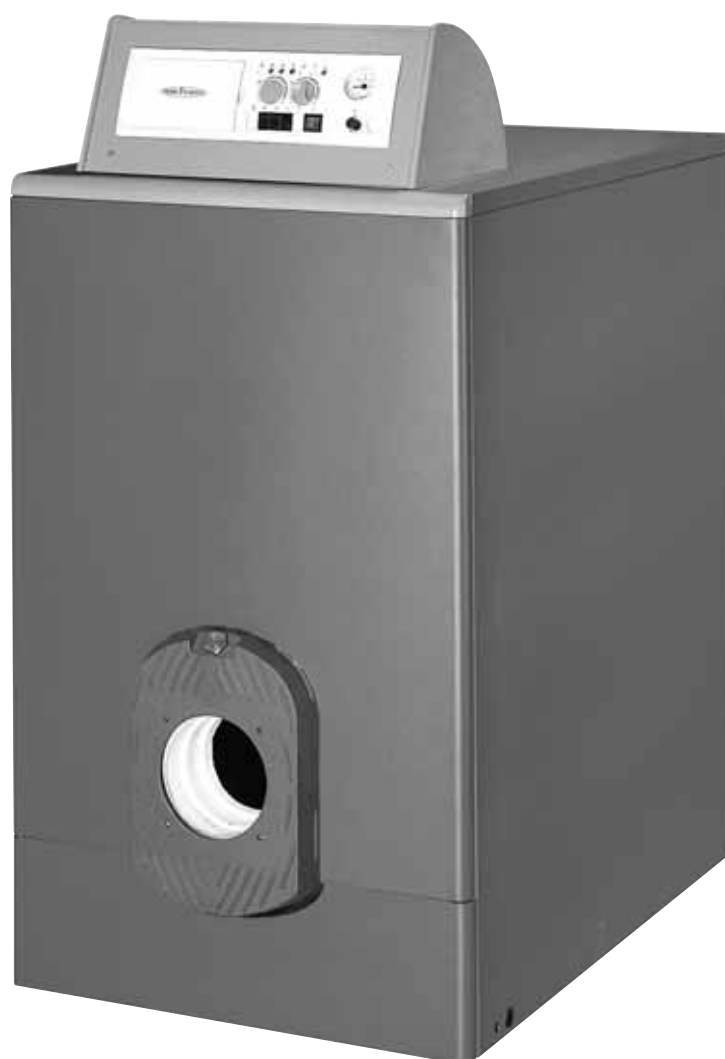




CE



# SCUDO

## INSTALLATION, USE AND MAINTENANCE



IST 04 C 085 - 02



*Thank you for choosing our boilers. Please read these installation and maintenance instructions with care.*

*Please note that the boiler must only be installed, repaired and serviced by qualified personnel.*

## General information for installers, service engineers and users

This INSTRUCTION MANUAL, which is an integral and indispensable part of the product, must be handed over 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 moved.

**This boiler must only be used for the purpose for which it has been designed. Any other use is 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 or damage, for which the manufacturer cannot be held liable.

Damage or injury caused by incorrect installation or use or failure to observe the manufacturer's instructions shall relieve the producer of all liability whether under a contract or not.

Before installing the boiler, check that the specification meets the requirements of the system in which it is to be installed.

Check that the boiler is intact and that it has not been damaged during transport and handling. Do

not install equipment which is clearly damaged or faulty.

Only original accessories must be used for all boilers supplied with optionals or kits (including electrical ones).

All the packaging materials can be recycled and should be sent to specific waste management sites.

Keep the packaging out of the reach of children as it constitutes a serious hazard.

In the event of a malfunction, switch off the boiler immediately. Do not attempt to make any repairs and contact a qualified technician.

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

Failure to do this may jeopardise the safety of the boiler and create a serious hazard.

**To guarantee efficiency and correct operation of the equipment, it is legally binding for the boiler to be serviced once a year according to the schedule indicated in the relevant section of this manual.**

If the boiler is not used for a certain length of time, switch off the electricity and fuel supply. Place some calcium carbonate inside the heat exchanger to absorb moisture.

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

### CAUTION

With gas-fired boilers, if the smell of gas is noticed, proceed as follows:

- **Do not operate any power switches or start up any electric appliances.**
- **Do not light anything producing a flame and refrain from smoking.**
- **Switch off the main gas tap.**
- **Open all doors and windows wide to ventilate the room.**
- **Contact a Service Centre, qualified fitter or the gas supply service.**

**Never attempt to look for leaks using a flame.**

### IMPORTANT

**SCUDO** has been built for installation only in the country indicated on the rating plate. **Installation in any other country may cause injury or damage.**

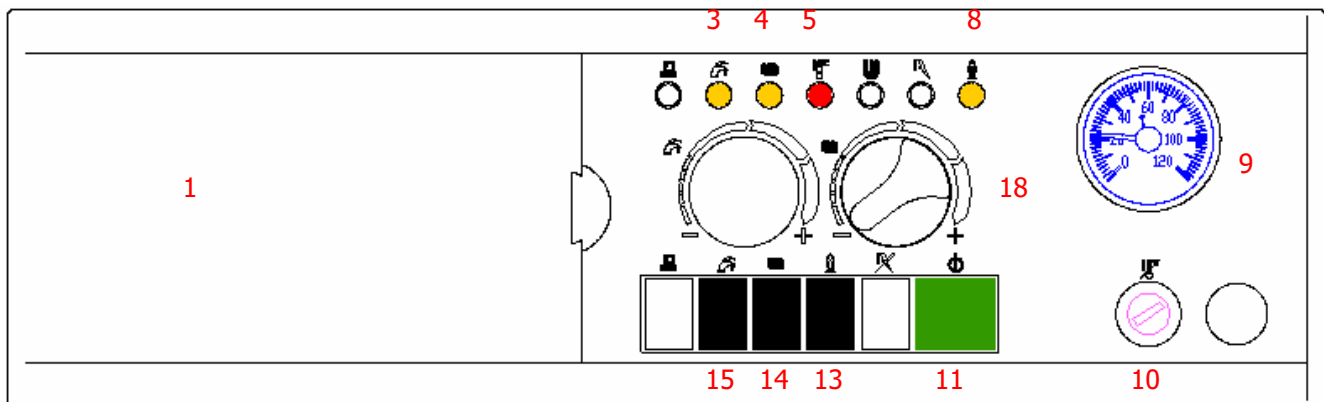
**Read carefully the conditions and clauses on the warranty certificate.**

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# 1 Instructions for the user

## 1.1 Control panel



pic. 1

1 = Temperature control unit (optional) or timer (optional)  
3 = Domestic hot water (DHW) on light (yellow)  
4 = Central heating (CH) on light (yellow)  
5 = Overheating shutdown light (red)

8 = Burner on light (yellow)  
9 = Thermometer  
10 = Safety thermostat with manual reset  
11 = Illuminated main switch (green)  
13 = Burner switch

14 = Central heating circulating pump switch  
15 = Hot water circulating pump switch  
18 = Two-stage central heating temperature regulator.

### Illuminated main switch (green) (11)

When the switch is in position **0**, the boiler is off and the green power light is off.

When the switch is in position **I**, the boiler is powered on and the light is on.

### Two-stage central heating temperature regulator (18)

This knob is used to set the temperature of the water in the boiler, range 60-90°C.

### Domestic hot water on light (yellow) (3)

When this light is on, it means that the system is demanding domestic hot water.

### Central heating on light (yellow) (4)

When this light is on, it means that the system is demanding heating.

### Overheating shutdown light (red) (5)

When this light comes on, it means that the safety thermostat with manual reset has switched off the boiler due to a malfunction.

### Burner on light (yellow) (8)

This light indicates that the burner is in operation.

### Thermometer (9)

This displays the temperature of the water in the boiler

### Safety thermostat with manual reset (10)

The safety thermostat switches the boiler off when there is a malfunction. Remove the black cap and press the reset button.

### Burner switch (13)

This is used to switch off the burner.

### Central heating pump switch (14)

This is used to turn off the central heating pumps.

### Hot water pump switch (15)

This is used to turn off the hot water pump.

## 1.2 How the boiler operates (Pic.1 )

### 1.2.1 Switching on

\*Check the pressure of the water in the system (maximum 5 bar – 500kPa, minimum 0.8-1 bar – 80-100 kPa).

\* Open the fuel tap.

\* Press the main switch **11** to the ON position (light on).

\* Press the burner switch **13** to switch on.

\* Set the central heating temperature on the control knob **18**.

\* Set the ambient temperature value on the ambient thermostat if there is one.

\* The yellow central heating light **4** comes on when the system demands heating.

\* The burner light **8** is on when the burner is in operation.

The boiler is fitted with a thermometer displaying the water temperature.

### 1.2.2 Burner shutdown

When there is a system malfunction, the burner switches off automatically and the shutdown light comes on. If this happens, proceed as follows:

\* Check the fuel supply first.

\* Press the burner reset button. If the boiler does not restart, try to reset the burner two times and

then call an authorised Service Centre or qualified maintenance personnel.

If the boiler shuts down frequently, this indicates that there is a recurring anomaly. In this case contact qualified personnel or an authorised Service Centre for maintenance.

### 1.2.3 Shutdown due to overheating

If the red overheating light **10** comes on, it means the manual reset safety thermostat has activated due to a malfunction. In this case contact qualified personnel or an authorised Service Centre for maintenance.

## 1.3 Maintenance

It is legal requirement to have the boiler and burner serviced once a year.

Correct maintenance allows the boiler to work optimally, respecting the environment and without endangering people, animals or property.

**The boiler must be serviced by qualified personnel.**

**The user may only clean the exterior cover of the boiler, using furniture cleaning products.**

**Do not use water!**

## 1.4 Information for the user

**The user can access only the parts of the boiler which can be reached without the need for tools and/or implements: it is therefore forbidden to disassemble the exterior cover of the boiler and tamper with the interior parts.**

**NO-ONE, INCLUDING THE SERVICE ENGINEER, MAY MAKE MODIFICATIONS TO THE BOILER.**

The service engineer is only authorised to install original Nova Florida kits.

**The producer declines all liability for injury to persons and animals and damage to property resulting from attempts to tamper with or misuse of the boiler.**

Frost protection can be ensured by adding a specific anti-freeze product suitable for multi-metal systems.

**Do not use anti-freeze for car engines and check regularly to make sure the product remains effective.**

## 2 Technical features and dimensions

### 2.1 Technical features

**SCUDO** is a boiler with a cast iron heat exchanger with three combustion gas passes. It operates by means of gas- or oil-fired free-standing blown air burners.

Comes in the following models:

**SCUDO 80**, thermal output 82 kW;

**SCUDO 100**, th. output 98 kW;

**SCUDO 120**, th. output 114 kW;

**SCUDO 140**, th. output 132 kW;

**SCUDO 160**, th. output 150 kW;

**SCUDO** meets the basic requirements of the following EC product Directives.

Gas Directive 90/396 EEC, 19<sup>th</sup> June 1992.

Efficiency Directive 92/42 EEC, 21<sup>st</sup> May 1992.

EMC Directive 89/336/EEC, 3<sup>rd</sup> May 1989, amended by Directive 92/31/EEC on 28<sup>th</sup> April 1992;

\* Low Voltage Directive 73/23/EEC, 19<sup>th</sup> February 1973, amended by Directive 93/68/EEC on 22<sup>nd</sup> July 1993.

**SCUDO** is also equipped with all the safety devices required by law.

The main technical features of **SCUDO** boilers are given below.

\* High-efficiency cast-iron heat exchanger with three combustion gas passes.

\* Fibreglas insulation with extra thick aluminised kraft (80 mm);

\* Galvanised sheet metal case, epoxy-polyester powder painted.

\* System drain tap.

Control panel for the central heating function only complete with the following:

\* Main switch with built-in light

\* Burner switch

\* Central heating pump switch

\* DHW pump switch

\* Indicator and warning light:

- power on

- CH system on

- DHW system on

- burner operation

- shutdown due to overheating.

\* Two-stage boiler water temperature regulator (60-90°C) with 8°C difference between 1<sup>st</sup> and 2<sup>nd</sup> stage.

\* Safety thermostat (100°C).

\* Thermometer.

\* Electrically wired to take a heating pump and a hot water pump.

\* Designed to take a tank heater priority thermostat.

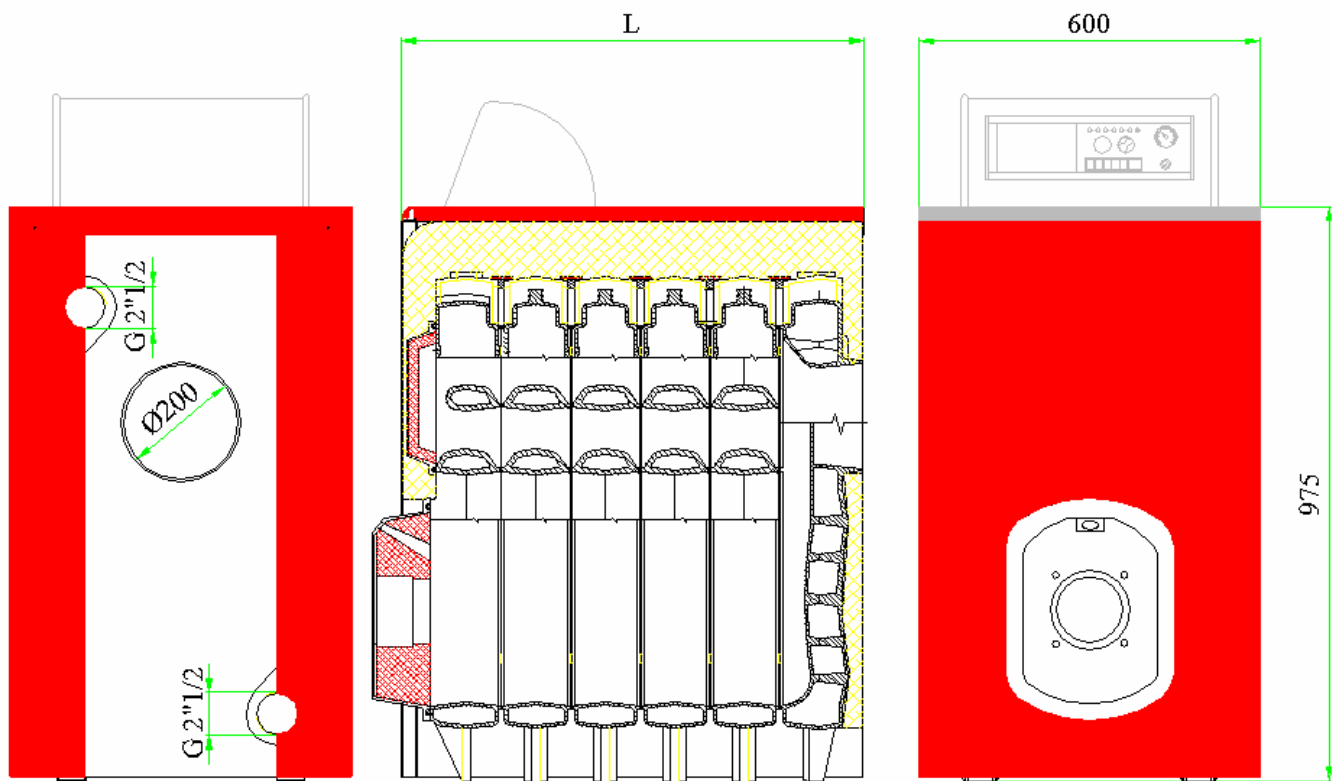
\* Designed to take a boiler minimum temperature thermostat.

\* Designed to take a central temperature control unit (optional kit).

\* Designed to take a board for handling three heating zones.



2.2 Dimensions



Pic.2

MODEL	L	Flow	Return
	mm		
80	885	G 2 ½	G 2 ½
100	1010	G 2 ½	G 2 ½
120	1130	G 2 ½	G 2 ½
140	1250	G 2 ½	G 2 ½
160	1375	G 2 ½	G 2 ½

## 2.3 Technical data

		Models				
		<b>80</b>	<b>100</b>	<b>120</b>	<b>140</b>	<b>160</b>
EC efficiency class		☆☆	☆☆	☆☆	☆☆	☆☆
Maximum thermal capacity		82	98	114	132	150
Minimum thermal capacity	kW	67	83	99	117	132
Thermal output	kW	90	107.4	124.8	144.3	163.6
Efficiency at the rated load	%	91.1	91.2	91.4	91.6	91.7
Efficiency at reduced load (30%)	%	92.9	92.9	92.8	92.8	92.7
Maintaining loss ( $\Delta t = 50K$ )	%	0.58	0.54	0.51	0.48	0.45
No. heat exchanger elements		6	7	8	9	10
Net weight	kg	340	380	425	470	510
Water content	l	71.7	82.3	92.9	103.5	114.1
Minimum hourly flow rate in the boiler	l/h	2300	2800	3200	3800	4300
Length of combustion chamber	mm	588	709	830	951	1072
Volume of combustion chamber	dm <sup>3</sup>	64.5	77.2	90	102.8	115.6
Volume on the flue gas side	dm <sup>3</sup>	90.5	108.2	126	143.8	162.6
Flue gas temperature	°C	180	179	177	175	175
Flue gas temperature at minimum capacity	°C	154	154	154	154	154
Flue gas flow rate at maximum capacity (oil)	kg/h	141	165	192	222	251
Flue gas flow rate at maximum capacity (natural gas)	kg/h	148	178	204	236	266
Operating pressure	bar	5	5	5	5	5
Load loss on the flue gas side	Pa	39	40	46	50	60
Furnace pressure	Pa	39	40	46	50	60
Load loss on the water side ( $\Delta t = 10K$ )	Pa	800	1500	2200	3000	3900
Max diameter of the burner head hole	mm	140	140	140	140	140
Diameter of M8 holes for the burner	mm	170	170	170	170	170
Flue gas outlet diameter	mm	200	200	200	200	200
Boiler water temperature range	°C	60 - 90	60 - 90	60 - 90	60 - 90	60 - 90
Boiler water bithermostat differential	K	8	8	8	8	8
Power supply	V/Hz	230/50	230/50	230/50	230/50	230/50
Power supply fuse	A	4	4	4	4	4
Maximum control panel power	W	575	575	575	575	575

### Note

In compliance with current laws (CE marking as per Directives 73/23/CEE –89/336/CEE – 90/396/CEE; EN 267 regulation) blown-air burners must be installed according to the manufacturer's instructions. The burner must be regulated to give a CO<sub>2</sub> value as shown below:

		Models				
<b>Fuel</b>		<b>80</b>	<b>100</b>	<b>120</b>	<b>140</b>	<b>160</b>
Natural gas G 20	% CO <sub>2</sub>	9.5- 9.7	9.5- 9.7	9.7- 9.9	9.8- 10	10.2- 10.4
Oil	% CO <sub>2</sub>	12.2- 12.5	12.2- 12.5	12.2- 12.5	12.4- 12.6	12.8- 13

### 3 Instructions for the installer

#### 3.1 Installation rules

The **SCUDO** boiler 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

**SCUDO** is delivered in three separate packs.

\* The first is a sturdy pallet holding the following wrapped parts: the front, rear and intermediate elements, the turbo fans (for SCUDO 80 and SCUDO 100), the doors, the gaskets and rings, a bag with accessories, the tie rods, assembly guides and sealant.

\* The second contains the case, the insulation, a bag with screws and nuts, the installation, use and maintenance handbook and the rating plate.

\* The third contains the control panel.

Once the boiler has been unpacked, check that it is intact. The packaging material can all be recycled and must be disposed of accordingly.

**Keep all the packaging materials out of the reach of children as they are a hazard. The producer declines all liability for injury to persons and animals or damage to property resulting from failure to observe these rule.**

##### 3.2.2 Choosing where to install the boiler

When choosing the position of the boiler bear in mind the following rules:

- \* It is advisable to leave a space of 50 cm all round the boiler to facilitate maintenance operations.
- \* Do not install the boiler in a damp or dusty room.
- \* Make sure the boiler after installation is not accessible to

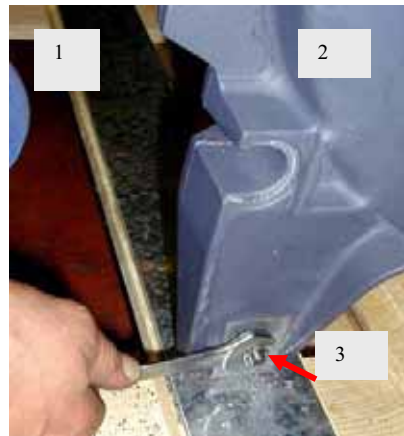
unauthorised persons, children or animals.

##### 3.2.3 Installing the boiler

Installation takes place in the following stages:

###### Stage 1. Assembling the body of the boiler

a) Position the slides **1** where the boiler is to go and fix the rear element **2** onto them using M 10x35 bolts, nuts and washers **3** (Pic. 3).



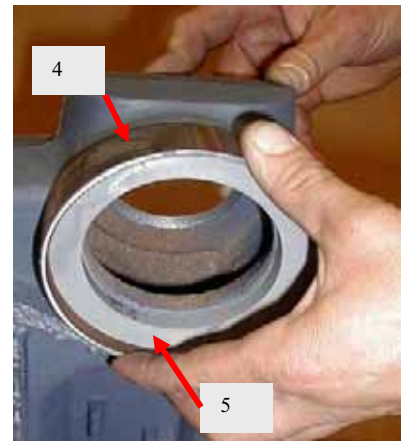
Pic. 3

b) Fill the spaces **A** in the flue gas area and the outer edge of the element with the sealant provided (Pic. 4).



Pic. 4

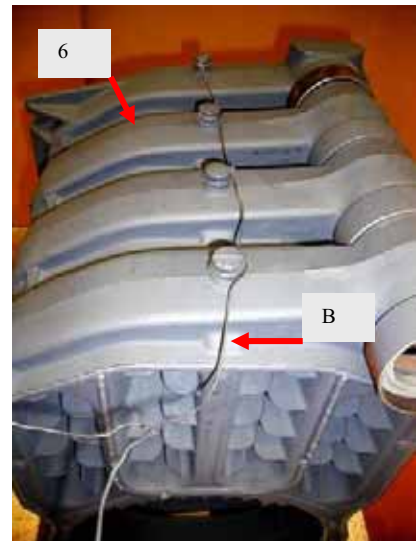
c) Mount the ring **4** and central gasket **5** on the hubs (Pic. 5). Bring the first intermediate element **6** and the rear element together.



Pic. 5

**Important: Use the iron wire B provided to keep the elements vertical and parallel (Pic. 6).**

d) Repeat steps b) and c) for the other intermediate elements and the front element (Pic. 6).

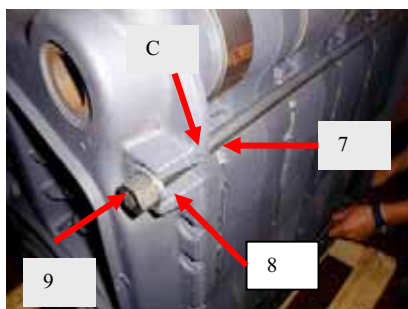


Pic. 6

e) Fit the four tie rods **7** in the slots in the front and rear elements, keeping the shorter end of the thread **C** towards the front of the boiler. Then fit on the 17x34x4.2 washers (**8**) and tighten the four nuts **9** by hand (Pic. 7).

f) Tighten the nuts **9** alternately until all the elements are in contact, using a torque wrench (torque 5 kgm - ~50 Nm) (pic. 8).

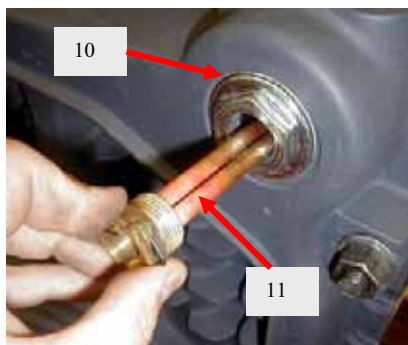
g) Mount the G 1 1/4 adaptors **10** on the front element. Mount the sheath **11** for the probes on the upper adaptor, and the boiler drain tap **12** on the lower ones (Pics. 9 and 10).



Pic. 7



Pic. 8



Pic. 9



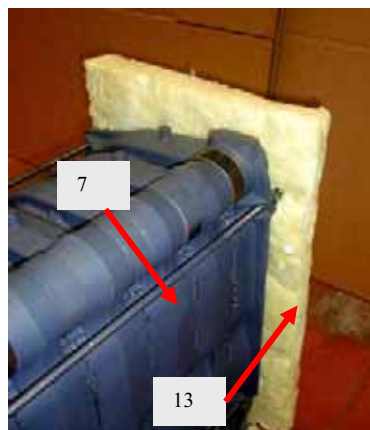
Pic. 10

## Stage 2. Plumbing and tightness test

a) Fit the insulating panel 13 against the rear element, centering the tie rods 7, and connect the central heating flow and return pipes (Pic. 11).

b) Fill the boiler with water and perform a tightness test at 6.5 bar (650 kPa), leaving the boiler pressurised for at least one hour.

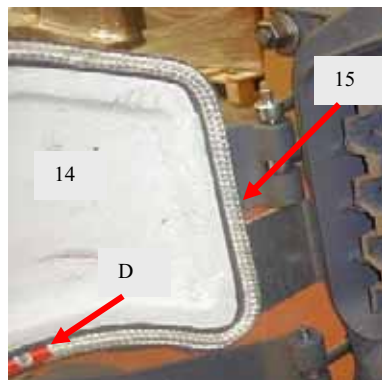
**THIS TEST IS MANDATORY.**



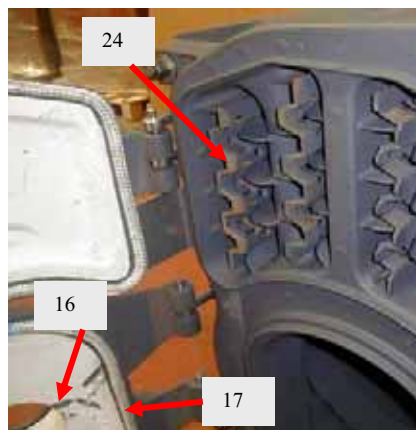
Pic. 11

## Stage 3. Mounting the doors and turbo fans (for SCUDO 80 and SCUDO 100)

a) Apply the insulating cord 15 (Ø 12x1300) to the top door 14, and the insulating cord 17 (Ø 12x1070) to the bottom door 16. Knock it in gently using a mallet and make the join D at the bottom (Pics. 12 and 13).



Pic. 12



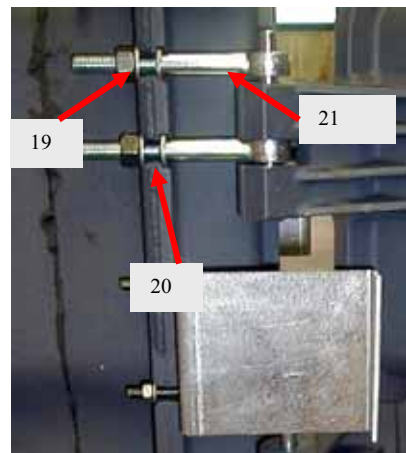
Pic. 13

b) Decide on which side to hinge the doors 14 and 16. Mount the M12x130 tie rods 18, using the nuts 19 and the washers 20.

Mount the eye tie rods 21 on the opposite side and secure temporarily with the nuts 19 and the washers 20 (Pics. 14 and 15).

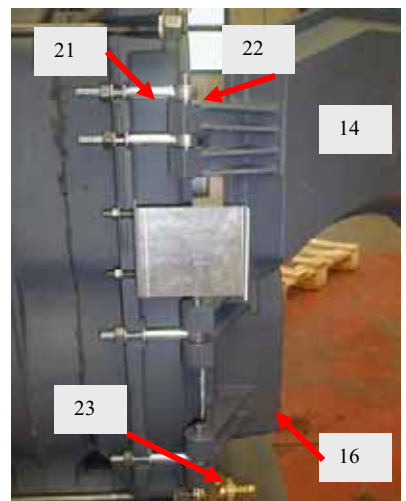


Pic. 14



Pic. 15

c) Fit on the cleaning door 14 and the burner door 16, coupling the tie rods 21 and the pins 22 and 23 (Pic. 16).



Pic. 16

**Important:** After mounting the pins, fully tighten the tie rods 21.



- d) With 6/7-element boilers, the turbo fans **24** must be fitted in the flues (Pic. 13).  
 e) Close the doors and secure them with the brass nuts **25** (Pic. 17).



Pic. 17

#### Stage 4. Mounting the case and control panel

- a) Mount the brackets **26** on the front element and secure in position with the M8x35 screws **27**, the nuts **28** and the washers **29** (Pic. 18).



Pic. 18

- b) Screw the nuts **30** and washers **31** onto the four rear tie rods (Pic. 19).



Pic. 19

- c) Position the insulating panel on the heat exchanger body, making sure it is symmetrical (Pic. 20).



Pic. 20

- d) Mount the two side panels of the case and secure them at the front with four 3.9x9.5 self-tapping screws **32** but do not tighten. (Pic. 21).



Pic. 21

- e) Unscrew the four nuts **30** previously fitted on the tie rods until they come up against the two side panels. Then, fit on four washers **31** on the outside and four more nuts **30** to hold the side panels in position (Pic. 22).  
 f) Lock the four front self-tapping screws **32** (Pic. 21).



Pic. 22

- g) Secure the L-shaped reinforcing bar using two 3.9x9.5 self-tapping screws (Pic. 23).



Pic. 23

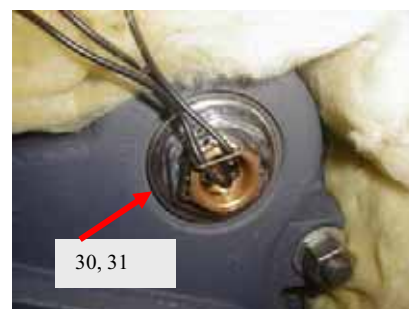


Pic. 24

- h) Fix the ABS profile to the top panel (Pic. 24).  
 i) Unwrap the control panel, remove the ABS cover and fix it onto the top panel using the four screws provided (Pic. 24).  
 j) Unwind the thermostat and thermometer terminals, taking care not to damage them. Insert the bulbs in the probe holder **11** in the cast iron body and secure using the spring (Pic. 25 and 26).



Pic. 25



Pic. 26

k) Fix to the side panels the pins (Pic. 27) and to the top panel the fixing springs (Pic. 28).

l) Fix the rear panels using the self-tapping screws (Pic. 29).

m) Fit the upper panel onto the side panels, applying sufficient pressure.



Pic. 27



Pic. 28

n) Insert fairleads in the holes in the side panels (Pic. 30).

o) Wire up the control panel (see paragraph 3.2.11) and re-place the ABS cover.

p) Complete assembly of the case by fitting the top front panel and the bottom front panel together (after fitting in insulation) (Pic. 31).

q) Fix the rating plate provided onto the right-hand side of the case.



Pic. 29



Pic. 30



Pic. 31

### 3.2.4 Plumbing system

The plumbing system must be fitted with all the safety and control devices required by current law (safety valve, water pressure switch, relief valve, pressure gauge, etc.).

#### Important

**A re-circulation pump must be fitted between the flow and return pipes to ensure constant water circulation in the boiler. Refer to the specification table. THIS REQUIREMENT IS MANDATORY**

#### Important

Before connecting the boiler to the heating system, clean all the pipes thoroughly. This is to remove any metal waste left over from the machining and welding processes, and any oil and grease, which would get into the boiler and damage it or affect operation.

**Important: Do not use solvents, which would damage the component parts.**

The CH flow and return pipes must be connected to the G 2 ½ fittings on the boiler.

When calculating the sizes of the pipes in the CH system, take into account the load losses caused by the radiators, any thermostatic valves, the radiator stop valves and the configuration of the whole system.

**The producer declines all liability for injury or damage resulting from failure to comply with the above.**

### 3.2.5 Ventilation of the boiler room

**SCUDO** boilers have an open flue and are designed for connection to a chimney, which means that **the combustion air is taken straight from the boiler room.**

The boiler must be installed in a suitable room meeting current legal requirements, which **should be taken as incorporated in full in this manual.**

### 3.2.6 Flue gas discharge system

The flue port in **SCUDO** boilers is designed for connection to a 200 mm flue.

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 from the boiler must be connected to a chimney made in compliance with all applicable standards and laws, which **should be taken as incorporated in full in this manual.**

Since this is a high-performance boiler, the temperature of the flue gas is low.

This means that condensate may form inside the chimney, particularly with a two-stage burner.

**Therefore the chimney must comply with the following requirements:**

- \* The diameter must not be less than the diameter of the boiler discharge pipe.
- \* 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 conditions.

**Provision must be made for a special flue gas sampling point to allow calibration of the burner and measurement of the efficiency of the boiler.**

**Provision must be made for a special section allowing the collection and discharge of condensate before it reaches the boiler.**

### **3.2.7 Choosing and installing the burner**

When choosing the burner to couple to the boiler, make sure the features are compatible with the boiler specification.

**The burner must bear the CE mark.**

**The control panel of the boiler is designed to operate a two-stage burner.**

The burner capacity (for fixed, multi-stage or modulating thermal capacity) must therefore be regulated when the boiler is operated for the first time, according to the instructions of the designer of the system. **It must always fall in the capacity range shown for the boiler in the specification table.**

**THESE VALUES MUST NOT BE CHANGED FOR ANY REASON.**

The burner must be fixed to the front plate of the boiler using four screws. The plate contains four M8 threaded holes arranged on the circumference of a 170 mm diameter circle.

If the burner has a different type of fixing, an adapter is required. The maximum diameter of the burner head is 140 mm. The standard hole in the insulation must be adapted to the size of the burner head.

The burner head length must be between 110 and 170 mm.

#### **Important**

Any space between the burner head and the ceramic insulation of the door must be packed with insulating material to protect the burner from flame radiation.

### **3.2.8 Measuring combustion efficiency**

Perform the following measurements 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 boiler operating normally.**

### **3.2.9 Connecting to the gas mains (for boilers with a gas burner).**

The cross section of the gas supply pipe must be no less than that of the burner gas ramp.

**It is important to comply with the applicable standards and laws, which should be taken as incorporated in full in this manual.**

**Remember that before running an internal gas supply system, i.e. before connecting it to the meter, it is important to carry out a gas tightness test.**

**The tightness test must not be done with combustible gas. Use air or hydrogen.**

**When there is gas in the pipe, never use a flame to detect leaks.**

**Use a suitable product from the trade or soapy water.**

### **3.2.10 Connecting to the oil supply (for boilers with a oil-fired burner).**

The oil supply pipe must be perfectly airtight. In particular, there must be no air leaks in the pipe from the tank. It is advisable to feed burners using a twin-pipe system.

The height of the tank must comply with the burner manufacturer's instructions.

With gravity feed tanks or oil systems with ancillary pumps, it is mandatory to install an extra automatic solenoid valve to cut off the fuel supply when the burner switches off automatically.

If the boiler is installed in a particularly cold climate, use oil with a low paraffin content. If

necessary, the burner should be equipped with an oil pre-heater.

IT IS ALSO ADVISABLE TO INSTALL AN OIL FILTER.

### 3.2.11 Connecting to the power mains and utilities

**SCUDO** boilers come with a terminal for connecting a three-core lead and cable locking device to prevent the lead from coming loose.

The boiler must be connected to **230V-50Hz** power supply.

Make sure all the wires are connected properly, respecting live and neutral.

**It is important to 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 boiler 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.

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

**The maximum power that can be handled by the control panel is 575 VA.**

**If the sum of the power of the burner, pump and zone valves exceeds this value, it is necessary to use contactors: it is advisable to set up an external control panel to be installed on the wall near the boiler.**

### 3.2.12 Installing original kits

**The producer** supplies original kits for installing the programming clock, the board for controlling three pumps or zone valves, and a central thermoregulator.

All kits must be installed according to the accompanying instructions.

### 3.3 Filling the system with water

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 check that the automatic relief valve in the boiler room operates efficiently.

- \* Open the filling tap gradually, making sure that any automatic air relief valves operate efficiently.

- \* Close the radiator air valves as soon as water starts to come out.

- \* Using a gauge in the boiler room, check that the pressure attains the set value (min 0.8-1 bar).

- \* Turn off the filling tap and open all the radiator air valves again.

- \* Switch on the boiler and allow it to heat up, then switch off the pump and bleed all the radiators again.

- \* Allow the system to cool down and re-establish the water pressure at 0.8-1 bar.

### IMPORTANT

With domestic heating systems it is important to treat the water with specific products that are compatible with multi-metal

systems. This is to optimise efficiency and safety, avoid early wear, ensure trouble-free operation of the system and ancillary equipment, and minimise power consumption in compliance with current standards and laws.

**Note. The drain tap at the front of the boiler can be used for emptying the system (Pic. 10).**

### 3.4 Starting up the boiler

#### 3.4.1 Preliminary checks

Before starting up the boiler carry out the following checks:

- \* Make sure the flue gas discharge pipe is installed correctly. **When the boiler is operating, 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 (minimum water pressure 0.8-1 bar);

- \* Make sure any cut-off valves in the system are open.

- \* Make sure the fuel supply tap is open.

- \* Check for gas or oil leaks.

- \* Switch on the main switch.

- \* Check that the boiler safety valve is not blocked.

- \* Check for water leaks.

- \* Check operation of the re-circulating pump.

#### 3.4.2 Switching the boiler on and off

For instructions on how to switch the boiler on and off, refer to the **Instructions for the user**.

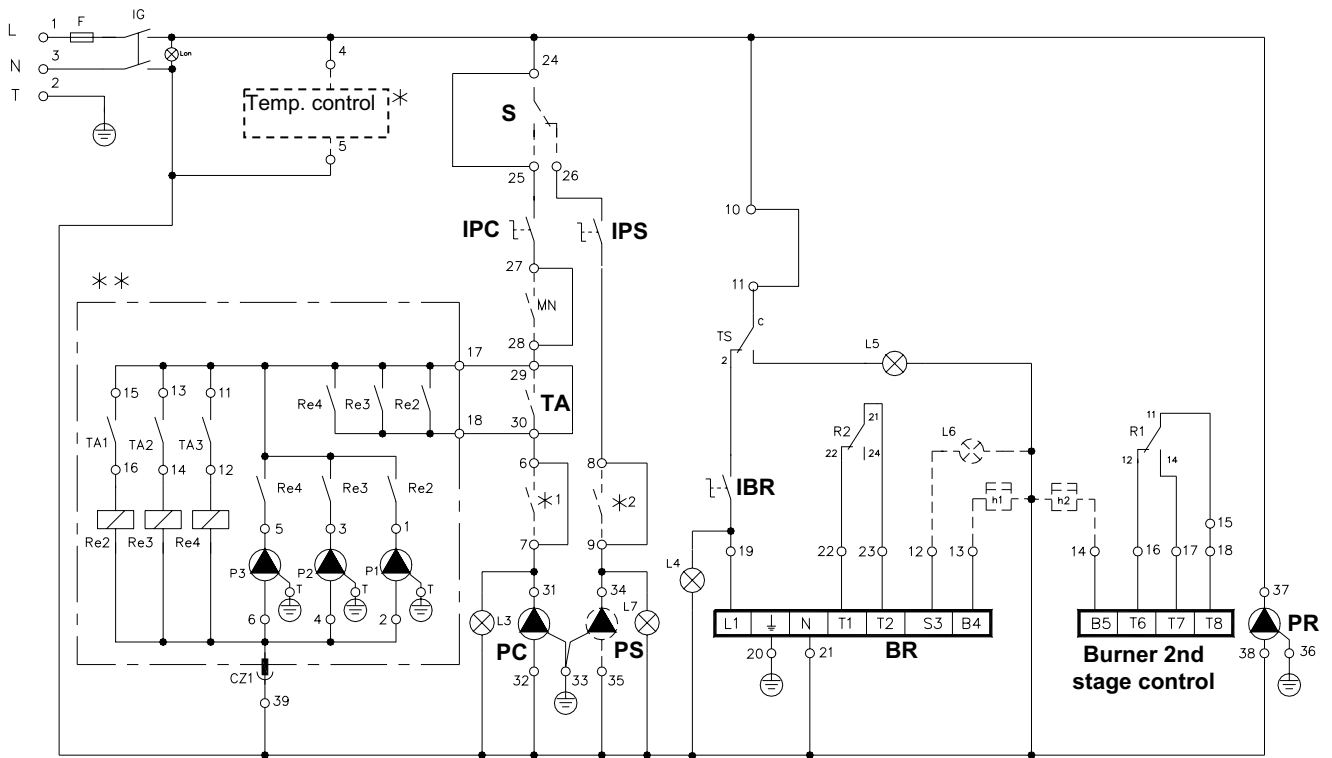
#### 3.4.3 Regulating thermal capacity

The thermal capacity of the burner must be regulated according to the specification of the boiler and the heating system.



### 3.5 Wiring diagrams and indications for the plumbing system

#### 3.5.1 General wiring layout for V-2 version



#### ELECTRICAL FEATURES

POWER SUPPLY: 230VAC +10% - 15%

FREQUENCY: 50Hz

MAX TOTAL CURRENT: 4(4) A

**IMPORTANT:** If the sum of the currents for all the loads connected is greater than 4A (inductive), control one or more of these loads via the contactors.

#### KEY:

**IG:** Main switch

**IPC:** CH recirculation pump switch

**IPS:** DHW recirculation pump switch

**IBR:** Burner switch

**L3:** Main pump light

**L4:** Burner on light

**L5:** Safety thermostat light

**L6:** Burner emergency light (not supplied)

**L7:** DHW re-circulating pump light

**TA:** Room thermostat

**R1:** Heating thermostat: 1<sup>st</sup> contact

**R2:** Heating thermostat: 2<sup>nd</sup> contact

**TS:** Safety thermostat

**F:** F4A 250V fuse

**BR:** Burner

**BR – 2<sup>nd</sup> stage:** burner 2<sup>nd</sup> stage control

**PC:** CH pump

**PS:** DHW re-circulating pump

**PR:** Boiler re-circulating pump

**P1:** Zone 1 pump

**P2:** Zone 2 pump

**P3:** Zone 3 pump

**TA1 :** Zone 1 room thermostat

**TA2 :** Zone 2 room thermostat

**TA3 :** Zone 3 room thermostat

**S:** DHW priority thermostat (not supplied)

**h1:** Burner 1<sup>st</sup> stage hour counter (not supplied)

**h2:** Burner 2<sup>nd</sup> stage hour counter (not supplied)

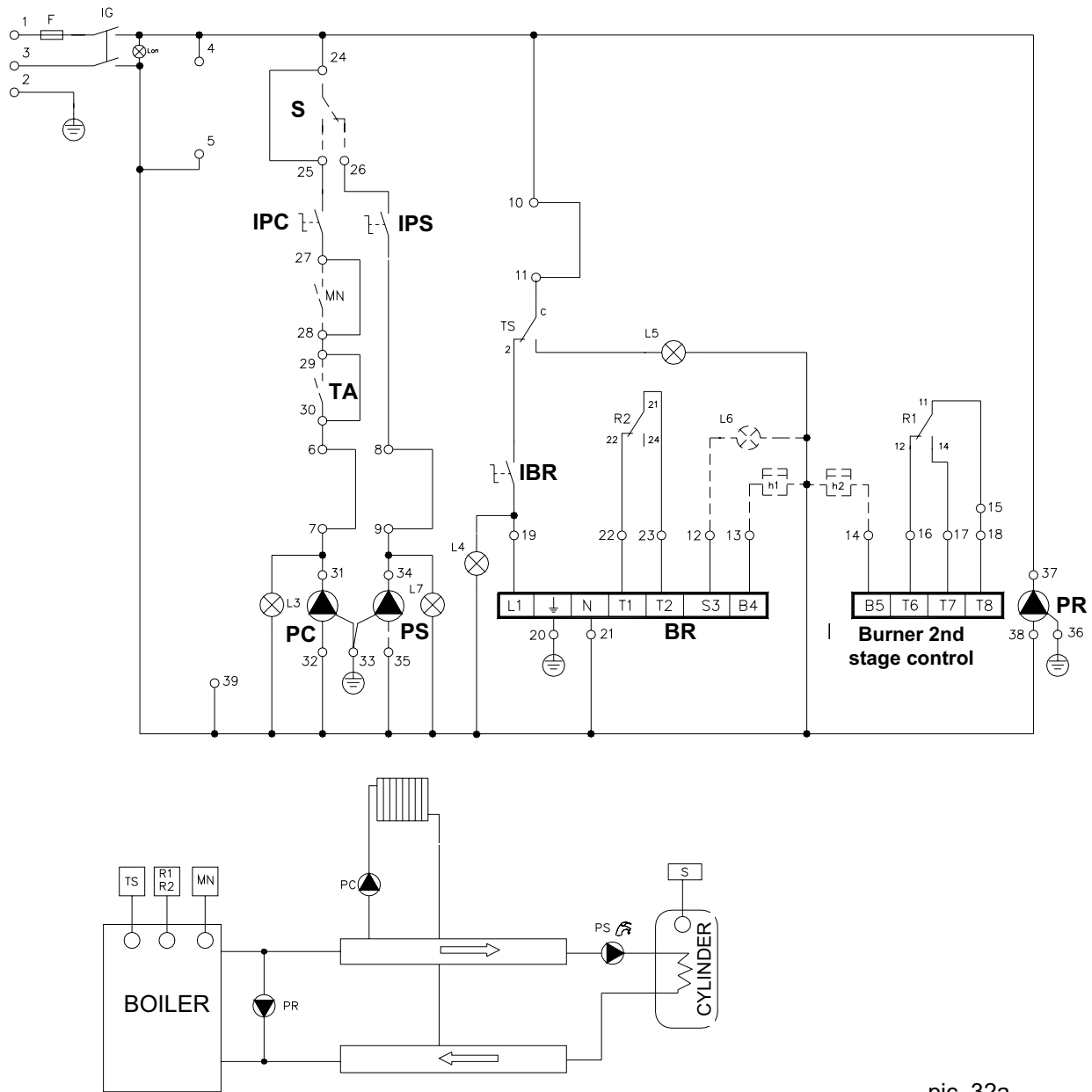
\* Central temperature control unit and contacts (not supplied)

\*\* Zone pump module (only for version P control panels)

pic. 32

### 3.5.2 Wiring layout with one high-temperature zone + water cylinder

The following diagrams are merely indicative of the electrical and plumbing systems. They cannot be taken as a complete description of the heating system.



pic. 32a

The control panel supplied standard is designed for central heating only, but it can also take the following:

- **room thermostat** (remove jumper and connect terminals 29 and 30);
- **burner shutdown light** (connect terminals 12 and 21);
- **burner 1<sup>st</sup> stage hour counter** (connect terminals 13 and 21);
- **burner 2<sup>nd</sup> stage hour counter** (connect terminals 14 and 21);
- **DHW priority thermostat** (remove jumper and connect terminals 24, 25 and 26)

In this case, the thermostat "S" switches off the CH pump "PC" and enables the water cylinder pump whenever there is a request of heat from the water cylinder.

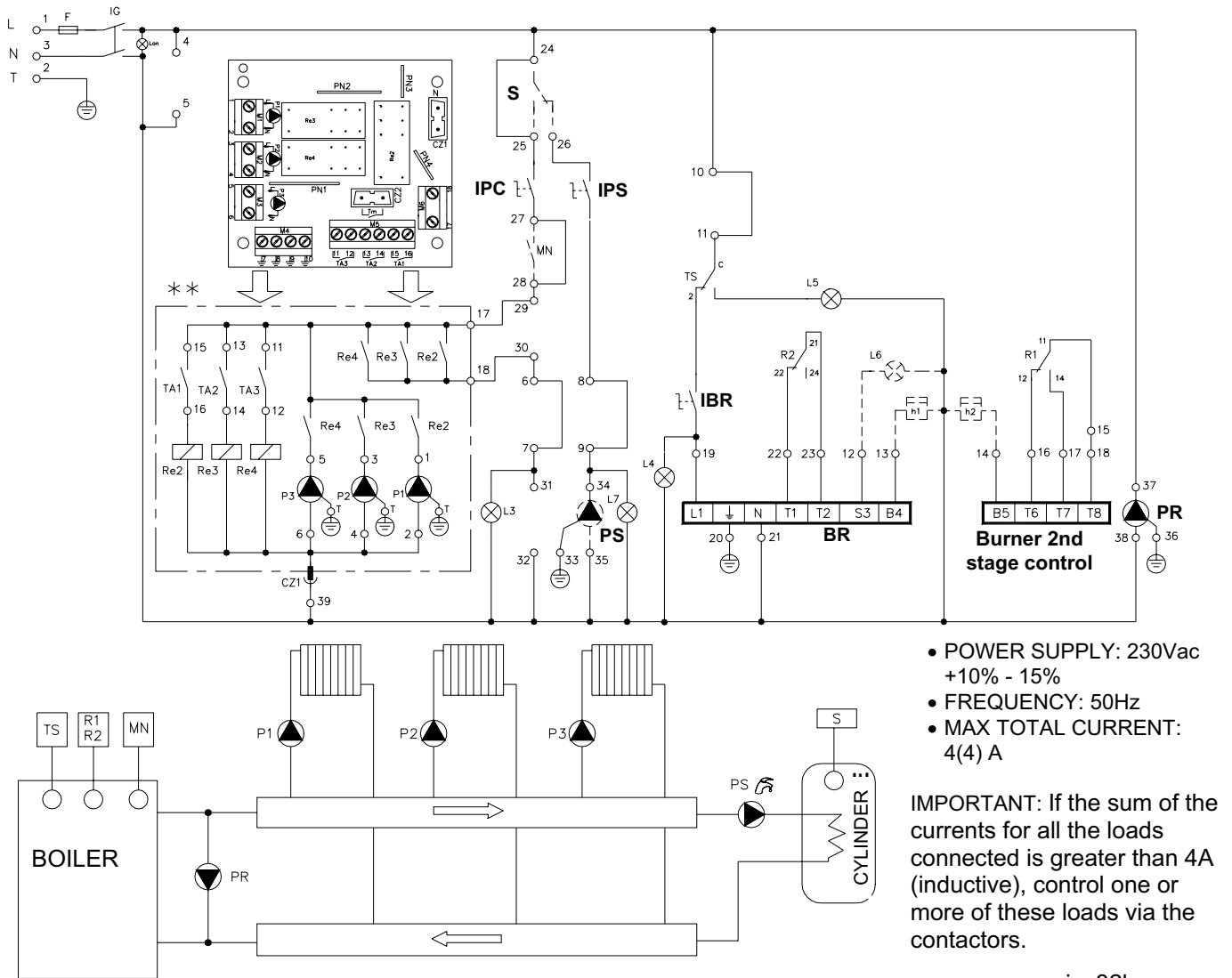
- **DHW priority thermostat** (do not remove the jumper between 24 and 25 and connect terminals 24 and 26)

In this case, the thermostat "S" **DOES NOT switch off** the CH pump PC and it enables the water cylinder recirculation pump PS whenever there is a request of heat from the water cylinder.

- **DHW recirculation pump** (connect terminals 33, 34 and 35).

### 3.5.3 Wiring layout with three high-temperature zones + water cylinder

The following diagrams are merely indicative of the electrical and plumbing systems. They cannot be considered as a complete description of the heating system.



pic. 32b

The control panel supplied standard is designed for central heating only, but it can also take the following:

- **burner shutdown light** (connect terminals 12 and 21);
- **burner 1<sup>st</sup> stage hour counter** (connect terminals 13 and 21);
- **burner 2<sup>nd</sup> stage hour counter** (connect terminals 14 and 21);
- **DHW priority thermostat** (remove jumper and connect terminals 24, 25 and 26)

In this case, the thermostat "S" switches off the CH pumps P1-P2 and P3 and enables the water cylinder pump whenever there is a request of heat from the water cylinder.

- **DHW priority thermostat** (do not remove the jumper between 24 and 25 and connect terminals 24 and 26)

In this case, the thermostat "S" **DOES NOT switch off** the CH pump P1-P2 and P3 and it enables the water cylinder recirculation pump "PS" whenever there is a request of heat from the water cylinder.

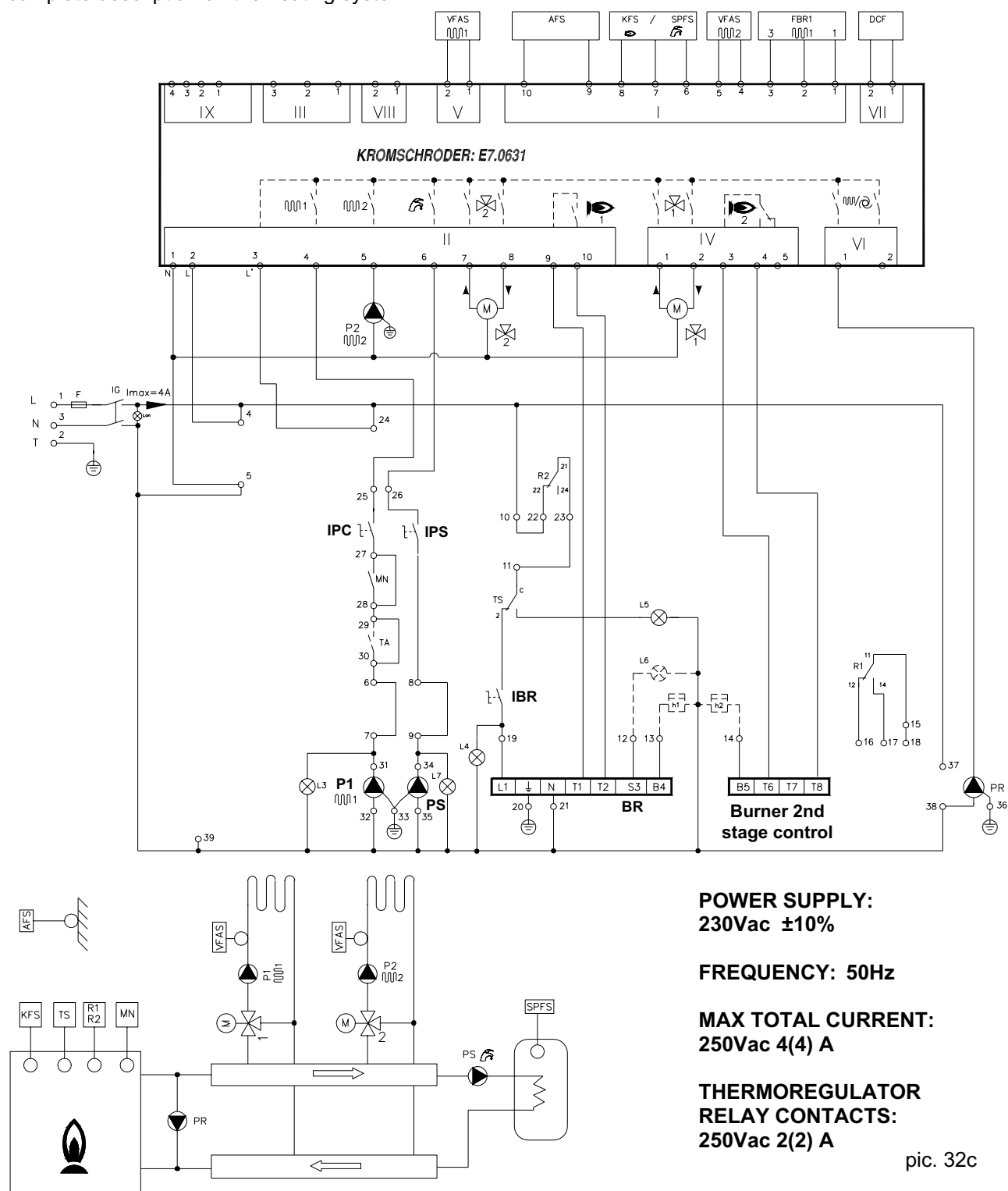
- **DHW recirculation pump** (connect terminals 33, 34 and 35);
- **zone pump module** (remove jumper and connect terminals 29 and 30) with their
- **thermostats and zone pumps:**

1. **zone 1:** connect contact TA1 between terminals 15 and 16 of the module and pump P1 between terminals 1 and 2.
2. **zone 2:** connect contact TA2 between terminals 13 and 14 of the module and pump P2 between terminals 3 and 4.
3. **zone 3:** connect contact TA3 between terminals 11 and 12 of the module and pump P3 between terminals 5 and 6.

The zone pump earth connections must be screwed onto the control panel plate.

### 3.5.4 Wiring layout with temperature control unit: two low-temperature zones + water cylinder

The following diagrams are merely indicative of the electrical and plumbing systems. They cannot be taken as a complete description of the heating system.



For more information on how to install the temperature control units, please refer to the instruction handbook supplied with our optional kit, code 0KITCEEL05.

### 3.5.5 Wiring layout with two boilers installed in cascade (one-stage burners only)

The following diagrams are merely indicative of the electrical and plumbing systems. They cannot be taken as a complete description of the heating system.

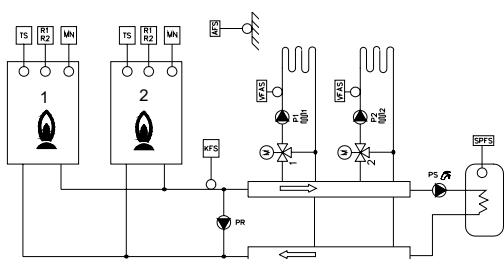
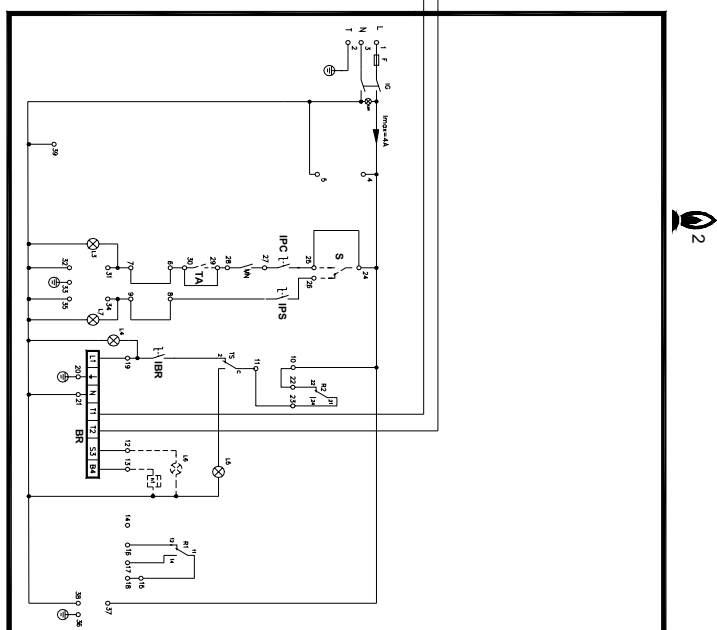
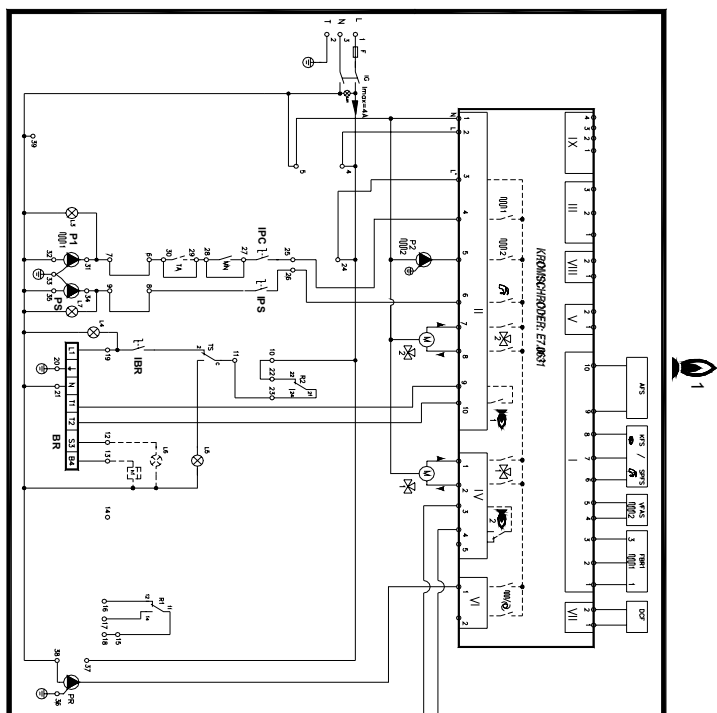
**POWER SUPPLY:**  
230Vac  $\pm 10\%$

**FREQUENCY:** 50Hz

**MAX TOTAL CURRENT FOR EACH ELECTRIC CONTROL PANEL:**  
250Vac 4(4) A

**THERMOREGULATOR RELAY CONTACTS:**  
250Vac 2(2) A

**Boiler no. 2 only requires connections to the burner.**



pic. 32d

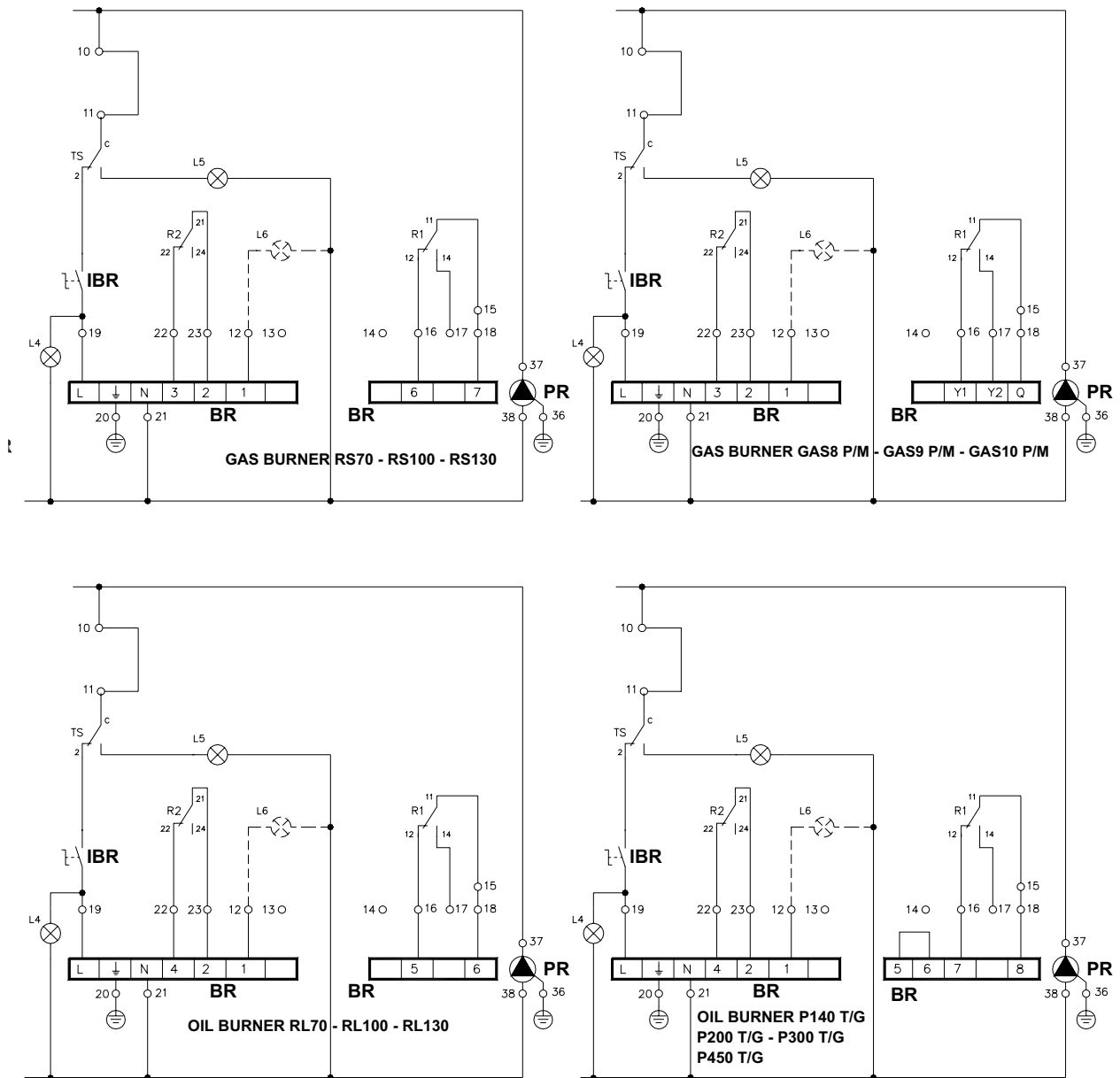
Two boilers in cascade can be installed if the burners of such boilers are equipped with one-stage burners. For more information on how to install the temperature control unit controlling two boilers in cascade, please refer to the instruction handbook supplied with our optional kit, code [0KITCEEL05](#).

KEY to pictures 32c and 32d

**P1-P2:** Zone pumps  
**PS:** DHW recirculation pump  
**M1-M2:** Motorized zone valves  
**PR:** Recirculation pump  
**VFAS:** Feed probe  
**AFS:** External probe  
**KFS:** Boiler probe  
**SPFS:** Cylinder probe  
**TS:** Safety thermostat  
**R1:** 1st stage regulation thermostat  
**R2:** 2nd stage regulation thermostat  
**IPS:** DHW recirculation pump switch  
**IBR:** Burner switch  
**L3:** Zone 1 pump “on” light  
**L4:** Burner “on” light  
**L5:** Overheating shutdown light  
**L6:** Burner shutdown light  
**L7:** DHL recirculation pump “on” light  
**h1:** Burner 1<sup>st</sup> stage hour counter  
**h2:** Burner 2<sup>nd</sup> stage hour counter  
**KROMSCHRODER E7.0631: Optional kit code 0KITCEEL05**

For more information on how to install the temperature control units, please refer to the instruction handbook supplied with our optional kit, code 0KITCEEL05.

### 3.5.6 Wiring diagram for burners



## 4 Maintenance

In order to ensure that the boiler operates correctly and efficiently, it needs to be serviced once a year according to the following schedule.

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

It is advisable for the boiler to be serviced and repaired by a qualified technician or a Service Centre, which can provide properly trained qualified personnel.

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

### Maintenance schedule

Periodic maintenance covers the following.

#### Checks and inspections.

- Perform a general check and inspection of the boiler.
- Check the gas or oil supply circuit for leaks.
- Check that the boiler 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 boiler fittings for water leaks and oxidation.
- Check the efficiency of the safety devices.

#### Cleaning operations with the boiler cold:

- Clean the inside of the boiler.
- Clean the burner and reset if necessary according to the manufacturer's instructions (see combustion test).
- Clean the ventilation grille in the boiler room.
- Clean the heat exchanger on the flue gas side. This can be done using brushes and suction devices to remove soot deposits from the walls and fins of the heat exchanger. Alternatively, specific chemical products can be used following the manufacturer's instructions.

**Do not use flammable products such as petrol or solvents to clean the heat exchanger.**

When remounting the front plates of the heat exchanger, check the state of the gaskets. **If in doubt, replace them.**

#### IMPORTANT

**Combustion residue is a highly polluting substance which must be disposed of in designated areas.**

**When repairing or servicing the boiler for the first time, perform the following checks.**

- Make sure the declaration of conformity is available.
- Make sure the service booklet is available.

#### Also check:

- That the boiler room is suitable.
- The ventilation openings.
- The diameters, length and state of the flue gas discharge pipes.
- The boiler is installed according to the instructions in this manual.

**If the boiler does not operate correctly in absolute safety for people and animals or damage to property, inform the Service Centre and fill in the relevant form.**











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Cod.0LIBISEN07

Uff. Pubbl. Fondital IST 04 C 085-02 Novembre 2004 (11/2004)