

INSTALLER INSTRUCTIONS

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IMPORTANT

When carrying out commissioning of the boiler, you are highly recommended to perform the following checks:

- Make sure that there are no liquids or inflammable materials in the immediate vicinity of the boiler.
- Make sure that the electrical connections have been made correctly and that the earth wire is connected to a good earthing system.
- Open the gas tap and check the soundness of the connections, including that of the burner.
- Make sure that the boiler is set for operation for the type of gas supplied.
- Check that the flue pipe for the outlet of the products of the combustion is unobstructed.
- Make sure that any shutoff valves are open.
- Make sure that the system is charged with water and is thoroughly vented.
- Purge the system, bleeding off the air present in the gas pipe by operating the pressure relief valve on the gas valve inlet.

1 DESCRIPTION OF THE BOILER

1.1 INTRODUCTION

The "RMG Mk.II" are hot water generators designed for medium-sized heating plants. Are designed and built in

accordance with the european directives 90/396/CEE, 89/336/CEE, 73/23/CEE, 92/42/CEE and with the european specification pr EN 656. These appliances can be fired by natu-

ral gas (methane) and butane gas (G30) or propane gas (G31). The instructions given in this manual are provided to ensure proper installation and perfect operation of the appliance.

1.2 DIMENSIONS

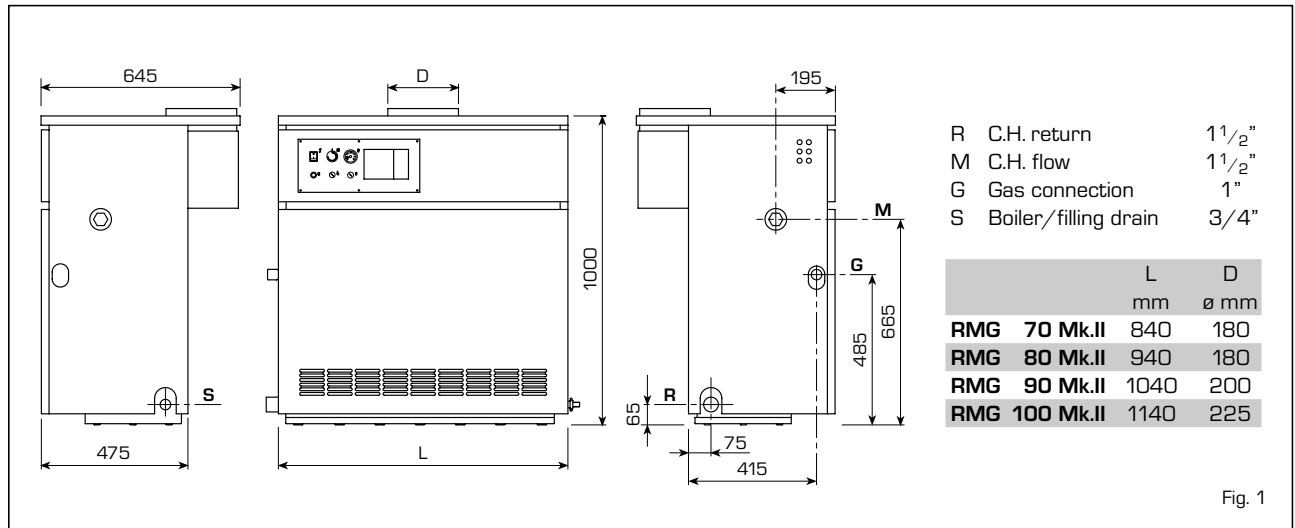


Fig. 1

1.3 TECHNICAL FEATURES

		RMG 70 Mk.II	RMG 80 Mk.II	RMG 90 Mk.II	RMG 100 Mk.II
Heat output	kW	49.1-70.1	56.0-78.7	63.0-90.0	69.9-98.6
Heat input	kW	54.5-77.9	62.2-87.4	70.0-100.0	77.7-109.5
Sections	n°	8	9	10	11
Power consumption	W	16	16	16	16
Maximum water head	bar	4	4	4	4
Test pressure	bar	6	6	6	6
Water content	l	27	30	33	36
Category		II2H3+	II2H3+	II2H3+	II2H3+
Type		B11BS	B11BS	B11BS	B11BS
Smokes temperature	°C	158	160	160	144
Smokes flow	gr/s	49	52	63	81
Maximum temperature	°C	95	95	95	95
C.H. setting range	°C	40÷85	40÷85	40÷85	40÷85
Main burner nozzles					
Quantity	n°	7	8	9	10
Natural gas	ø mm	2.95	2.95	2.95	2.95
G30 - G31	ø mm	1.70	1.70	1.70	1.70
Gas consumption *					
Natural gas	m³s/h	8.2	9.2	10.6	11.6
Butane (G30)	kg/h	6.0	6.8	7.7	8.5
Propane (G31)	kg/h	5.9	6.7	7.6	8.3
Burner gas pressure					
Natural gas	mbar	4.5 - 9.3	4.6 - 9.1	4.7 - 9.3	4.7 - 9.3
Butane (G30)	mbar	12.2 - 25.2	12.3 - 25.4	12.0 - 25.1	12.5 - 25.1
Propane (G31)	mbar	16.4 - 32.6	16.1 - 30.2	15.6 - 30.0	16.6 - 32.7
Gas supply pressure					
Natural gas	mbar	20	20	20	20
Butane (G30)	mbar	29	29	29	29
Propane (G31)	mbar	37	37	37	37
Weight	kg	238	266	294	322

* The gas consumptions refer to the calorific value at standard conditions at 15°C - 1013 mbar.

1.4 MAIN COMPONENTS

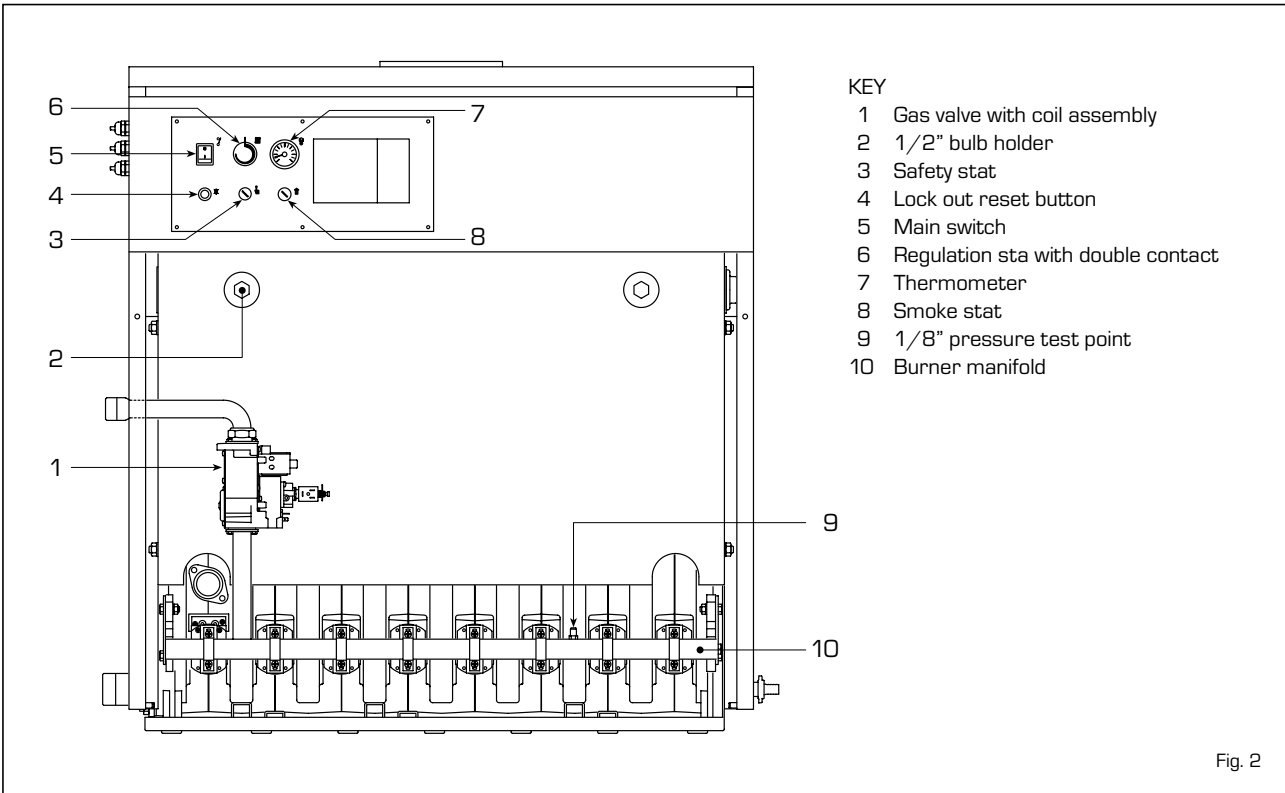


Fig. 2

2 INSTALLATION

The boiler must be installed in a fixed location and only by specialized and qualified firms in compliance with all instructions contained in this manual. Furthermore, the installation must be in accordance with current standards and regulations.

2.1 BOILER ROOM

The "RMG Mk.II" boilers with a rating of more than 35 kW must be equipped with a technical room whose dimensions and requirements correspond to the current safety standards. The minimum height of the boiler room must comply with what is indicated in fig. 3 in relation to the overall thermal capacity. The minimum distance between the walls of the room and the external points of the boiler (right, left side,

rear) must not be less than 0.60 m. It is possible to place a number of apparatus next to each other, on condition that all the safety and control devices can be easily reached. In addition, to

circulate air in the room, air vents must be made on the outside walls for which the surface area must never be less than 3,000 cm² and 5,000 cm² for gas with a density greater than 0.8.

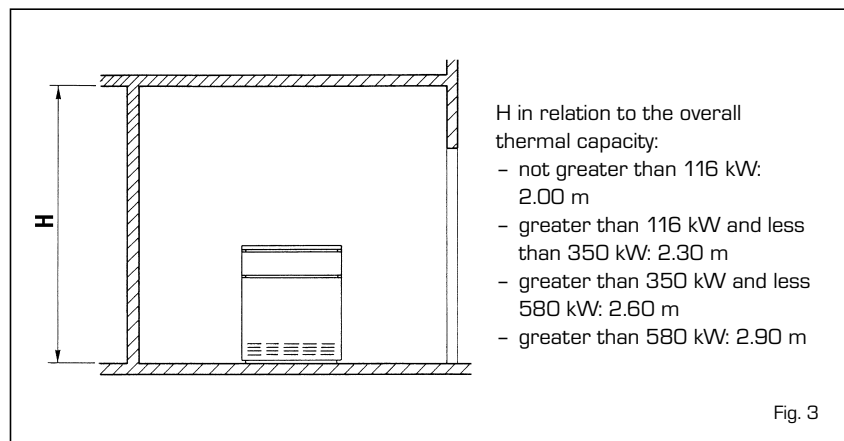


Fig. 3

2.1.1 Handling

Once the boiler is in its place of installation and the packaging has been removed, proceed as follows if it must be moved (fig. 3/a):

- remove the casing cover;
- attach the lifting brackets (located on the rear of the boiler) and fasten it in place with the screws provided;
- insert two 3/4" pipes in the holes in the brackets, lift the boiler carefully and place into position.

2.2 CONNECTING UP SYSTEM

Before proceeding to connect up the boiler, you are recommended to make the water circulating in the piping in order to eliminate any foreign bodies that might be detrimental to the operating efficiency of the appliance.

The unit must be connected up with rigid pipe fittings which will not subject it to stress of any kind. The connections should be easy to disconnect using pipe unions with orientable connections. You are recommended to install suitable shutoff valves on the system flow and return pipes.

CAUTION: In order to achieve a good water distribution inside the cast-iron body, the system flow and return pipes should be connected to the same side of the boiler. The boiler comes supplied standard with the attachments on the right-hand side, with the possibility of them being transferred to the left-hand side. In that case, move the water distributor, located on the return header, and the thermostat bulbs located in the sheathe, to the same side.

The thermal jump between the system flow and return pipes should not exceed 20°C. For this purpose, it is advisable to install a mixer valve with corresponding anti-condensation pump.

CAUTION: The system circulation pump or pumps must go into action at the time of boiler ignition. For this purpose, you are recommended to use an automatic system of precedence.

The gas connection must be made using seamless steel pipe (Mannesmann type), galvanized and with threaded joints provided with gaskets, excluding three-piece connections, except for initial and end connections. Where the piping has to pass through walls, a suitable insula-

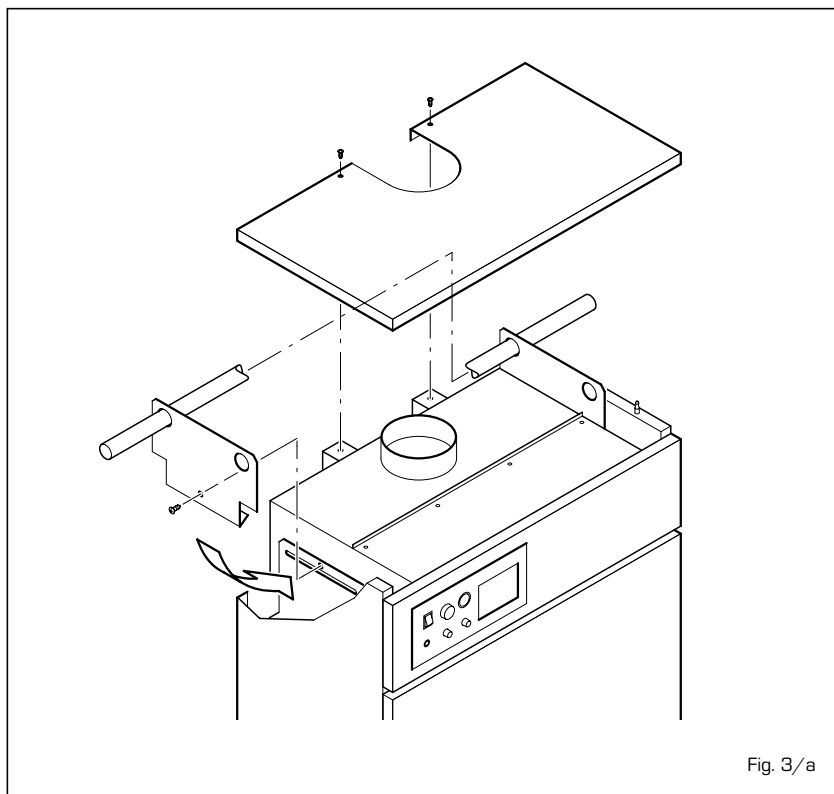


Fig. 3/a

ting sleeve must be provided.

When sizing gas piping, from the meter to the boiler, take into account both the volume flow rates (consumption) in m³/h and the relative density of the gas in question. The sections of the piping making up the system must be such as to guarantee a supply of gas sufficient to cover the maximum demand, limiting pressure loss between the gas meter and any apparatus being used to not greater than:

- 1.0 mbar for family II gases (natural gas);
- 2.0 mbar for family III gases (butane or propane).

An adhesive data plate is stuck inside the front panel; it contains all the technical data identifying the boiler and the type of gas for which the boiler is arranged.

2.3 CHARACTERISTICS OF FEEDWATER

It is absolutely essential that the water used for the central heating system should be treated in the following cases:

- Very extensive systems (with high contents of feedwater).
- Frequent addition of makeup water into the system.
- Should it be necessary to empty the system either partially or totally.

2.3.1 Filter on the gas pipe

The gas valve is supplied ex factory with an inlet filter, which, however, is not adequate to entrap all the impurities in the gas or in gas main pipes.

To prevent malfunctioning of the valve, or in certain cases even to cut out the safety device with which the valve is equipped, install an adequate filter on the gas pipe.

2.4 SYSTEM FILLING

Filling must be done slowly so as to allow any air bubbles to be bled off through the air vents provided on the heating system.

The pressure of cold charging of the system, and the pressure of pre-pressurization of the expansion vessel, must correspond, or in any case must not be less than, the height of the static column of the system (e.g., for a static column of 5 m, the pre-pressurization pressure of the expansion vessel and the charging pressure must correspond to at least 0.5 bar).

2.5 CONNECTING UP FLUE

The flue for the atmospheric expulsion of the combustion products from natural draught appliances must meet

the following requirements:

- Be gas-tight to the combustion products, waterproof and thermally insulated.
- Be built of materials suitable for keep resisting to normal mechanical stresses, heat, and the action of combustion products and their possible condensates.
- Follow a vertical path and not present any throttling throughout its entire length.
- Be adequately insulated to prevent phenomena of condensation or smokes cooling, in particular if located outside the building or in unheated ambiances.
- Be set at an adequate distance from combustible or easily inflammable material by means of an air gap or suitable insulating material.
- Have beneath the mouth of the first smoke duct a chamber for collecting solid material and any condensate; the height of the chamber must be at least 500 mm.

Access to the chamber must be guaranteed by means of an opening provided with an air-tight metal door.

- Have a circular, square, or rectangular internal cross section; in the case of square or rectangular sections, the corners must be rounded off with a radius of not less than 20 mm. However, hydraulically equivalent cross sections are allowed.
- Be equipped with a chimney-pot at the top, which must be outside the so-called back-flow zone, so as to prevent the formation of back-flow, which prevents free discharge of the products of combustion into the atmosphere.

Therefore, conform to the minimum heights indicated in fig. 4.

- Be devoid of mechanical means of suction located at the top of the pipe.
- No overpressure should be present in a chimney that passes within or close up to inhabited rooms.

2.5.1 Sizing of flue

The correct sizing of the flue is an essential condition for efficient boiler operation.

The main factors to be taken into consideration for calculating the section are the heat input of the boiler; the type of fuel, the percentage of CO₂, the mass flow of smoke at nominal load, the temperature of the smoke, the roughness of the internal wall, and

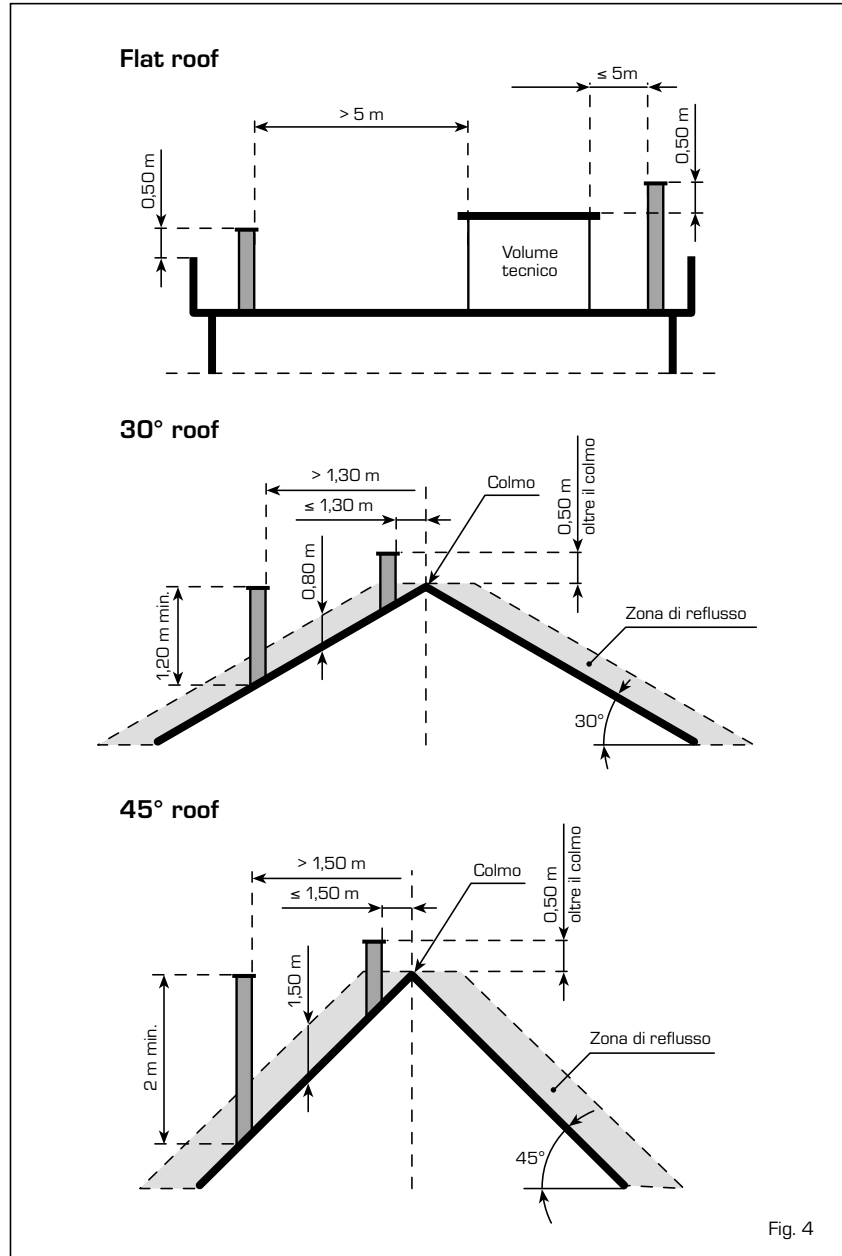


Fig. 4

the effect of gravity on the draught pressure, which must take into account the external temperature and the altitude.

2.6 ELECTRICAL CONNECTION

The boiler is supplied with an electric cable. Should this require replacement, it must be purchased exclusively from SIME. The electric power supply to the boiler must be 230V-50Hz single-phase through a fused main switch, with at least 3 mm spacing between contacts. The room stat must be class II as specified by standard EN 60730.1 (clean contact).

NOTE: Device must be connected to an efficient earthing system.

SIME declines all responsibility for injury or damage to persons, animals or things, resulting from the failure to provide for proper earthing of the appliance. Always turn off the power supply before doing any work on the electrical panel.

2.6.1 Control system connection (optional)

In the electrical circuit a series of connectors are provided for the installation of an optional control system, marked by different colours black, red and brown (fig. 5).

The connectors are polarised in such a way that the order cannot be inverted. To install the control system these connectors must be connected and jumpers 4-5 and 11-12 must be removed from the terminal board (marked in bold in fig. 6). The control system allows for the use of sensors and environment units whose connectors, polarised and coloured, are found in a bag inside the control board.

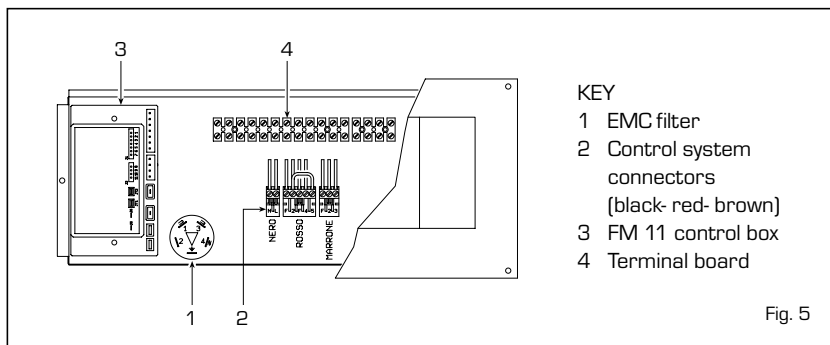


Fig. 5

2.6.2 Wiring diagram

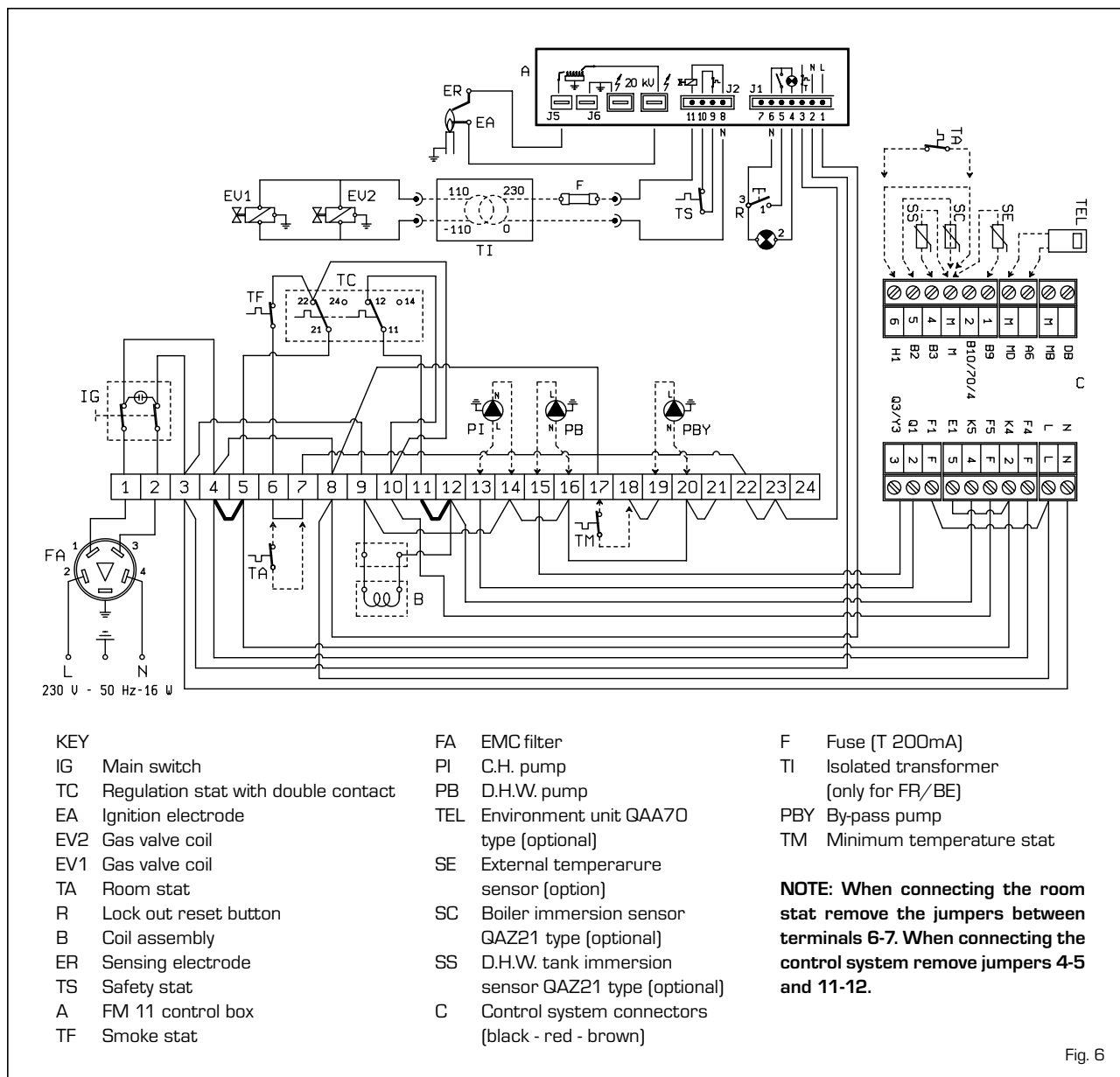


Fig. 6

2.7 CONTROL SYSTEM RVA43.222 (optional)

All the boiler functions can be operated by the optional control system code 8096303, supplied with external temperature sensor (SE), boiler immersion sensor (SC) (fig. 7). Another series of low tension connectors may be connected to the control system, these are used for the connection of the sensors and the environment unit (the connectors are to be found in a bag inside the control board). The bulb of the sensor of the external D.H.W. tank (SS), optional code 6277110, must be inserted in the hot water sheath and the boiler probe (SC) in the boiler sheath. To assemble the external temperature sensor (SE) follow the instructions given on the packaging of the sensor.

For the electrical connection refer to the diagram in fig. 6.

WARNING: to grant the correct operation of the plant set the boiler thermostat at the maximum value.

2.7.1 Characteristics and functions

“RVA 43” is realized as regulator of one boiler mono or bi-stadium or regulator of cascade connections to manage 16 boilers maximum.

Operating Efficiency

- Qualification or not of the heat production in the presence of integration with storage.

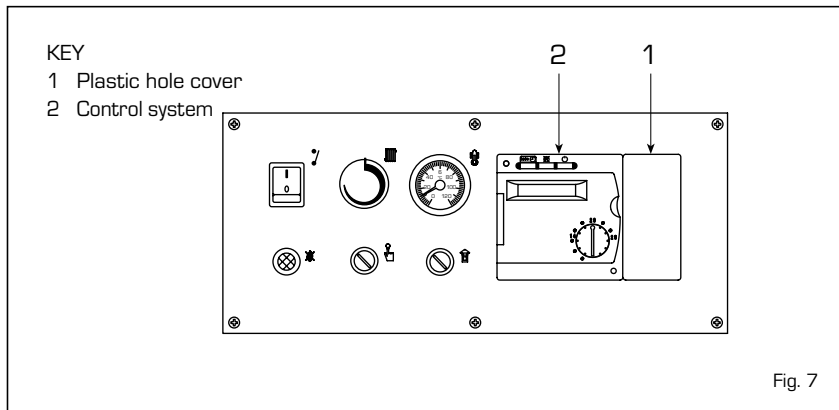


Fig. 7

- Climatic control of the temperature of the boiler, with the possibility of room compensation.
- Operation of a direct heating circuit (with pump) for each regulator.
- Auto-adjusting function of the climatic curve on the basis of the thermal inertia of the building and the presence of “free heat” (with compensation).
- Optimising function of the ignition and turning off (speeded up heating and turning off before time).
- Saving function calculated on a daily basis according to the dynamic characteristics of the structures.
- Automatic summer/winter switching

Safety Functions

- Minimum and maximum adjustable temperature of return
- Differentiated antifreeze protection, hot water storage and plant.
- Protection from overheating of the boiler.

- Antiscuff protection of the pumps.
- Protection of the burner with minimum operating time.

Operating functions

- Simplified starting procedure.
- All the settings may be carried out on the regulator.
- Standard for weekly programming.
- All the settings and operating regimes available on display and lit up leds.
- Relay and sensor test.

Hot water production

- Programming of day hours.
- Possibility of setting the minimum temperature for the hot water during the reduction period.
- Possibility of controlling the storage loading pump.
- Hot water circuit priority can be selected.

Other technical characteristics

- Easy connection with a digital environment unit (QAA70).

3 CHARACTERISTICS

3.1 CONTROL BOX

The “RMG Mk.II” boilers are provided with automatic ignition (without pilot burner). They are therefore equipped with FM 11 electronic control and protection, with a built-in transformer, located inside the instrument panel protection box. Ignition and flame detection is controlled by two electrodes located on the burner.

These guarantee maximum safety with intervention times, for accidental switching off or gas failure, within 8 seconds (fig. 8).

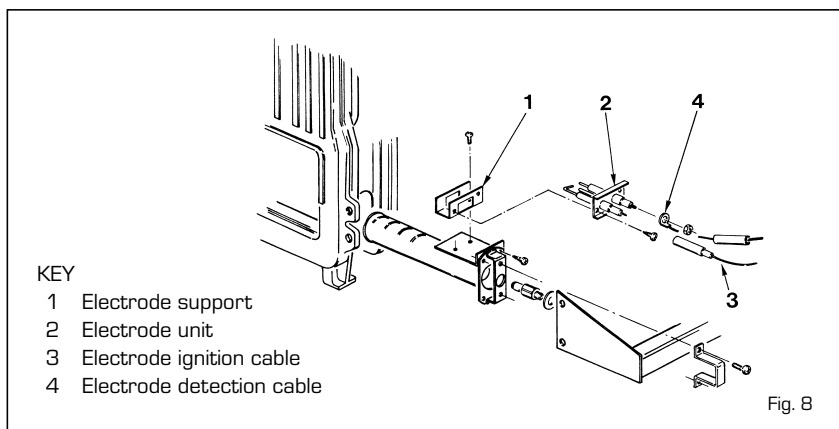


Fig. 8

3.1.1 Operating cycle

Before igniting the boiler, use a voltmeter to make sure that the electrical connection to the terminal block has been made properly, respecting the position of live and neutral, as shown in the diagram. Then press the switch on the control panel detecting voltage and lighting the led lamp.

The boiler is now ready to start working; a discharge current is sent to the ignition electrode through the FM 11 programmer, and the gas valve opens at the same time.

Burner ignition normally takes place within 2 or 3 seconds. However, it is possible for ignition failures to occur, with consequent activation of signal indicating that the equipment has "locked out".

Failures may be due to one of the following causes:

- Gas failure

The control box runs through the cycle normally sending electric power to the ignition electrode.

The electrode continues spark discharge for a maximum of 8 sec. If the burner does not ignite, the control box "locks out".

This may occur upon first ignition or after long periods of boiler lay-off when there is air in the pipes.

It may be caused by the failure of the gas valve to open owing to a break in the electric coil.

- Ignition electrode fails to spark

In the boiler, only opening of gas to the burner is seen to occur. After 8 sec. the control box "locks out".

This may be due to there being a break in the wire of the electrode or the wire not being properly fastened to the terminal of the control box; or else, the transformer has burnt out.

- No detection of flame

The continuous spark discharge of the electrode is noted starting from ignition even though the burner is lit. After 8 seconds have elapsed, the sparks cease, the burner goes out, and the warning lamp indicating equipment "lock-out" lights up.

This occurs when the position of live and neutral has not been respected on the terminal block.

There is a break in the wire of the

sensing electrode or the electrode itself is earthed: the electrode is worn out and needs replacing.

The control box is faulty

When there is a sudden voltage failure, the burner shuts out immediately; when power supply returns, the boiler will start up again automatically.

3.1.2 Ionization circuit

The ionization circuit is to be checked using a dial-type micro-ammeter, or preferably a digital micro-ammeter with a 0 to 50 μ A scale.

The micro-ammeter terminals must be series-connected to the wire of the sensing electrode. Under normal operating conditions, the value oscillates between 6 - 10 μ A.

The minimum value of the ionization current for which the equipment can "lock out" is about 1 μ A.

In this case, make sure that there is a good electrical contact and check the degree of wear of the end part of the electrode and the corresponding ceramic protection.

3.2 REGULATION THERMOSTAT

"RMG Mk.II" boilers are equipped with a regulating thermostat with a double contact having differentiated setting (6 fig. 2).

This makes it possible to obtain a reduction of heat output before the burner goes out completely, by means

of the coil assembly installed on the gas valve regulator.

This step-modulation system affords the following advantages:

- higher overall boiler efficiency;
- containment within acceptable values of the increase in temperature that takes place in the cast-iron body (heat inertia) when the burner goes out.

3.3 SMOKE SAFETY DEVICE

This is a safety device against possible smoke emission into the ambience (8 fig. 2).

The safety device goes into action by blocking operation of the gas valve when the return of the smoke into the ambience is continuous and in quantities that might constitute a danger. To restart the boiler, the cover of the thermostat must be unscrewed and reset the underlying button. Make sure the control panel is disconnected before carrying out this operation. Should the boiler continue to "lock out", it will be necessary to make a careful check on the flue pipe, making all the necessary modifications and amendments so that it can work properly.

3.5 SYSTEM AVAILABLE HEAD

The head available is shown in graph in fig. 9.

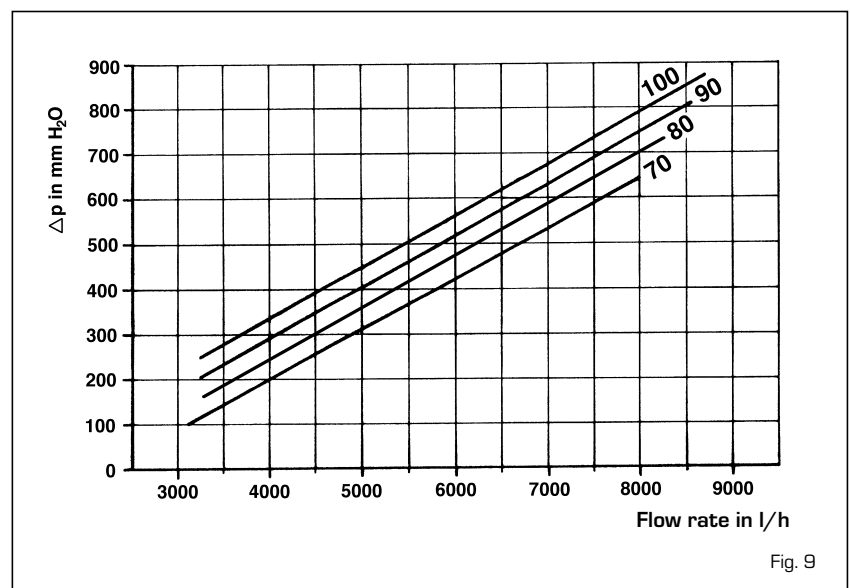


Fig. 9

4 USE AND MAINTENANCE

4.1 GAS VALVE

“RMG Mk.II” boilers come equipped standard with a HONEYWELL VR 4605 C gas valve (for “70 - 80” models) and VR 4605 CB gas valve (for “90 - 100” models).

When the boiler is ignited the first time, it is always recommended to bleed the piping by using the pressure outlet upstream from the valve (fig. 10).

4.2 GAS VALVE ADJUSTMENT

The “RMG Mk.II” boilers have the gas valve equipped with a coil assembly, which enables, via the double-contact regulating thermostat, a reduction in output corresponding to approx. 60% of nominal output before the burner goes out completely. Calibration of the operating pressures is done by SIME in the factory. Consequently they should not be altered. Only when you switch to another type of gas (butane or propane) is it permitted to alter the operating pressures (Table 1).

It is essential that this operation be carried out exclusively by authorized technical staff. When the working pressures have been adjusted, reseal the regulators.

When the gas pressures are to be reset, this must be done following a set order: first the maximum pressure and then the minimum.

4.2.1 Nominal pressure adjustment

To set the maximum pressure, proceed as follows (fig. 11):

- connect the pressure column or a pressure gauge to the pressure intake located on the burner

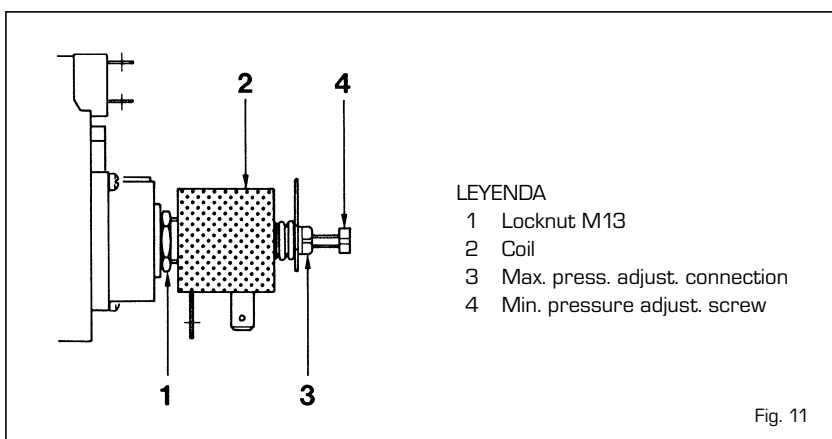


Fig. 11

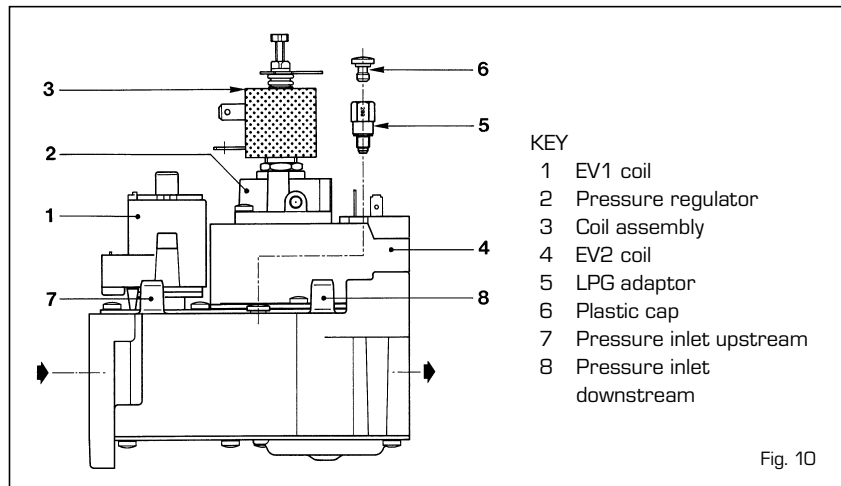


Fig. 10

TABLE 1

		70 Mk.II	80 Mk.II	90 Mk.II	100 Mk.II
Methane - G20					
Burner max. pressure	mbar	9.3	9.1	9.3	9.3
Burner min. pressure	mbar	4.5	4.6	4.7	4.7
Butane - G30					
Burner max. pressure	mbar	25.2	25.4	25.1	25.1
Burner min. pressure	mbar	12.2	12.3	12.0	12.5
Propane - G31					
Burner max. pressure	mbar	32.6	30.2	30.0	32.7
Burner min. pressure	mbar	16.4	16.1	15.6	16.6

- unscrew the screw (4) completely;
- set the knob of the thermostat to the maximum value;
- supply electric power to the boiler;
- loosen the locknut (1) and turn the connection (3):
to reduce the pressure, turn the connection counterclockwise; to increase the pressure, turn the connection clockwise;
- tighten the locknut (1);
- operate the main switch a number of times, making sure that the maximum pressure corresponds to the values given in Table 1.

4.2.2 Reduced pressure adjustment

To set the reduced pressure, proceed as follows (fig. 11):

- deactivate the coil (2) electric supply;
- switch on the boiler and after a short period of operation at nominal output, turn the thermostat knob slowly towards the minimum position until you hear the click of the first contact of the thermostat;
- leave the knob in that position and, turning the screw (4), seek the minimum pressure value according to Table 1 for the gas in question: to reduce the pressure, turn the screw counterclockwise; to increase the pressure, turn the screw clockwise;
- restore electric power to the coil;
- operate the main switch a number of times, making sure that the minimum pressure corresponds to the value given in Table 1.

4.3 GAS CONVERSION

To convert to butane gas (G30) or propane gas (G31), the main nozzles must be replaced with another supplied in the boiler gas conversion kit and apply

the LPG adaptor code 6248301 onto the gas valve (5 fig. 10).

To adjust the operating pressures, refer to section 4.2.

When the working pressures have been adjusted, reseal the regulators.

After have ultimated the conversion of the boiler, please stick onto the casing panel the plate showing the relevant feeding gas which is included into the conversion kit.

NOTE: After assembling all the gas connections, a test for gas tightness must be carried out using soapy water or special products.

Do not use naked flames. The conversion to different gas must be carried out exclusively by authorized technical personnel.

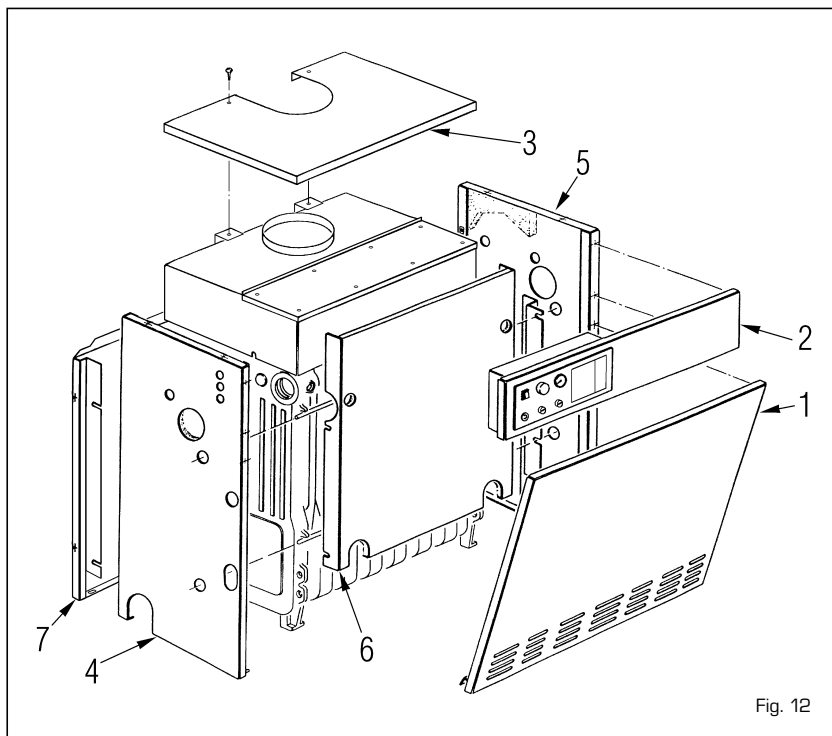
4.4 SHELL DISASSEMBLY

Follow the steps described below to disassemble the shell (fig. 12):

- Remove the shell door [1] which is attached with pressure fit pins.
- To remove the cover [3] loosen the two screws that attach it to the flue gas chamber and lift.
- Remove the top front panel [2] placing it against the flue gas chamber.
- Disassemble the left side [4] unscrewing the nuts that attach it to the tie rods.
- Do the same operation to disassemble the right side [5].
- Remove the inner wall [6] by pulling it forward.
- Unscrew the nuts that secure the rear wall [7] to remove it from the tie rods.

4.5 CLEANING AND MAINTENANCE

At the end of each heating season, it is essential to have the boiler thoroughly



checked and cleaned out.

Proceed as follows:

- Turn the main switch off to stop electric power reaching the boiler and close the gas feed cock.
- Remove the shell door and cover.
- Remove the top panel of the flue gas chamber attached to it with self-threading screws.
- Remove the gas unit.
- Insert a special brush from the top into the rows of pins in the cast iron exchanger and move the brush up and down to remove the scales.
- Remove the burner from the nozzle header and aim a jet of air toward the inside of the burners to remove any dust. Make sure that there are no scales on the top drilled part of the burners (fig. 13).
- Remove any scales from the bottom of the boiler and replace the items that were removed, checking the

position of the gaskets.

- Check the chimney to make sure that the flue is clean.
- Check operation of the equipment and the main burner.
- After assembly of all the gas connections, these must be tested for soundness, using soapy water or appropriate products. **DO NOT USE NAKED FLAMES.**

Preventive maintenance and checking of efficient operation of equipment and safety devices must be carried out exclusively by authorized technical personnel.

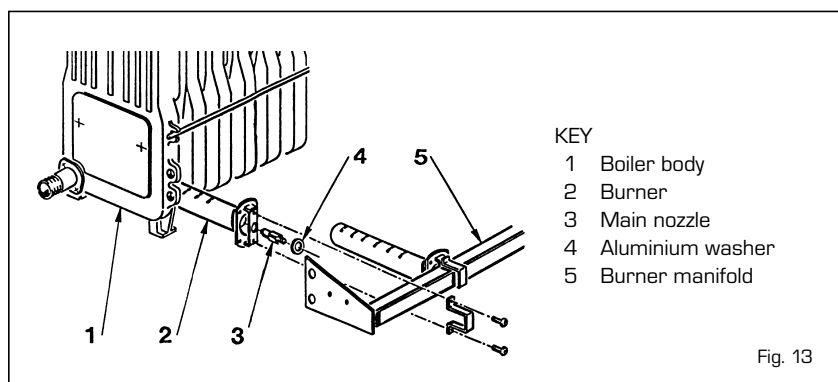
4.6 FAULT FINDING

The main burner does not ignite.

- This means that the flue smoke stat has tripped off (point 3.3).
- Make sure power arrives to the gas valve.
- Replace the electric operator of the valve.
- Replace the valve.

The boiler reaches the set temperature, but the radiators do not heat up.

- Make sure there are no air bubbles in the system, if so purge from appropriate air vents.
- The room stat is too low or must be replaced if faulty.
- The connections of the room stat



KEY

- 1 Boiler body
- 2 Burner
- 3 Main nozzle
- 4 Aluminium washer
- 5 Burner manifold

Fig. 13

-
- are not correct (make sure the cables are placed on terminals 6 and 7 of the boiler terminal board).
- The circulation pump is blocked, unblock it.

Boiler operates only at nominal pressure and does not reduce pressure.

- Check whether there is voltage at both ends of coil.
- The coil has a break in the winding; replace.
- The rectifier card that supplies the coil is interrupted; replace.

- There is no differential on setting of the two contacts of the regulating thermostat; replace.
- Check calibration of reduced pressure adjusting screw (4 fig. 11) of coil assembly.

The boiler gets dirty easily causing scaling of cast iron exchanger and cutting off of smoke stat.

- Check that the flame of the main burner is well regulated and that gas consumption is proportional to boiler output.

- Poor ventilation of premises where boiler is installed.
- Flue with insufficient draught or not meeting requirements.
- The boiler works at too low temperatures. Adjust the boiler thermostat to higher temperatures.

Thermostat switches boiler back on with too high temperature difference.

- Replace regulating thermostat since it is out of calibration.