

# CAPRI C

GB



## INSTALLATION, USE AND MAINTENANCE



*Dear Customer,*

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

## General informations for installers, service engineers and users

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**It is necessary to service the boiler periodically, according to the schedule indicated in the applicable section of this manual.**

**Correct maintenance allows for efficient and correct functioning of the equipment, granting the better working conditions, optimizing performance and safety for people, animals, things and environment.**

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

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

### WARNING

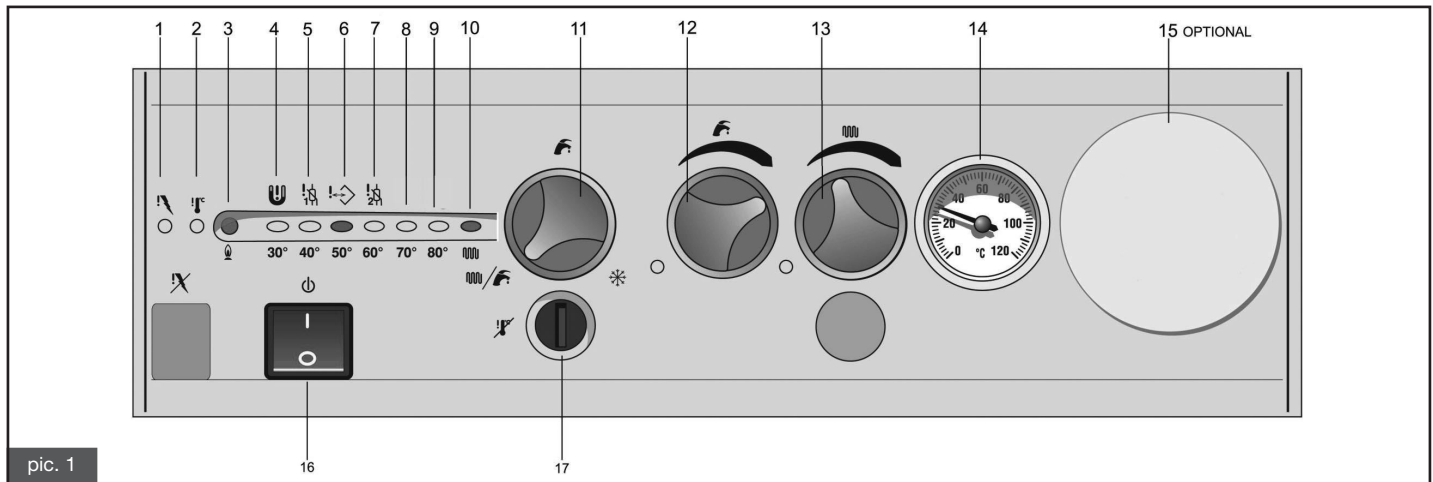
This boiler has been built for installation in the country indicated on the technical data plate: installation in any other country may be source of danger for people, animals and property.

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# 1. INSTRUCTIONS FOR THE USER

## 1.1 CONTROL PANEL



pic. 1

**1. Signalling light (red):** when the red LED is illuminated this means that the burner is blocked because the flame has been extinguished.

This blockage is released by actuating the unblocking button on the burner (fig. 2).

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

**3. Indication light (green):** when a fixed green LED is illuminated this means that the burner is fed electrically (it does not signify that the flame is present).

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

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

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

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

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

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

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

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

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

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

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

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

**11. Boiler mode selector:** this selector allows to choose the boiler mode (please, refer to paragraphs 1.2.2.).

**12. DHW supply knob:** the knob allows for DHW supply mode management.

**13. CH water temperature knob:** the knob allows for CH mode management.

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

**15. Programmer (optional):** the programmer can be set for CH supply scheduling.

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

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

## 1.2 Operating the boiler

### 1.2.1 Switching on

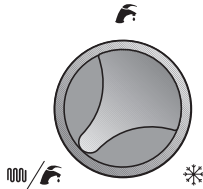
- Open the gas stop cock.
- Turn power mains switch to **ON**.
- Set boiler power switch no. **17** (pic.1) to **ON** (the switch lights up)
- Choose boiler mode through knob no. **11**, no. **12** and no. **13** and the programmable programmer no. **15** (please, refer to 1.2.2.3 and 1.2.2.4 paragraph).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

### IMPORTANT


**the production and maintenance of domestic hot water always has priority over the central heating function. When there is no demand for heating the boiler is kept at a temperature of 70 °C to avoid waitings when requiring DHW.**


### 1.2.2 Operation


#### SELECTOR (11, pic. 1)



The selector (3 positions) is for setting the operation mode of the unit:

 WINTER: all of the functions are enabled (HEATING, MAINTENANCE, DOMESTIC WATER, ANTI-FREEZE, PUMP ANTI-BLOCKAGE).

 SUMMER: the HEATING function is disabled (the functions MAINTENANCE, DOMESTIC WATER, ANTI-FREEZE, PUMP ANTI-BLOCKAGE are enabled).

 ANTI-FREEZE: the functions ANTI-FREEZE and PUMP ANTI-BLOCKAGE are enabled.

### HEATING

The control card regulates the heating temperature from a value of 50°C to 82°C according to the value set by the operator with the regulator 13 (pic. 1).

The heating function is requested when the contact of a room thermostat (optional) and the contact of a programming clock (optional) are closed; such request terminates when one of the contacts opens or if there is a demand for hot water.

At the end of the heating the heating pump carries out a post-circulation of 180 seconds and then it turns off.

The function HEATING is not enabled when the selector is set to SUMMER and ANTI-FREEZE.

### MAINTENANCE

In the absence of demand for heating and hot water, the control card will regulate the temperature of the primary at a fixed value of 50°C, in order to speed the response time should there be a demand for domestic hot water.

The MAINTENANCE function is not enabled when the selector is in the ANTI-FREEZE position.

## DOMESTIC HOT WATER

The domestic hot water function starts when the contact of the flow sensor closes and terminates when the same contact of the flow sensor opens.

The control card regulates the temperature of the domestic hot water from 35°C to 57°C depending on the setting made by the operator with the regulator 12 (pic. 1).

The DOMESTIC HOT WATER function is disabled when the selector is in the ANTI-FREEZE position.

### ANTI-FREEZE

The anti-freeze function is enabled in all of the positions of the selector:

- when the supply temperature falls below 5°C, the control card starts up the burner and the heating pump until a supply temperature of 50°C is reached, or, if the supply temperature of 50°C is not reached, until reaching a functioning time of 15 minutes;

- when the temperature of the domestic hot water falls below 5°C, the control card starts the burner and the water pump until the temperature of 8°C of the water has been reached or, if 8°C are not reached, until the functioning time of 15 minutes is reached. The supply temperature in this phase is brought to 50°C.

### HEAT ABSORPTION

When the supply temperature exceeds 90°C the pumps come on to absorb heat. In particular:

- in the SUMMER position the hot water pump runs until the supply temperature does not fall below 85°C;

- in the WINTER and ANTI-FREEZE position the heating pump will run until the supply temperature does not fall below 85°C.

### PUMP ANTI-BLOCKAGE

Every 24 hours the pumps (heating and domestic hot water) are activated for 180 seconds to avoid blockage.

### ZONE HEATING

**Should there be the necessity to heat 2 or 3 zones independently at a high temperature, it is possible to connect a zone card to the boiler (optional) + an interface Open Therm (optional). It is also possible to manage 1 zone at a high temperature + 1 zone at a low temperature (with fluid temperature); in this case, besides these two cards, it is necessary to utilise the external sensors (optional) to be connected to the zone cards.**

### 1.2.3 Boiler shutdown

When the boiler malfunctions, the burner is automatically shutdown.

Please, see the troubleshooting section (paragraph 7. "Troubleshooting") in this manual, for possible shutdown cause detection.

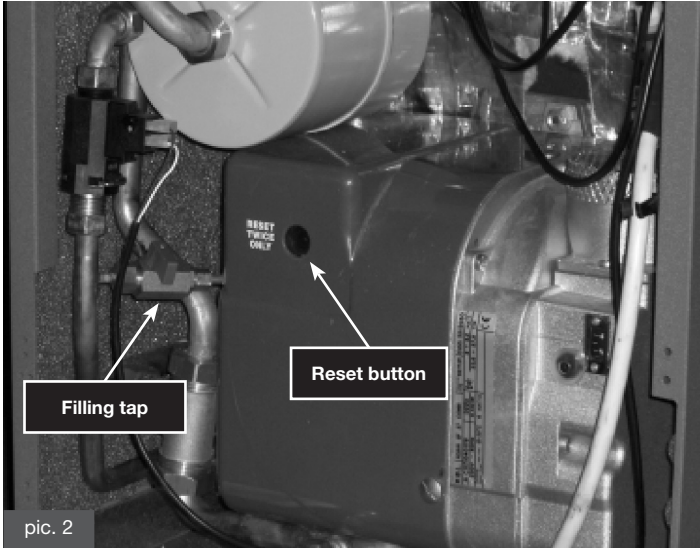
#### 1.2.3.1 Burner shutdown

When there is a burner malfunction, it automatically shuts down and light 7 comes on, in which case proceed as follows:

- First check there is sufficient fuel by checking that the fuel interception valve is open and that there is fuel in the network;

- Then unhook the front panel of the boiler by pulling it outwards, lift it in order to remove it from the boiler itself and unblock the burner by pressing the lit up red unblocking button (pic. 2); if the appliance does not start up or blocks again, at the third attempt contact qualified professionals for servicing.

Do the same if the burner shuts down frequently, as there is obviously a recurring fault.



#### 1.2.3.2 Shutdown due to overheating

Should the overheating red light 2 (pic. 1) come on, signalling the safety thermostat intervention due to a malfunction, contact an Authorized Service Centre or qualified personnel for service.

#### 1.2.3.3 Shutdown due to insufficient water pressure

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

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

- set the general switch 16 (pic. 1) to 0 (the green light turns off);
- unhook the front panel of the boiler by pulling it outwards and lift it in order to remove it from the boiler itself;
- turn the knob of the loading valve (pic. 2) in an anti-clockwise direction to let the water into the unit and keep it open until the manometer (14 pic. 1) indicates that the pressure value of 1 ÷ 1,3 bar has been reached; at this stage close the valve by turning the knob in a clockwise direction and replace the front panel.

### WARNING

**Only the loading valve should be actuated. Do not touch any other part of the unit that could scald, such as the heat exchanger or the water pipes.**

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

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

#### 1.2.3.4 Shutdown due to malfunction of temperature probes

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

- red light 5 (pic.1) for probe 1 (CH)
- red light 7 for probe 2 (water tank)

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

### 1.3 Maintenance

**It is necessary to service the boiler periodically, according to the schedule indicated in the applicable section of this manual.**

**Correct maintenance allows for efficient and correct functioning of the equipment, granting the better working conditions, optimizing performance and safety for people, animals, things and environment.**

**The user may only clean the external boiler casing, by means of commonly marketed household products. Do not use water!**

As provided, the boiler is to be serviced once a year. Correct maintenance ensures boiler to function efficiently, environmentally friendly, preventing any danger to people, animals or property. Only qualified personnel are lawfully allowed to service the boiler.

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

### 1.4 Information for the user

**The user may only access boiler parts that can be reached without using technical equipment and/or tools: no one, including qualified personnel, is authorized to modify the boiler.**

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

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

**Pump service therefore only qualified personnel may perform it.**

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

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

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

## 2 TECHNICAL CHARACTERISTICS AND DIMENSIONS

### 2.1 Technical characteristics

This is an heating unit with a cast iron heat exchanger with three combustion gas passes that operates an oil-fired blown-air burner and a DHW water tank.

The following models are available:

**CTF 23:** unit with open combustion chamber and heat output of 24 kW;

**CTF 33:** unit with open combustion chamber and heat output of 33 kW;

**CTFD 23:** unit with sealed combustion chamber and halved emissions and heat output of 24 kW;

**CTFD 33:** unit with sealed combustion chamber and halved emissions and heat output of 33 kW;

The unit meets all of the standards in force in the country of destination that is indicated on the technical card.

The installation in a different country than the one specified could be a source of danger to persons, animals and things.

The main technical features of these heating units are given below:

#### Manufacture characteristics

- High-efficiency cast-iron heat exchanger with three combustion gas passes
- Fibreglas insulation with extra thick aluminised kraft (50 mm)
- Oil-fired blown air burner in the balance flue version with built-in fuel oil pre-heater
- Body in electro-galvanised sheet steel, painted with epoxy polyester powders
- Unit electronic management card
- Heating expansion vessel with 8 litre capacity
- Heating safety valve at 3 bar
- Three speed heating circulator
- Single speed domestic hot water circulator
- Heating system de-aerator
- Copper coil for DHW instantaneous production
- Ready for connection to a programmable timer
- Oil filter
- Heating and hot water temperature sensor
- Domestic hot water priority flow sensor
- Loading valve of heating system
- Heating system drainage valve
- Safety device for water shortage
- Safety thermostat (110°C)
- Predisposition for the connection of a card for the management of several heating zones (optional kit)
- Predisposition for connection to a Remote Control (optional kit)
- Possibility of connection of an external sensor to the Remote Control (optional)

#### Operator interface

- General luminous switch
- SUMMER, WINTER, ANTI-FREEZE selector
- Regulator of the temperature of the heating water
- Regulator of the temperature of the domestic hot water
- LED thermometer
- Manometer
- Lights indicating:
  - Power on
  - Burner operation
  - Heating function activated
  - Burner shutdown
  - Shutdown due to overheating
  - Blockage due to insufficient system pressure
  - Blockage due to malfunctioning of the temperature sensor
  - Communication error with Remote Control

#### Operational characteristics

- Anti-freeze function
- Pump anti-blockage function
- Pump post-circulation function
- Heat absorption function



## 2.2 Dimensions

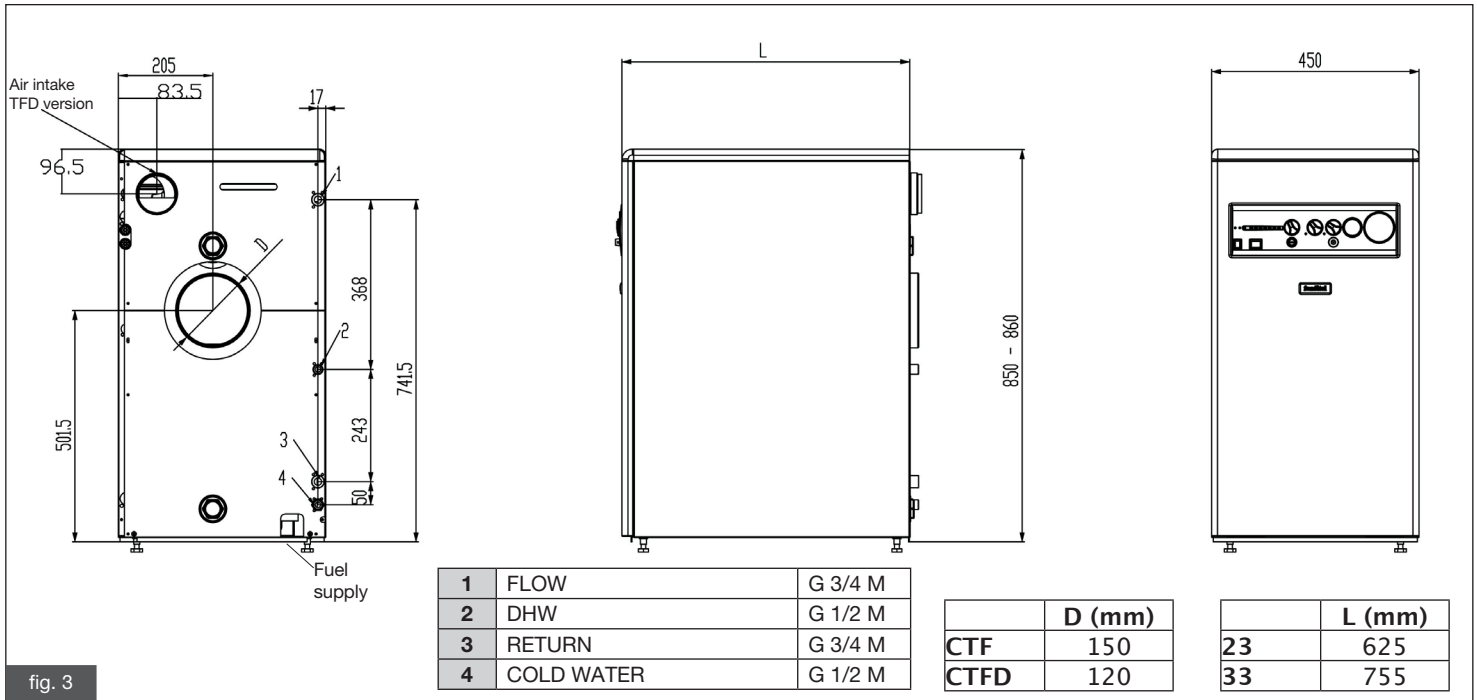
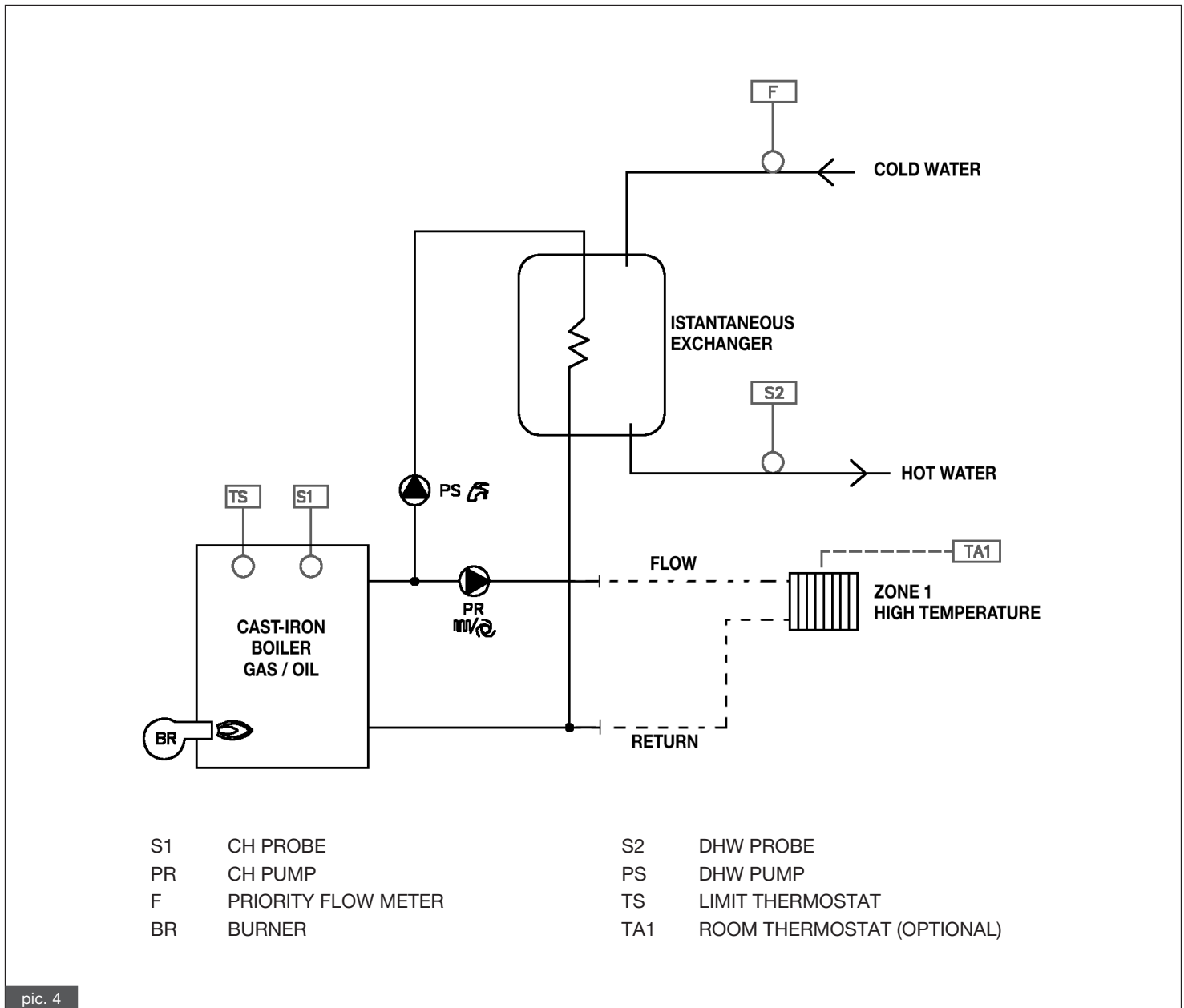


fig. 3

## 2.3 Plumbing diagram for the unit



pic. 4

## 2.4 Technical data of the heating unit

MODEL		23	33
Class of efficiency		★★	★★
Heat input Q <sub>n</sub>	kW	26.6	36.3
Heat output P <sub>n</sub>	kW	24.0	33.0
Efficiency at nominal load	%	90	91
Efficiency at reduced load (30%)	%	89.7	90.7
No. of elements of the cast iron heat exchanger		3	4
CO <sub>2</sub> value	%	12.5 ÷ 13.0	
Flue gas temperature	°C	210	190
Bacharach number		<1	<1
Flue gas flow rate	kg/h	40.0	53.2
Flue gas load loss	Pa	13	25
Water capacity	l	20	24
Minimum CH water flow rate	l/h	680	950
Load loss on the water side (ΔT = 10K)	Pa	4800	5600
Maintaining loss (ΔT = 50K)	%	0.5	0.5
CH temperature setting range	°C	50 ÷ 82	
Maximum CH working pressure	bar	3	3
CH expansion vessel capacity	l	12	12
DHW temperature setting range	°C	35 ÷ 57	
Maximum DHW working pressure	bar	6	6
DHW supply (ΔT = 30K)	l/min	11.5	15.8
Power supply	V/Hz	230/50	
Power supply fuse	A	2	2
Height	mm	850	850
Width	mm	450	450
Depth	mm	625	755
Net weight of the heating unit	Kg	150	180

## 2.5 Technical data of the burner

MODEL		23	33
Fuel		Fuel oil 1.4°E, Hi = 10210 kcal/kg 20°C	
Nozzle make		Delavan W, Steinen Q, Danfoss S	
Type of nozzle	Usgal/h	0.55	0.75
Nozzle inclination	-	80°B	80°W
Fuel oil setting pressure	bar	13.0	12.0
Fuel oil consumption	kg/h	2.24 ± 4%	3.06 ± 4%
Pump negative pressure	bar	>-0.4	>-0.4
Pre-heater	W	25	25
Combustion head setting	index	fixed	fixed

## 3 INSTRUCTIONS FOR THE INSTALLER

### 3.1 Installation regulations

This is a heating unit which must be installed pursuant to applicable standards and laws, which should be taken as incorporated in full in this manual.

### 3.2 Installation

#### 3.2.1 Packaging

The unit is packed and delivered in a wooden crate on pallets. Once the boiler has been removed from its crate, check that it is intact. The packaging material can be recycled and it must be disposed of accordingly.

Keep the packaging out of the reach of children as it represents a choking and suffocation hazard. The manufacturer waives all liability for injury to persons and animals or damage to property resulting from non-observance of the above.

The packaging contains:

- a) installation, use and maintenance handbook,
- b) four screw-adjusting legs,
- c) fuel oil filter, hose pipes and fittings for the burner supply.

#### 3.2.2 Choosing where to install the heating unit

When choosing the position of the heating unit please take into account the following:

- when installing the heating unit in a kitchen (the height of the boiler is 850 mm, like most kitchen appliances) always provide the possibility to access it from the upper side, in order to simplify operations in case it is necessary to replace components or make repairs;
- avoid installing the heating unit in wet or dusty atmospheres.

#### 3.2.3 Installing the heating unit

Before connecting the boiler to the DHW and CH system pipes, carefully clean the pipes to remove all traces of metal resulting from processing and welding operations as well as any oil and grease which could damage the boiler or jeopardise its operation.

#### ATTENTION

**Do not use solvents which could damage the components.**

**The producer waives all liability for injury to persons and animals or damage to property resulting from non-observance of the above.**

After placing the heating unit in the boiler room, please proceed as follows to install it:

- Remove the front panel.
- Unscrew the two front screws securing the base to the pallet (pic. 7).
- Raise the wooden panel to remove the heating unit as follows:
  - insert two ropes or straps from front to rear under the frame supporting the exchanger body; raise it taking care not to damage hydraulic parts and lower it to the floor.
- Screw up the two adjustable supporting legs to align and stabilise the unit.
- Connect the heating unit to the DHW and CH delivery and return pipes.
- Join the unit to the chimney and to the air intake pipe (for D versions).
- Connect the burner to the fuel oil supply pipes (see sub-section 3.2.4).
- Connect the unit to the power mains and to the room thermostat, if any.

#### 3.2.4 Connection to fuel oil mains supply

Refer to subsection 4.3 for the instructions on how to connect the boiler to the fuel oil supply.

For heating units installed in areas that are particularly cold, use fuel oil with a low content of paraffins.

If necessary, install a supplementary oil pre-heating system.

**It is compulsory to install the fuel oil filter included in the supply.**

#### 3.2.5 Ventilation

These heating units are designed for connection to a chimney. The combustion air can be taken:

- directly from the room in which the unit is installed.
- from outdoor using 80mm-dia. pipes (version D, see subsection 3.2.7).

**If the combustion air is taken from the room where it is installed, this must comply with applicable standards and laws which should be taken as incorporated in full in this manual.**

#### 3.2.6 Air intake and flue gas discharge pipes

It is mandatory to comply with all applicable standards and laws relating to the emission of flue gas, which should be taken as incorporated in full in this manual.

The flue gas discharge pipes in the heating system have the following diameter:

- for connections to 150 mm diameter ducts (**versions CTF; type B23**);
- for connections to 120 mm diameter ducts (**versions CTFD; type B23; C53; C83**).

#### CTF Version (type B23)

The flue gas pipes in version CTF type B23, must be connected to a flue made in compliance with all applicable standards and laws, which should be taken as incorporated in full in this manual.

The flue and gas pipes must comply with the following requirements:

- The diameter must not be less than the heat-exchanger discharge pipe diameter. In the case of flue with a square or rectangular cross section, the diameter must be 10% more than the coupling diameter of the heat exchanger.
- The pipes must be made of waterproof material that is resistant to flue gas temperature and acid condensate.
- They must have low thermal conductivity, good mechanical resistance, perfect seal and correctly calculated height and cross section.
- The flue must be positioned vertically with a constant cross section without any chokes.
- The end section must ensure constant, efficient discharge of flue gases in any atmospheric condition.
- The end section must project at least 50 cm from any adjacent structure within a 5 metre radius.

## Version CTFD (type B23; C53; C83)

The heating unit version CTFD (Types B23, C53 and C83) has a female fitting at the back with an 80 mm lip seal for connecting to a combustion air intake pipe.

Combustion air must be taken from outside the room in which the heating unit is installed by means of a suitable pipe.

The maximum length of this pipe is given in the technical data sheet.

When using bends, remember that a wide radius 90° curve is, in term of load losses, equivalent to a straight section of pipe 1 metre long, and a narrow radius 90° curve is equivalent to a straight pipe 1.5 metres long.

When flue gas is discharged through vertical and horizontal pipes diameter 120 mm, and with through wall discharge, when allowed, the maximum length of the discharge pipes is shown in the technical data sheet.

When using bends, remember that a wide radius 90° curve is, in term of load losses, equivalent to a straight section of pipe 1 metre long, and a narrow radius 90° curve is equivalent to a straight pipe 1.5 metres long.

### IMPORTANT

**Only enamelled or stainless steel pipes with trade or The manufacturer gaskets must be used for flue gas discharge.**

**With vertical pipes, a special section is required for condensate discharge.**

**All the installations both versions CTF and CTFD require a special section in the link to the flue allowing measurement of the flue gas temperature and CO<sub>2</sub> percentage. This is so that the burner can be set correctly and the combustion efficiency determined.**

### IMPORTANT

**When running pipes through walls made of flammable material, make sure the discharge pipe has suitable thermal insulation (min. 50 mm).**

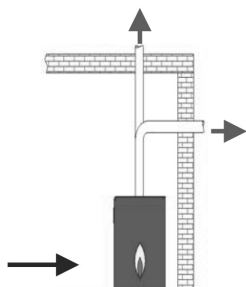
### IMPORTANT

**When flue gas system is discharged through pipes diameter 125 mm, it is compulsory to install on the air intake pipe an 80 mm diameter terminal similar to those used for the flue gas discharge of wall-hung boilers.**

## 3.2.7 Types and classification of air intake and flue gas discharge pipes

### Type B23

Discharge through the wall (if allowed by the installation standards) or through the roof or via the boiler flue. The relevant data is shown on the technical data sheet, which complies with current standards.



### model C23

Max equivalent length of discharge pipe Ø 120 mm: 5 metres

Each added wide radius 90° bend equals 1 metre discharge

Each added narrow radius 90° bend equals 1.5 metre discharge

### model C33

Max equivalent length of discharge pipe Ø 120 mm: 4 metres

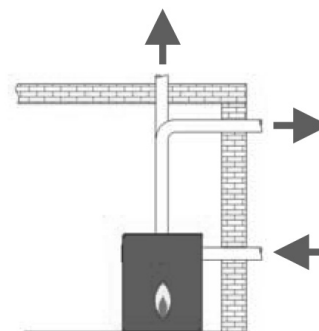
Each added wide radius 90° bend equals 1 metre discharge

Each added narrow radius 90° bend equals 1.5 metre discharge

### Type C53

The end sections of the air intake and flue gas discharge pipes must never be in opposing walls.

Refer to the table in subsection 2.2.



### model CTFD 23

Max equivalent length of air intake pipe Ø 80 mm	Max equivalent length of discharge pipe Ø 120 mm
< 1 m	up to 5 m
from 1 to 6 m	up to 6 m
from 6 to 7 m	up to 7 m

Each added wide radius 90° bend equals 1 metre both air intake and discharge

Each added narrow radius 90° bend equals 1.5 metre both air intake and discharge

### model CTFD 33

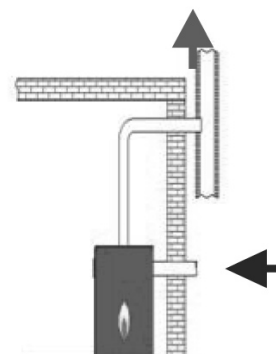
Max equivalent length of air intake pipe Ø 80 mm	Max equivalent length of discharge pipe Ø 120 mm
from 0 to 4 m	up to 4 m
from 4 to 6 m	up to 6 m
from 6 to 7 m	up to 7 m

Each added wide radius 90° bend equals 1 metre both air intake and discharge

Each added narrow radius 90° bend equals 1.5 metre both air intake and discharge

### Type C83

Connection to the chimney compatible with type C83.



### 3.2.8 Measuring combustion efficiency

Perform the following to determine combustion efficiency.

- measure the combustion air temperature.
- measure the temperature of the flue gas and the percentage of CO<sub>2</sub> taken through the holes in the flue gas duct.

Take these readings with the heating unit running, after making sure the Bacharach index is less than 1.

### 3.2.9 Connecting to the power mains

The heating unit must be connected to a **230V – 50 Hz** power supply.

**The power cable must be made of rubber.**

**Do not use PVC cables, which have low temperature resistance and tend to deteriorate quickly.**

Make sure all the wires are connected correctly.

**During installation, comply with the applicable standards and laws, which should be taken as incorporated in full in this manual.**

A two-pole switch must be fitted before the heating unit to allow maintenance to be carried out in safety. The power line must be protected by a differential magnetothermal switch with a suitable breaking capacity.

The mains supply must be properly earthed.

**This safety precaution is mandatory. In case of doubt, have the whole system checked carefully by a qualified electrician.**

This safety precaution is mandatory. In case of doubt, have the whole system checked carefully by a qualified electrician.

**The manufacturer can in no way be held liable for damage or injury caused by failure to earth the system properly. The DHW, CH and fuel pipes are not suitable for earthing purposes.**

### 3.2.10 Plumbing connections

#### CENTRAL HEATING

Before installing the heating unit we recommend you clean the system to remove any impurities from the various components which might damage the circulating pumps or the heat exchanger.

The central heating flow and return pipes must be connected using G 3/4 fittings.

When determining the size of the heating circuit pipes, it is essential to take into account the load losses induced by the radiators, any thermostatic valves, radiator cut-off valves and the configuration of the system.

#### DOMESTIC HOT WATER

The flow and return pipes must be connected to the respective G 1/2" fittings on the heating unit.

The mains pressure must not be more than 6 bar, otherwise a pressure reducer needs to be provided.

The pressure in the DHW circuit should be between 3 and 4 bar.

The hardness of the mains water determines how often the heat exchanger coil needs to be cleaned.

#### ATTENTION

- **If the water is particularly hard it may be necessary to provide a domestic water softener with a device for dosing a specific product for treating drinking water in compliance with the applicable laws. It is always advisable to treat water with a hardness of more than 20°F.**
- **Due to its pH value, water supplied from normal water softeners may not be compatible with some components of the heating system.**
- **The safety valves should be connected to a drain, otherwise the boiler room may get flooded when they operate.**

The manufacturer can in no way be held liable for damage caused by failure to take these basic safety precautions.

Picture 14 shows the plumbing system diagram of the heating unit.

### 3.3. Filling the Central Heating Circuit

When all the connections have been made, the CH circuit can be filled with water. This must be done carefully in the following order:

- Open all the radiator air valves and the automatic relief valves on the heating unit.
- Remove the front panel by pulling and lifting it toward the outside.
- Load the boiler by opening the tap anticlockwise (as shown in pic. 2) to let the water in.
- Close the radiator air valves as soon as water starts to come out.
- Using a gauge, check that the pressure is 1/1.3 bar.
- Turn off the filling tap and open all the radiator air valves again.
- Switch on the heating unit and allow it to heat up, then switch it off and bleed all the radiators again.
- Allow the system to cool down and check the water pressure is within the correct range (1/1.3 bar).

#### WARNING

As far as domestic heating systems treatment of water is concerned, in order to optimize performance and safety, to preserve these conditions over time, to ensure long-lasting regular operation of auxiliary equipment as well, and to minimize energy consumption, thereby integrating current laws and standards it is advisable to use specific products that are suitable for multi-metal plants.

### 3.4 Starting up the heating unit

#### 3.4.1 Preliminary checks

Before starting up the heating unit carry out the following checks:

- Make sure the flue gas discharge pipe and the air intake pipe are installed correctly. When the heating unit is switched on, there must be no leakage of combustion products from any of the seals.
- Check that the supply voltage is 230 V - 50 Hz.
- Make sure the system is full of water (water pressure 0.8-1 bar);
- Make sure any cut-off valves in the CH and DHW systems are open.
- Make sure the fuel supply tap is open.
- Switch on the main switch.
- Check that the safety valve is not blocked.
- Check for water leaks.

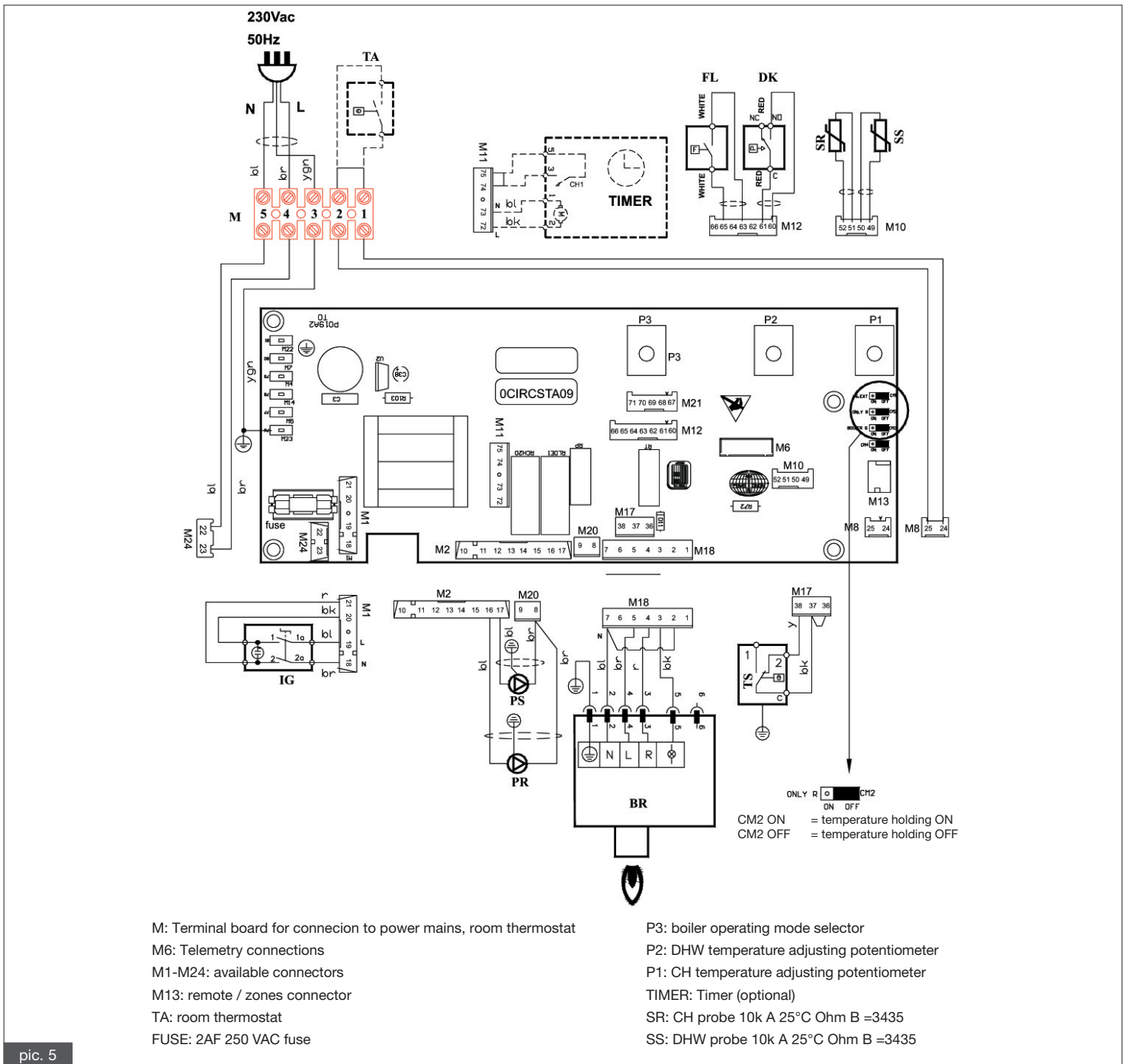
#### 3.4.2 Switching on and off

For instructions on how to switch the heating unit on and off, refer to the "User Manual".

#### 3.4.3 Burner regulation

After starting up the heating unit it is necessary to regulate the burner setting (see par. 4.4).

### 3.5 Wiring diagram



pic. 5

## 4 OIL BURNER

### 4.1 Description

The heating unit is equipped with a single-stage oil burner bearing the CE mark and complying with EC Product Directives.

### 4.2 Mounting the burner on the heating unit

The burner is mounted on the heating unit by means of an aluminium flange and held in position by a projecting screw and nut. If you need to service burner, unscrew the nut A and remove the burner (pic. 6)

### 4.3 Plumbing system

The burner pump can generate a maximum depression of 0.4 bar. Steam is generated when this value is exceeded.

The oil pipes must be perfectly airtight.

**It is mandatory to install a filter on the fuel oil supply pipe.**

The burner pump is designed to operate with a twin-pipe system. If you need to work with a single pipe, unscrew the cap 2 and remove the grub screw 3. Afterwards, replace the cap 2 (pic. 17).

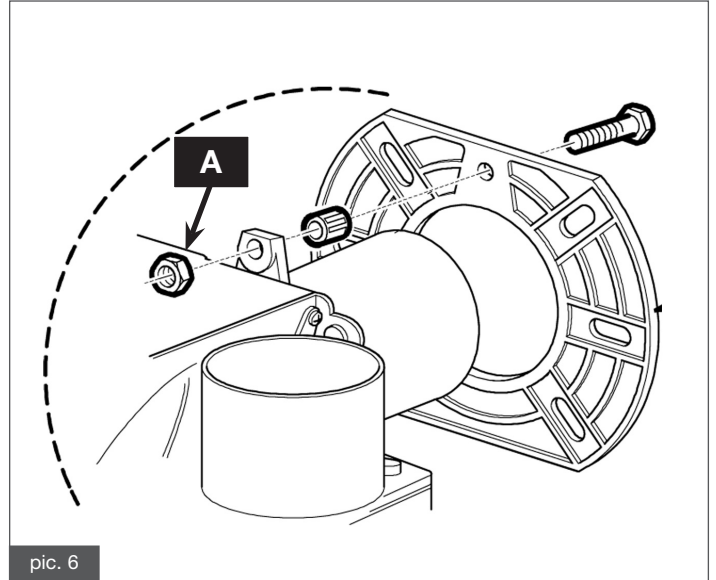
#### IMPORTANT

**With twin-tube systems, before starting up the burner make sure the return pipe is clear. This is because excessive back pressure would damage the pump.**

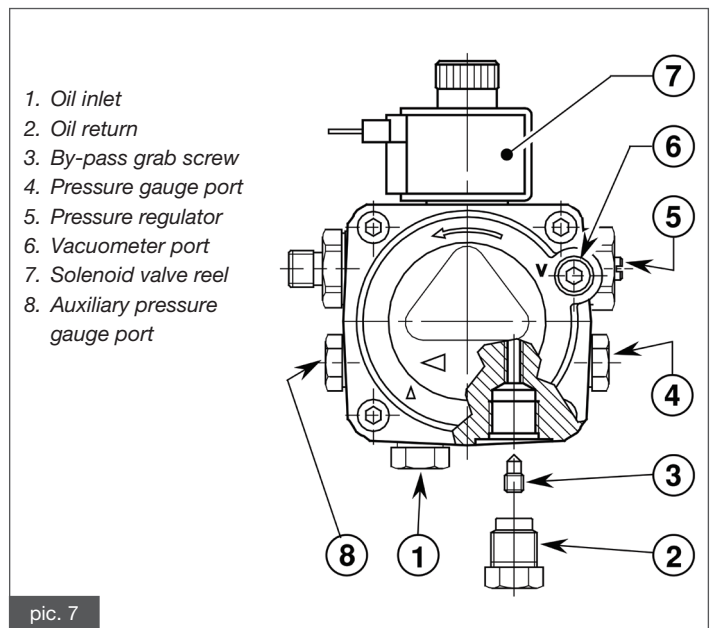
Picture 18 refers to single-pipe gravity feed.

#### ATTENTION

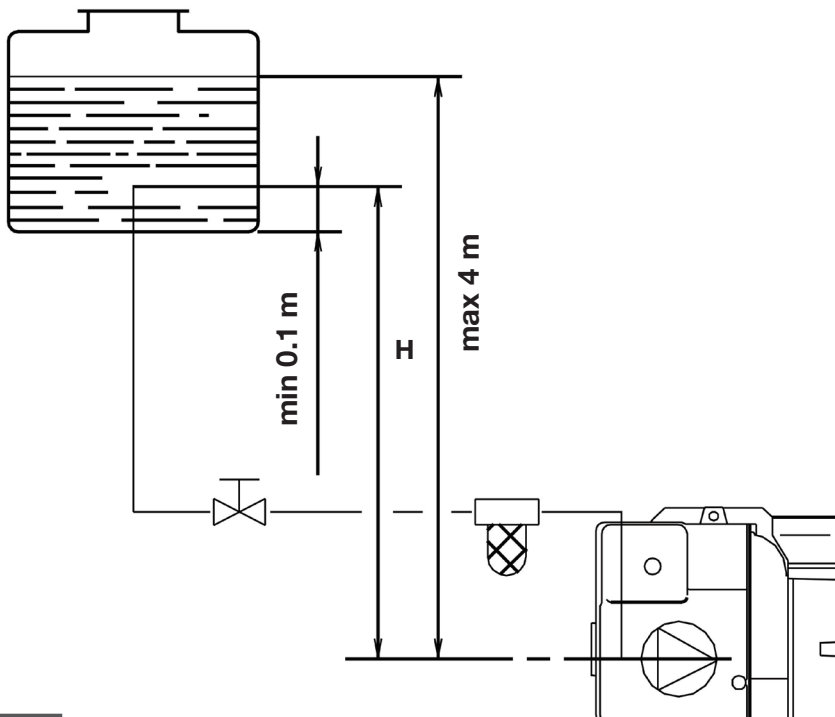
**In the 2 pipe supply system, before starting the burner, make sure that the return pipe is not blocked: an excessive pressure could, in fact, damage the pump.**



pic. 6



pic. 7

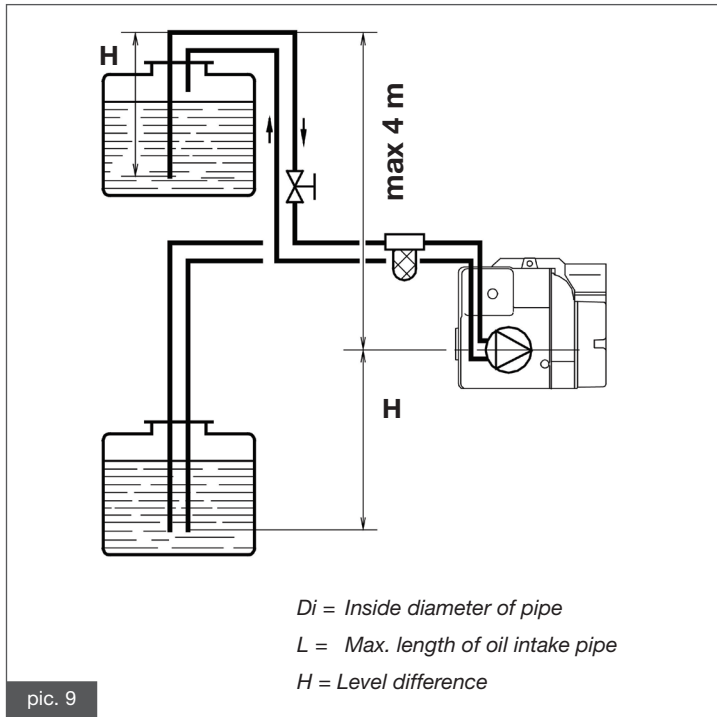


pic. 8

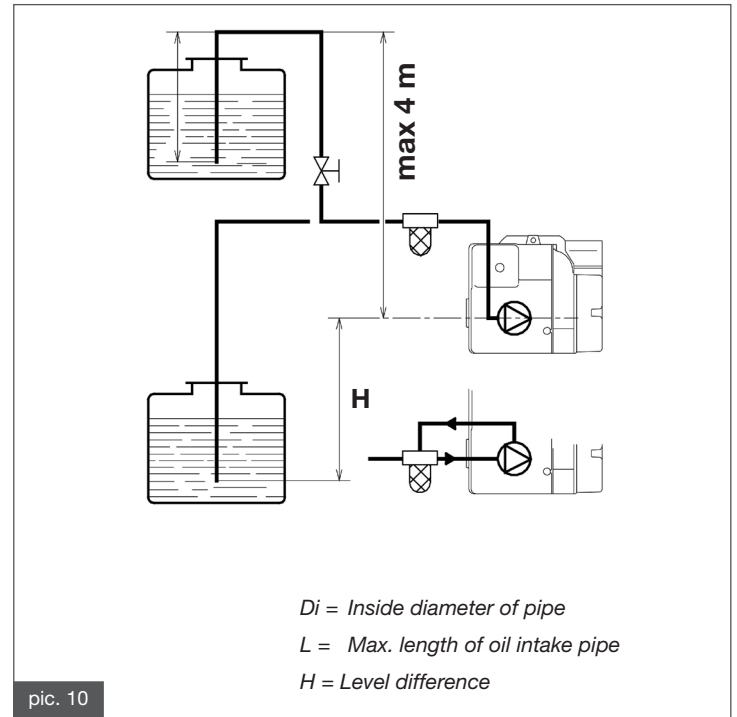
$D_i$  = Inside diameter of pipe  
 $L$  = Max. length of oil intake port  
 $H$  = Level difference

H (m)	L pipe (m)	
	ID of 8 mm pipe	ID of 10 mm pipe
0,5	10	20
1	20	40
1,5	40	80
2	60	100

Picture 19 shows a twin-pipe system.  
 If oil is taken from a tank, the return pipe is must end at the same height as the uptake pipe.  
 If the return pipe is above the oil level, a non return valve must be mounted on the uptake pipe to prevent it from emptying.



The burner performs best when the return pipe is immersed in the oil  
 Picture 10 refers to a twin-pipe system.



**ATTENTION**

**Important A manual or solenoid cut-off valve must be fitted on the oil supply pipe.  
 The burner hose pipes must be inspected regularly.**

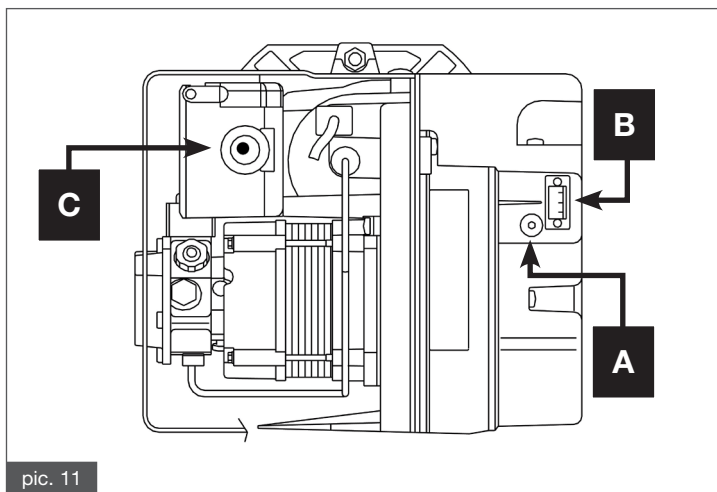
**4.4 Regulating combustion**

When regulating combustion, keep to the CO<sub>2</sub>, flue gas temperature, Bacharach index and oil pressure values shown on the technical data sheet.

The burner combustion head in the unit models 23, 31 and 33 is the fixed type and does not need regulating.

The combustion air can be regulated by turning the socket screw A shown in pic. 11. The setting is shown on a graduated scale B.

The oil pressure can be regulated by turning screw 5 in pic. 17. Refer to the technical data sheet for the value required.



**ATTENTION**

**Each installation has its own settings that cannot be predicted in advance. This means that the combustion needs to be regulated after the system has been installed.**

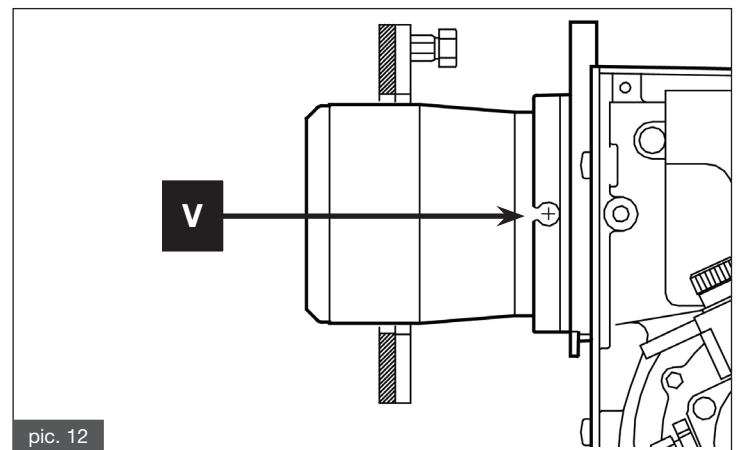
**4.5 Removing the nozzle**

Proceed as follows to remove the nozzle:

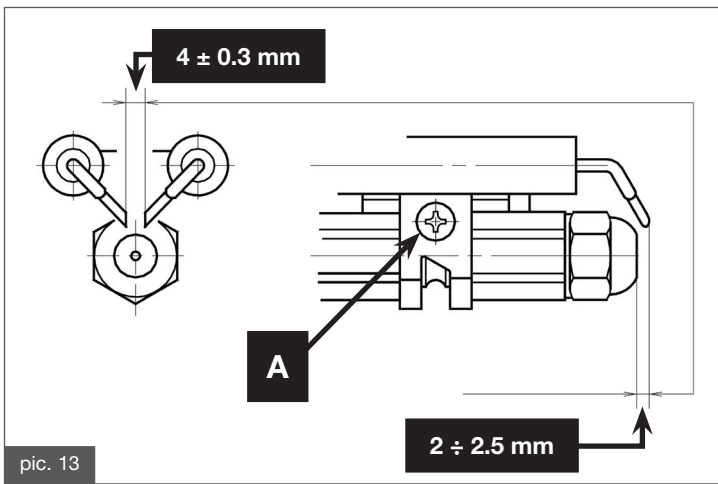
- Unscrew the two screws V (pic. 12) and remove the burner head.
- Unscrew the screw A (pic. 13) and remove the electrodes.
- Remove the nozzle using one 17 mm and one 16 mm spanner.

**4.6 Regulating the electrodes**

If the burner is to work efficiently, it is important to keep to the correct distances between the electrodes and between the nozzle and the electrodes (pic.13)

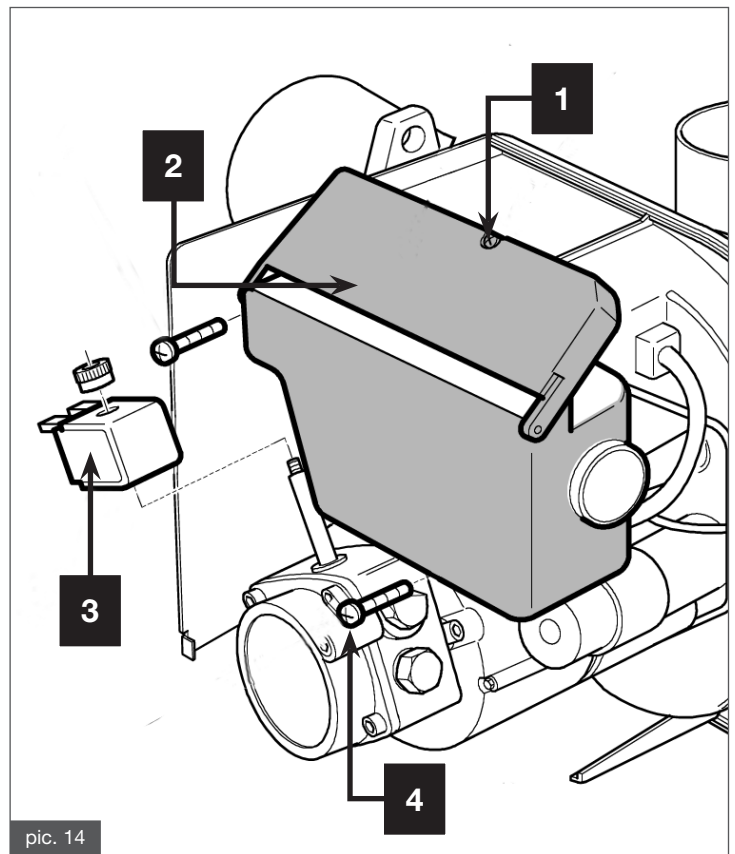






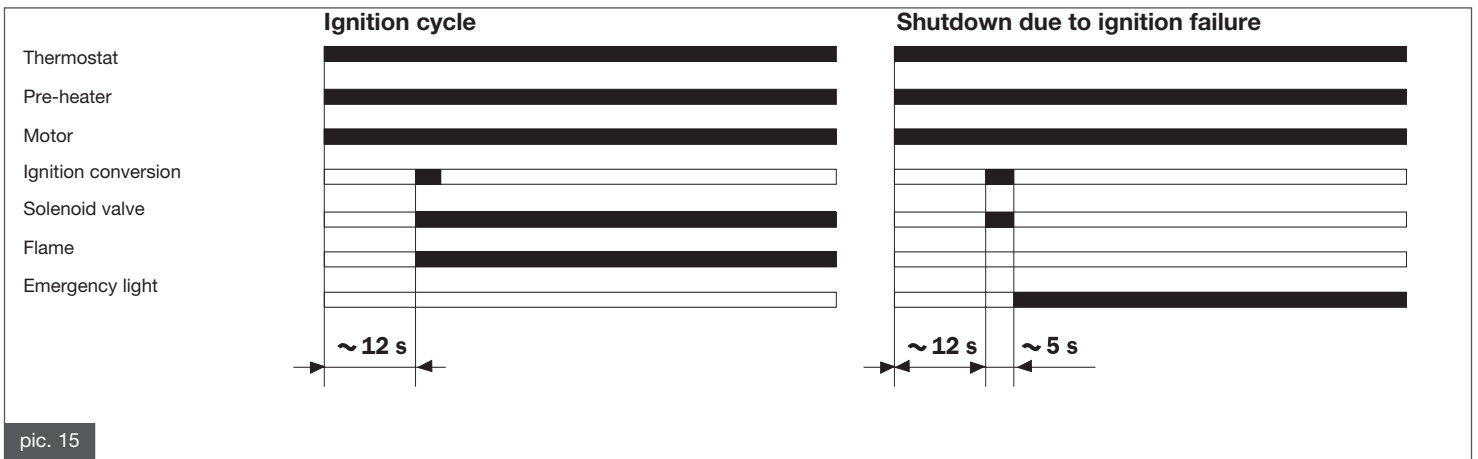
#### 4.7 Replacing the control unit

- Proceed as follows to replace the burner control unit (pic. 24).
- Unscrew the screw 1, open the lid 2 and disconnect the wires.
  - Remove the coil 3.
  - Unscrew the two screws 4.
  - Move the box slightly and disconnect the high-voltage wires.



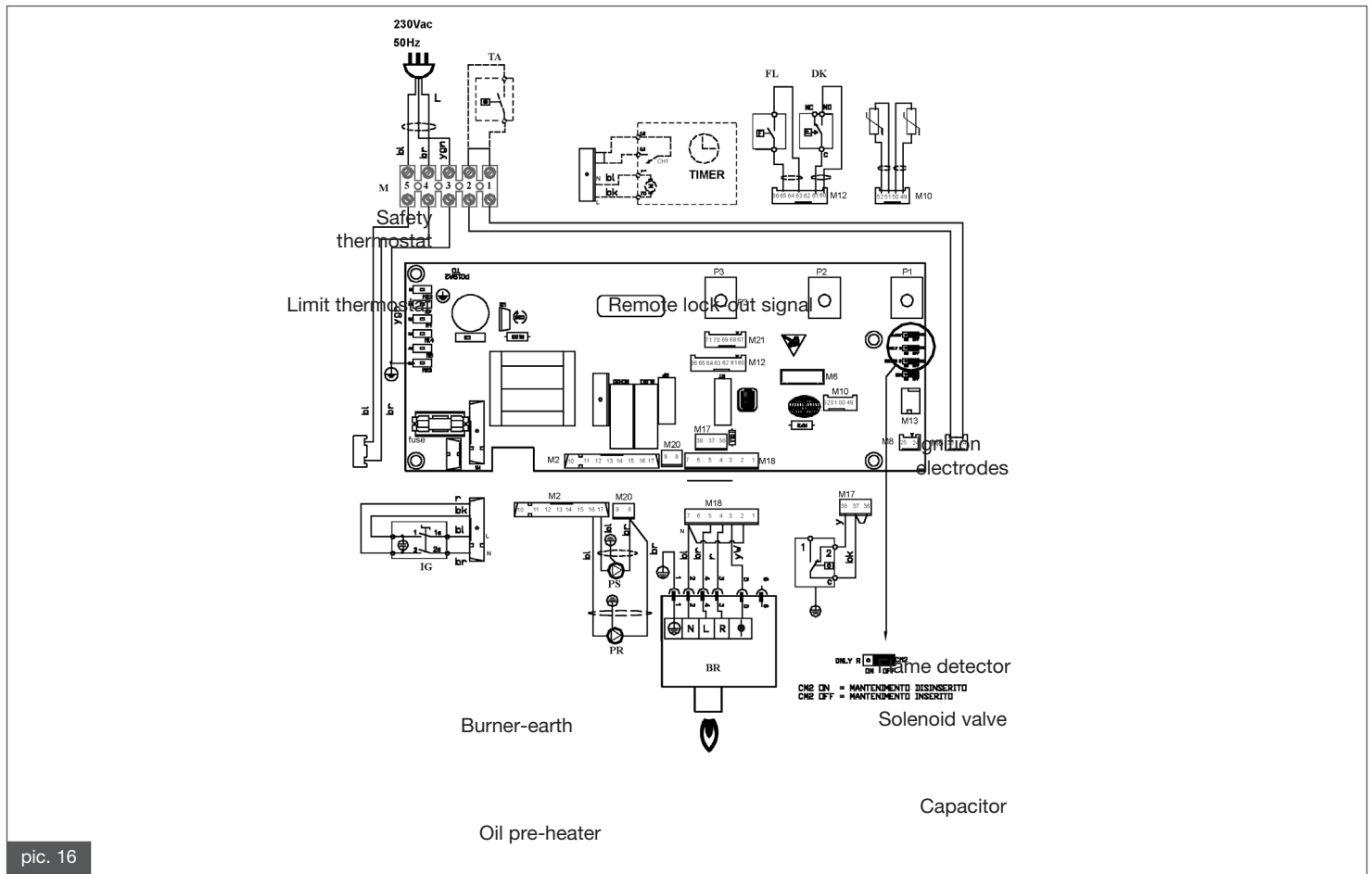
#### 4.8 Burner ignition

- In the event of shutdown, the red be pressed to reset.
- The burner ignition cycle is light 7 on the control panel (pic. 25 summarised in the graphs in pic. 1) comes on and the reset button **C** on the burner (pic. 11)



## 4.9 Burner wiring diagram

Picture 16 shows the wiring diagrams of the burners.



pic. 16

## 4.10 Burner troubleshooting

MALFUNCTION	POSSIBLE CAUSE	SOLUTIONS
The burner does not switch on when it receives a start signal from the room thermostat	Boiler is not powered on	Check voltage at the terminals
		Check the fuse
		Check the room thermostat
	The photo resistance reads a false light	Eliminate the false light
The burner implements pre-washing procedure and then shuts down	The control unit is connected wrongly	Check the terminal connections
	The photoresistance is dirty	Clean it
	The photoresistance is faulty	Replace it
	The flame goes out or does not light	Check the oil pressure
		Check that oil flows smoothly from the nozzle
		Check the air
Check the solenoid valve		
The burner starts after one failed ignition	Change the nozzle	
	The ignition electrodes are wrongly positioned	Position electrodes according to instructions
	The air flow is too high	Regulate the air flow
	The nozzle is dirty or damaged	Replace it
	The resistor is faulty	Replace it

## 5 TESTING THE HEATING UNIT

### 5.1 Preliminary checks

Before starting up the heating unit, carry out the following checks:

- Make sure the heating unit has been installed in compliance with legal requirements.
- Make sure the flue gas discharge pipe is installed correctly.  
When the heating unit is switched on, there must be no leakage of combustion products from any of the seals.
- Check that the supply voltage is 230 V - 50 Hz.
- Make sure the system is full of water (water pressure 0.8-1 bar).
- Make sure any cut-off valves in the system are open.
- Make sure there are no oil leaks.
- Switch on the main switch.

- Check that the safety valve is not blocked.
- Check for water leaks.

If the heating unit is not installed in compliance with the relevant laws and standards, do not attempt to switch it on and inform the Service Centre.

### 5.2. Switching on and off

For instructions on how to switch the heating unit on and off, refer to the "User Manual".

## 6 MAINTENANCE

In order to ensure correct and efficient heating unit operation, have it serviced according to the following schedule and complying to the legal requirements.

Correct maintenance allows for efficient and correct functioning of the equipment, granting the better working conditions, optimizing performance and safety for people, animals, things and environment.

All maintenance and repairs must be carried out by a properly qualified service engineer.

It is advisable for the heating unit to be serviced and repaired by an authorised Service Centre, which can provide properly trained qualified personnel.

Before carrying out any maintenance involving the replacement of components or cleaning inside the unit, always turn off the main switch.

### 6.1 Maintenance schedule

Periodic maintenance covers the following

#### Checks and Inspections

- Perform a general check and inspection of the heating unit.
- Check the oil supply circuit for leaks.
- Check that the heating unit switches on correctly.
- Check the combustion parameters by means of flue gas analyses.
- Check the condition, state and tightness of the flue gas discharge pipes.
- Check that all the safety devices are intact and operational.
- Check the fittings for water leaks and oxidation.
- Check the efficiency of the safety valve.
- Check the safety thermostat.
- Check the contents of the expansion vessel

#### Cleaning operations:

- Clean the inside of the heating unit.
- Clean the burner and reset if necessary (see par. 4.4 "Regulating combustion").
- Clean the ventilation grille in the room in which the unit is installed.
- Clean the heat exchange on the flue gas side.

#### When repairing or servicing the unit for the first time, perform the following checks:

- Make sure the room of installation is suitable.
- Check the ventilation openings.
- Check the diameters, length and state of the flue gas discharge pipes .
- Make sure the heating unit is installed according to the instructions in this manual.

**If the heating unit does not operate correctly or is likely to cause a hazard for people and animals or damage to property, inform the Service Centre and fill in the relevant form.**

## 7 TROUBLE-SHOOTING

UNIT STATUS	MALFUNCTION	POSSIBLE CAUSE	SOLUTIONS
The boiler is blocked, the red blockage light 1 is illuminated.	See paragraph 4.10. "Burner diagnostic".	See paragraph 4.10. "Burner trouble-shooting".	See paragraph 4.10. "Burner trouble-shooting".
The boiler has shut down and red light no. 2 is on. Reset by pressing no. 17 button.	Safety thermostat has shut the boiler down	Water is not flowing in the CH system: pipes are clogged, thermostatic valves are closed, intercepting valves in the system are closed	Check CH system
		Pump is blocked or faulty	Check the pump
The boiler has shut down and red light no. 4 is flashing. Restore correct water pressure	Insufficient water pressure	Possible water leaks	Check system for leaks
		Pressure switch is disconnected	Reconnect it
		Water pressure switch is faulty	Replace it
The boiler has shut down, red light no. 5 is flashing. Boiler will automatically resume operation as soon as the problem is solved	Flow probe is faulty	Flow probe is disconnected	Replace it
		Flow probe is faulty	Replace it
The boiler has shut down and red light no. 6 is flashing. Boiler will automatically resume operation as soon as the problem is solved	Boiler communication to and from remote control is faulty	Connecting wire is faulty	Check connecting wire
The boiler has shut down, red light no. 7 is flashing. Boiler will automatically resume operation as soon as the problem is solved	Water tank is faulty	Water tank probe is disconnected	Reconnect it
		Water tank probe is faulty	Replace it
The boiler has shut down, red light no. 9 is flashing (BTN model only). Reset by pressing no. 19 button.	Flue gas thermostat is not consenting to boiler operation	Flue gas thermostat is faulty	Check flue gas thermostat operation: replace when faulty
		Air inlet or flue gas discharge flow is not adequate	Replace it
Boiler is not supplying DHW	Flow meter is not operating	The system has not sufficient pressure or flow rate	Check DHW system
			Check flow meter filter
		Flow meter sensor is faulty or disconnected	Replace or reconnect it
		Flow meter is blocked	Replace it









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