

**GB**

**Light oil burner**

**CN**

**轻油燃烧器**

Two stage operation

两段火运行



**RIELLO 40**

**CODE - 代码**

**MODEL - 型号**

**TYPE - 类型**

20018161

G3D MC

1000T



**Original instructions**

说明书原文翻译

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**1 Declaration****Declaration of conformity in accordance with ISO / IEC 17050-1**

Manufacturer:	RIELLO S.p.A.	
Address:	Via Pilade Riello, 7 37045 Legnago (VR)	
Product:	Light oil burner	
Model:	G3D MC	
These products are in compliance with the following Technical Standard: EN 267		
and according to the European Directives:		
MD	2006/42/EC	Machine Directive
LVD	2006/95/EC	Low Voltage Directive
EMC	2004/108/EC	Electromagnetic Compatibility

**The quality is guaranteed by a quality and management system certified in accordance with UNI EN ISO 9001.**

Legnago, 30.07.2010

Mr. G. Conticini  
Burners Division Department  
RIELLO S.p.A.



**2 Information and general warnings**

**2.1 Information about the instruction manual**

**2.1.1 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 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.

**Symbols used in the manual**

In some parts of the manual you will see triangular DANGER signs. Pay great attention to these, as they indicate a situation of potential danger.

**2.1.2 General dangers**

The **dangers** can be of **3 levels**, as indicated below.



**DANGER**

Maximum danger level!  
This symbol indicates operations which, if not carried out correctly, cause serious injury, death or long-term health risks.



**WARNING**

This symbol indicates operations which, if not carried out correctly, may cause serious injury, death or long-term health risks.



**CAUTION**

This symbol indicates operations which, if not carried out correctly, may cause damage to the machine and/or injury to people.

**2.1.3 Other symbols**



**DANGER**

**DANGER: LIVE COMPONENTS**  
This symbol indicates operations which, if not carried out correctly, lead to electric shocks with lethal consequences.



**DANGER: FLAMMABLE MATERIAL**  
This symbol indicates the presence of flammable materials.



**DANGER: BURNING**  
This symbol indicates the risks of burns due to high temperatures.



**DANGER: CRUSHING OF LIMBS**  
This symbol indicates the presence of moving parts: danger of crushing of limbs.



**WARNING: MOVING PARTS**  
This symbol indicates that you must keep limbs away from moving mechanical parts; danger of crushing.



**DANGER: EXPLOSION**

This symbol signals places where an explosive atmosphere may be present. An explosive atmosphere is defined as a mixture - under atmospheric conditions - of air and flammable substances in the form of gases, vapours, mist or dust in which, after ignition has occurred, combustion spreads to the entire unburned mixture.



**PERSONAL PROTECTION EQUIPMENT**

These symbols indicate the equipment that must be worn and kept by the operator for protection against threats against safety and/or health while at work.



**OBLIGATION TO ASSEMBLE THE COVER AND ALL THE SAFETY AND PROTECTION DEVICES**

This symbol signals the obligation to reassemble the hood and all the safety and protection devices of the burner after any maintenance, cleaning or checking operations.



**ENVIRONMENTAL PROTECTION**

This symbol gives indications for the use of the machine with respect for the environment.



**IMPORTANT INFORMATION**

This symbol indicates important information that you must bear in mind.

- This symbol indicates a list.

**Abbreviations used**

Ch.	Chapter
Fig.	Figure
Page	Page
Sec.	Section
Tab.	Table

**2.1.4 Delivery of the system and the instruction manual**

When the system is delivered, it is important that:

- the instruction manual is delivered 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 must carefully inform the user about:
  - the use of the system;
  - any further tests that may be required before activating the system;
  - maintenance, and the need to have the system checked at least once a year by a representative of the manufacturer or another specialised technician.
 To ensure a periodic check, the manufacturer recommends the drawing up of a Maintenance Contract.

**2.2 Guarantee and responsibility**

The manufacturer guarantees its new products from the installation date, in accordance with the regulations in force and/or the sales contract. At the moment of the first start-up, check that the burner is integral and complete.



**WARNING**

Failure to observe the information given in this manual, operating negligence, incorrect installation and carrying out of non authorised modifications will result in the annulment by the manufacturer of the guarantee that it supplies with the burner.

In particular, the rights to the guarantee and the responsibility will no longer be valid, in the event of damage to things or injury to people, if such damage/injury was due to any of the following causes:

- incorrect installation, start-up, use and maintenance of the burner;
- improper, incorrect or unreasonable use of the burner;
- intervention of unqualified personnel;
- carrying out of unauthorised modifications on the equipment;
- use of the burner with safety devices that are faulty, incorrectly applied and/or not working;
- installation of untested supplementary components on the burner;
- powering of the burner with unsuitable fuels;
- faults in the fuel supply system;
- use of the burner even following an error and/or an irregularity;
- repairs and/or overhauls incorrectly carried out;
- modification of the combustion chamber with inserts that prevent the regular development of the structurally established flame;
- insufficient and inappropriate surveillance and care of those burner components most likely to be subject to wear and tear;
- the use of non-original components, including spare parts, kits, accessories and optional;
- force majeure.

**The manufacturer furthermore declines any and every responsibility for the failure to observe the contents of this manual.**

## 3 Safety and prevention

### 3.1 Introduction

The burners have been designed and built in compliance with current regulations and directives, applying the known technical rules of safety and envisaging all the potential danger situations.

It is necessary, however, to bear in mind that the imprudent and clumsy use of the equipment may lead to situations of death risk for the user or third parties, as well as the damaging of the burner or other items. Inattention, thoughtlessness and excessive confidence often cause accidents; the same applies to tiredness and sleepiness.

It is a good idea to remember the following:

- The burner must only be used as expressly described. Any other use should be considered improper and therefore dangerous.

In particular:

it can be applied to boilers operating with water, steam, diathermic oil, and to other uses expressly named by the manufacturer;

the type and pressure of the fuel, the voltage and frequency of the electrical power supply, the minimum and maximum deliveries for which the burner has been regulated, the pressurisation of the combustion chamber, the dimensions of the combustion chamber and the room temperature must all be within the values indicated in the instruction manual.

- Modification of the burner to alter its performance and destinations is not allowed.
- The burner must be used in exemplary technical safety conditions. Any disturbances that could compromise safety must be quickly eliminated.
- Opening or tampering with the burner components is not allowed, apart from the parts requiring maintenance.
- Only those parts envisaged by the manufacturer can be replaced.



The manufacturer guarantees safety and proper functioning only if all burner components are intact and positioned correctly.

### 3.2 Personnel training

The user is the person, body or company that has acquired the machine and intends to use it for the specific purpose. He is responsible for the machine and for the training of the people working around it.

The user:

- undertakes to entrust the machine exclusively to suitably trained and qualified personnel;
- undertakes to inform his personnel in a suitable way about the application and observance of the safety instructions. With that aim, he undertakes to ensure that everyone knows the use and safety instructions for his own duties;
- Personnel must observe all the danger and caution indications shown on the machine.
- Personnel must not carry out, on their own initiative, operations or interventions that are not within their province.
- Personnel must inform their superiors of every problem or dangerous situation that may arise.
- The assembly of parts of other makes, or any modifications, can alter the characteristics of the machine and hence compromise operating safety. The manufacturer therefore declines any and every responsibility for any damage that may be caused by the use of non-original parts.

In addition:



- the user must take all the measures necessary to prevent unauthorised people gaining access to the machine;
- the user must inform the manufacturer if faults or malfunctioning of the accident prevention systems are noticed, along with any presumed danger situation.
- Personnel must always use the personal protective equipment envisaged by legislation and follow the indications given in this manual.



**4 Technical description of the burner**

**4.1 Technical data**

Type	1000T
Thermal power – output	19 – 35 kW – 1.6 – 3 kg/h
Fuel	Light oil, viscosity 4 – 6 mm <sup>2</sup> /s at 20 °C (Hi = 11.86 kWh/kg)
Electrical supply	Single phase, ~ 50Hz 230 V ± 10%
Motor	Run current 0.7 A – 2850 rpm – 298 rad/s
Capacitor	4 µF
Ignition transformer	Secondary 8 kV – 16 mA
Pump	Pressure 7 – 15 bar
Electrical power consumption	0.115 kW

Tab. A

**4.2 Burner description**

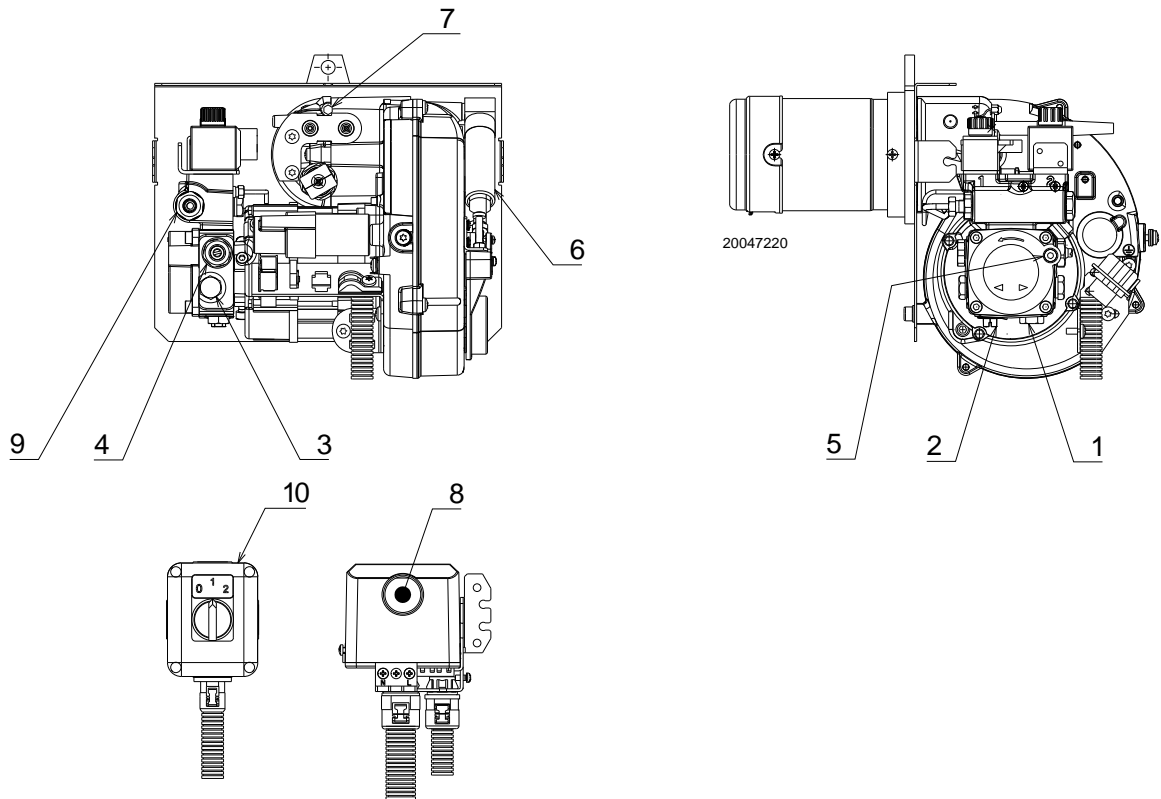


Fig. 1

- |                                               |                                                        |
|-----------------------------------------------|--------------------------------------------------------|
| 1 – Return line                               | 6 – Hydraulic jacks with air-damper                    |
| 2 – Suction line                              | 7 – Combustion head adjustment screw                   |
| 3 – Gauge connection                          | 8 – Lock-out lamp and reset button                     |
| 4 – Pressure regulator, 2 <sup>nd</sup> stage | 9 – Regulation pressure, 1 <sup>st</sup> stage         |
| 5 – Vacuum gauge connection                   | 10 – Selector, 1 <sup>st</sup> - 2 <sup>nd</sup> stage |

**4.3 Burner equipment**

- |                                     |       |
|-------------------------------------|-------|
| Hose with nipple .....              | No. 2 |
| Insulating gasket .....             | No. 3 |
| Cover .....                         | No. 1 |
| Screw with two nuts for flange..... | No. 1 |
| Screws and nuts for flange.....     | No. 4 |

4.4 Burner dimensions

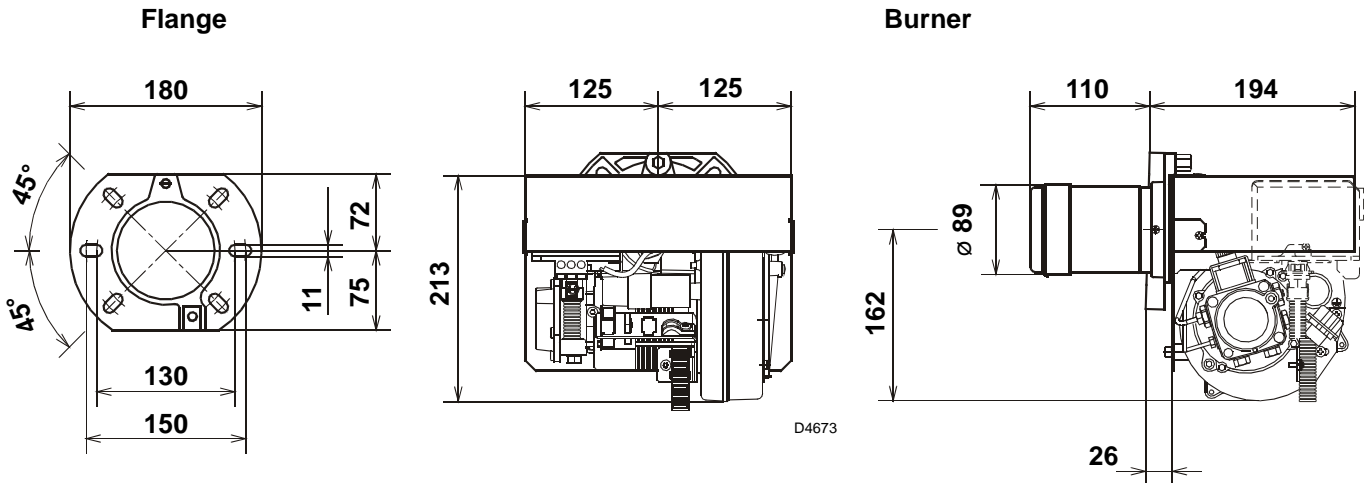


Fig. 2

4.5 Firing rate

The **MAXIMUM OUTPUT** is chosen from within the diagram area (Fig. 3).

The **MINIMUM OUTPUT** must not be lower than the minimum limit of the diagram.

The burner delivery must be selected within area of the diagrams (Fig. 3). This area is called firing rate and provides the maximum delivery of the burner in relation to the pressure in the combustion chamber.

The work point may be found by plotting a vertical line from the desired delivery and a horizontal line from the pressure in the combustion chamber. The intersection of these two lines is the work point which must lie within the firing rates.



The firing rate area values have been obtained considering a surrounding temperature of 20 °C, and an atmospheric pressure of 1013 mbar (approx. 0 m above sea level).

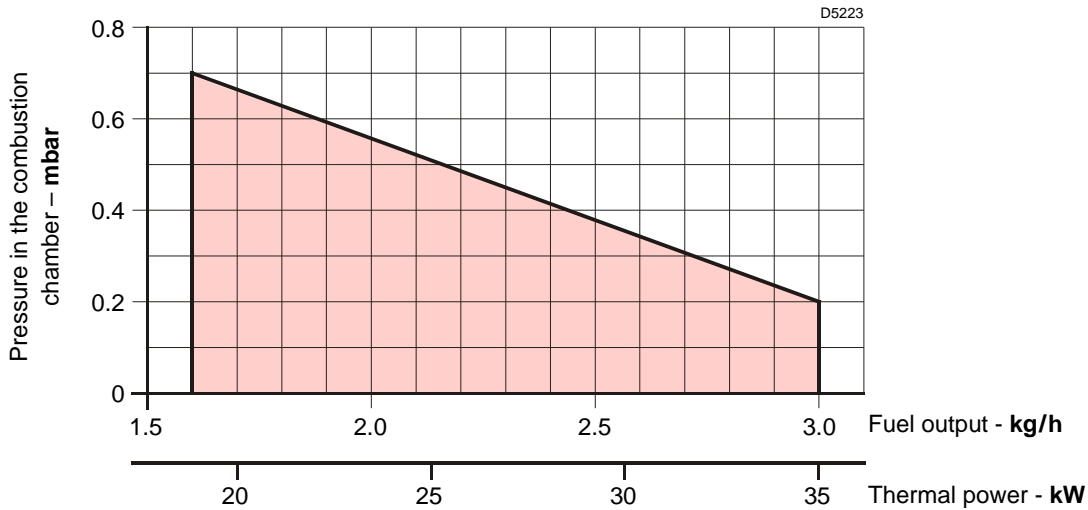


Fig. 3

**5 Installation**

**5.1 Notes on safety for the installation**

After carefully cleaning all around the area where the burner will be installed, and arranging the correct lighting of the environment, proceed with the installation operations.



All the installation, maintenance and disassembly operations must be carried out with the electricity supply disconnected.



The installation of the burner must be carried out by qualified personnel, as indicated in this manual and in compliance with the standards and regulations of the laws in force.

**5.2 Handling**

The packaging of the burner includes a carton box, so it is possible to move the burner (still packaged) with a transpallet truck or fork lift truck.



The handling operations for the burner can be highly dangerous if not carried out with the greatest attention: keep any unauthorised people at a distance; check the integrity and suitability of the available means of handling. Check also that the area in which you are working is empty and that there is an adequate escape area (i.e. a free, safe area to which you can quickly move if the burner should fall). When handling, keep the load at not more than 20-25 cm from the ground.



After positioning the burner near the installation point, correctly dispose of all residual packaging, separating the various types of material. Before proceeding with the installation operations, carefully clean all around the area where the burner will be installed.

**5.3 Preliminary checks**

**Checking the consignment**



After removing all the packaging, check the integrity of the contents. In the event of doubt, do not use the burner; contact the supplier.



The output of the burner must be within the boiler's firing rate;



The packaging elements (wooden cage or cardboard box, nails, clips, plastic bags, etc.) must not be abandoned as they are potential sources of danger and pollution; they should be collected and disposed of in the appropriate places.



A burner label that has been tampered with, removed or is missing, along with anything else that prevents the definite identification of the burner makes any installation or maintenance work difficult.

**Checking the characteristics of the burner**

R.H.E.	A		B	
	D	C	D ≤	H
	E	F		
	G			

S8585

**Fig. 4**

Check the identification label of the burner, showing:

- the model **A**(Fig. 4) and type of burner **B**;
- the year of manufacture, in cryptographic form **C**;
- the serial number **D**;
- the electrical input power **E**;
- the electrical power consumption **F**;
- the types of fuel used and the relative supply pressures **G**;
- the data of the burner's minimum and maximum output possibilities **H**(see Firing rate)

### 5.4 Working position



The burner is designed to operate only in the positions 1, 2, 3 and 4 (Fig. 5).

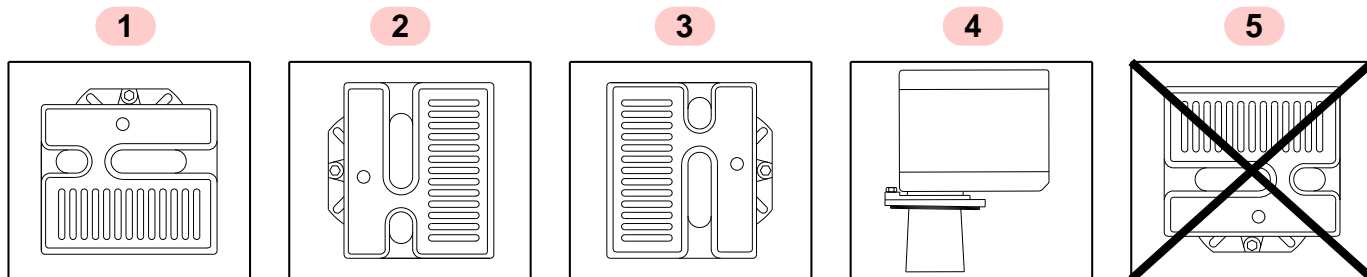
Installation 1 is preferable, as it is the only one that allows performing maintenance operations as described in this manual.

Installation 4 allows working operations but not maintenance with hooking to the boiler.



Any other position could compromise the correct operation of the appliance.

Installation 5 is forbidden for safety reasons.

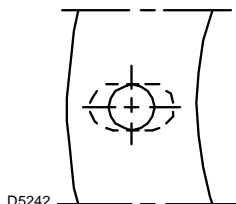


D10931

Fig. 5

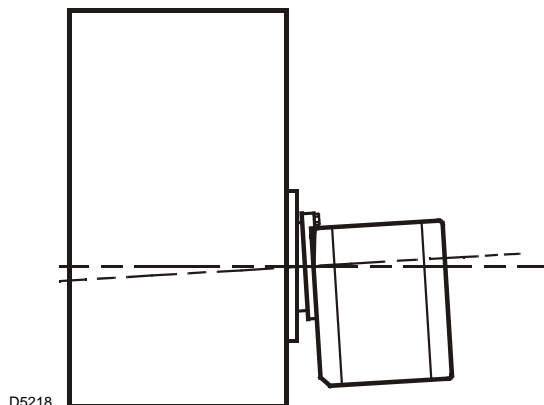
### 5.5 Securing the burner to the boiler

- It is necessary that the insulating gasket 9)(Fig. 1) is placed between the boiler door and the burner flange. The insulating gasket has six holes, which, if necessary, can be modified as shown in Fig. 6.
- Put on the flange 1)(Fig. 7) the screw 2) and two nuts 3).
- Verify that the installed burner is lightly leaned towards the button (Fig. 8).



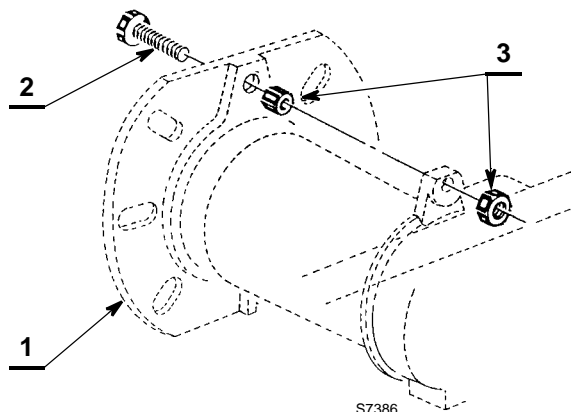
D5242

Fig. 6



D5218

Fig. 8



S7386

Fig. 7

## 6 Hydraulic systems

## 6.1 Hydraulic circuits

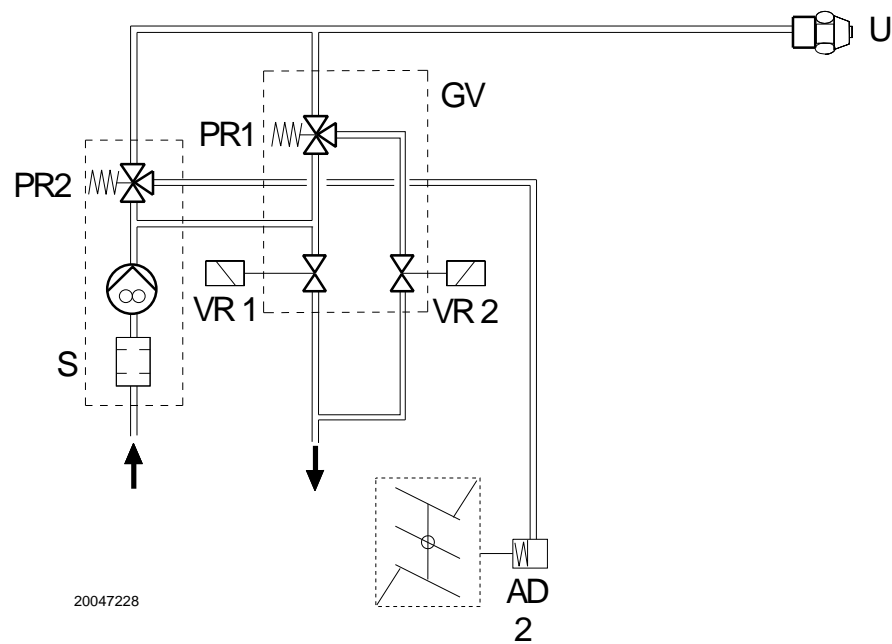


Fig. 9

**Key**

- S - Pump with filter and pressure regulator (high pressure)
- VR1 (NO) - 1<sup>st</sup> stage oil return valve normally open
- VR2 (NO) - 2<sup>nd</sup> stage oil return valve normally open
- AD2 - Air damper hydraulic jack for the 2<sup>nd</sup> stage
- PR1 - 1<sup>st</sup> stage oil regulator (low pressure)
- PR2 - 2<sup>nd</sup> stage oil regulator (high pressure)
- GV - Valve unit
- U - Nozzle

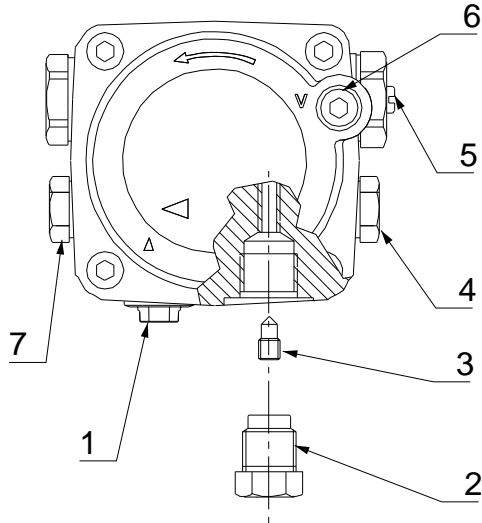
### 6.2 Fuel supply

- The burner is designed to allow entry of the hoses-lines on either side of the burner.

#### 6.2.1 Pump

The pump is designed to allow working with two pipes.

In order to obtain one pipe working it is necessary to unscrew the return hose, remove the by-pass screw 3) and then screw the return plug 2).



20052290

Fig. 10

Key (Fig. 10)

1	Suction line	5	1st stage pressure adjuster
2	Return line	6	Vacuum gauge connection
3	By-pass screw	7	Auxiliary pressure test point
4	Gauge connection		



Where at all possible avoid the use of two pipe systems where the circulated fuel is returned to the tank.

If this cannot be avoided make sure that the return pipe is normally below the surface of the fuel level within the storage tank. See Fig. 11.



The suction plug 1) is made of plastic. Once removed, it must not be used again.

In single pipe installations, the plug in the return line 2) must be totally in steel.



It is strongly recommended a periodic check of the pump pressure operation (annually or better every six months, if the burner operation is continuous).

If the value is lower than 1 bar, compared to that one of the initial setting, please check the cleaning of the pump and line filters.

In case the pressure setting was not restorable, please replace the pump, in order to guarantee that the pump pressure during the pre-purge time is at least 3.7 bar.

**6.3 Two pipe system**

Vacuum two pipe systems (Fig. 11) have a negative fuel pressure (depression) on intake to the burner. Usually the tank is lower than the burner.

The return line should terminate in the oil tank at the same level as the suction line; in this case a non-return valve is not required.

Should however the return line arrives over the fuel level, the non-return valve is indispensable. This solution however is less safe than previous one, due to the possibility of leakage of the valve.

**6.3.1 Priming pump**

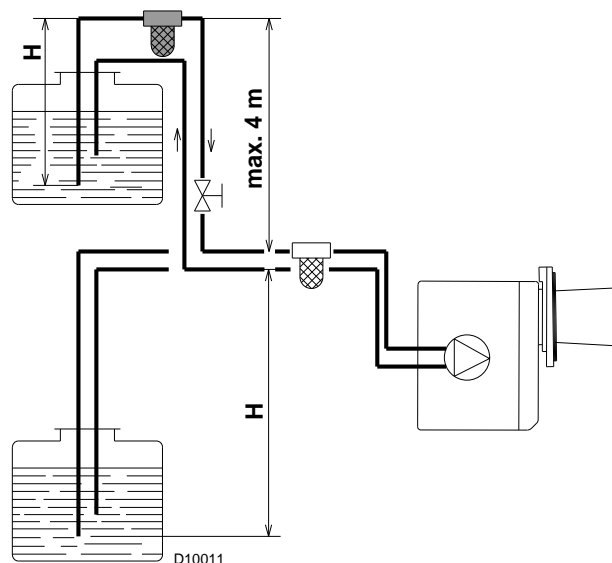


Before starting the burner make sure that the return pipe-line is not clogged: any obstruction would cause the pump seals to break.

On the system in Fig. 11 start the burner and wait for the priming. Should lock-out occur prior to the arrival of the fuel, await at least 20 seconds before repeating the operation.



The pump vacuum should not exceed a maximum of 0.4 bar (30 cm Hg). Beyond this limit gas is released from the oil.



**Fig. 11**

H metres	L metres	
	I.D. (8 mm)	I.D. (10 mm)
0	35	100
0.5	30	100
1	25	100
1.5	20	90
2	15	70
3	8	30
3.5	6	20

**Tab. B**

- H difference of level
- L max. length of the suction line
- I.D. interterminal diameter of the oil pipes

**NOTE:**

The Tab. B shows the maximum approximate lengths for the supply line, depending on the difference in level, length, and the diameter of the fuel conduit.

**6.4 One pipe system**

Pressurised one pipe systems (Fig. 12) have a positive fuel pressure on intake to the burner. Usually the tank is higher than the burner, or the fuel pumping systems are on the outside of the boiler.

Vacuum one pipe systems (Fig. 13) have a negative fuel pressure (depression) on intake to the burner. Usually the tank is lower than the burner.

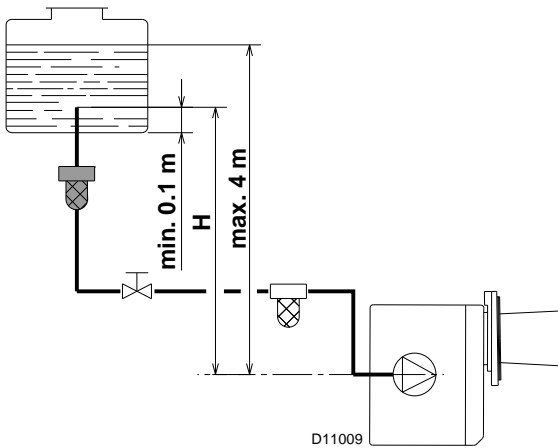
**6.4.1 Priming pump**

On the system in Fig. 12 it is sufficient to loosen the plug of the vacuum gauge 6)(Fig. 10) and wait until the fuel flows out.

On the system in Fig. 13 start the burner and wait for the priming. Should lock-out occur prior to the arrival of the fuel, await at least 20 seconds before repeating the operation.



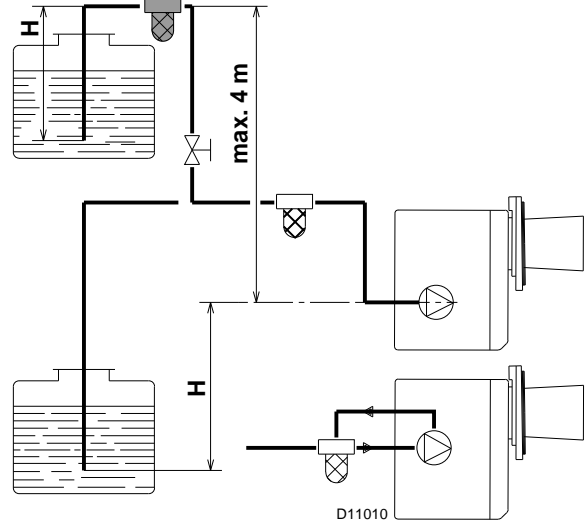
The installer must ensure that the supply pressure is not above 0.5 bar. Above that level, the pump seal is subject to too much stress.



**Fig. 12**

H metres	L metres	
	I.D. (8 mm)	I.D. (10 mm)
0.5	10	20
1	20	40
1.5	40	80
2	60	100

**Tab. C**



**Fig. 13**

H metres	L metres	
	I.D. (8 mm)	I.D. (10 mm)
0	35	100
0.5	30	100
1	25	100
1.5	20	90
2	15	70
3	8	30
3.5	6	20

**Tab. D**

**H** difference of level  
**L** max. length of the suction line  
**I.D.** interterminal diameter of the oil pipes

**NOTE:**

The Tab. C and Tab. D show the maximum approximate lengths for the supply line, depending on the difference in level, length, and the diameter of the fuel conduit.



## 7 Electrical system

### 7.1 Notes on safety for the electrical wiring



**DANGER**

- The electrical wiring must be carried out with the electrical supply disconnected.
- Electrical wiring must be carried out by qualified personnel and in compliance with the regulations currently in force in the country of destination. Refer to the wiring diagrams.
- The manufacturer declines all responsibility for modifications or connections different from those shown in the wiring diagrams.
- Do not invert the neutral with the phase in the electrical supply line. Any inversion would cause a lockout due to firing failure.
- Check that the electrical supply of the burner corresponds to that shown on the identification label and in this manual.
- The burners have been set for intermittent operation. This means they should compulsorily be stopped at least once every 24 hours to enable the control box to perform checks of its own start-up efficiency. Normally the boiler's thermostat/pressure switch ensures the stopping of the burner.  
If this is not the case, it is necessary to apply in series with IN a timer switch that turns off the burner at least once every twenty-four hours. Refer to the wiring diagrams.
- The electrical safety of the device is obtained only when it is correctly connected to an efficient earthing system, made according to current standards. It is necessary to check this fundamental safety requirement. In the event of doubt, have the electrical system checked by qualified personnel.
- The electrical system must be suitable for the maximum input power of the device, as indicated on the label and in the manual, checking in particular that the section of the cables is suitable for the input power of the device.
- For the main power supply of the device from the electricity mains:
  - do not use adapters, multiple sockets or extensions;
  - use an omnipolar switch, as indicated by the current safety standards.
- Do not touch the device with wet or damp body parts and/or in bare feet.
- Do not pull the electric cables.

Before carrying out any maintenance, cleaning or checking operations:



**DANGER**

disconnect the electrical supply from the burner by means of the main system switch;



**DANGER**

isolate the fuel supply.



**DANGER**

Condensation, water infiltration and formation of ice are not permitted!

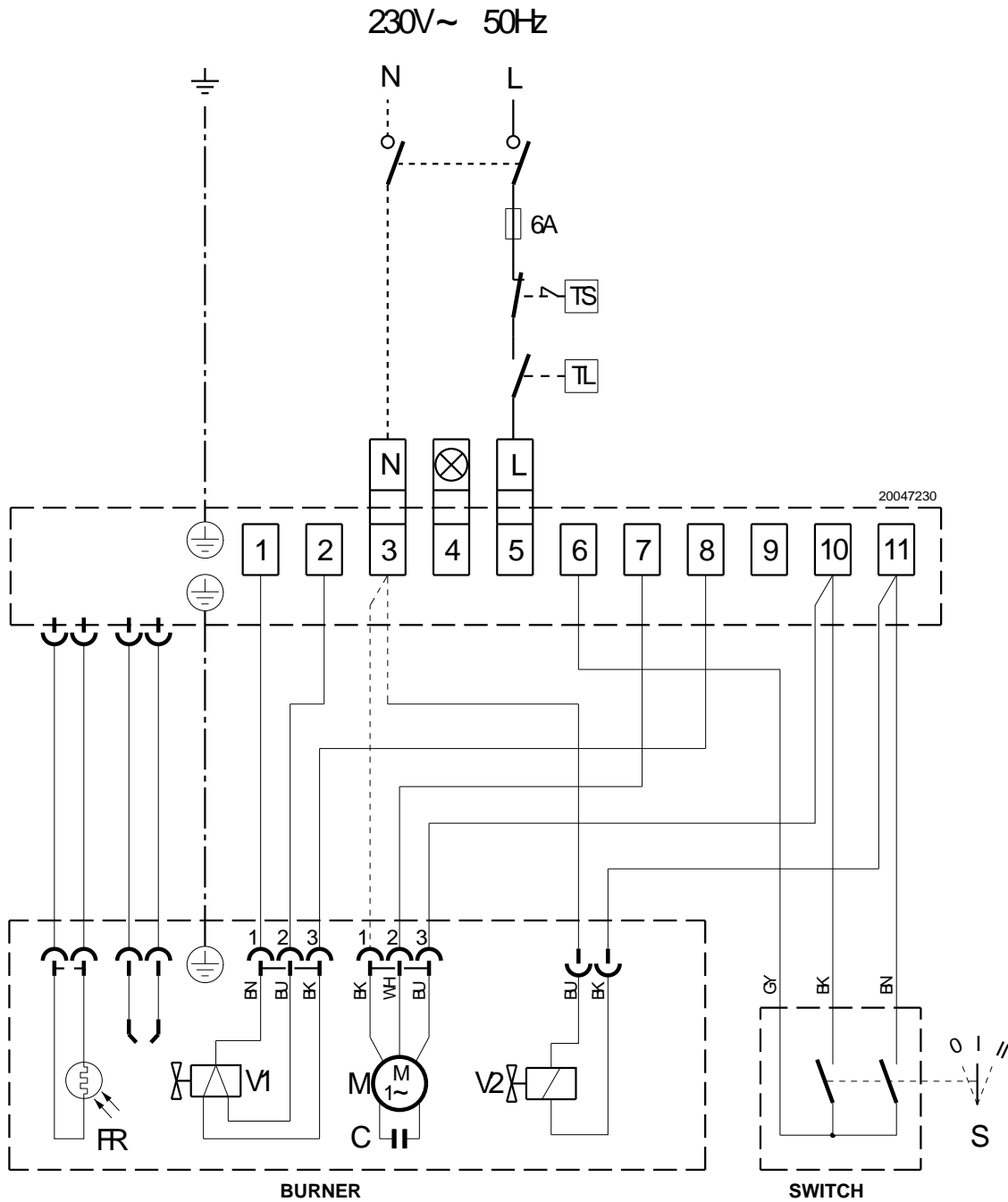
If the cover is still present, remove it and proceed with the electrical wiring according to the wiring diagrams.

Use flexible cables in compliance with the EN 60 335-1 standard.



After carrying out maintenance, cleaning or checking operations, reassemble the cover and all the safety and protection devices of the burner.

**7.2 Electrical wiring**



**Fig. 14**

**Key (Fig. 14)**

- C - Capacitor
- E - Electrodes
- FR - Photocell
- M - Motor
- S1 - Selector, 1<sup>st</sup> -2<sup>nd</sup> stage
- TL - Limit thermostat
- TS - Safety thermostat
- V1 - 1<sup>st</sup> stage valve
- V2 - 2<sup>nd</sup> stage valve
- BK - Black
- BN - Brown
- BU - Blue
- GY - Grey
- WH - White



**WARNING**

- Do not swap neutral and phase over, follow the diagram shown carefully and carry out a good earth connection.
- The electrical wiring carried out by the installer must be in compliance with the rules in force in the country.
- The section of the conductors must be at least 1mm<sup>2</sup>. (Unless requested otherwise by local standards and legislation).

**TESTING**

Check the shut-down of the burner by opening the thermostats.

**8 Start-up, calibration and operation of the burner**

**8.1 Notes on safety for the first start-up**



The first start-up of the burner must be carried out by qualified personnel, as indicated in this manual and in compliance with the standards and regulations of the laws in force.



Check the correct working of the adjustment, command and safety devices.

**8.2 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<sub>2</sub> concentration in the flue gases, their temperatures and the average temperature of the water in the boiler.

To suit the required appliance output, fit the nozzle then adjust the pump pressure and the air damper opening in accordance with the Tab. E.

The values shown in the table are measured on a CEN boiler (as per EN 267).

They refer to 12.5% CO<sub>2</sub> at sea level and with light oil and room temperature of 20°C.

Stage		Nozzle 1*	
		1 <sup>st</sup>	2 <sup>nd</sup>
Nozzle	GPH	0.65	
	Angle	60°	
Pump Pressure	bar	10	14
Burner output	kg/h	2.2	3.0
Comb. head adjustment	Set-point	6	
Air dumper adjustment	Set-point	4	

Tab. E

**8.2.1 Nozzles recommended**

- Monarch type R
- Delavan type W - E
- Steinen type Q
- Danfoss type S
- Satronic type S

The burner complies with the emission requirements of the EN 267 standard.

In order to guarantee that emissions do not vary, recommended and/or alternative nozzles specified by the manufacturer in the Instruction and warning booklet should be used.



It is advisable to replace nozzles every year during regular maintenance operations.



The use of nozzles other than those specified by the manufacturer and inadequate regular maintenance may result into emission limits non-conforming to the values set forth by the regulations in force, and in extremely serious cases, into potential hazards to people and objects.

The manufacturing company shall not be liable for any such damage arising from nonobservance of the requirements contained in this manual.

**8.2.2 Combustion head setting**

This is done when fitting the nozzle, with the blast tube removed. It depends on the output of the burner and is carried out by rotating the regulating rod, till the terminal plane of the blast tube is level with the set-point, as indicated in the schedule. For this application, the head should be fully open (at notch 6).

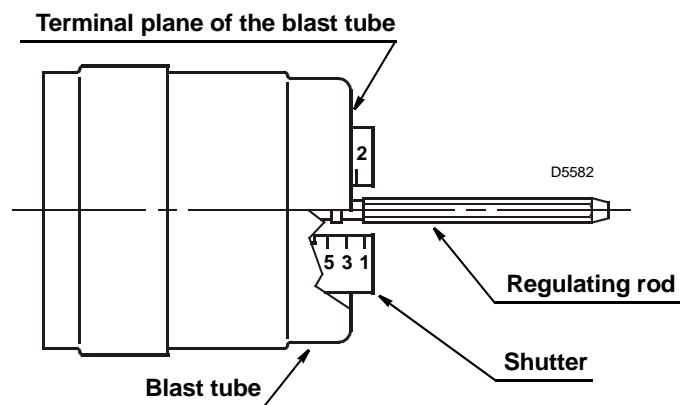


Fig. 15

Combustion head settings indicated in the schedule are valid for most cases.

The setting of the fan output according to the installation should normally be done only through the air damper. Should one subsequently want to retouch also the setting of the combustion head, with the burner running, operate on the rod (1) with a 6 mm spanner (2) as follows:

**Turn to the right: (Sign +)**

In order to increase the volume of air entering the combustion chamber and thus diminishing its pressure. There is a reduction of CO<sub>2</sub> and the adhesion of the flame to the air diffuser disc improves.

(Setting advisable for ignitions at low temperatures).

**Turn to the left: (Sign -)**

In order to reduce the volume of air entering the combustion chamber and thus increasing its pressure. The CO<sub>2</sub> improves and the adhesion of the flame to the diffuser tends to reduce. (This setting is not advisable for ignitions at low temperatures).

In any case do not bring the combustion head setting more than one point away from that indicated in the schedule. One set-point corresponds to 3 turns of the rod; a hole (3) at its end facilitates counting the number of turns.

**8.2.3 Air damper adjustment**

The settings indicated in the schedule refer to the burner with its metal cover fitted and the combustion chamber with “zero”depression. These regulations are purely indicative. Each installation however, has its own unpredictable working conditions: actual nozzle output; positive or negative pressure in the combustion-chamber, the need of excess air, etc. All these conditions may require a different air-damper setting.

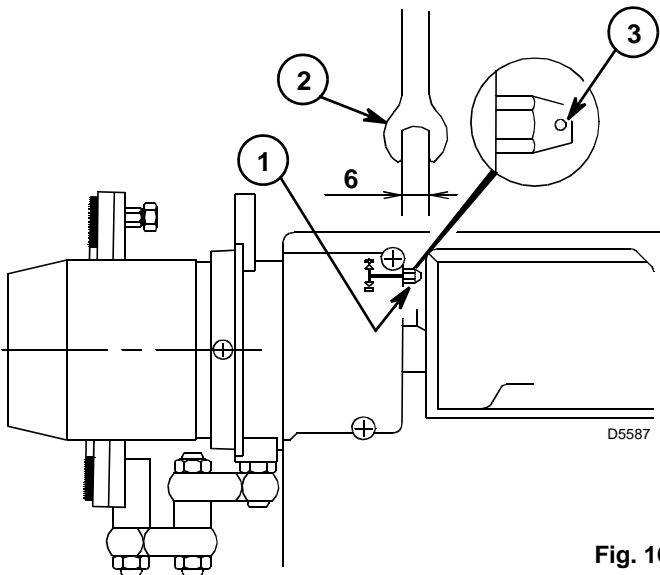


**WARNING**

It is important to take account of the fact that the air output of the fan differs according to whether the burner has its metal cover fitted or not.

Therefore we recommended to proceed as follows:

- adjust the air damper as indicated in the Tab. E to page 17;
- mount the cover, simply by means of the upper screw;
- check smoke number;
- should it become necessary to modify the air output, remove the cover by loosening the screw, adjust the air damper, remount the cover and finally recheck the smoke number.



**Fig. 16**

### 8.3 Pump pressure and air output

The burner is provided with an hydraulic device controlled by the economizer which reduces to approx. 70 % the max. output of light oil and air.

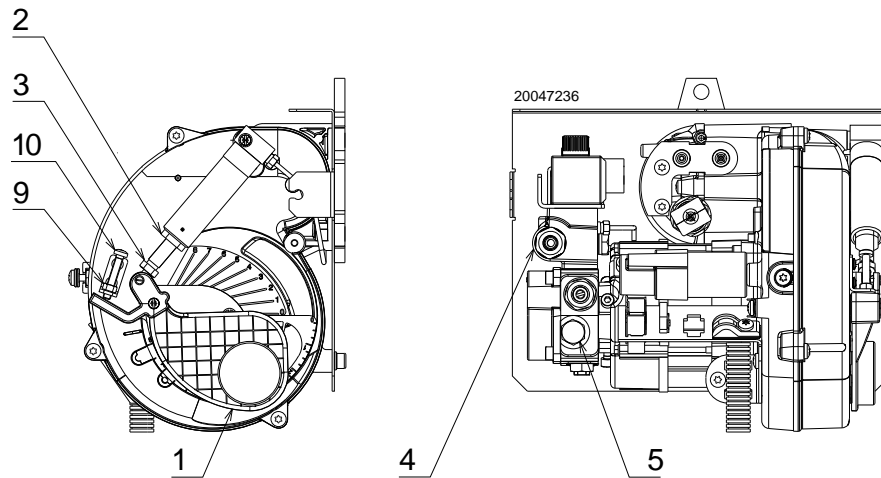


Fig. 17

#### 8.3.1 1<sup>st</sup> STAGE ADJUSTMENT (with selector on Pos. 1)

##### Adjustment of air shutter:

Unloosen the nut (9) turn the screw (10) until the air shutter (1) reaches the position desired.

Then lock the nut (9).

##### Pressure regulation:

this is set at 10 bar at the factory.

Should such pressure be reset or changed, just turn the screw (4).

The pressure gauge must be mounted in place of cap (5).

#### 8.3.2 2<sup>nd</sup> STAGE ADJUSTMENT (with selector on Pos. 2)

##### Adjustment of air shutter:

Unloosen the nut (2) turn the screw (3) until the air shutter (1) reaches the position desired.

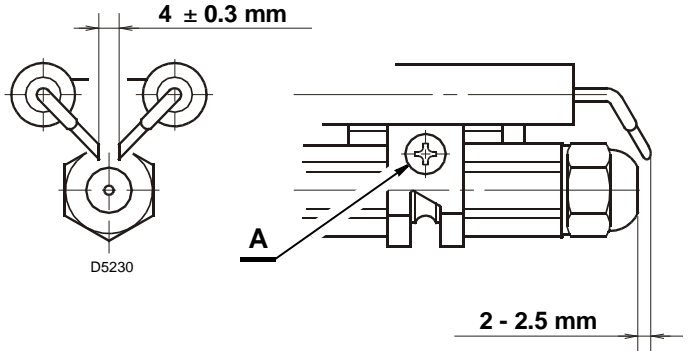
Then lock the nut (2).

**8.4 Electrode setting**



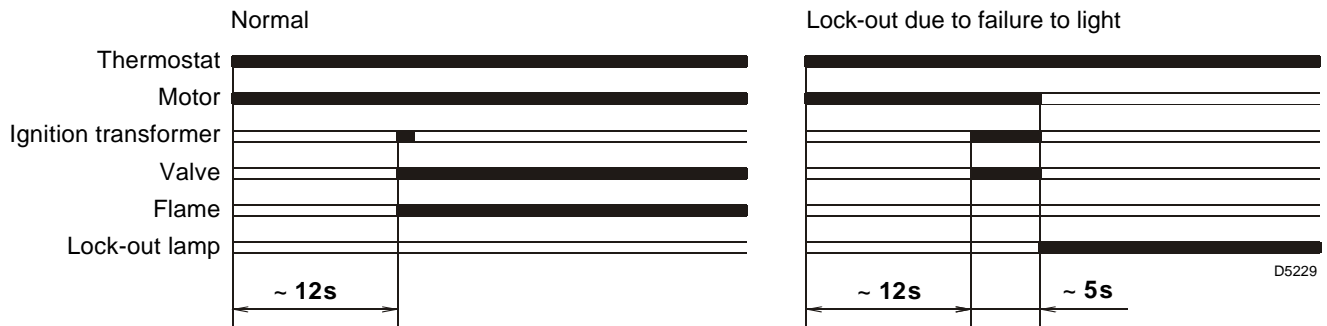
The position of the electrodes cannot be regulated. In case of failure, check that the measurements as shown on the figure are respected.

Before removing or assembling the nozzle, loosen the screw A)(Fig. 18) and move the electrodes ahead.



**Fig. 18**

**8.5 Burner start-up cycle**



**Fig. 19**

**8.6 Adjustments, to avoid flame - Detachment, at burner ignition**

This inconvenience can occur, when the temperature of the light oil decreases below + 8 °C.

- 1) **Correct positioning of the electrodes, (see Fig. 18).**
- 2) **Nozzle: atomizing cone**  
Choose empt ies or semi-empt ies cones.  
For exemple: Delavan type A - E; Steinen type H; Danfoss type H.
- 3) **Pump - setting**  
The pump is factory set, at a pressure of 12 bar.  
When the temperature of the light-oil decreases below + 8 °C, increase the pressure to 14 bar.
- 4) **Combustion-head setting**  
Regulate the combustion-head one set-point further ahead than indicated in the instructions.  
**Example:** the instructions require to set the combustion-head on set-point 2.  
Instead, the setting is made on set-point 3.
- 5) **Fan - Air damper adjustment**  
Adjust the damper, reducing the excess air until the Bacharach number is not near 1.  
(i.e. a combustion with the lowest possible excess-air).

## 9 Maintenance

### 9.1 Notes on safety for the maintenance

The periodic maintenance is essential for the good operation, safety, yield and duration of the burner.

It allows you to reduce consumption and polluting emissions and to keep the product in a reliable state over time.



The maintenance interventions and the calibration of the burner must only be carried out by qualified, authorised personnel, in accordance with the contents of this manual and in compliance with the standards and regulations of current laws.

Before carrying out any maintenance, cleaning or checking operations:



disconnect the electricity supply from the burner by means of the main switch of the system;



isolate the fuel supply.

### 9.2 Maintenance programme

#### 9.2.1 Maintenance frequency

The combustion system should be checked at least once a year by a representative of the manufacturer or another specialised technician.

#### 9.2.2 Checking and cleaning

##### Combustion head

Open the burner and make sure that all components of the combustion head are in good condition, not deformed by the high temperatures, free of impurities from the surroundings and correctly positioned.

Clean the combustion head in the fuel exit area, on the diffuser disc.

##### Burner

Check for excess wear or loose screws and clean the outside of the burner.

##### Fan

Check to make sure that no dust has accumulated inside the fan or on its blades, as this condition will cause a reduction in the air flow rate and provoke polluting combustion.

##### Photoresistance

Clean the photoresistance.

##### Electrodes

Check the correct position of electrodes.

##### Nozzles

It is advisable to replace nozzles every year during regular maintenance operations.

Do not clean the nozzle openings; do not even open them.

##### Filters

Check the filtering baskets on line and at nozzle present in the system. Clean or replace if necessary.

If rust or other impurities are observed inside the pump, use a separate pump to lift any water and other impurities that may have deposited on the bottom of the tank.

##### Pump

Delivery pressure must correspond with the table on Tab. E at page 17. Please check that the supply line and filters are clear. The use of a pump vacuum gauge will assist in this. This measure

permits the cause of the anomaly to be traced to either the suction line or the pump.

If the problem lies in the suction line, check to make sure that the filter is clean and that air is not entering the piping.

##### Hoses

- Check periodically the flexible pipes conditions. They have to be replaced at least **every 2 years**.
- Check to make sure that the hoses are still in good condition.

##### Fuel tank

If water or contamination is present within the fuel tank, it is essential that this is removed before the equipment is to be used. If in doubt about how to achieve this then please contact the fuel or oil tank supplier.

##### Boiler

Clean the boiler as indicated in its accompanying instructions in order to maintain all the original combustion characteristics intact, especially the flue gas temperature and combustion chamber pressure.

##### Combustion

In case the combustion values found at the beginning of the intervention do not respect the standards in force or, in any case, do not correspond to a proper combustion, contact the Technical Assistant and have him carry out the necessary adjustments.

Allow the burner to work for 10 min. and then check the combustion readings with the parameters indicated within the appliance instruction manual. **Then carry out a combustion check verifying:**

- Smoke temperature at the chimney;
- Content of CO<sub>2</sub> (%);
- Content of CO (ppm);
- Smoke value according to opacity smokes index according to Bacharach scale.

### 10 Faults / Solutions

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

A fault usually makes the lock-out lamp light which is situated inside the reset button of the control box 8)(Fig. 1 at page 7).

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.

FAULTS	POSSIBLE CAUSES	SOLUTION
<b>The burner will not start when the limit thermostat closes.</b>	Lack of electrical supply.	Check presence of voltage in the L - N clamps of the control box. Check the conditions of the fuses. Check that safety thermostat limit is not lock out.
	The photoresistance sees false light.	Eliminate the light.
	The connections in the control box are wrongly inserted.	Check and connect completely all the plugs.
<b>Burner runs normally in the prepurge and ignition cycle and locks out after 5 seconds ca.</b>	The photoresistance is dirty.	Clean it.
	The photoresistance is defective.	Change it.
	Flame moves away or fails.	Check pressure and output of the fuel. Check air output. Change nozzle. Check the coil of solenoid valve.
<b>Burner starts with an ignition delay.</b>	The ignition electrodes are wrongly positioned.	Adjust them according to the instructions of this manual.
	Air output is too high.	Set the air output.
	Nozzle dirty or worn.	Replace it.



**WARNING**

The manufacturer cannot accept responsibility for any damage to persons, animals or property due to error in installation or in the burner adjustment, or due to improper or unreasonable use or non observance of the technical instruction enclosed with the burner, or due to the intervention of un-qualified personnel.



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## 1 声明

## 符合 ISO / IEC 17050-1 标准声明

制造商：	RIELLO S.p.A.	
地址：	Via Pilade Riello, 7 37045 Legnago (VR)	
产品：	轻油燃烧器	
型号：	G3D MC	
以上产品符合如下技术标准：	EN 267	
且符合如下欧洲指令：		
MD	2006/42/EC	机械指令
LVD	2006/95/EC	低电压指令
EMC	2004/108/EC	电磁兼容性指令

产品质量符合 UNI EN ISO 9001 质量管理体系标准。

Legnago, 30.07.2010

Mr. G. Conticini  
Burners Division Department  
RIELLO S.p.A.



2 信息及注意事项

2.1 关于本手册

2.1.1 简介

操作手册随燃烧器附带：

- ▶ 是产品必不可少的组成部分，因此需要妥善保管此手册以备查阅；若燃烧器易主，也需随附此手册。若此手册丢失或损毁，需向本地区技术服务部索取；
- ▶ 专为有资质的操作人员编写；
- ▶ 内容包括燃烧器的安装、启动、使用及维护等重要操作的说明。

本手册使用标识

在手册某些部分会出现带有 DANGER 标记的三角形。请特别注意此符号，警示潜在危险。

2.1.2 危险提示

危险 可分为 3 个等级，如下所示。



危险

最高危险等级！

此标识表示如果操作不当，将会造成严重伤害、死亡或长期健康危害。



警告

此标识表示如果操作不当，可能会造成严重伤害、死亡或长期健康危害。



小心

此标识表示如果操作不当，可能会造成机器损毁和/或人身伤害。

2.1.3 其它标识



危险

危险：带电元件

此标识表示如果操作不当，将会造成电击，导致伤亡事故。



危险：易燃材料

此标识表示存在易燃材料。



危险：燃烧

此标识表示高温会导致燃烧。



危险：断臂危险

此标识表示存在移动部件：小心掉落砸伤四肢。



警告：转动零部件

此标识表示必须使四肢远离转动机械部件，否则会伤害四肢。



危险：爆炸

此标识出现于存在爆炸性气体的地方。爆炸性气体是指在大气条件下，危险物质以气体、蒸气、薄雾或粉尘的形式与空气的混合物，该混合物内部被点燃后，燃烧会扩散至整个未点燃的部分。



个人防护装备

左侧标识表示操作人员工作中必须穿戴的装备以保证个人安全。



必须将燃烧器保护罩以及所有安全防护装置安装到位

此标识表示在对燃烧器进行维护、清洁和检查操作后，需要将燃烧器保护罩以及所有安全防护装置安装到位。



环境保护

此符号代表机器的使用符合环保要求。



重要信息

此标识表示必须牢记的重要信息。

此符号表示列表信息。

缩略语

- Ch. 章
- Fig. 图
- Page 页
- Sec. 节
- Tab. 表

**2.1.4 系统的交付和操作手册**

交付系统时，需注意：

- 应由系统制造商将操作手册送达至用户手中，并建议用户将操作手册存放在燃烧器安装室内。

➤ 手册信息包括：

- 燃烧器的序列号：

.....

.....

- 最近的技术支持中心的地址和电话。

.....

.....

.....

.....

.....

.....

➤ 系统供应商应特别提示用户以下内容：

- 系统的使用；
- 系统启动前可能需要进行进一步测试；
- 系统需由制造商或其它专业技术人员进行至少每年一次的维护和检修。  
为了保证对燃烧器进行定期检查，制造商建议制定维护维修合同。

**2.2 保证及责任**

根据当地强制标准和 / 或销售合同，制造商从机器安装之日起对新产品进行保证。首次启动时，检查确认燃烧器各部件齐全。



**警告**

由于未按照手册规定进行操作造成操作失败以及由于操作疏忽、错误安装和未经授权对燃烧器进行改动造成的严重后果不在制造商提供的随燃烧器所附保证书所保证内容之列。

如果由于以下原因发生损害 / 伤害，造成人员及财产损失的，保证书将失效，制造商将不承担任何责任：

- 对燃烧器进行了不正确的安装、启动、使用和维护
- 非正常、不正确或不合理使用燃烧器；
- 由不具备资质的人员操作燃烧器；
- 未经授权对设备进行改动；
- 保证燃烧器安全的安全设备损坏、使用不当和 / 或发生运行故障；
- 在燃烧器上安装未经测试的零部件
- 使用不适当的燃料运行燃烧器
- 燃料供应系统故障；
- 燃烧器发生运行故障和 / 或运行不稳定时，仍继续使用燃烧器；
- 维修和 / 或彻底检修时操作不当；
- 为防止火焰生成不稳定，改变炉膛内部结构；
- 对易磨损部件监管及维护不足或不当；
- 使用非原厂零配件，包括各种零件、组件、配件以及其它可选配件；
- 不可抗力因素。

因未遵守本手册进行操作导致的后果，制造商将不承担任何责任。

### 3 安全防护

#### 3.1 简介

燃烧器的设计运用了成熟的安全技术，同时考虑到所有可能的危险情况，符合目前技术规范 and 标准。

但须注意，对设备粗心和不当的操作可能会对使用者或第三方造成死亡伤害的后果，同时会损坏燃烧器或其它物体。疏忽、轻率以及过度自信常常会导致事故发生；疲劳和困倦同样可造成事故。

需牢记：

- ▶ 必须按照功能描述使用燃烧器。用于其它用途均属不当操作，会导致危险发生。

需特别注意：

燃烧器可以应用于热水锅炉、蒸汽发生器、导热油炉以及制造商指明的其它产品上；

调节燃烧器用的各类参数，如燃料类型及压力，电压及电源频率，最小和最大出力，以及炉膛耐压性、尺寸和温度必须在手册所列值的范围之内。

- ▶ 禁止因想改变燃烧器性能和安装地而对燃烧器进行改动。
- ▶ 燃烧器必须在绝对安全的环境中使用。任何可能对安全造成威胁的情况都必须立即予以消除。
- ▶ 除需检修的零部件外，不得打开或破坏燃烧器内部零件。
- ▶ 更换燃烧器零部件时必须使用制造商认可的配件。



警告

制造商仅在燃烧器所有部件完好且安装位置正确时保证燃烧器安全及良好性能。

#### 3.2 人员培训

用户指已经购买了设备并且准备将其用于特定目的的个人、团体或公司。用户需对设备负责，并对设备操作人员做好培训。

用户：

- ▶ 必须请接受过正规培训有资质的人员操作设备；
- ▶ 需采取适当方式告知操作人员安全注意事项。因此用户有责任保证每个人都了解安全注意事项。
- ▶ 操作人员必须遵守设备上所有危险及警告提示。
- ▶ 操作人员不得私自进行超出其职责范围的操作。
- ▶ 操作人员必须将设备产生的任何问题或发生的危险情况报告给其上级主管。
- ▶ 使用其它制造商的零部件，或对设备的任何改动，都会造成设备性能的改变，因此会降低其安全性能。因此因使用非原厂零配件而造成的设备损坏，制造商将不承担任何责任。

此外：



- ▶ 必须采取一切措施防止非认证人员操作设备；
- ▶ 必须通知制造商，如果设备发生故障或运行失灵，同时有任何危险预兆时。
- ▶ 操作人员必须使用法律所规定的防护设备，并且按照手册进行操作。

4 燃烧器技术描述

4.1 技术数据

类型	1000T
热出力	19 – 35 kW – 1.6 – 3 kg/h
燃料	轻油，粘度 4 – 6 mm <sup>2</sup> /s 在 20°C (Hi = 11.86 kWh/kg)
电源	单相，~ 50Hz 230 V ± 10%
马达	运行电流 0.7A – 2850 rpm – 298 rad/s
电容	4 μF
点火变压器	二级 8 kV – 16 mA
油泵	压力范围 7 – 15 bar
耗电量	0.115 kW

表 A

4.2 燃烧器描述

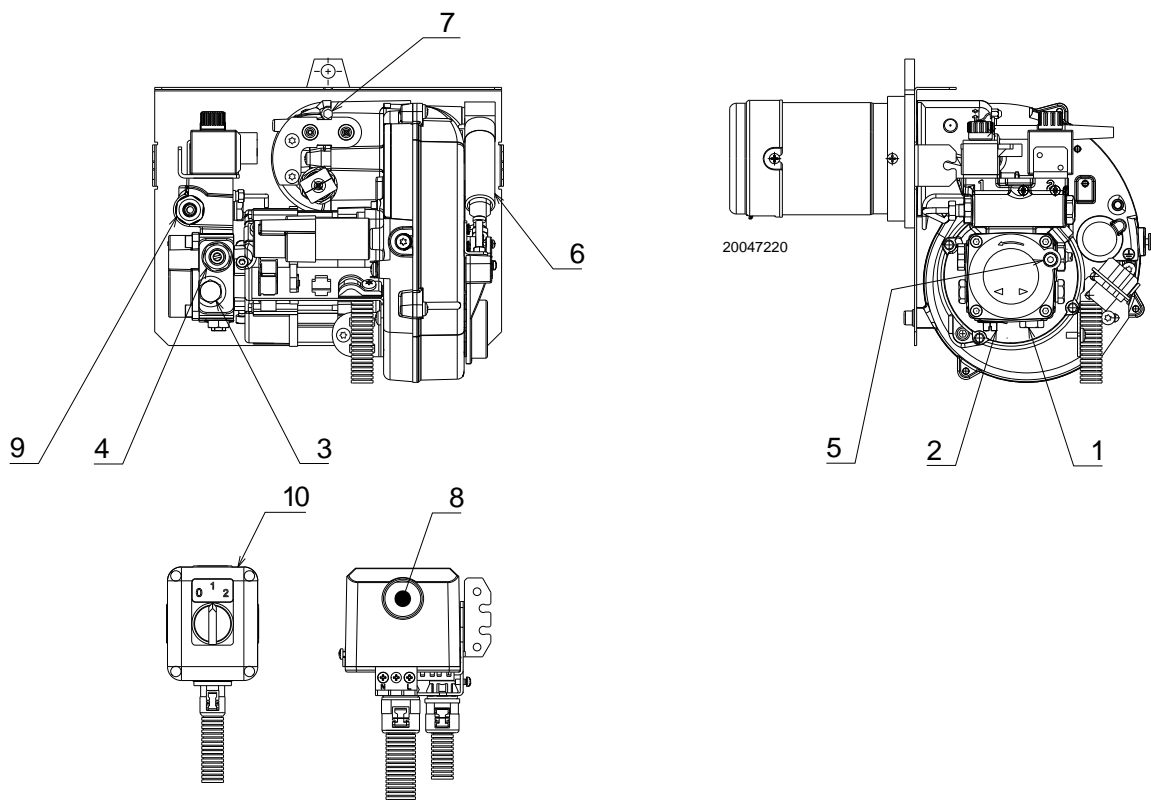


图 1

- |   |         |    |                |
|---|---------|----|----------------|
| 1 | 回油管路    | 6  | 带风挡的液压缸        |
| 2 | 进油管路    | 7  | 燃烧头调节螺丝        |
| 3 | 压力表表座   | 8  | 锁定指示灯及复位按钮     |
| 4 | 2 段火调压器 | 9  | 1 段火调压器        |
| 5 | 真空计表座   | 10 | 1 段火 - 2 段火转换器 |

4.3 燃烧器配置

- |          |     |
|----------|-----|
| 带接头的软管   | 2 根 |
| 绝缘垫      | 3 个 |
| 机罩       | 1 个 |
| 法兰用双螺母螺丝 | 1 套 |
| 法兰用螺丝和螺母 | 4 套 |

4.4 燃烧器尺寸

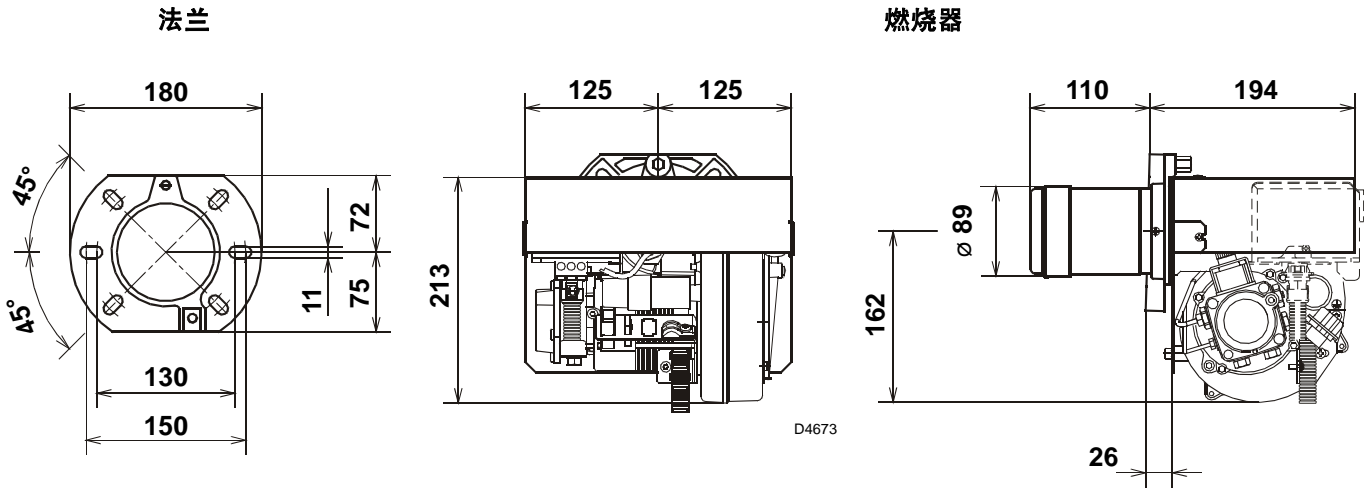


图 2

4.5 出力范围

最大出力必须在图内选择 (图 3)。

最小出力不得低于图中所示最小极限：

燃烧器出力必须在图中所围内 (图 3) 选择。这一区域为出力范围，根据炉膛压力调整燃烧器最大出力。

依据所需出力画一条垂直线，根据炉膛压力画一条水平线，两线相交处为工作点，此点必须在出力范围内。



警告

燃烧出力范围数值 (图 3) 在环境温度为 20°C 时测得，大气压力为 1013 mbar (海拔约为 0 米)。

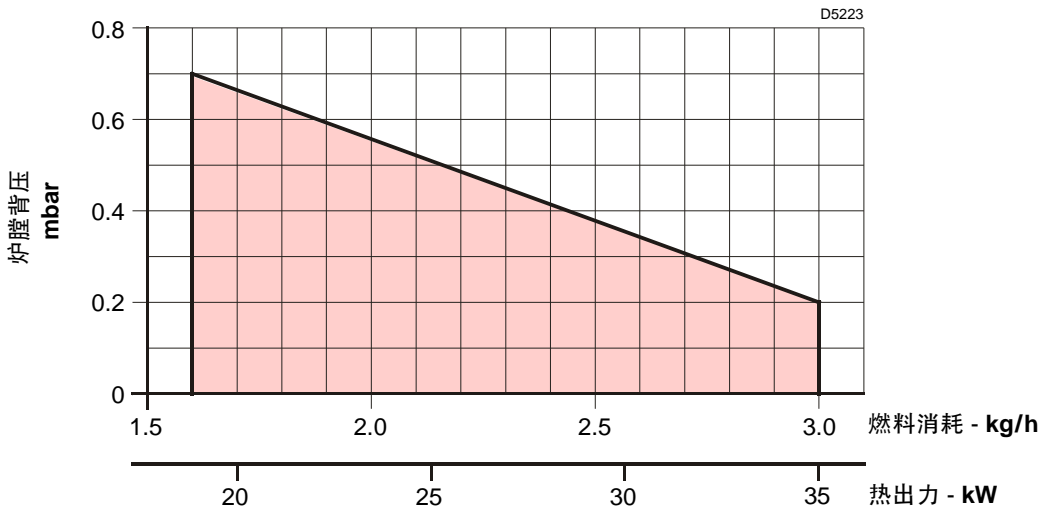


图 3



5 安装

5.1 安装安全注意事项

将锅炉安装区域打扫干净，环境照明良好，然后开始进行安装操作。



危险

所有的安装、维护和拆卸操作都必须在切断电源的情况下进行。



警告

燃烧器的安装必须由具有资质的人员操作，如本手册所要求，且符合安装地的强制标准。

5.2 操作

燃烧器由木质托盘包装，因此可以用移动托盘或叉车搬运燃烧器（连带包装一起搬运）。



警告

搬运燃烧器的操作危险，所以要特别小心：一切无关人员均应远离搬运现场；检查确认搬运方法的连贯性和可行性。同时检查确认安装区域无杂物，且有足够的逃生空间（如一旦燃烧器掉落，操作人员有一个自由安全的空间避险）。搬运期间，确保载重物离地面不超过 20-25 cm。



小心

将燃烧器放置在安装位置附近后，正确拆卸所有剩余的包装，取出各类材料。在进行安装操作前，请仔细将安装燃烧器的区域打扫干净。

5.3 初步检查

检查货物



小心

拆开包装后，检查包装内物品的完整性。如有疑问，请勿使用燃烧器；联系供货商。



包装材料（木箱或硬纸箱，钉子，别针、塑料袋等）不得随意丢弃，造成潜在危险和污染；应将拆下的包装材料收集好，在适当的地方处理掉。

检查燃烧器性能

R.H.E.	A		B	
	D	C	H	
	E	F	D ≤	
	G			

S8585

图 4

检查燃烧器上的铭牌，应显示如下信息：

- 燃烧器型号 A) (图 4) 以及燃烧器类型 B)；
- 制造年份加密代码 C)；
- 序列号 D)；
- 电源功率 E)；
- 耗电量 F)；
- 所使用燃气类型和相关输送压力 G)；
- 燃烧器最小和最大出力相关数据 H) (见“出力范围”)



警告

燃烧器出力不得高于锅炉负荷



警告

篡改、移除或丢失燃烧器铭牌，会造成无法辨认燃烧器型号，给燃烧器的安装和维护带来困难。

### 5.4 运行位置



警告

燃烧器被设计为只能在 1, 2, 3 和 4 位置运行 (图 5)。

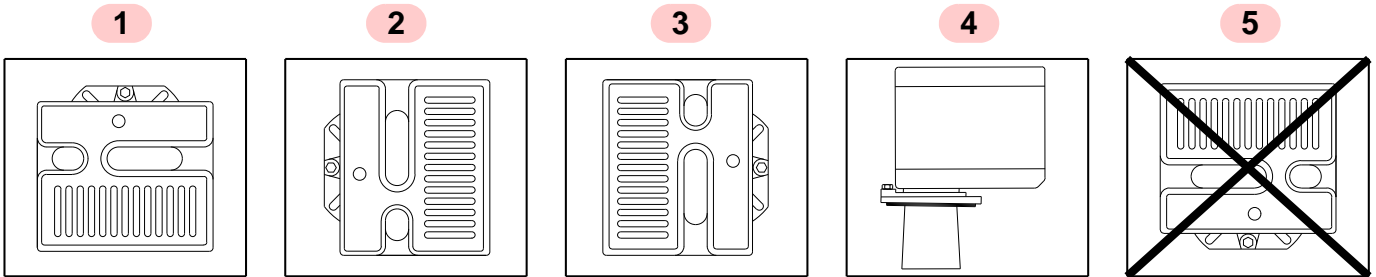
最好安装于位置 1, 因为此位置是唯一能按手册描述来维护燃烧器的位置。

位置 4 也可以运行燃烧器, 但不利于其与锅炉连接处的维护。



危险

安装在其它位置可能会损害设备的正常运行。为确保安全, 禁止将燃烧器安装在位置 5。

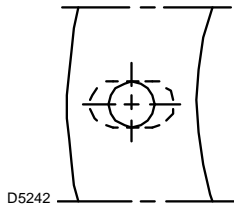


D10931

图 5

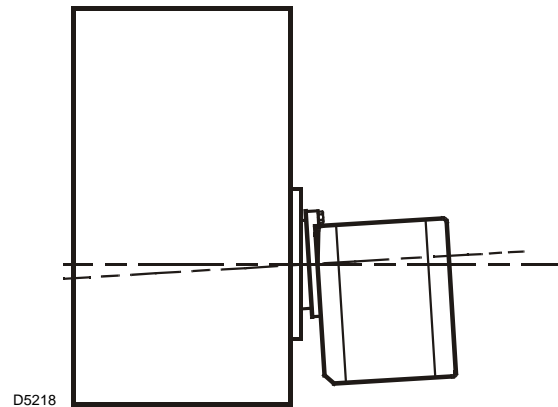
### 5.5 安装燃烧器到锅炉

- ▶ 必须在锅炉钢板和燃烧器法兰之间加装隔热垫 9) (图 1)。
- 隔热垫有 6 孔, 如必要, 可按图 6. 所示进行调整。
- ▶ 安装法兰 1) (图 7), 螺丝 2) 和两个螺母 3)。
- ▶ 检查确认已安装好的燃烧器应向按钮处倾斜 (图 8)。



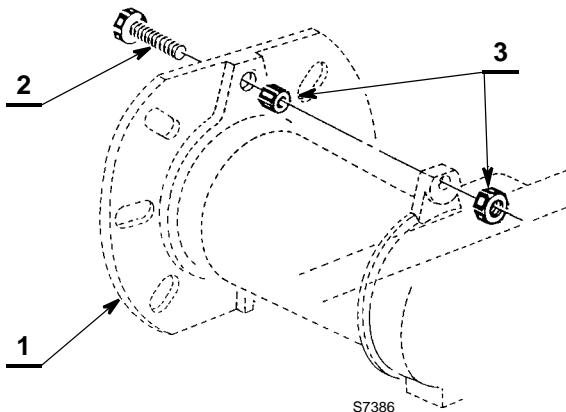
D5242

图 6



D5218

图 8



S7386

图 7

## 6 油路系统

## 6.1 油回路

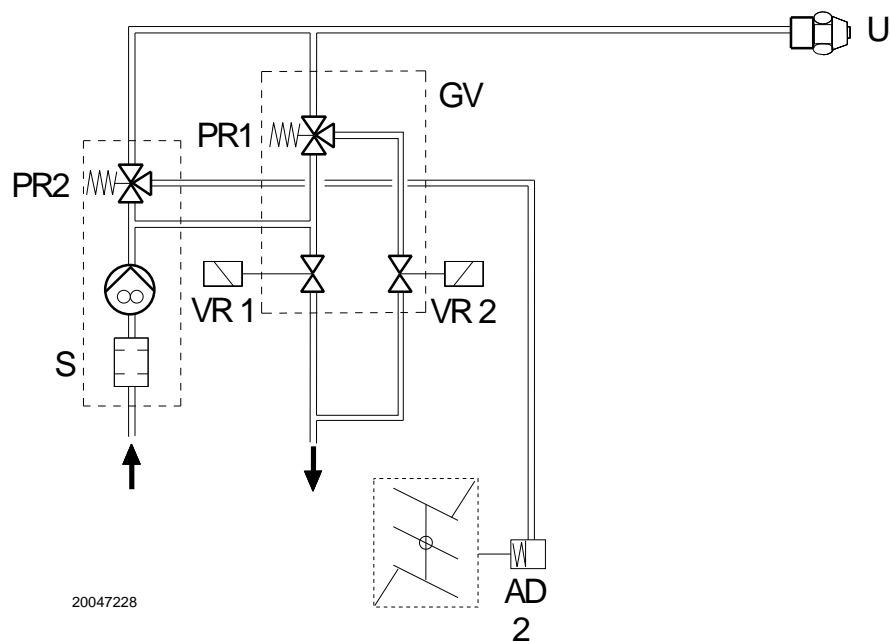


图 9

## 图例

- S - 带过滤器和调压器的油泵 (高压)
- VR1 (NO) - 1 段火回油阀 常开
- VR2 (NO) - 2 段火回油阀 常开
- AD2 - 2 段火调节风挡液压缸
- PR1 - 1 段火燃油调节器 (低压)
- PR2 - 2 段火燃油调节器 (高压)
- GV - 阀组单元
- U - 喷嘴

### 6.2 燃料供应

► 进油软管可以连接至燃烧器左侧或右侧。

#### 6.2.1 油泵

油泵可双管路系统运行。

要实现单管路运行，需要拧下回路软管，取下旁路螺丝 3)，然后拧上回路插件 2)。

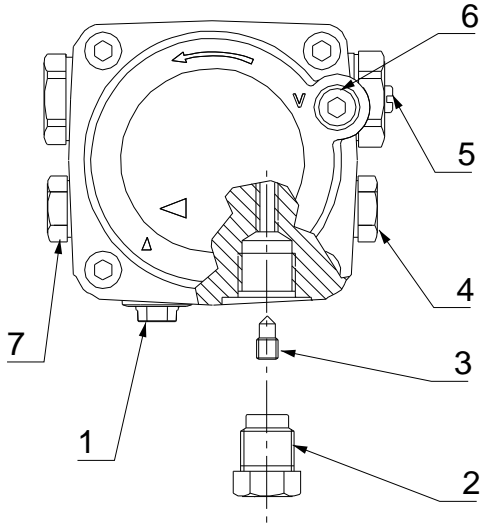


图 10

20052290

图例 (图 10)

- |         |           |
|---------|-----------|
| 1 进油管路  | 5 1 段火调压器 |
| 2 回油管路  | 6 真空计连接   |
| 3 旁路螺丝  | 7 辅助压力测试点 |
| 4 压力表连接 |           |



警告



警告



危险

要确保回油管路高度低于油料箱内燃油水平高度。见图 11。

进油管路插件 1) 为塑料材质。一旦移除，则不能重复使用。

在安装单管路系统时，回油管路插件 2) 必须为全钢材质。

建议定期检测油泵运行压力(如果燃烧器为连续运行模式，每年或最好每半年检测一次)。

和最初设定值进行比较，如果压力低于 1 bar，需检查油泵及输油管路过滤器的清洁度。

如果压力设置无法恢复，请更换油泵，以保证油泵压力在预吹扫阶段至少达到 3.7 bar。

### 6.3 双管路系统

负压双管路系统(图 11)中,燃烧器进油管路中存在负压(低压)。油箱位置通常低于燃烧器。

回油管进入油箱的终端高度应与进油管高度相同: 这样就不需要使用止回阀。

如果回油管到达高度超过油箱内燃油高度, 则必须使用止回阀。相比较而言, 后一种方法安全性差, 因为阀门处有可能有燃油泄漏。

#### 6.3.1 启动油泵



警告

启动燃烧器前, 必须确认回油管路没有堵塞: 任何堵塞都有可能破坏油泵的密封性。

图 11 所示系统, 启动燃烧器, 等待油泵启动。如果在燃油进入油泵前燃烧器锁定, 请等待至少 20 秒后, 再重新操作。



警告

油泵真空计压力最大不得超过 0.4 bar (30 cm Hg)。超过此压力, 可能出现油气分离现象。

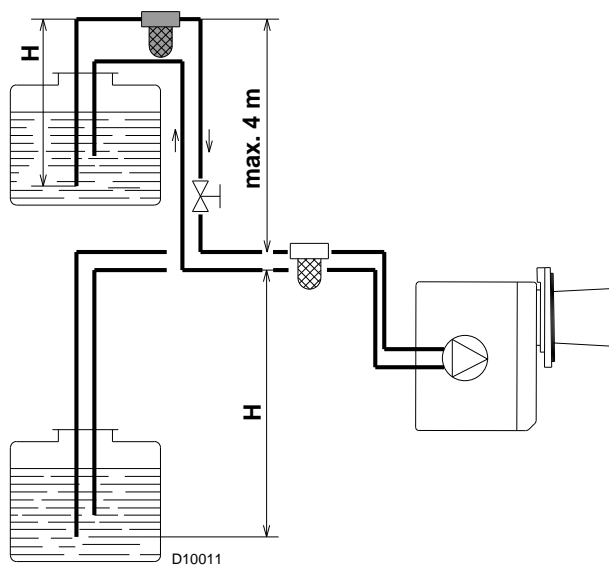


图 11

H 米	L 米	
	I.D. (8 mm)	I.D. (10 mm)
0	35	100
0.5	30	100
1	25	100
1.5	20	90
2	15	70
3	8	30
3.5	6	20

表 B

H 高度差  
L 进油管最大长度  
I.D. 管路内径

#### 注意:

表 B 显示根据燃料管道的高度差、长度以及直径所需的供油管路最长距离。

### 6.4 单管路系统

带压的单管路系统（图 12）中，燃烧器进油管带正压。油料箱位置通常高于燃烧器，或油泵系统在锅炉外部。

负压单管路系统（图 13）中，燃烧器进油管为负压（低压）。油料箱位置通常低于燃烧器。

#### 6.4.1 启动油泵

图 12 所示系统，只需松开真空计 6) (图 10) 堵头即可，等待燃料流出。

图 13 所示系统，启动燃烧器，等待油泵注油。如果在燃油进入油泵前燃烧器锁定，请等待至少 20 秒后，再重新操作。



警告

安装人员必须确保供油压力不高于 0.5 bar。若高于这一压力，油泵密封需承受过大压力。

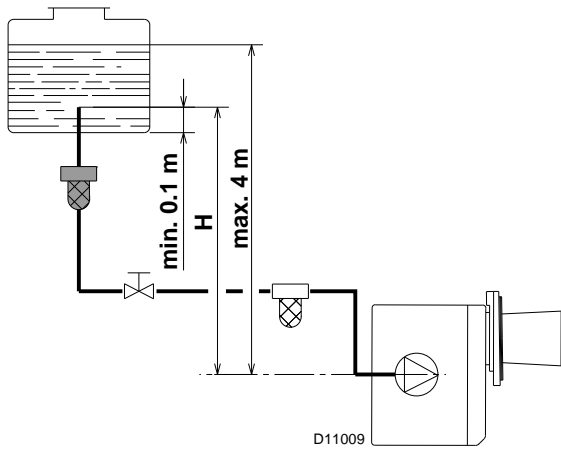


图 12

H 米	L 米	
	I.D. (8 mm)	I.D. (10 mm)
0.5	10	20
1	20	40
1.5	40	80
2	60	100

表 C

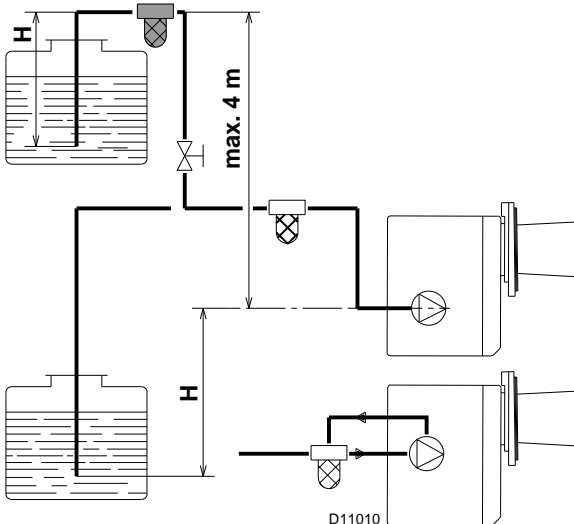


图 13

H 米	L 米	
	I.D. (8 mm)	I.D. (10 mm)
0	35	100
0.5	30	100
1	25	100
1.5	20	90
2	15	70
3	8	30
3.5	6	20

表 D

H 高度差  
L 进油管最大长度  
I.D. 管路内径

**注意：**

表 C 和表 D 显示根据燃料管道的高度差、长度以及直径所需的供油管最长距离。

## 7 电气系统

## 7.1 电气连接安全注意事项



危险

- 电气连接时必须切断电源。
- 电气连接必须由具有资质的技术人员进行操作，且符合安装地的强制标准。参看电气连接图。
- 因改变本手册电气连接图或电气连接与图不符而造成的后果，利雅路公司将不承担任何责任。
- 不得将零线和相线接反，否则会导致燃烧器因点火失败而锁定。
- 检查确认燃烧器电源是否符合机器铭牌和本手册描述。
- 燃烧器为间歇式运行。即每 24 小时至少强制停机一次以便对控制盒进行自检，确保其启动功能的有效性。正常情况下，锅炉负荷控制系统会自动将燃烧器停机。  
如果不是这样，则需在 IN 上串联一个定时器以保证燃烧器至少每 24 小时停机一次。参看电气连接图。
- 符合安装地强制标准的正确有效的接地系统能够保证设备的电气安全。必须检查基本安全要求。如有疑问，需请有资质的人员检查电气系统。
- 电气系统必须适合设备铭牌和技术手册所示的设备的最大输入功率，特别需要检查确认所用电缆是否与设备输入功率匹配。
- 连接主输电线的设备主电源：
  - 不要使用适配器、多功能插座或接线器；
  - 使用一个多极开关，如安全标准中所示。
- 不要用潮湿的身体和 / 或光脚时接触设备。
- 不得拉拽电缆。

在进行任何维护、清洁和检查之前，需进行如下操作：



危险

切断主开关系统，断开燃烧器主电源；



危险

停止燃料供应。



危险

避免外壳出现冷凝水，冰及水。

如果仍有保护罩，取下保护罩，根据电气接线图进行电气连接。

使用符合 EN 60 335-1 标准的电缆。



对燃烧器进行维护、清洁或检修后，重新安装保护罩及其它燃烧器安全防护装置。

7.2 电气连接

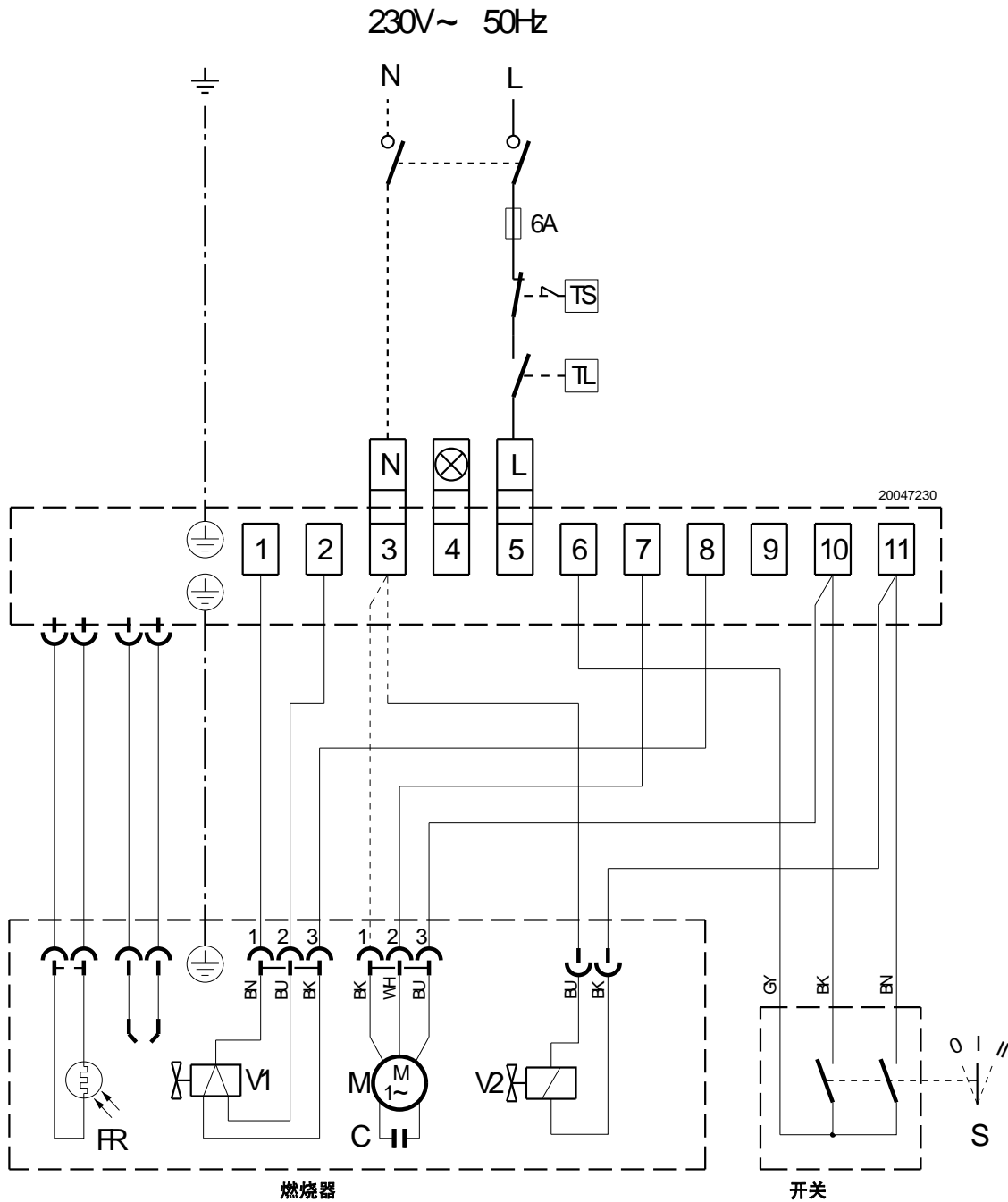


图 14

图例 (图 14)

- C - 电容
- E - 点火电极
- FR - 光电管
- M - 马达
- S1 - 1 段火 -2 段火转换器
- TL - 限位温控器
- TS - 安全温控器
- V1 - 1 段火阀门
- V2 - 2 段火阀门
- BK - 黑
- BN - 棕
- BU - 蓝
- GY - 灰
- WH - 白



警告

- 不得将零线和相线接反。按电气接线图仔细操作，确保设备接地良好。
- 由安装人员操作的电气连接必须符合安装地的强制标准。
- 导线截面积最小为1mm<sup>2</sup>。(当地标准另有规定的除外)。

测试

断开温控器，检查燃烧器应该停机。



## 8 燃烧器的启动、校准及运行

### 8.1 首次启动安全注意事项



警告

首次启动燃烧器必须由具有资质的技术人员操作，如本手册所要求，且符合安装地的强制标准。



警告

检查确认调节装置、指令装置以及安全装置工作正常。

### 8.2 燃烧状态调节

安装到锅炉的燃烧器符合效率指令 92/42/EEC，必须按照锅炉操作手册进行调节和测试，内容包括烟气中 CO 和 CO<sub>2</sub> 浓度的核查，以及烟气温度和锅炉中平均水温的测定。

为了满足所需的设备输出，需根据表 E 设定喷嘴，调节油泵压力和风门挡板开度。

表中所列数据为在 GEN 锅炉上测得（根据 EN 267 标准）。

测量参数为海平面高度，12.5% 的 CO<sub>2</sub>，使用轻油，室温为 20°C 表。

阶段	喷嘴 1*	喷嘴 1*	
		1 段火	2 段火
喷嘴	GPH	0.65	
	角度	60°	
油泵压力	bar	10	14
燃烧器出力	kg/h	2.2	3.0
燃烧头设定	设定点	6	
风门挡板调节	设定点	4	

表 E

#### 8.2.1 推荐喷嘴

- Monarch R 型
- Delavan W - E 型
- Steinen Q 型
- Danfoss S 型
- Satronic S 型

燃烧器排放符合 EN 267 标准。

为了确保排放稳定，应使用制造商在手册及警告书中列出的推荐和 / 或备选喷嘴。



警告

在定期维护时，建议每年更换一次喷嘴。



小心

未使用制造商推荐的喷嘴，且未进行定期维护，可能会导致燃烧器排放烟气不符合当地强制标准，严重时，可对人员及其它物品产生潜在危害。

制造商将不会对由于未遵守操作手册进行操作导致的伤害承担任何责任。

#### 8.2.2 燃烧头设定

将燃烧筒拆下。在设定喷嘴同时设定燃烧头。

根据燃烧器出力，用调节杆进行操作，直至燃烧筒端面与设定点持平，如下图所示。

如此设定，燃烧头将处于完全开启状态（位于刻度 6 处）。

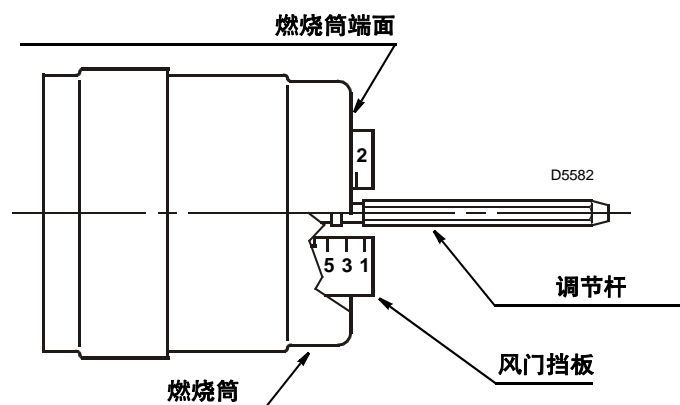


图 15

图中所示的燃烧头设定方法适用于大多数情况。

根据安装情况，通常仅通过风门挡板调节风量。如果之后需要对正在运行的燃烧器的燃烧头进行调节，应使用 6 mm 扳手 (2) 对调节杆 (1) 进行调节，如下图：

#### 向右旋转：（符号 +）

可增大炉膛进风量，降低风压。同时可降低 CO<sub>2</sub> 排放，提高火焰在空气扩散盘上的附着力。

（低温点火状态下设定）。

#### 向左旋转：（符号 -）

可减少炉膛进风量，增大风压。同时 CO<sub>2</sub> 排放增加，火焰在空气扩散盘上的附着力降低。（低温点火状态时不建议采用）。

任何情况下，每次调节燃烧头时不要多于 1 个设定点。调节杆转动 3 次，调节 1 个设定点；调节杆末端的孔 (3) 可以辅助确定转动次数。

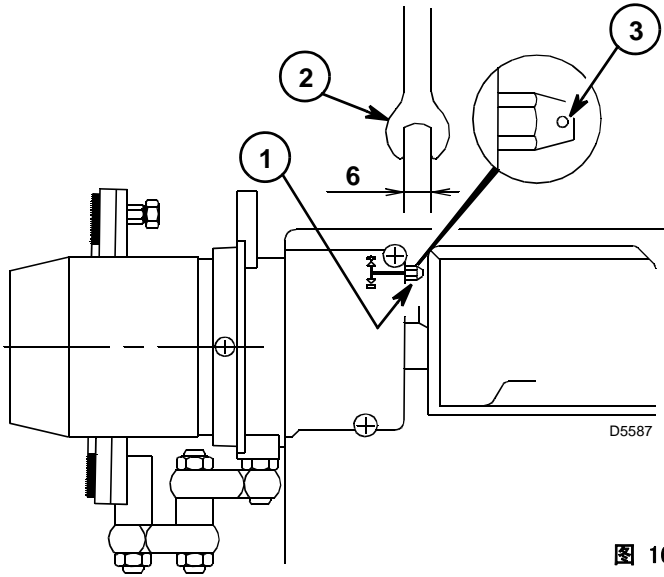


图 16

### 8.2.3 风门挡板调节

图中所示设定条件为：燃烧器装有金属保护罩，炉膛压力为 0。此设定仅供参考。因为任何安装都有其不可预测的工作条件：如实际的喷嘴出力；炉膛内的正压和负压；需要过量空气，等等。以上所有条件都有可能需要对风挡进行不同的设定。



警告

调节风门挡板时，需要考虑燃烧器是否安装了金属保护罩这一因素。

建议按以下步骤操作：

- 根据第 17 页表 E 所示，调节风门挡板；
- 使用上部螺丝，安装保护罩；
- 检测烟气排放数值；
- 如果要调整空气量，需拧松螺丝，取下保护罩，调节风挡，再重新安装保护罩，最后重新检测烟气排放数值。

### 8.3 油泵压力与风量

燃烧器配有由节油器控制的液压装置，它可以将轻油和风量降低到最大出力值的 70%。

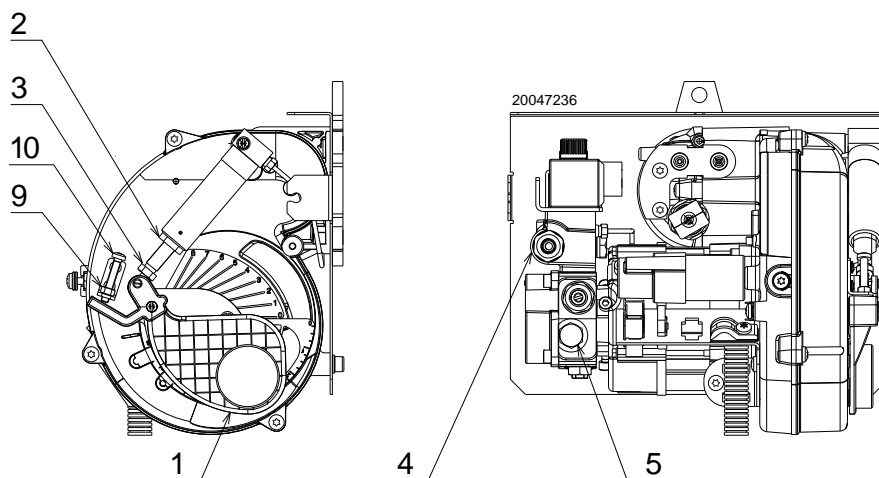


图 17

#### 8.3.1 1 段火调节（开度指示器在位置 1）

##### 调节风门挡板：

拧松螺母 (9)，旋转螺丝 (10) 直至风挡 (1) 达到所需位置。  
然后拧紧螺母 (9)。

##### 调节压力：

工厂预设为 10 bar。

要改变或重置压力设定，仅需旋转螺丝 (4)。

压力计必须安装在螺帽处 (5)。

#### 8.3.2 2 段火调节（开度指示器位于位置 2）

##### 调节风门挡板：

拧松螺母 (2)，旋转螺丝 (3) 直至风门挡板 (1) 到达所需位置。  
然后拧紧螺母 (2)。

8.4 点火电极设定



警告

点火电极位置不可改变。如果发生故障，请检查尺寸是否如图所示。

拆除或安装喷嘴之前，需拧松螺丝 A (图 18) 并向前移动点火电极。

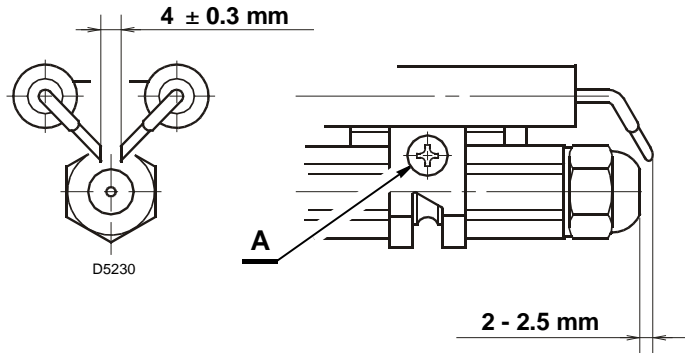


图 18

8.5 燃烧器启动周期

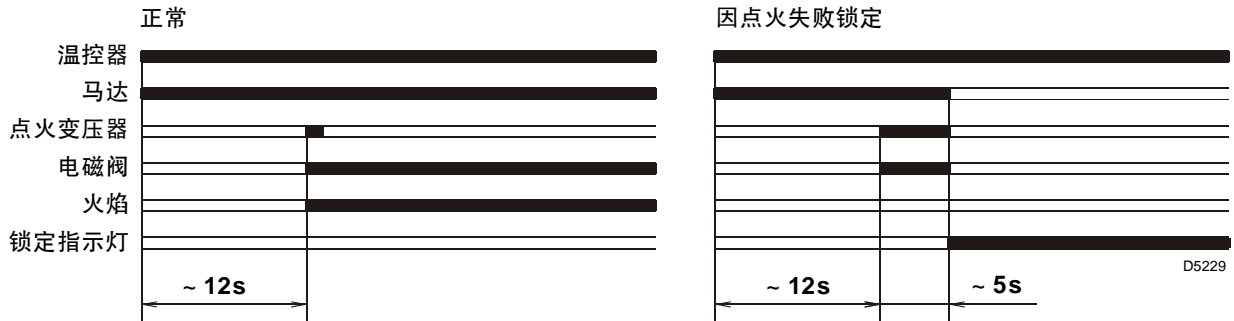


图 19

8.6 调节，防止燃烧器点火时脱火

轻油温度降至 + 8°C 以下，可能会出现脱火现象。

- 1) 电极位置正确，(见图 18)。
- 2) 喷嘴：雾化锥体  
选择全空或半空锥体。  
举例：Delavan A - E 型；Steinen H 型；Danfoss H 型。
- 3) 油泵设定  
工厂预设油泵压力为 12 bar。  
轻油温度低于 + 8°C 时，将油泵压力增大至 14 bar。
- 4) 燃烧头设定  
将燃烧头的设定点调节至手册所示位置更远的地方。  
举例：手册要求将燃烧头设定在设定点 2。  
但实际应设定在设定点 3。
- 5) 风机 - 风门挡板调节  
调节风门挡板，降低过量空气，直至 Bacharach 值 不接近 1。  
(例如，在最低过量空气状态下燃烧)。

9 维护

9.1 维护安全注意事项

定期维护对保持燃烧器良好的运行状态、安全性、燃烧效率以及耐用性都非常重要。

定期维护可以降低燃料消耗和污染排放，并且能保证产品的耐用性。



燃烧器的维护和校准必须由具有资质的专业技术人员操作，且符合本手册要求和安装地的强制标准。

在进行任何维护、清洁及检查之前，需做到：



通过切断系统主开关切断燃烧器电源；



停止燃料供应。

9.2 维护计划

9.2.1 维护频率

燃烧系统应每年由制造商代表或其它专业技术人员至少检查一次。

9.2.2 检查及清洁

燃烧头

打开燃烧器，确认燃烧头所有部件状态良好，没有出现因高温变形或有污物附着其上等情况，且燃烧头位置正确。

清洁燃料分配盘上燃料出口区的燃烧头。

燃烧器

检查燃烧器，没有过度磨损或螺丝松动的情况，清洁燃烧器外部。

风机

检查确认风机内或其叶片上没有积聚灰尘，如有灰尘可能会造成空气流量减少并产生燃烧污染。

光敏电阻

清洁光敏电阻。

电极

检查电极位置是否正确。

喷嘴

建议在定期维护燃烧器时，每年更换喷嘴。

不要清洁喷嘴开口处；也不得打开喷嘴。

过滤器

检查回路及喷嘴处过滤器网。如必要，清洁或更换过滤网。

如果油料箱内出现锈斑或杂质，请使用另一台独立的泵清洁油料箱底部的水及任何杂质。

油泵

根据第 17 页表 E 确定输油压力。检查输油管路及过滤器，可使用油泵真空计进行，以便之后对输油管路或油泵进行故障原因排查。

如果故障原因在输油管路，则检查确认过滤器是否洁净以及是否有空气进入管路内部。

软管

- 定期检查连接软管的状态。应至少每 2 年更换一次软管。
- 检查确认软管状态仍旧良好。

燃料箱

如果油料箱内有水或其它污物，应在使用设备前将其清除。如对此操作有任何疑问，请联系燃油及油料箱供应商。

锅炉

按照随附说明书清洁锅炉以保证其最初燃烧特性完好，特别是烟气温度和炉膛压力。

燃烧状态

如果在燃烧器运行的初始阶段获得的燃烧数据不符合当地强制标准，或者在任意出力下燃烧效果不佳，请联系利雅路公司技术人员让其对燃烧器做必要调整。

让燃烧器运行 10 分钟，然后对照操作手册所列出的参数检查燃烧读书。然后再进行燃烧状态检查核实：

- 烟囱内烟气温度；
- CO<sub>2</sub> 含量 (%)；
- CO 含量 (ppm)；
- 根据 Bacharach 计量标准，确定烟气黑度。

## 10 故障 / 解决方案

下表所列为可能引起燃烧器启动失败或非正常运行等故障的原因及可能的解决方案。

故障通常会点亮控制盒8)内复位按钮上的锁定指示灯(见第7页,图1)。

当锁定指示灯点亮,只有在按下复位按钮后,燃烧器才会重新点火。之后,如果燃烧器运行正常,则锁定仅为一个临时故障。

如果复位后仍出现锁定,则必须确定故障原因并排除故障。

故障	可能的原因	解决方案
限位温控器闭合时燃烧器不能启动。	未连接电源	检查控制盒内 L - N 上的电压 检查线路上的保险 检查确认安全温控器未锁定
	光电管感应虚假火焰	消除虚假火焰
	控制盒内部电气连接错误	检查并连接所有插头
燃烧器在预吹扫和点火阶段运行正常,但5秒后锁定。	光电管脏	清洁
	光电管故障	更换
	火焰飘动或消失	检查油泵压力及燃料输出 检查风压 更换喷嘴
		检查安全阀线圈
燃烧器启动时点火延迟。	点火电极位置错误	根据操作手册正确设定点火电极
	风量过大	减小风量
	喷嘴脏或磨损	更换



警告

由于错误安装、调试燃烧器、不正确使用燃烧器、未按技术手册要求进行操作及由未经资格认证的人员操作燃烧器而导致的人员、牲畜及财产损失,制造商不承担任何责任。



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