
- Close gas pressure check valves.
- **Check for gas leaks.**



pic. 34 - Gas valve adjustment

4. TESTING THE BOILER

4.1. Preliminary checks

Before testing the boiler, it is advisable to carry out the following checks:

- The installation must comply with current standards.
- Flue disclose pipes and terminals must be implemented as instructed. When the boiler is running, no combustion products must leak from the gaskets.
- The power mains supply to the boiler must be 230 V – 50 Hz.
- The system must be correctly filled (water pressure gauge must read $1 \div 1.3$ bar).
- All stopcocks in the system piping must be open.
- The type of gas supplied to the boiler must meet the boiler specifications. If the type of gas is not correct for the current boiler set-up, the boiler can be adapted for the available gas (see subsection 3.6).
- The gas supply stopcock must be open.
- There must be no gas leaks.
- The external main switch must be on.
- The boiler safety valve must not be blocked.
- There must be no water leaks.



If the boiler is not installed in compliance with current laws and standards, inform the system supervisor and do not test the boiler.

4.2. Switching on and off

For the boiler start-up and switching off procedure, refer to the “Instructions for the user” (section 1).

5. MAINTENANCE

Routine boiler maintenance must be provided in accordance with the applicable laws and with the schedule listed below.

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

Boiler maintenance and repair operation must be carried out by a qualified service engineer.

The manufacturer recommends that Customers contact a Service Centre for maintenance and repair operations.



Before carrying out any maintenance involving replacement of components and/or cleaning inside parts of the boiler, switch off the power supply to the boiler.

5.1. Maintenance schedule

The routine maintenance schedule must include the following checks:

- General integrity of the boiler.
- Boiler and mains gas supply leakage.
- Gas supply pressure to the boiler.
- Minimum and maximum gas pressures to boiler nozzles.
- Boiler ignition.
- Boiler combustion parameters by flue gas analysis. This check must be performed in accordance with applicable laws and standards.
- Flue system integrity, good state of preservation, and leak test.
- Draught stop device (model TN only).
- Absence of flue gas reflux to the boiler room and correct discharge of flue gas (model TN only).
- Operation of the safety thermostat installed on the draught stop (model TN only).
- Air pressure switch operation (model TFS only).
- Efficiency of boiler safety devices in general.
- Water leaks and rusted areas on the boiler fittings.
- Efficiency of the system's safety valve.
- Expansion vessel loading pressure.
- Water pressure switch efficiency.

and the following cleaning operations:

- Internal areas of the boiler.
- Gas nozzles.
- Air intake and flue gas exhaust system (model TFS only).
- Draught stop device (model TN only).
- Vent grille in boiler room (model TN only).
- Flue side of the heat exchanger.

When implementing a boiler maintenance schedule for the very first time, also check:

- Suitability of the boiler room.
- Air vents in the boiler room (model TN only).
- Diameter and length of flue system pipes.
- Boiler installation in accordance with the "Installation manual".

If the boiler does not operate correctly, or if it poses a danger to people, animals or property, inform the system supervisor both verbally and in writing.

5.2. Analysis of combustion parameters

The boiler combustion parameters must be checked in accordance with legal requirements to determine the efficiency and the emission of pollutants.

6. TROUBLESHOOTING

BOILER STATUS	MALFUNCTION	PROBABLE CAUSE	SOLUTION
The boiler has shut down, and red light 5 is flashing. Turn selector 9 to RESET position to resume boiler operation	The burner does not ignite	Gas supply failure	Check gas pressure Check mains gas safety valve
		Gas valve has disconnected	Reconnect gas valve
		Gas valve is faulty	Replace it
		PCB is faulty	Replace it
	Burner does not ignite	Spark electrode is faulty	Replace it
		Ignition transformer is faulty	Replace ignition transformer
		PCB is faulty	Replace PCB
	Burner ignites for a few seconds and then goes off	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
		Detection electrode is faulty	Replace electrode
		PCB does not detect flame	Replace PCB
		P ACC ignition value set point is too low	Adjust P ACC ignition value set point
		Min heat input is not set correctly	Check burner adjustment
The boiler has shut down and red light 4 is flashing. Turn selector 9 to RESET position to resume boiler operation	Flue pressure switch not operating (model TFS only)	Flue pressure switch is faulty	Check flue pressure switch and replace if necessary
		Silicone pipes are disconnected or faulty	Reconnect or replace silicone pipes
		Insufficient air intake or flue gas discharge	Check air/flue gas pipes: unclog or replace as required
		Fan is faulty	Replace it
		PCB is faulty	Replace it
	Flue thermostat has shut boiler down (model TN)	Air / flue chimney system is clogged	Check flue gas exhaust and air intake vent grilles in the boiler room
		Flue gas thermostat is faulty	Replace it
The boiler has shut down and red light 3 is flashing. Turn selector 9 to RESET position to resume boiler operation	Boiler safety thermostat has shut boiler down	CH water does not flow: pipes may be clogged, thermostatic valves may be shut, system stopcocks may be closed	Check CH system
		Pump is stuck or faulty	Check the pump
The boiler has shut down and red light 6 is flashing. Reset boiler by restoring 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 2 and yellow light 8 are flashing. Boiler will automatically resume operation when the problem has been solved	CH probe is not operational	CH probe is disconnected	Reconnect it
		CH probe is faulty	Replace it

BOILER STATUS	MALFUNCTION	PROBABLE CAUSE	SOLUTION
The boiler has shut down and red light 2 is flashing. Boiler will automatically resume operation when the problem has been solved	DHW probe is not operational	DHW probe is disconnected	Reconnect it
		DHW probe is faulty	Replace it
Boiler is not providing DHW	DHW flow meter is not operational	Insufficient system pressure or capacity	Check DHW system
			Check DHW flow meter filter
		Flow meter sensor is disconnected or faulty	Reconnect or replace it
		Flow meter is stuck	Replace it



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Fondital S.p.A.

25079 VOBARNO (Brescia) Italy - Via Cerreto, 40
Tel. +39 0365/878.31 - Fax +39 0365/878.576
e mail: fondital@fondital.it - www.fondital.it

The manufacturer reserves the right to implement any necessary and/or useful variation to products, without modifying fundamental characteristics.

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