



gas boilers

**RX GB**

installation and servicing instructions

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# 1 Technical features and dimensions

## 1.1 BOILER DESCRIPTION

The new series of “RX” gas-fired heating boilers has been designed and manufactured to ensure maximum user-friendliness and to ease both the installation and the maintenance operations for the installer.

They are equipped with all safety and control devices required by the law and their technical and operating specifications meet the requirements of the specifications on the safety and use of combustible gas.

Moreover they have been designed and manufactured in compliance with European Directive EN 297.

They can be fuelled with natural gas or L.P.G. Should a gas other than that for which the boiler is equipped be

used, the conversion will be carried out directly by the authorized engineer during the commissioning operation. This manual contains the instructions for the following boiler models:

- “RX 19 ÷ 55 CE” with piezoelectric ignition;
- “RX 19 ÷ 55 CE IONO” with electronic ignition and flame ionization;
- “RX 19 - 26 PVA CE” with pump, expansion vessel and piezoelectric ignition;
- “RX 19 - 26 PVA CE IONO” with pump, expansion vessel, electronic ignition and flame ionization.

This manual contains all the instructions needed by the installer for the correct installation and commissioning of the equipment.

## 1.2 DIMENSIONAL DETAILS

### 1.2.1 “RX 19-26” dimensions

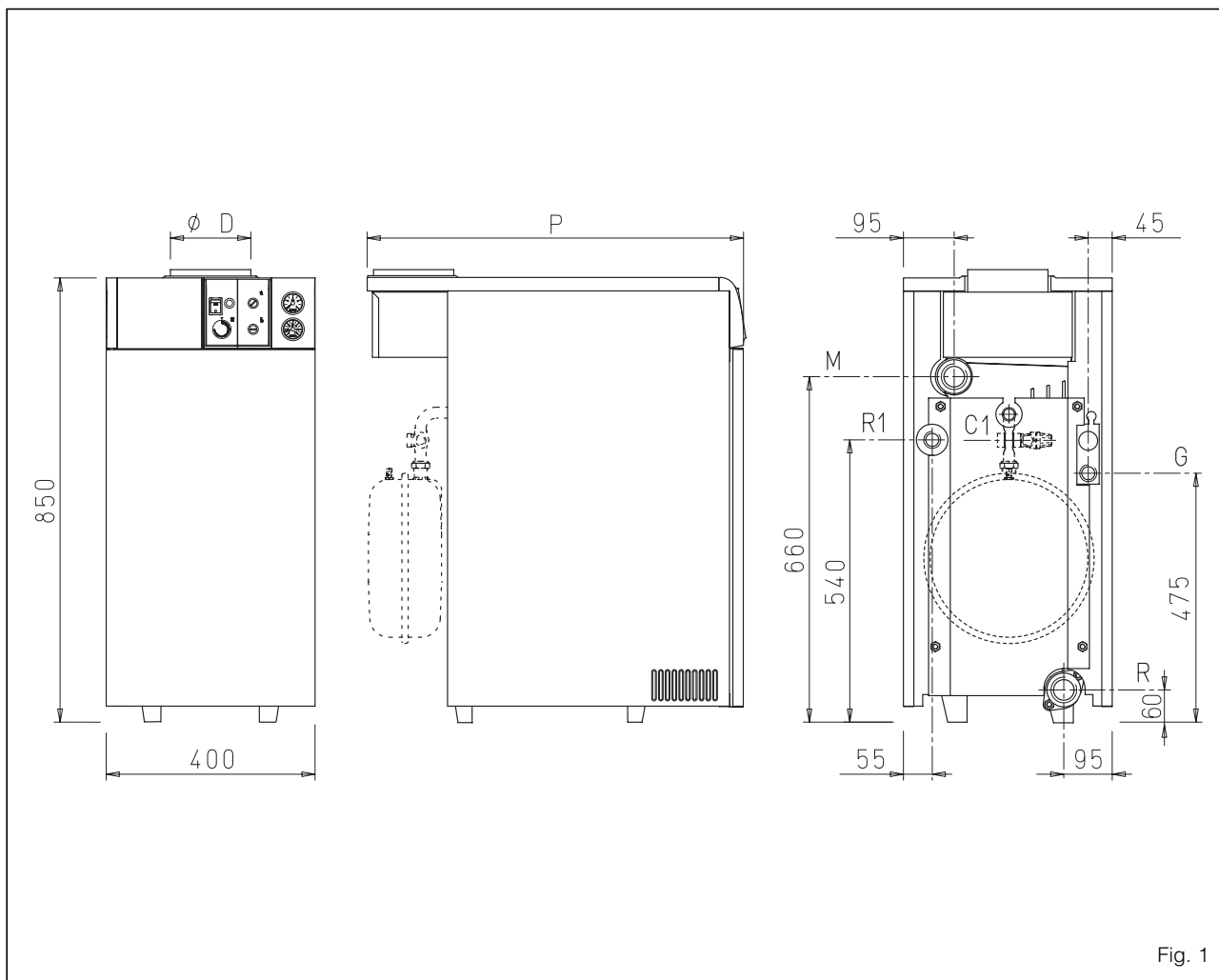
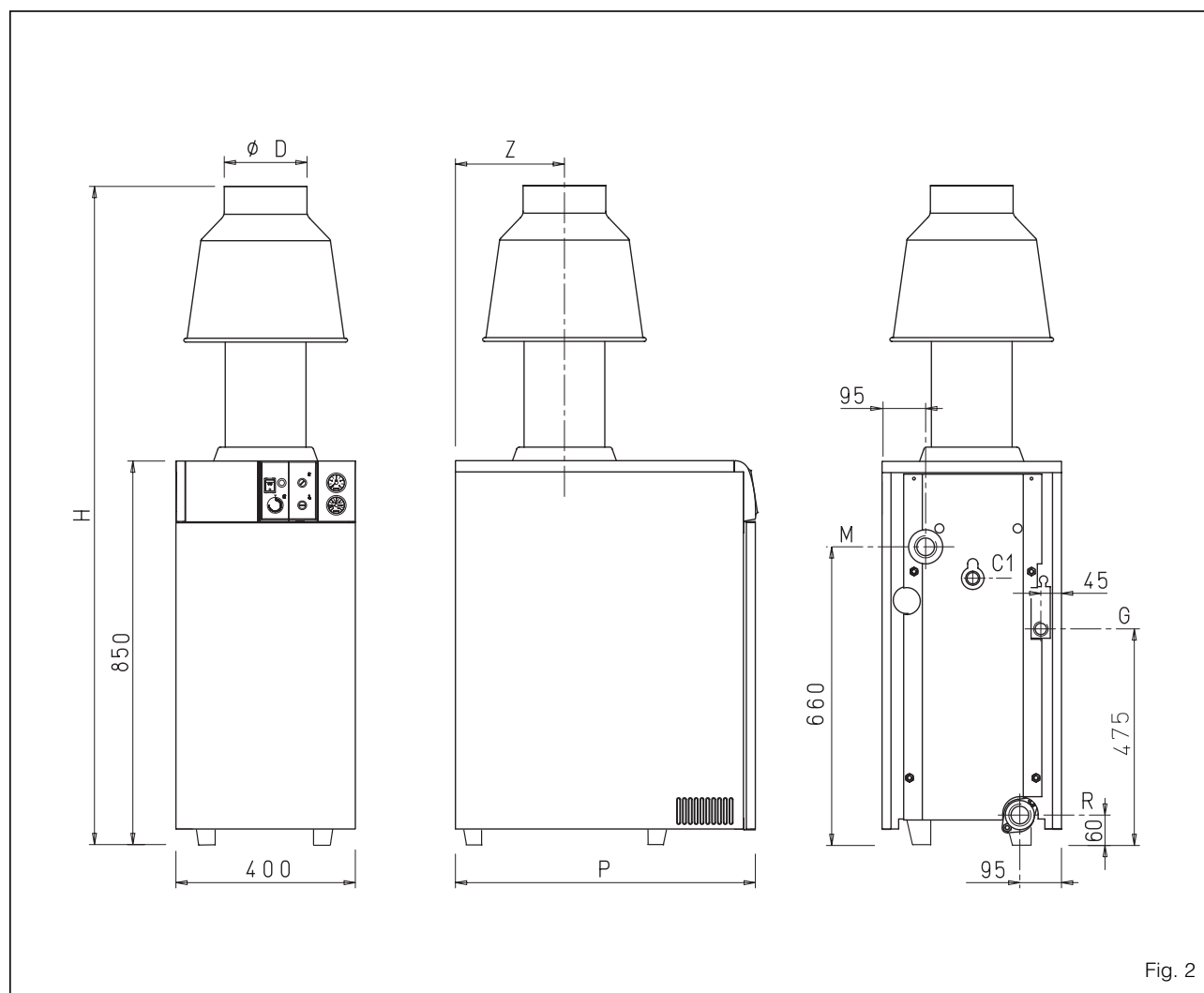


Fig. 1

TABLE 1

Model	Depth P mm	Flue socket D Ø mm	C.H. flow M Ø	C.H. return with pump R1 Ø	C.H. return R Ø	Gas connection G Ø	Filling connection C Ø
RX 19	595	130	1 1/2"	1"	1 1/2"	1/2"	1/2"
RX 26	720	150	1 1/2"	1"	1 1/2"	1/2"	1/2"

### 1.2.2 “RX 37-48-55” dimensions



**TABLE 2**

Model	Dimensions			Flue socket D Ø mm	C.H. flow M Ø	C.H. return R Ø	Gas connection G Ø	Filling connection C Ø
	P mm	H mm	L mm					
<b>RX 37</b>	670	1.435	245	180	1 1/2"	1 1/2"	3/4"	1/2"
<b>RX 48</b>	770	1.435	295	180	1 1/2"	1 1/2"	3/4"	1/2"
<b>RX 55</b>	870	1.675	345	200	1 1/2"	1 1/4"	3/4"	1/2"

### 1.3 TECHNICAL FEATURES

**TABLE 3**

Model	Heat Input kW	Heat Output kW	Power consumption W	Number of sections	Water content litres	Pressure loss water side *** mm W.G.	Maximum water head bar
<b>RX 19</b>	25.0	22.0	5 - 16* - 100**	3	10	20	3
<b>RX 26</b>	34.8	30.5	5 - 16* - 100**	4	13	30	3
<b>RX 37</b>	44.8	39.1	5 - 16*	5	16	45	3
<b>RX 48</b>	55.0	48.8	5 - 16*	6	19	55	3
<b>RX 55</b>	69.2	60.7	5 - 16*	7	22	103	3

\* IONO models

\*\* PVA-PVA IONO models

\*\*\* These figures refer to the water  $\Delta p$  with  $\Delta t$  10°C

TABLE 4

Model	Main burner nozzles			Burner gas pressure		Gas supply pressure		Gas consumption (*)		
	Quantity	Nat. gas	L.P.G.	Nat. gas	L.P.G.	Nat. gas	L.P.G.	Nat. gas	L.P.G.	L.P.G.
	No.	Ø mm	Ø mm	mbar	G30/G31 mbar	mbar	G30/G31 mbar	m³ s/h	kg/h	kg/h
RX 19	2	3.15	1.80	9.8	28/35	20	30/37	2.64	1.97	1.94
RX 26	2	3.65	2.10	9.6	28/35	20	30/37	3.68	2.74	2.69
RX 37	3	3.40	1.95	9.6	28/35	20	30/37	4.73	3.53	3.47
RX 48	3	3.90	2.20	9.1	28/35	20	30/37	5.82	4.34	4.27
RX 55	3	4.05	2.45	11.5	28/35	20	30/37	7.32	5.45	5.37

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

TABLE 5

Model	Pilot nozzles		Expansion vessel		Smokes temperature °C	Smokes flow gr/s	Weight RX kg	Weight RX PVA kg
	Nat. gas Ø mm	L.P.G. Ø mm	Capacity litres	Preloading Pressure bar				
RX 19	0.29	0.24	8	1	119	24,7	101	113
RX 26	0.29	0.24	10	1	118	34,7	126	138
RX 37	0.29	0.24	–	–	110	52,2	150	–
RX 48	0.29	0.24	–	–	130	53,1	176	–
RX 55	0.29	0.24	–	–	141	59,2	202	–

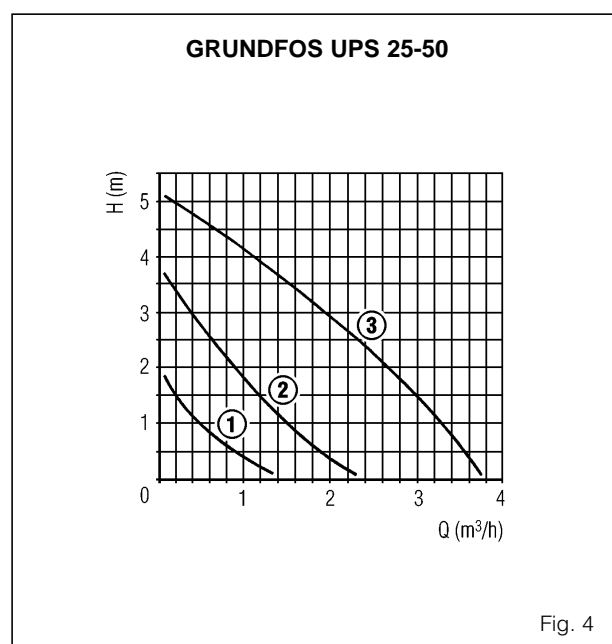
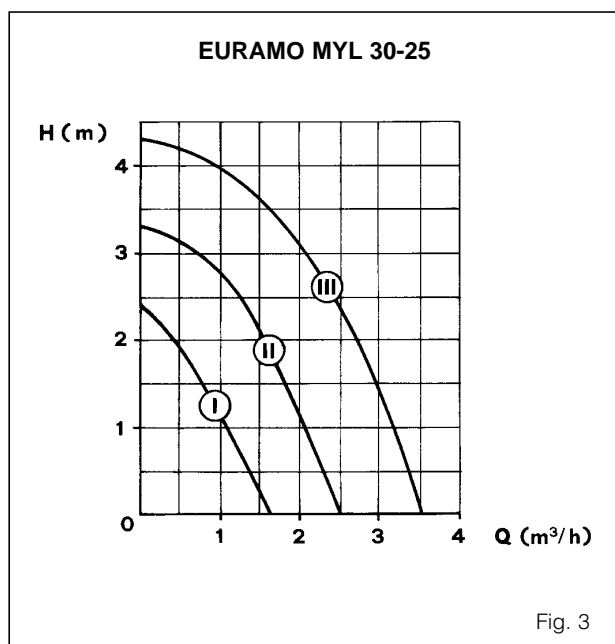
NOTE: The burner header gas pressure and inputs shown in the table refer to the boiler max. capacity

#### 1.4 CIRCULATING PUMP PERFORMANCE CURVES

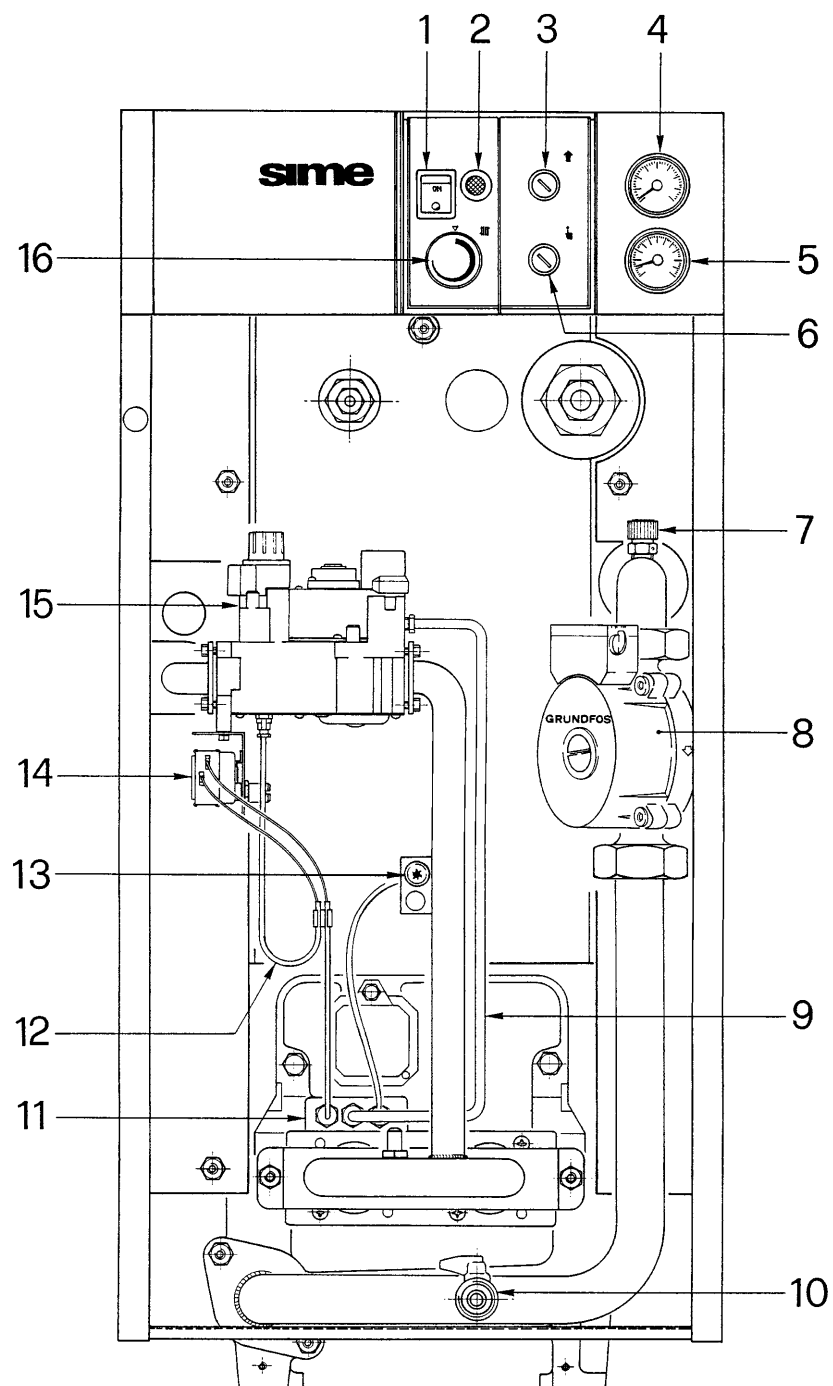
The “RX PVA” boilers can be equipped with either EURAMO MYL 30-25 or GRUNDFOS UPS 25-50 circulating pumps. Both have a built-in speed selector for adjusting head and capacity.

Head and capacity performance curves of the standard circulating pump, at different speeds, are given in figs. 3 and 4.

**NOTE: Before starting the boiler check that the circulating pump is not locked. To unlock the circulating pump simply remove the front plug and wheel the pump pin by using a notch screwdriver.**



## 1.5 INTERNAL VIEW



### KEY

- 1 Main switch
- 2 Lock out lamp ("RX IONO")
- 3 Smoke stat
- 4 Hydrometer
- 5 Thermometer
- 6 Overheat stat ("RX IONO")
- 7 Air vent valve ("RX PVA")
- 8 Circulating pump ("RX PVA")

- 9 Gas pilot tube
- 10 Drain cock (1/2")
- 11 Pilot burner
- 12 Interrupted thermocouple
- 13 Piezoelectric ignition
- 14 Overheat stat
- 15 Gas valve
- 16 Boiler stat

Fig. 5

## 2 General instructions for the installation

The boiler should be installed in a fixed location and shall be carried out only by specialized and qualified firms in compliance with all instructions contained in this manual.

### 2.1 BOILER ROOM

There are no particular regulations to follow with reference to the boiler room because “RX 19-26” boilers, which do not exceed the 35 kW limit, can be installed in rooms that are sufficiently ventilated.

The “RX 37-55” models with a capacity exceeding 35 kW shall instead be installed in a boiler room that meets the existing safety regulations for network gas-fired heating systems, where minimum distances must be observed.

### 2.2 VENTILATION REQUIREMENTS

The rooms where the gas-fired systems are installed must receive at least the quantity of air necessary for the normal combustion of the gas used by the various installations. Therefore, to ensure the air circulation in the rooms, it is necessary to make some holes in the walls. These holes must have the following characteristics:

- have a total free surface of minimum 6 cm<sup>2</sup> for each kW of thermal capacity, for a minimum of 150 cm<sup>2</sup> (if necessary, these holes can be obtained by increasing the space between the door and the floor).
- be on the lower part of an external wall, preferably facing the one with the burnt gas discharge.

### 2.3 BOILER CONNECTION

Before connecting the boiler circulate some water in the pipes to eliminate any foreign bodies which may prevent the equipment from working properly. When making the hydraulic connections, follow the instructions of fig. 1 and 2 carefully. The boiler connections shall be made by using rigid pipe fittings or steel flexible pipes that do not cause any stress on the installation.

Connections shall be easily disconnected by means of unions with revolving fittings. It is always advisable to mount suitable interception gate valves on the C.H. flow and C.H. return plant pipes.

The gas pipe connection shall be made with weldless galvanized steel pipes (Mannesmann type) with threaded and lined joints, and using three-piece pipe fittings only for initial and end connections. Pipes inside walls shall be covered by a suitable sheath. The size of gas pipes from the meter to the boiler will depend on both the volume capacity (consumption) expressed in m<sup>3</sup>/h and the gas density.

The installation pipe sections must be such as to ensure the supply of the quantity of gas necessary to meet the maximum requirements, keeping the loss of pressure between the meter and any equipment. The door carries on the inside an adhesive plate with the technical specifications and the type of gas suitable for the boiler.

### 2.4 FLUE CONNECTION

A flue for the discharge into the atmosphere of the products of combustion of natural draught plants must have

the following characteristics:

- be sealed against the products of combustion, water-proof and insulated;
- be made of materials capable of withstanding normal mechanical stresses, heat and the action of the products of combustion and their condensate;
- be vertical and with no narrowing throughout its whole length;
- be properly insulated to avoid flue gases condensing or cooling, especially if it is placed outside a building or in rooms with no heating;
- be kept at a safe distance from combustible and easily inflammable materials by an air space or any other suitable insulating material;
- have a chamber collecting solid materials and condensates below the mouth of the first flue; this chamber must be at least 500 mm high. Access to this chamber must be ensured through a hole with an airtight metal door;
- its inner section must be round, square or rectangular; if it is square or rectangular, the corners must be round and have a radius of 20 mm minimum; however, hydraulically equivalent sections are also permitted;
- be topped by a chimneypot having its outlet outside the reflux area in order to avoid back pressures which may obstruct the free discharge of flue gas into the air;
- there must be no mechanical suction equipment at the top of the pipe;
- there must be no overpressure in stacks placed inside or adjacent to inhabited rooms.

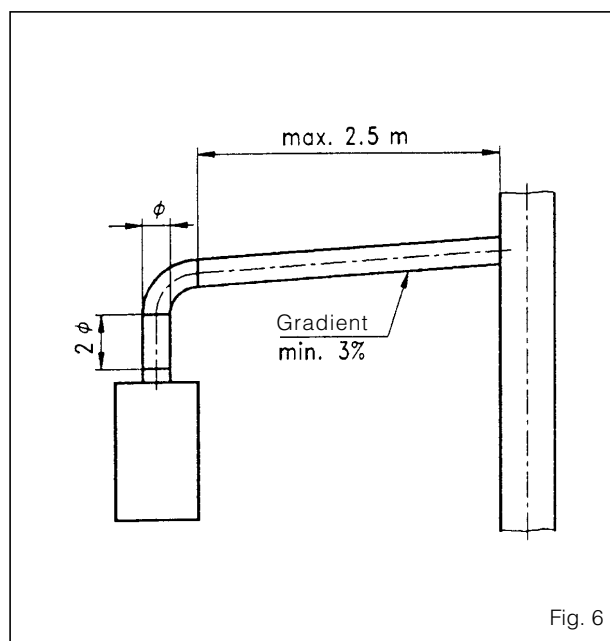


Fig. 6 refers to the boiler connection to the flue or to the stack through flue ducts. In making the connection observe the dimensions given and use sealing materials capable of withstanding mechanical stresses and flue heat over time. At any point of the flue the burnt gas temperature shall not exceed the dew point temperature. Maximum three changes of direction can be made, including the union to the stack/flue. For changes of direction, use only curved components.

## 2.5 HEATING SYSTEM WATER

If the water hardness exceeds  $20 \div 25^\circ\text{Fr}$  it is necessary to use treated water both in the sanitary and in the heating system to avoid any limestone incrustations and the consequent heat exchange reduction. It is worth remembering that a small, few millimetre-thick incrustations, because of their low heat conductivity, cause a strong overheating of the boiler walls leading to serious problems.

THE HEATING SYSTEM WATER MUST ALWAYS BE TREATED IN THE FOLLOWING CASES:

- very large systems (large water content);
- frequent additions of water to the system.

In case it is necessary to drain the system, the refilling must be made with water adequately treated.

## 2.6 FILLING WATER SYSTEM

The system loading pipe can be connected with the 1/2" coupling on the back header or, on the "RX PVA" models, on the cross coupling connected to the expan-

sion tank. The filling shall be made slowly so that air bubbles are eliminated through the vents. Check the gradual pressure increase with the thermomanometer until the plant hydrostatic height has been exceeded by a few meters. The tank preload pressure shall be regulated at the time of installation according to the plant hydrostatic height and water content, bearing in mind that the safety valve is set at 3 bar. During the filling it is better keep the main switch off.

## 2.7 ELECTRIC CONNECTION

The boiler is equipped with an electric cable with plug and shall be supplied with 230 V - 50 Hz single-phase current through a fuse protected switch having a minimum distance of 3 mm between the pins. The room thermostat (class II according to EN 60730.1), which should be installed to ensure a good temperature control, must be connected to terminals 1 and 4 after the existing bridge has been removed (figs. 7-10).

**SIME refuses all responsibility for damage to people or things due to non-earthing of the boiler.**

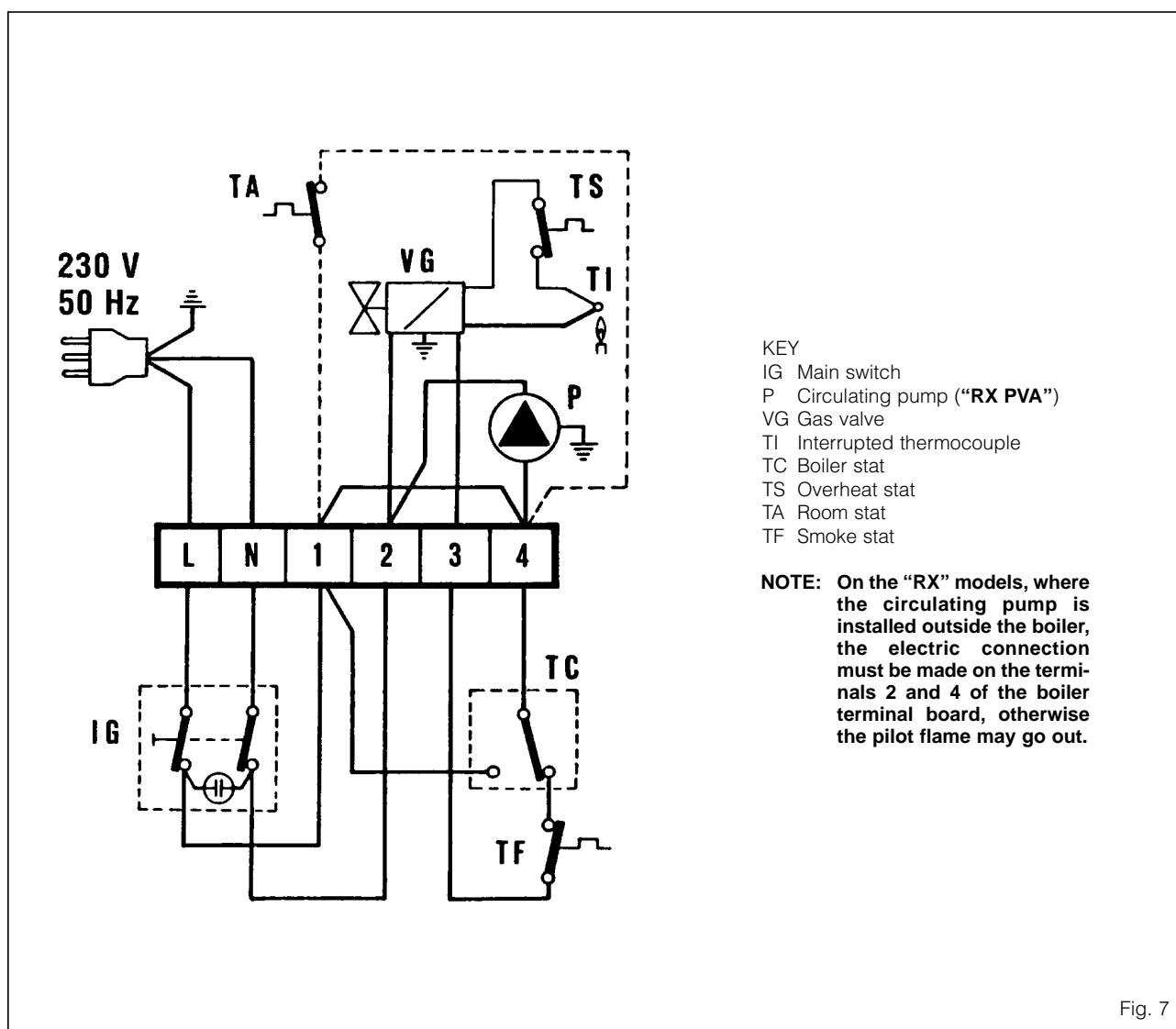


Fig. 7



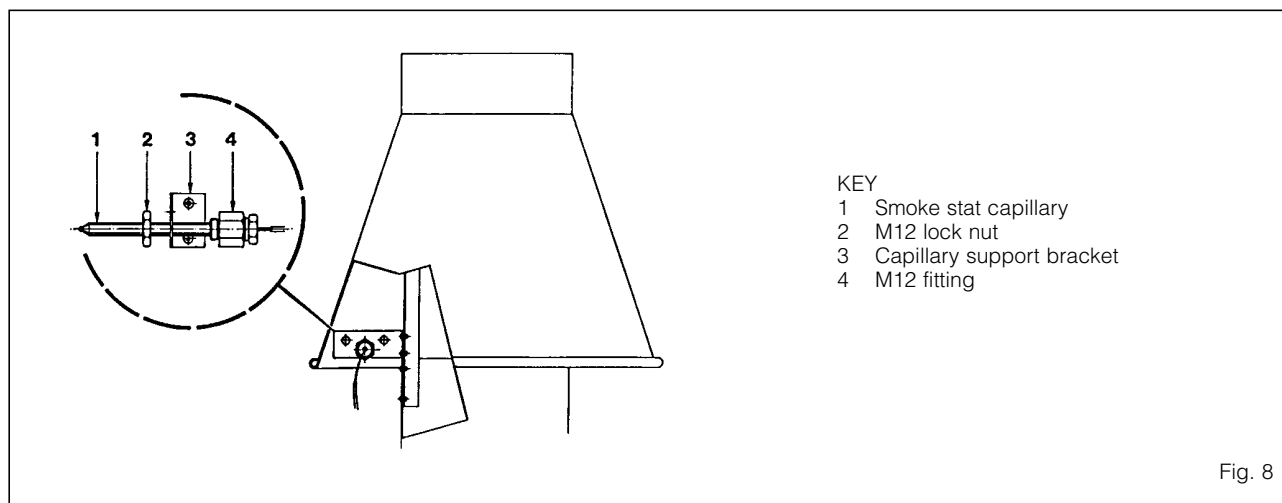


Fig. 8

## 2.8 OVERHEAT PROTECTION

In case the boiler temperature exceeds 100°C an overheat stat, connected in the thermocouple circuit, will extinguish the pilot burner thus shutting off the gas flow to the pilot and main burner.

On the “RX CE” models the overheat stat is supported by a bracket fixed to the gas valve flange (6-14 fig. 5).

On the “RX CE IONO” models the overheat stat is located on the control board and is connected in series with the smoke stat.

“RX 19-26” models are equipped with overheat thermostat with automatic resetting, and “RX 37÷55” with manual resetting.

Should the thermostat with manual resetting trip off, it will be necessary to unscrew the cover and reset the button below for the pilot burner to restart.

To restart the boiler it will be necessary to wait for the temperature inside the exchanger to go below the overheat stat set value.

## 2.9 SMOKE SAFETY DEVICE

The smoke thermostat on the control panel (3 fig. 5) is standard on “RX CE” boilers. It provides a protection against the discharge of flue gas into the atmosphere. This control device stops the gas valve if the flue gas is discharged into the boiler room in a continuous way and in such quantities as to become dangerous. To start the boiler again, switch off the power, then remove the smoke stat cover and reset the button below. If the thermostat continues to trip off, it will be necessary to check the flue thoroughly, making all the necessary changes to ensure it works properly. On the “RX 37÷55” models, the smoke stat capillary on the back of the boiler shall be put into the 12.5 Ø hole of the draughtdiverter support bracket and fixed to it with the fitting and the M 12 lock nut already mounted on the capillary (fig. 8).

**NOTE: It absolutely forbidden, under penalty of warranty loss, to disconnect, remove or tamper with safety devices. Please contact the authorized technical personel if controls or replacements of the devices are needed.**

## 2.10 ELECTRONIC IGNITION

The “RX CE IONO” boilers are equipped with electronic ignition without pilot flame; they are therefore equipped with an electric control and protection device. An electronic programmer, model Brahma FM 11, controls the ignition and the ionisation by means of two electrodes as shown in fig. 9. Maximum safety is guaranteed because in case of accidental extinction of the burner the gas flow is stopped within 1 second. A reference mark made on the burner ensures the proper application of the ignition electrode.

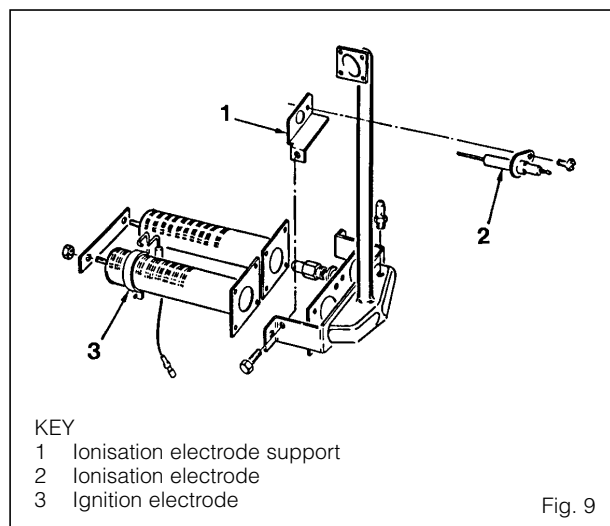


Fig. 9

### 2.10.1 Working cycle

Before lighting the boiler check with a voltmeter that the electric connection to the terminal board has been properly made observing the phase and neutral positions of the wiring diagram. Press the main switch on the control board; the lamp will light if there is power. At this stage the boiler will start to work sending, via the FM 11 programmer, a discharge current to the electrode and, at the same time, opening the gas valve. Normally the burner takes 1 or 2 seconds to light.

It may however fail to light, in which case the boiler lock-out lamp will be activated. The main causes maybe:

– **No gas supply**

The equipment performs regularly sending voltage to the ignition electrode that continues to spark for max. 10 seconds, without detecting the burner starting, then it shuts down.

It may occur at the first starting or when the boiler has not been used for a long period of time and there is air in the pipes. It may occur if the gas cock is closed or if the winding of one of the valve coils is interrupted, thus preventing it from opening.

– **There is no spark**

In the boiler you will only notice the gas flow to the burner, after 10 seconds it shuts down.

It may be due to the fact that the electrode cable is disconnected or is not properly fixed to the terminal 10; or the equipment transformer is burnt.

– **No ionisation**

From the time of the starting you can observe the electrode continuous sparking even if the burner is on. After 10 seconds the sparking stops and so does the burner, while the lock-out lamp appears to be on.

It occurs if the phase and neutral position on the terminal board has not been observed.

The detection electrode cable is disconnected or the electrode itself is earthed; the electrode is very worn-out and needs replacing.

**NOTE: Should the programmer shut off, press the lock out lamp only after having waited at least 10 seconds since the lamp turned on. Otherwise the equipment will not be unlocked.**

The sudden lack of voltage causes the immediate shut-down of the burner and when the voltage is restored the boiler will automatically restart.

## 2.10.2 Ionization circuit

The ionization circuit shall be checked with a normal microammeter, or even better, with a digital microammeter with a 0-50  $\mu\text{A}$  range. The microammeter terminals shall be electrically connected in series to the ionisation electrode cable. Under standard conditions the value varies from 4÷6  $\mu\text{A}$ . The minimum ionization current value, at which the equipment may shut down, is approximately 1  $\mu\text{A}$ . In this case it will be necessary to check that there is a good electric contact and to check the wear of the electrode tip and of its ceramic protection.

## 2.10.3 “RX CE IONO” boiler wiring diagram

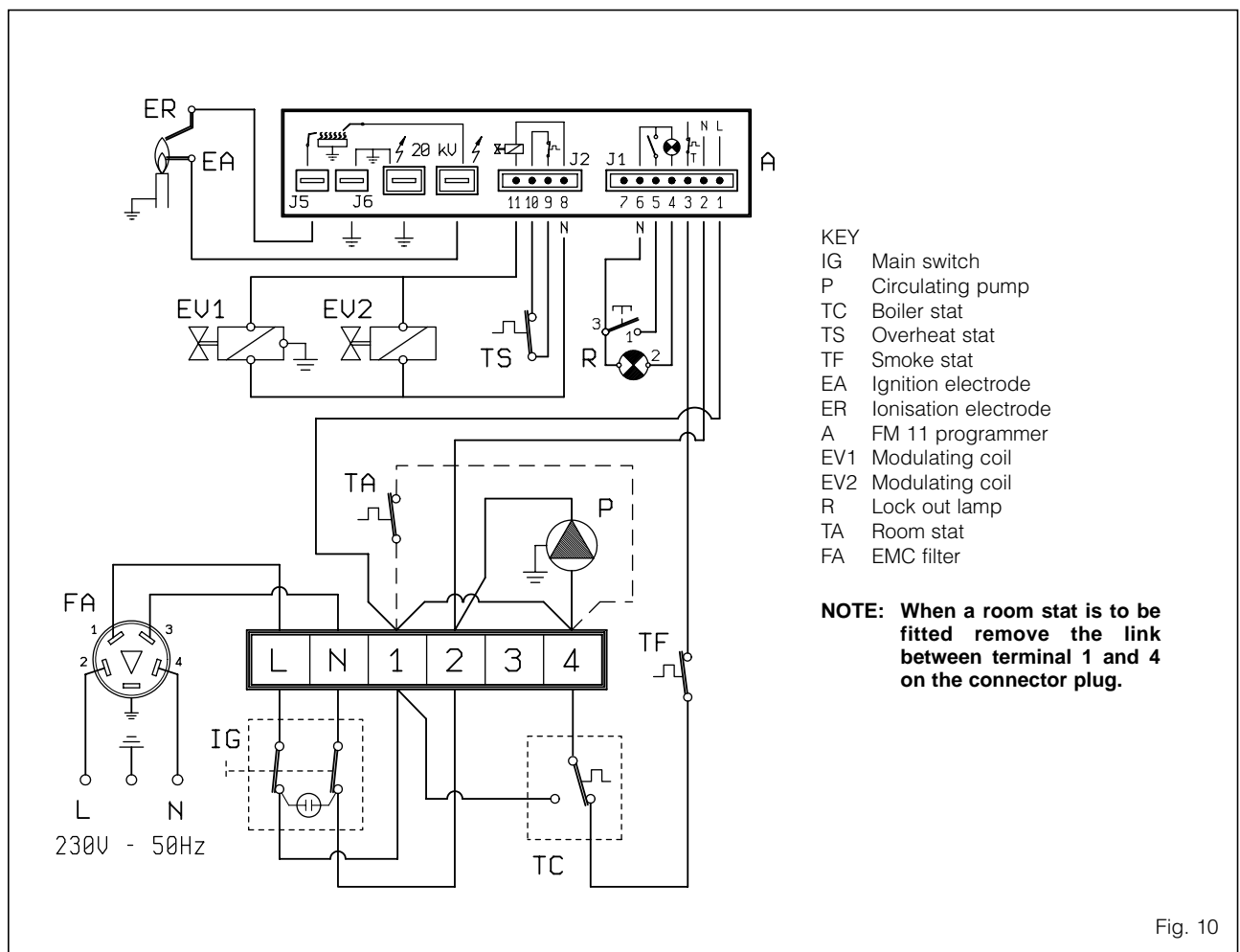


Fig. 10

# 3 Use and maintenance

## 3.1 PRE-LIGHTING CHECKS

When the boiler is started for the first time, the following controls shall be carried out:

- Check that the boiler has been filled with water and correctly vented.
- Make sure that the gate valves are open.
- Check that flue for the discharge of the products of combustion is not obstructed.
- Open the gas cock and check the connections, including the burner one.
- Release the air contained in the gas pipe by using the special pressure test nipple on the gas valve inlet.
- Make sure that the electrical connection has been made correctly and that the earth wire is connected to a good earth system.
- Check that the circulator is not locked, otherwise unlock it.
- Check that there are no inflammable liquids or materials near the boiler.

## 3.2 HONEYWELL V 4600 C GAS VALVE

Standard “RX 19-55 CE” and “RX 19-26 PVA CE” boilers feature a HONEYWELL V 4600 C gas valve (fig. 11). Follow these instructions to ignite the boiler and to adjust the valve:

- Release the air contained in the gas pipe by using the inlet pressure tap (6) on the gas valve.
- Press the gas valve push button hard and, simultaneously, push the piezo igniter button several times.
- Keep the valve button pressed for 15-20 seconds, then release it checking through the peep-hole that the pilot burner is on.

Should it go off, repeat the operation.

- The pilot burner gas flow rate shall be adjusted on the screw (4). To decrease the pilot flame rotate the screw clockwise; to increase the pilot flame rotate the screw anticlockwise.
- Start the main burner pressing the main switch on the control board.
- To adjust the main burner gas pressure remove the plug on the pressure regulator (2). The regulation is made by rotating the screw under the plastic plug with a screwdriver: rotate the nylon screw anticlockwise to reduce the pressure, clockwise to increase it.
- To shut the boiler completely off, including the pilot burner, simply rotate the gas valve button clockwise.

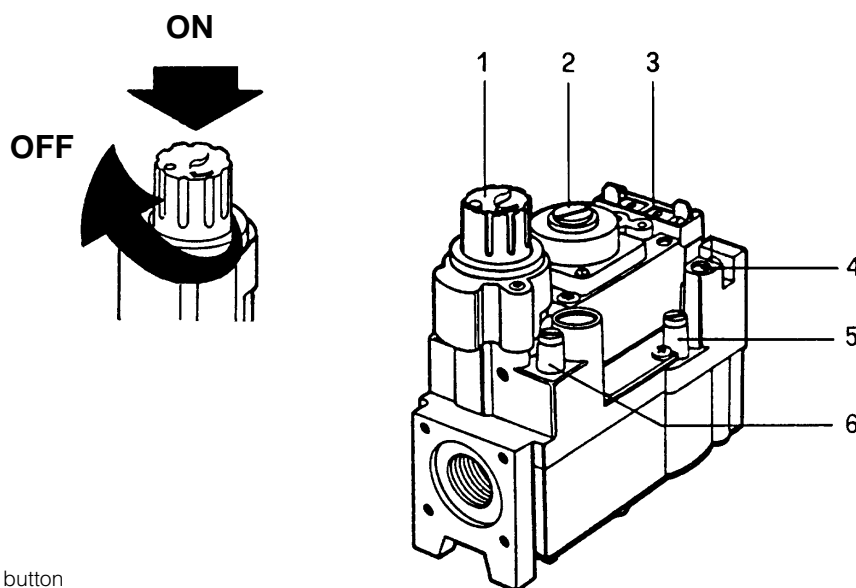
## 3.3 SIT 830 TANDEM GAS VALVE

Standard “RX 19-26 CE IONO” and “RX 19-26 PVA CE IONO” boilers with electronic ignition feature a SIT 830 TANDEM gas valve (fig. 12).

When the boiler is ignited for the first time, it is always better to purge the pipe through the pressure tap (3). Remove the plug on the pressure regulator (4) to adjust the main burner gas pressure.

The regulation is made by rotating the screw under the plug: rotate the screw clockwise to increase the pressure, anticlockwise to reduce it. The valve can control a “soft” ignition of the boiler through the screw (1). Rotate the screw anticlockwise to increase the burner “soft” ignition pressure (STEP), clockwise to reduce it. The optimum “soft” ignition values of the burner depend on the type of gas:

- natural gas: 3-4 mbar
- L.P.G.: 6-7 mbar.



### KEY

- 1 Control button
- 2 Pressure regulator
- 3 Electric operator
- 4 Pilot burner adjusting screw
- 5 Outlet pressure tap
- 6 Inlet pressure tap

Fig. 11

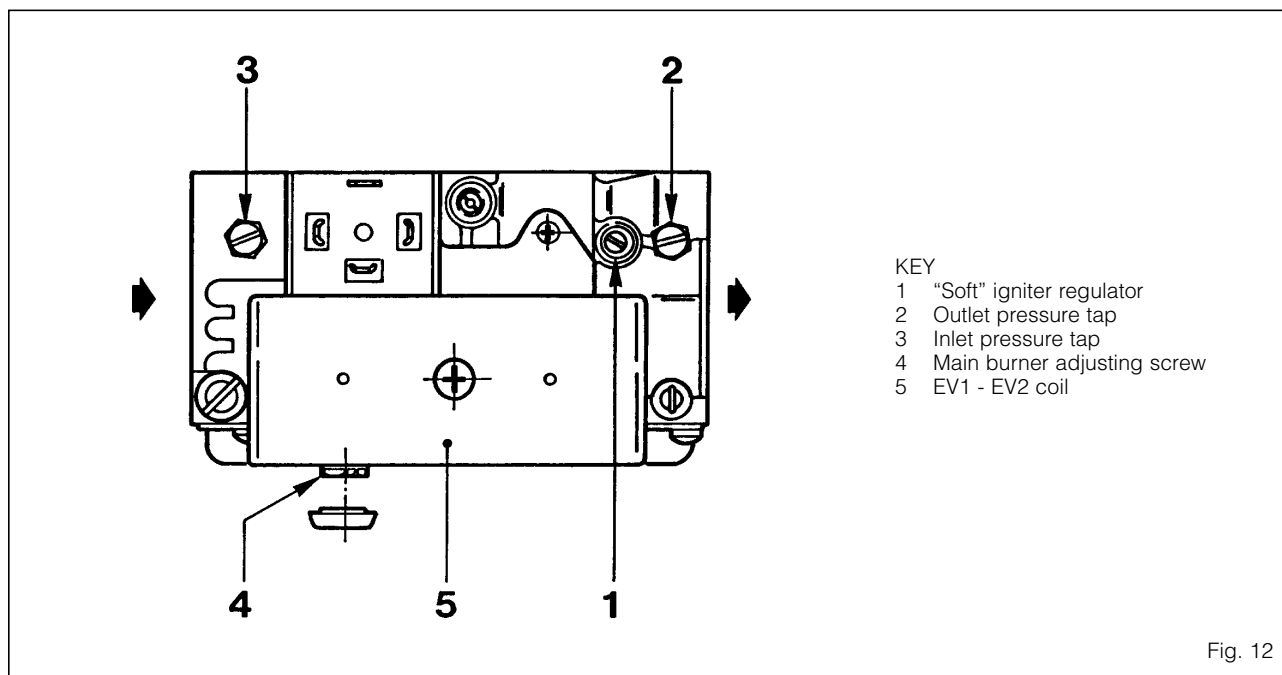


Fig. 12

### 3.4 HONEYWELL VR 4605 C GAS VALVE

The electronically ignited **"RX 37+55 CE IONO"** boilers are equipped with the HONEYWELL VR 4605 C gas valve (fig.13).

When igniting the boiler for the first time, it is always advisable to purge the pipe by opening the inlet pressure tap (3). To adjust gas pressure to the main burner remove the plug on the pressure regulator (5). Use a screwdriver to regulate the screw under the plug: to increase pressure screw clockwise, to reduce it screw counterclockwise.

### 3.5 ADJUSTING THE GAS PRESSURE TO BURNERS

Pressure calibration and gas input are carried out by the

manufacturer.

During installation of the equipment, feed pressure might be different from standard values.

It is therefore necessary to check pressure and gas input when igniting the boiler for the first time.

This test should be performed with the boiler in full operation (obviously no other gas appliances should be working at the same time).

Read the gas meter twice every 6 minutes. Multiply the consumption by ten to calculate the consumption per hour.

If this value does not correspond to the one in Table 4, turn the screw of the pressure regulator on the valve until the exact value is obtained.

Screw slowly and gradually.

Read the gas meter at least thirty seconds after regulating the pressure.

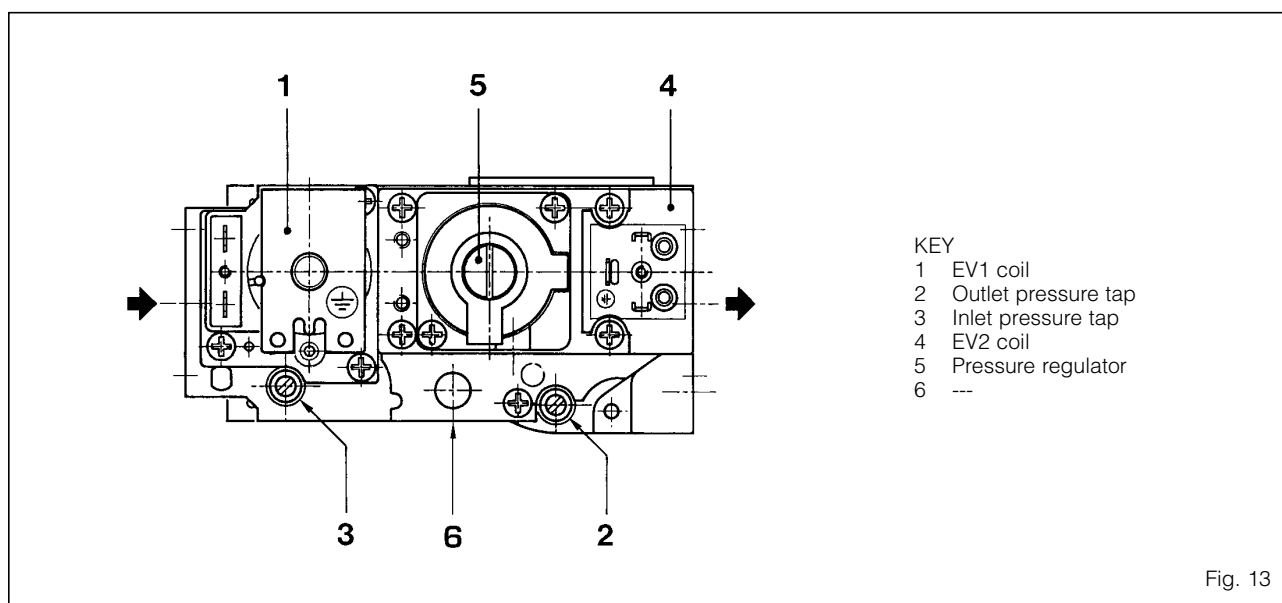


Fig. 13

### 3.6 CONVERSION INTO L.P.G.

If the boiler uses a different gas from the one for which it has been equipped, it is necessary replace the main nozzles and pilot nozzle (only for model with pilot flame) with suitable ones (tables 4 -5).

Follow these steps:

- tighten the adjusting screw (2 fig.11) or (5 fig.13).  
For **“RX 19÷55 CE IONO”** and **“RX 19-26 PVA CE IONO”** models remove the plug on pressure regulator (4 fig.12) and tighten the adjusting screw.
- set valve input pressure at 30/37 mbar according to the type of gas by acting on the outer pressure reducer.

### 3.7 REMOVING THE CASING

Remove the outer casing as follow:

- remove the boiler top which is fixed with pressure plugs;
- remove the panelboard;
- to remove the door, unscrew completely the screw fixing the top hinge and lift the door, removing it from the fixed plug of the bottom hinge;
- remove front and back panels by loosening the four nuts which fix them to the panels side;.
- remove the sides.

### 3.8 GAS PIPE FILTER

The **“RX”** boiler gas valves are equipped with a filter at the valve inlet which however cannot filter all impurities in the gas and network pipes.

To avoid poor functioning of the valve, or in some cases

even to prevent its safety devices from not working, put a suitable gas filter at the inlet of the boiler gas tubes.

### 3.9 CLEANING AND MAINTENANCE

When the heating is turned off at the end of the season, it is compulsory to check the boiler and clean it as follows:

- take off the boiler top;
- remove the smoke chamber cleaning plate by unscrewing the fastening screws in the **“RX 19-26”** boilers;
- remove the smoke chamber completely unscrewing the two nuts from the back side and the nut from the front side of **“RX 37÷55”** boilers;
- extract the burner assembly by unscrewing the four screws which fix it to the valve flange;
- with the appropriate brush, reach down to the rows of plugs of the cast iron exchanger from the top and scrape off any scale with vertical movements;
- remove the burners from the nozzle holder header and throw a jet of air inside them so that any dust can be removed. Make sure that the top drilled part of the burners has no scale left;
- when disassembling and reassembling the burners be careful not to force any delicate parts, such as the thermocouple drill or the ignition unit;
- scrape off any scale from the boiler bottom and reassemble all the parts checking the position of the gaskets;
- check the stack making sure the flue is clean;
- check the correct operation of the equipment.

**Maintenance and check of equipment and safety devices should be carried out at the end of each season only by authorized technical personel.**

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### 3.10 FAULT FINDING

#### FAULTS

**The pilot burner does not ignite.**

#### LIKELY CAUSES AND SOLUTIONS

- Make sure the gas inflow is regular and that any air in the pipes has been eliminated.
- Make sure the hole of the pilot nozzle is not blocked.
- Check ignition operations.

**The igniter does no spark.**

- Replace the faulty piezoelectric igniter.
- The electrode is misplaced or must be replaced if broken.
- Make sure there is no false contact between terminal and igniter cable.

**The pilot burner goes out when the ignition button is released.**

- Make sure the pilot burner flame covers the thermocouple sufficiently.
- Regulate gas capacity to the pilot.
- Make sure the split thermocouple terminals are well fixed to the overheat stat.
- The overheat stat is faulty and must be replaced.
- Replace the split thermocouple.
- Replace the gas valve.

**The pilot burner does not burn properly.**

- Check that the gas pressure is regular.
- Clean the main air inlet hole of pilot burner.
- Clean the pilot filter in the gas valve.

**Light explosions when the burner starts and delayed ignition.**

- Make sure the pilot burner flame is not too short.
- Make sure the boiler exchanger is not too dirty.

**The main burner does not ignite.**

- This means that the flue smoke stat has tripped off (point 2.9)
- 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 are not correct. Make sure the cables are placed on terminals 1 and 4 of the boiler terminal board.
- The circulation pump is blocked, unblock it.
- The electric winding of the circulation pump is faulty, replace the pump.

**The boiler pressure relief valve opens often.**

- Make sure the system cold water pressure is not too high, follow the suggested values.
- If the pressure relief valve is faulty, replace it.
- Check pre-load pressure of the expansion tank.
- Replace the expansion tank if faulty.

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

- Make sure the main burner flame is well regulated and the gas consumption is proportional to the boiler output.
- The boiler is installed in a poorly ventilated room.
- Insufficient flue draught or not complying with existing standards
- The boiler operates at too low temperatures, set the boiler stat at higher temperatures.

**The thermostat re-ignites with too high temperature drop.**

- Replace the boiler stat which is faulty.



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