

GB **Forced draught gas burners**

CN **强制通风燃气燃烧器**

Two stage progressive or modulating operation

平滑二段火或比例调节运行

RIELLO 40

CODE - 编码	MODEL - 型号	TYPE - 型号
20013642	GS10/M - HEATER - 加热器	729 T50
20013641	GS20/M - HEATER - 加热器	730 T50

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;

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

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- 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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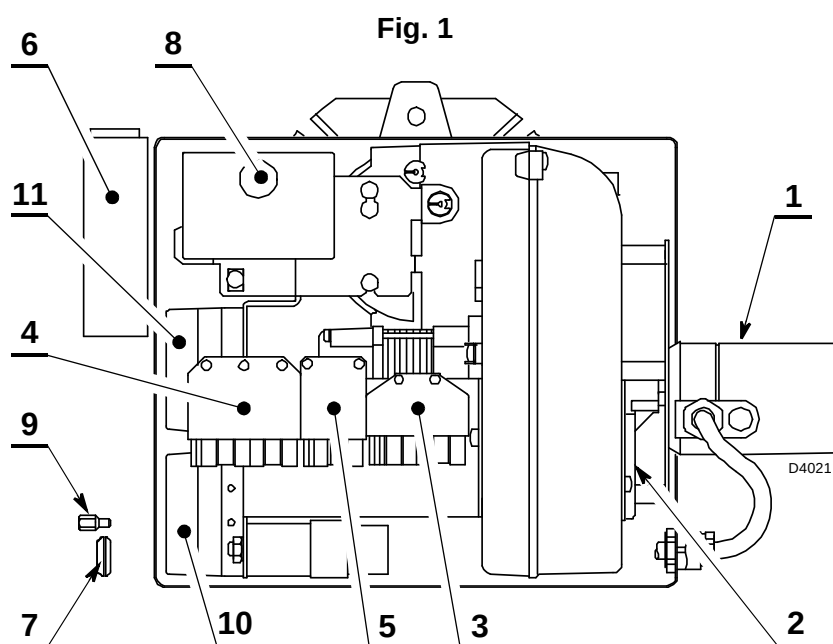
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1. BURNER DESCRIPTION

Two stage progressive operation mode or fully modulating by regulator, available as accessory.

- The burner is approved for intermittent operation as per Directive EN 676.
- The burner meets protection level of IP 40, EN 60529.
- 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.
- Gas train according to EN 676.

- 1 – Air damper servomotor
- 2 – Air-damper
- 3 – 6 pole socket for gas-train
- 4 – 7 pole socket for electrical controls
- 5 – 4 pole socket for high-low power
- 6 – Power regulator of RWF 40
- 7 – Grommet
- 8 – Lock-out lamp and reset button
- 9 – Screw for fixing the cover
- 10 – Min. air pressure switch
- 11 – Max. air pressure switch



NOTE

The cable grommet (7) and the screw for fixing the cover (9) supplied with the burner, must be fitted to the same side as the gas train.

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
Hinge	No. 1	4 pin plug	No. 1
Screw for fixing the cover	No. 1	6 pin plug	No. 1
Cable grommet	No. 1	M12 connector	No. 1
Pipe	No. 1	G1/8 union elbow	No. 1

2. TECHNICAL DATA

2.1 TECHNICAL DATA

TYPE		729T50	730T50
Thermal power (1)	kW	22/42 – 105	43/82 – 194
	kcal/h	18,900/36,100 – 90,300	37,000/70,520 – 166,840
Natural gas (Family 2)		Net heat value: 10 kWh/Nm ³	
		Pressure: min. 10 mbar – max. 360 mbar	
Electrical supply		Single phase, ~ 50Hz 230 V ± 10%	
Motor		Run current 0.7 A	Run current 1.3 A
		2830 rpm - 297 rad/s	2750 rpm - 289 rad/s
Capacitor		4 µF	5 µF
Ignition transformer		Primary 230 V – 45 VA Secondary 1 x 15 kV – 25 mA	
Absorbed electrical power		0.13 kW	0.25 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		IT - DK	GB	DE	FR	IE
GAS CATEGORY		I12H3P	I12H3P	I12E3P	I12Er3P	I12H3P
PRESSURE	G20	20 - 360	20 - 360	20 - 360	20/25 - 360	20 - 360
	G31	28/37 - 360	37 - 360	50 - 360	30 - 360	37 - 360

2.2 ACCESSORIES (optional)

- **KIT (PC INTERFACE KIT):** cod. 3002719

- **OUTPUT POWER REGULATOR KIT:**

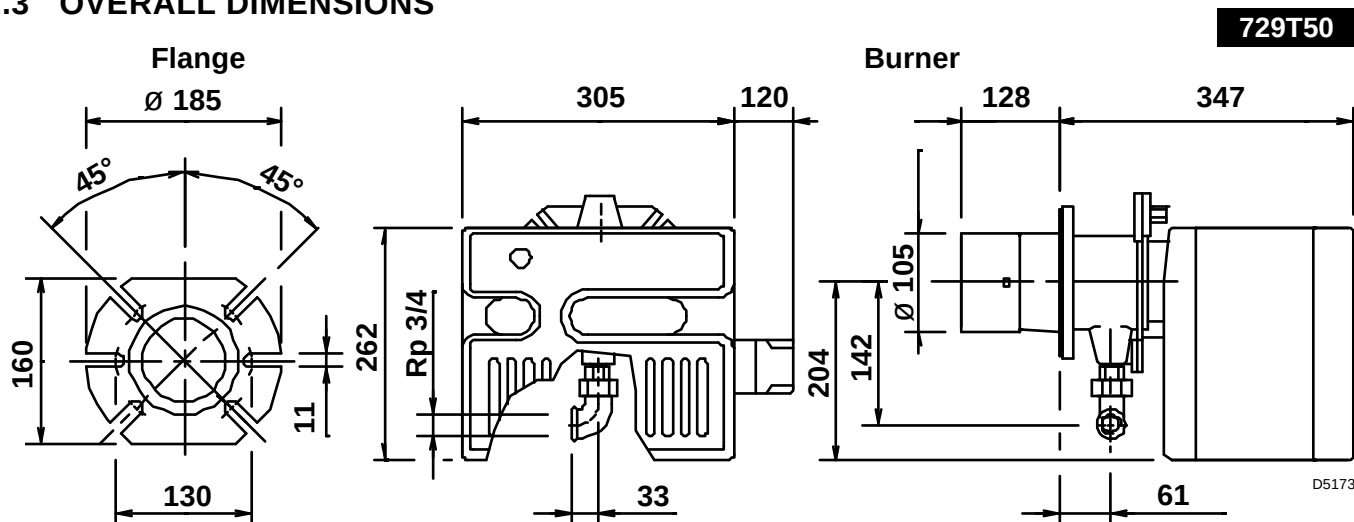
Under modulating operation, the burner automatically adapts to one of an infinite number of firing rates between the low and high flame output position, thus ensuring stable operating conditions in terms of temperature or pressure.

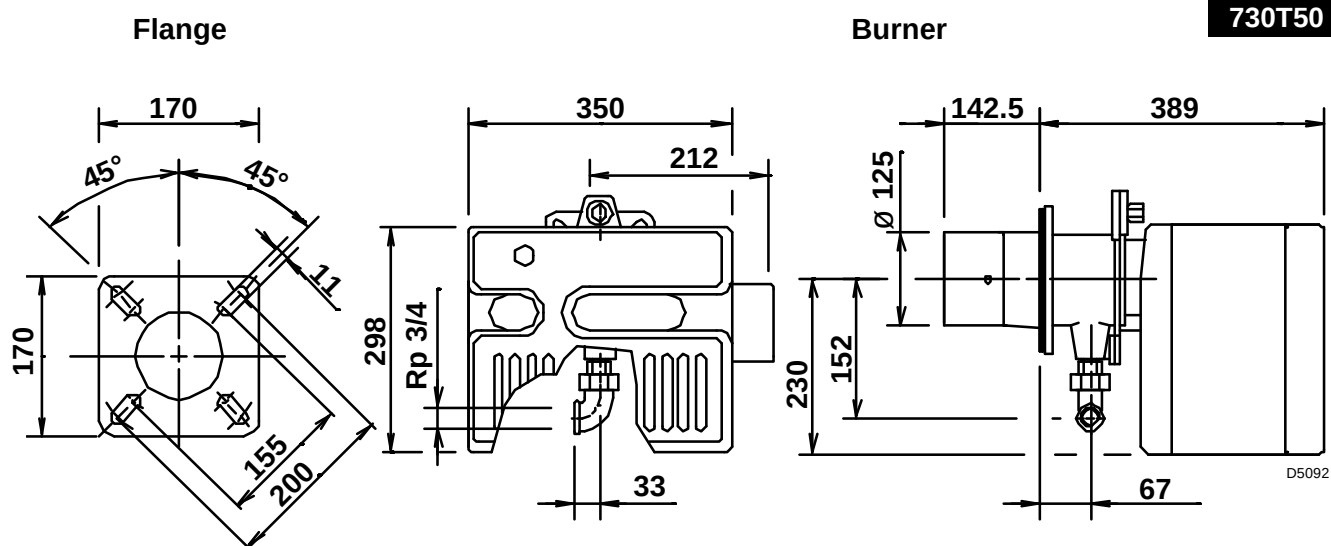
Two components should be ordered:

- Power regulator to install to the burner.
- Probe to install to the boiler.

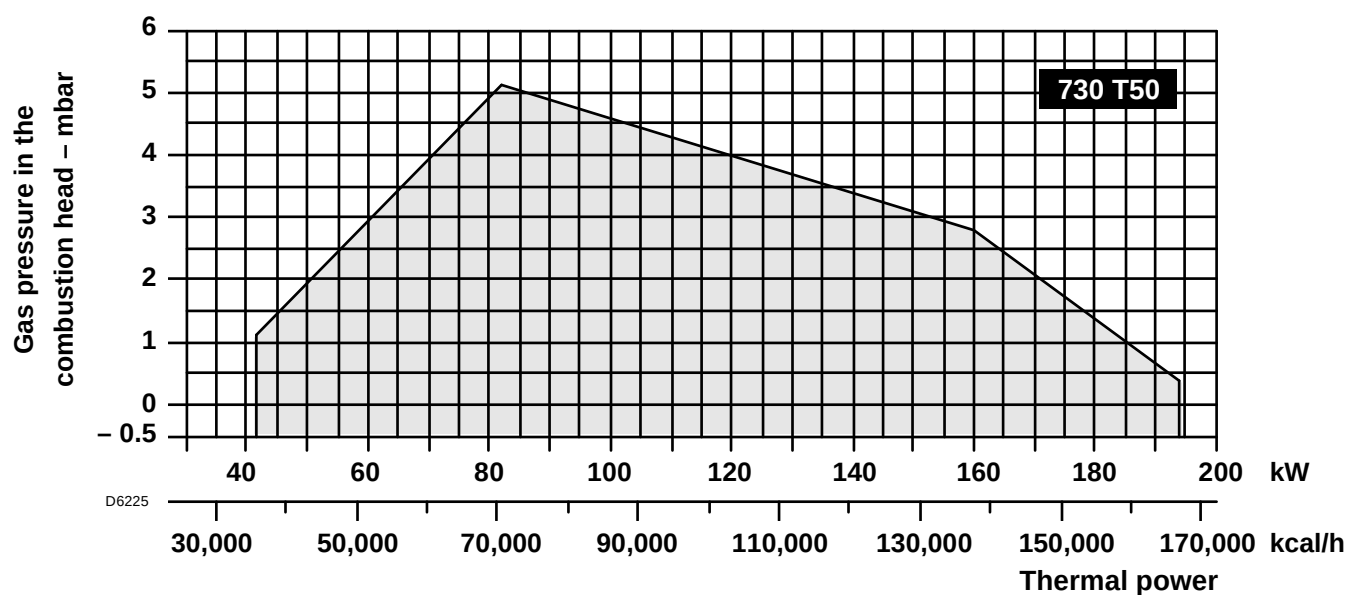
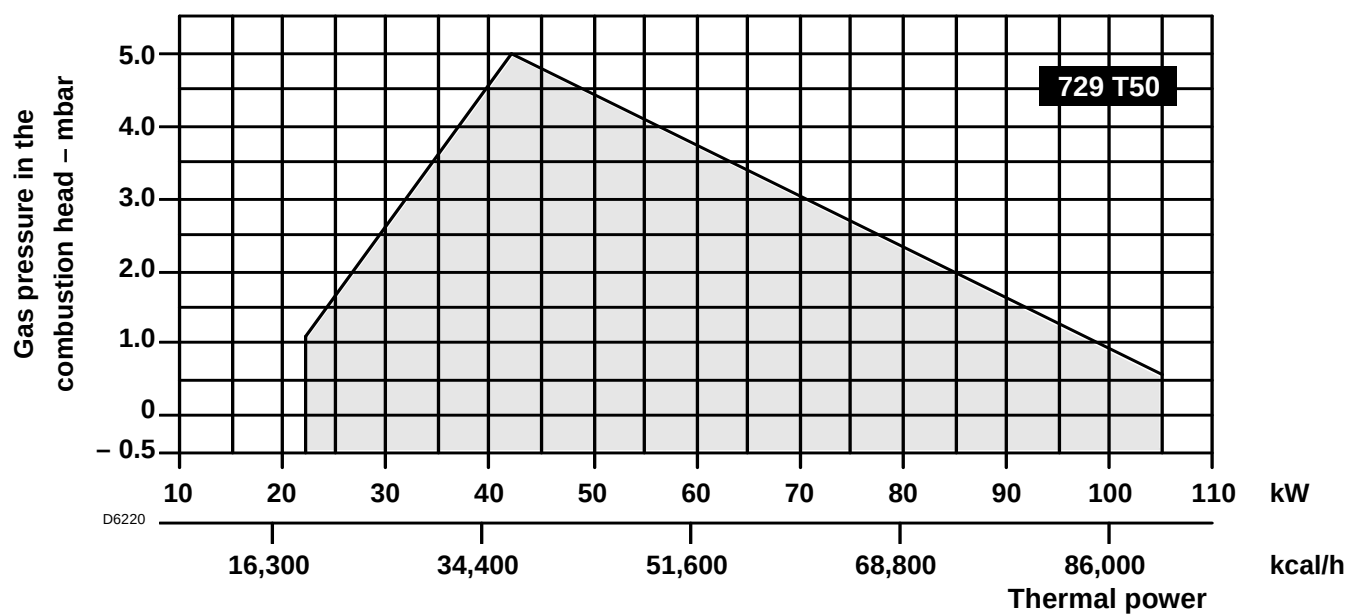
PARAMETER TO BE REGULATED	PROBE			REGULATOR	
	Range	Type	Code	Type	Code
Temperature	– 100...+ 500 °C	PT 100	3010110	RWF40	3001074
Pressure	0...2.5 bar	Output probe 4...20 mA	3010213		
	0...16 bar	Output probe 4...20 mA	3010214		

2.3 OVERALL DIMENSIONS





2.4 FIRING RATES (as EN 676)



TEST BOILER

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

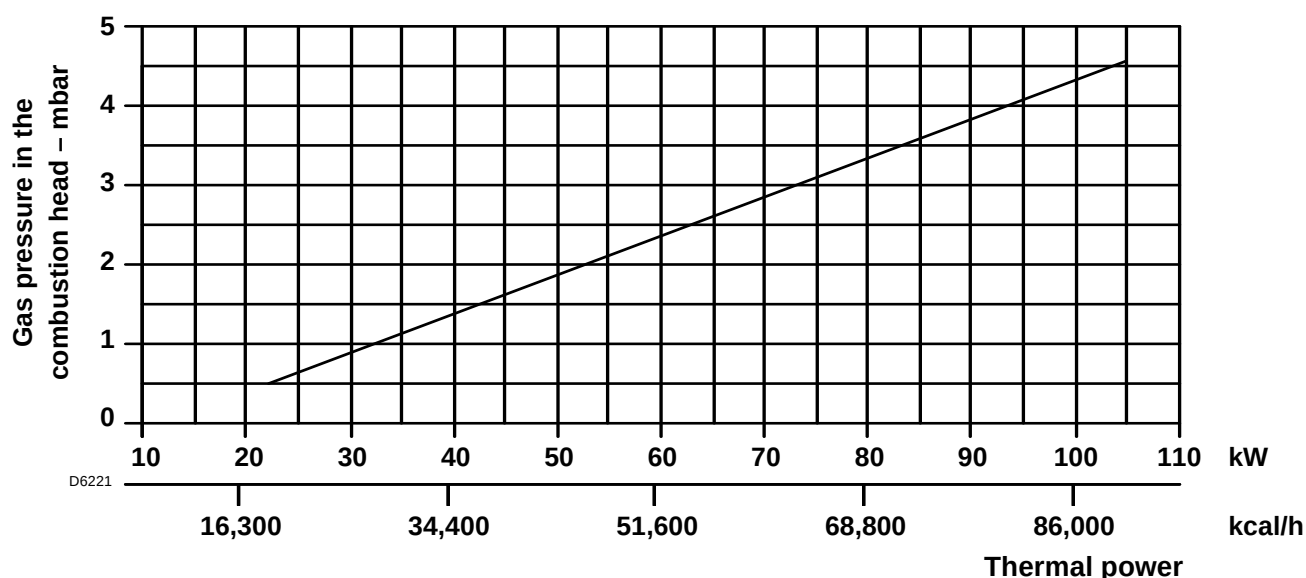
COMMERCIAL BOILERS

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.

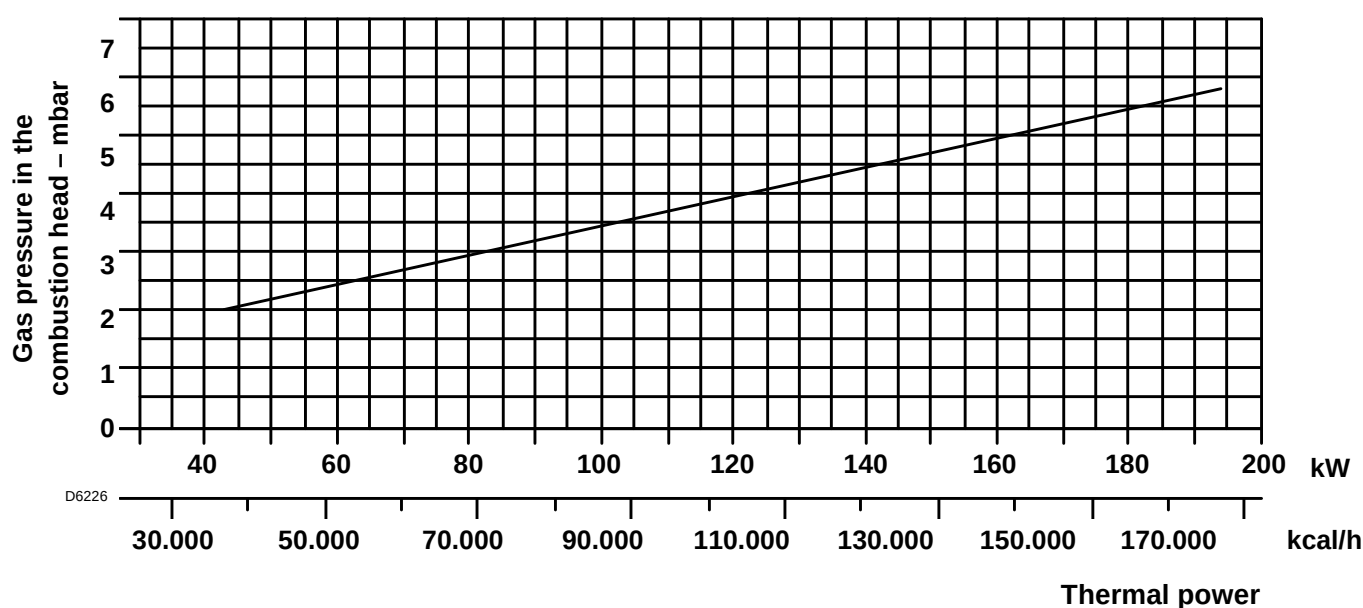
CORRELATION BETWEEN GAS PRESSURE AND BURNER OUTPUT

To obtain the maximum output, a gas head pressure of 4.6 mbar, relatively to type 729T50, is measured with the combustion chamber at 0 mbar using gas G20 with a net heat value of 10 kWh/Nm³.

729 T50



730 T50

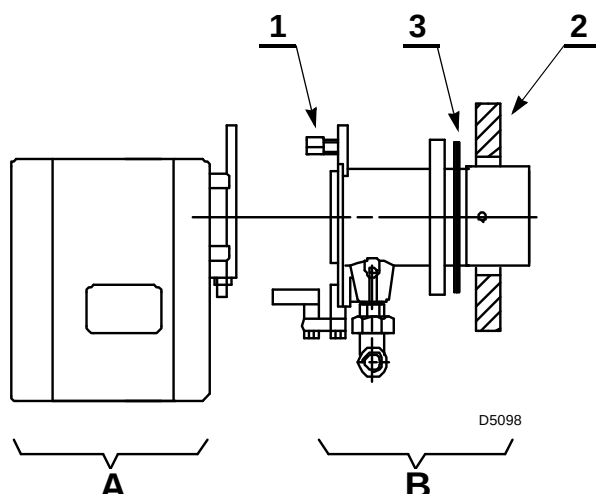


3. INSTALLATION

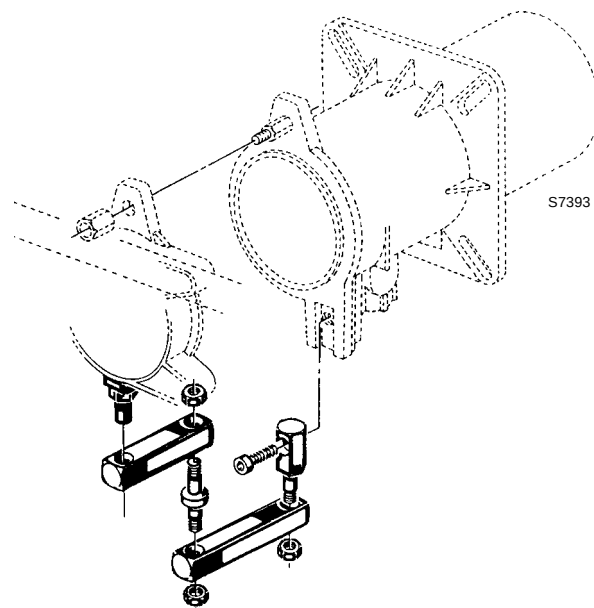
3.1 BOILER FIXING

Separate the combustion-head assembly from the burner body by removing nut (1) and removing group **(A)**.

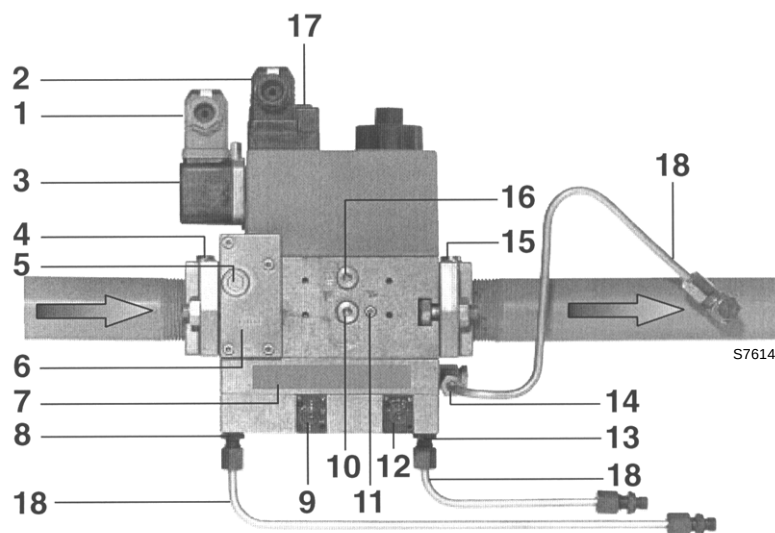
Fix the head assembly group **(B)** to the boiler (2) insert the equipped insulating gasket (3).



HINGE ASSEMBLY



3.2 GAS FEEDING LINE



- 1 - Electrical connection for pressure switch
- 2 - Electrical connection for valves
- 3 - Pressure switch
- 4 - Inlet flange
- 5 - Test point connection upstream of filter
- 6 - Filter
- 7 - Type plate
- 8 - Pressure connection (air)
- 9 - Setting screw, ratio **V**
- 10 - Test point connection
- 11 - Test point connection
- 12 - Setting screw, zero point adjustment **N**
- 13 - Pressure connection for furnace pressure
- 14 - Pressure connection (gas)
- 15 - Outlet flange
- 16 - Test point connection
- 17 - Operation indicator LED
- 18 - Impulse line

GAS TRAIN ACCORDING TO EN 676

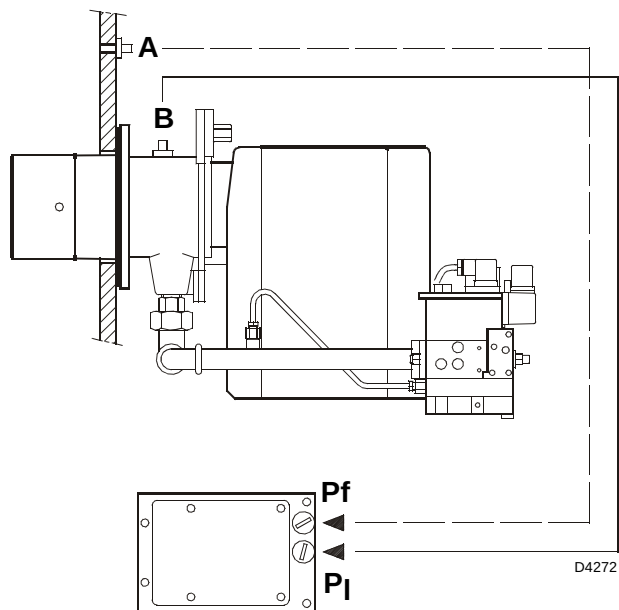
GAS TRAIN		MATCHED BURNER	CONNECTIONS		USE
TYPE	CODE		INLET	OUTLET	
MB-VEF 407 B01	3970535	GS10-20/M	Rp 3/4	Rp 3/4	Natural gas and LPG
MB-VEF 412 B01	3970536	GS20/M	Rp 3/4	Rp 3/4	Natural gas high capacity ≥ 120 kW

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

CONNECTION OF PRESSURE TAPS TO GAS TRAIN

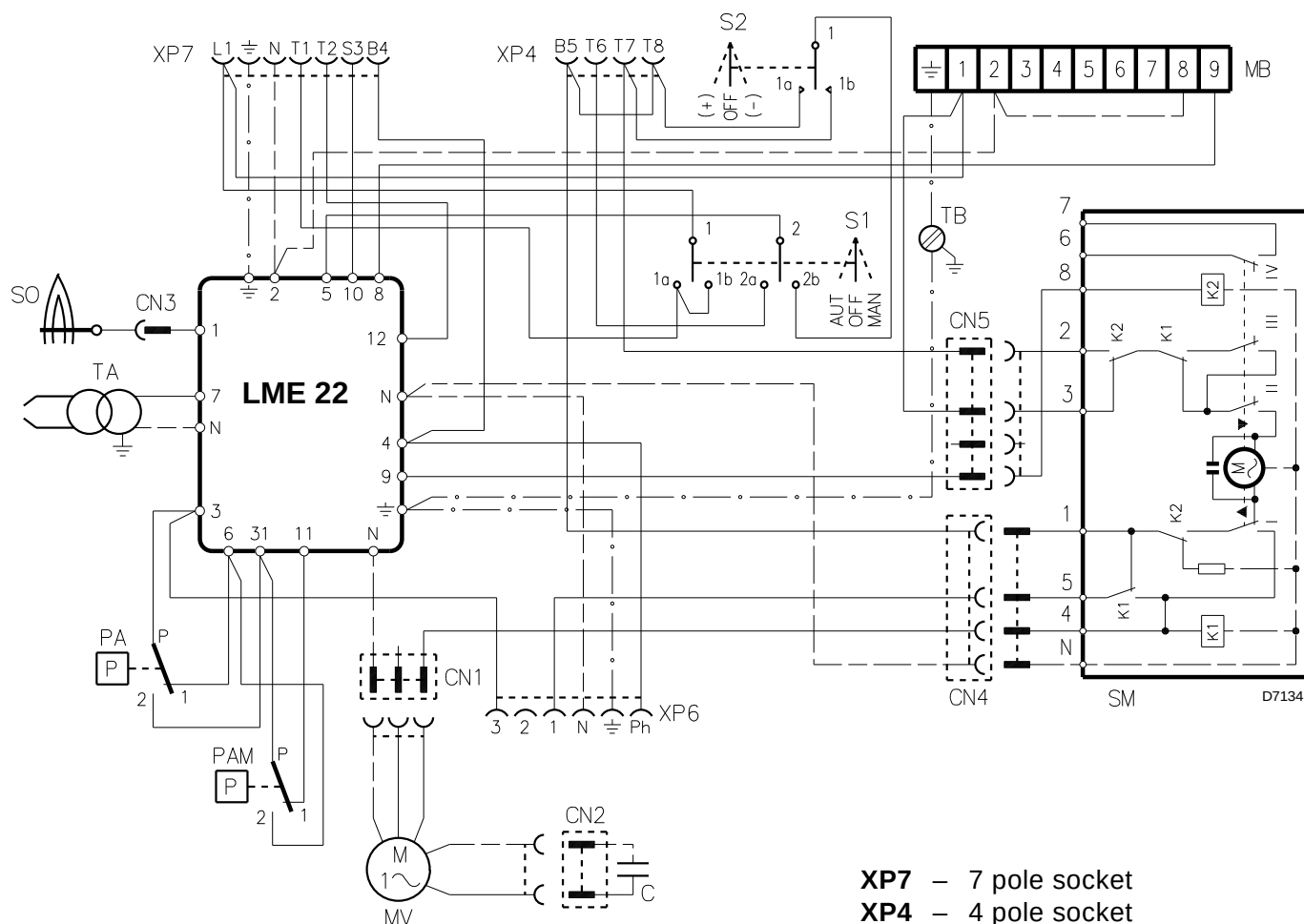
Connect proceeding as follows:

- Secure the three G1/8 connectors (one supplied with the burner and two with the train) at points **A**, **P_f** and **P_I**.
- Secure the M12 connector at point **B**.
- Cut the pipe supplied with the burner into equal halves.
- Connect boiler tap **A** with valve tap **P_f** and sleeve tap **B** with valve tap **P_I** using the previously cut pipes.



4. ELECTRICAL WIRING

4.1 ELECTRICAL SYSTEM, (as set up by the manufacturer)



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 1mm².
(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 shut-down of the burner by opening the thermostats, and the lock-out by opening the connector (CN3) inserted in the red cable of the probe placed outside of the control box.

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).

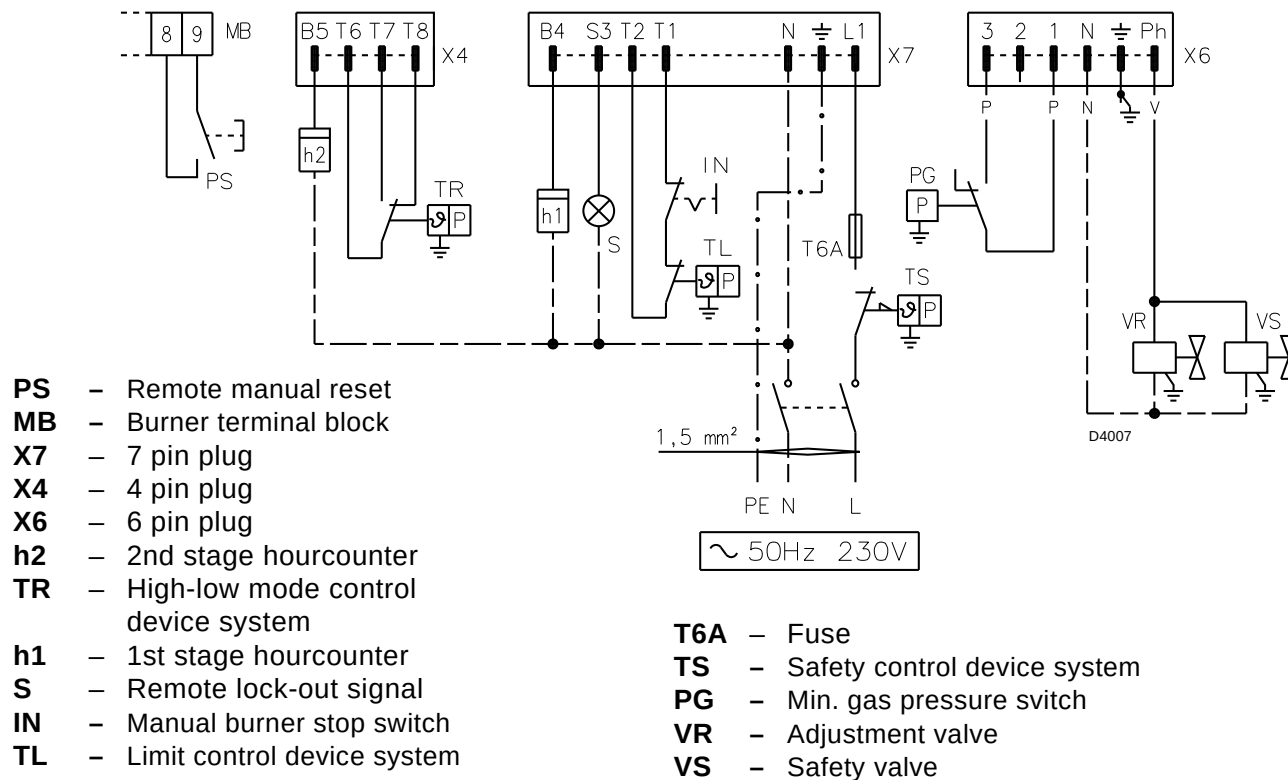
- XP7** – 7 pole socket
- XP4** – 4 pole socket
- XP6** – 6 pole socket
- MB** – Auxiliary terminal block
- S1** – Switch for:
MAN = manual operation
AUT = automatic operation
OFF = stand by
- S2** – Button for:
– = power reduction
+ = power increase
- F1** – Protection against radio interference
- TB** – Burner-earth
- SO** – Ionisation probe
- CN...** – Connectors
- TA** – Ignition transformer
- PA** – Min. air pressure switch
- PAM** – Max. air pressure switch
- C** – Motor capacitor
- SM** – Servomotor

4.2 ELECTRICAL CONNECTION, (as set up by the installer)

WARNING

If the boiler has a the 7 pin plug, it should be replaced with the one supplied with the burner.

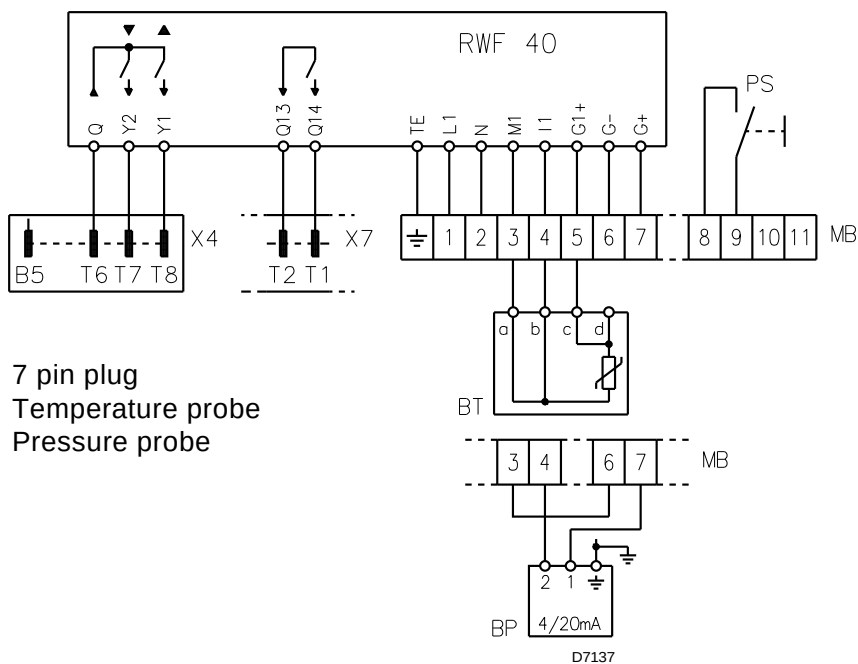
WITHOUT REGULATOR (high-low progressive mode operation)



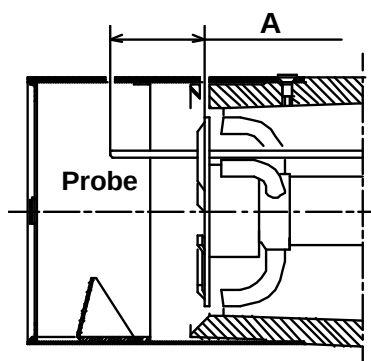
WITH REGULATOR (fully modulating mode operation)

ATTENTION

Do not connect any contact between **T6** and **T8** at the 4 pin plug and between **T1** and **T2** at the 7 pin plug, in order to avoid interference with the regulator.

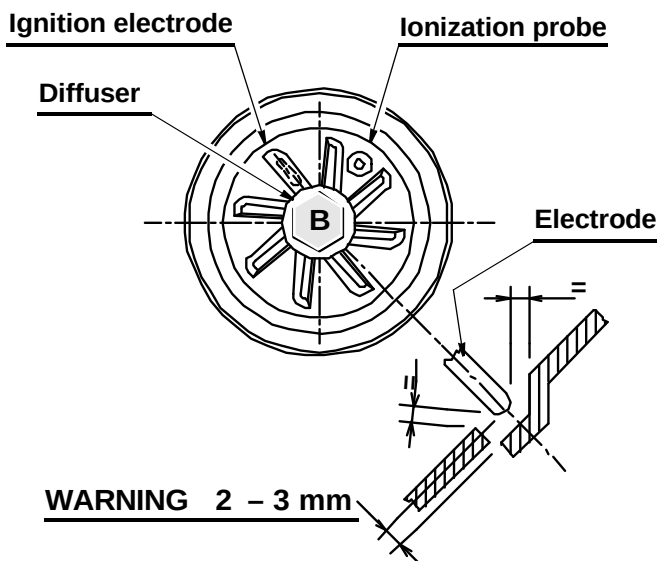


4.3 PROBE-ELECTRODE POSITIONING



D4046

TYPE	A	B
729 T50	~ 40 mm	2.2
730 T50	~ 47 mm	3.7

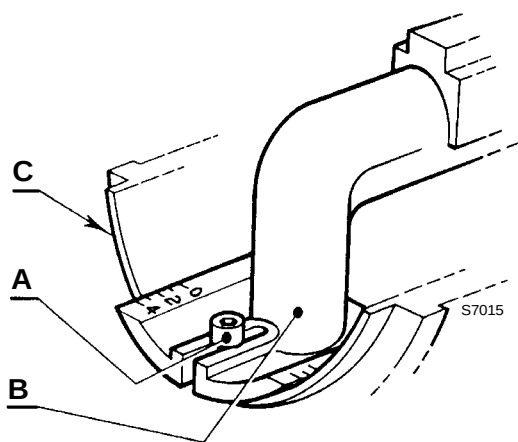


5. BURNER SETTINGS

5.1 COMBUSTION HEAD SETTING

Factory calibration is set for medium power; according to the boiler output:

Loosen screw (A) and shift the elbow (B) such that the rear surface of the head assembly casting (C) coincides with the desired notch. Tighten screw (A).



Example:

The burner type 729 T50 is installed in a 77 kW boiler.

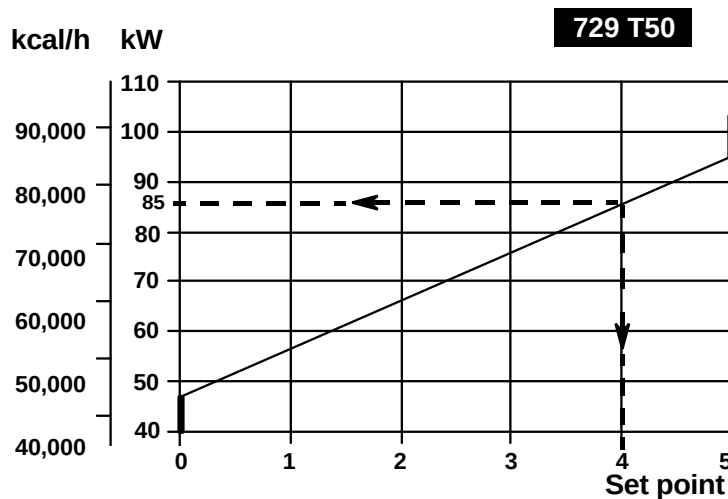
The burner will have to deliver about 85 kW, considering an efficiency of 90%.

The diagram indicates, that for this output the elbow (B) is adjusted to set-point 4.

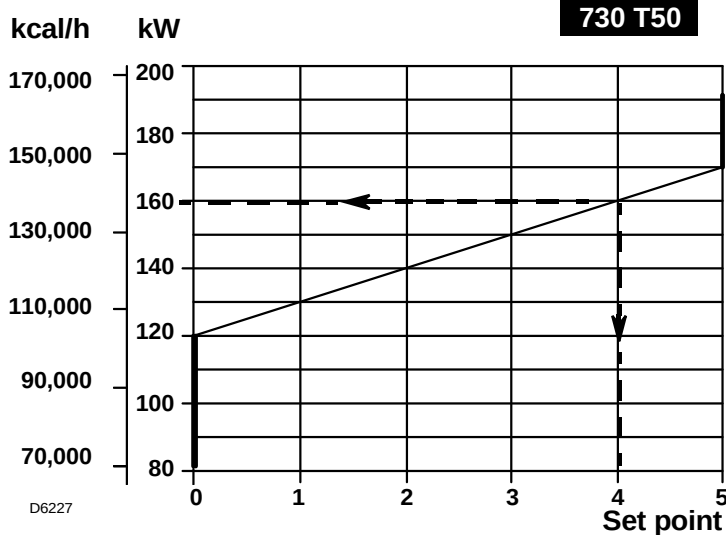
NOTE

The diagram is indicative only.

The head setting may require adjustment to suit the boiler characteristics.



D6223



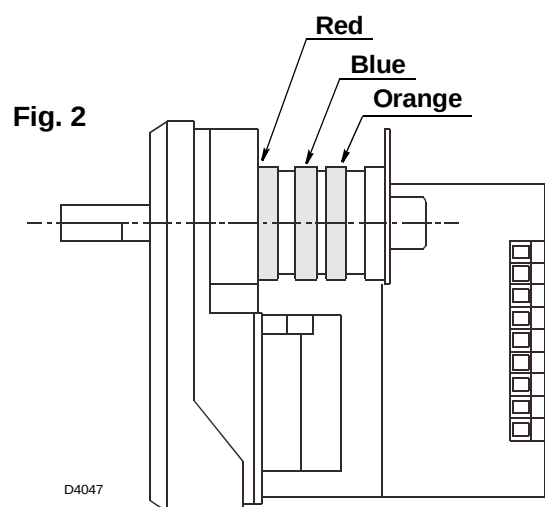
D6227

5.2 SETTING OF THE AIR DAMPER SERVOMOTOR (see fig. 2)

STAND-BY	CAM II (Blue) CAM II assures the fully closed position of the air damper, when the burner is shut down (stand by). It is adjusted by the factory at 0°. DO NOT ALTER.
FIRST STAGE	CAM III (Orange) CAM III adjusts the air damper for the ignition and for the minimum output. It is set at 20° by the factory. Do not decrease that value; it can be increased a little, following the need of the application.
SECOND STAGE	CAM I (Red) CAM I limits the rotation at the maximum output. It is adjusted at 90° by the factory. DO NOT INCREASE THAT VALUE: the burner can be damaged.

NOTE

The servomotor is equipped with two micrometric screws for a careful setting of **CAM II (Blue)** and **CAM III (Orange)**.



5.3 COMMISSIONING

After completing both the electrical and gas valve connections, set the minimum air and the gas pressure switches at minimum value; the maximum air pressure switch must be first set at maximum value. These will be adjusted only at the end of commissioning procedure.

Connect a manometer to the gas pressure test point situated on the burner.

- For guidance the following table shows:
 - the capacity required by the application;
 - the minimum firing rate achieved for each capacity;
 - approximate gas pressure measured at the combustion head, depending on the maximum capacity required;
 - the setting for the air damper.

Type	Thermal power	Min output	Gas pressure on combustion head	Air damper adjustment
	kW	kW	mbar (●)	Set point
729T50	42	22	1.4	4
	60	26	2.4	5
	81	30	3.2	6
	106	35	3.7	8
730T50	81	43	3.2	5.25
	159	47.8	4.6	7
	170.3	48.9	5.1	max

(●) These values refer to a combustion chamber with 0 [mbar] back pressure at maximum output.

- For the maximum capacity required, first set the head (section 5.1), and then the manual air damper as per the table at page 10.

- 3) Select the manual (**MAN**) mode operation, and switch **ON** the burner.
- 4) When the burner is alight, press the **(+)** button to manually drive the servomotor to the high fire position and check that the gas pressure also increases.
- 5) Check the gas flow rate at high fire. To set the correct flow rate use the screw adjustments **V** and **N** on the valve body (mainly **V**). Increasing the setting of either **V** or **N** increases the gas flow.
- 6) Adjust the manual air damper to give the required CO_2 level in the flue products. If adjusting the air damper alters the gas flow rate then adjust **V** accordingly.
- 7) Decrease the servomotor position to low fire by pushing the **(-)** button. Check the gas flow rate and adjust if necessary, with screw **N** only, to give the required CO_2 level in the flue products.
- 8) If the low fire output is then more or less than required, adjust **CAM III (Orange)** accordingly.
Any adjustment of screw **N** will affect the high fire gas rate.
- 9) Return the servomotor to the high fire position. Re-adjust the high fire gas rate using only screw **V**.
- 10) Again return the servomotor to the low fire position and re-adjust the low fire gas rate using only screw **N**.
- 11) Repeat steps (9) and (10) two or three times until no re-adjustment of screws **V** and **N** is necessary.
- 12) Finally return the selector switch to the automatic (**AUT**) mode position.

5.4 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 CO_2 concentration in the flue gases, their temperatures and the average temperature of the water in the boiler.

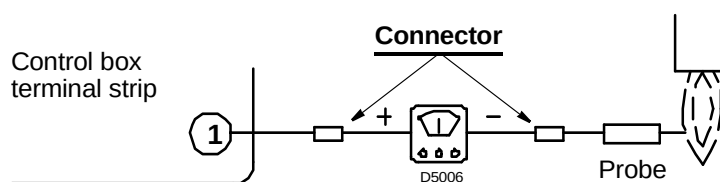
It is advisable to set the burner according to the type of gas used and following the indications of the table:

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 30	14.0	11.6	10.7	≤ 100	≤ 230
G 31	13.7	11.4	10.5	≤ 100	≤ 230

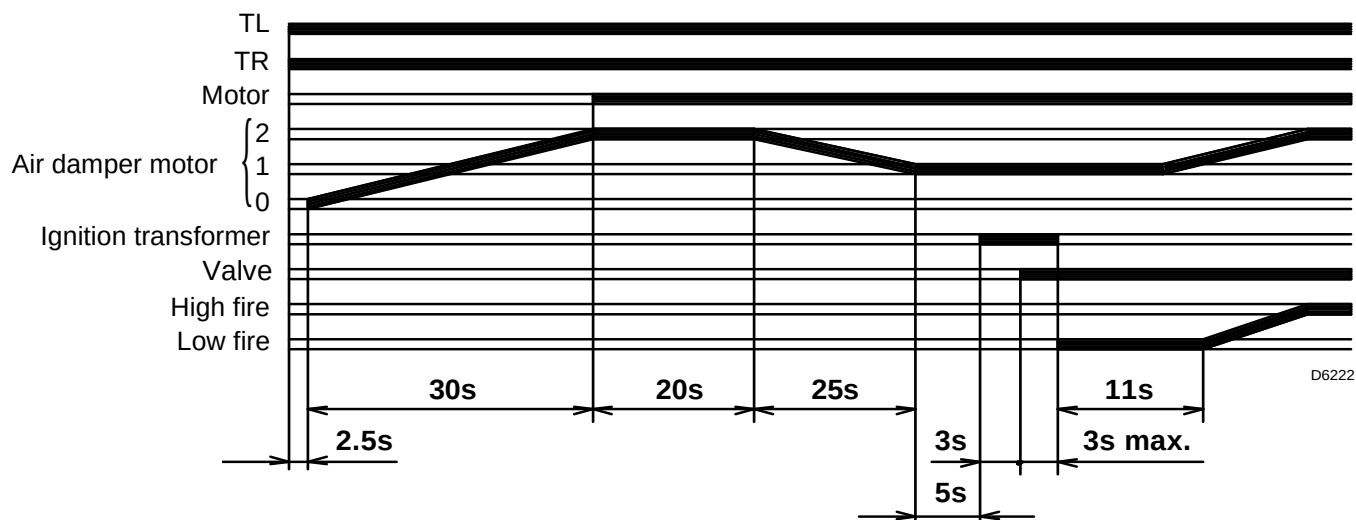
IONIZATION CURRENT

The minimum current necessary for the control box operation is $2 \mu\text{A}$. 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 (**CN3**) (see electrical scheme page 7) fitted on the wire and insert a microammeter.



5.5 BURNER START-UP



5.6 MIN. 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 minimum 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.

5.7 MAX. AIR PRESSURE SWITCH

The over pressure switch must be set after all other adjustments have been made. Its purpose is to cause the burner to shut down if the combustion chamber pressure increases above normal operational values. Begin with the switch at the highest setting, with the burner working at the maximum output, adjust the dial anti-clockwise, decreasing its value until the burner shuts down. Now increase the value by one set point and re-start the burner. If the burner shuts down due to the pressure surge in the combustion chamber caused by the ignition gas, check that the start gas rate is less than 25% of the main gas rate. If it is, increase the value on the over pressure switch by a further half a set point and repeat the test.

NOTE:

To comply with the Appliance Standard Pr EN 1020, the CO value must not exceed 0.1% under normal operational conditions.

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%.

6. 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 interruptions for 10 min. and set rightly all the components stated in this manual. **Then carry out a combustion check verifying:**

- Content of CO₂ (%)
- Content of CO (ppm)
- Flue gas temperature (°C).

7. FAULTS / SOLUTIONS

The control box has a self-diagnostic system, by which it is possible to easily check the faults and find the solutions.

To use this function, wait for a minimum of 10 sec after the lock out, then push the reset button for 3 sec. After releasing the button, the RED LED will begin to flash, as shown in the following schedule.

Red fault LED waiting time 10s	Press lockout reset button for > 3s	Blink code	Approx. 3s	Blink code
		● ● ● ● ●		● ● ● ● ●

The LED provide a blink code each 3sec.

The blink codes give the information of the possible faults, as follows:

BLINK CODE	POSSIBLE CAUSE
2 blinks ● ●	The flame does not stabilize at the end of the safety time: – faulty or soiled ionization probe; – faulty or soiled fuel valves; – neutral/phase exchange; – poor burner regulation.
3 blinks ● ● ●	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 blinks ● ● ● ●	Extraneous light during pre-purging, or control box faulty.
5 blinks ● ● ● ● ●	Minimum air pressure switch does not open: – air pressure switch faulty; – air pressure switch incorrectly adjusted.
7 blinks ● ● ● ● ● ● ●	Loss of flame during operation: – poor burner regulation; – faulty or soiled fuel valves; – short circuit between ionization probe and earth.
10 blinks ● ● ● ● ● ● ● ● ● ●	Control box faulty.

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。

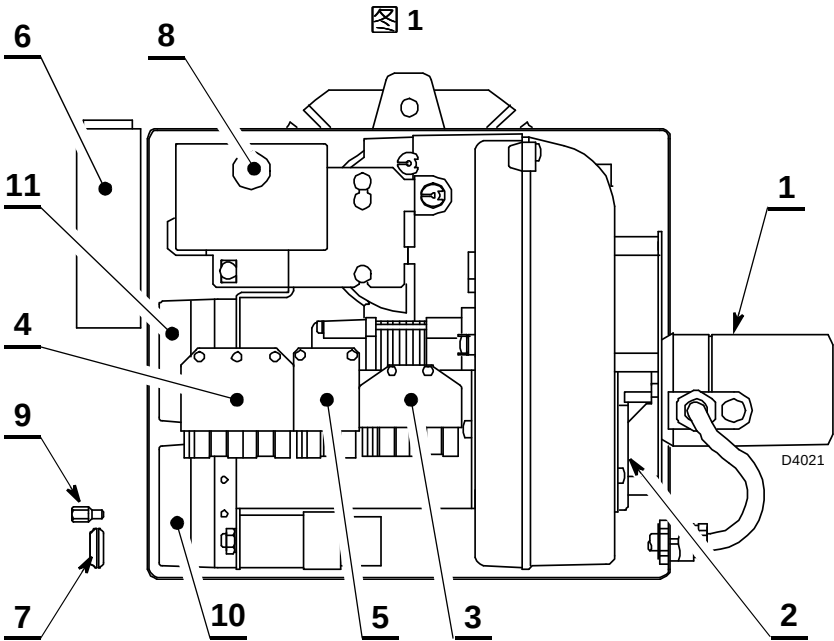
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1. 燃烧器说明

平滑两段火或加装比例调节仪实现完全比例调节。
根据 EN676 标准，燃烧器用于间歇运行。
根据 EN60529 标准燃烧器满足 IP40 保护等级。
符合下列指令：EMC 89/336/EEC - 2004/108/EC, 低电压 73/23/EEC - 2006/95/EC, 机器 98/37/EEC 和效率 92/42/EEC。
燃气阀组符合 EN676 标准。

- 1 - 伺服电机
- 2 - 风门挡板
- 3 - 燃气阀组的 6- 孔插座
- 4 - 电气接线的 7- 孔插座
- 5 - 大小火转换的 4 孔插座
- 6 - RWF40 比例调节仪
- 7 - 电缆护套
- 8 - 带锁定指示灯的复位按钮
- 9 - 用于固定机盖的螺钉
- 10 - 最小风压开关
- 11 - 最大风压开关



注意

与燃烧器一起提供的电缆护套（7）和固定机盖用（9）的螺钉必须固定到燃气阀组的同侧。

1.1 燃烧器附件

带隔热垫的法兰.....	数量 1	将法兰固定到锅炉上所需的螺钉和螺母.....	数量 4
法兰螺钉和螺母.....	数量 1	7 针插座.....	数量 1
铰链.....	数量 1	4 针插座.....	数量 1
固定机盖用的螺钉.....	数量 1	6 针插座.....	数量 1
电缆护套.....	数量 1	M12 连接件.....	数量 1
管.....	数量 1	G1/8 连接弯通.....	数量 1

2. 技术数据

2.1 技术数据

类型		729T50	730T50
热功率 (1)	kW	22/42 – 105	43/82 – 194
	kcal/h	18,900/36,100 – 90,300	37,000/70,520 – 166,840
天然气 (2 类)	净热值： 10 kWh/Nm ³		
	压力：最低 10 mbar – 最高 360 mbar		
电源	单相， ~ 50Hz 230V ± 10%		
电机	运行电流 0.7 A 2830 rpm - 297 rad/s		运行电流 1.3 A 2750 rpm - 289 rad/s
电容	4 μF		5 μF
点火变压器	初级 230 V – 45 VA 次级 1 x 15 kV – 25 mA		
电功消耗	0.13 kW		0.25 kW
(1) 参照条件： 温度 – 20℃ - 气压 1013 mbar – 海拔 0m			

对于 3 类燃气 (LPG) 适用的组件:

国家		IT - DK	GB	DE	FR	IE
燃气类别		II2H3P	II2H3P	II2E3P	II2Er3P	II2H3P
压力	G20	20 - 360	20 - 360	20 - 360	20/25 - 360	20 - 360
	G31	28/37 - 360	37 - 360	50 - 360	30 - 360	37 - 360

2.2 附件 (可选)

•PC 接口装置 : 编码 3002719

• 比例调节装置 :

比例调节运行模式下, 燃烧器自动适应小火和大火之间的任意出力, 从而保持温度或压力的稳定。

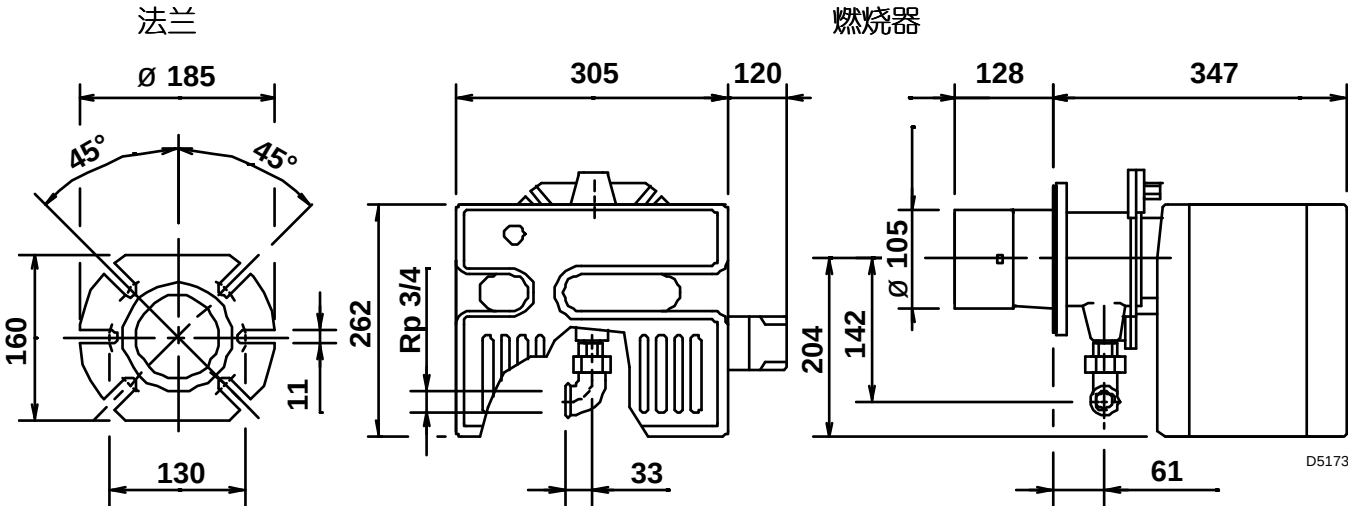
需要订购两个组件:

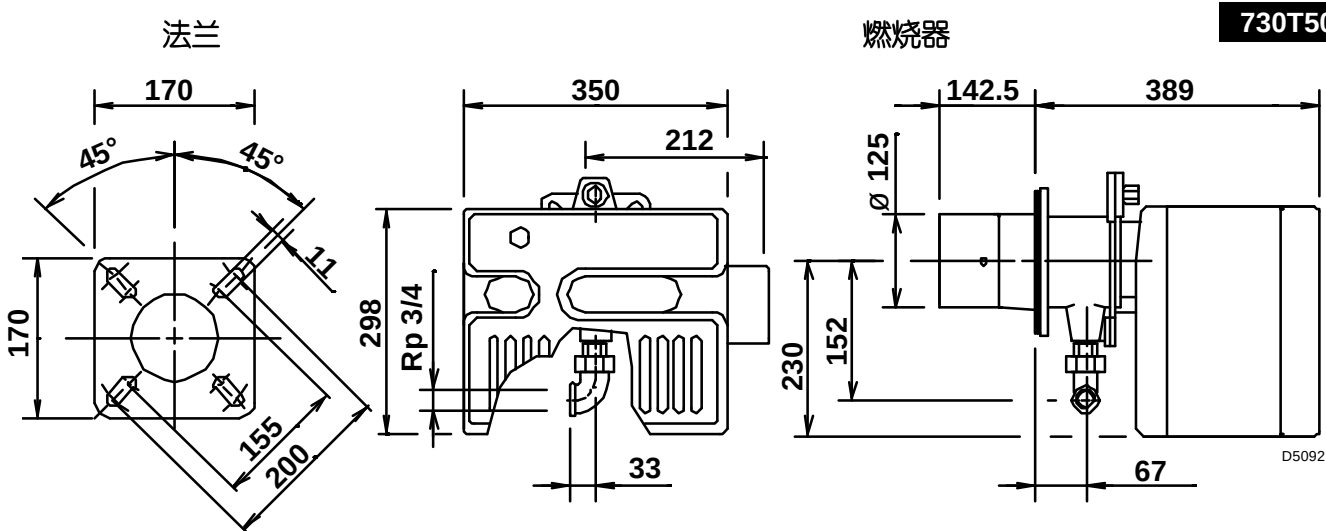
- 安装在燃烧器的比例调节仪。
- 安装在锅炉的探针。

需要控制的参数	探针			比调仪	
	范围	型号	代码	型号	代码
温度	– 100...+ 500 °C	PT 100	3010110	RWF40	3001074
压力	0...2.5 bar	输出 4...20 mA 信号	3010213		
	0...16 bar	输出 4...20 mA 信号	3010214		

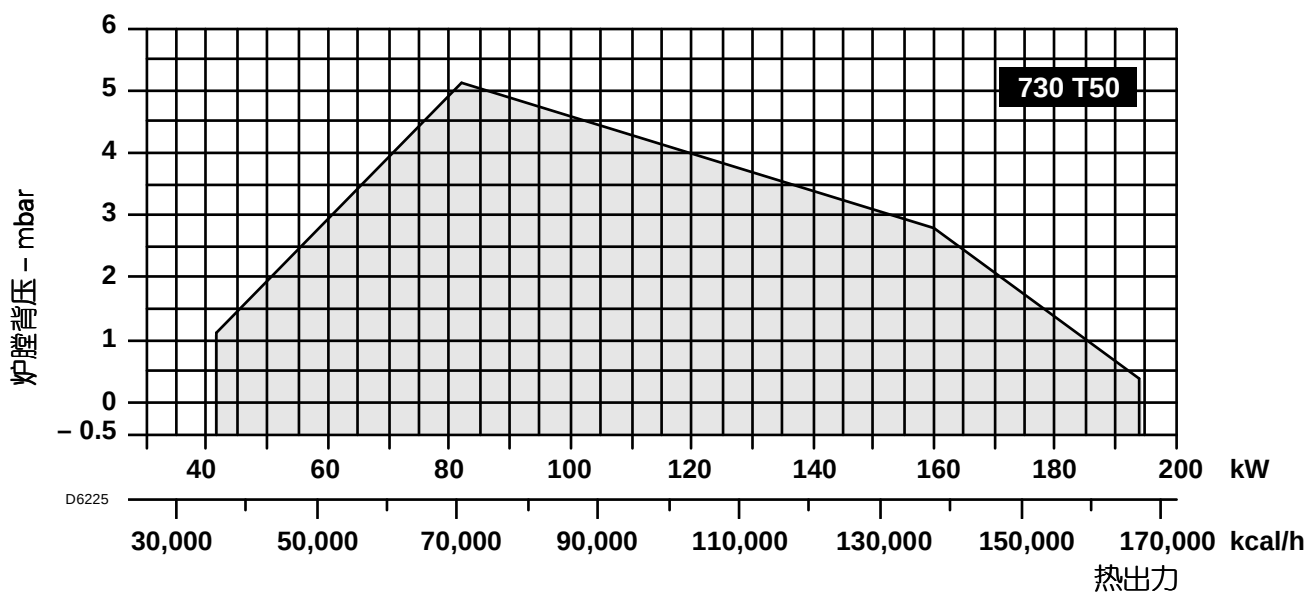
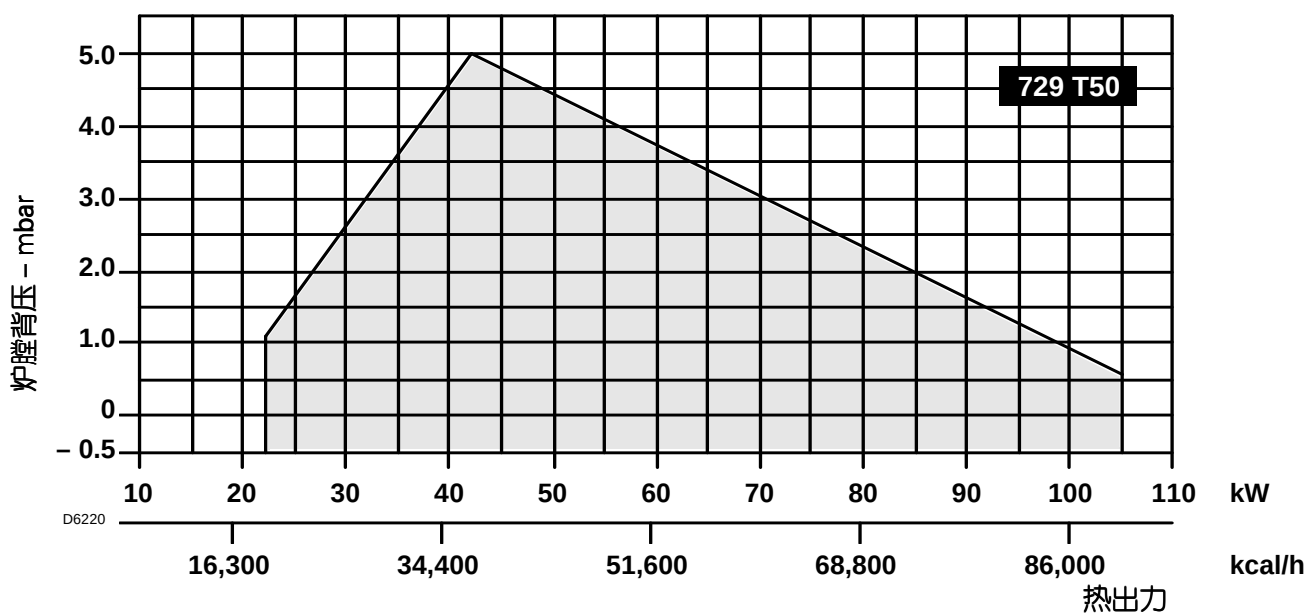
2.3 整体尺寸

729T50





2.4 负荷图 (参照 EN 676 标准)



测试锅炉

负荷图是依据 EN676 标准测试得到。

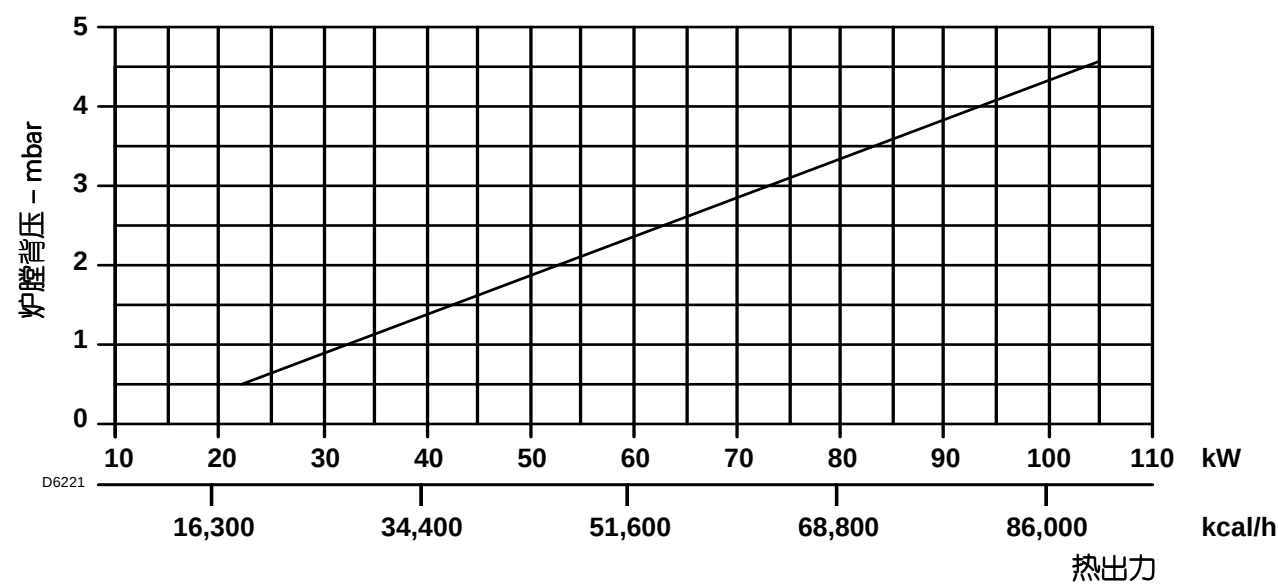
商用锅炉

如果锅炉的设计和制造符合EN303标准，并且炉膛尺寸与EN676标准中的图标接近，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 标准中的图表参考尺寸，请咨询生产商。

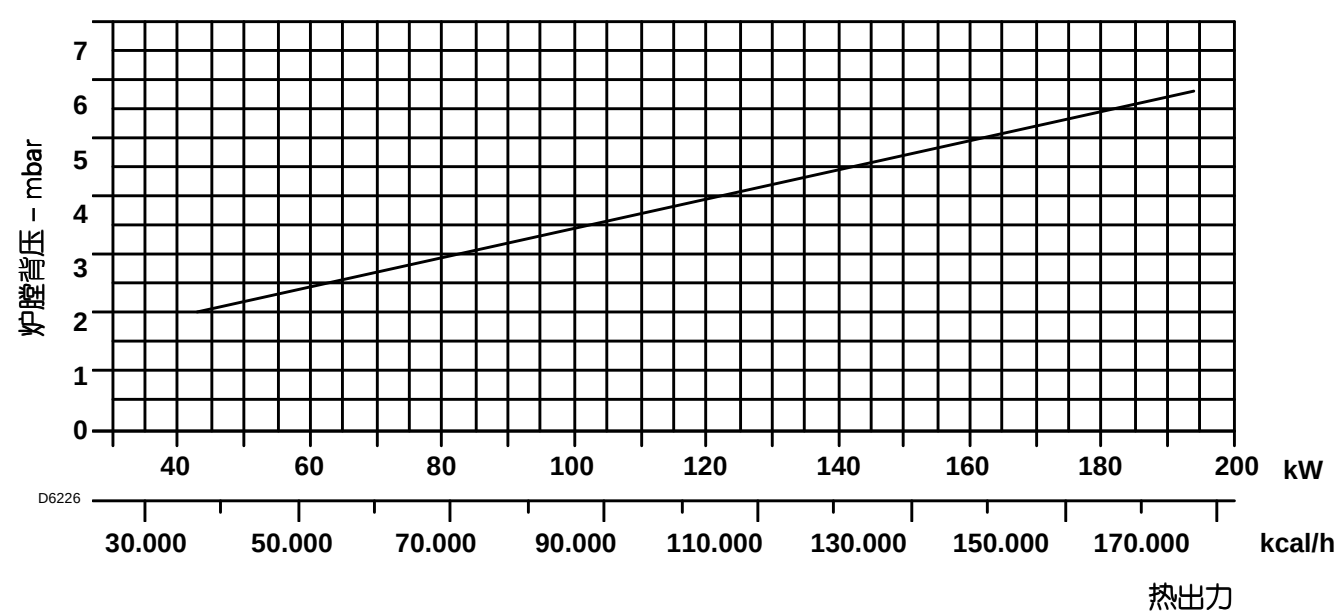
燃气压力与燃烧器出力的关系

对于型号 729T50 燃烧器，出力最大时，用净热值为 10KWh/Nm3（8.570kcal/Nm3）的 G20 燃气在锅炉背压为 0mbar 情况下进行测试，燃烧头处测量压力应为 4.6mbar。

729 T50



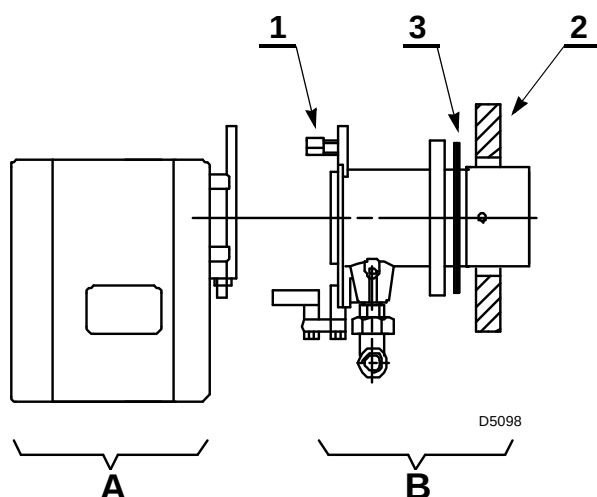
730 T50



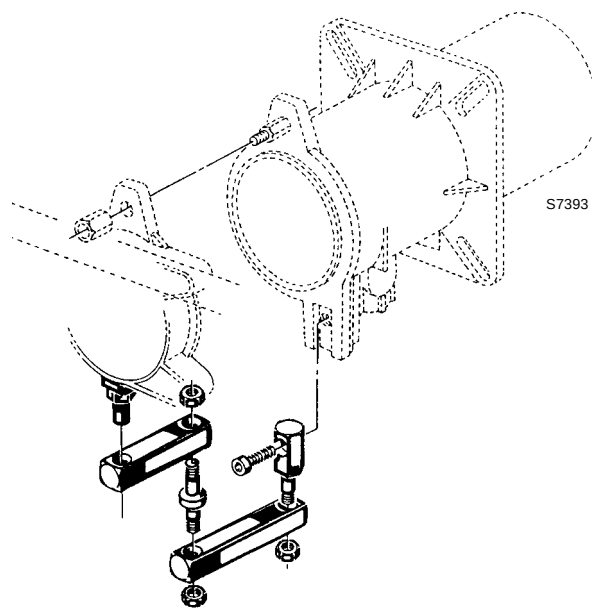
3. 安装

3.1 燃烧器安装

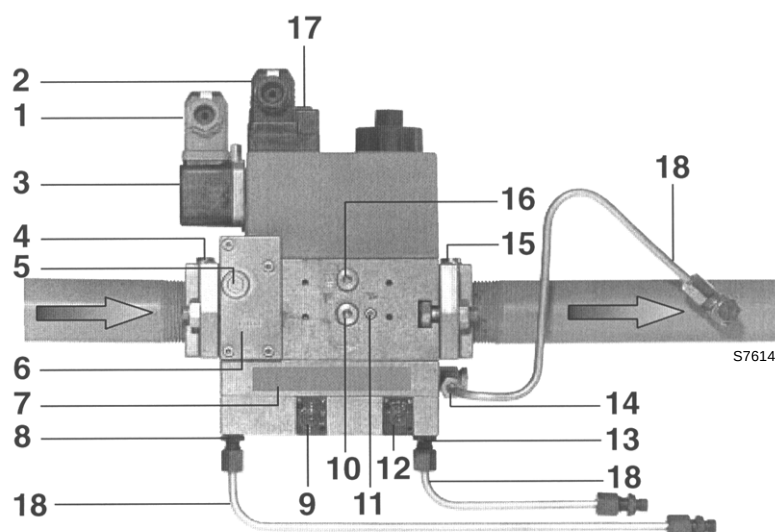
拆下螺母（1）和（A）组，将燃烧头组件从燃烧器本体上分离。固定燃烧头组件（B）到锅炉（2），插入随机提供的隔热垫（3）。



铰链装置



3.2 燃气供气管路



- 1 - 压力开关的连接线
- 2 - 阀组的连接线
- 3 - 压力开关
- 4 - 进口法兰
- 5 - 过滤器上游压力测点
- 6 - 过滤器
- 7 - 铭牌
- 8 - 空气压力管接头（空气）
- 9 - 调节螺栓，比例 V
- 10 - 测点连接管
- 11 - 测点连接管
- 12 - 调节螺栓，零位调节 N
- 13 - 炉膛背压测试连接管
- 14 - 压力测试连接管（燃气）
- 15 - 出口法兰
- 16 - 测试点连接
- 17 - LED 运行指示灯
- 18 - 取压管线

符合 EN 676 标准的燃气阀组：

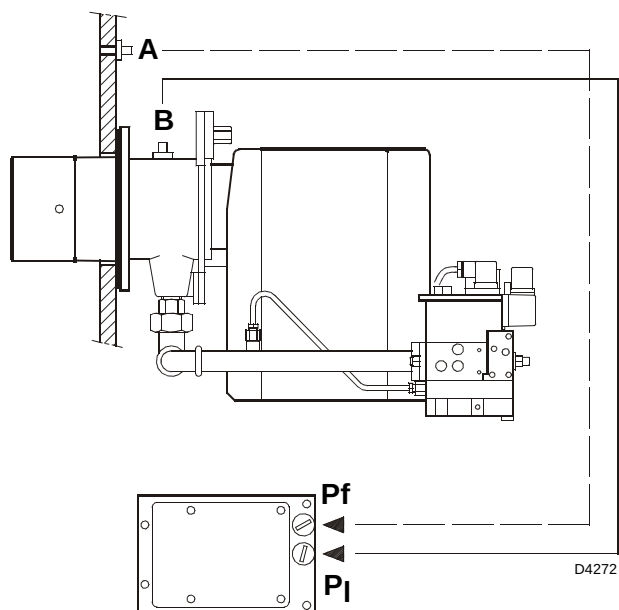
燃气阀组		燃烧器	连接尺寸		应用
类型	代码		入口	出口	
MB-VEF 407 B01	3970535	GS10-20/M	Rp 3/4	Rp 3/4	天然气和 LPG
MB-VEF 412 B01	3970536	GS20/M	Rp 3/4	Rp 3/4	天然气（出力 ≥ 120 kW）

燃气阀组是单独提供的，其调整见所附说明书。

将压力管连接到燃气阀组上

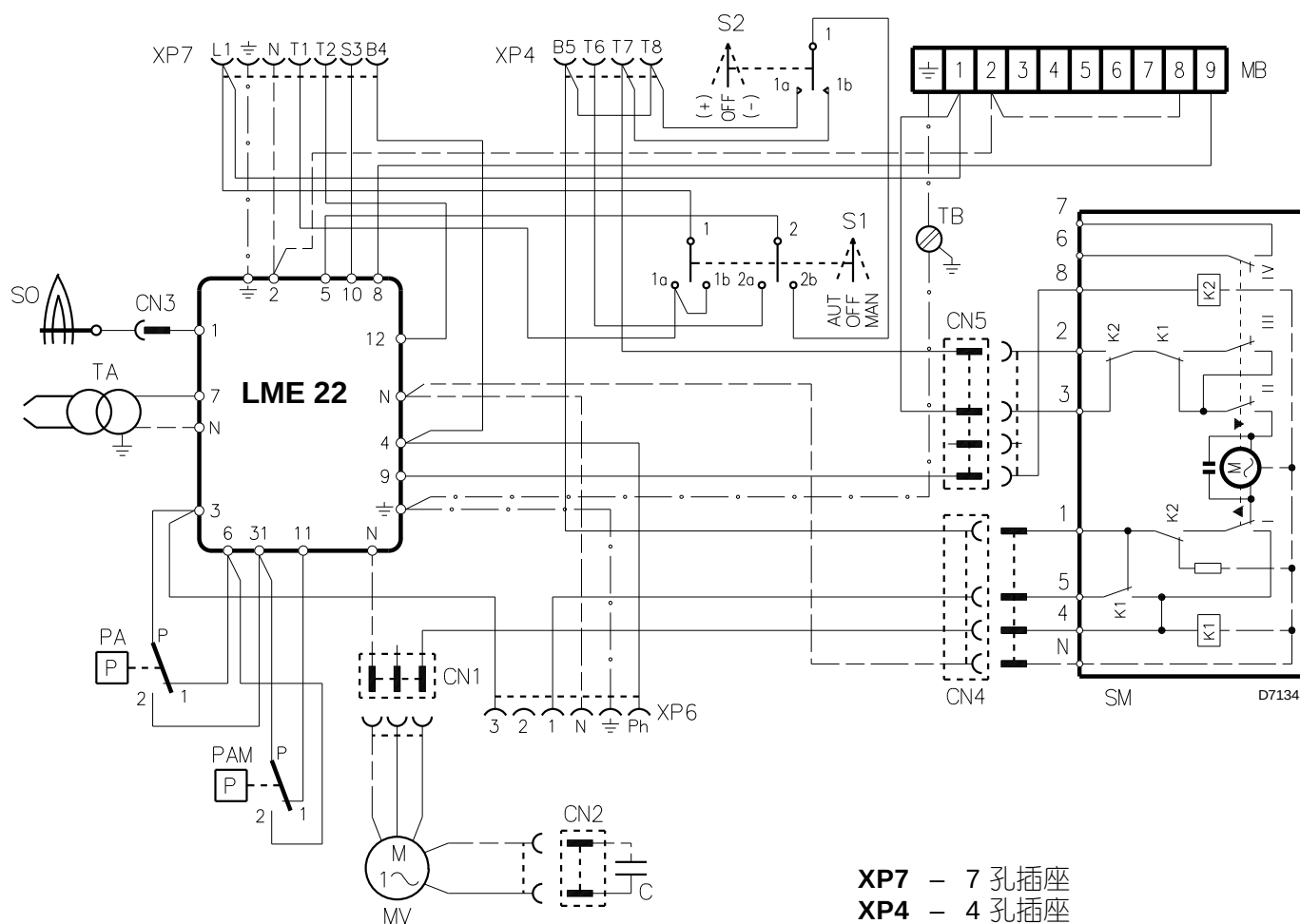
按如下步骤操作：

- 将3个 G1/8接头 (一个用在燃烧器上，两个用在阀组上) 安装在 **A** 点，**Pf** 点和 **Pi** 点。
- 安装 M12 接头在 **B** 点。
- 将随机提供的软管分割成 2 等分。
- 用软管连接炉膛接口点 **A** 和阀组接口 **Pf**，连接燃烧器上的接口 **B** 和阀组接口 **Pi**。



4. 电气接线

4.1 电气接线, (工厂完成)



- XP7** - 7 孔插座
XP4 - 4 孔插座
XP6 - 6 孔插座
MB - 辅助接线板
S1 - 开关:
MAN = 手动运行
AUT = 自动运行
OFF = 备用
S2 - 按钮:
- = 减小出力
+ = 增加出力
F1 - 防电磁干扰滤波器
TB - 燃烧器接地
SO - 电离探针
CN... - 接头
TA - 点火变压器
PA - 最小风压开关
PAM - 最大风压开关
C - 电机电容
SM - 伺服电机

注意:

零线和火线不要接反! 按图所示仔细连接好接地线。

- ▶ 连接导线横截面积不小于 1mm²。(除非当地标准和法规另有要求)。
- ▶ 电气接线必须由具有本国资质认证的人员来完成。

测试

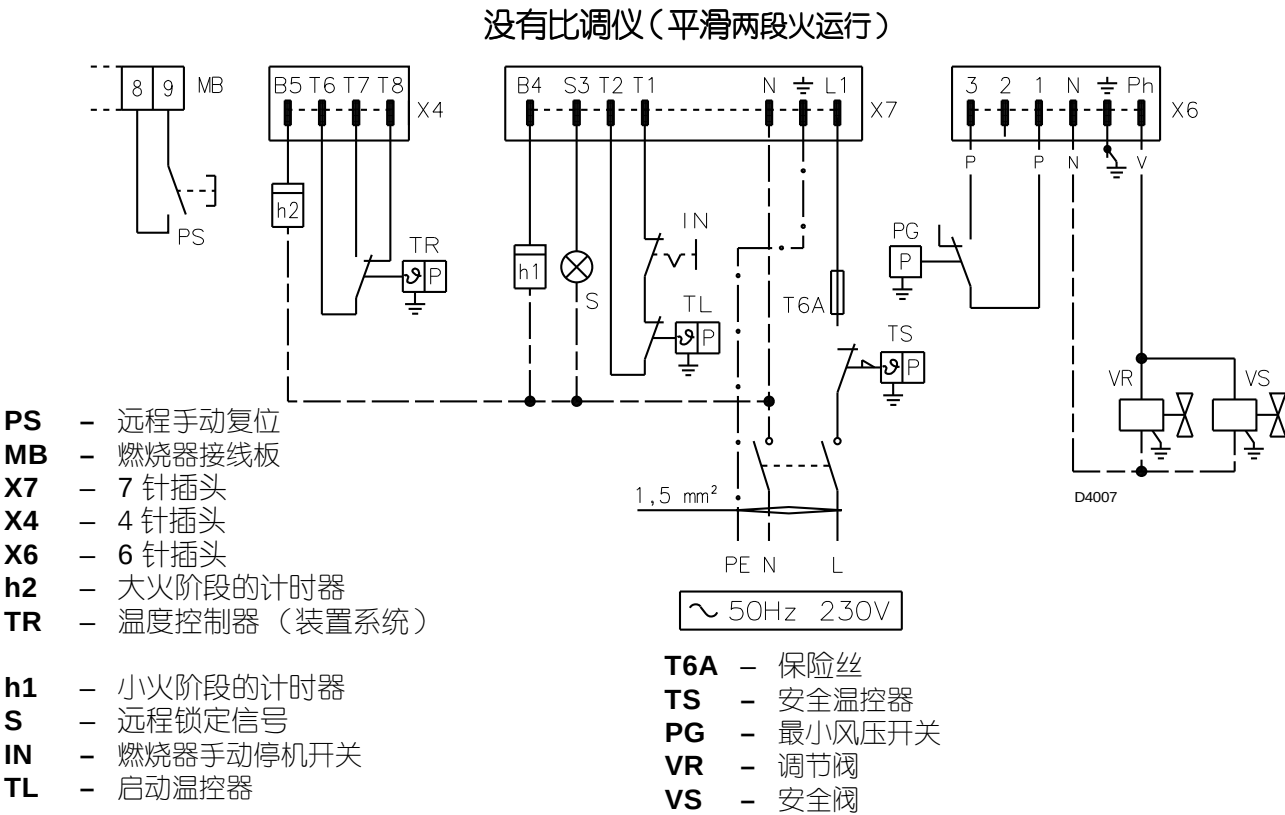
检查断开温控开关后燃烧器是否停机, 断开控制盒外的连接探针的红色电缆上的接头 (**CN3**) 检查燃烧器是否锁定。

注意:

燃烧器设计为间歇运行。这就意味着燃烧器必须每隔 24 小时停机 1 次来检查控制盒在启动过程中的可靠性。通常锅炉的启动温控器 (**TL**) 可以保证燃烧器停机。如果不能保证停机就需要在启动温控器 (**TL**) 上串联一个时间继电器来保证每 24 小时燃烧器停机 1 次。

4.2 电气连接 (由安装方负责完成)

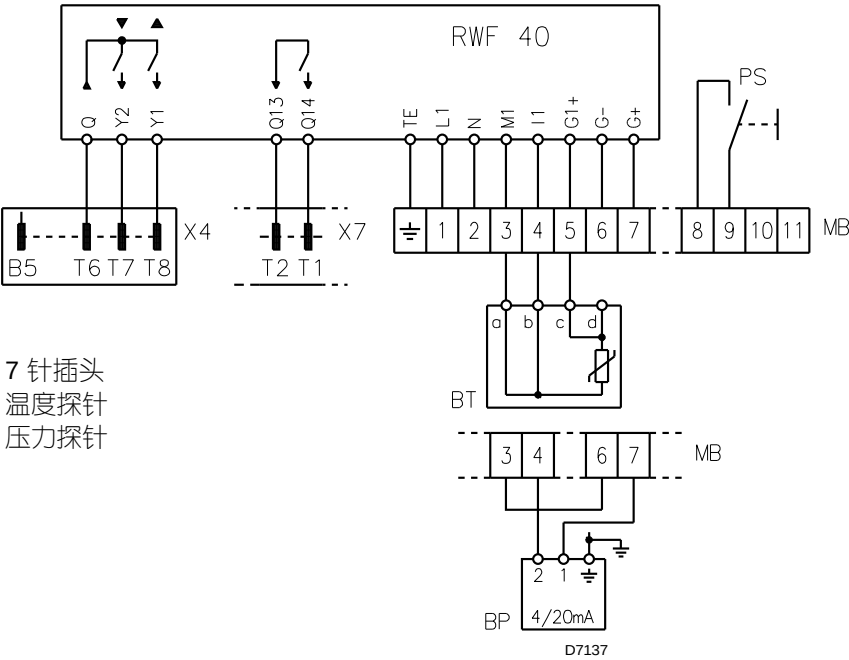
警告
如果锅炉带有 7 针插头，则应使用随燃烧器提供的插头替换该 7 针插头。



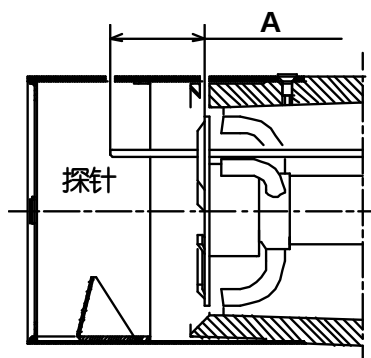
带比例调节仪 (完全比例调节运行)

注意
4 针插头的 T6 和 T8 之间一定不能有任何接触，7 针插头的 T1 和 T2 之间同样不得有任何的接触，以免干扰比调仪。

- PS** - 远程手动复位
MB - 燃烧器接线板
X4 - 4 针插头
- X7** - 7 针插头
BT - 温度探针
BP - 压力探针

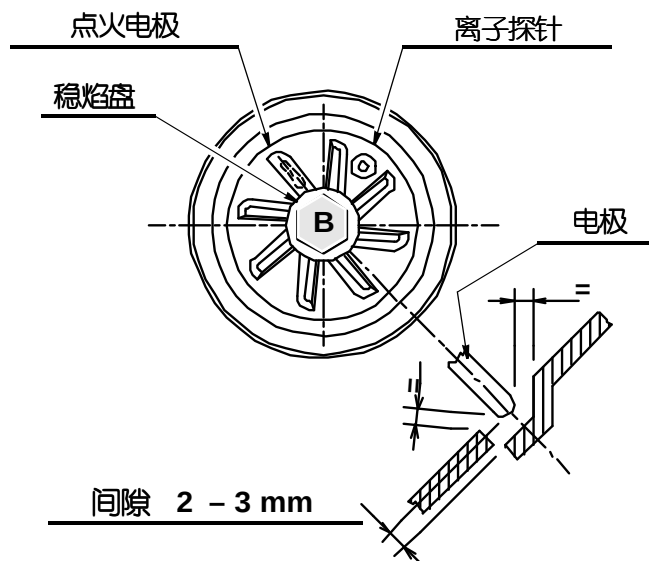


4.3 探针 - 电极定位



D4046

型号	A	B
729 T50	~ 40 mm	2.2
730 T50	~ 47 mm	3.7

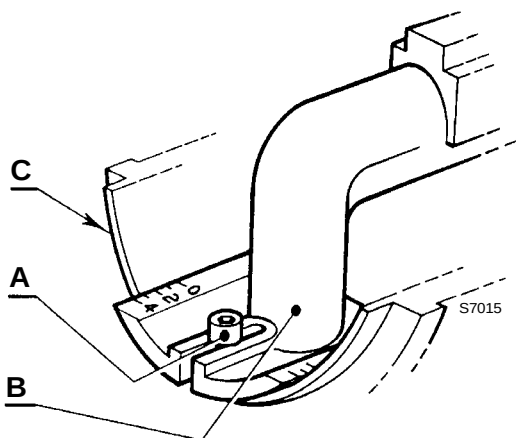


5. 燃烧器设置

5.1 燃烧头设置

出厂设置是为中等出力而设置的，根据锅炉实际出力需要调整时按如下步骤进行：

松开螺栓（A），移动肘型弯（B）使之与联轴器（C）的断面对齐在相应的刻度位置。拧紧螺栓（A）。

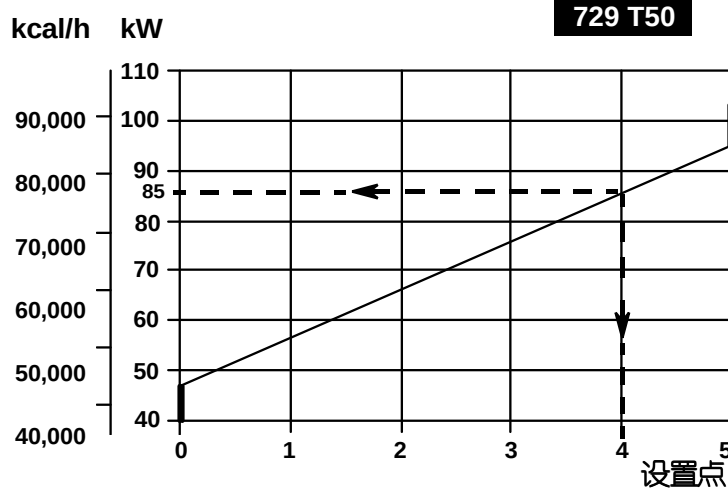


示例：

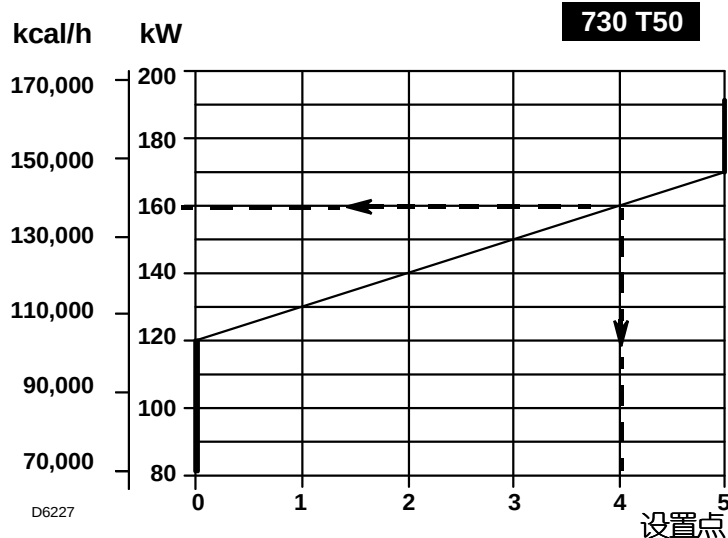
729 T50型号的燃烧器安装在出力为77 kW，效率为90%的锅炉上，燃烧器出力为85 kW，按照图表所示，燃烧头设定为4。

注意：

此图表仅供参考。
可以根据实际的锅炉特征来调整燃烧头的设置。



D6223



D6227

5.2 伺服电机的设置 (见图 2)

备用

凸轮 II (蓝色)
凸轮 II 保证燃烧器停机 (备用) 时风门挡板处于全关闭位置。工厂设置为 0°。不要改变!

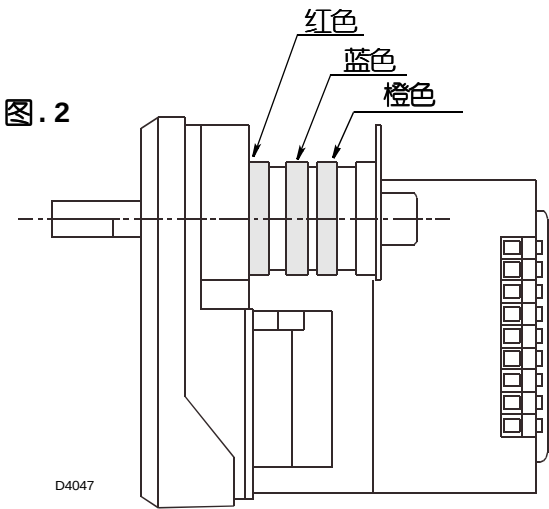
小火

凸轮 III (橙色)
凸轮 III 设置风门挡板的点火和最小出力位置。工厂设置为 20°。不要减小该设置值, 可以根据应用需要增大一点。

大火

凸轮 I (红色)
凸轮 I 限制了最大出力时的旋转角度。工厂设置为 90°。不要增大该设置值: 增大设置值可能会损坏燃烧器。

注意: 伺服电机装配了两个小螺杆, 以便能细致设置凸轮 II (蓝色) 和凸轮 III (橙色)。



5.3 试运行

完成电气连接和阀组连接后, 将最小风压开关和最低燃气压力开关设置为最小值; 最大风压力开关设置为最大值。这些 设置设置只能在试运行阶段使用。

将气压表连接到燃烧器上的燃气压力测试点。

- 1) 如下表数据作为参考:
-) 应用的出力要求。
 -) 具体应用的最小出力。
 -) 最大出力时, 在燃烧头处测量到的燃气压力值。
 -) 风门挡板的设置。

型号	热出力	最小出力	燃烧头处燃气压力	风门挡板的设置
	kW	kW	mbar (●)	设置点
729T50	42	22	1.4	4
	60	26	2.4	5
	81	30	3.2	6
	106	35	3.7	8
730T50	81	43	3.2	5.25
	159	47.8	4.6	7
	170.3	48.9	5.1	最大值

- (●) 这些数值的参考条件是: 最大出力时炉膛背压为 0 mbar。
- 2) 对于要求的最大出力, 首先设置燃烧头 (第 5.1 节), 并且按照第 10 页表格手动设置风门挡板。

- 3) 选择手动 (MAN) 模式运行并且启动燃烧器。
- 4) 当燃烧器着火后, 按 (+) 按钮手动驱动伺服电机到大火位置, 并且检查燃气压力是否随之增加。
- 5) 检查大火时的燃气量。使用阀体上的调整螺钉 V 和 N (主要是 V) 设置适当的燃气流量。增加 V 或 N 的设置, 可以增加燃气流量。
- 6) 手动调整风门挡板, 使烟气中 CO_2 的含量达到一定的水平。调整风门挡板的同时也可以通过相应地调整 V 来改变燃气流量。
- 7) 通过按 (-) 按钮把出力降低到小火位置。检查燃气流量, 如有必要可以适当调节, 只能对螺丝 N 进行调整, 保持烟气中的 CO_2 含量达标。
- 8) 如果小火位置的出力比要求的偏多或偏少, 相应地调整 **CAM III (橙色)**。螺丝 N 的任何调整都将影响大火时的出力。
- 9) 转到大火位置。只通过调整螺钉 V 重新调整大火出力。
- 10) 再次转到小火位置, 只通过调整螺钉 V 重新调整小火时的出力。
- 11) 重复第 (9) 和第 (10) 步两到三次, 直到不再需要调整螺钉 V 和 N 为止。
- 12) 最后将选择开关转到自动 (AUT) 模式运行。

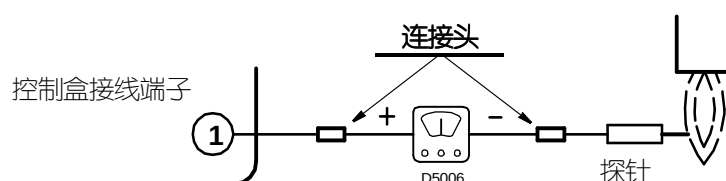
5.4 燃烧调整

根据效率指令 92/42/EEC, 燃烧器应用在锅炉上时, 调整和测试必须按照锅炉说明书进行操作, 包括确认烟气中 CO 和 CO_2 的浓度, 温度以及锅炉中水的平均温度。

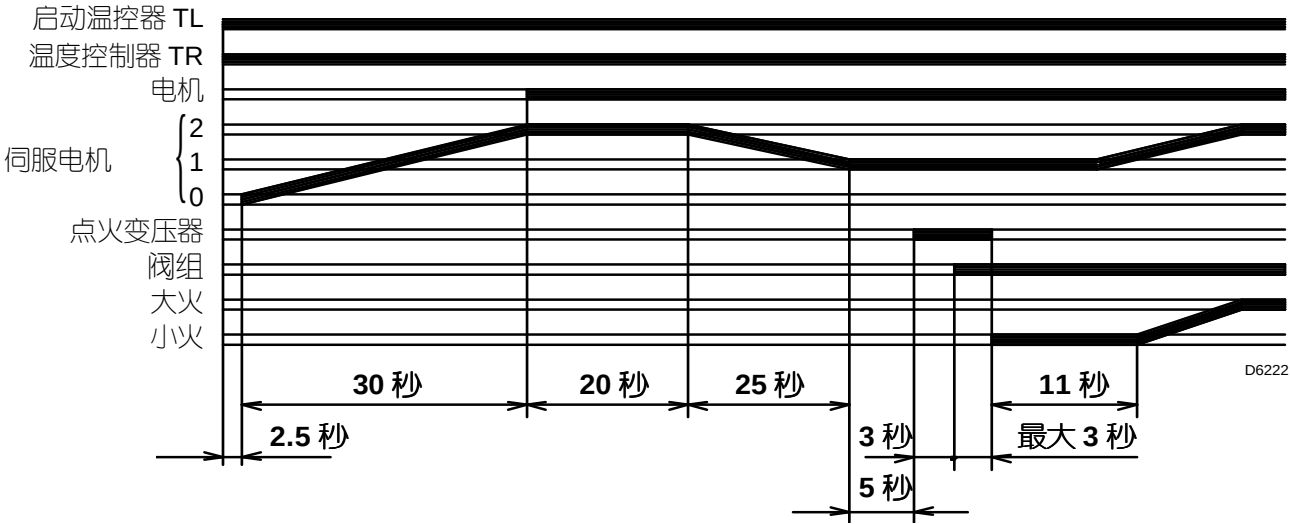
EN 676		过量空气: 最大出力 $\lambda \leq 1.2$ - 最小出力 $\lambda \leq 1.3$			
燃气	理论最大值 CO_2 0 % O_2	设定 CO_2 %		CO mg/kWh	NO_x mg/kWh
		$\lambda = 1.2$	$\lambda = 1.3$		
G 20	11.7	9.7	9.0	≤ 100	≤ 170
G 30	14.0	11.6	10.7	≤ 100	≤ 230
G 31	13.7	11.4	10.5	≤ 100	≤ 230

离子探针电流

控制盒正常运行所需的最小电流为 $2 \mu\text{A}$, 通常离子探针会产生更高的电流, 因此不需要检测, 如果需要测量电离电流, 断开红色电缆上的连接头 (CN3) (见第 7 页接线图), 并串入微安表。



5.5 燃烧器启动循环



5.6 最低风压开关

在最低风压开关设置在刻度起始位置的条件下完成各项燃烧器的调整后再来调整最低风压开关。让燃烧器运行在最小出力，沿顺时针方向缓慢转动旋钮直到燃烧器锁定。然后沿逆时针方向转动旋钮回调设置值点的大约 20%，然后检查燃烧器是否正常启动，如果燃烧器再次锁定，再沿逆时针方向稍微转动旋钮。

5.7 最高风压开关

在最高风压开关设置在刻度盘最大值的条件下完成所有燃烧器的调整之后再设置。其目的就是为了避免在炉膛压力增加超过正常值时关闭燃烧器。初始时设置在最大值，让燃烧器运行在最大出力，逆时针调整旋钮，降低设定值直到燃烧器停机为止。然后，顺时针转动旋钮增大一个刻度值并且重新启动燃烧器。如果由于点火时导致炉膛内压力波动，燃烧器关闭，检查启动时点火出力是否小于大火出力的 25%。如果是，将最高燃气压力开关再增加半个刻度值并且反复测试。

注意：
按照 EN1020 标准，正常运行条件下的 CO 值不能超过 0.1%。

注意：
一般来说，风压开关必须防止空气压力降低到设定值的80%以下以保证烟气中的CO含量不超过 1% (10,000 ppm)。为了检查这一点，将烟气分析仪插入烟道中，缓慢关小风机吸入口（比如厚纸板）尺寸，检查燃烧器是否在 CO 含量超过 1% 之前锁定。

6. 维护

燃烧器要求合格且授权的技术人员按照法律和当地标准 进行定期维护。
维护对于燃烧器的可靠性十分重要，也可避免燃料过度消耗和污染超标。
进行清洁或者维护操作之前，必须关闭燃烧器的主电源开关。

- 一般检查项目包括：
- 燃炉连续工作 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 (%)
 - CO 含量 (ppm)
 - 烟气温度 (℃)。

7. 故障 / 解决方案

控制盒具有自诊断系统，通过该功能，可以方便地检查故障并且找到解决方案。
为了使用该功能，锁定后至少等待 10 秒，然后按复位按钮超过 3 秒钟，释放按钮后，红色 LED 指示灯脉冲闪烁如下表所示。

红色 LED 指示灯亮 等待 10 秒	按住复位按钮 超过 3 秒	闪烁	大约 3 秒	闪烁
		● ● ● ● ●		● ● ● ● ●

LED 指示灯每隔 3 秒钟连续闪烁一次。
闪烁的次数可以提供以下可能的故障信息：

闪烁次数	可能原因
闪烁 2 次 ● ●	安全时间过后火焰不稳定： - 电离探针故障； - 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： - 确定 VPS 是否锁定； - 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 ● ● ● ●	预吹扫期间的外部光线，或者控制盒故障。
闪烁 5 次 ● ● ● ● ●	最低风压开关没有断开： - 风压开关故障； - 风压开关调整不当。
闪烁 7 次 ● ● ● ● ● ● ●	运行过程中火焰熄灭： - 燃烧器调整不当； - 燃气阀组故障或脏； - 电离探针对地短路。
闪烁 10 次 ● ● ● ● ● ● ● ● ● ●	控制盒故障。
