

GB **Forced draught gas burners**

CN **强制通风燃气燃烧器**

One stage operation
单段火运行

Gulliver



CODE - 编码

MODEL - 型号

TIPE - 类型

20023776

RS5

920T1

INDEX

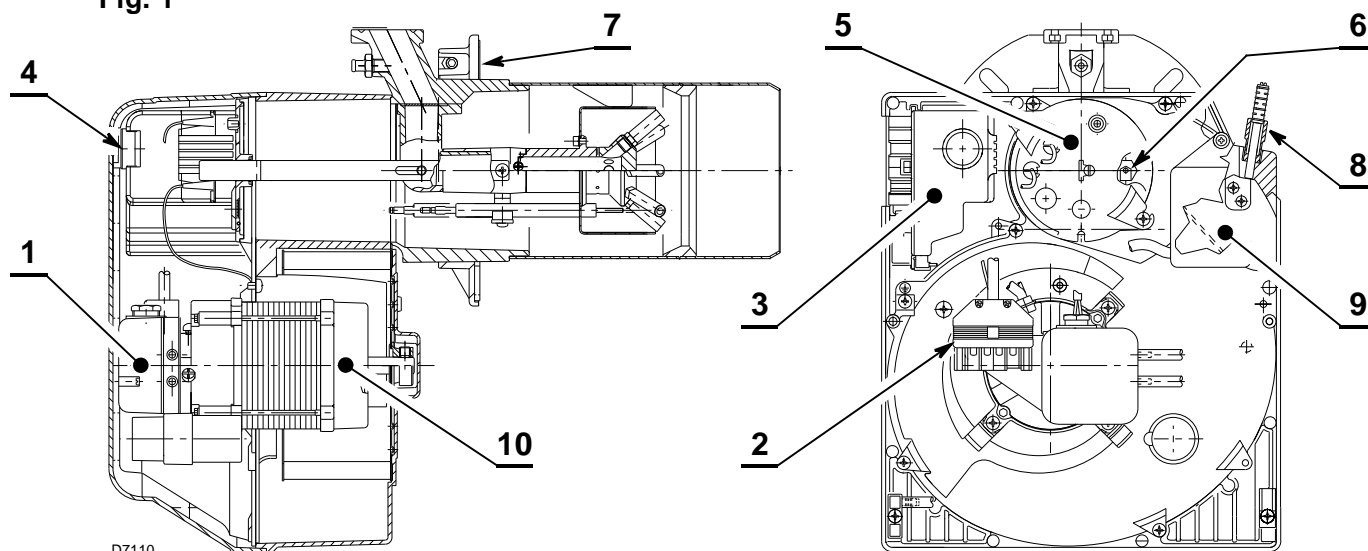
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1. BURNER DESCRIPTION

One stage gas burner.

- The burner meets protection level of IP X0D (IP 40), EN 60529.
According to directives: EMC 89/336/EC - 2004/108/EC, Low Voltage 73/23/EEC - 2006/95/EC and Machines 98/37/EEC - 2006/42.
- Gas train according to EN 676.
- The burner is approved for intermittent operation as per Directive EN 676.

Fig. 1



- | | |
|-------------------------------------|------------------------------------|
| 1 – Air pressure switch | 6 – Pressure test point |
| 2 – 6 pole socket for gas train | 7 – Flange with insulating gasket |
| 3 – Control box with 7 pole socket | 8 – Air damper adjustment assembly |
| 4 – Reset button with lock-out lamp | 9 – Servomotor |
| 5 – Head holder assembly | 10 – Motor |

1.1 BURNER EQUIPMENT

- | | | | |
|---|-------|--|-------|
| Flange with insulating gasket | No. 1 | Screws and nuts for flange to be fixed to boiler . . . | No. 4 |
| Screw and nut for flange | No. 1 | 7 pin plug | No. 1 |
| Remote reset connection | No. 1 | | |

1.2 ACCESSORIES

SOFTWARE DIAGNOSTIC KIT

A special kit is available that, by an optical link to a PC, shows the burner life together with operating hours, type and number of failures, serial number, etc.

To visualise the diagnostics proceed as follows:

- Connect the kit supplied separately to the control box socket.
Reading of the information begins when the software programme included in the kit starts.

REMOTE RESET KIT

The burner has a remote reset kit (**RS**) consisting of a connection and a push-button operating at a distance of 20 metres max.

In order to install it remove the protective lock-out installed at the factory and insert the lock-out supplied with the burner (see electrical diagram on page 7).

MULTIBLOC ROTATION KIT

There is a special kit available that can be used to install the burner turned 180°, as illustrated on page 5 in position 5 in the section entitled "**3.1 WORKING POSITION**". This kit is designed to ensure the gas train valve works properly. The kit must be installed in conformity with laws and local regulations.

2. TECHNICAL DATA

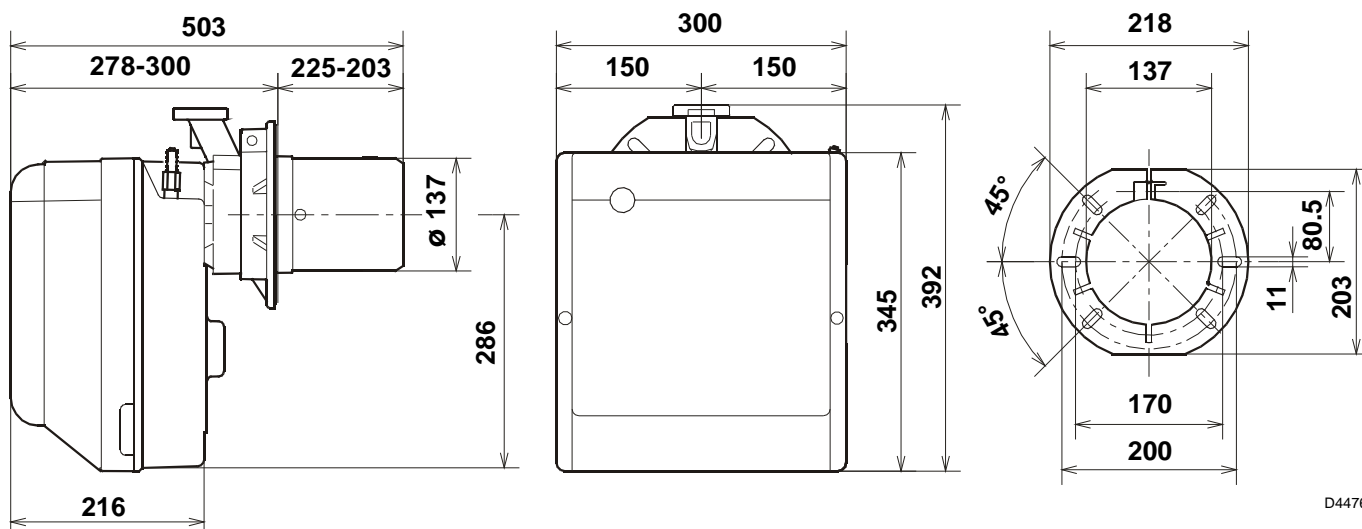
2.1 TECHNICAL DATA

TYPE	920 T1
Thermal power (1)	160 – 330 kW - 137.600 – 283.800 kcal/h
Natural gas (Family 2)	Net heat value: 8 – 12 kWh/Nm ³ = 7000 – 10,340 kcal/Nm ³
	Pressure: min. 20 mbar - max. 100 mbar
Electrical supply	Single phase, 230V ± 10% ~ 50Hz
Motor	Run current 1.9A - 2720 rpm - 288 rad/s
Capacitor	8 µF
Ignition transformer	Primary 230V / 0.2A - Secondary 8 kV / 12 mA
Absorbed electrical power	0.43 kW
(1) Reference conditions: Temp. 20°C - Barometric pressure 1013 mbar – Altitude 0 m above sea level.	

For gas family 3 (LPG) ask for separate kit.

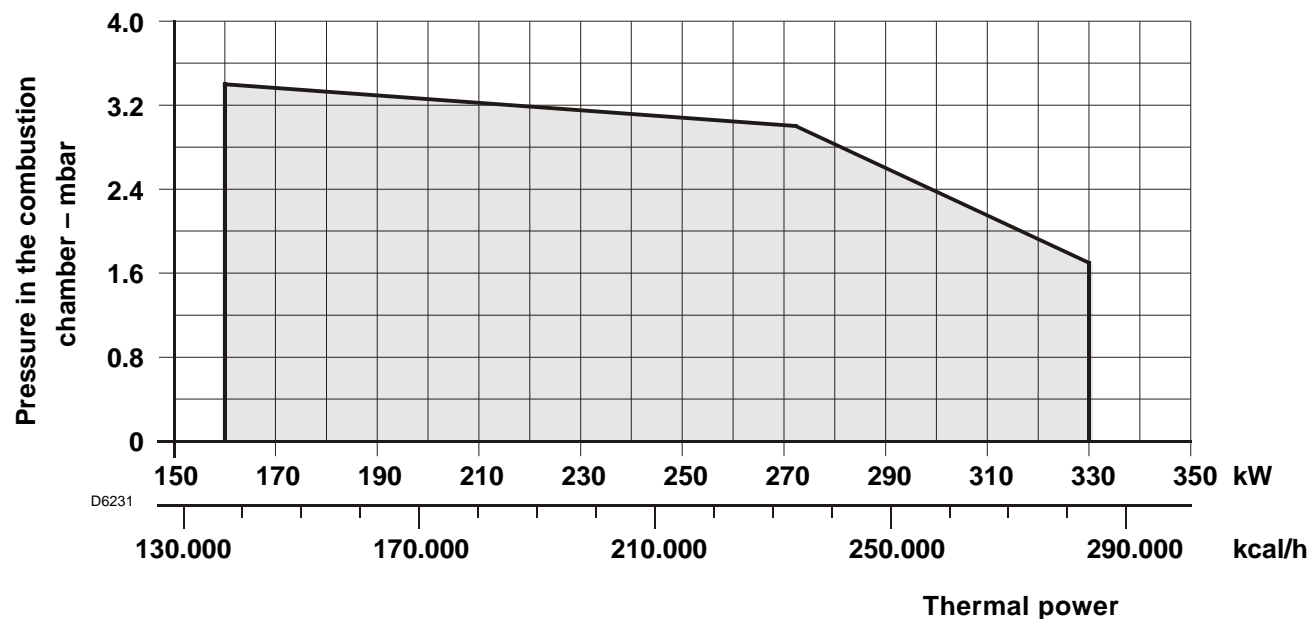
COUNTRY			AT - IT - DK - CH	GB - IE	DE	FR	NL	LU	BE
GAS CATEGORY			I12H3B/P	I12H3P	I12ELL3B/P	I12Er3P	I12L3B/P	I12E3B/P	I2E(R)B, I3P
GAS PRESSURE	G20	H	20	–	–	–	–	–	–
	G25	L	–	25	20	–	25	25	–
	G20	E	–	–	20	20/25	–	–	20/25

2.2 OVERALL DIMENSIONS



D4476

2.3 FIRING RATE (as EN 676)



TEST BOILER

The firing rate has been defined according to EN 676 standard.

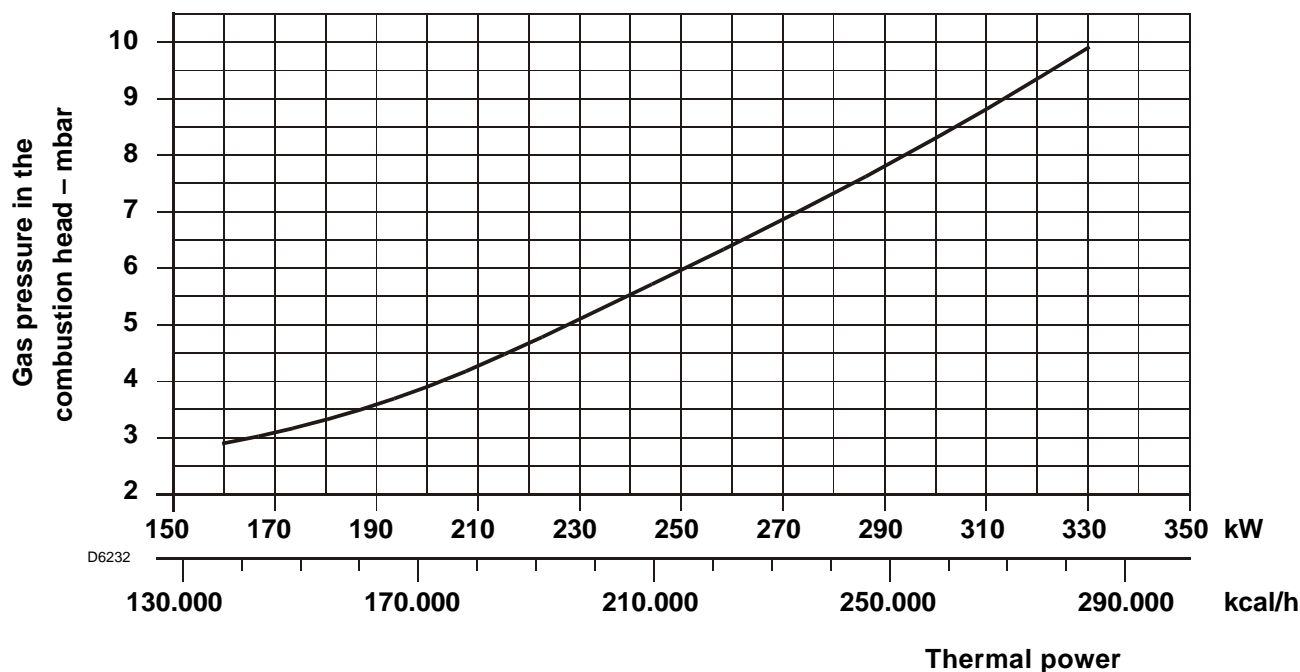
COMMERCIAL BOILERS

The burner-boiler matching is assured if the boiler is according to EN 303 and the combustion chamber dimensions are similar to those shown in the diagram EN 676.

For applications where the boiler is not according to EN 303, or where the combustion chamber dimensions differ from those shown in EN 676, please consult the manufacturers.

CORRELATION BETWEEN GAS PRESSURE AND BURNER OUTPUT

To obtain the maximum output, a gas head pressure of 9.9 mbar is measured (**M2**, see chapter 3.5, page 6) with the combustion chamber at 0 mbar using gas G20 with a net heat value of 10 kWh/m³ (8.570 kcal/m³).



3. INSTALLATION

THE BURNER MUST BE INSTALLED IN CONFORMITY WITH LEGISLATION AND LOCAL STANDARDS.

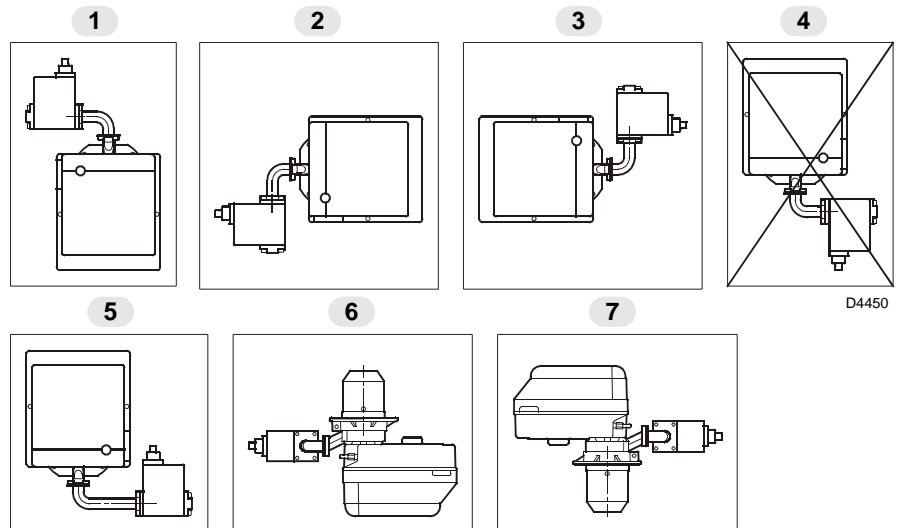
3.1 WORKING POSITION

The burner is designed for operation in position **1** only.

Installation in positions **2, 3, 5, 6** and **7** is not recommended as it is likely to hinder the unit's proper operation since air damper closure cannot be guaranteed when the burner is on standby.

Installation in position **5** is only possible using the "MULTIBLOC rotation kit", to be ordered separately.

Installation **4** is prohibited as safety is compromised.

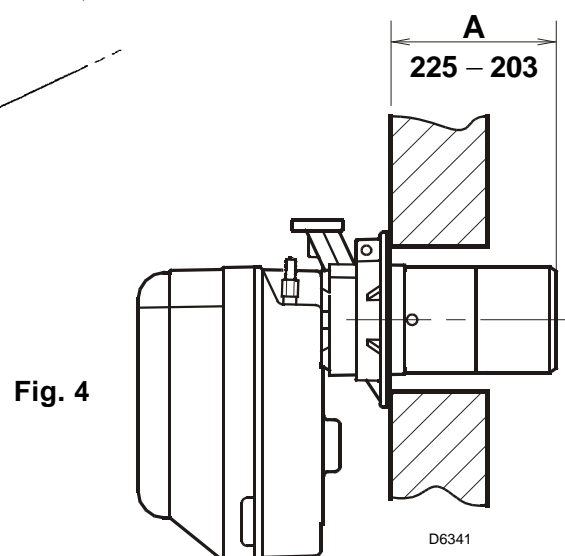
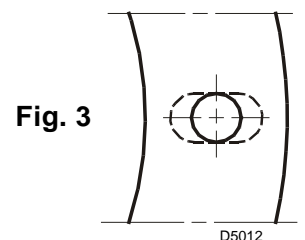
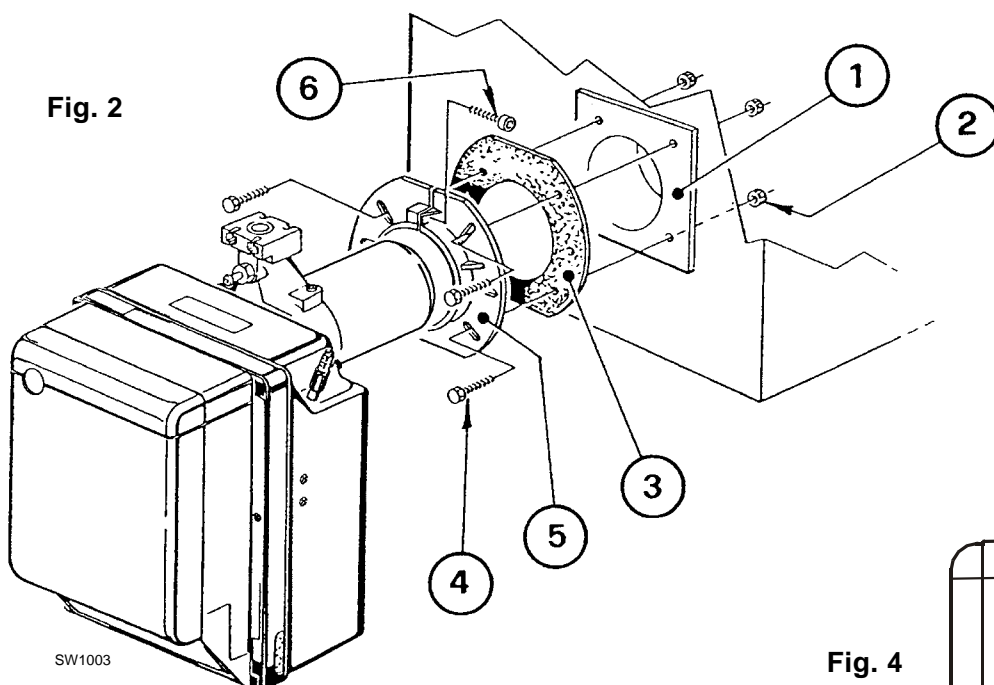


3.2 BOILER FIXING

To fit the burner to the boiler it is necessary to carry out the following:

- Widen, if necessary, the insulating gasket holes (3, fig. 3).
- Fix the flange (5) to the boiler door (1) using four screws (4) and (if necessary) the nuts (2) **interposing the insulating gasket (3)** but keep unloosening one of the two upper screws (4) (see fig. 2).
- Put on the flange (5) the burner combustion head, tighten the flange with the screws (6) and lock the loose screw (4).

N.B.: The burner can be fixed with the variable dimension **(A)** (see fig. 4). Anyway, make sure that the combustion head crosses completely the boiler door thickness.



3.3 GAS TRAIN, (as EN 676)

The gas train is supplied separately, for its adjustment see the enclosed instructions.

GAS TRAIN		CONNECTIONS		USE
TYPE	CODE	INLET	OUTLET	
MBDLE 410 B01	3970549	Rp 1 1/4	Flange 3	Natural gas $\leq 200\text{kW}$ and LPG 160 – 330 kW
MBDLE 412 B01	3970550	Rp 1 1/4	Flange 3	Natural gas $\leq 300\text{ kW}$
MBDLE 415 B01	3970558	Rp 1 1/2	Flange 3	Natural gas $\geq 300\text{ kW}$

3.4 GAS TRAIN ELECTRICITY SUPPLY

The gas train's power cables can be fed to the right or left of the burner, as illustrated in figure 5.

Depending on the entry point, the cable clamp with pressure test point (1) and simple cable clamp (2) may need swapping over.

Consequently, you must make sure:

- cable clamp (1) is positioned correctly;
- the tube is positioned correctly so that there are no restrictions likely to impede air flowing to the pressure switch.

WARNING

If necessary, cut the tube to the right size.

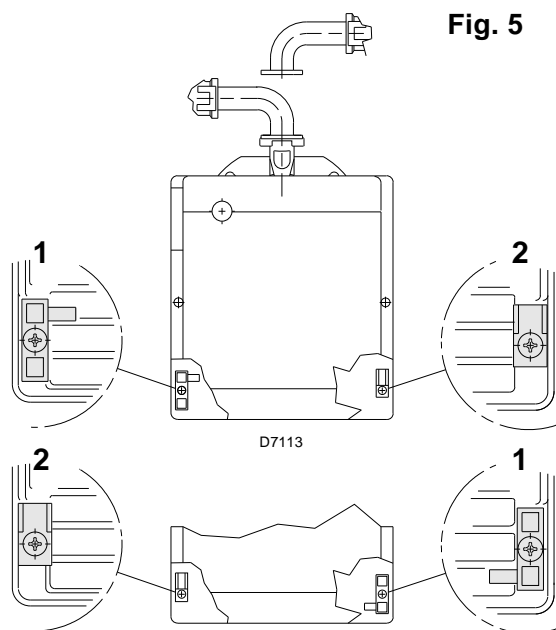
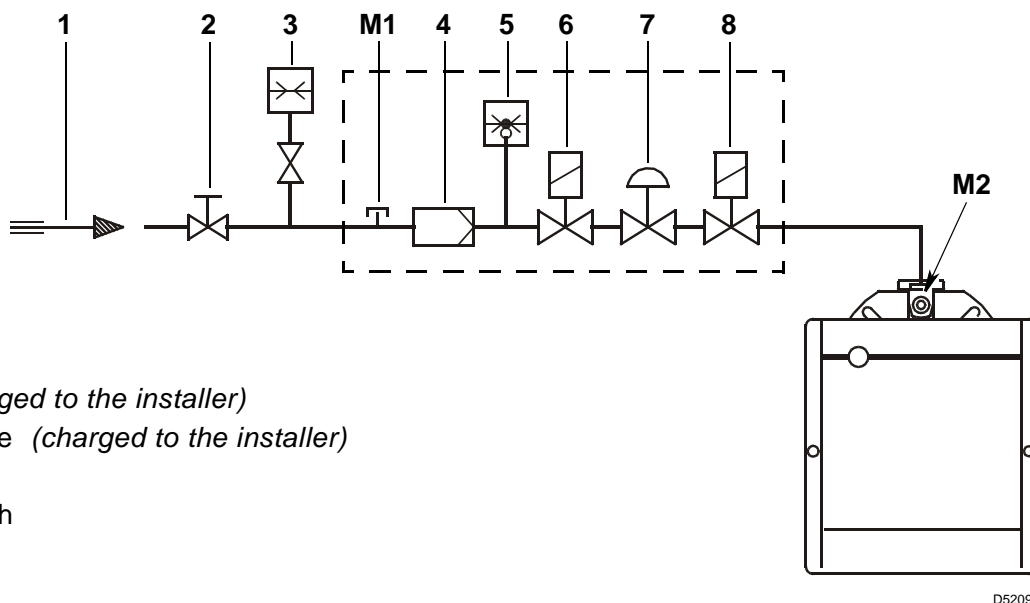


Fig. 5

3.5 GAS FEEDING LINE

Fig. 6



- 1 – Gas supply pipe
- 2 – Manual cock (*charged to the installer*)
- 3 – Gas pressure gauge (*charged to the installer*)
- 4 – Filter
- 5 – Gas pressure switch
- 6 – Safety valve
- 7 – Pressure governor
- 8 – Adjusting valve
- M1 – Gas-supply pressure test point
- M2 – Pressure coupling test point

3.6 ELECTRICAL WIRING

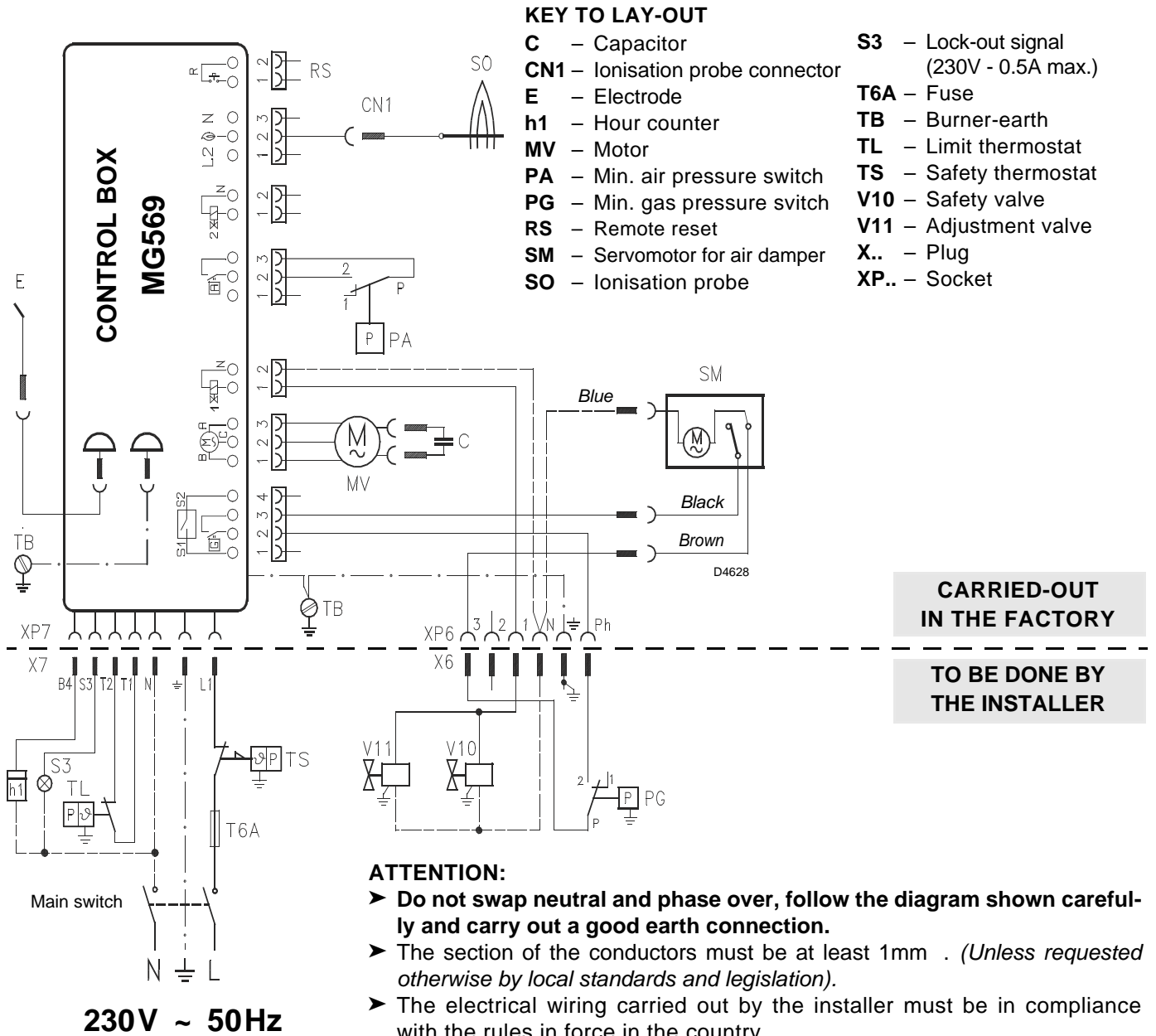
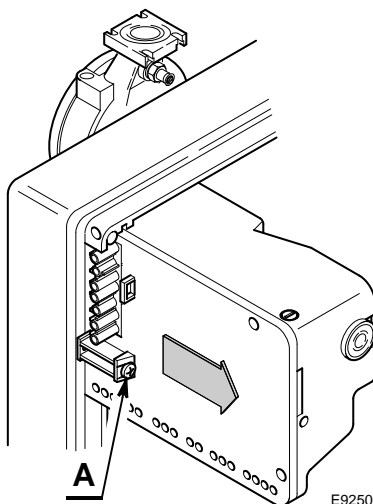


Fig. 7



ATTENTION:

- Do not swap neutral and phase over, follow the diagram shown carefully and carry out a good earth connection.
- The section of the conductors must be at least 1mm . (Unless requested otherwise by local standards and legislation).
- The electrical wiring carried out by the installer must be in compliance with the rules in force in the country

TESTING

- Check the burner has stopped by opening the thermostats.
- Check that the burner is blocked by opening the connector (CN1) inserted in the probe red wire and located outside the control box.

CONTROL BOX, (see fig. 7)

To remove the control box from the burner it is necessary to:

- disconnect all the connectors, the 7-pin plug, the high voltage cables and the earth wire (TB);
- unscrew the bolt (A, fig. 7) and pull the control box in the direction of the arrow.

To install the control box it is necessary to:

- screw the bolt (A) in at a torque of 1 - 1.2 Nm;
- reconnect all the connectors previously disconnected.

NOTES

The burners have been type-approved for intermittent operation. This means they must stop at least once every 24 hours in order to allow the electrical control box to check its efficiency on start-up. The boiler limit thermostat (TL) normally ensures the burner halts. If this does not happen a time switch halting the burner at least once every 24 hours must be applied in series to limit thermostat (TL).

4. WORKING

FIRING OUTPUT

The firing must occur at reducer output and not higher than 120 kW.

In order to measure the firing output:

- Disconnect the connector (CN1) on the ionization probe cable (see *electrical wiring* at page 7); the burner will fire and then go into lock-out after the safety time (3s) has elapsed.
- Perform 10 firings with consecutive lock-outs.
- On the meter read the total quantity of gas burned. This quantity must be equal to or lower than the quantity here given:
0.10 Nm³ for G20 (natural gas H)
0.10 Nm³ for G25 (natural gas L)
0.03 Nm³ for G31 (LPG).

4.1 COMBUSTION ADJUSTMENT, (see fig. 8)

In conformity with Efficiency Directive 92/42/EEC the application of the burner on the boiler, adjustment and testing must be carried out observing the instruction manual of the boiler, including verification of the CO and CO₂ concentration in the flue gases, their temperatures and the average temperature of the water in the boiler.

To suit the required appliance output, choose the proper setting of the combustion head, and the air damper opening.

The burner leaves the factory set for the minimum output.

4.2 COMBUSTION HEAD SETTING

It depends on the output of the burner and is carried out by rotating clockwise or counterclockwise the setting screw (6) until the set-point marked on the regulating rod (2) is level with the outside plane of the head assembly (1).

In the sketch of fig. 8 the combustion head is set for an output of 230 kW.

The set point 4 marked of the regulating rod is at the same level with the outside plane of the head-assembly as indicated in the diagram.

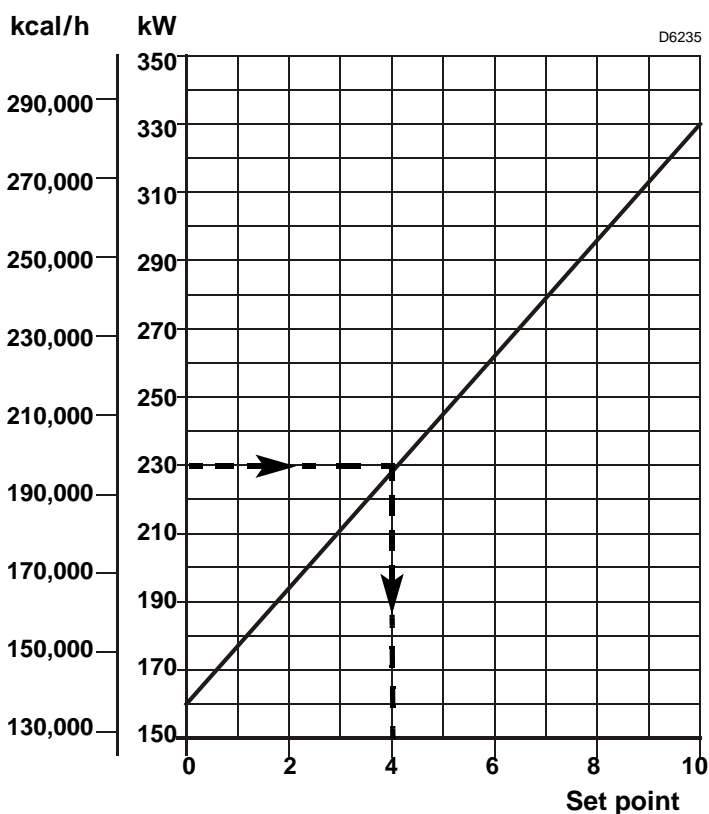
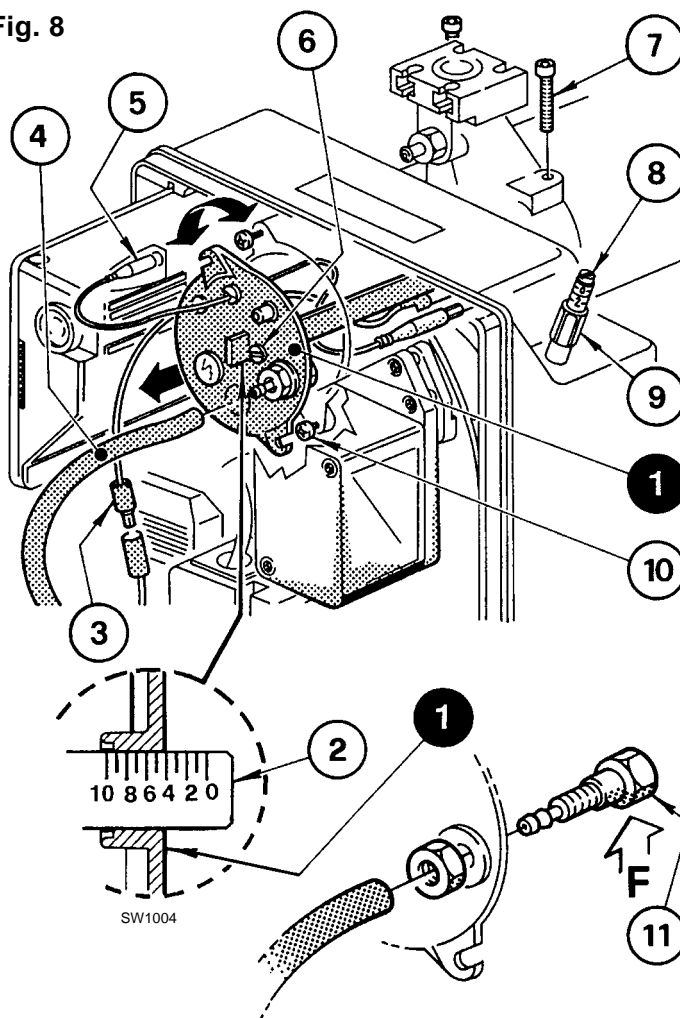
Example:

The burner is installed in a 210 kW boiler.
The burner will have to deliver about 230 kW, considering an efficiency of 90%.
The diagram indicates, that for this efficiency the adjustment has to be effected on the set-point 4.

NOTE

The diagram is orientative; to assure a good working of the burner, we suggest to adjust the combustion head according to the boiler.

Fig. 8



HEAD ASSEMBLY REMOVING, (see fig. 8, page 8)

To remove the head assembly, carry out the following operations:

Remove the head-older assembly (1), after taking away the screws (7), disconnect the connections (3 and 5), extract the small tube (4) and loose the screws (10).

Do not modify the setting position of the bracket-elbow during the disassembly.

REASSEMBLY OF THE HEAD SYSTEM, (see fig. 8, page 8)

Warning

- During the reassembly of the system, tighten the screws (7) completely (*without locking them*); then lock them with a torque wrench setting of 3 - 4 Nm.
- Control that, during the working, there are not gas losses coming from the screws.
- If casually the pressure test point (11) looses, fix correctly and be sure that the hole (F), placed in the external side of the head-assembly (1) turns towards the lower part.

4.3 AIR DAMPER SETTING, (see fig. 8, page 8)

WARNING

Do not carry out the first ignition with the air damper lower than set point 1.

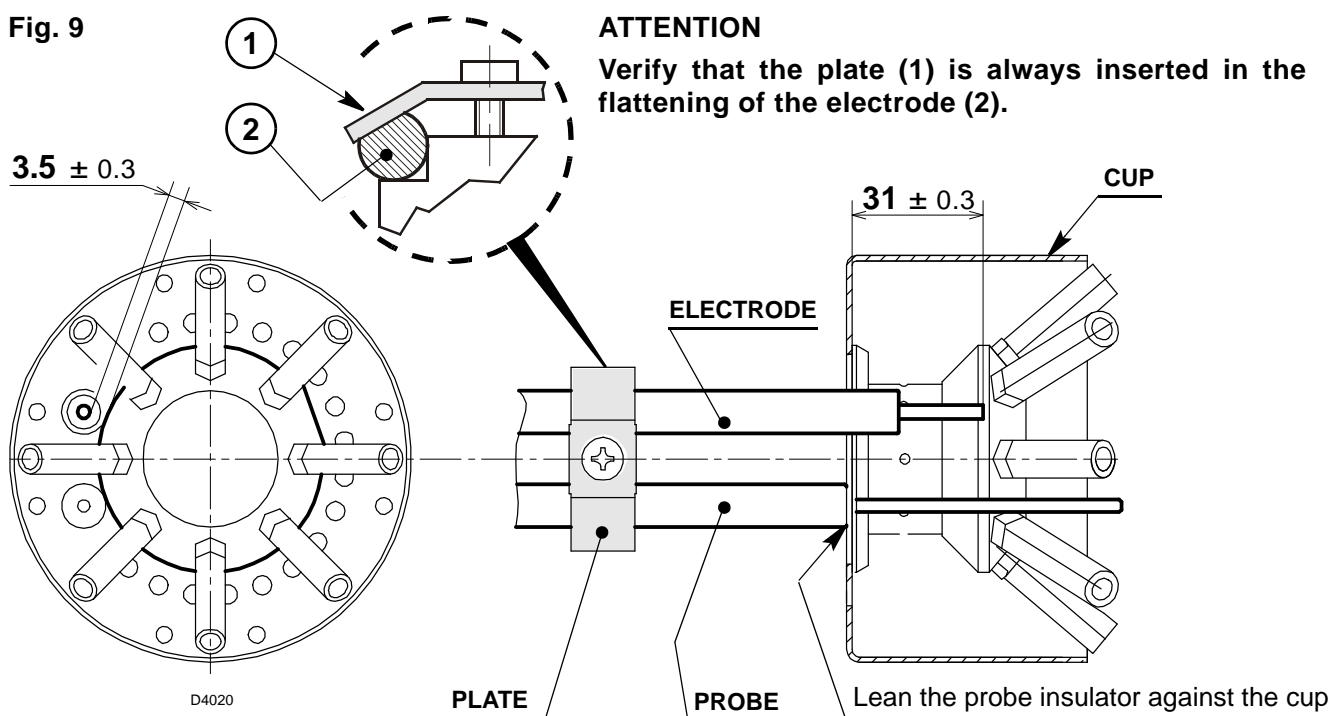
The air damper leaves the factory set for minimum output.

To vary the setting proceed as follows:

- Loosen the nut (9) and the screws (8).
- When the burner shuts down the air damper closes automatically until a max. chimney depression of 0.5 mbar is reached.

4.4 PROBE - ELECTRODE POSITIONING, (see fig. 9)

Fig. 9



4.5 COMBUSTION CHECK

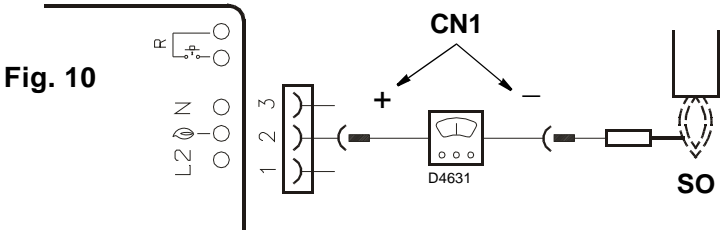
It is advisable to set the burner according to the type of gas used and following the indications of the table:

EN 676		AIR EXCESS: max. output $\lambda \leq 1.2$ – min. output $\lambda \leq 1.3$			
GAS	Theoretical max. CO ₂ 0 % O ₂	Setting		CO mg/kWh	NO _x mg/kWh
		$\lambda = 1.2$	$\lambda = 1.3$		
G 20	11.7	9.7	9.0	≤ 100	≤ 170
G 25	11.5	9.5	8.8	≤ 100	≤ 170
G 30	14.0	11.6	10.7	≤ 100	≤ 230
G 31	13.7	11.4	10.5	≤ 100	≤ 230

IONIZATION CURRENT

The minimum current necessary for the control box operation is 5 μ A.

The burner normally supplies a higher current value, so that no check is needed. Anyway, if you want to measure the ionization current, you have to open the connector (CN1) (see electrical scheme page 7) fitted on the wire and insert a microammeter.



4.6 AIR PRESSURE SWITCH

Adjust the air pressure switch after having performed all other burner adjustments with the air pressure switch set to the start of the scale.

With the burner operating at the required power, slowly turn knob clockwise until burner locks out. Then turn the knob anti-clockwise by about 20% of the set point and subsequently check to see if burner has started correctly. If the burner locks out again, turn the knob anti-clockwise a little bit more.

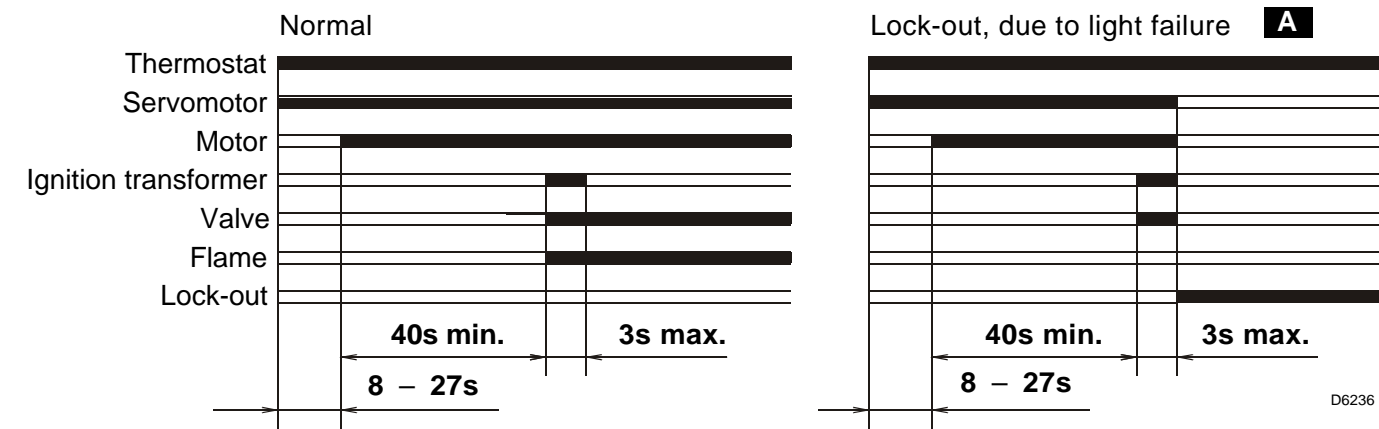
The burner leaves the factory with the pressure switch set at the beginning of the scale.

Attention:

As a rule, the air pressure switch must prevent the air pressure from lowering below 80% of the adjustment value as well as preventing the CO in the fumes from exceeding 1% (10,000 ppm).

To check this, insert a combustion analyser into the chimney, slowly close the fan suction inlet (for example with cardboard) and check that the burner locks out, before the CO in the fumes exceeds 1%.

4.7 BURNER START-UP CYCLE



A Lock-out is indicated by a lamp on the control box (4, fig. 1, page 2).

4.8 RE-CYCLE FUNCTION

The control box allows re-cycling, i.e. the complete repetition of the starting programme, for 3 attempts maximum, in the event the flame goes out during operation.

4.9 POST-VENTILATION FUNCTION

Post-ventilation is a function that maintains air ventilation even after the burner is switched off. The burner switches off when the limit thermostat (TL) opens, cutting off the fuel supply to the valves.

To use this function the reset button must be pressed when the limit thermostat is not switched over (**BURNER SWITCHED OFF**).

Post-ventilation time can be set to a maximum of 6 minutes. Proceed as follows:

- Press and hold the reset button for at least 5 seconds till the LED indicator changes to red.
- Set the desired time pressing the button repeatedly: **once = post-ventilation for 1 minute**.
- After 5 seconds the control box automatically shows the minutes set by the red LED flashing:
1 pulse = post-ventilation for 1 minute.

To reset this function, press and hold the button for at least 5 seconds at least, till the LED indicator changes to red then release it without carrying out any operation, then wait for 20 seconds for the burner to start.

If during post-ventilation there is a new request for heat, post-ventilation time is halted and a new operating cycle starts when the limit thermostat (TL) switches over.

The control box leaves the factory with the following setting: **0 minutes = no post-ventilation**.

4.10 CONTROL BOX RESET

To carry out the control box reset, proceed as follows:

- Press the reset button for at least 1 second.
In the event of the burner not restarting it is necessary to check if the limit thermostat (TL) is closed.

5. MAINTENANCE

Disconnect the electric supply to the burner by switching off the main power switch and close the gas shut-off valve before maintaining or checking the system.

The burner requires scheduled maintenance that must be carried out by qualified personnel and in compliance with local legislation.

Scheduled maintenance is vital for the smooth operation of the burner; it avoids waste of fuel and reduces harmful emissions into the atmosphere.

THE FUNDAMENTAL OPERATIONS TO CARRY OUT ARE AS FOLLOWS:

- Check at regular intervals that the holes of the gas head are not obstructed. If they are, clean them with a suitable tool as shown in the figure 11.
- Check there are no occlusions or obstructions in the inlet or return pipes, in the air suction areas and in the combustion product waste pipe.
- Check that the burner and gas train electrical connections are correct.
- Check that the positioning of the air pressure test point (6, fig. 1, page 2) is correct.
- Check that the gas train is suited to the burner capacity, the type of gas used and the network gas pressure.
- Check that the positioning of the combustion head is correct and that it is properly fixed to the boiler.
- Check that the air damper is positioned correctly.

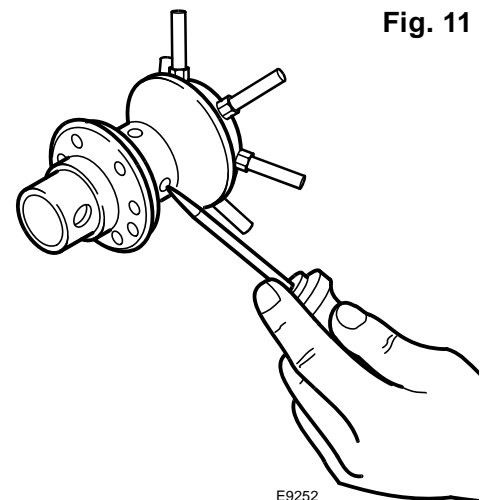


Fig. 11

- Check that the ionisation probe and the electrode are positioned correctly (see fig. 9, page 9).
- Check that the air pressure switch and the gas pressure switch are set correctly.

Let the burner run at full capacity for about ten minutes, setting all the elements correctly as explained in this manual.

Then carry out the analysis of the combustion by checking:

- CO₂ percentage (%);
- CO content (ppm);
- NO_x content (ppm);
- Ionisation current (μA);
- Flue gases temperature at the stack.

5.1 VISUAL DIAGNOSTIC CONTROL BOX

The control box has a diagnostic function that can identify the likely causes of any malfunctions (indicator: **RED LED**).

In order to be able to use this function, press and hold the reset button for at least 3 seconds from when the appliance is made safe (**lock-out**).

The control box sends a sequence of pulses that are repeated at 2-second intervals.

RED LED illuminated press reset for 3 sec.	Pulses	Interval 2s	Pulses
	● ● ● ● ●		● ● ● ● ●

The sequence of pulses issued by the control box identifies the possible types of malfunction, which are listed in the table below.

SIGNAL	PROBABLE CAUSE
2 pulses ● ●	The flame does not stabilise at the end of the safety time: <ul style="list-style-type: none"> – faulty ionisation probe; – faulty or soiled gas valves; – neutral/phase exchange; – faulty ignition transformer – poor burner regulation (insufficient gas).
3 pulses ● ● ●	Min. air pressure switch does not close or is already closed before the limit thermostat closed: <ul style="list-style-type: none"> – air pressure switch faulty; – air pressure switch incorrectly regulated.
4 pulses ● ● ● ●	Light present in the chamber before the burner's switching on or off: <ul style="list-style-type: none"> – presence of a strange light before or after the limit thermostat switching over; – presence of a strange light during pre-ventilation; – presence of a strange light during post-ventilation.
6 pulses ● ● ● ● ● ●	Loss of ventilation air: <ul style="list-style-type: none"> – air loss during pre-ventilation; – air loss during and after safety time.
7 pulses ● ● ● ● ● ● ●	Loss of flame during operations: <ul style="list-style-type: none"> – poor burner regulation (insufficient gas); – faulty or soiled gas valves; – short circuit between ionisation probe and earth.

ATTENTION To reset the control box after the diagnostics display, press the lockout-reset button.

6. FAULTS / SOLUTIONS

Here below you can find some causes and the possible solutions for some problems that could cause a failure to start or a bad working of the burner.

A fault usually makes the lock-out lamp light which is situated inside the reset button of the control box (4, fig. 1, page 2).

When lock out lamp lights the burner will attempt to light only after pushing the reset button. After this if the burner functions correctly, the lock-out can be attributed to a temporary fault.

If however the lock out continues the cause must be determined and the solution found.

6.1 START-UP PROBLEMS

FAULTS	POSSIBLE CAUSES	SOLUTION
The burner doesn't start when the limit thermostat closes.	Lack of electrical supply.	Check presence of voltage in the L1 - N clamps of the 7 pin plug.
		Check the condition of the fuses.
		Check that safety thermostat is not lock out.
	Lack of gas.	Check the manual cock opening.
		Check that the valves charge over to the opening position and there are not short circuits.
	The gas pressure switch does not close its contact.	Adjust them.
	The connections in the control box are wrongly inserted.	Check and connect all the plugs.
	The air pressure switch is changed over to the operational position.	Replace the pressure switch.
	The servomotor is locked.	Check the right electrical connection.
The servomotor doesn't close completely and therefore it doesn't pull in the burner ignition micro: check the micro working.		
The burner runs normally in the prepurge and ignition cycle and locks out after about 3 seconds.	Phase and neutral connection is inverted.	Invert them.
	The earth connection lacks or is inefficient.	Make the earth connection efficient.
	The ionization probe is earthed or not in contact with the flame, or its wiring to the control box is broken, or there is a fault on its insulation to the earth.	Check the right position and if necessary set it according to the instructions of this manual.
		Reset the electrical connection.
		Replace the faulty connection.
The burner starts with an ignition delay.	The ignition electrodes is wrongly positioned.	Adjust it according to the instructions of this manual.
	Air output is too high.	Set the air output according to the instructions of this manual.
	Valve brake is too close with insufficient gas output.	Adjust it.

FAULTS	POSSIBLE CAUSES	SOLUTION
The burner locks out after the prepurge phase due to flame-failure.	The solenoid valves is passing too little gas.	Check the pressure in the network and/or adjust the solenoid valve according to the instructions of this manual.
	The solenoid valves are defective.	Change them
	The ignition arc is irregular or has failed.	Check the right insertion of the connectors.
		Check the right position of the electrode according to the instructions of this manual.
	The pipe has not been purged from the air.	Carry out a complete breathing of the line of gas-supply.
The burner locks out during the prepurge phase.	The air pressure switch does not change over to the operational position.	The pressure switch is faulty, change it.
		The air pressure is too low, (the head is bad adjusted).
	The flame exists.	Faulty valves: replace them.
	The pressure test point (11, fig. 8, page 8) is badly positioned.	Place it in the right position according to the instructions of this manual on page 8, chapter 4.2.
The burner continues to repeat the starting cycle without going on lock-out.	The gas pressure in the gas-mains lies very close to the value to which the gas pressure switch has been set. The sudden falling-off pressure at the opening of the valve causes the opening of the pressure switch. However this only temporarily, because the valve immediately closes again, so then does the pressure switch, because the pressure builds-up again, causing the cycle to be repeated over and over.	Lower and set the pressure switch.

6.2 OPERATING IRREGULARITIES

FAULTS	POSSIBLE CAUSES	SOLUTION
The burner locks out during operation.	Earth probe.	Check the right position and if necessary set it according to the instructions of this manual.
		Clean or replace the ionization probe.
	The flame disappears 4 times.	Check the gas pressure in the network and/or adjust the solenoid valve according to the instructions of this manual.
	Air pressure switch opening.	The air pressure is too low, (the head is bad adjusted).
		The air pressure switch is faulty, change it.
Burner shut down.	Gas pressure switch opening.	Check the pressure in the network and/or adjust the solenoid valve according to the instructions of this manual.

7. SAFETY WARNINGS

The dimension of the boiler's combustion chamber must respond to specific values, in order to guarantee a combustion with the lowest polluting emissions rate.

The Technical Service Personnel will be glad to give you all the information for a correct matching of this burner to the boiler.

This burner must only be used for the application it was designed for.

The manufacturer accepts no liability within or without the contract for any damage caused to people, animals and property due to installation, adjustment and maintenance errors or to improper use.

7.1 BURNER IDENTIFICATION

The Identification Plate on the product gives the serial number, model and main technical and performance data. If the Identification Plate is tampered with, removed or missing, the product cannot be clearly identified thus making any installation or maintenance work potentially dangerous.

7.2 BASIC SAFETY RULES

- Children or inexperienced persons must not use the appliance.
- Under no circumstances must the intake grids, dissipation grids and ventilation vents in the installation room be covered up with cloths, paper or any other material.
- Unauthorised persons must not attempt to repair the appliance.
- It is dangerous to pull or twist the electric leads.
- Cleaning operations must not be performed if the appliance is not disconnected from the main power supply.
- Do not clean the burner or its parts with inflammable substances (e.g. petrol, alcohol, etc.). The cover must be cleaned with soapy water.
- Do not place anything on the burner.
- Do not block or reduce the size of the ventilation vents in the installation room.
- Do not leave containers and inflammable products in the installation room.

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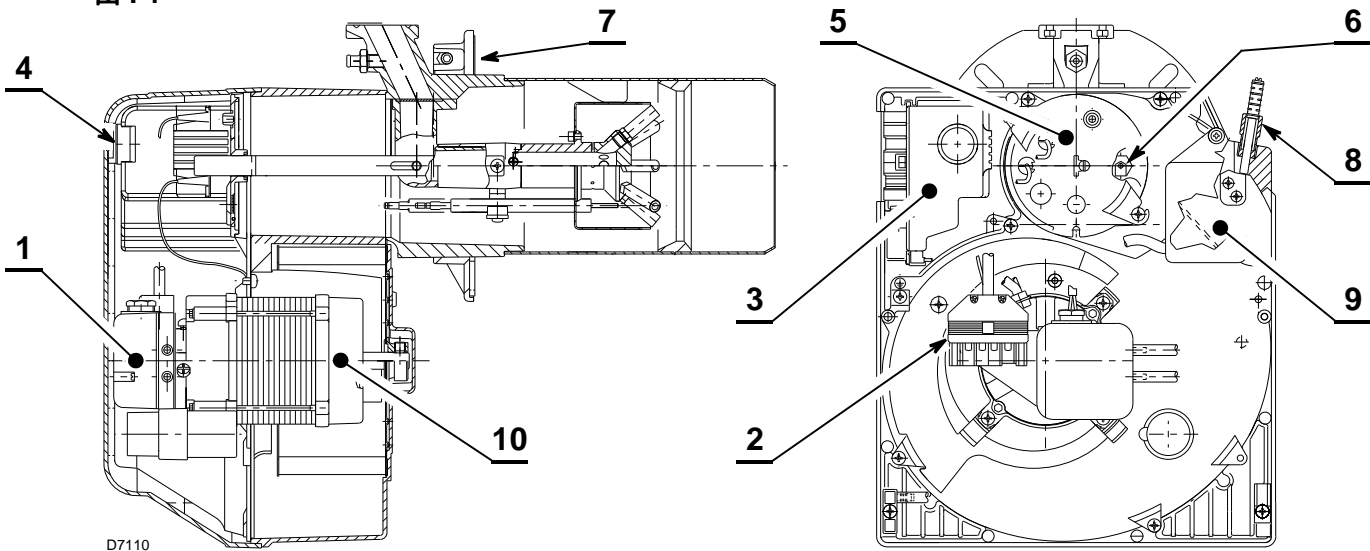
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1. 燃烧器描述

单段火燃烧器。

- ▶ 燃烧器符合的防护等级为 IP X0D (IP 40), EN 60529。
并符合以下规范：EMC 规范 89/336/EEC - 2004/108/EC，低电压规范 73/23/EEC - 2006/95/EC 和机械规范 98/37/EEC - 2006/42/EC。
- ▶ 燃气阀组符合 EN 676 标准。
- ▶ 燃烧器为间歇式运行方式，符合 EN 676 标准。

图 . 1



- | | |
|---------------------|-------------|
| 1 - 空气压力开关 | 6 - 压力检测点 |
| 2 - 用于连接燃气阀组的 6 孔插座 | 7 - 带绝热垫的法兰 |
| 3 - 带 7 孔插座的燃烧器控制盒 | 8 - 风门调节装置 |
| 4 - 带故障指示灯的复位按钮 | 9 - 伺服电机 |
| 5 - 燃烧头组件 | 10 - 风机 |

1.1 燃烧器配置

带绝热垫的法兰	1	用于固定锅炉连接法兰的螺钉和螺母	4
用于法兰连接的螺钉和螺母	1	7 孔插头	1
远程复位连接件	1		

1.2 附件

软件诊断装置

该装置可通过电缆连接到 PC 机上，显示燃烧器的使用时间，故障类型和故障数量以及系列号等等。

显示诊断过程如下：

- ▶ 连接该装置单独提供的控制盒底座。
当软件工作后就可以从中读出数据了。

远程复位装置

燃烧器有远程复位装置 (RS) 包括一个连接件和 一个按钮，该装置的最大运行连接距离为 20 米。

把出厂时原有的故障锁定装置拆下，将提供的连接件插上即可。(见第 6 页电气连接图)。

多方位旋转装置

使用该装置可以将燃烧器旋转 180° 安装，在第 4 页 “3.1 工作位置” 章节中的 5 位置内有具体说明。该装置的设计初衷是确保燃气阀组的正常工作。此装置的安装必须符合相关的规范和当地的法律法规。

2. 技术参数

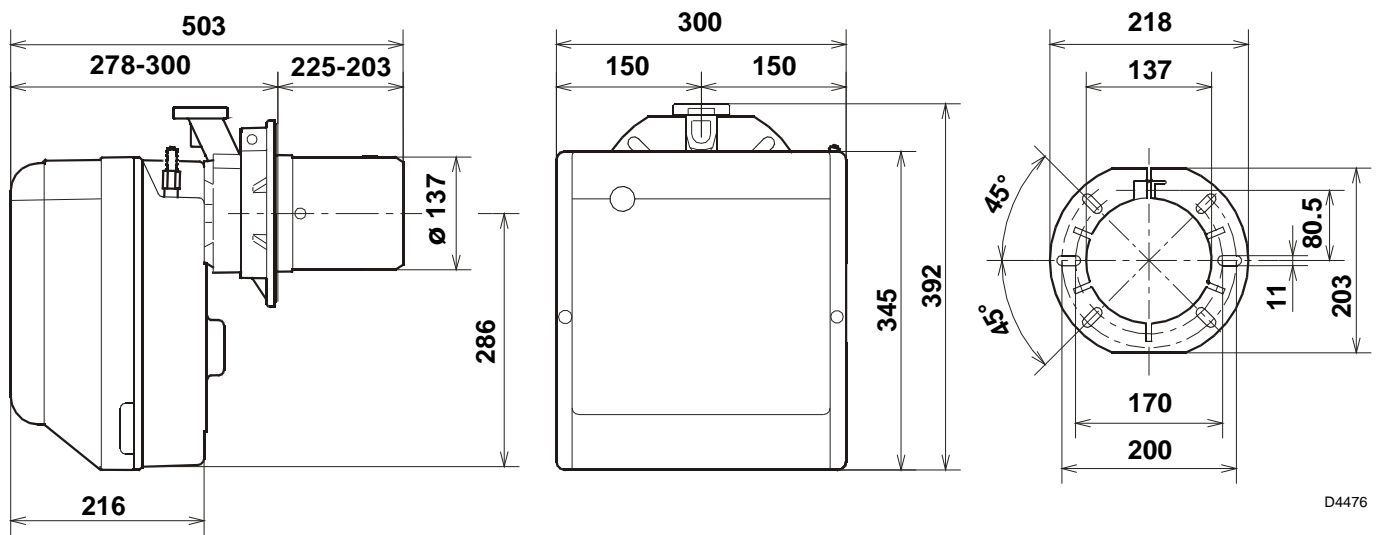
2.1 技术参数

类型	920 T1
热功率 (1)	160 – 330 kW - 137.600 – 283.800 kcal/h
天然气 (民用 2)	净热值：8 – 12 kWh/Nm ³ = 7000 – 10,340 kcal/Nm ³
	压力： 最小 20 mbar - 最大 100 mbar
电气连接	单相电， 230V ± 10% ~ 50Hz
电机	运行电流 1.9A - 2720 rpm - 288 rad/s
电容	8 µF
点火变压器	原边 230V / 0.2A - 次边 8 kV / 12 mA
绝对耗电量	0.43 kW
(1) 参考条件：环境温度 20°C - 大气压 1013 mbar – 海拔为海平面上 0 米。	

如果使用民用液化气 3 (LPG)，需要使用单独的配件。

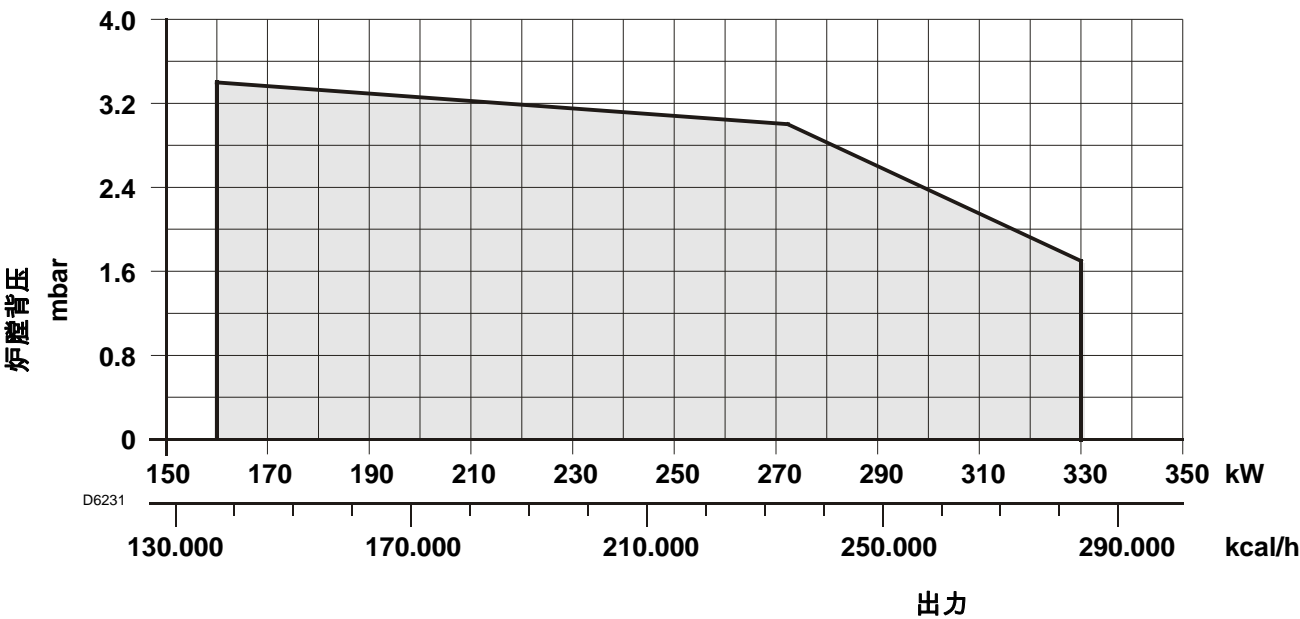
国家			AT - IT - DK - CH	GB - IE	DE	FR	NL	LU	BE
燃气种类			II2H3B/P	II2H3P	II2ELL3B/P	II2Er3P	II2L3B/P	II2E3B/P	I2E(R)B,I3P
燃气压力	G20	H	20	–	–	–	–	–	–
	G25	L	–	25	20	–	25	25	–
	G20	E	–	–	20	20/25	–	–	20/25

2.2 最大尺寸



D4476

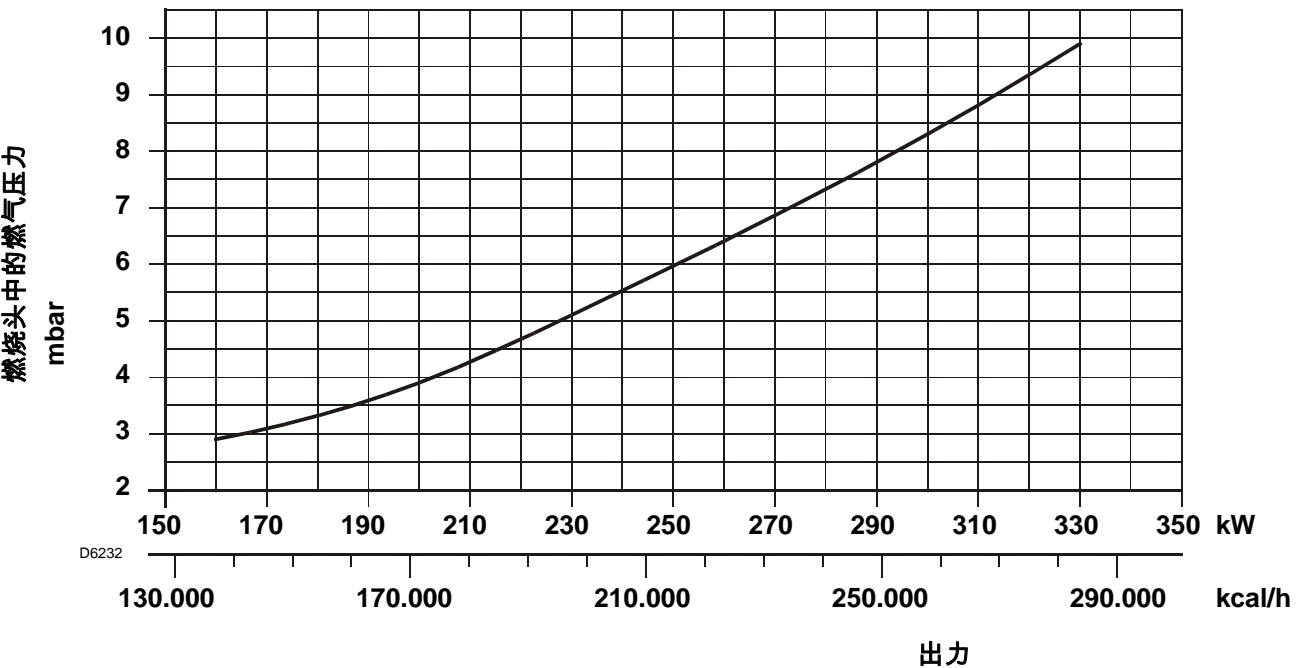
2.3 出力范围 (符合 EN 676)



测试锅炉
出力范围符合 EN 676 标准。

商用锅炉
如果锅炉是符合 EN 303 标准，并且燃烧室的尺寸与 EN 676 标准中的图表所视尺寸相近时，燃烧器与锅炉的匹配是没有问题的；如果锅炉不符合 EN 303 标准，或者燃烧室的尺寸与 EN 676 标准中的尺寸相差较大时，请咨询锅炉生产厂家。

燃气压力与燃烧器出力的关系
当使用净热值为 10 kWh/m³ (8.570 kcal/m³) 的 G20 型天然气时，如果锅炉背压为 0 mbar，则测得燃烧器最大出力时燃烧头的燃气压力为 9.9 mbar (图 6 中的 M2, 见第 5 页的 3.5 章节)。



3.3 燃气阀组，(符合 EN 676)

燃气阀组可单独定货，对于它的调整可参考附带的说明书。

燃气阀组		连接件		使用范围
类型	代码	进口	出口	
MBDLE 410 B01	3970549	Rp 1 1/4	法兰 3	天然气 ≤ 200kW 和 LPG 160 – 330 kW
MBDLE 412 B01	3970550	Rp 1 1/4	法兰 3	天然气 ≤ 300 kW
MBDLE 415 B01	3970558	Rp 1 1/2	法兰 3	天然气 ≥ 300 kW

3.4 燃气阀组的电气连接

燃气阀组的电源线可以从燃烧器的左边或右边进燃烧器，如图 5 所示。

根据进线口，带压力测点的电缆卡子 (1) 可以和普通的电缆卡子 (2) 交换位置。

因此，你必须确保：

- 电缆卡子 (1) 的位置正确；
- 连接管的位置合适，使通往压力开关的通道没有堵塞。

警告

如果有必要，切断右侧的连接管。

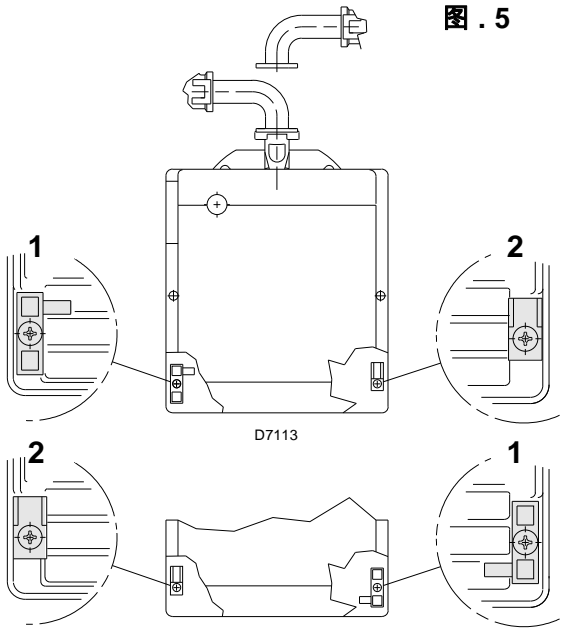
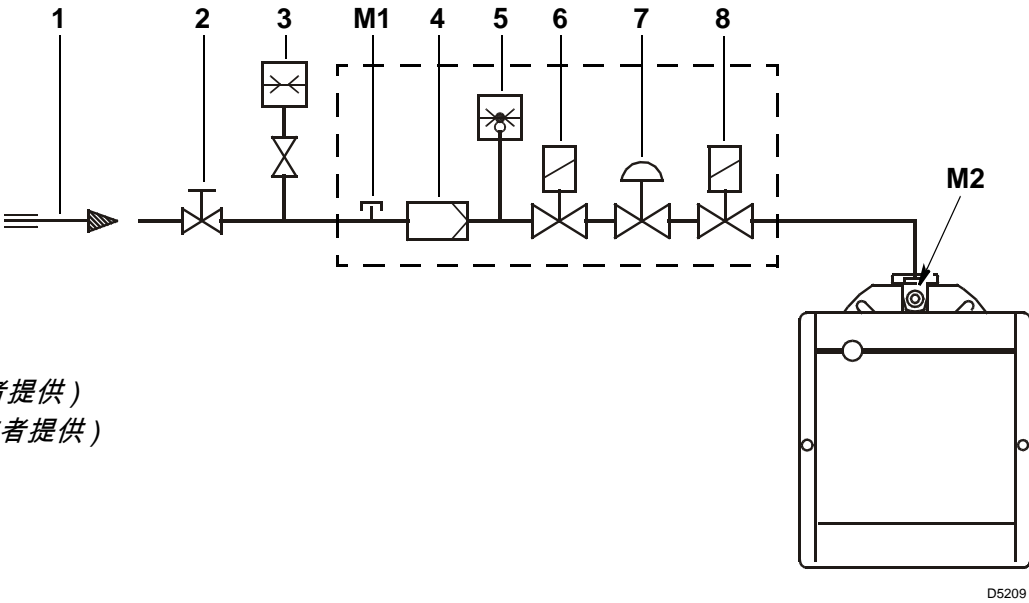


图 . 5

3.5 燃气进气管线

图 . 6



- 1 - 燃气供气管
- 2 - 手动球阀 (由安装者提供)
- 3 - 燃气压力表 (由安装者提供)
- 4 - 过滤器
- 5 - 燃气压力开关
- 6 - 安全阀
- 7 - 稳压阀
- 8 - 调节阀
- M1 - 供气压力检测点
- M2 - 燃烧头的压力测点

3.6 电气连接

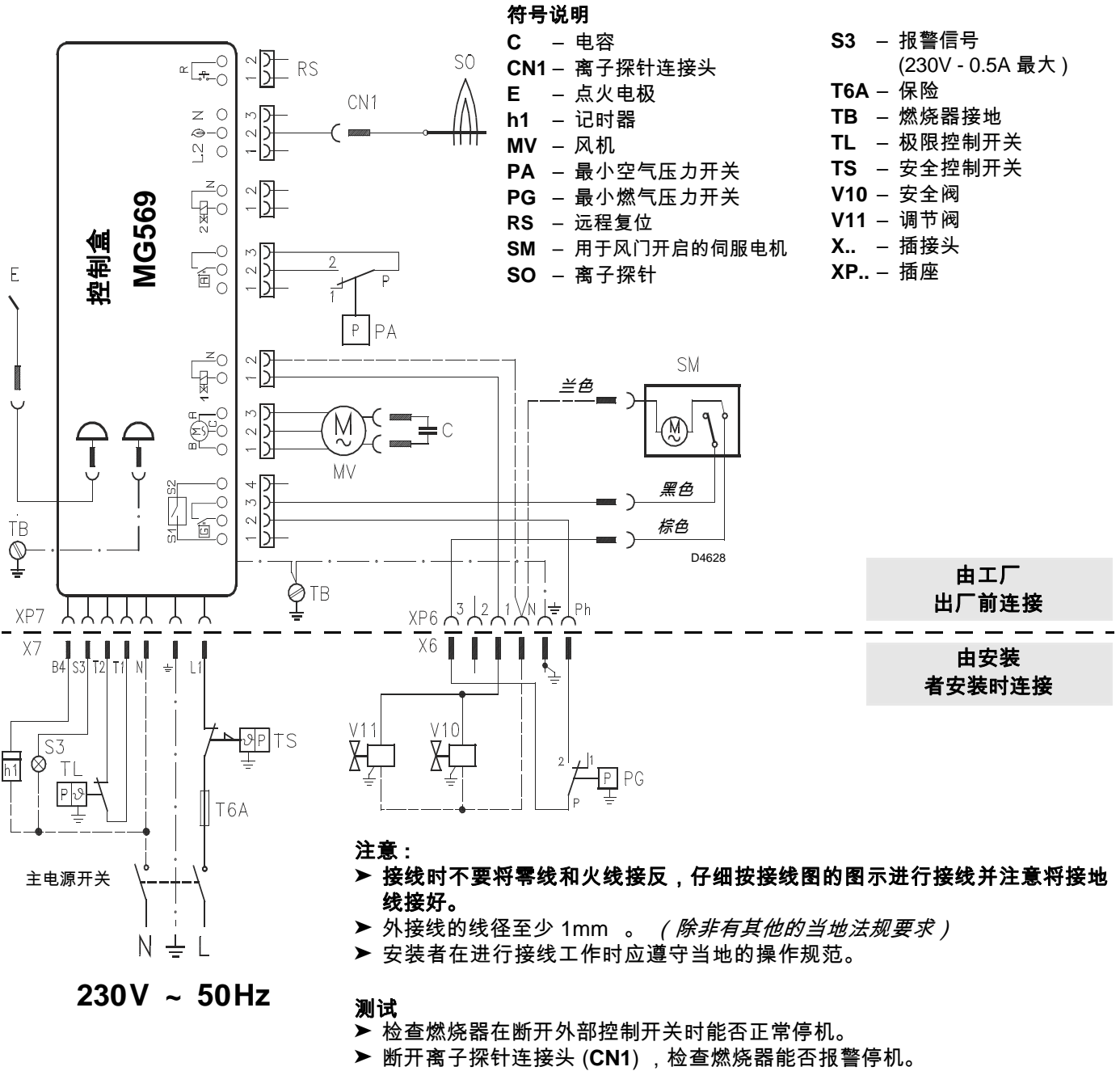
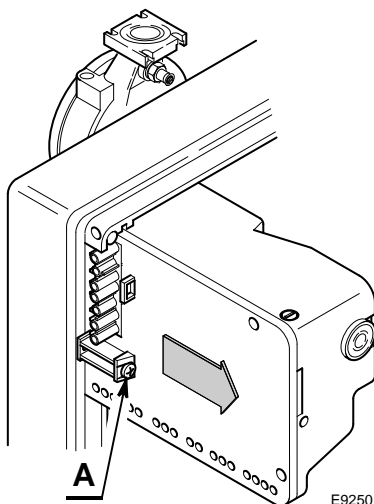


图 . 7



控制盒 (见图 . 7)

要将控制盒从燃烧器上卸下时，按如下步骤进行：

- 拆开所有的电气连接：7 孔插头，高压电缆和接地线 (TB)。
- 卸下螺钉 (A, 图 7) 并按箭头方向将控制盒拔出。

将控制盒装回去的步骤如下：

- 用 1 - 1.2 Nm 的扭矩拧紧螺钉 (A)。
- 将以前拆开的电气连接重新连接好。

注意

该燃烧器的设计及认证是以间歇式运行来进行的。这意味着燃烧器必须 24 小时内停机一次，以便控制盒进行启动自检。锅炉极限控制开关 (TL) 通常就可以确保燃烧器的 24 小时停机一次的要求。但如果锅炉极限控制开关 (TL) 无法确保时，就必须在锅炉极限控制开关上串联一个每 24 小时动作的停机装置。

4. 运行

点火出力

燃烧器点火出力不能超过 120 kW。

I 可按如下步骤测量点火出力：

- 拆开离子探针电缆接头 (CN1) (见第6页电气连接图)；启动燃烧器，则燃烧器在安全时间 (3s) 后进入报警锁定状态。
- 重复点火 10 次。
- 从流量表中读出燃烧器 10 次点火总的耗气量。这个耗气量必须小于或等于下面的数据：
 - 0.10 Nm³ 对于 G20 (高热值天然气 H)
 - 0.10 Nm³ 对于 G25 (低热值天然气 L)
 - 0.03 Nm³ 对于 G31 (液化气 LPG)。

4.1 燃烧调节

(见图 . 8)

根据 92/42/EEC 标准，在锅炉上使用燃烧器时，燃烧器的调节和测试必须根据锅炉的指导说明，其中包括烟气中 CO 和 CO₂ 的含量，烟气温度和锅炉中热水的平均温度。

为适应燃烧器的出力大小，应设定好燃烧头的刻度和风门的大小。

燃烧器出厂前的出力被设置在最小。

4.2 燃烧头设定

根据燃烧器的出力大小顺时针或逆时针旋转螺钉 (6) 直到调节棒 (2) 上的设定刻度点与燃烧头组件 (1) 的外表面齐平。

在图 8 中燃烧头的设定刻度值对应的燃烧器出力为 230 kW。

根据图表所示，调节棒上的设定刻度值 4 与燃烧头组件的外表面齐平。

举例：

用在 210 kW 锅炉上的燃烧器

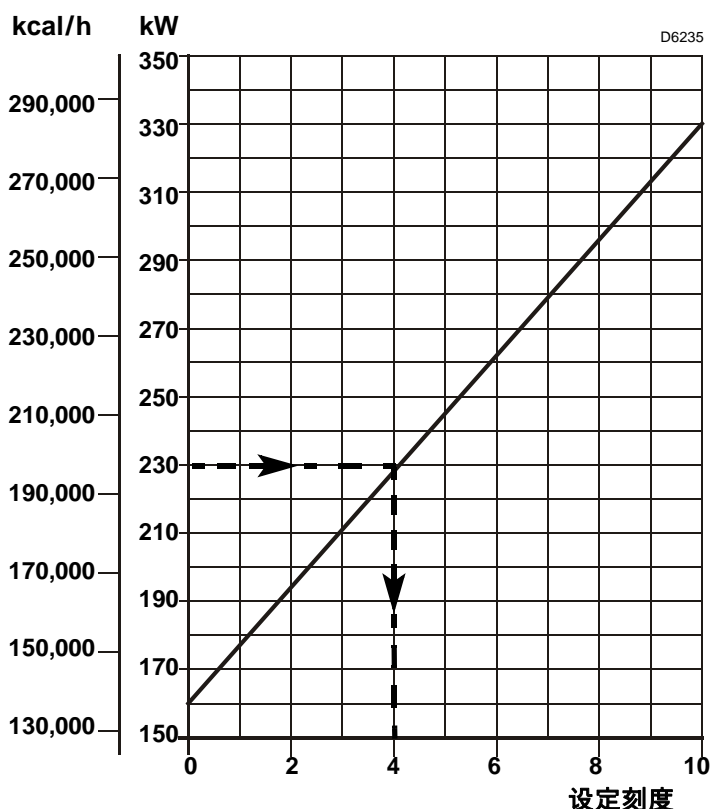
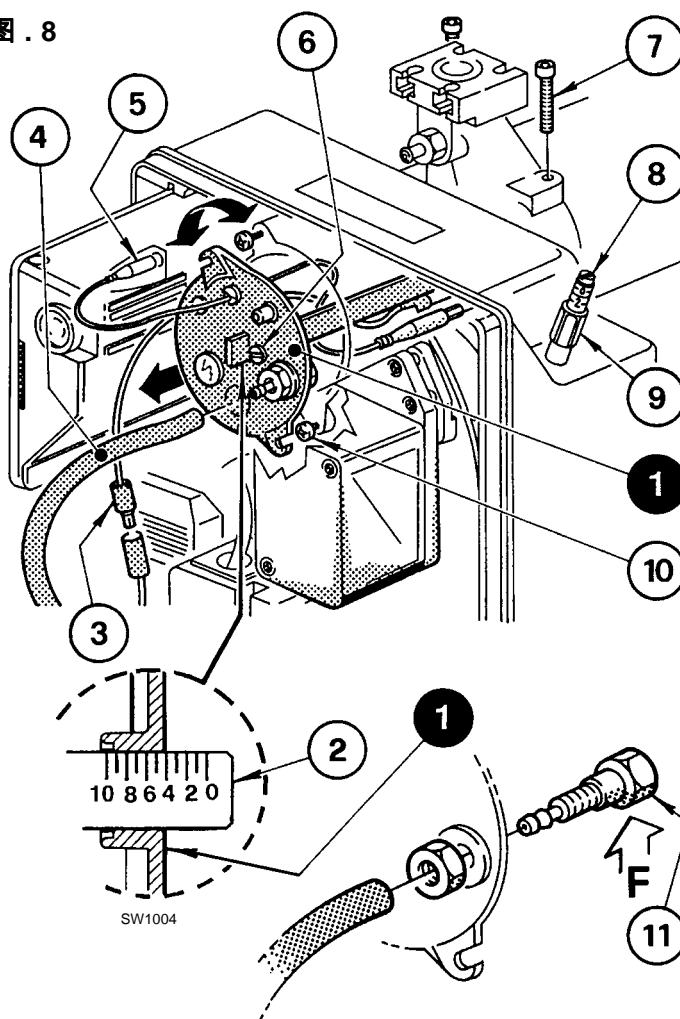
考虑到 90% 的效率，则燃烧器的出力应为 230 kW。

根据图表，燃烧头的设定刻度应调节在 4 上。

注意

由于图表数据只是一个大概值，为了确保燃烧器能更好的运行，我们建议还要根据锅炉的实际情况调节燃烧头。

图 . 8



拆卸燃烧头组件 (见图 8, 第 8 页)

按下列步骤拆下燃烧头组件：

在拧下螺钉 (7), 断开 (3 和 5) 的电气接头, 将小皮管 (4) 拔出并拧松螺钉 (10) 后就可以将燃烧头组件 (1) 拿出来。
在拆卸时注意不要改变肘托处的设定。

装配燃烧头组件 (见图 8, 第 8 页)

警告

- ▶ 在装配组件时, 先要完全拧住螺钉 (7) (不要锁紧); 接着用 3 - 4 Nm 的扭距将它锁紧。
- ▶ 确保燃烧器运行时, 在螺钉处没有燃气泄漏。
- ▶ 如果测压点 (11) 偶然松开了, 应将它紧固好并确保位于组件 (1) 外侧的小孔 (F) 方向向下。

4.3 风门设定 (见图 8, 第 8 页)

警告

在进行初次点火时风门设定刻度不能小于刻度 1。

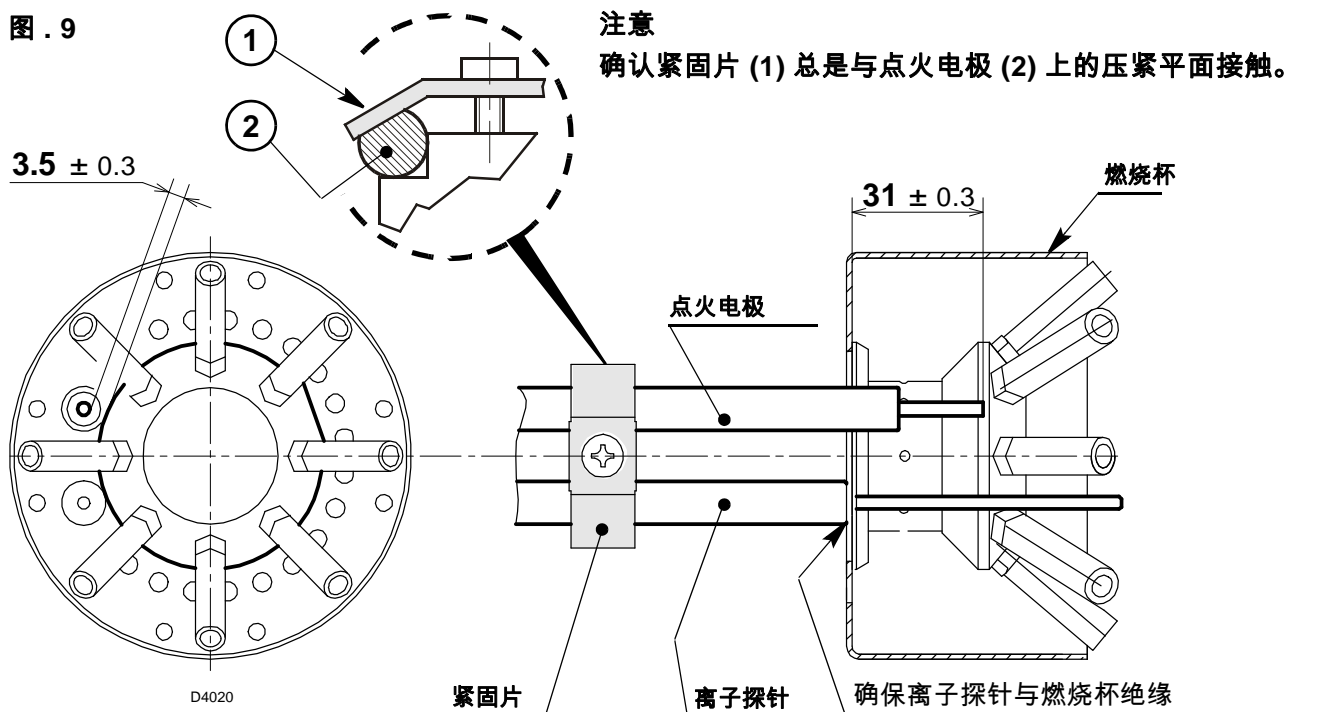
出厂时的风门刻度是对应于最小出力的。

可按如下步骤改变风门刻度：

- ▶ 松开螺母 (9) 和螺钉 (8)。
- ▶ 在正常情况下, 当燃烧器停机时风门会自动完全关闭；只有当烟道负压达到 0.5 mbar 以上时, 风门有可能不能自动关闭。

4.4 离子探针 - 点火电极的位置 (见图 9)

图 9



4.5 燃烧检查

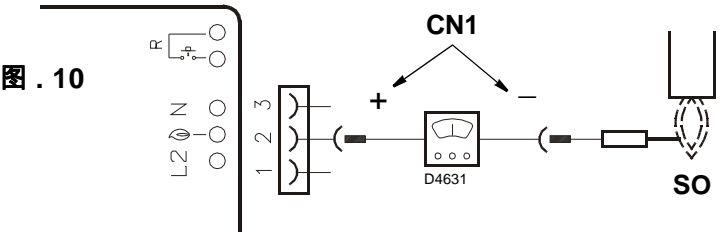
建议根据所用燃气的种类和下表的指示调节燃烧器：

EN 676		过剩空气量：最大出力时 $\lambda \leq 1.2$ – 最小出力时 $\lambda \leq 1.3$			
燃气	最大理论值 CO ₂ 0 % O ₂	设定 CO ₂ %		CO mg/kWh	NO _x mg/kWh
		$\lambda = 1.2$	$\lambda = 1.3$		
G 20	11.7	9.7	9.0	≤ 100	≤ 170
G 25	11.5	9.5	8.8	≤ 100	≤ 170
G 30	14.0	11.6	10.7	≤ 100	≤ 230
G 31	13.7	11.4	10.5	≤ 100	≤ 230

离子电流

控制盒正常工作时的最小离子火焰检测电流是 5 μ A。

通常燃烧器正常运行时的离子电流都要比这个值高很多，因此不必检查。然而如果想测量离子电流时，必须将连接头 (CN1) (见第 6 页的电气接线图) 断开并串接一个微安表。



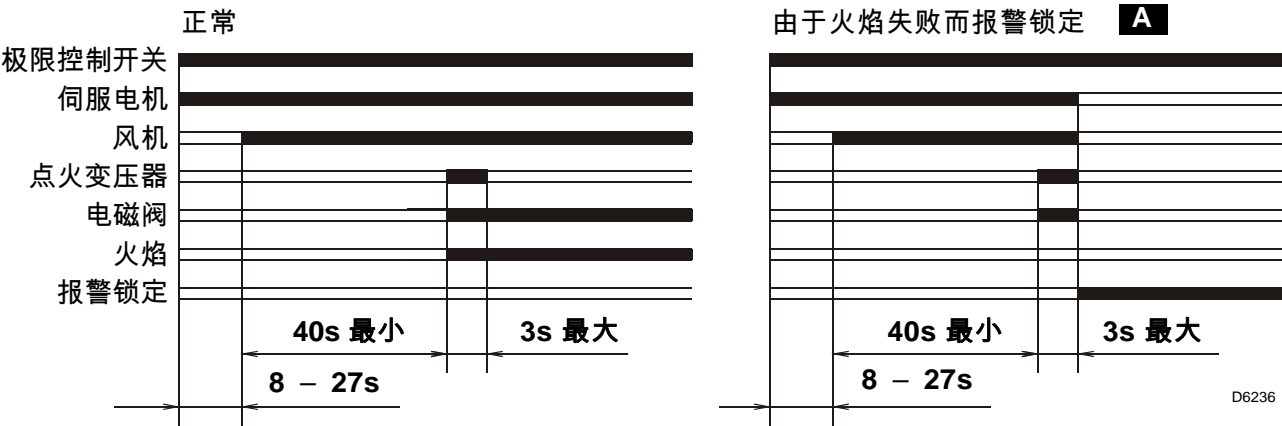
4.6 空气压力开关

在进行完其他燃烧器调节后，可以将空气压力开关的刻度设定在零位，然后进行空气压力开关的运行调节。在燃烧器正常运行时，顺时针缓慢旋转空气压力开关上的刻度旋钮直到燃烧器报警锁定。此时将空气压力开关的刻度值逆时针降低 20%，然后重新启动燃烧器检查燃烧器能否正常启动。如果燃烧器仍报警锁定，可再将空气压力开关刻度值逆时针降低一点即可。

燃烧器出厂时空气压力开关的刻度值在零位。

注意：
按照规范要求，空气压力开关必须防止实际空气压力低于设定值的 80%，同样也是防止烟气中的 CO 含量不超过 1% (10,000 ppm)。
为了检查这一点，可在烟囱处插入烟气分析仪，缓慢关闭进风口 (例如可以用纸板遮挡) 并检查当烟气中的 CO 含量超过 1% 之前，燃烧器能否报警锁定。

4.7 燃烧器启动周期



A 报警锁定指示灯在控制盒上 (第 1 页，图 1 中的 4)。

4.8 重复启动功能

当燃烧器在正常运行中一旦火焰突然消失，燃烧器可以自动重新启动但重新启动的次数最多只有 3 次。

4.9 后吹扫功能

后吹扫功能是指当燃烧器停机后风机能维持吹扫。当极限控制开关 (TL) 断开时，燃气阀切断，燃烧器会停机。要使用这个功能就必须在保证极限控制开关 (TL) 没有再次闭合时按控制盒的复位按钮 (燃烧器处于停机状态)。后吹扫时间最大可设为 6 分钟。具体步骤如下：

- ▶ 按住控制盒复位按钮 5 秒钟直到 LED 指示灯变成红色。
- ▶ 通过重复按复位按钮来设定时间：按一次 = 设定后吹扫时间为 1 分钟。
- ▶ 5 秒钟后燃烧器会自动通过红色 LED 灯闪烁的次数来显示所设定的后吹扫时间：
1 个闪烁脉冲 = 后吹扫时间为 1 分钟。

要复位该功能，可按住复位按钮至少 5 秒钟，直到 LED 指示灯变为红色并松开复位按钮。至少等待 20 秒，期间不能有任何操作。

如果在后吹扫期间有新的加热指令，那么后吹扫时间将终止，在极限控制开关 (TL) 闭合时燃烧器会重新启动。燃烧器在出厂时的后吹扫设置为：0 分钟 = 无后吹扫功能。

4.10 控制盒复位

按如下步骤复位控制盒：

- ▶ 按住复位按钮至少 1 秒钟。
如果燃烧器不启动必须检查极限控制开关 (TL) 是否闭合。

5. 维修

在维修或检查系统前，要确保已切断电源供应并且燃气切断阀也已关闭。

燃烧器需要定期维护，维护人员需要具备当地资格认证。

定期维护对燃烧器的正常运行是必不可少的；它可以防止燃料的浪费并且可以减少对环境的污染。

基本操作步骤如下：

- ▶ 如图 11 所示，检查燃气分配头上的间隔孔是否有堵塞的，如果有用合适的工具将它清理干净。
- ▶ 检查各种进风进气以及燃烧废气管是否有闭塞或堵塞。
- ▶ 检查燃烧器和燃气阀组的电气连接是否正确。
- ▶ 检查空气压力开关测点的安装位置是否正确 (第 1 页图 1 中的 6)。
- ▶ 检查燃气阀组的调节是否适合燃烧器的出力要求，同时检查一下所用燃气的种类和供气压力。
- ▶ 检查燃烧头的调节是否正确，并检查是否正确地安装在锅炉上。
- ▶ 检查风门的位置是否正确。
- ▶ 检查离子探针和点火电极的位置是否正确。(见第 9 页图 9)。
- ▶ 检查空气压力开关和最小燃气压力开关的设定是否正确。

让燃烧器在最大出力状态下工作 10 分钟，按说明书正确设置所有部件。

用烟气分析仪分析燃烧产物：

- CO₂ 百分含量 (%)；
- CO 含量 (ppm)；
- NO_x 含量 (ppm)；
- 离子电流 (μA)；
- 烟气温度。

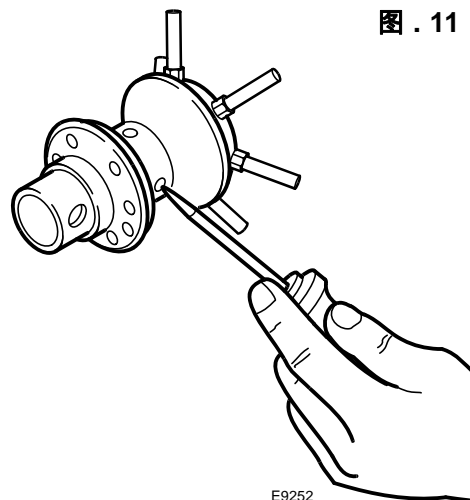
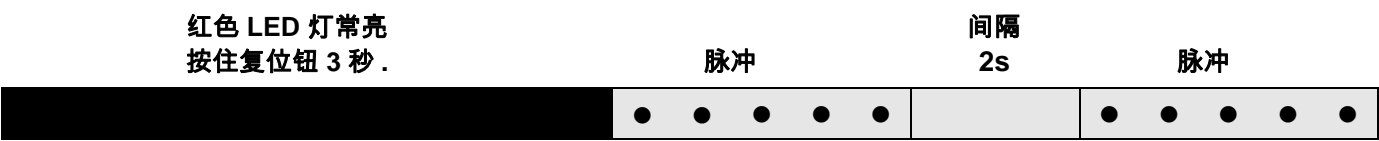


图 . 11

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5.1 可视故障代码

控制盒有故障诊断功能，可以识别出各种故障及其原因。(指示灯：红色 LED 灯)。
为了能够使用这一功能，应在故障报警时按住复位按钮 3 秒。
控制盒发出的脉冲序列之间间隔 2 秒。



控制盒对可能的故障类型定义了不同的脉冲序列，序列说明如下表所示：

信号	故障原因
2 下脉冲闪烁 ● ●	在安全时间结束时火焰没有稳定： - 离子探针有问题； - 燃气电磁阀有故障； - 零线火线接反； - 点火变压器失败； - 燃烧器没有调节好 (燃气量不足)。
3 下脉冲闪烁 ● ● ●	最小空气压力开关不能闭合或在极限控制开关闭合前就已经闭合了： - 空气压力开关有故障； - 空气压力开关调节不正确。 .
4 下脉冲闪烁 ● ● ● ●	在燃烧器启动或停止前燃烧室中有光线存在： - 在极限控制开关动作前后存在不明光线； - 在预吹扫阶段存在不明光线； - 在后吹扫阶段存在不明光线。
6 下脉冲闪烁 ● ● ● ● ● ●	没有吹扫空气： - 在预吹扫阶段时没有空气； - 在安全时间后没有空气。
7 下脉冲闪烁 ● ● ● ● ● ● ●	在正常运行中火焰消失： - 燃烧器调节不正确 (燃气不足)； - 燃气电磁阀有故障； - 离子探针与地直接短路。

注意

在故障诊断显示后，按锁定复位按钮可复位控制盒。

6. 故障 / 解决方法

下面有当燃烧器启动失败或运行不正常时的故障原因和解决方法说明。

当一个故障发生时，控制盒复位按钮上的指示灯会亮（见第 1 页图 1 的 4）。

当故障报警时，只有按复位按钮燃烧器才能重新启动。如果此时燃烧器能正常运行了，那么刚才的报警可能是偶然的报警。但是如果继续报警，就一定要查找原因并加以解决。

6.1 启动问题

故障	原因	解决方法
极限控制开关已闭合但燃烧器仍不启动	没有电源	检测 7 孔插头的 L1-N 端子之间的电压
		检查控制盒上的保险
		确认安全控制回路没有报警
	燃气没有供应	检查燃气管道上的手阀是否打开
		检查燃气阀是否已处在打开状态
	最小燃气压力开关的触点不能闭合	调节
	控制盒上的电气连接头接线错误	检查并重新连接这些插头
	空气压力开关已处在工作位置	更换
燃烧器在预吹扫阶段和点火阶段都正常，但 3 秒钟后报警锁定	风门伺服电机锁住	检查电气连接是否正确
		伺服电机不能完全关闭，导致接触器无法触发启动；同时检查启动接触器
	零火线接反	调换零火线
	接地不充分	重新进行有效接地
	离子探针已接地 或没有与火焰接触上，或者离子探针与控制盒的连线断了，并且也有可能是连线与地之间的绝缘已损坏	检查探针的位置是否正确，如果有必要要根据说明书进行设置
		重新进行电气连接
燃烧器点火延时	点火电极位置错误	根据说明书调节
	空气量太大	根据说明书调节
	燃气阀打开太小，燃气量不足	调节
在吹扫阶段后由于火焰失败燃烧器报警	电磁阀过气量太小	检查燃气管道压力，并且根据说明书调节电磁阀
	电磁阀已损坏	更换
	点火不正常或不点火。	检查电气连接是否正确
		根据说明书检查点火电极的位置是否正确
	燃气管道排空不完全	对燃气管道进行彻底排空
燃烧器在预吹扫阶段报警	空气压力开关没有转换到运行状态	空气压力开关损坏，更换它
		实际空气压力太低（燃烧头调节不合适）
	有火焰存在	燃气阀损坏，更换
	空气压力测点的位置错误（第 8 页图 8 的 11）	根据说明书上第 8 页的 4.2 章节中的说明调节

故障	原因	解决方法
燃烧器重复启动但不报警	主燃气压力非常接近最小燃气压力开关的设定值。当燃气阀打开运行时，燃气压力会有一个突然的下降，这样会导致最小燃气压力开关动作，从而使燃烧器停止工作，燃气阀也断电关闭。然而由于燃气阀的关闭，燃气管道内的燃气压力又恢复上升，导致燃烧器又重复启动。	将最小燃气压力开关设低点

6.2 运行不正常

故障	原因	解决方法
燃烧器在运行中报警锁定	离子探针接地	检查离子探针的位置，如果有必要可参考说明书进行调节
		清理或更换离子探针
	在重复启动功能中当第 4 次启动时仍没有火焰出现	检查燃气管道中的燃气压力，根据说明书调节电磁阀
	空气压力开关断开	实际空气压力太低(燃烧头的调节不合适). 空气压力开关损坏，更换
燃烧器停机关闭	最小燃气压力开关断开	检查燃气管道中的燃气压力，根据说明书调节电磁阀

7. 安全注意事项

锅炉炉膛的尺寸必须与指定的数值相近，以便在燃烧过程中产生最低的污染排放。

技术服务人员会给你提供关于正确匹配燃烧器与锅炉的所有信息。

这种燃烧器只能用在设计运用的方面。

制造商不承担由于错误地安装调节和维护或不正确地使用所造成的对人员，动物和财产的损失。

7.1 燃烧器标签

在燃烧器上的指导说明标签显示了产品的系列号，型号和主要技术性能数据。如果标签被篡改，移走或丢失时，产品就不能被清晰的标定，这样会使安装者和维护工程师的工作中存在潜在的危險。

7.2 基本安全规范

- 儿童或非专业人员不能使用该设备。
- 绝对不要在有关锅炉房进风口，出风口或通风口的地方用布，纸或其他东西遮蔽覆盖。
- 没有专业资格的人员不能维修该设备。
- 对电气导线进行拽拉或捻搓是有危险线。
- 如果没有切断电源连接就不能进行清理维护工作。
- 不能用可燃物质清理燃烧器或相关部件（如汽油，酒精等）。外壳表面可用肥皂水清洗。
- 不要在燃烧器上放置任何东西。
- 不要减小或堵塞锅炉房通风口的尺寸。
- 不要在锅炉房内存放其他压力容器或可燃物质。



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