

## RENDIMAX N EL

gas-fired cast iron boiler for central heating  
with electronic ignition and flame control

ISO 9001 : 2000  
CERTIFIED COMPANY



Appr. Nr. A 9504 A • 0085 AQ.0766

cod. 3543742/3 - 05/2005



OPERATING, INSTALLATION AND MAINTENANCE INSTRUCTIONS



## Warning

- Read the warnings given in this manual thoroughly. They provide important information for safe installation, use and maintenance
- Keep the manual carefully for future consultation.
- The instruction manual is an integral and essential part of the product and must be kept by the user.
- If the appliance is sold or transferred to another owner or if the owner moves, leaving the appliance behind, always ensure that the manual is kept with the appliance for consultation by the new owner and /or installer.
- Incorrect installation or poor maintenance absolves the manufacturer from all liability for damage to people or things.
- Installation and maintenance must be carried out in conformity with current legislation, according to the manufacturer's instructions and by qualified personnel.
- Before cleaning or maintenance, disconnect the appliance from the mains via the switch on the appliance or a suitable isolating device.
- In the event of malfunction or faulty operation, deactivate the appliance. Do not attempt to repair or carry out any other operation on the appliance directly. Contact qualified personnel only.
- Repairs or the replacement of components must be carried out exclusively by qualified personnel using original spare parts only. Failure to respect the above may compromise the safety of the appliance.
- To guarantee efficient operation, the appliance must be serviced once a year by an authorised service centre.
- The appliance may not be used for purposes other than those for which it was explicitly designed. Any other use is considered improper and therefore dangerous.
- Incorrect installation and use or failure to follow the instructions provided by the manufacturer absolve the manufacturer from all liability for damage.
- After unpacking, check that the contents are whole and undamaged.
- Keep packing out of reach of children as it is potentially hazardous.
- To clean external parts, use a damp cloth moistened with soapy water if necessary. Avoid using abrasive cleaning products and solvents.

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## OPERATING INSTRUCTIONS

### 1. DESCRIPTION OF THE BOILER

#### **1.01 Presentation of the boiler**

The "Rendimax N EL" floor-standing boilers are gas-fired heat generators for central heating systems, with cast-iron bodies.

They are fitted with electronic ignition devices, automatic operation control (electronic flame control unit) and flue gas sensors for verifying the correct discharge of the combustion gases.

The "Rendimax N EL PV" models are also pre-fitted with a variable-speed pump, expansion vessel and safety valve.

The boilers are manufactured as standard for operation on natural gas (G20); For operation on LPG (G31), the boilers must be converted on-site.

#### **1.02 Instructions and requirements**

The assembly, installation, conversion to other type of gas, commissioning and maintenance of the boiler must be performed by specialist Companies, following all the relative technical requirements and standards. The boiler must be installed according to the Standards and Laws in force, in particular regarding the size of the boiler room, the discharge of flue gases, the water piping, the combustible gas supply system and the electrical system.

#### **1.03 Checking and controlling the discharge of flue gases**

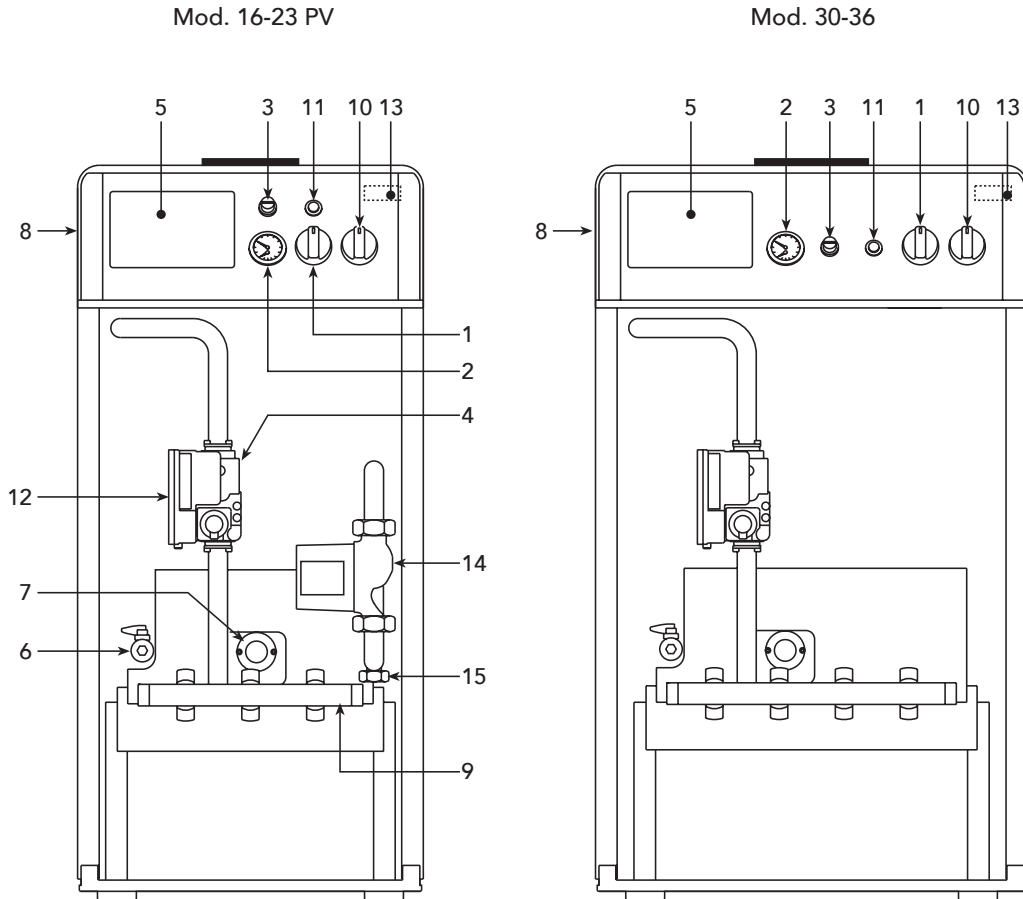
The boiler is fitted with a flue gas thermostat, which cuts off the supply of gas to the burner in the event of incorrect functioning of the flue.

If the flue gas thermostat is activated, unscrew the protective cover on the control panel (3, Fig. 1) and press the manual reset button; the boiler will then re-ignite.

If the flue gas thermostat is activated frequently, shut-down the boiler and call the Service Department.

**2. MAIN COMPONENTS**

**Front view of the boilers with control panel cover open**



**Fig. 1**

**Key**

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li><b>1</b> Boiler thermostat</li> <li><b>2</b> Thermal pressure gauge</li> <li><b>3</b> Flue gas thermostat cover</li> <li><b>4</b> Gas valve</li> <li><b>5</b> Cap (ready for mounting electronic control unit)</li> <li><b>6</b> Drain valve</li> <li><b>7</b> Electrode assembly</li> <li><b>8</b> Control panel</li> <li><b>9</b> Burner assembly</li> </ul> | <ul style="list-style-type: none"> <li><b>10</b> Boiler switch</li> <li><b>11</b> Reset button for electronic flame control unit</li> <li><b>12</b> Electronic flame control unit</li> <li><b>13</b> Safety thermostat with automatic reset</li> <li><b>14</b> Heating system pump (PV version)</li> <li><b>15</b> Cap on fitting for filling the system (PV version)</li> </ul> |
|---|--|

## 3. IGNITION AND SHUT-DOWN

### **3.01 Ignition**

Place the boiler thermostat in the “minimum temperature” position and power the appliance using the boiler switch.

To ignite the burner assembly, proceed as follows:

- open the gas cock (fitted by the installer);
- adjust, using the knob, the boiler thermostat to the desired value (not less than 50°C.).

At this stage, the electronic control unit starts operating and will pilot, after a set waiting time, the gas valve and the spark to the ignition electrode, which in turn will light the burner assembly. The ionisation electrode then checks the presence of the flame in the burner assembly.

The boiler operates automatically, controlled by the boiler thermostat and/or any other control devices (room thermostat, electronic temperature control unit, etc.).

**Note** If after having correctly performed the ignition operation, the burners do not light and the reset button light on the electronic control unit (11 - Fig. 1) is on, wait around 10 seconds and then press the reset button. The control unit is reset and will repeat the ignition cycle.

**Note** In the event of power failure, the burners will shut-down and will be automatically ignited once the power returns.

### **3.02 Temporary shut-down**

To temporarily shut-down the boiler, simply place the boiler switch (10- Fig. 1) in position “0”.

### **3.03 Extended boiler shut-down**

To shut the boiler down, proceed as follows:

- turn the knob of the boiler switch to position “0”;
- close the gas cock upstream from the boiler;
- disconnect power to the appliance.

**Note** If the boiler is not used for an extended period in winter, to avoid damage from frost, special anti-freeze should be added to the system, or else the system should be completely emptied (operation to be performed only by qualified personnel).

### **3.04 Adjusting the central heating supply temperature**

The supply temperature can be set using the boiler thermostat. The field of adjustment for the knob (1 - Fig. 1) is 30-90 °C. It is not recommended to set the temperature below 50°C, to avoid dangerous condensation from occurring.

## 4. CHECKS AND MAINTENANCE

### Attention

Current technical standards envisage periodic maintenance of the appliance, as well as analysis of the composition of the flue gas, to check correct combustion in the burner assembly. As a result, it is suggested that the user stipulate a programmed maintenance contract with a specialised company to periodically carry out the operations listed below.

### **4.01 General notes on maintenance**

Have the correct operation and integrity of the flue checked periodically.

In the event of work or maintenance on structures located near the flues and/or flue gas discharge devices and accessories, shut the appliance down and, upon completion of the work, have the condition of such parts checked by professionally qualified personnel.

Do not clean the appliance and/or its parts with easily inflammable substances (e.g. petrol, alcohol, etc.).

Do not leave containers with inflammable substances in the room where the appliance is installed.

### **4.02 System checks (to be performed once a year)**

The system is generally checked at the end of the winter season. Check that the water in the expansion vessel is pressurised. Verify serviceability and operation of the pumps.

### **4.03 Boiler checks (to be performed once a year)**

- Check the boiler for correct operation by effecting ignition and shut-down tests using the regulation thermostat.
- Check on the rear wall of the boiler, at the height of the draught diverter, that there are no flue gas leaks, signs of any blockages in the flue or insufficient draught.
- Check that the connecting pipe between the boiler and flue is perfectly sealed at the joints.

### **4.04 Cleaning the boiler and the flue**

To be performed once every 3 years.

### **4.05 Cleaning the burner assembly**

To be performed once a year.



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## INSTALLATION AND MAINTENANCE INSTRUCTIONS

### 5. DESCRIPTION OF THE BOILER

#### **5.01 presentation of the boiler**

The **"Rendimax N EL PV"** floor-standing boilers are gas-fired heat generators for central heating systems, with cast-iron bodies.

They are fitted with electronic ignition devices, automatic operation control (electronic flame control unit) and flue gas sensors for verifying the correct discharge of the combustion gases.

The **"Rendimax N EL PV"** models are also pre-fitted with a variable-speed pump, expansion vessel and safety valve.

The boilers are manufactured as standard for operation on natural gas (G20).

The appliance can be converted from operation on natural gas to lpg (G31); refer to the instructions provided in paragraph 12.

#### **5.02 instructions and requirements**

The assembly, installation, commissioning and maintenance of the boiler must be performed by specialist companies, following all the relative technical requirements and standards. The boiler must be installed according to the standards and laws in force, in particular regarding the size of the boiler room, the discharge of flue gases, the water piping, the combustible gas supply system and the electrical system.

## 6. MAIN COMPONENTS

### 6.01 main components

**Front view of the boilers  
with control panel cover open**

**Rear view**

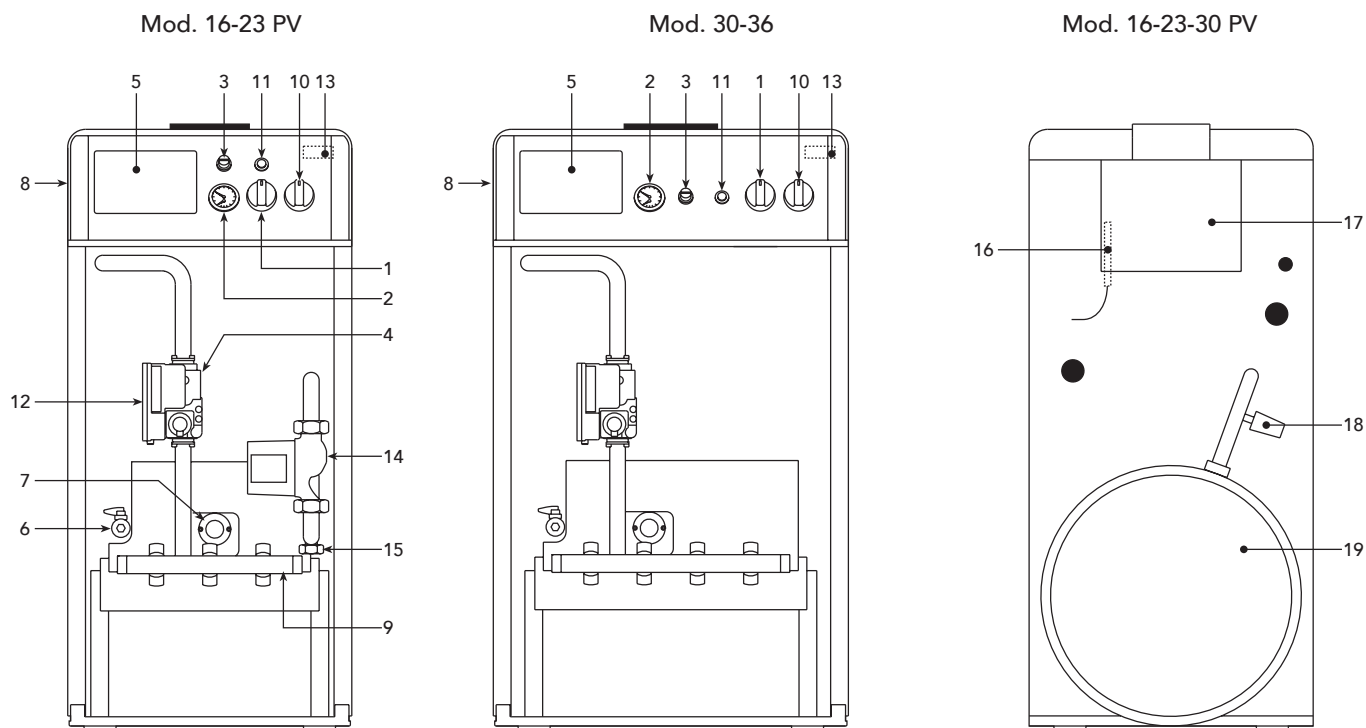


fig. 2

### Key

- 1 Boiler thermostat
- 2 Thermal pressure gauge
- 3 Flue gas thermostat cover
- 4 Gas valve
- 5 Cap (ready for mounting electronic control unit)
- 6 Drain valve
- 7 Electrode assembly
- 8 Control panel
- 9 Burner assembly
- 10 Boiler switch
- 11 Reset button for electronic flame control unit
- 12 Electronic flame control unit
- 13 Safety thermostat with automatic reset
- 14 Heating system pump (pv version)
- 15 Cap on fitting for filling the system (pv version)
- 16 Flue thermostat bulb
- 17 Smokebox
- 18 Safety valve (pv version)
- 19 Expansion vessel (pv version)

## 7. TECHNICAL SPECIFICATIONS

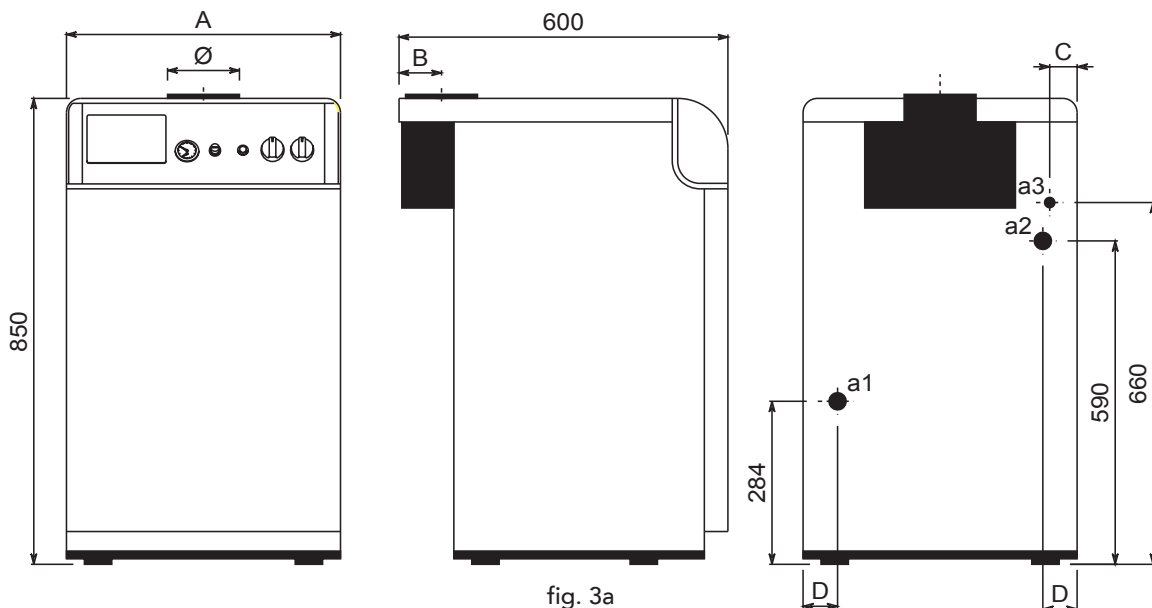
### 7.01 Table of technical specifications, dimensions and connections (base version)

MODEL	Heat output				Heat input (NET)				Number of sections
	Nominal		Adjustable up to:		Nominal		Min.		
	kW	kcal/h	kW	kcal/h	kW	kcal/h	kW	kcal/h	
Rendimax N 16 EL	16,2	14.000	11,0	9.500	18,0	15.500	12,7	11.000	3
Rendimax N 23 EL	23,0	19.800	16,0	13.800	25,5	22.000	18,4	15.800	4
Rendimax N 30 EL	29,5	25.400	20,0	17.200	32,8	28.200	23,0	19.800	5
Rendimax N 36 EL	36,0	31.000	24,0	20.600	40,0	34.400	27,6	23.800	6

MODEL	Number injectors	Injectors Natural Gas (G20)		Injectors L.P.G. (G31)		Gas supply pressure mbar		Gas flow rate				Gas valve Honeywell
		Ø injector mm	Nominal pressure mbar	Ø injector mm	Nominal pressure mbar	Natural G20	L.P.G. G31	Natural G20 m³ S/h		L.P.G. G31 kg/h		
								min.	nom.	min.	nom.	
Rendimax N 16 EL	2	2,45	13,0	1,55	35	18-20	37	1,16	1,94	0,90	1,50	VK 4105C1009
Rendimax N 23 EL	3	2,35	15,2	1,50	35	18-20	37	1,69	2,70	1,31	2,08	VK 4105C1009
Rendimax N 30 EL	4	2,35	14,2	1,50	35	18-20	37	2,46	3,47	1,63	2,68	VK 4105C1009
Rendimax N 36 EL	5	2,35	13,5	1,50	35	18-20	37	2,95	4,23	1,96	3,27	VK 4105C1009

MODEL	Dimensions					Connections			Boiler water content lt.	Max. working pressure bar
	A mm	B mm	C mm	D mm	Ø mm	Return a1	Flow a2	Gas inlet a3		
Rendimax N 16 EL	400	57	33	62	100	1"	1"	1/2"	7,3	6
Rendimax N 23 EL	400	62	33	24	110	1"	1"	1/2"	9,0	6
Rendimax N 30 EL	500	72	33	36	130	1"	1"	1/2"	10,7	6
Rendimax N 36 EL	600	82	58	47	150	1"	1"	1/2"	12,4	6

Maximum boiler operating temperature 100°C.



## 7.02 Table of technical specifications, dimensions and connections (pv version)

MODEL	Heat output				Heat input (NET)				Number of sections
	Nominal		Adjustable up to:		Nominal		Min.		
	kW	kcal/h	kW	kcal/h	kW	kcal/h	kW	kcal/h	
Rendimax N 16 EL PV	16,2	14.000	11,0	9.500	18,0	15.500	12,7	11.000	3
Rendimax N 23 EL PV	23,0	19.800	16,0	13.800	25,5	22.000	18,4	15.800	4
Rendimax N 30 EL PV	29,5	25.400	20,0	17.200	32,8	28.200	23,0	19.800	5

MODEL	Number injectors	Natural Gas (G20)		L.P.G. (G31)		Gas supply pressure mbar		Gas flow rate				Gas valve Honeywell
		Ø injector mm	Nominal pressure mbar	Ø injector mm	Nominal pressure mbar	Natural G20	L.P.G. G31	Natural G20 m <sup>3</sup> S/h		L.P.G. G31 kg/h		
								min.	nom.	min.	nom.	
Rendimax N 16 EL PV	2	2,45	13,0	1,55	35	18-20	37	1,16	1,94	0,90	1,50	VK 4105C1009
Rendimax N 23 EL PV	3	2,35	15,2	1,50	35	18-20	37	1,69	2,70	1,31	2,08	VK 4105C1009
Rendimax N 30 EL PV	4	2,35	14,2	1,50	35	18-20	37	2,46	3,47	1,63	2,68	VK 4105C1009

MODEL	Dimensions							Valvola di sicurezza bar	Capacità vaso espansione lt.	Conexions			Boiler water content lt.	Max. working pressure bar
	A mm	B mm	C mm	D mm	E mm	F mm	Ø mm			Return a1	Flow a2	Gas inlet a3		
Rendimax N 16 EL PV	400	57	33	62	72	622	100	3	6	1"	1"	1/2"	7,3	6
Rendimax N 23 EL PV	400	62	33	24	34	622	110	3	6	1"	1"	1/2"	9,0	6
Rendimax N 30 EL PV	500	72	33	36	46	637	130	3	8	1"	1"	1/2"	10,7	6

Maximum boiler operating temperature 100°C

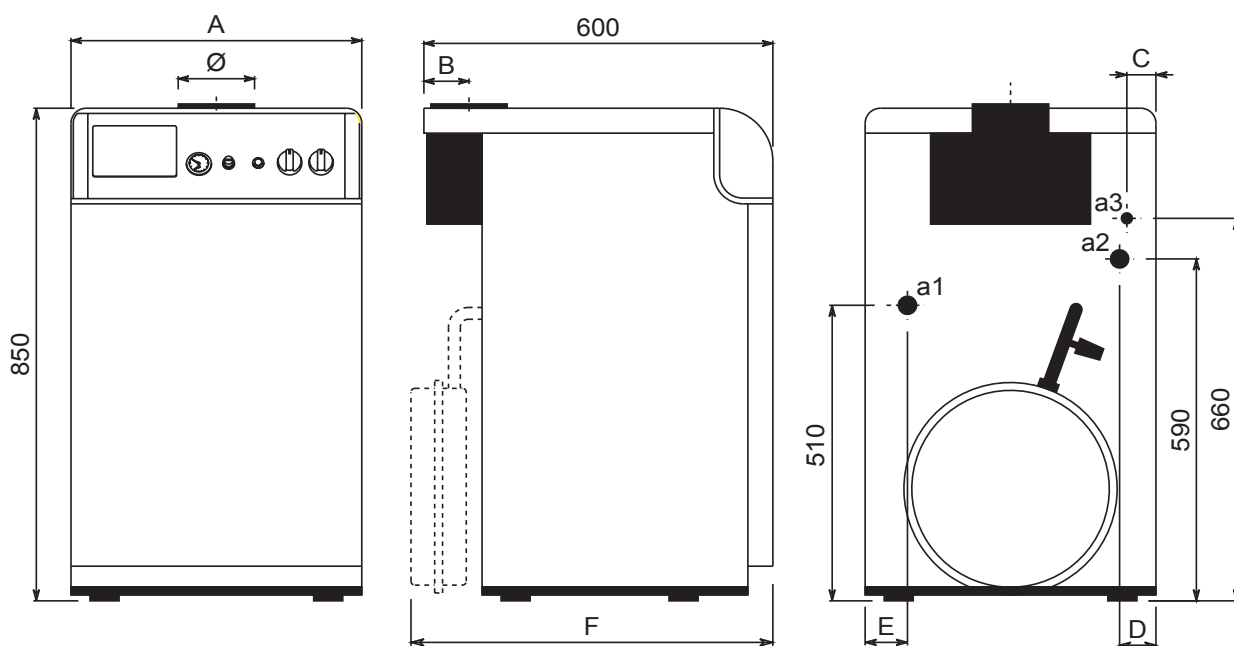


fig. 3b

## 7.03 output variability characteristics

The heat rate of the boiler furnace and, as a consequence, the heat output delivered to the central heating water, can be adjusted by simply adjusting the main burner assembly via the gas valve. The diagrams in figs. 4a and 4b indicate the variation in heat output delivered to the water in relation to the adjustment of the operating pressure of the burner assembly. The possibility of adjusting the boiler output to the effective needs of the central heating system, means above all reductions in heat loss and thus savings in gas consumption. Furthermore, with the output variation feature, governed by the relative standards, the boiler maintains near constant thermal efficiency values and combustion characteristics.

The instructions for adjusting the gas valve are provided in chapter 11.

### Output variability on natural gas (G20)

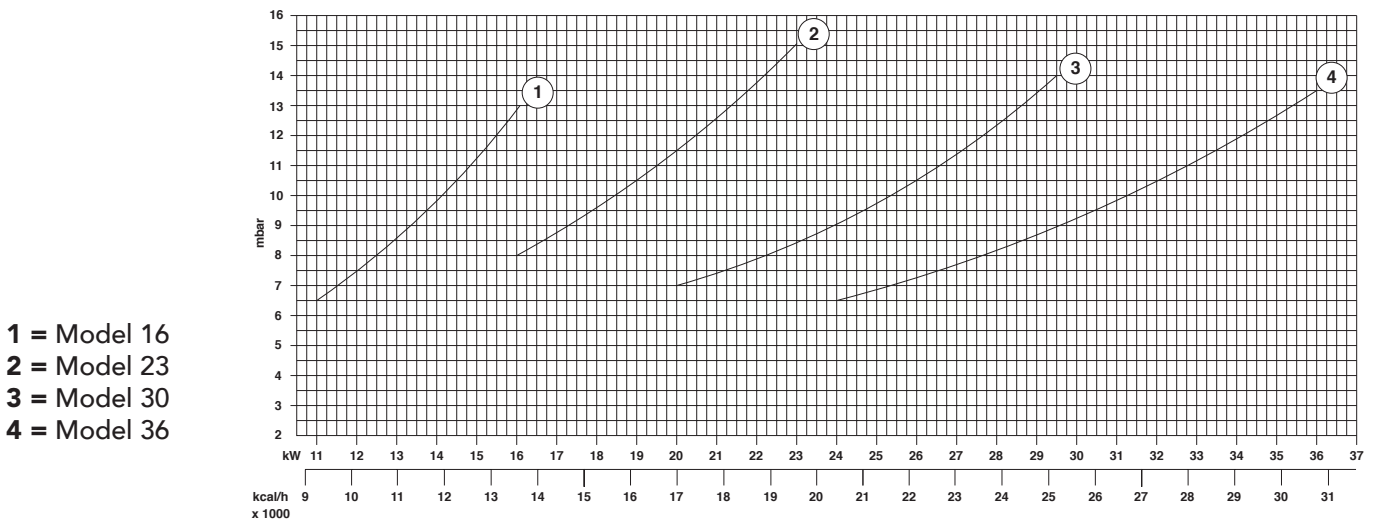


Fig. 4a

### Output variability on L.P.G. (G31)

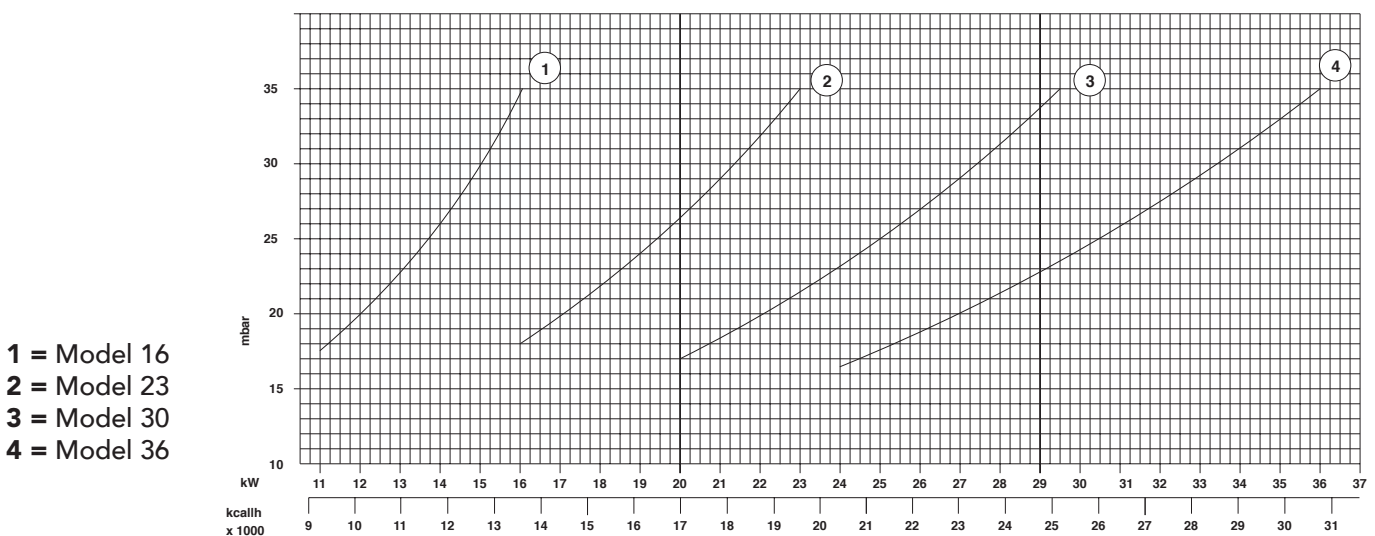


Fig. 4b

**7.04 characteristics of the pump built into the boiler (models 16 -23 - 30 pv)**

The discharge head and the flow-rate can be adjusted on the pump using the speed selector switch on the pump itself.

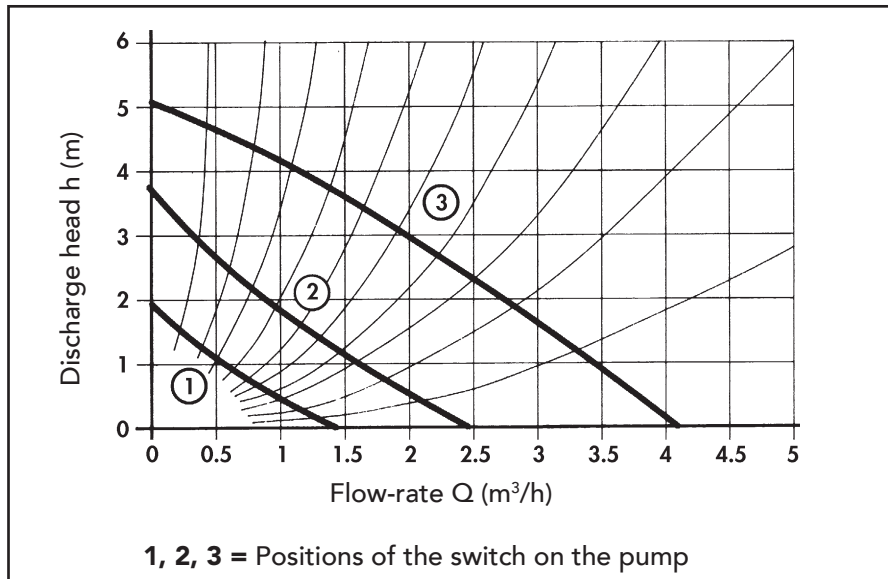


fig. 5

**7.05 adjusting the thermal head ( $\Delta t$ ) of the heating system (models 16-23-30 pv)**

The difference between the supply and return temperature in the central heating system can be adjusted using the speed selector switch on the pump. In this way, the flow-rate and discharge head of the pump itself are adjusted. Increasing the rpm of the pump, the  $\Delta t$  decreases, and vice-versa.

**Warning** A difference between supply and return temperature of over 20°C may endanger the boiler due to condensation; a lower  $\Delta t$  value is thus recommended.

## 7.06 pressure drop as a function of heating system water flow-rate

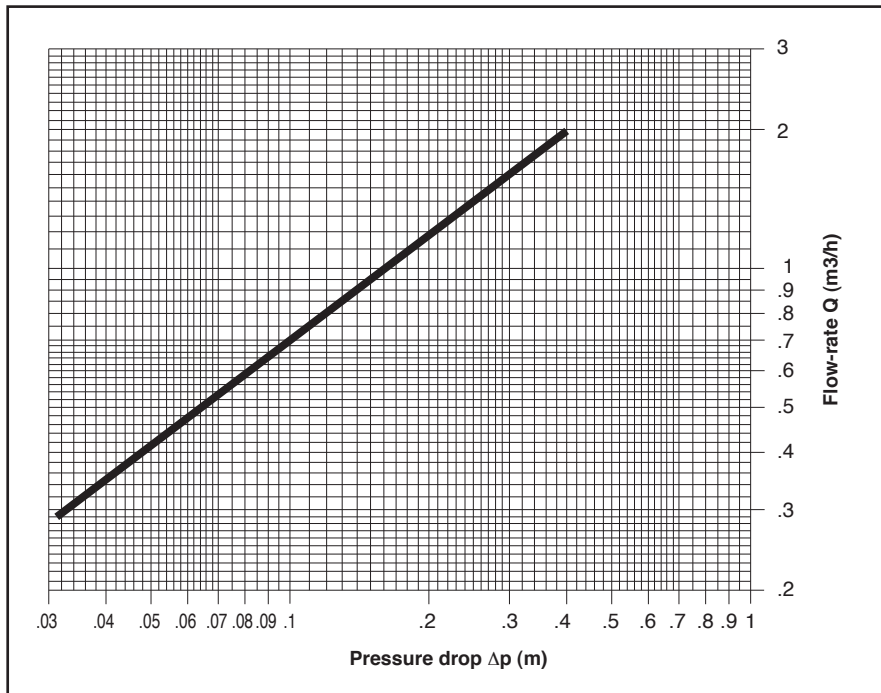


fig. 6

## 7.07 Residual discharge head available to the heating system (models 16-23-30 PV)

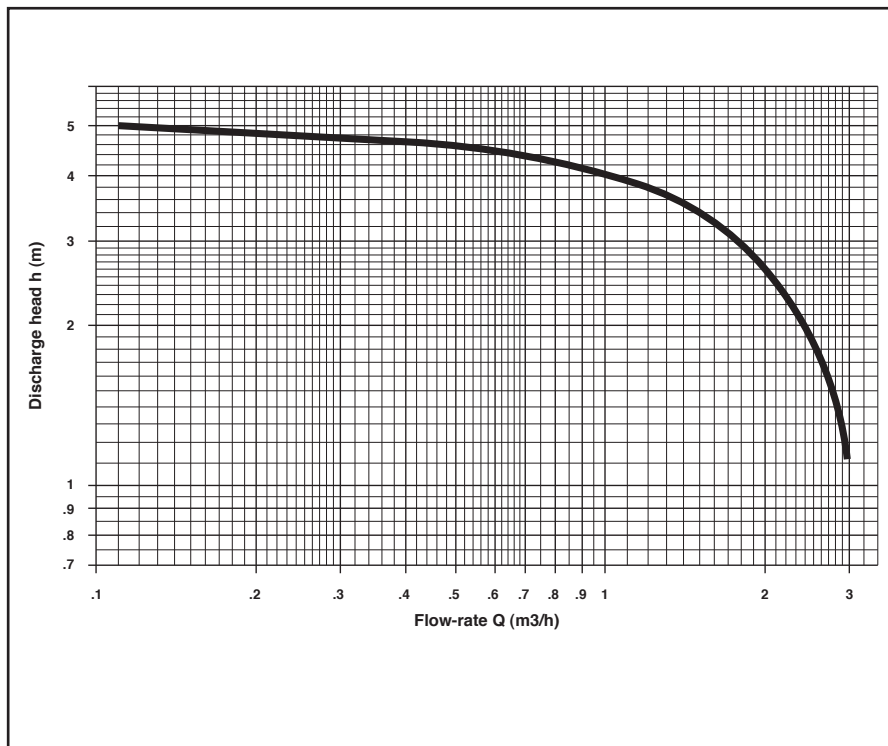


fig. 7

**Note** The diagram in fig. 7 refers to the maximum heating pump discharge head/flow-rate with the speed selector switch in position 3.

## 8. INSTALLATION AND SAFETY DEVICES

- The boiler must only be installed by specialist companies according to the instructions, requirements and laws in force
- This boiler must only be used for the application it has been specifically designed for.

### Important

**This boiler is used to heat water to temperatures below boiling, at atmospheric pressure. The boiler must be connected to a central heating system compatible with its performance and output rating.**

### 8.01 preliminary operations

The boiler must be installed in a suitable room compliant with the standards and regulations in force. Before connecting the boiler, perform the following operations:

- Carefully clean all the pipe work in the heating system to remove any residues or impurities that may compromise the correct operation of the boiler;
- Check that the boiler is configured for operation with the type of combustible gas available. This is written on the packaging and on the rating plate;
- Check that the chimney/flue has a suitable draught, is not choked and that there are no discharges inserted from other appliances, except where the flue has been created to serve a series of appliances, according to the specific standards and regulations in force. Only after having performed this check can the joiner pipe between the boiler and chimney/flue be fitted.
- Check any existing flues to make sure they have been carefully cleaned, as any scale flaking off the side walls during operation may block the passage of the flue gas, creating extremely dangerous situations for the user.

### 8.02 On-off valves

It is recommended to fit on-off valves between the boiler and the central heating system; these allow the boiler to be isolated from the heating system, if necessary.

### 8.03 Boiler room

**Warning** This appliance can only be installed and operated in permanently ventilated rooms.

### 8.04 Connection to the flue

The flue connection pipe must be no smaller in diameter than the fitting on the draught diverter. Starting from the draught diverter, it must follow a vertical course of no less than half a metre. The dimensions and installation of the flues and the connecting pipes must respect the standards in force.

### 8.05 Heating system connection

Perform the connections to the corresponding fittings according to the positions indicated in figs. 3a and 3b. The discharge of the safety valve must be connected to a collection container, to avoid water spilling on the ground in the event of over-pressure in the central heating circuit.

**Note** if the central heating supply and return pipes follow a course in which, at some point, air pockets may be created, an air valve should be installed at the corresponding points.

When the boiler is installed below the level of the central heating system, a "flow-stop" valve should be fitted to stop the natural flow of water in the central heating system.



## **8.06 Filling the system**

The installer must ensure that the system is provided with a manual or automatic filling system.

The filling pressure when the heating system is cold must be between 0.5 and 1 bar. If, during operation, due to the evaporation of the gases dissolved in the water, the heating system pressure falls below the minimum value described above, it should be returned to the initial value. For correct operation, the water pressure in the boiler, when hot, must be around 1.5 bar.

## **8.07 Gas connection**

The gas connection is made using a pipe, with the fitting of a gas cock.

Please note that any flexible connection pipes must be approved for such use.

## **8.08 Checks**

Fill the system as indicated above. Check the water circuits and combustible gas system for tightness. When checking the gas system for tightness, proceed with care using soapy water.

**Note** The manufacturer declines all liability for damage to persons or things resulting from the failure to electrically earth the boiler.

## **8.09 Safety devices**

The Rendimax EL boiler is fitted with appropriate devices to ensure safety in the event of operating anomalies.

Contact an authorised service centre to check the correct operation of these devices.

## **8.10 Over-pressure safety device (for models 16, 23 and 30 pv)**

This device is designed to prevent the central heating system pressure from exceeding 3 bar.

To check the efficiency of this device, open the system fill valve and check that, on exceeding the pressure value indicated above, the safety valve intervenes to discharge the excess water.

## **8.11 Temperature limiting device (safety thermostat) with automatic reset**

The function of this device is to prevent the temperature of the heating system water from exceeding boiling temperature.

The maximum activation temperature is 110°C.

The temperature limiting device is automatically deactivated only when the boiler has cooled (the temperature must fall by at least 10°C) and when the problem has been identified and resolved. The safety thermostat (part 13 in fig. 2) is located on the control panel.

## **8.12 Flue gas safety sensor device (flue gas thermostat)**

The boiler is fitted with a device for checking the discharge of the products of combustion. If any anomalies arise in the flue gas discharge system, with the consequent emission of burnt gas into the room, the appliance will shut down. To measure and control the temperature of the flue gas, the wind-protection hood is fitted with a temperature sensor bulb (pos. 16 fig. 2).

Any release of burnt gas into the room causes the temperature measured by the bulb to increase, and as a consequence the boiler is shut-down within 2 minutes, by cutting off the supply of gas to the burner assembly.

If the flue gas sensor is activated, unscrew the protective cover (3, fig. 2) on the control panel and manually reset the device. The boiler will recommence operation.

If, in the event of failure, the sensor needs to be replaced, only use original accessories, and check that the electrical and bulb connections are performed correctly.

**N.B.** The flue gas sensor must not be bypassed under any circumstances!

9. ELECTRICAL CONNECTIONS

9.01 electrical connection

The boiler must be connected to a single-phase, 230 volt - 50 hz (phase/neutral) power supply, with 3 a max fuses, and a bipolar switch with minimum contact opening of at least 3 mm fitted between boiler and the source of power. It is important to always properly earth the boiler. . The control panel is fitted with a terminal block for connecting the boiler to any room thermostats or electronic temperature control units present (follow the wiring diagrams in figs. 8 and 9). To access this terminal block and the various components inside the control panel, see paragraph 9.02.

**Note** If replacing the power cable, only use "HAR H05 VV-F" 3x0.75 mm<sup>2</sup> cables, with a maximum external diameter of 8 mm

Diagram of electrical connections

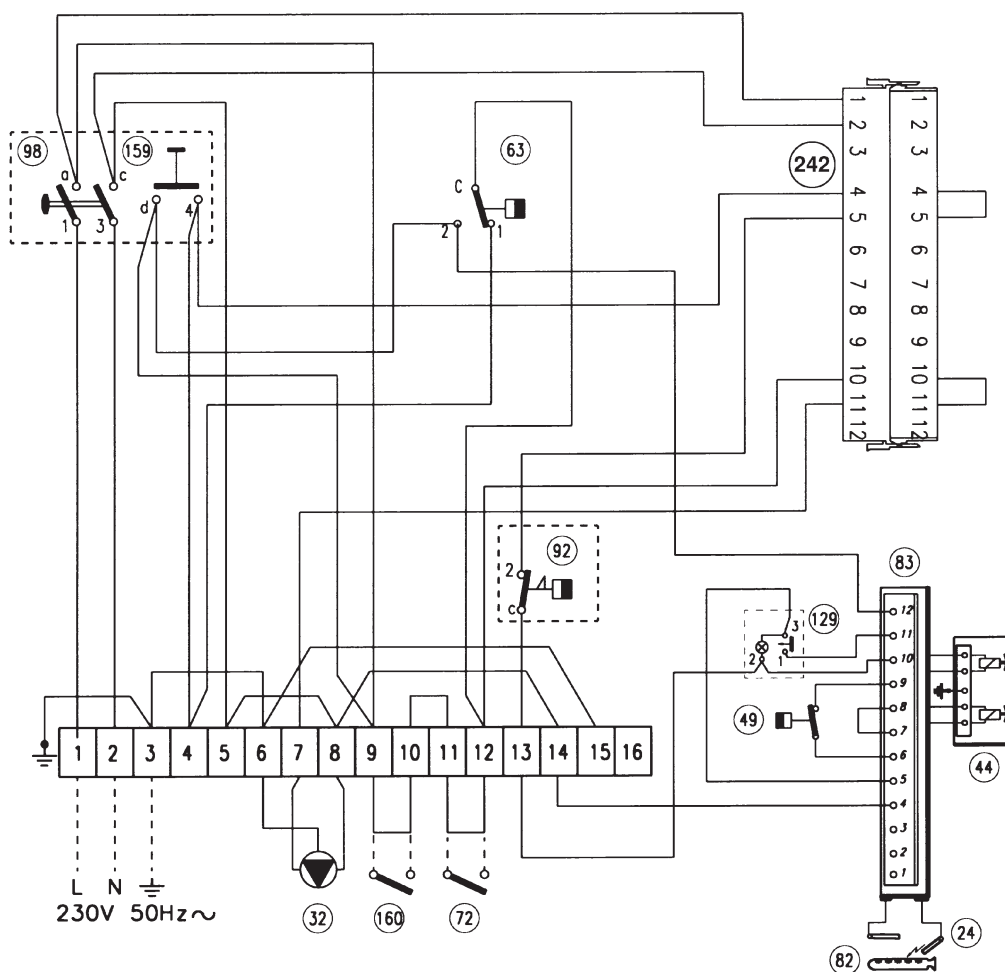


fig. 8

- |   |   |
|---|---|
| 24 Ignition electrode                       | 83 Electronic flame control unit            |
| 32 Heating system pump (models 16-23-30 pv) | 92 Flue gas thermostat with manual reset    |
| 44 Gas valve                                | 98 Boiler switch                            |
| 49 Safety thermostat                        | 129 Reset button with pilot light           |
| 63 Boiler thermostat                        | 159 Test knob                               |
| 72 Room thermostat (not supplied)           | 160 Auxiliary contact                       |
| 82 Detection electrode                      | 242 Connector for thermostatic control unit |

**Note** Dashed wiring to be handled by the installer

**N.B.** The manufacturer declines all liability for damage to persons or things resulting from the failure to electrically earth the boiler.

## Operating principle wiring diagram

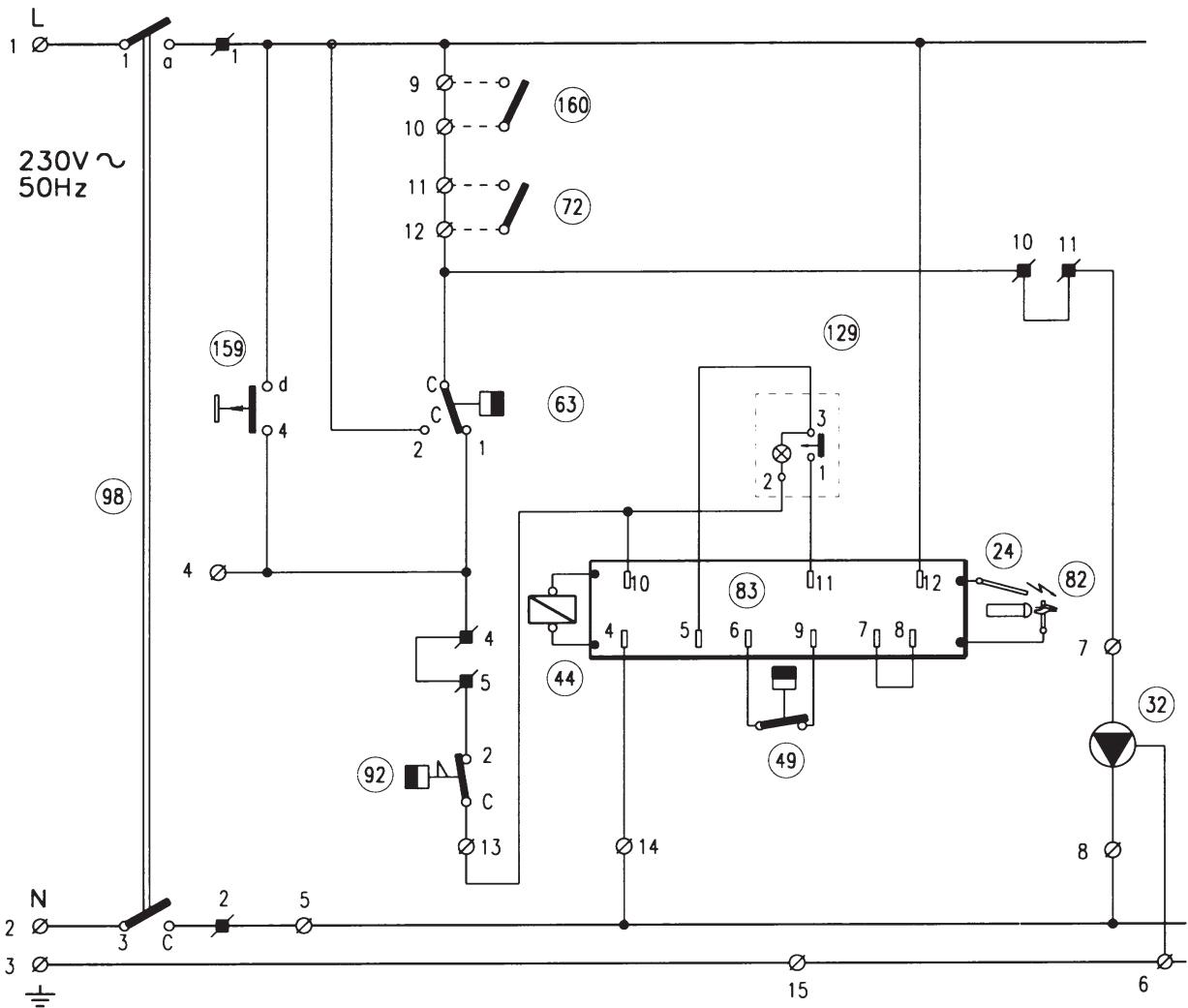


fig. 9

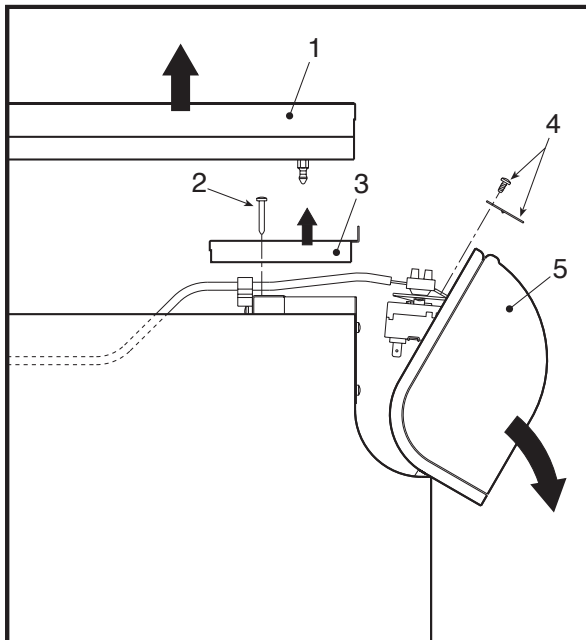
- |   |  |
|---|--|
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| 44 Gas valve                                | 98 Boiler switch                         |
| 49 Safety thermostat                        | 129 Reset button with pilot light        |
| 63 Boiler thermostat                        | 159 Test knob                            |
| 72 Room thermostat (not supplied)           | 160 Auxiliary contact                    |
| 82 Detection electrode                      |  |

**Note** Dashed wiring to be handled by the installer

**N.B.** The manufacturer declines all liability for damage to persons or things resulting from the failure to electrically earth the boiler.

## 9.02 opening the control panel

To access the electrical components inside the control panel, follow the sequence in fig. 10.



### Key

- 1 Boiler cover
- 2 Protective cover fastening screw
- 3 Wiring protective cover
- 4 Fastening plate and screw
- 5 Control panel

fig. 10

## 10. SET-UP

### 10.01 first ignition

The first ignition and the training of the user for the correct operation of the boiler must be carried out by an authorised service centre.

### 10.02 checks to be performed upon first ignition

During the first ignition of the boiler, it is important to check that the on-off valves between the boiler and the heating system are open; that the heating circuit is filled and vented of air; that there are no gas or water leaks in the heating system or in the boiler; that the electrical connections are correct and that the earth cable is connected to an adequate earth system; that there are no inflammable liquids or materials in the immediate vicinity of the boiler; and that the flue is not blocked.

### 10.03 ignition

Set the boiler thermostat to the "minimum temperature" position, and power the appliance using the boiler switch.

To ignite the burner assembly, proceed as follows:

- Open the gas cock (fitted by the installer);
- Vent the air in the gas pipes using the air vent fitted upstream from the gas valve (fig. 11).
- Adjust the knob on the boiler thermostat to the desired value (not less than 50 °C.).

At this stage the electronic control unit starts operating and will pilot, after a set waiting time, the gas valve and the spark to the ignition electrode, which in turn will light the burner assembly. The ionisation electrode then checks the presence of the flame in the burner assembly.

The boiler operates automatically, controlled by the boiler thermostat and/or any other control devices (room thermostat, electronic temperature control unit, etc.).

Note if after having correctly performed the ignition operation, the burners do not light and the reset button light on the electronic control unit is on, indicating that the control unit is blocked, wait around 10 seconds and then press the reset button.

The control unit is reset and will repeat the ignition cycle.

If, after the second attempt, the burners do not light, refer to paragraph 13 "troubleshooting".

In the event of power failures, the burners will shut-down and will be automatically ignited once the power returns.

## **10.04 Temporary shut-down**

To temporarily shut-down the boiler, simply place the boiler switch in position "0".

## **10.05 Extended boiler shut-down**

To shut the boiler down, proceed as follows:

- Turn the knob of the boiler switch to position "0";
- Close the gas cock upstream from the boiler;
- Disconnect power to the appliance.

**N.B.** If the boiler is not used for an extended period in winter, to avoid damage from frost, special anti-freeze should be added to the system, or else the system should be completely emptied.

## **10.06 checks after ignition**

Following the first ignition:

- Check the gas circuit and the heating system for tightness.
- Check the correct operation of the boiler by effecting ignition and shut-down tests using the regulation thermostat.
- Check on the rear wall of the boiler, at the height of the draught diverter, that there are no flue gas leaks, signs of blockages of the flue or insufficient draught.
- Check the effectiveness of the flue during boiler operation.
- Check that the connecting pipe between the boiler and flue is perfectly sealed at the joints.
- Verify that the circulation of water between the boiler and the heating system is correct.
- Make sure that, in the absence of a flame in the burner assembly, the appliance shuts-down.

## **11. SETTINGS**

### **11.01 setting the heating temperature**

The central heating water temperature is set by turning the knob on the boiler thermostat, on the control panel. Turn the knob clockwise to increase the central heating water temperature; anticlockwise to decrease it. The minimum temperature setting must not be below 50°.

### **11.02 setting the ambient temperature (with room thermostat installed)**

The ambient temperature is set by turning the knob on the room thermostat to the desired value. This device, which is not supplied with the boiler, maintains the ambient temperature at the value set on the knob, reducing energy consumption and increasing the level of comfort.

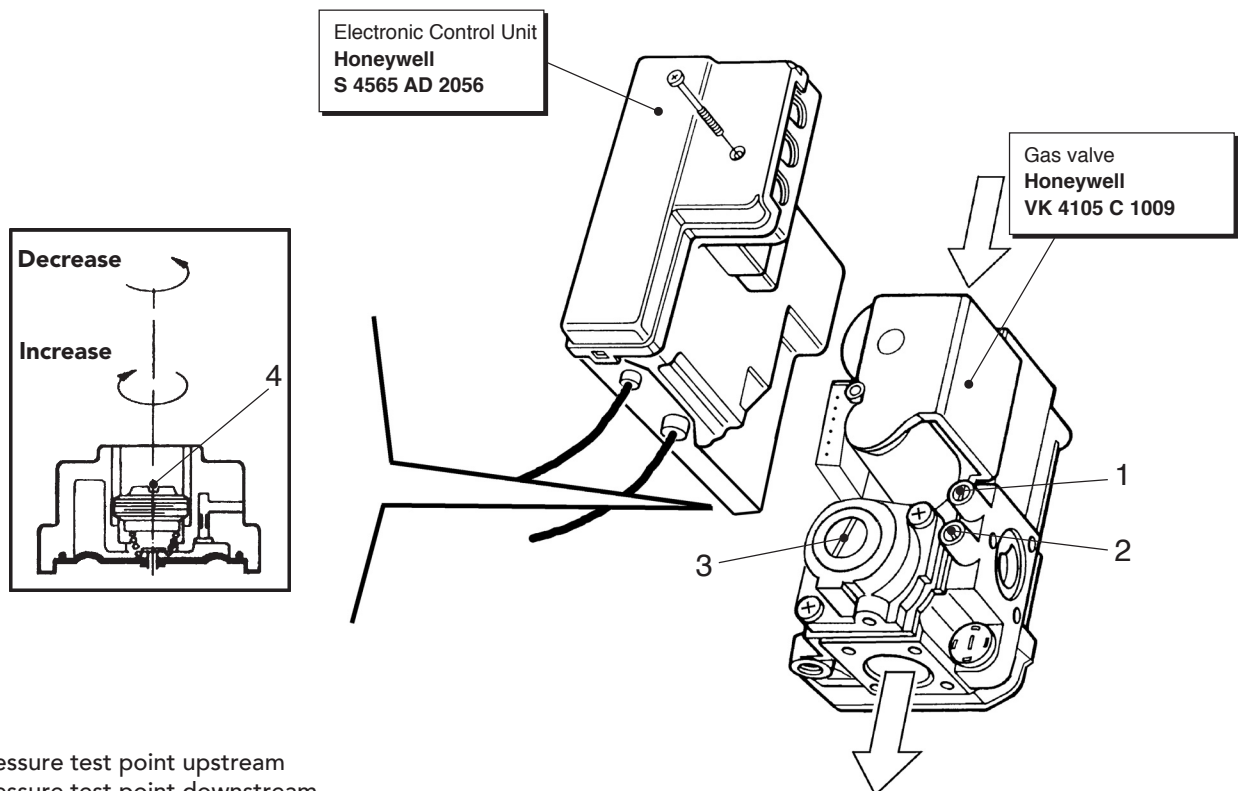
**11.03 adjusting the heating system power**

This procedure must be performed with the boiler in operation.

Connect a pressure gauge to the pressure test point 2 (fig. 11) located downstream from the gas valve, and turn the knob on the boiler thermostat to the maximum value.

After removing the protective cap 3 (fig. 11), adjust the pressure of the gas supplied to the burner assembly, using the screw 4, to the desired value, referring to the diagrams in figs. 4a and 4b, paragraph 7.02.

Having completed this operation, ignite and shut-down the burner assembly 2, 3 times, using the regulation thermostat, and check that the pressure is equal to the set value; otherwise, make further adjustments until the correct value is reached.



**Key**

- 1 Pressure test point upstream
- 2 Pressure test point downstream
- 3 Protective cap
- 4 Adjustment screw

**11.04 adjusting the heating system t by varying the flow-rate discharge head of the built-in pump (models 16-23-30 pv)**

The thermal head  $\Delta t$  (difference between the supply and return temperature in the central heating system) must be less than 20°C, and is adjusted by varying the flow-rate/discharge head of the, using the 3-speed selector switch on the pump itself. Note that on increasing the speed of the pump, the  $\Delta t$  decreases, and vice-versa.

**11.05 adjusting the central heating system water pressure**

The central heating system water pressure, as read on the thermal pressure gauge on the control panel, must be set according to the instructions provided in paragraph 8.06. In the case of an open vessel system, simply check the water level periodically.

## 12. GAS CONVERSION

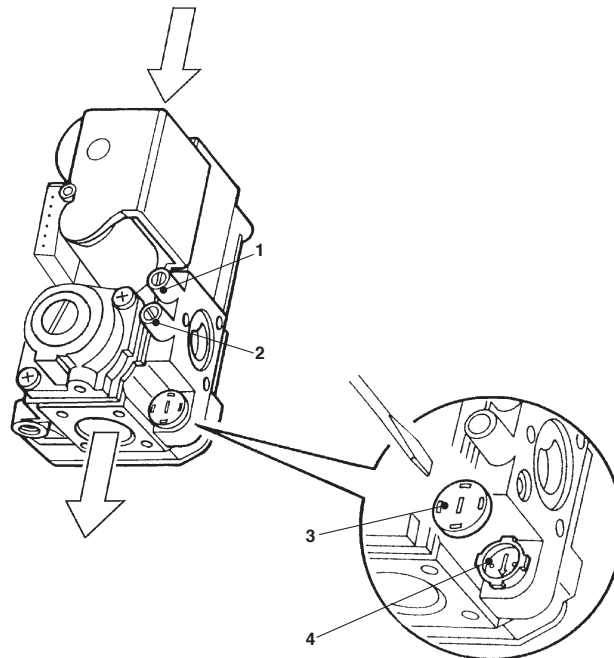
The following adjustment and conversion operations must be carried out exclusively by qualified personnel, such as those from our sales network or customer service department.

### 12.01 to change from natural gas (g20) to lpg (g31)

- Replace the burner nozzles (see table of technical specifications).
- Remove the small protective cap 3 from the gas valve (see fig. 12).
- Using a small screwdriver, adjust the ignition "step" to lpg.
- Replace the small cap 3 on the regulator.

### 12.02 to change from lpg (g31) to natural gas (g20)

- Follow the operations described in paragraph 12.01 in the reverse order, using the nozzles provided for natural gas (see table of technical specifications).



**Key**

- 1 Pressure test point upstream
- 2 Pressure test point downstream
- 3 Protective cap
- 4 "Step" ignition adjuster

### Adjusting the ignition step

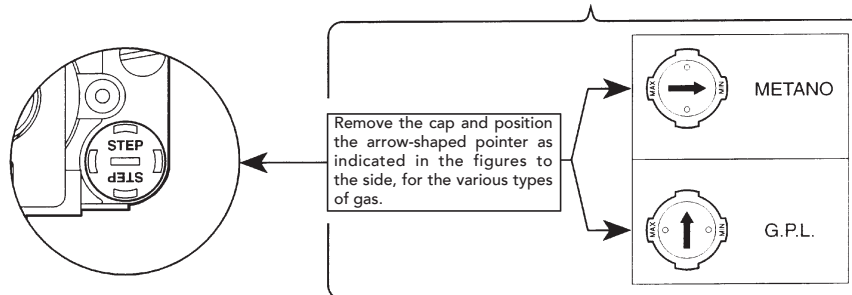


fig. 12

## 13. CHECKS AND MAINTENANCE

### Attention

The boiler's electrical devices work at 230v ~ 50hz.

Before carrying out any work, make sure the electrical power is removed.

### 13.01 checking the system boiler (to be performed once a year)

The system checks are generally performed at the end of the winter season. Check that the water in central heating circuit is pressurised. Verify serviceability and operation of the pumps.

Check the correct operation of the boiler by effecting ignition and shut-down tests using the regulation thermostat.

Check on the rear wall of the boiler, at the height of the draught diverter, that there are no flue gas leaks, signs of blockages of the flue or insufficient draught.

Check the effectiveness of the flue during the operation of the boiler.

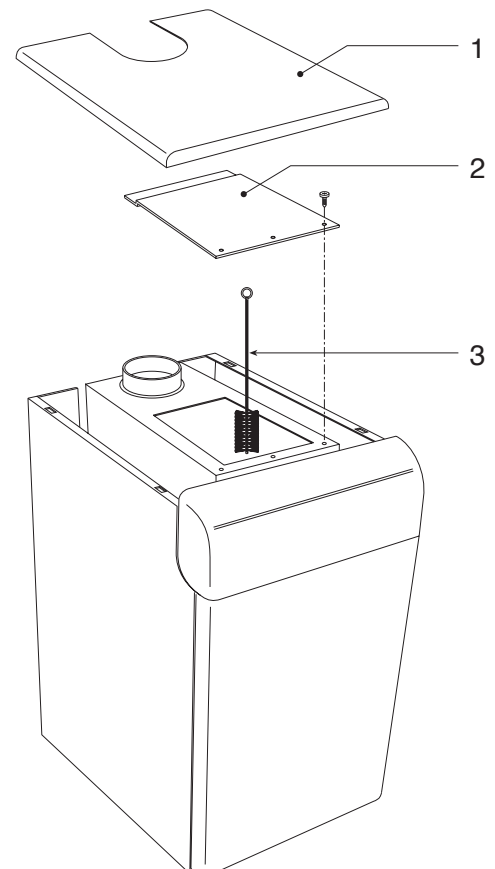
Check that the connecting pipe between the boiler and flue is perfectly sealed at the joints.

Check that, in the absence of a flame in the burner assembly, the appliance shuts-down and the light on the reset button 11, fig. 1, turns on.

### 13.02 cleaning the boiler and chimney (to be performed once every 3 years)

To properly clean the boiler, proceed as follows:

- Close the gas upstream from the appliance and remove electrical power.
- Remove the boiler door.
- Lift the cover of the casing, applying upwards pressure (fig. 13).
- Remove the smokebox closing plate.
- Remove the burner assembly (see 13.03).
- Clean from top to bottom, using a brush. The same operation can be performed from bottom to top.
- Clean the flue gas discharge pipes between the cast-iron elements of the boiler body, using a vacuum cleaner.
- Carefully replace all the previously removed parts and check the gas circuit and flue pipes for tightness.
- Make sure when cleaning not to damage the bulb of the flue gas thermostat, fitted at the rear of the smokebox.



### Key

- 1 Casing cover
- 2 Smokebox closing plate
- 3 Brush

fig. 13



## **13.03 disassembling and cleaning the burner assembly (to be performed once a year)**

To remove the burner assembly, proceed as follows:

- Remove the electrical power and close the gas upstream from the boiler.
- Remove the electronic flame control unit from the gas valve (fig. 14)
- Disconnect the cables from the electrode assembly.
- Unscrew the four screws which fasten the gas supply pipe upstream from the gas valve.
- Unscrew the two nuts which fasten the door of the combustion chamber to the cast-iron parts of the boiler (fig. 15).
- Remove the burner assembly and door of the combustion chamber.

At this stage, the burners can be cleaned and checked. Clean the burners and electrodes using only a non-metallic brush or compressed air; never use chemicals.

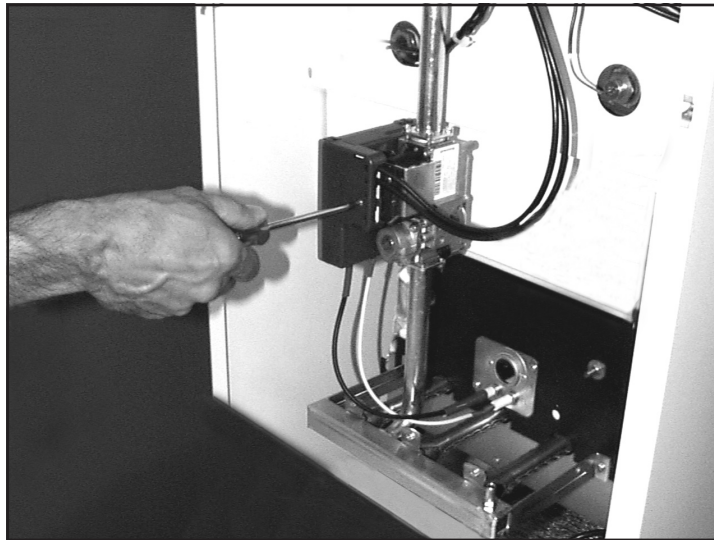


fig. 14

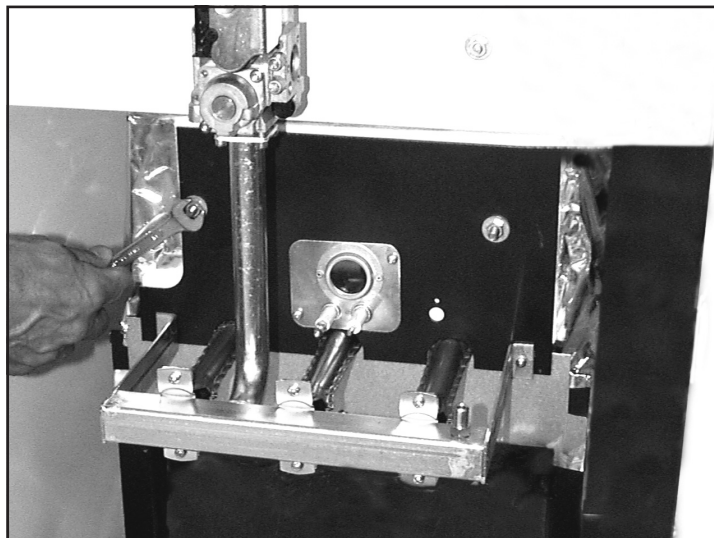


fig. 15

**13.04 electrode assemblies**

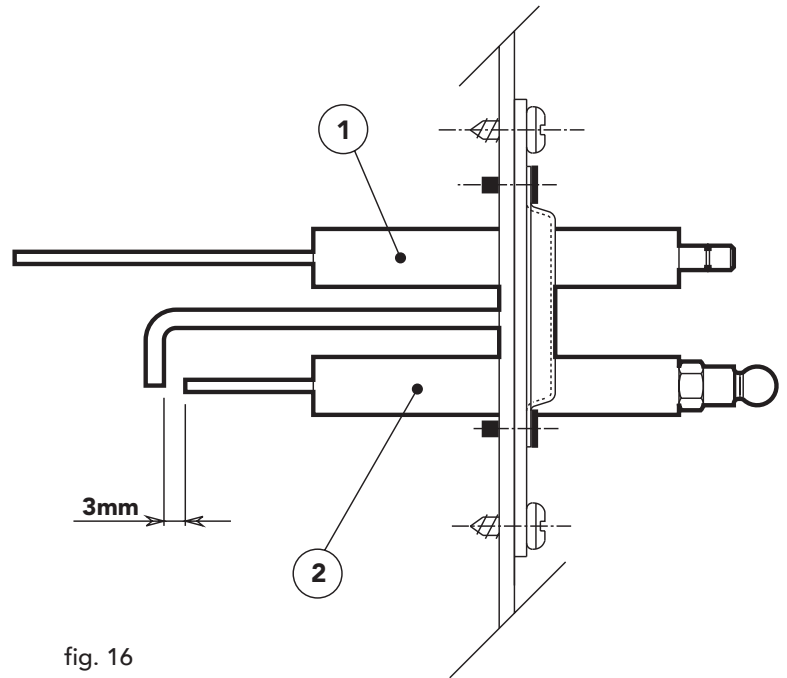


fig. 16

**Key**

- 1 Ionisation electrode
- 2 Ignition electrode

**14. TROUBLESHOOTING**

**Fault**

Cause and corrective action

**After a number of attempts at ignition, the electronic control unit shuts the boiler down**

- Check that the supply of gas to the boiler is correct and that the air has been eliminated from the pipes.
- Check that the electrodes have been positioned correctly and do not contain deposits (see fig. 16).
- Check that the boiler is properly earthed.
- Check that the gas valve is powered.
- Check the connections to the ignition and ionisation electrodes.

**In the ignition phase, there is no spark between the electrodes.**

- Check that the electrodes have been positioned correctly and do not contain deposits (see fig. 16).
- Regulation thermostat set too low.
- Check the electrical power supply.
- Check the connections to the electronic flame control unit.
- Check that the phase-neutral wires are not reversed and that the earth contacts are effective.
- Check the pressure of the gas at the inlet and any open gas pressure switches.
- Reset the flue gas thermostat.
- Check that the room thermostat is closed.

## **The burner assembly burns poorly: Flames too high, too low or too yellow**

- Dirty gas valve filter.
- Check the pressure of the gas supply.
- Dirty gas nozzles.
- Check that the boiler is not dirty.
- Check that the ventilation in the room where the appliance is installed is sufficient for correct combustion.

## **Smell of unburned gas**

- Check that the boiler is perfectly clean.
- Check that there is sufficient draught.
- Check that gas consumption is not excessive.

## **The boiler works but the temperature does not increase**

- Check the regulation thermostat for correct operation.
- Check that the gas consumption is not less than the required consumption.
- Check that the boiler is perfectly clean.
- Check that the boiler is properly rated for the heating system.
- Check that the heating system pump is not blocked.

## **Temperature of the water supplied to the heating system is too high or too low**

- Check the operation of the regulation thermostat.
- Check that the pump is not blocked.
- Check that the circulating pump is adequately rated for the system.

## **Explosions in the burner assembly. Delays in ignition**

- Check that the pressure of the gas is correct and that the boiler body is not dirty.

## **The regulation thermostat starts the boiler with a too-great temperature difference**

- Check that the bulb is properly inserted in the sheath.
- Check the operation of the thermostat.

## **The boiler produces condensation**

- Check that the boiler is not working at too-low temperatures (below 50°C).
- Check that the gas consumption is correct.
- Check the effectiveness of the flue.

## **The boiler shuts down for no apparent reason**

- Activation of the flue gas thermostat.
- Activation of the safety thermostat (with automatic reset), due to overtemperature.

**N.B.** Before calling the customer service department, to avoid unnecessary expense, check that boiler shut downs are not due to interruptions to the gas or electrical power supply.

The logo for Ferroli features the word "ferroli" in a bold, lowercase, sans-serif font. A grey, curved graphic element, resembling a stylized arch or a swoosh, is positioned above the letters "e" and "r".

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