

# 1R - 2R

## freestanding

CERTIFICAZIONE  
DEL SISTEMA DI  
QUALITÀ AZIENDALE

**ISO 9001**  
registered by

**GASTEC**



Remove the **“Testing Certificate”** from inside the combustion chamber and keep together with the instructions manual.

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# 1 BOILER DESCRIPTION

## 1.1 INTRODUCTION

The new "1R - 2R freestanding" series of cast iron boilers has been designed in compliance with the European Directive CEE 92/42.

They use light oil and have a perfectly balanced combustion with a very high thermal efficiency for economical performance.

This booklet contains the installation, operating and maintenance instruc-

tions.

The components for "1R - 2R freestanding" installation are supplied in three separate packages: boiler body, casing with enclosed documents and control panel.

## 1.2 DIMENSIONAL DETAILS

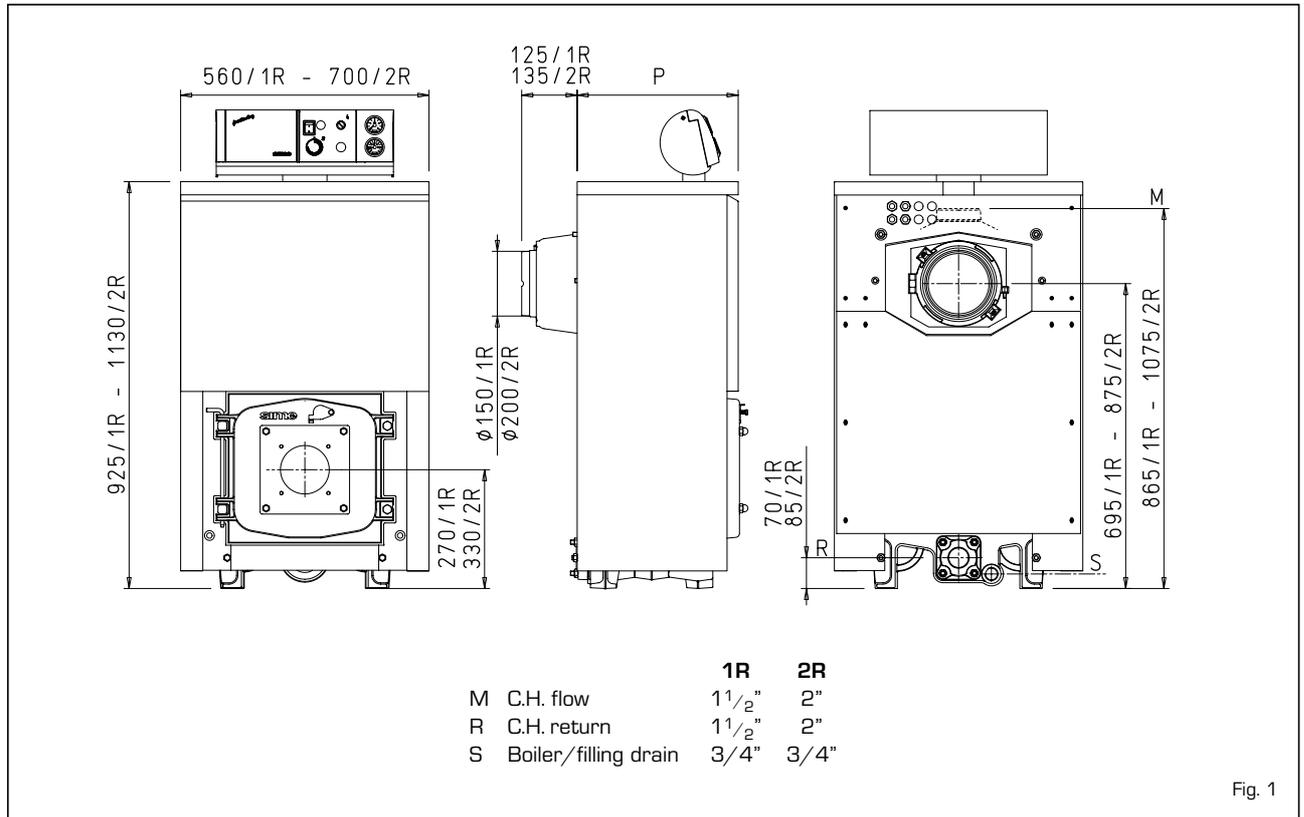


Fig. 1

## 1.3 TECHNICAL FEATURES

### 1.3.1 "1R" boiler

		1R4	1R5	1R6	1R7	1R8	1R9
<b>Output</b>	kW	39.2	52.0	64.8	74.0	84.0	93.3
	kcal/h	33,700	44,700	55,700	63,600	72,200	80,200
<b>Input</b>	kW	44.7	59.1	73.4	83.1	93.8	103.4
	kcal/h	38,400	50,800	63,100	71,500	80,700	88,900
<b>P (depth)</b>	mm	440	520	595	670	750	825
<b>Sections</b>	n°	4	5	6	7	8	9
<b>Maximum water head</b>	bar	4	4	4	4	4	4
<b>Water content</b>	l	28.5	33.0	37.5	42.0	46.5	51.0
<b>Loss of head</b>							
Smoke	mbar	0.10	0.15	0.20	0.16*	0.22*	0.30*
Water ( $\Delta t$ 10°C)	mbar	17.5	25.0	30.0	34.0	40.0	45.5
<b>Comb. chamber pressure</b>	mbar	- 0.02	- 0.02	- 0.01	0.06	0.08	0.08
<b>Min. chimney depression</b>	mbar	0.12	0.17	0.21	0.22	0.30	0.38
<b>Smokes temperature</b>	°C	225	225	225	217	209	201
<b>Smokes flow</b>	m <sup>3</sup> n/h	41.4	54.7	68.0	77.7	88.0	97.6
<b>Adjustment range</b>							
Heating	°C	30÷85	30÷85	30÷85	30÷85	30÷85	30÷85
<b>Smokes volume</b>	dm <sup>3</sup>	33	37	42	46	50	55
<b>Weight</b>	kg	201	229	261	293	325	357

\* Without baffles

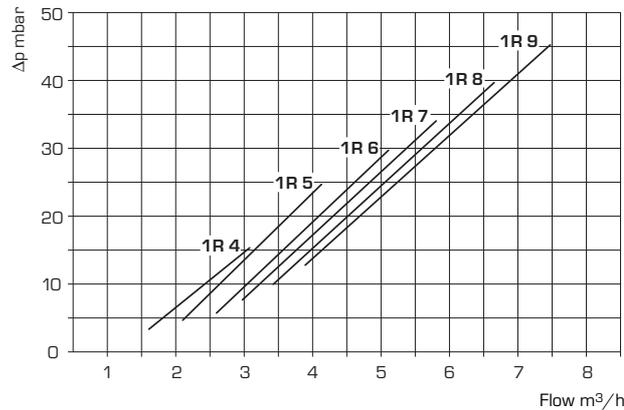
### 1.3.2 "2R" boiler

		2R6	2R7	2R8	2R9	2R10	2R11	2R12	2R13	2R14	2R15
<b>Output</b>	kW	100.6	123.8	147.1	165.1	179.7	197.7	213.4	230.2	248.8	266.9
	kcal/h	86,500	106,500	126,500	142,000	154,500	170,000	183,500	198,000	214,000	229,500
<b>Input</b>	kW	113.5	139.1	164.7	184.1	199.7	219.7	237.1	255.8	276.4	296.7
	kcal/h	97,600	119,700	141,600	158,300	171,700	188,900	203,900	220,000	237,700	255,200
<b>P (depth)</b>	mm	735	835	935	1,035	1,135	1,235	1,335	1,435	1,535	1,635
<b>Sections</b>	n°	6	7	8	9	10	11	12	13	14	15
<b>Max. water head</b>	bar	5	5	5	5	5	5	5	5	5	5
<b>Water content</b>	l	92	107	122	136	151	165	180	194	209	223
<b>Loss of head</b>											
Smoke	mbar	0.10	0.15	0.22	0.29	0.24*	0.37*	0.39*	0.42*	0.49*	0.50*
Water ( $\Delta t$ 10°C)	mbar	61.0	76.0	85.0	92.0	100.0	112.0	118.0	121.0	125.0	130.0
<b>Comb. chamb. press.</b>	mbar	- 0.02	- 0.02	- 0.01	- 0.02	- 0.02	- 0.01	- 0.02	0.31	0.35	0.50
<b>Min. chimney depress.</b>	mbar	0.12	0.17	0.23	0.31	0.26	0.38	0.41	0.73	0.84	1.00
<b>Smokes temperature</b>	°C	238	236	234	232	229	224	219	215	211	207
<b>Smokes flow</b>	m <sup>3</sup> /h	105.2	129.2	153.3	171.9	186.9	205.4	221.6	238.9	257.9	276.6
<b>Adjustment range</b>											
Heating	°C	30÷85	30÷85	30÷85	30÷85	30÷85	30÷85	30÷85	30÷85	30÷85	30÷85
<b>Smoke volume</b>	dm <sup>3</sup>	83	92	101	110	119	128	138	147	157	167
<b>Weight</b>	kg	462	520	578	636	676	734	792	850	908	966

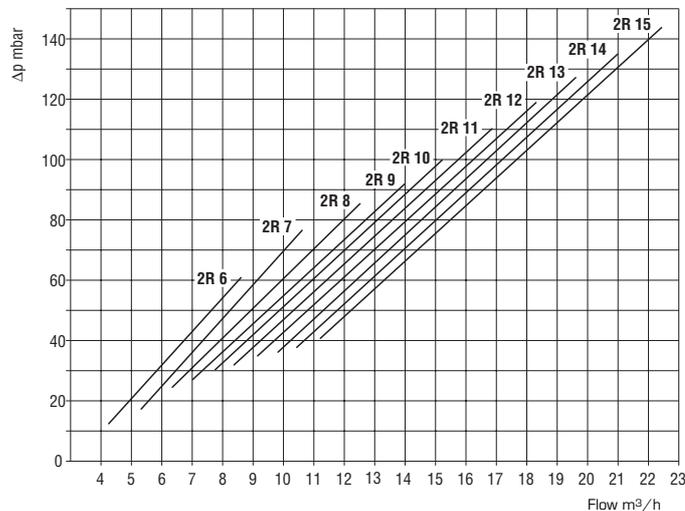
\* Without baffles

### 1.4 LOSS OF HEAD

#### "1R" boiler



#### "2R" boiler



NOTE: The losses of head shown in the diagram were obtained with a  $\Delta t$  of 10°C

Fig. 2

## 1.5 COMBUSTION CHAMBER DIMENSIONS

The dimensions of this direct passage combustion chamber are reported in fig. 3.

The refractory brick is supplied on the "1R4" models.

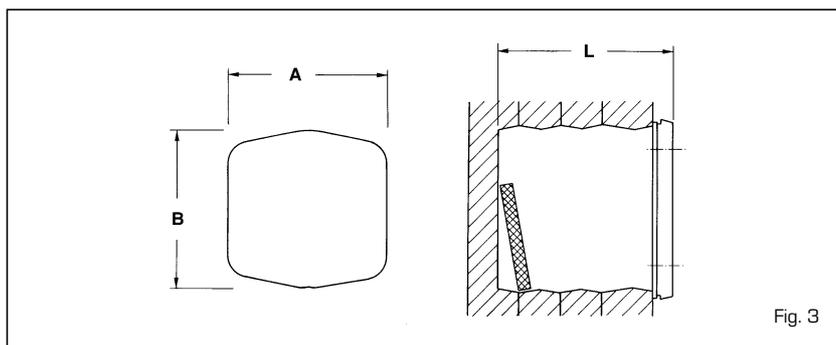


Fig. 3

	1R4	1R5	1R6	1R7	1R8	1R9
A mm	310	310	310	310	310	310
B mm	310	310	310	310	310	310
L mm	296	372	448	524	600	676
Volume m <sup>3</sup>	0,025271	0,031891	0,038510	0,045129	0,051748	0,058367

	2R6	2R7	2R8	2R9	2R10	2R11	2R12	2R13	2R14	2R15
A mm	390	390	390	390	390	390	390	390	390	390
B mm	430	430	430	430	430	430	430	430	430	430
L mm	570	670	770	870	970	1.070	1.170	1.270	1.370	1.470
Volume m <sup>3</sup>	0,081690	0,096314	0,110938	0,125562	0,140186	0,154810	0,169434	0,184058	0,198682	0,213306

## 1.6 COMPATIBLE BURNER BRANDS

In general, the oil burner that is compatible with the boiler should use full spray nozzles.

### 1.6.1 ECOFLAM burners

Boiler	Model		Atomising angle
	1 flame	2 flames	
1R4	MINOR 4	-	60°
1R5	MINOR 8	-	60°
1R6	MINOR 8	-	60°
1R7	MINOR 8	-	60°
1R8	MINOR 12	-	60°
1R9	MINOR 12	-	60°

Boiler	Model		Atomising angle
	1 flame	2 flames	
2R6	MAIOR P 15	MAIOR P 15 AB	60°
2R7	MAIOR P 15	MAIOR P 15 AB	60°
2R8	MAIOR P 15	MAIOR P 15 AB	60°
2R9	MAIOR P 25	MAIOR P 25 AB	60°
2R10	MAIOR P 25	MAIOR P 25 AB	60°
2R11	MAIOR P 25	MAIOR P 25 AB	60°
2R12	MAIOR P 25	MAIOR P 25 AB	60°
2R13	MAIOR P 35	MAIOR P 35 AB	60°
2R14	MAIOR P 35	MAIOR P 35 AB	60°
2R15	-	MAIOR P 45 AB	60°

### 1.6.2 RIELLO burners

Boiler	Model			Atomising angle
	Gulliver	R. 40	REG	
1R4	RG1R - RG1 - RG1RK	G5R - G5 - G5RK	REG 5	60°
1R5	RG2 - RG2D	R. 40 G10	REG 5	60°
1R6	RG2 - RG2D	R. 40 G10	-	60°
1R7	RG2 - RG2D	R. 40 G10	-	60°
1R8	RG2 - RG2D	R. 40 G10	-	60°
1R9	RG2 - RG2D - RG3 - RG3D	R. 40 G10 - R. 40 G20	-	60°
2R6	RG3 - RG3D	R. 40 G20	-	60°
2R7	RG3 - RG3D	R. 40 G20	-	60°
2R8	RG3 - RG3D	R. 40 G20	-	60°
2R9	RG3 - RG3D	R. 40 G20 - G20D	-	60°
2R10	RG4S - RG4D	R. 40 G20 - G20D	-	60°
2R11	RG4S - RG4D	R. 40 G20 - G20D	-	60°
2R12	RG5D - RL28 - RL28/1	-	-	60°
2R13	RG5D - RL28 - RL28/2	-	-	60°
2R14	RG5D - RL28 - RL28/3	-	-	60°
2R15	RL28 - RL28/4	-	-	60°

### 1.6.3 F.B.R. burners

Boiler	Model	Atomising angle
1R4	G1 2001	60°
1R5	G1 2001	60°
1R6	G2 2001	60°
1R7	G2 2001	60°
1R8	G2 2001	60°
1R9	G2 MAXI	60°

Boiler	Model	Atomising angle
2R6	G2 MAXI	60°
2R7	FG 14 TC	60°
2R8	FG 14 TC	60°
2R9	G 20 TC	60°
2R10	G 20 TC	60°
2R11	G 20 TC	60°
2R12	G 20 TC	60°
2R13	G 20 TC	60°
2R14	G 30/2 TC	60° - 45°
2R15	G 30/2 TC	60° - 45°

### 1.6.4 Burner assembly

The boiler is supplied to be assembled on the burner:

The connection flange dimensions are indicated in fig. 4.

	A	B	C
	mm	mm	∅
1R 4÷6	110	150	M8
1R 7÷9	130	170	M8
2R 6-7	130	170	M8
2R 8÷15	160	190	M10

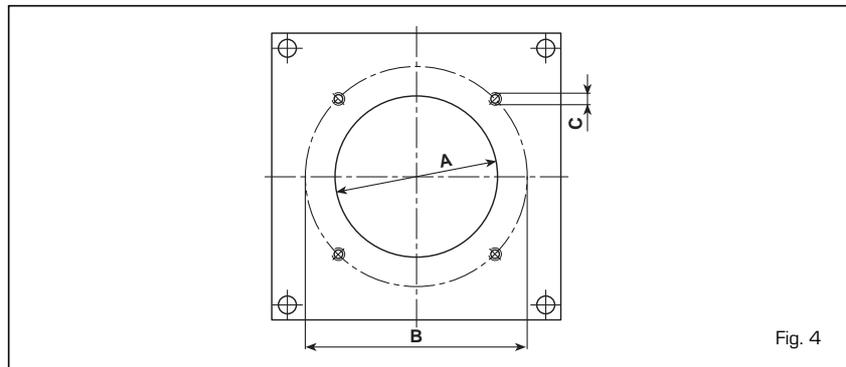


Fig. 4

## 2 INSTALLATION

### 2.1 BOILER ROOM

The boiler room should feature all the characteristics required by standards governing liquid fuel heating systems.

### 2.2 BOILER ROOM DIMENSIONS

Position the boiler body on the foundation bed, which should be at least 10 cm high. The body should rest on a surface allowing shifting, possibly by means of sheet metal.

Leave a clearance between the boiler and the wall of at least 0.60 m, and between the top of the casing and the ceiling of 1 m (0.50 m in the case of boilers with incorporated D.H.W. tank). The ceiling height of the boiler room should be less than 2.5 m.

### 2.3 CONNECTING UP SYSTEM

When connecting up the water supply to the boiler, make sure that the specifications given in fig. 1 are observed. All connecting unions should be easy

to disconnect by means of tightening rings. A closed expansion tank system must be used.

#### 2.3.1 Filling the water system

**Before connecting the boiler, thoroughly flush the system to eliminate scale which could damage the appliance.**

Filling must be done slowly so as to allow any air bubbles to be bled off through the air valves. In closed-circuit heating systems, the cold water filling pressure and the pre-charging pressure of the expansion vessel should be no less than or equal to the height of the water head of the installation (e.g. for water head of 5 metres, the vessel pre-charging pressure and installation filling pressure should be at least 0.5 bar).

#### 2.3.2 Water system characteristics

THE WATER USED FOR THE CENTRAL HEATING SYSTEM SHOULD BE TREATED IN THE FOLLOWING CASES:

- for extensive systems (with high contents of water);
- frequent addition of water into the system;
- should it be necessary to empty the system either partially or totally.

### 2.4 CONNECTING UP FLUE

The flue is of fundamental importance for the proper operation of the boiler; if not installed in compliance with the standards, starting the boiler will be difficult and there will be a consequent formation of soot, condensate and encrustation.

The flue used to expel combustion products into the atmosphere must meet the following requirements:

- be constructed with waterproof materials, and resistant to smoke temperature and condensate;
- be of adequate mechanical resilience and of low heat conductivity;
- be perfectly sealed to prevent cooling of the flue itself;
- be as vertical as possible; the terminal section of the flue must be fitted

with a static exhaust device that ensures constant and efficient extraction of products generated by combustion;

- to prevent the wind from creating pressure zones around the chimney top greater than the uplift force of combustion gases, the exhaust outlet should be at least 0.4 m higher than structures adjacent to the stack (including the roof top) within 8 m;
- have a diameter that is not inferior to that of the boiler union: square or rectangular-section flues should have an internal section 10% greater than that of the boiler union;
- the useful section of the flue must conform to the following formula:

$$S = K \frac{P}{\sqrt{H}}$$

S resulting section in cm<sup>2</sup>

K reduction coefficient for liquid fuels:

- 0.045 for firewood
- 0.030 for coal
- 0.024 for light oil
- 0.016 for gas

P boiler input in kcal/h

H height of flue in metres, measured from the flame axis to the top of the flue reduced by:

- 0.50 m for each change of direction of the connection union between boiler and flue;
- 1.00 m for each metre of union itself.

## 2.5 BOILER BODY ASSEMBLY

The boiler body comes supplied assembled. Where there is difficulty in gaining access to the boiler room, the body can be supplied in separate sections. For assembly, proceed as follows:

- prepare the sections, cleaning the seats of the tapered nipples with solvent;
- insert the bead of putty (fig. 5) in the groove provided for fume tightness, pressing lightly;
- prepare one of the two intermediate sections. After lubricating them with boiled linseed oil, insert the tapered nipples (fig. 6);
- prepare the head, proceeding as above, and bring it up to the intermediate section. Add only one section at a time;
- assemble the sections, using the tools provided consisting of a pair of staybolts for assembly with the cor-

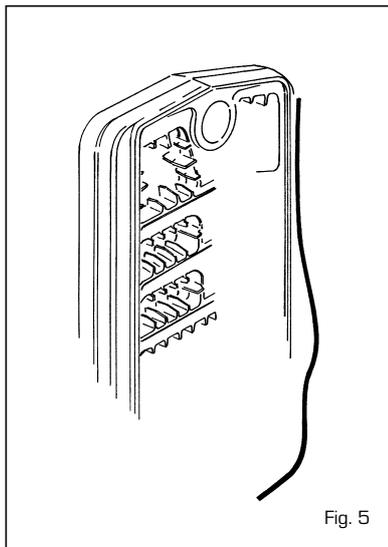


Fig. 5

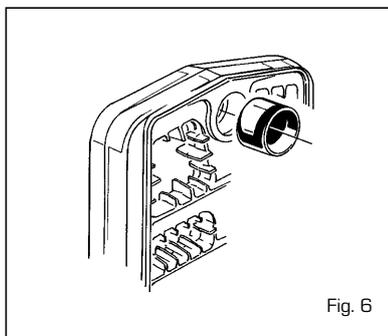


Fig. 6

responding accessories (code 6050900 - fig. 7), exerting pressure simultaneously on the top hub and on the bottom hub. If, during this operation, the sections were to slot together in such a way as not to be even and parallel, slide a chisel in the tighter side and, by applying a little

force, bring the two pieces together so that they are parallel.

The sections can be considered properly joined together when their outer edges come into contact;

- insert the bead of putty in the groove of the section that has just been assembled, and then proceed to joining up the other sections until the body is completed.

**NOTE: before proceeding to connect the system, test the boiler block with a water pressure of 7.5 bar.**

## 2.6 FITTING THE CASING

The casing and the control panel are supplied in separate cardboard packages. The housing package also contains the boiler documents and the glass wool for insulating the cast iron body. To fit the casing, proceed as follows (fig. 8):

- fix the left front side angle bar (2) and the right front side angle bar (3) to the upper tie rods using the two galvanized nuts provided;
- place the front cross bar (4) on the lower tie rods before securing the angle bars with the two cap nuts provided;
- insulate the cast iron body with the glass wool (1);
- fix the side parts (5) and (6) to the angle bars using the ten self-tapping screws provided, and secure them at the back with the nuts placed on the tie rods;
- assemble the lower rear panel (7)

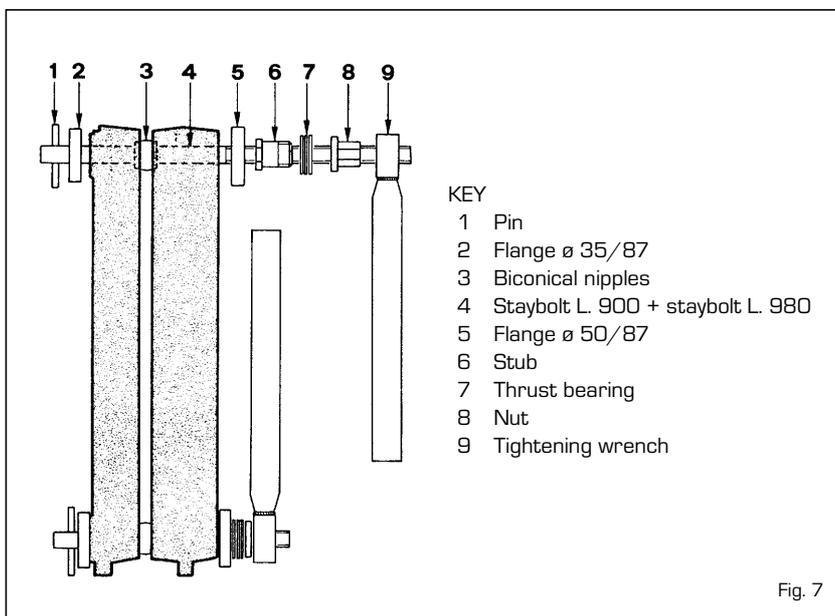


Fig. 7

with the eight self-tapping screws provided;

- assemble the upper rear panel (8) with the six self-tapping screws provided;
- fix the control panel (12) to the cover (13) using the check nut (14);
- unwind the capillary tubes of the two thermostats and thermometer by inserting their sensors inside the sheath (11), securing the assembly in position using the capillary tube retaining spring provided;
- screw the water gauge to the check valve (10);
- complete assembly by fixing the cover (13) and the front panel (9) to the side parts.

**NOTE:** Remove the "Testing Certificate" from inside the combustion chamber and keep together with the instructions manual.

## 2.7 ELECTRICAL CONNECTION

The boiler is fitted with an electricity cable, and requires a single-phase power supply of 230V - 50Hz through the main switch protected by fuses.

The room thermostat (required for enhanced room temperature con-

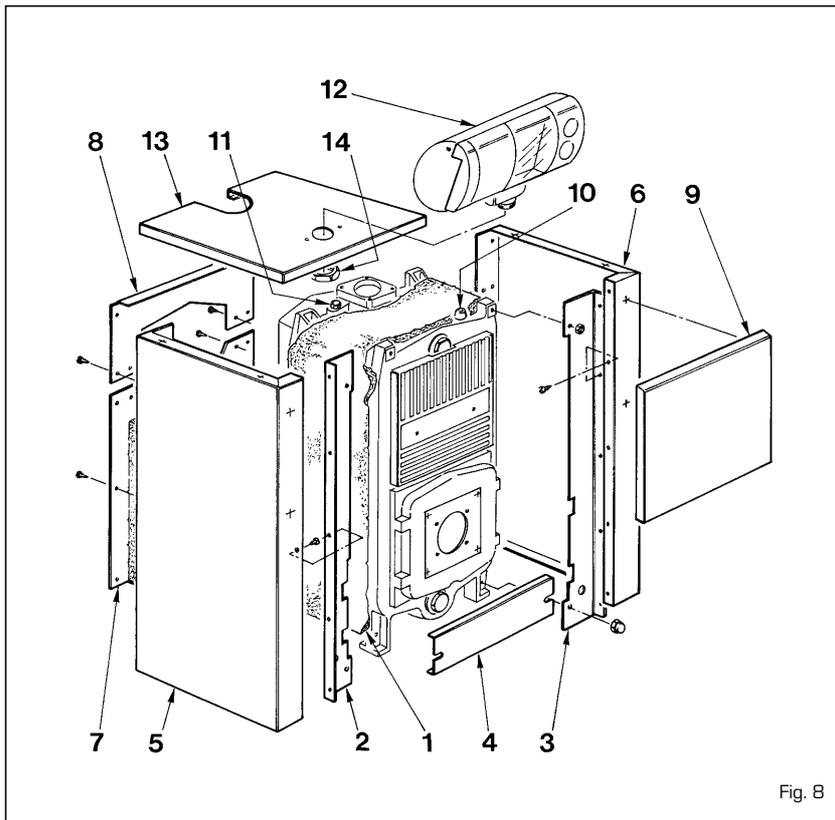


Fig. 8

trol) must be connected to the terminals 4-5 after removing the link (fig. 9). Connect the burner cable supplied.

**NOTE:** SIME declines all responsibility for injury caused to persons due to failure to earth the boiler.

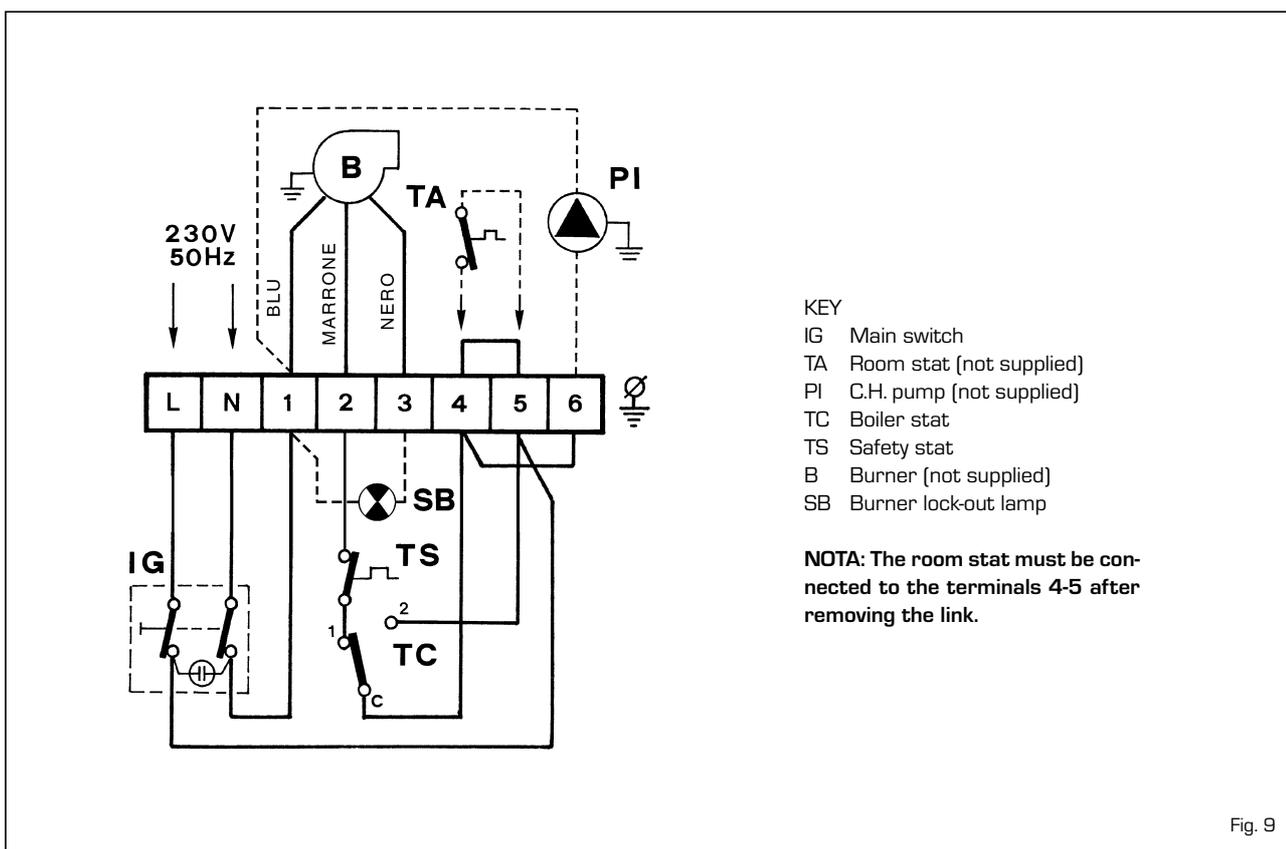


Fig. 9

## 3 USE AND MAINTENANCE

### 3.1 COMMISSIONING THE BOILER

When commissioning the boiler it is recommended:

- to make sure that the system has been filled with water and adequately vented;
- to make sure that the flow and return valves are fully open;
- to make sure that flue and chimney are free from obstructions;
- to make sure that the electrical connections to the mains and the earthing are correct;
- to make sure that no flammable liquids or materials are near the boiler.

### 3.2 LIGHTING AND OPERATION

#### 3.2.1 Lighting the boiler

To light the boiler proceed as follows (fig. 10):

- check that the "Testing Certificate" has been removed from inside the combustion chamber;
- switch on the main switch (1); the burner will start;
- turn the boiler stat knob (5) to the desired setting.

For best results, set the boiler stat knob to a temperature no lower than 60°C to prevent the formation of condensate.

The set temperature value can be checked on the thermometer (4).

#### 3.2.2 Safety stat

The safety stat with automatic reset calibration set at 100°C (2 fig. 1) trips,

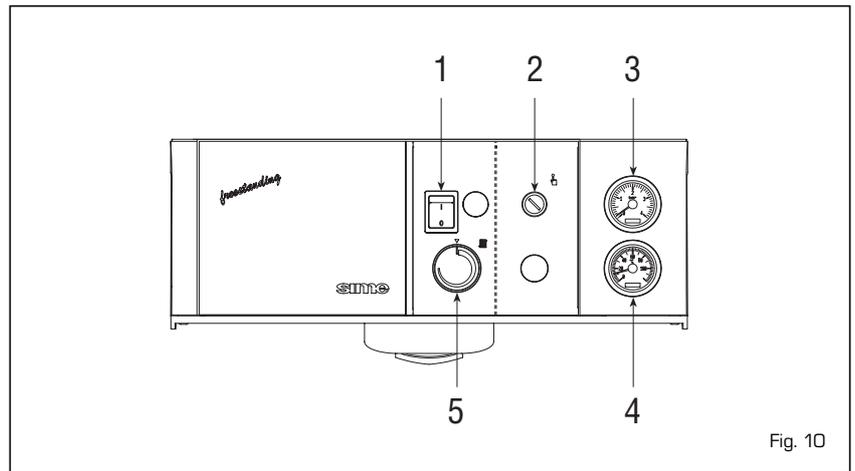


Fig. 10

immediately turning off the burner when the boiler accidentally overheats. To restore normal operations, wait until the temperature drops below the thermostat calibration setting.

#### 3.2.3 System filling

Periodically check the pressure values of the hydrometer (3 fig. 10) which, when the system is cold, should range between 1 and 1.2 bar. If the pressure is less than 1 bar, reset the system.

#### 3.2.4 Turning OFF boiler

To turn off the boiler, cut off the voltage by pressing the mains switch (1 fig. 10).

### 3.3 CLEANING THE BOILER

The boiler body and flue should be cleaned at the end of each season.

To clean the boiler, simply remove the

burner-holding plate and the cleaning plate with their insulation and protection panels; this operation gives easy access to the three front pockets and the combustion chamber.

Before proceeding to clean the and "2R6 ÷ 2R9" models, the baffles must be removed (fig. 11).

Once maintenance has been completed, reposition the baffles.

Use the pig (fig. 11) to clean the smoke pipes.

#### NOTE:

**Preventive maintenance must be carried out by authorized technical staff.**

### 3.4 USER WARNINGS

When faults occur and/or the equipment does not operate correctly, turn it off, without attempting to make any repairs or take direct action.

For any operation only contact the authorised technical personnel in your area.

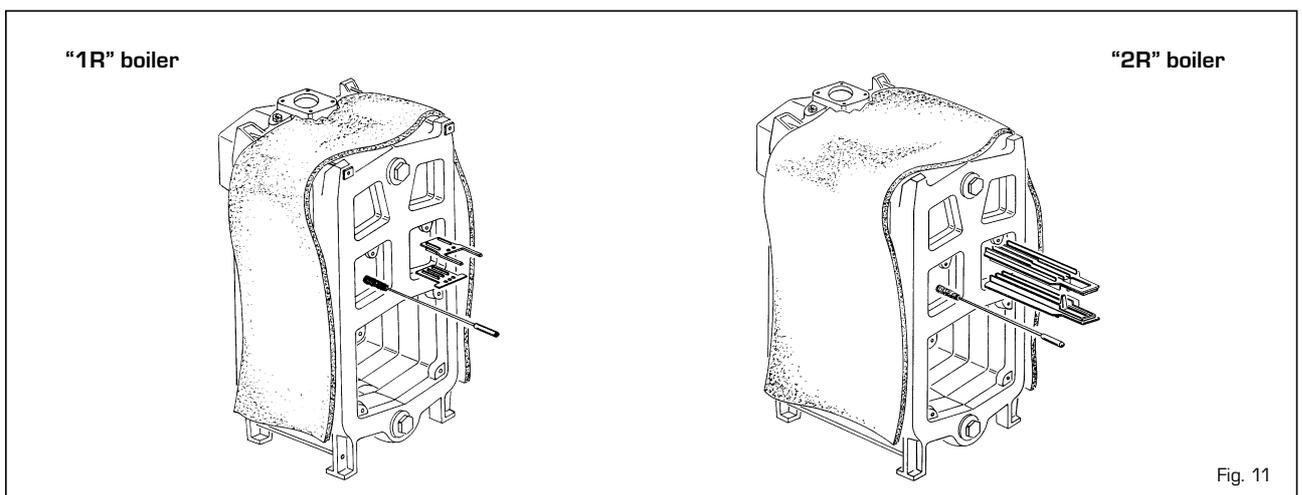


Fig. 11