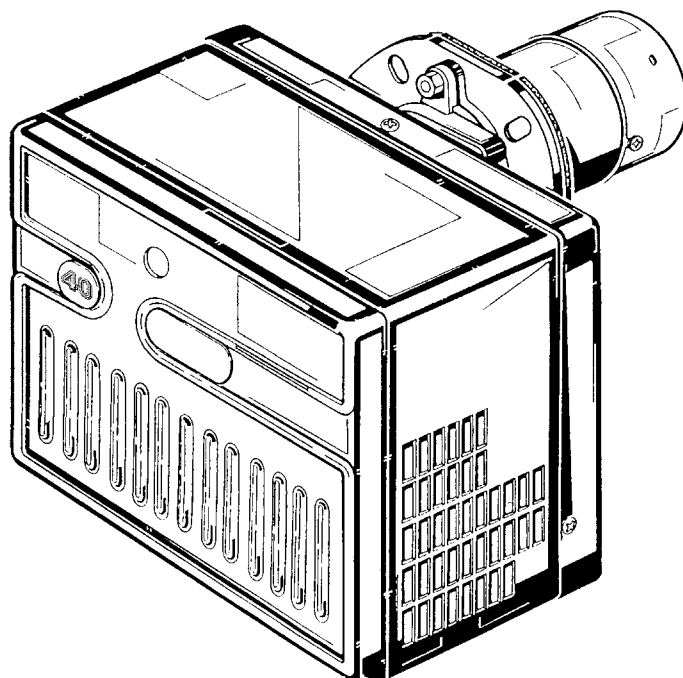


GB **Forced draught gas burner**
CN **强制通风燃气燃烧器**

Two stage operation
二段火运行



RIELLO 40

CODE - 编码

MODEL - 型号

TYPE - 类型

20014782

GS10D

576 T1

INFORMATION ABOUT THE INSTRUCTION MANUAL

INTRODUCTION

The instruction manual supplied with the burner:

- is an integral and essential part of the product and must not be separated from it; it must therefore be kept carefully for any necessary consultation and must accompany the burner even if it is transferred to another owner or user, or to another system. If the manual is lost or damaged, another copy must be requested from the Technical Assistance Service **RIELLO** of the area;
- is designed for use by qualified personnel;
- offers important indications and instructions relating to the installation safety, start-up, use and maintenance of the burner.

DELIVERY OF THE SYSTEM AND THE INSTRUCTION MANUAL

When the system is delivered, it is important that:

- The instruction manual is supplied to the user by the system manufacturer, with the recommendation to keep it in the room where the heat generator is to be installed.
- The instruction manual shows:
 - the serial number of the burner;

| |
|-------|
| |
|-------|

- the address and telephone number of the nearest Assistance Centre;

| |
|-------|
| |
| |
| |

- The system supplier carefully informs the user about:
 - the use of the system,
 - any further tests that may be necessary before the system is started up,
 - maintenance and the need to have the system checked at least once a year by the manufacturer or another specialised technician.

To ensure a periodic check, **RIELLO** recommends the drawing up of a Maintenance Contract.

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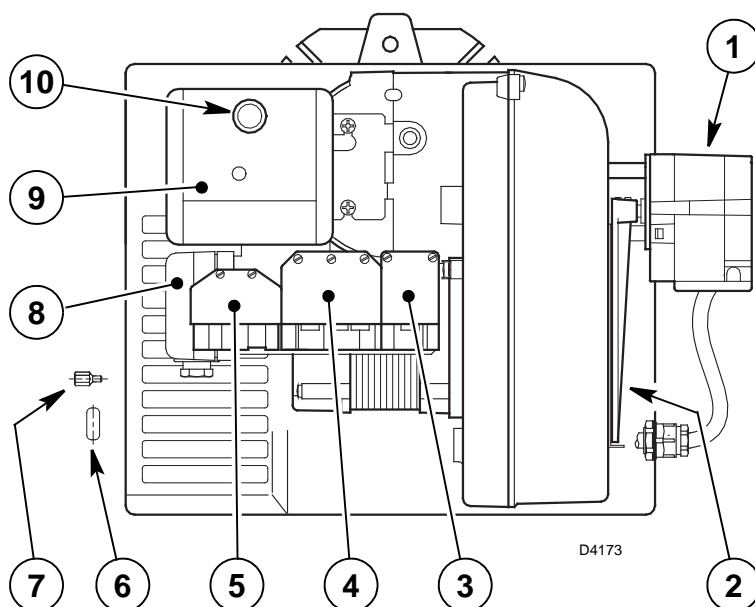
1. BURNER DESCRIPTION

Gas burner with two stage working.

- CE marking according to directives: EMC 89/336/EEC - 2004/108/EC, Low Voltage 73/23/EEC - 2006/95/EC, Machines 98/37/EEC and Efficiency 92/42/EEC.
- The burner is approved for intermittent operation as per Directive EN 676.
- The burner meets protection level of IP X0D (IP 40), EN 60529.
- Gas train according to EN 676.

Fig. 1

- 1 – Air damper actuator
- 2 – Air dampers
- 3 – 4 pole socket for 2nd stage
- 4 – 7 pole socket for electrical supply and control
- 5 – 6 pole socket for gas train
- 6 – Cable grommet
- 7 – Screw for fixing the cover
- 8 – Air pressure switch
- 9 – Control box
- 10 – Reset button with lock-out lamp



NOTE

The cable grommet (6) and the screw for fixing the cover (7) supplied with the burner, must be fitted to the same side of the gas train.

1.1 BURNER EQUIPMENT

| | |
|-------------------------|-------|
| Insulating gasket | No. 1 |
| Cable grommet | No. 1 |
| Hinge | No. 1 |
| 4 pin plug | No. 1 |

| | |
|---|-------|
| Screws and nuts for flange to be fixed to boiler. . . | No. 4 |
| Screw for fixing the cover | No. 1 |
| 7 pin plug | No. 1 |

2. TECHNICAL DATA

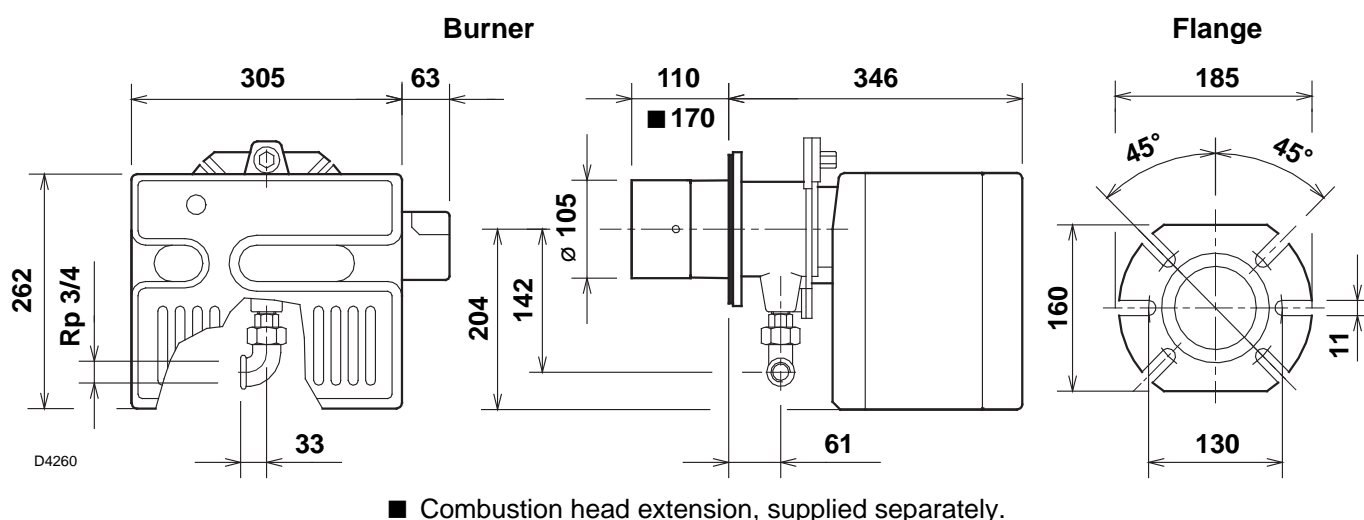
2.1 TECHNICAL DATA

| | |
|--|--|
| Thermal power (1) | 29/41 – 106 kW - 25,000/35,000 – 91,000 kcal/h |
| Natural gas (Family 2) | Net heat value: 8 – 12 kWh/Nm ³ - 7,000 – 10,340 kcal/Nm ³ |
| | Pressure: min. 16 mbar - max. 100 mbar |
| Electrical supply | Single phase, 230V ± 10% ~ 50Hz |
| Motor | 230V / 0.7 A |
| Capacitor | 2 µF |
| Ignition transformer | Primary 230V / 1.8A - Secondary 8 kV - 30 mA |
| Absorbed electrical power | 0.13 kW |
| (1) Reference conditions: Temp. 20°C - Barometric pressure 1013 mbar – Altitude 0 m above sea level. | |

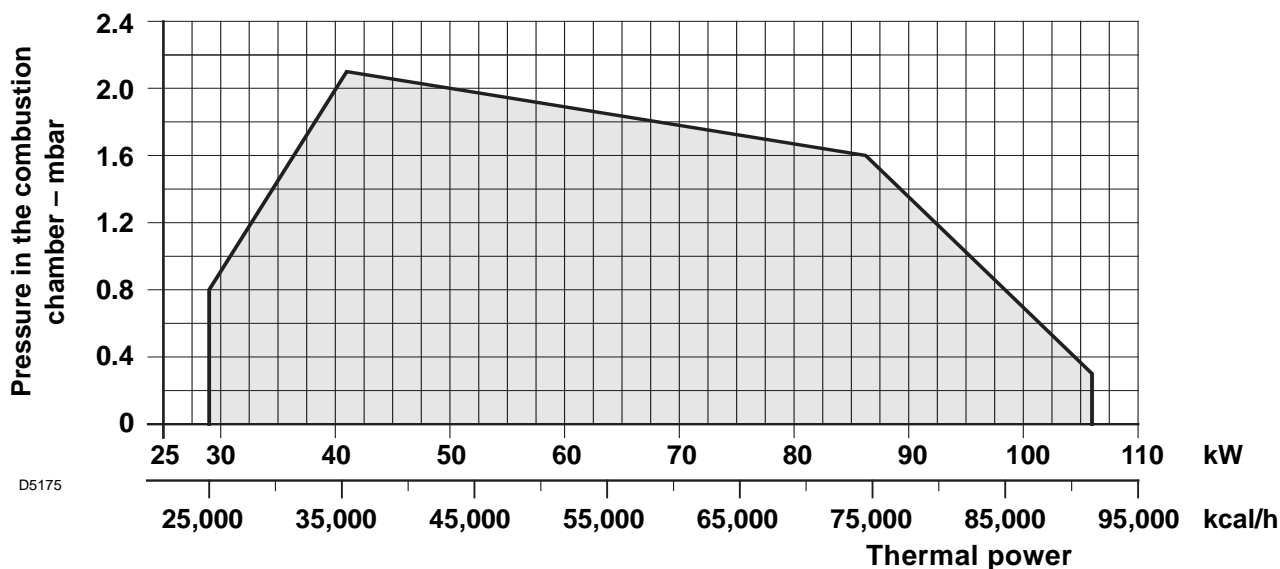
For gas family 3 (LPG) ask for separate kit.

| | | | | |
|--------------|------------|----------|--------------|----------|
| COUNTRY | DE | AT | ES - GB - IE | LU |
| GAS CATEGORY | II2ELL3B/P | II2H3B/P | II2H3P | II2E3B/P |

2.2 OVERALL DIMENSIONS



2.3 WORKING FIELD (as EN 676)



TEST BOILER

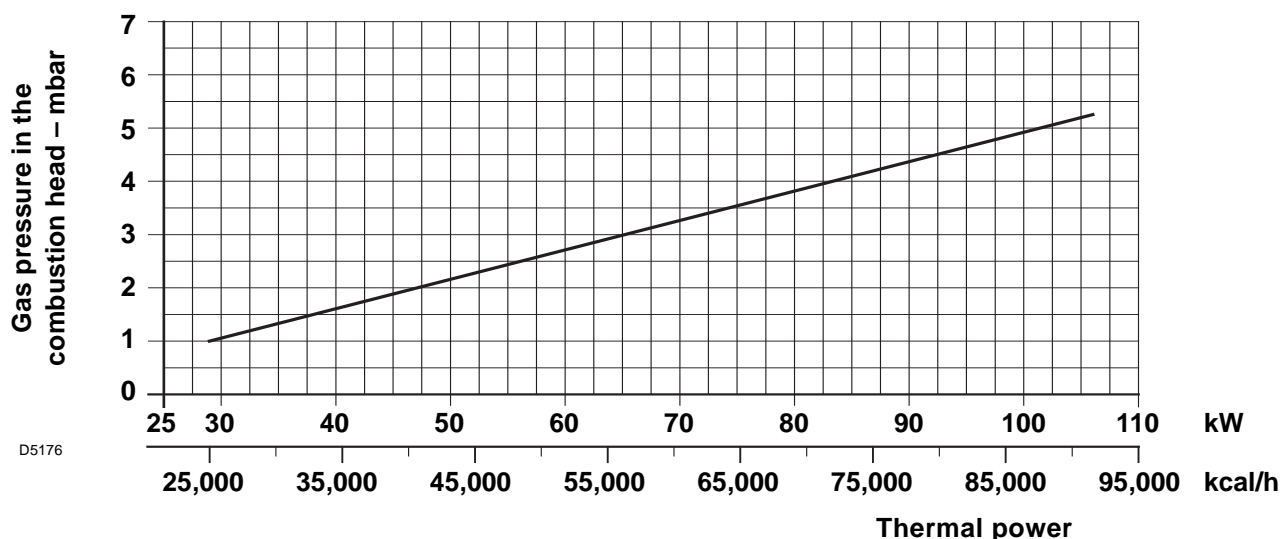
The working field has been defined according to EN 676 standard.

COMMERCIAL BOILERS

The burner-boiler matching is assured if the boiler conforms to EN 303 and the combustion chamber dimensions are similar to those shown in the diagram EN 676. For applications where the boiler does not conform to EN 303, or where the combustion chamber is much smaller than the dimensions given in EN 676, please consult the manufacturers.

CORRELATION BETWEEN GAS PRESSURE AND BURNER OUTPUT

To obtain the maximum output, a gas head pressure of 5.25 mbar is measured (**M2**, see chapter 3.3, page 4) with the combustion chamber at 0 mbar using gas G20 with a net heat value of 10 kWh/Nm³ (8,570 kcal/Nm³).



3. INSTALLATION

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

3.1 BOILER FIXING

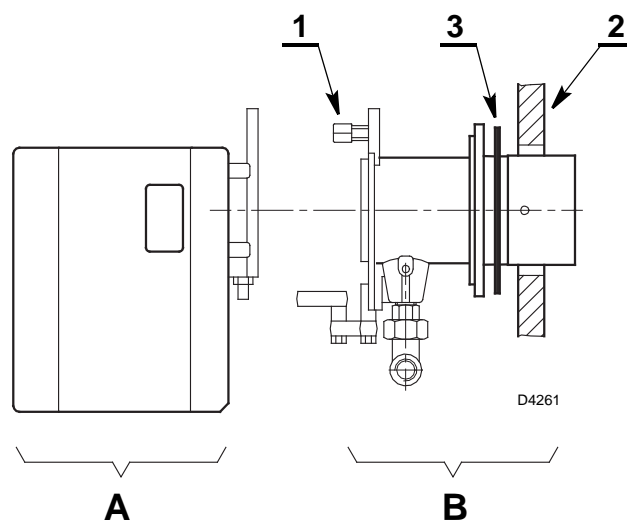
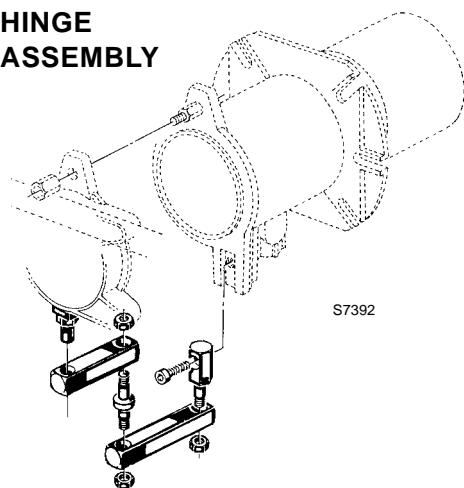
IMPORTANT

Boiler door must have a max. thickness of **90 mm**, refractory lining included.

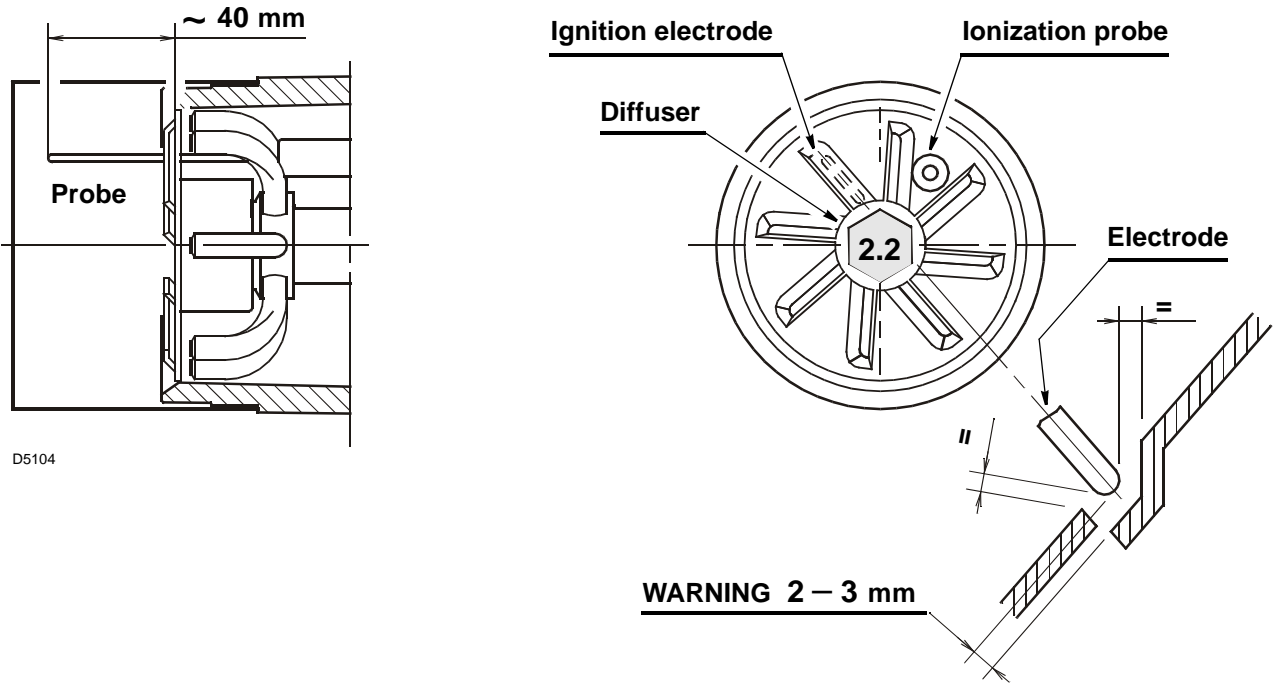
If thickness is greater (**max. 150 mm**), a combustion head extension must be fitted, which is supplied separately.

- Separate the combustion-head assembly from the burner body by removing nut (1) and removing group (**A**).
- Fix the head assembly group (**B**) to the boiler (2) insert the supplied insulating gasket (3).

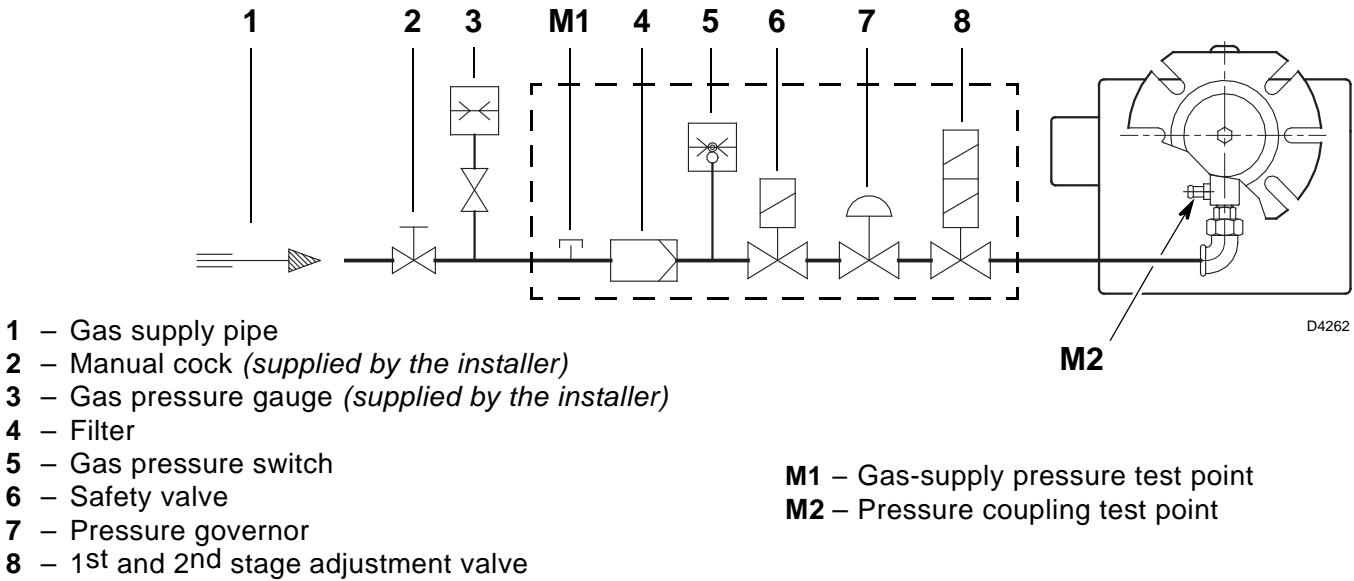
HINGE ASSEMBLY



3.2 PROBE - ELECTRODE POSITIONING



3.3 GAS FEEDING LINE



GAS TRAIN ACCORDING TO EN 676

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

| GAS TRAIN | | CONNECTIONS | | USE |
|-----------------|---------|-------------|--------|-----------------------------|
| TYPE | CODE | INLET | OUTLET | |
| MBZRDLE 405 B01 | 3970084 | Rp 1/2 | Rp 3/4 | Natural gas ≤ 80 kW and LPG |
| MBZRDLE 407 B01 | 3970537 | Rp 3/4 | Rp 3/4 | Natural gas and LPG |

3.4 ELECTRICAL WIRING

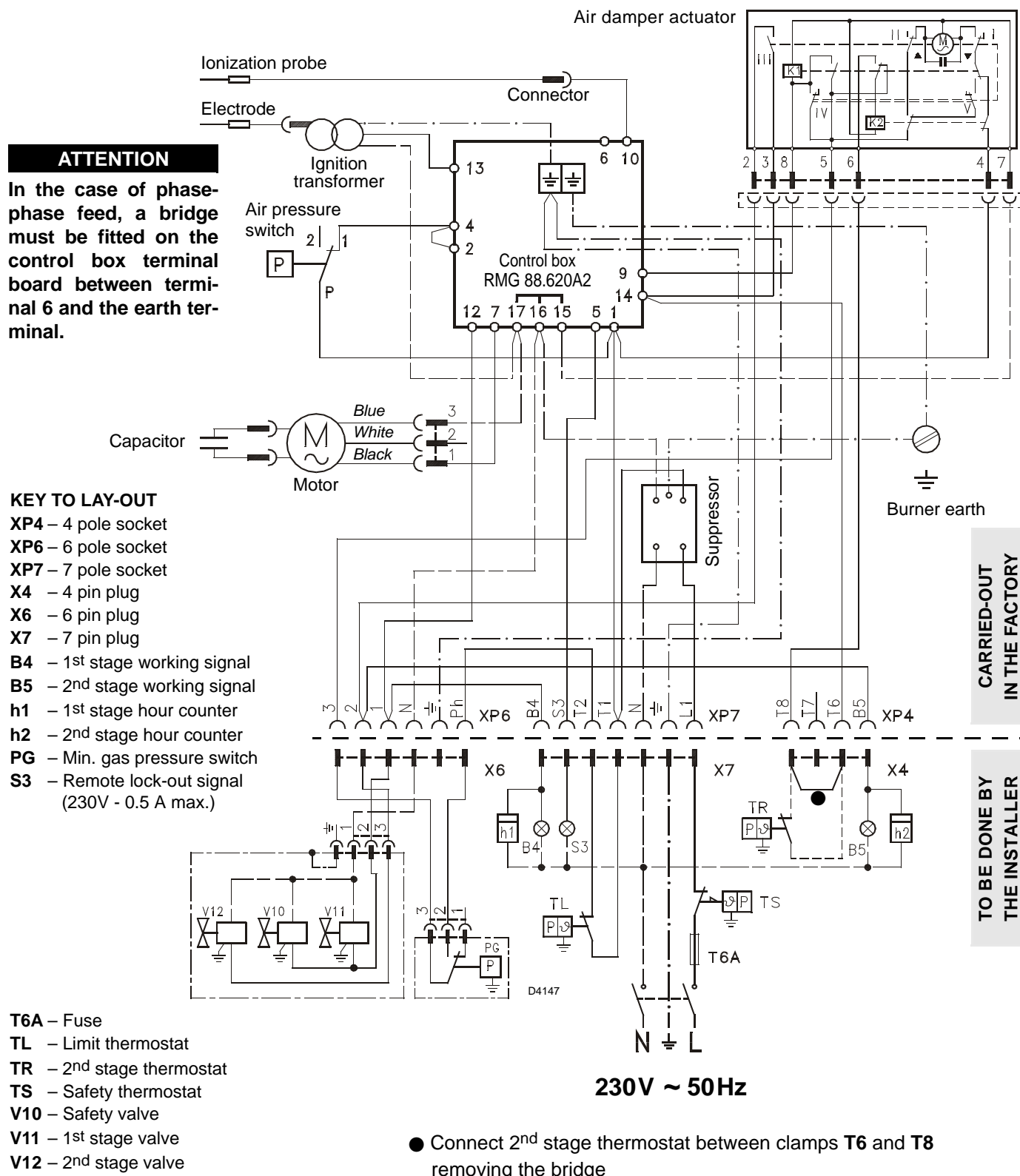
ATTENTION:

- 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.
- Verify that the burner stops by operating the boiler control thermostats and that the burner locks out by separating the red ionisation probe lead connector.

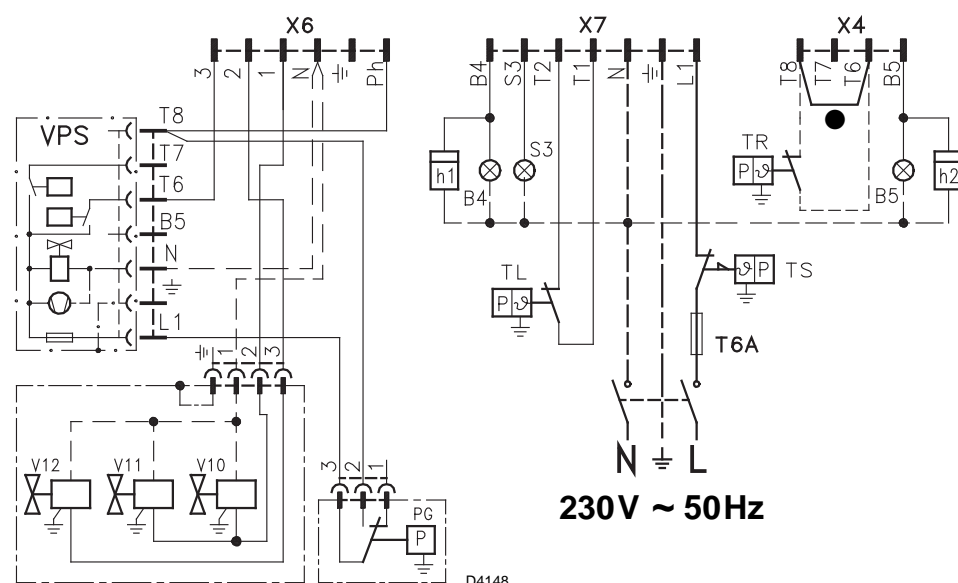
NOTES

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).

3.4.1 STANDARD ELECTRICAL WIRING



3.4.2 ELECTRICAL WIRING WITH GAS LEAK CONTROL DEVICE (DUNGS VPS 504)



**TO BE DONE BY
THE INSTALLER**

KEY TO LAY-OUT

- X4** – 4 pin plug
- X6** – 6 pin plug
- X7** – 7 pin plug
- B4** – 1st stage working signal
- B5** – 2nd stage working signal
- h1** – 1st stage hour counter
- h2** – 2nd stage hour counter
- PG** – Min. gas pressure switch (230V - 0.5 A max.)
- S3** – Remote lock-out signal
- T6A** – Fuse
- TL** – Limit thermostat
- TR** – 2nd stage thermostat
- TS** – Safety thermostat
- V10** – Safety valve
- V11** – 1st stage valve
- V12** – 2nd stage valve

- Connect 2nd stage thermostat between clamps **T6** and **T8** removing the bridge.

4. WORKING

4.1 COMBUSTION ADJUSTMENT

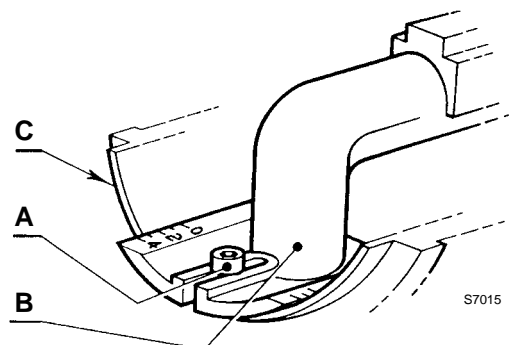
In conformity with Efficiency Directive 92/42/EEC the application of the burner on the boiler, adjustment and testing must be carried out observing the instruction manual of the boiler, including verification of the CO and CO₂ concentration in the flue gases, their temperatures and the average temperature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

4.2 COMBUSTION HEAD SETTING

Loose the screw (A), move the elbow (B) so that the rear plate of the coupling (C) coincides with the set point.

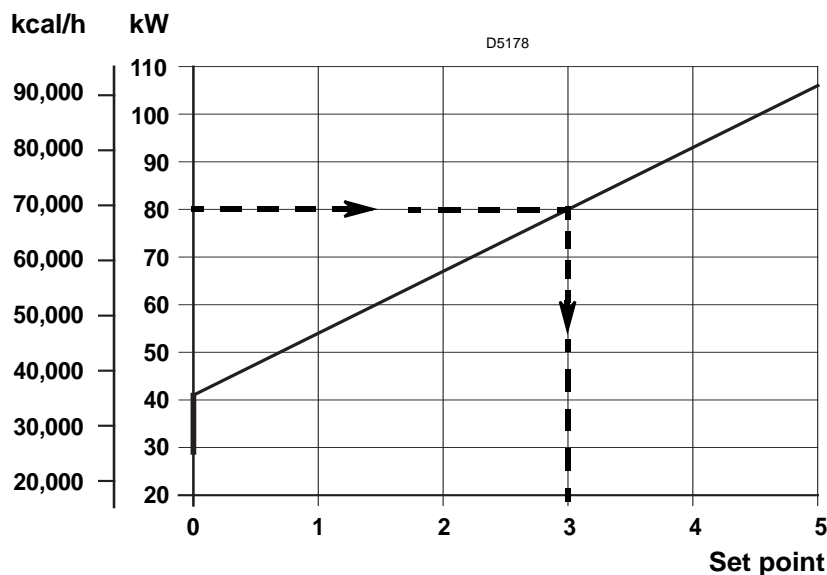
Tighten the screw (A).



Example:

The burner is installed on a 72 kW boiler with an efficiency of 90%, the burner input is about 80 kW using the diagram, the combustion set point is **3**.

The diagram is to be used only for initial settings, to improve air pressure switch operation or improve combustion, it may be necessary to reduce this setting (*set point toward position 0*).



4.3 SETTING OF THE AIR DAMPER ACTUATOR

PAUSE

I CAM

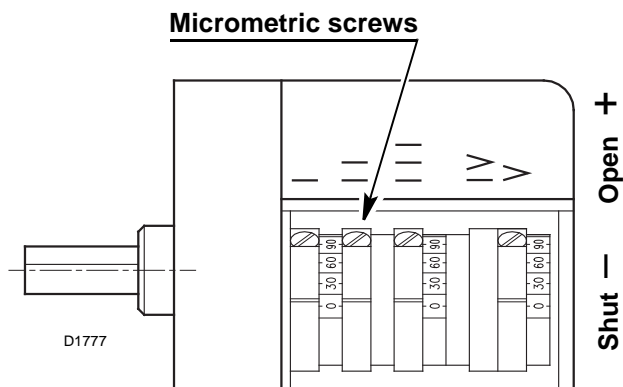
The **I** cam is factory set to allow the air damper to fully close on shutdown. (Reference value 0°).

Do not modify this setting for any reason.

FIRST STAGE

V CAM

The **V** cam controls the air for the 1st stage flame (2, fig. 2). The cam must be adjusted on decrease (damper closing) by adjusting the micrometer screw. The definitive position is obtained after 2nd stage adjustment.



SECOND STAGE

II CAM

The **II** cam controls the air for the 2nd stage flame. (Reference value 60°, not to exceed 70°).

Do not modify this setting for any reason.

The regulation of airflow at 2nd stage is carried out by operating the air damper (1, fig. 2).

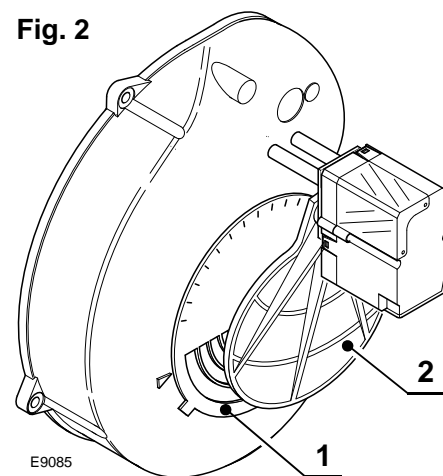
The **III** cam controls the opening of the gas valve at 2nd stage and must precede the **II** cam by at least 15°.

Warning:

For power adjustment at 1st and 2nd stage, apply the following indications:

- the power ratio between 1st and 2nd stage must be 1 : 2 at a maximum, if the above ratio is exceeded, valve seal control must be used;
- in any case, the minimum burner power at 1st stage must not be less than the firing rate range.

Fig. 2



4.4 COMBUSTION CHECK

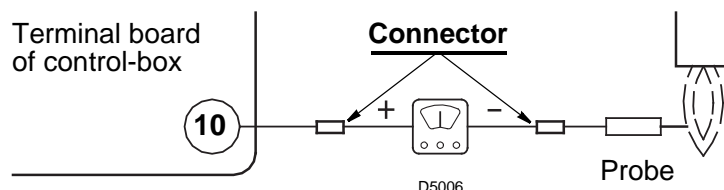
It is advisable to set the burner according to the type of gas used and following the indications of the table:

| 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 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 |

IONIZATION CURRENT

The minimum current necessary for the control box operation is 3 μ A.

The burner normally supplies a higher current value, so that no check is needed. However, if you want to measure the ionization current, you must open the connector fitted to the red wire and insert a microammeter.



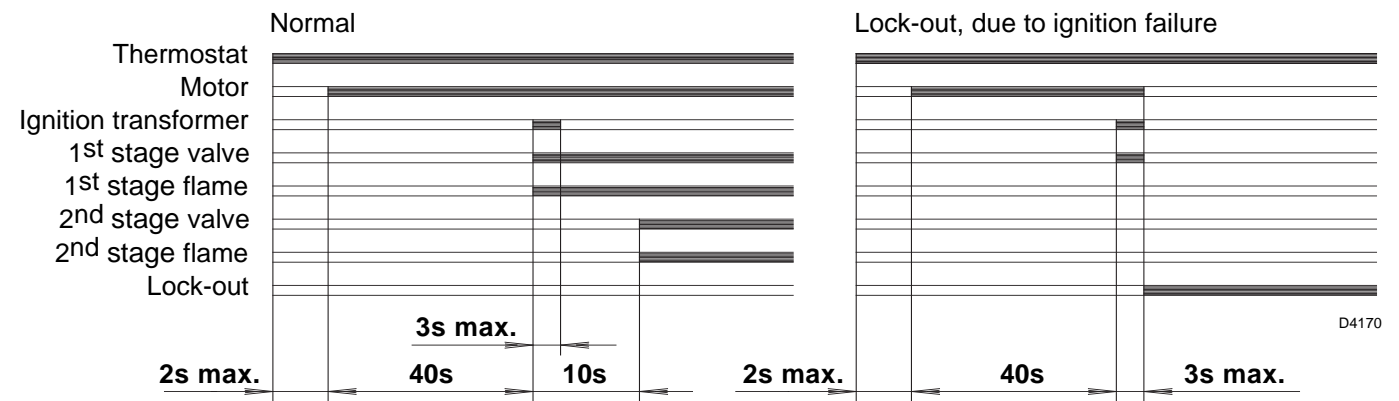
4.5 AIR PRESSURE SWITCH

The air pressure switch is set after all other adjustments have been made. Begin with the switch at the lowest setting. With the burner working at the minimum output, adjust the dial clockwise, increasing its value until the burner shuts down. Now reduce the value by one set point, turning the dial anti-clockwise. Check for reliable burner operation, if the burner shuts down, reduce the value by a half set point.

Attention:

To comply with the EN 676 standard, the air pressure switch must operate when the CO value exceeds 1% (10,000 ppm). To check this, insert a combustion analyser in the flue, slowly reduce the burner air setting and verify that the burner shuts down by the action of the air pressure switch before the CO value exceeds 1%.

4.6 BURNER START-UP CYCLE



When flame-failure occurs during working, shut down takes place within one second.

4.7 START-UP CYCLE DIAGNOSTICS

During start-up, indication is according to the followin table:

| COLOUR CODE TABLE | |
|-------------------------------------|---|
| Sequences | Colour code |
| Pre-purging | ● ● ● ● ● ● ● ● ● ● ● ● |
| Ignition phase | ● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ● |
| Operation, flame ok | □ □ □ □ □ □ □ □ □ □ □ □ |
| Operating with weak flame signal. | □ ○ □ ○ □ ○ □ ○ □ ○ □ ○ |
| Electrical supply lower than ~ 170V | ● ▲ ● ▲ ● ▲ ● ▲ ● ▲ ● ▲ ● |
| Lock-out | ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ |
| Extraneous light | ▲ □ ▲ □ ▲ □ ▲ □ ▲ □ ▲ □ ▲ |
| Index: | ○ Off ● Yellow □ Green ▲ Red |

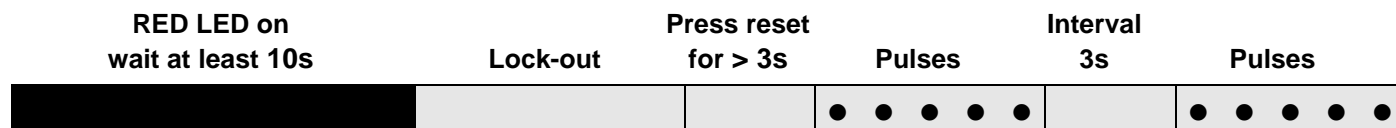
4.8 RESETTING THE CONTROL BOX AND USING DIAGNOSTICS

The control box features a diagnostics function through which any causes of malfunctioning are easily identified (indicator: **RED LED**).

To use this function, you must wait at least 10 seconds once it has entered the safety condition (**lock-out**), and then press the reset button.

The control box generates a sequence of pulses (1 second apart), which is repeated at constant 3-second intervals.

Once you have seen how many times the light pulses and identified the possible cause, the system must be reset by holding the button down for between 1 and 3 seconds.



The methods that can be used to reset the control box and use diagnostics are given below.

RESETTING THE CONTROL BOX

To reset the control box, proceed as follows:

- Hold the button down for between 1 and 3 seconds.
The burner restarts after a 2-second pause once the button is released.
If the burner does not restart, you must make sure the limit thermostat is closed.

VISUAL DIAGNOSTICS

Indicates the type of burner malfunction causing lock-out.

To view diagnostics, proceed as follows:

- Hold the button down for more than 3 seconds once the red LED (burner lock-out) remains steadily lit.
A yellow light pulses to tell you the operation is done.
Release the button once the light pulses. The number of times it pulses tells you the cause of the malfunction, indicated in the table below.

SOFTWARE DIAGNOSTICS

Reports the life of the burner by means of an optical link with the PC, indicating hours of operation, number and type of lock-outs, serial number of control box etc ...

To view diagnostics, proceed as follows:

- Hold the button down for more than 3 seconds once the red LED (burner lock-out) remains steadily lit.
A yellow light pulses to tell you the operation is done.
Release the button for 1 second and then press again for over 3 seconds until the yellow light pulses again.
Once the button is released, the red LED will flash intermittently with a higher frequency: only now can the optical link be activated.

Once the operations are done, the control box's initial state must be restored using the resetting procedure described above.

| BUTTON PRESSED FOR | CONTROL BOX STATUS |
|---|--|
| Between 1 and 3 seconds | Control box reset without viewing visual diagnostics. |
| More than 3 seconds | Visual diagnostics of lock-out condition: (LED pulses at 1-second intervals). |
| More than 3 seconds starting from the visual diagnostics condition | Software diagnostics by means of optical interface and PC (hours of operation, malfunctions etc. can be viewed) |

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: – faulty ionisation probe; – faulty or soiled gas valves; – neutral/phase exchange; – faulty ignition transformer – poor burner regulation (insufficient gas). |
| 3 pulses ● ● ● | Minimum air pressure switch does not close: – make sure VPS trips to produce lockout; – air pressure switch faulty; – air pressure switch incorrectly regulated; – fan motor does not run; – maximum air pressure switch operating. |
| 4 pulses ● ● ● ● | Min. air pressure switch does not open or light in the chamber before firing: – air pressure switch faulty; – air pressure switch incorrectly regulated. |
| 7 pulses ● ● ● ● ● ● ● | Loss of flame during operations: – poor burner regulation (insufficient gas); – faulty or soiled gas valves; – short circuit between ionisation probe and earth. |
| 10 pulses ● ● ● ● ● ● ● ● ● ● ● ● | – Wiring error or internal fault. |

5. MAINTENANCE

The burner requires periodic maintenance carried out by a qualified and authorised technician **in conformity with legislation and local standards**.

Maintenance is essential for the reliability of the burner, avoiding the excessive consumption of fuel and consequent pollution.

Before carrying out any cleaning or control always first switch off the electrical supply to the burner acting on the main switch of the system.

THE BASIC CHECKS ARE:

Leave the burner working without interruption for 10 min., checking the right 1st and 2nd stage settings of all the components stated in this manual.

● CO₂ (%) content ● Smoke temperature at the chimney ● CO content (ppm).

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 (10, fig. 1, page 1).

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.

BURNER STARTING DIFFICULTIES

| Signal | Problem | Possible cause | Recommended remedy |
|-------------------------|---|---|--|
| 2 blinks ● ● | Once the pre-purging phase and safety time have passed, the burner goes into lock-out without the appearance of the flame | 1 - The operation solenoid lets little gas . . . through 2 - One of the two solenoid valves does not open. 3 - Gas pressure too low. 4 - Ignition electrode incorrectly adjusted . . . 5 - Electrode grounded due to broken insulation 6 - High voltage cable defective 7 - High voltage cable deformed by high . . . temperature 8 - Ignition transformer defective 9 - Incorrect valve or transformer electrical . wiring 10 - Defective control box. 11 - A closed valve upline the gas train 12 - Air in pipework. 13 - Gas valves unconnected or with interrupted coil | Increase Replace Increase pressure at governor Adjust, see page 4 Replace Replace Replace and protect Replace Check Replace Open Bleed air Check connections or replace coil |
| 3 blinks ● ● ● | The burner does not switch on, and the lock-out appears | 14 - Air pressure switch in operating position . | Adjust or replace |
| | The burner switches on, but then stops in lockout | - Air pressure switch inoperative due to insufficient air pressure: 15 - Air pressure switch incorrectly adjusted. . 16 - Pressure switch pressure test point pipe. blocked 17 - Poorly adjusted head. 18 - High pressure in the furnace | Adjust or replace Clean Adjust Connect air pressure switch to fan suction line |
| | Lockout during pre-purging phase | 19 - Defective motor control contactor (only three-phase version) 20 - Defective electrical motor 21 - Motor lockout (defective electrical motor) | Replace Replace Replace |
| 4 pulses ● ● ● ● | The burner switches on, but then stops in lockout | 22 - Flame simulation | Replace the control box |
| | Lockout when burner stops | 23 - Permanent flame in the combustion head or flame simulation | Eliminate persistence of flame or replace control box |
| 6 blinks ● ● ● ● ● ● | The burner switches on, but then stops in lockout | 24 - Defective or incorrectly adjusted servomotor | Adjust or replace |

| Signal | Problem | Possible cause | Recommended remedy |
|-------------------------------------|---|--|--|
| 7 blinks ● ● ● ● ● ● ● | The burner goes into lockout immediately following the appearance of the flame | 25 - The operation solenoid lets little gas through 26 - Ionisation probe incorrectly adjusted 27 - Insufficient ionisation (less than 5 A) 28 - Earth probe 29 - Burner poorly grounded 30 - Phase and neutral connections inverted . . 31 - Defective flame detection circuit | Increase Adjust, see page 4 Check probe position Withdraw or replace cable Check grounding Invert them Replace the control box |
| | Burner lockout moving between 1st and 2nd stages, or between 2nd and 1st stages | 32 - Too much air or too little gas | Adjust air and gas |
| | Burner goes into lock-out during operation | 33 - Probe or ionisation cable grounded | Replace worn parts |
| 10 blinks ● ● ● ● ● ● ● ● ● ● | The burner does not switch on, and the lock-out appears | 34 - Incorrect electrical wiring | Check |
| | The burner goes into lockout | 35 - Defective control box 36 - Presence of electromagnetic disturbances in the thermostat lines | Replace Filter or eliminate |
| No blink | The burner does not start | 37 - No electrical power supply | Close all switches - Check connections |
| | | 38 - A limiter or safety control device is open . . | Adjust or replace |
| | | 39 - Line fuse blocked | Replace |
| | | 40 - Defective control box | Replace |
| | | 41 - No gas supply | Open the manual valves between contactor and train |
| | | 42 - Mains gas pressure insufficient | Contact your GAS COMPANY |
| | | 43 - Minimum gas pressure switch fails to close | Adjust or replace |
| | | 44 - Servomotor fails to move to min. ignition . position | Replace |
| | The burner continues to repeat the start-up cycle, without lockout | 45 - The gas pressure in the gas mains lies very close to the value to which the minimum gas pressure switch has been set. The sudden drop in pressure after valve opening causes temporary opening of the pressure switch itself, the valve immediately closes and the burner comes to a halt. Pressure increases again, the pressure switch closes again and the ignition cycle is repeated. And so on | Reduce the minimum gas pressure switch intervention pressure. Replace the gas filter cartridge. |
| | Ignition with pulsations | 46 - Poorly adjusted head | Adjust. See page 6 |
| | | 47 - Ignition electrode incorrectly adjusted . . . | Adjust, see page 4 |
| | | 48 - Incorrectly adjusted fan air damper: too . . much air | Adjust |
| | | 49 - Output during ignition phase is too high . . | Reduce |
| | The burner does not move into the 2nd stage | 50 - Remote control device TR fails to close . . | Adjust or replace |
| | | 51 - Defective control box | Replace |
| | Burner stops with air damper open | 52 - Defective servomotor | Replace |
| | | 53 - Defective servomotor | Replace |

N.B.: If problems still occur after all of the above checks have been made, check the electrical connections on the plug and sockets, the damper and burner motor, gas control wiring ignition transformer and external interlocks, if the burner still fails to function, replace the control box.

NORMAL OPERATION / FLAME DETECTION TIME

The control box has a further function to guarantee the correct burner operation (signal: **GREEN LED** permanently on).

To use this function, wait at least ten seconds from the burner ignition and then press the control box button for a minimum of 3 seconds.

After releasing the button, the GREEN LED starts flashing as shown in the figure below.



The pulses of the LED constitute a signal spaced by approximately 3 seconds.

The number of pulses will measure the probe DETECTION TIME since the opening of gas valves, according to the following table:

| SIGNAL | FLAME DETECTION TIME |
|-------------------------|----------------------|
| 1 blink ● | 0.4s |
| 2 blinks ● ● | 0.8s |
| 6 blinks ● ● ● ● ● ● | 2.8s |

This is updated in every burner start-up.

Once read, the burner repeats the start-up cycle by briefly pressing the control box button.

WARNING

If the result is > 2s, ignition will be retarded.

Check the adjustment of the hydraulic brake of the gas valve, the air damper and the combustion head adjustment.

KIT INTERFACE ADAPTER RMG TO PC Code 3002719

说明书的相关信息

引言

说明书随燃烧器一起提供：

- 说明书是产品不可或缺的组成部分，不得将其与产品分离；因此必须小心保存以便查阅，如果将燃烧器转给另一个用户或转移至另一个系统，则说明书必须跟随燃烧器一起转移。如果说明书损坏或丢失，则必须从您就近的 **RIELLO** Technical Assistance Centre（技术支持中心）索取说明书的复印件；
- 说明书只能由有资格的人员使用；
- 说明书提供了有关燃烧器安装、启动、使用和维护的重要指示和安全警告。

系统和说明书的交付

一旦交付系统：

- 系统制造商也必须将说明书交付给用户，并建议其将说明书保存在热发生器的安装区域附近。
- 说明书上显示：
 - 燃烧器的序列号：

.....

- 最近 Assistance Centre（支持中心）的地址和电话号码：

.....

.....

.....

- 系统制造商必须告知用户有关以下内容的准确信息：
 - 系统的使用；
 - 启动系统前需要进行的测试；
 - 必需的维护和检查（每年必须由制造商代表或别的专业技术人员至少检查系统一次）。
要保证定期检查，**RIELLO** 建议遵照 Maintenance Contract（维护合同）的规定。

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1. 燃烧器说明

如有必要，可使用二段火操作模式或一段火运行。

符合下列指令：EMC89/EEC - 2004/108/EC，低电压 73/23/EEC - 2006/95/EC 及效率 92/42/EEC。

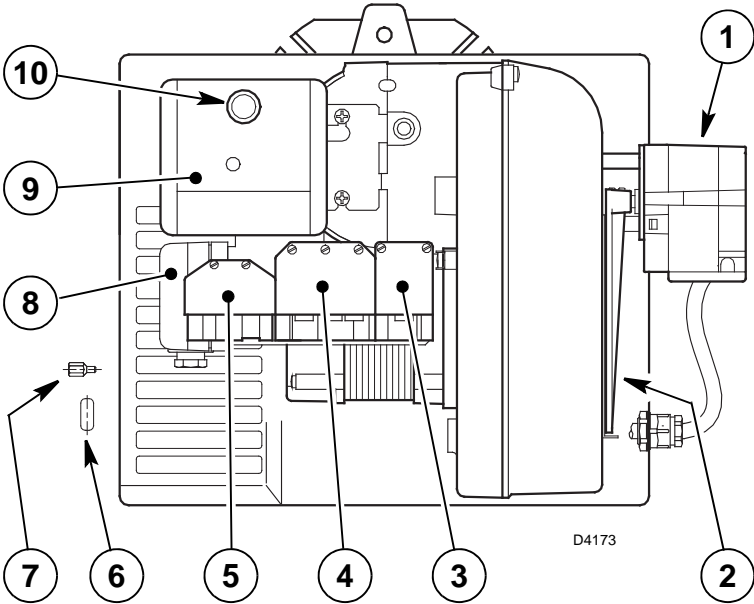
根据 EN676 标准，燃烧器用于间歇运行。

燃烧器满足 EN60529 标准的 IP X0D（IP40）的保护等级。

燃气阀组符合 EN676 标准。

图 . 1

- 1 – 伺服马达
- 2 – 风门挡板
- 3 – 二段火 4 孔插座
- 4 – 供电和控制用 7 孔插座
- 5 – 燃气阀组的 6 孔插座
- 6 – 电缆护套
- 7 – 用于固定机盖的螺钉
- 8 – 风压开关
- 9 – 控制盒
- 10 – 带有锁定指示灯的复位按钮



注意：

- 与燃烧器一起提供的电缆护套（6），必须固定到燃气阀组的同侧。

1.1 燃烧器附件

| | | | |
|-------------|------|-------------------------|------|
| 隔热垫 | 数量 1 | 将法兰固定到锅炉上所需的螺钉和螺母 | 数量 4 |
| 电缆护套 | 数量 1 | 固定到机盖上所需的螺钉 | 数量 1 |
| 铰链 | 数量 1 | 7 针插头 | 数量 1 |
| 4 孔插座 | 数量 1 | | |

2. 技术数据

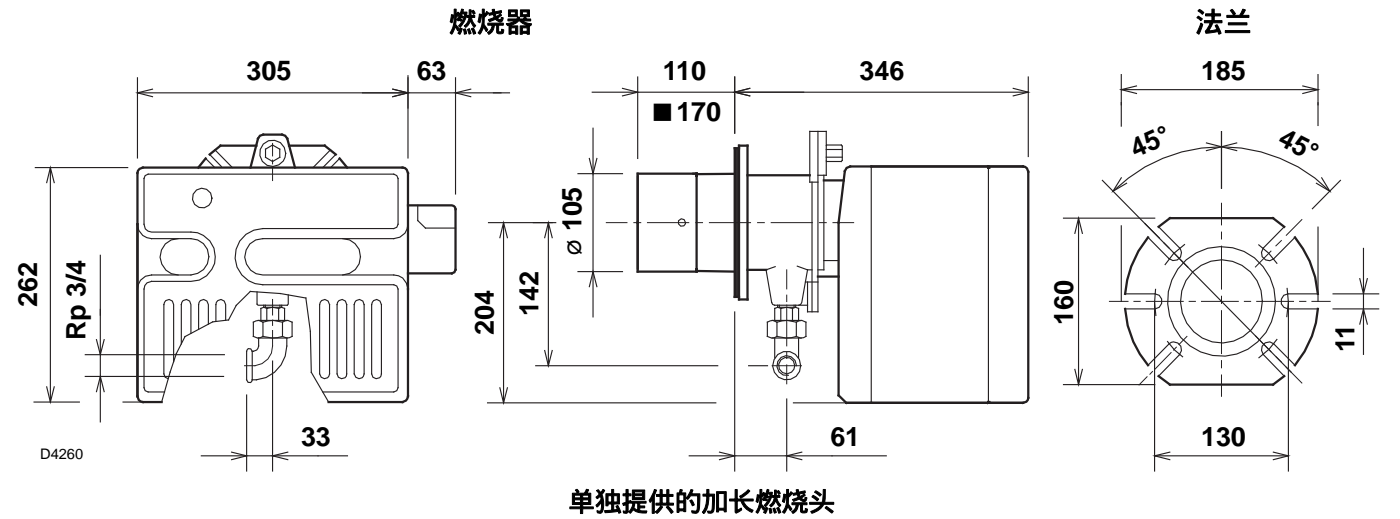
2.1 技术数据

| | | |
|--|-------|---|
| 热功率 | (1) | 29/41 – 106 kW - 25,000/35,000 – 91,000 kcal/h |
| 天然气 | (2 类) | 净热值 :8 – 12 kWh/Nm ³ - 7,000 – 10,340 kcal/Nm ³ |
| | | 压力: 最小 16 mbar - 最大 100 mbar |
| 电源 | | 单相, 230V ± 10% ~ 50Hz |
| 电机 | | 230V / 0.7 A |
| 电容器 | | 2 µF |
| 点火变压器 | | 初级 230V / 1.8A - 次级 8 kV - 30 mA |
| 电功消耗 | | 0.13 kW |
| (1) 参照条件: 温度 20°C - 气压 1013 mbar – 海拔 0 米。 | | |

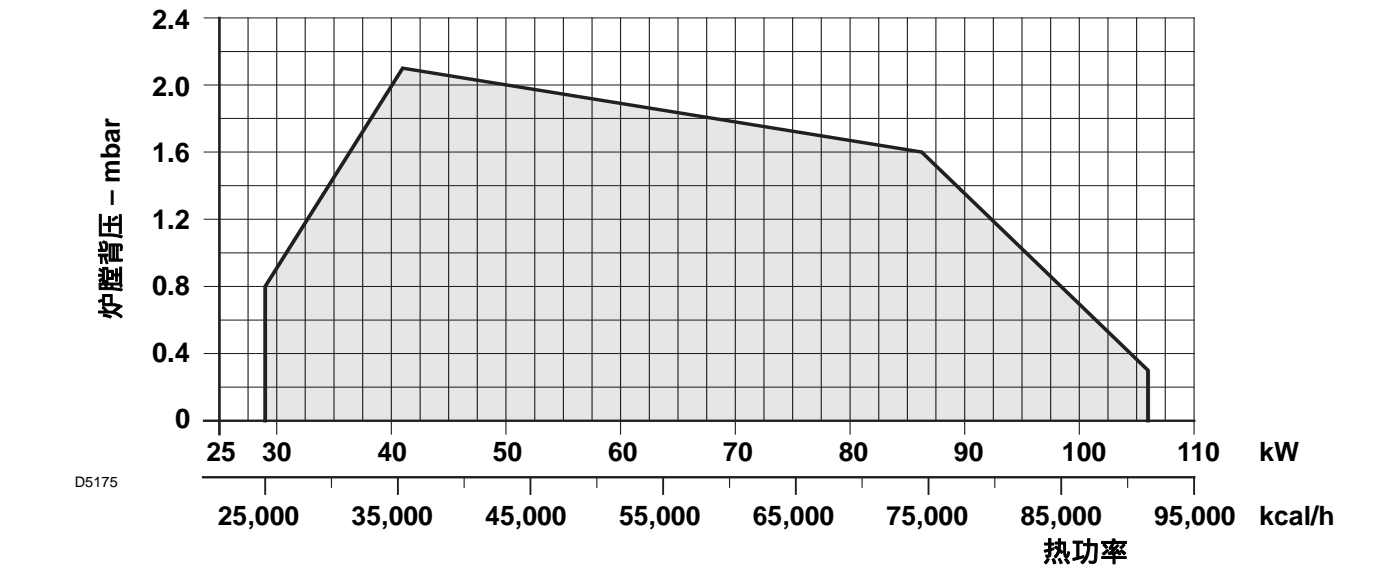
对于 3 类 (LPG) 燃气适用的组件。

| | | | | |
|------|------------|----------|--------------|----------|
| 国家 | DE | AT | ES - GB - IE | LU |
| 燃气类别 | II2ELL3B/P | II2H3B/P | II2H3P | II2E3B/P |

2.2 外观尺寸



2.3 负荷图 (按照 EN 676 标准)



测试锅炉

负荷图依据 EN676 标准测试得到。

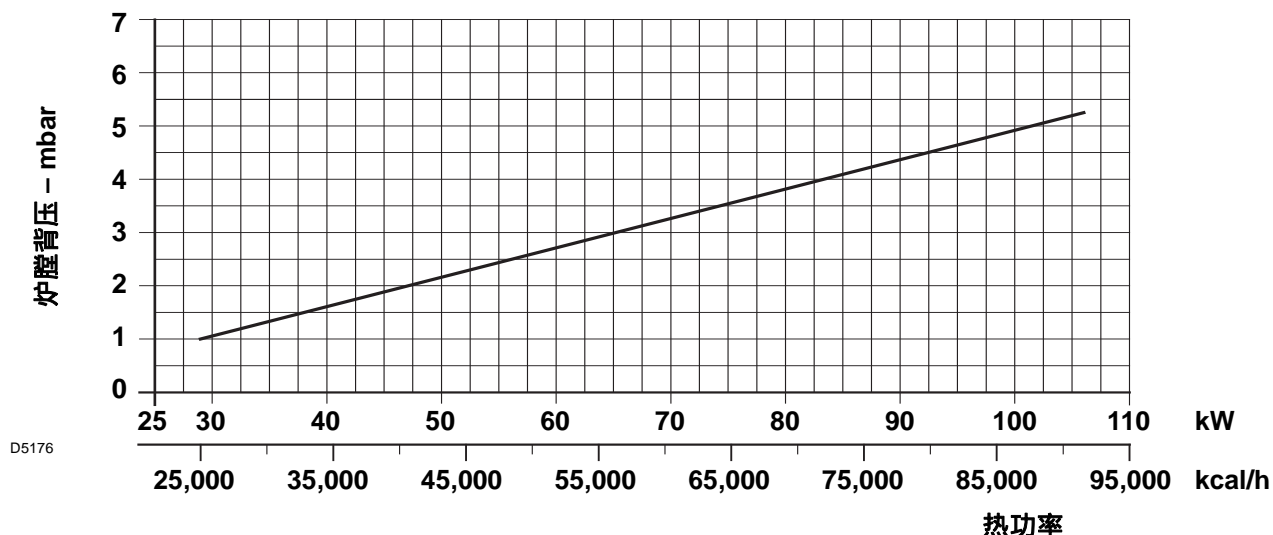
商用锅炉

如果锅炉的设计和制造符合 EN303 标准，并且炉膛尺寸与 EN676 标准中的图表尺寸接近，那么燃烧器 - 锅炉匹配没问题。

如果锅炉的设计和制造不符合 EN303 标准或者炉膛尺寸大大小于 EN676 标准中的图表尺寸，请咨询生产商。

燃气压力与燃烧器出力的关系

用净热值为 10KWh/m³ (8.570kcal/m³) 的 G20 燃气进行测试，锅炉背压为 0mbar 并在燃烧器出力最大时，燃烧头处测量压力为 5.25mbar(M2，见第 4 页，章节 3.3)。



3. 安装

燃烧器安装必须依据法令以及本地标准规定。

3.1 锅炉安装

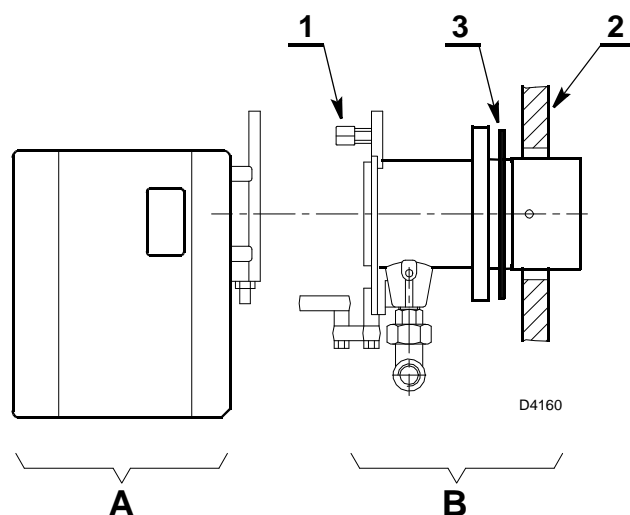
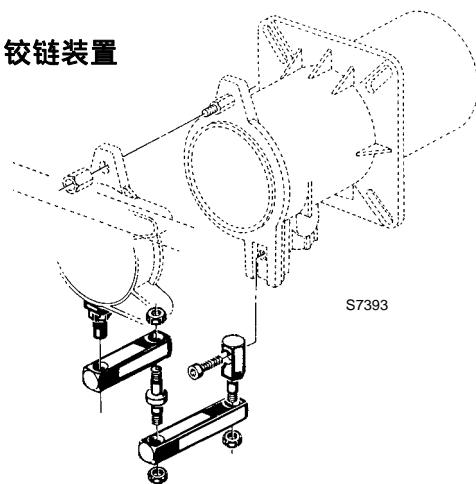
重要

炉门的最大厚度必须有 100 mm，包括耐火衬里。

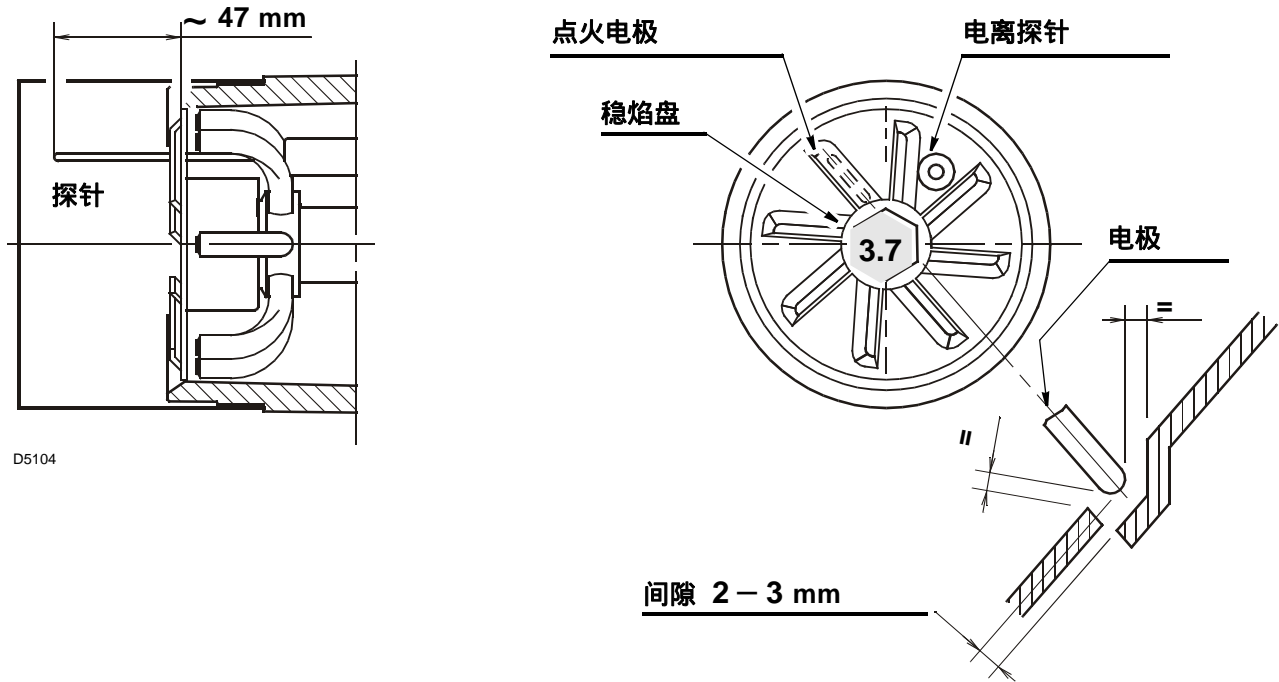
如果厚度大于最大厚度 (260mm) 必须选用单独供应的加长燃烧头。

- 拆下螺母 (1) 和 (A) 组，将燃烧头组件从燃烧器本体上分离。
- 固定燃烧头组件 (B) 到锅炉 (2)，插入随机提供的隔热垫 (3)。

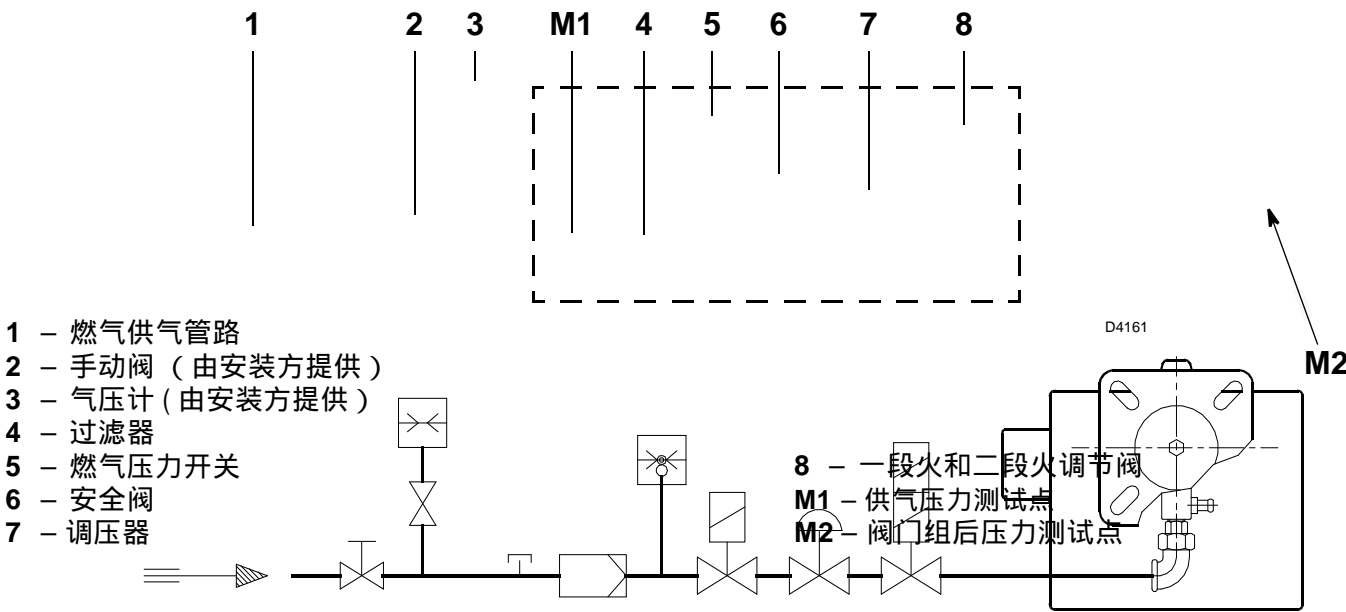
铰链装置



3.2 探针 - 电极定位



3.3 燃气供气管路



符合 EN 676 标准的燃气阀组
燃气阀组是单独提供的，其调整见所附说明。

| 燃气阀组 | | 接口 | | 应用 |
|-----------------|---------|--------|--------|------------------|
| 类型 | 代码 | 入口 | 出口 | |
| MBZRDLE 407 B01 | 3970537 | Rp 3/4 | Rp 3/4 | 天然气 ≤ 180 kW LPG |
| MBZRDLE 410 B01 | 3970534 | Rp 1 | Rp 3/4 | 天然气及 LPG |

3.4 电气接线

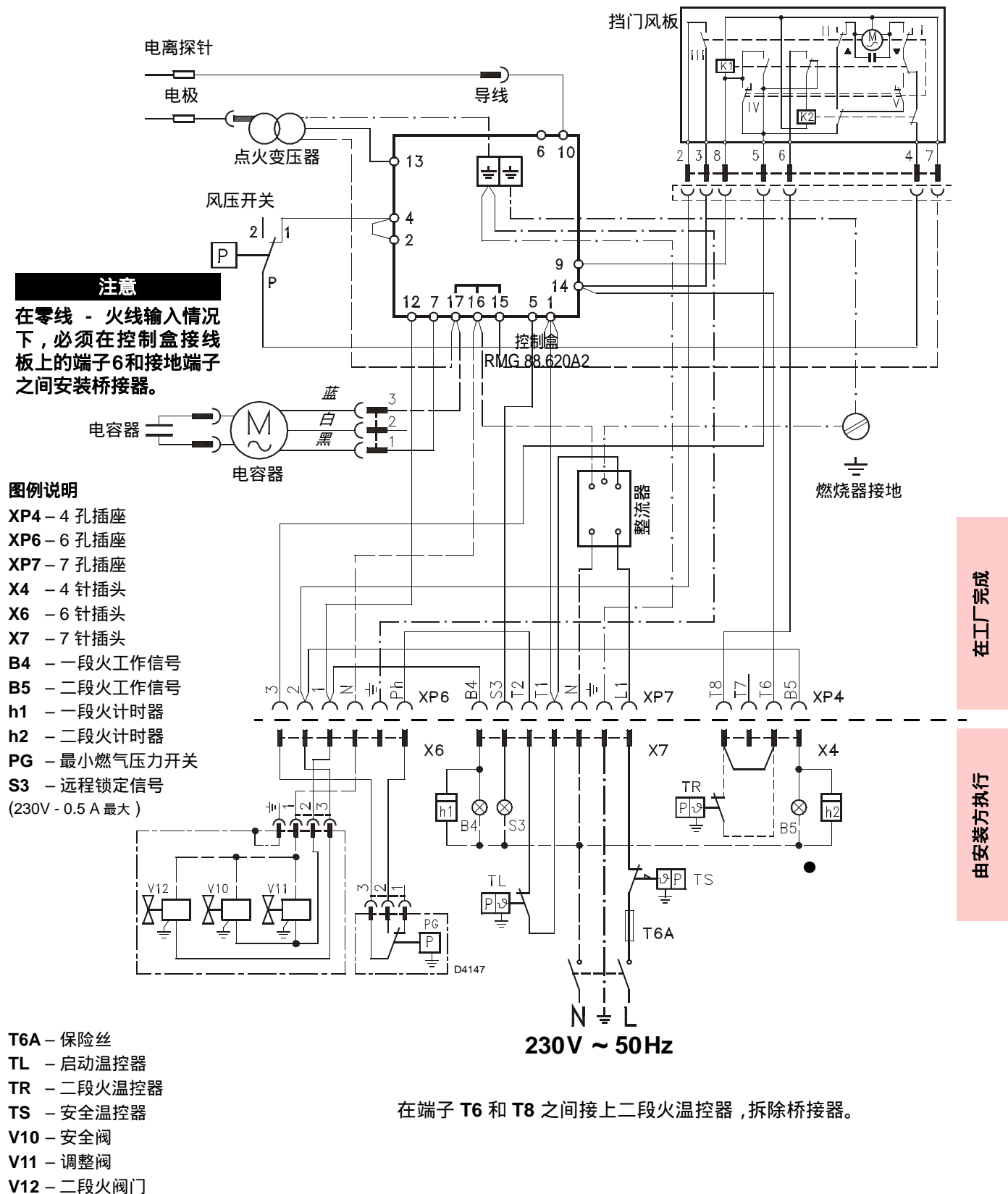
注意：
不要将零线和火线接反，遵照图示仔细操作，保证良好接地。
电缆的横截面必须不小于 1m m²（除非当地规范和法规另有要求）。
安装工人进行的电气接线必须符合该国有效的规则。

当断开锅炉温控开关时，验证燃烧器是否停机，断开红色的电离子探针连接头验证燃烧器是否锁定。

注意：

燃烧器用于间歇运行。这意味着它们必须每个 24 小时至少停机一次，便于控制盒能够检验其有效性，通常锅炉启动温控器（TL）能够确保燃烧器停机。如果没有停机，必须串联一个定时开关到启动温控器（TL）中，保证燃烧器每 24 小时至少停机一次。

3.4.1 标准电气接线



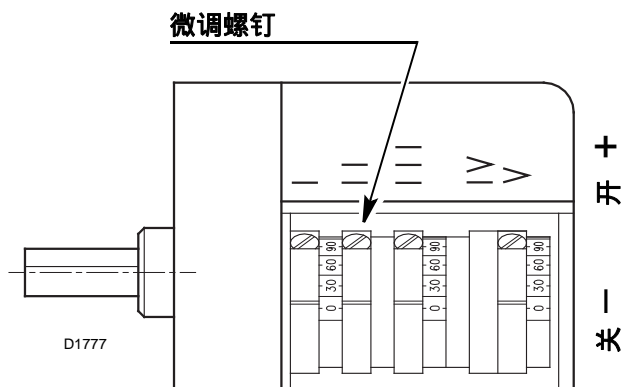
4.3 风门挡板设置

关闭 凸轮 I

凸轮 I 是生产商设置的，是在关闭状态下使风门挡板完全关闭。（参照值 0 度）
任何情况下，均不能修改该设置。

一段火 凸轮 V

凸轮 V 控制着一段火火焰用空气（2，图 2）
若要将该凸轮调低（关闭调节器），必须通过调节微调螺钉。
在二段火调节后，可获得确定位置。



二段火 凸轮 II

凸轮 II 控制着二段火用空气。
（参照值 60°，不超过 70°）。
任何情况下，均不能修改该设置。
二段火气流调节是通过操作风挡板（1，图 2）执行的。
凸轮 III 控制着两段火燃气阀的开启并且必须位于 凸轮 II 前至少 15°。

警告：

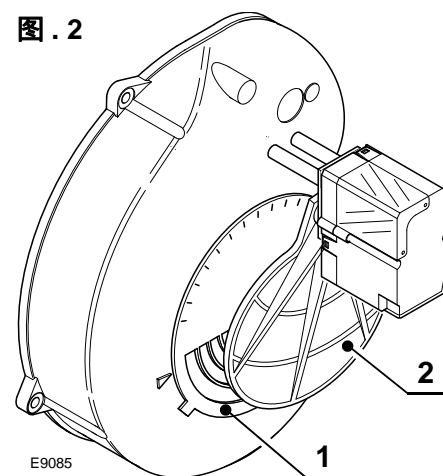
针对一段火和二段火的出力调节，应遵循下列指示：

- 一段火和二段火之间的出力比最大必须为：1：2，若超出这个比率，则应使用阀门泄漏检测装置；
- 在任何情况下，一段火的最小出力不能低于负荷图的最小出力范围。

4.4 燃烧检查

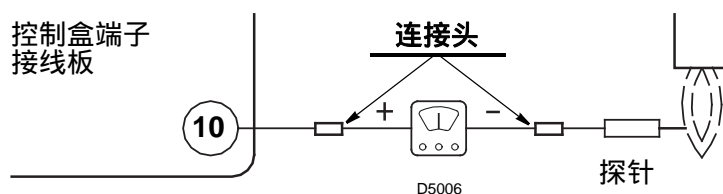
建议使用的燃气类型并按照下表的参数来设定燃烧器：

图 . 2



| EN 676 | | 过量空气系数： 最大出力 $\lambda \leq 1.2$ – 最小出力 $\lambda \leq 1.3$ | | | |
|--------|---|--|-----------------|--------------|-------------------------|
| 燃气 | 理论最大值 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



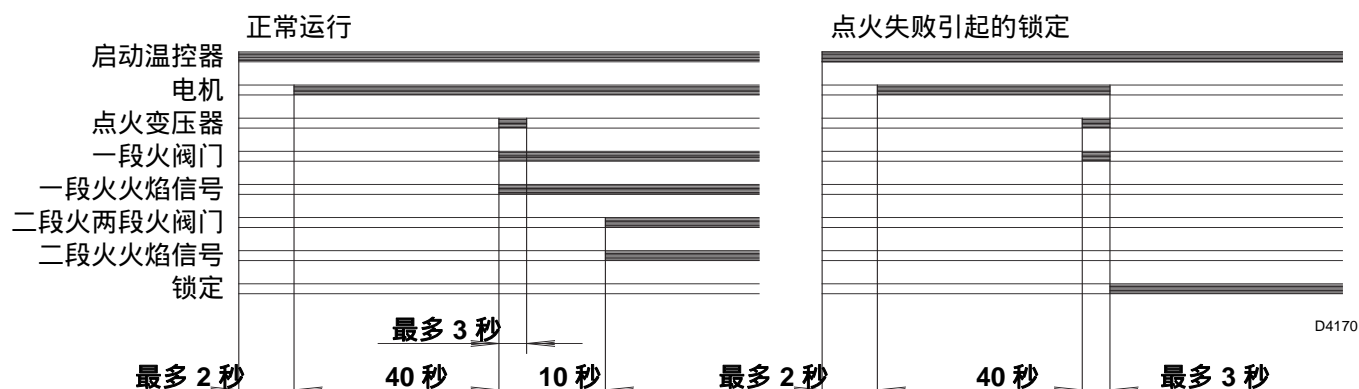
4.5 风压开关

风压开关的设置所有调整完成后进行，从风压开关设在最低设定值处开始。使燃烧器处于最小出力的工作状态，顺时针旋转转盘，增加设定值直至燃烧器锁定。然后逆时针转动转盘将设定值减少 1 个刻度值。检查并确保燃烧器运行可靠，如燃烧器再次锁定，将设定值再减小半个刻度值。

注意：

根据 EN676 标准, 当 CO 超过 1% (10,000ppm) 时, 风压开关必须动作。在烟道中插入一个烟气分析仪, 慢慢减少进风量, 检查并确认在 CO 超过 1% 之前, 风压开关是否动作并锁定燃烧器。

4.6 燃烧器启动循环



如果在运行中发生失火，应在 1 秒内燃烧器停机。

4.7 启动循环诊断

启动过程中运行进程指示如下表所示：

| 色码表 | |
|-------------|------------------------------------|
| 顺序 | 色码 |
| 预吹扫 | ●●●●●●●●●●●● |
| 点火阶段 | ●○●○●○●○●○● |
| 运行，火焰正常 | □□□□□□□□□□□ |
| 运行，火焰较弱 | □○□○□○□○□○ |
| 电压低于 ~ 170V | ●▲●▲●▲●▲●▲● |
| 锁定 | ▲▲▲▲▲▲▲▲▲▲ |
| 外部光线 | ▲□▲□▲□▲□▲□▲ |
| 图例： | ○ 不亮 ● 黄色 □ 绿色 ▲ 红色 |

4.8 控制盒复位和使用诊断功能

控制盒具有诊断功能，能够轻松识别故障原因（指示器：红色 LED 灯）。

要使用此功能，待燃烧器进入安全状态（锁定状态）后，至少等待 10 秒，然后按复位按钮超过 3 秒钟。

控制盒指示灯产生一连串的闪烁（间隔 1 秒），每隔 3 秒钟重复一次。

待观测到闪烁次数并识别出故障原因后，应感主复位按钮 1-3 秒钟来复位。

| 红色 LED 指示灯亮 至少等待 10 秒钟 | 锁定 | 按复位按钮 长于 > 3 秒钟 | 闪烁 | 间隔 3 秒钟 | 闪烁 |
|---------------------------|----|--------------------|---------|------------|---------|
| | | | ● ● ● ● | | ● ● ● ● |

复位控制盒和故障诊断操作方法如下所示：

复位控制箱

按下列步骤复位控制盒：

(按下按钮 1-3 秒钟。

松开按钮 2 秒钟之后燃烧器重新启动。

如果燃烧器没有重启，必须确保启动温控器处于闭合状态。

可视诊断

可以标识导致燃烧器锁定的故障信息。

要进行诊断，按如下步骤操作：

- 红灯亮起（燃烧器锁定）后，按住复位按钮并保持 3 秒钟。

黄灯闪烁时松开按钮，这时可以看到红灯闪烁，闪烁的次数代表可能的故障，参考第 11 页的故障代码对应表。

软件诊断

要实现燃烧器的实时分析，将燃烧器通过红外线接口连接到一台 个人电脑上，就可以显示燃烧器的工作状态，包括燃烧器工作的时间，锁定的次数和类型，控制盒的序列号等。

从而按照以下步骤进行可视诊断：

- 红灯亮时（燃烧器锁定），按住复位按钮超过 3 秒钟，黄色灯闪烁，松开按钮 1 秒钟，然后再按住复位按钮超过 3 秒钟，直到看到黄灯再次闪烁。

松开按钮，红色 LED 等高频闪烁：只有这个时候红外连接才会激活。

操作完成后，需要复位控制盒重新启动燃烧器，方法上面已经介绍。

| 按钮持续时间 | 控制箱状态 |
|--------------------|------------------------------------|
| 1-3 秒 | 不进入诊断状态，控制盒复位。。 |
| 超过 3 秒 | 可视诊断： (LED 指示灯每间隔 1 秒闪烁一次)。 |
| 进入可视诊断状态后，再按超过 3 秒 | 软件诊断，需要红外接口和电脑 (可以看到工作时间、故障等) |

如下表所示列出了闪烁次数对应的可能的故障类型。

| 闪烁次数 | 可能故障 |
|--------------------------------|---|
| 闪烁 2 次 ● ● | 安全时间过后火焰不稳定： – 电离子探子故障； – 燃气阀组故障或脏； – 火线与零线接反； – 点火变压器故障； – 燃烧器调整较差（燃气量不足）。 |
| 闪烁 3 次 ● ● ● | 最低风压开关没有闭合： – 确认是否 VPS 已经锁定； – 风压开关故障； – 风压开关调整不当； – 风机电机没有运行； – 风压开关处于运行状态。 |
| 闪烁 4 次 ● ● ● ● | 外部光源。 |
| 闪烁 7 次 ● ● ● ● ● ● ● | 运行过程中火焰熄灭： – 燃烧器调整不当（燃气量不足）； – 燃气阀组故障或脏； – 电离子探针对地短路。 |
| 闪烁 10 次 ● ● ● ● ● ● ● ● ● ● | – 接线错误或内部故障。 |

5. 维护

燃烧器需要由授权的有资质合格技术人员按当地法规和标准定期维护。
维护可以保证燃烧器的可靠运行，避免燃料浪费和排放污染物增加。
进行清扫或者维护之前，必须切断燃烧器主电源开关。

一般检查包括：

锅炉连续工作 10 分钟后，检查所有说明书中提到的部件设置。然后进行燃烧检测：
CO₂ (%) 含量 烟囱中烟气温度 CO 含量 (ppm)。

6. 故障 / 解决方案

从下表可以找到导致燃烧器不能启动或不正常工作的一些问题的原因和相应的解决方案。发生故障后，位于控制盒的复位按钮内的锁定指示灯通常亮起红色灯（第 1 页图 1 部件 10）。

当锁定指示灯亮时，仅在按下复位按钮后，燃烧器才会重新启动。如果燃烧器正常运行，锁定可归因于暂时故障。

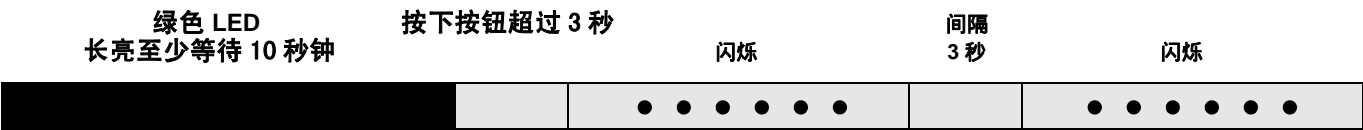
如果继续锁定，必须分析原因并找到解决方法。

| 信号 | 故障 | 可能的原因 | 建议的弥补措施 |
|-------------------------|------------------------|---|--|
| 闪烁 2 次 ● ● | 预吹扫和安全时间后燃烧器锁定并且没有火焰出现 | 1 - 燃气阀组过气量太少 2 - 两个电磁阀中的一个未打开 3 - 燃气压力过低 4 - 点火电极调整不当 5 - 由于电缆破损点火电极接地 6 - 高压电缆有缺陷 7 - 高压电缆因为高温而变形 8 - 点火变压器故障 9 - 阀组或变压器接线错误 10 - 控制盒故障 11 - 燃气阀组上游手动阀未开 12 - 燃气管中有空气 13 - 阀组没有连接，或线圈故障 | 增加燃气量 更换 增加调压器的压力 调整，见第 4 页 更换 更换 更换或保护 更换 检查 更换 打开 排气 检查接线或更换线圈 |
| 闪烁 3 次 ● ● ● | 燃烧器没有启动就出现锁定 | 14 - 风压开关处于运行状态 | 调整或更换 |
| | 燃烧器启动，然后锁定停机 | - 风压开关由于气压不足而不动作： 15 - 风压开关调整不正确 16 - 风压开关气压测试点管道被阻塞 17 - 燃烧头调整不正确 18 - 燃烧器背压过高 | 调整或更换 清洁 调整 风压开关另一管连接到风机进风口 |
| | 预吹扫期间锁定 | 19 - 电机控制接触器故障（仅 3 相型）. 20 - 电机故障 21 - 电机锁定（电机故障）..... | 更换 更换 更换 |
| 闪烁 4 次 ● ● ● ● | 燃烧器启动，随后锁定 | 22 - 模拟火焰 | 更换控制盒 |
| | 在燃烧器停机时锁定 | 23 - 燃烧头的残留火焰或虚假火焰 | 消除火焰或更换控制盒 |
| 闪烁 6 次 ● ● ● ● ● ● | 燃烧器启动，但是随后停机锁定 | 24 - 伺服马达故障或调整不当..... | 调整或更换 |
| 闪烁 7 次 ● ● ● ● ● ● ● | 燃烧器在出现火焰之后立即锁定 | 25 - 燃气阀组过气量太少 26 - 电离子探针的调整不当 27 - 电离子电流太小（小于 5μA）.... 28 - 离子探针接地 29 - 燃烧器接地不好 30 - 相线和中线接反 31 - 火焰探测电路故障 | 增加燃气量 调整见第 4 页 检查探针位置 拉出或更换电缆 检查接地 调换 更换控制盒 |
| | 燃烧器在一段火转二段火或二段火转一段火时锁定 | 32 - 空气太多或燃气太少 | 调整空气或燃气量 |
| | 燃烧器运行期间锁定 | 33 - 离子探针或电缆接地 | 更换磨损部分 |

| 信号 | 故障 | 可能的原因 | 建议的弥补措施 |
|---------------------------|--------------------|--|----------------------|
| 闪烁 10 次 ●●●●● ●●●●● | 燃烧器没有启动， 但出现锁定 | 34 - 接线错误..... | 检查 |
| | 燃烧器锁定 | 35 - 控制盒故障..... 36 - 启动温控器线路中出现电磁干扰.. | 更换 过滤或消除干扰 |
| 不闪烁 | 燃烧器不启动 | 37 - 没有电源..... | 闭合所有开关 - 检查接线 |
| | | 38 - 启动温控开关安全温控开关断开.. | 调整或更换 |
| | | 39 - 保险丝被熔断 | 更换 |
| | | 40 - 控制盒故障..... | 更换 |
| | | 41 - 没有燃气..... | 打开手动阀 |
| | | 42 - 燃气供气气压不足 | 联系燃气公司 |
| | | 43 - 最小燃气压力开关没有闭合 | 调整或更换 |
| | | 44 - 伺服马达不能转到点火位置 | 更换 |
| | 燃烧器不断重复启动， 而不锁定 | 45 - 燃气供气气压非常接近最低燃气压力开关的设定值，阀门打开之后压力的突然下降造成压力开关临时断开，阀门会立即关闭且燃烧器停机。压力增加，最低燃气压力开关会重新闭合而重复点火过程等等。 | 降低最小燃气压力开关设定值。更换过滤芯。 |
| | 点火脉冲 | 46 - 头部调整不当 | 调整，见第 6 页 |
| | | 47 - 点火电极调整不正确..... | 调整，见第 4 页 |
| | | 48 - 风门挡板调整不当，风量太大 ... | 调整 |
| | | 49 - 点火出力太大 | 减少出力 |
| | 燃烧器不能转到二段火 | 50 - 远程控制器 TR 没有闭合 | 调整或更换 |
| | | 51 - 控制盒故障..... | 更换 |
| | 燃烧器不能转到二段火 | 52 - 伺服马达故障 | 更换 |
| | | 53 - 伺服马达故障 | 更换 |
| | 燃烧器停机时风门挡板处于打开位置 | | |

正常运行 / 检测到火焰的时间

控制盒有监控燃烧器正常运行的功能 (信号：LED 指示灯绿灯长亮)。
要使用这个功能，燃烧器点火后等待十秒钟，按住控制盒的复位按钮保持 3 秒钟。
绿色指示灯开始闪烁，如下图所示：



LED 指示灯间隔接近 3 秒闪烁。
闪烁的次数指示从燃气阀组开启后火焰探测器检测到火焰的时间，如下图所示：

| 信号 | 检测到火焰的时间 |
|-----------------------|----------|
| 闪烁 1 次 ● | 0.4 秒 |
| 闪烁 2 次 ● ● | 0.8 秒 |
| 闪烁 6 次 ● ● ● ● ● ● | 2.8 秒 |

每次启动此数值都更新。
读取闪烁次数后，燃烧器需要按一下复位按钮重新启动。
警告
如果结果是大于 2 秒，点火有延迟。
检查燃气阀组的调节，风门挡板的设置和燃烧头的调整。

RMG 控制盒和 PC 机连接的组件编码 3002719。



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