

GB **Forced draught gas burners**

CN **强制通风燃气燃烧器**

Two stage operation
两段火运行

Gulliver



| CODE - 编码 | MODEL - 型号 | TYPE - 类型 |
|-----------|------------|-----------|
| 20024345 | BS1D | 915 T1 |
| 20024417 | BS2D | 916 T1 |
| 20023689 | BS3D | 917 T1 |
| 20023768 | BS4D | 918 T1 |

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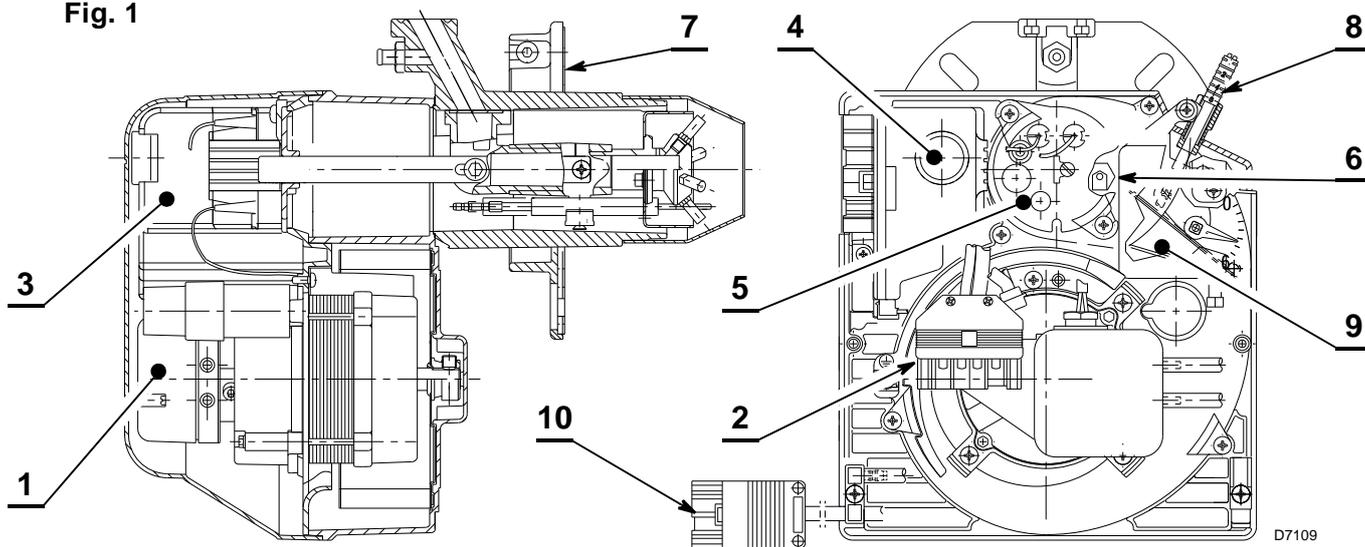
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1. BURNER DESCRIPTION

Two stage gas burner.

- The burner meets protection level of IP X0D (IP 40) as EN 60529.
According to Directives: EMC 89/336/EEC - 2004/108/EC, Low Voltage 73/23/EEC - 2006/95/EC and Machines 98/37/EEC - 2006/42/EC.
- Gas train according to EN 676.
- The burner is approved for intermittent operation as per Directive EN 676.
- **Note for Switzerland.** Swiss provisions, local and cantonal provisions, the provisions of the SVGW authorities for the use of gas, as well as those of the Fir Brigade (VKF), must all be complied with.

Fig. 1



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

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 |
| 4 pin plug No. 1 | Remote reset connectionNo. 1 |

1.2 ACCESSORIES

SOFTWARE DIAGNOSTIC KIT

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

To visualise the diagnostics proceed as follows:

- Connect the kit supplied separately to the control box socket.

Reading of the information begins when the software programme included in the kit starts.

REMOTE RESET KIT

The burner has a remote reset kit (**RS**) consisting of a connection and a push-button operating at a distance of 20 metres max. In order to install it remove the protective lock-out installed at the factory and insert the lock-out supplied with the burner (see electrical diagram on page 8).

MULTIBLOC ROTATION KIT

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

2. TECHNICAL DATA

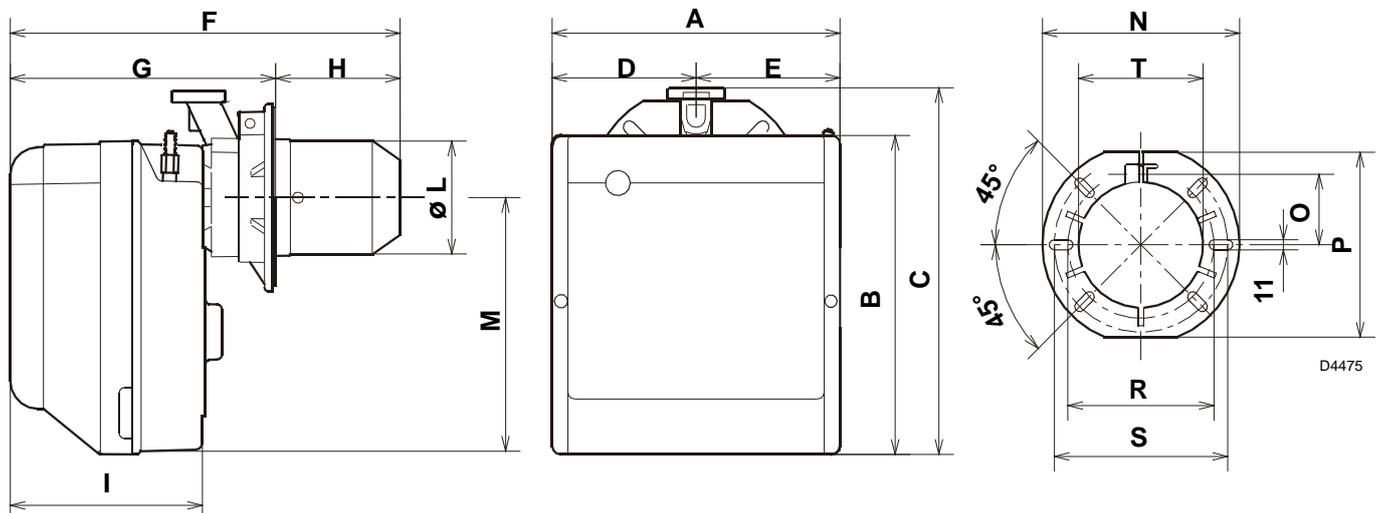
2.1 TECHNICAL DATA

| TYPE | | 915 T1 | 916 T1 | 917 T1 | 918T1 |
|---|--------|---|---|---|------------------|
| Thermal power (1) | kW | 16/19 – 52 | 35/40 – 91 | 65/80 – 200 | 110/140 – 250 |
| | Mcal/h | 13.8/16.3 – 44.7 | 30.1/34.4 – 78.2 | 55.9/68.8 – 172 | 94.6/120.4 – 215 |
| Natural gas (Family 2) | | Net heat value: 8 – 12 kWh/m ³ = 7000 – 10,340 kcal/m ³ | | | |
| | | Pressure: min. 20 mbar – max. 100 mbar | | | |
| Electrical supply | | Single phase, 230V ± 10% ~ 50Hz | | | |
| Motor | | Run current 0.8A 2750 rpm 288 rad/s | Run current 1.8A 2800 rpm 294 rad/s | Run current 1.9A 2720 rpm 288 rad/s | |
| Capacitor | | 4 µF | 6.3 µF | 8 µF | |
| Ignition transformer | | Primary 230V / 0.2A – Secondary 8 kV / 12 mA | | | |
| Absorbed electrical power | | 0.15 kW | 0.18 kW | 0.35 kW | 0.53 kW |
| (1) Reference conditions: Temp. 20°C - Barometric pressure 1013 mbar – Altitude 0 m above sea level. | | | | | |

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

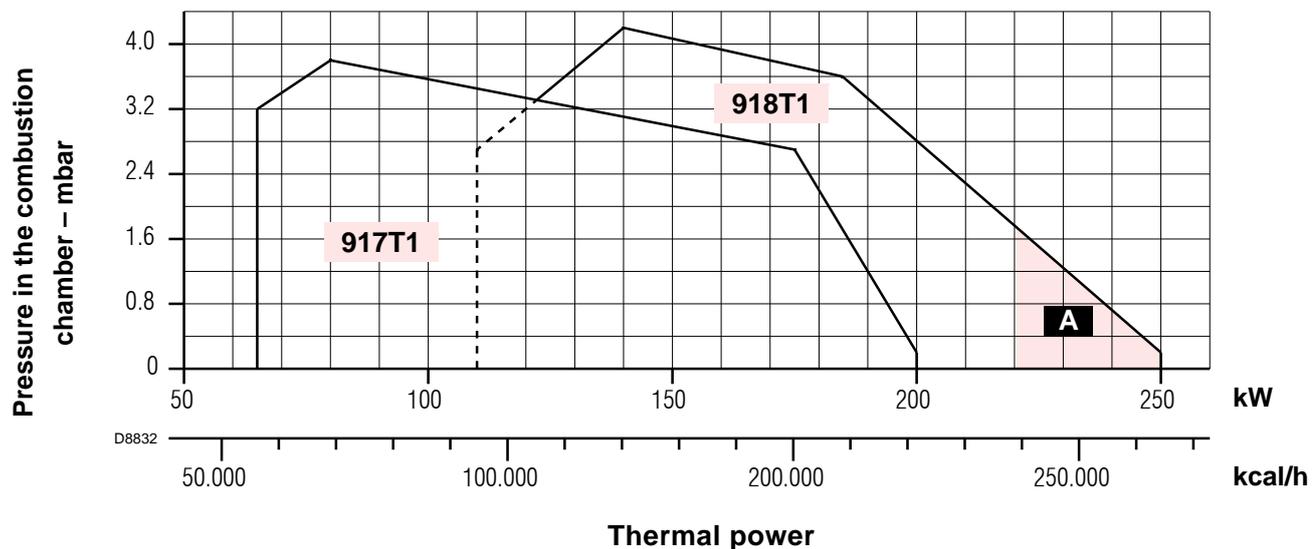
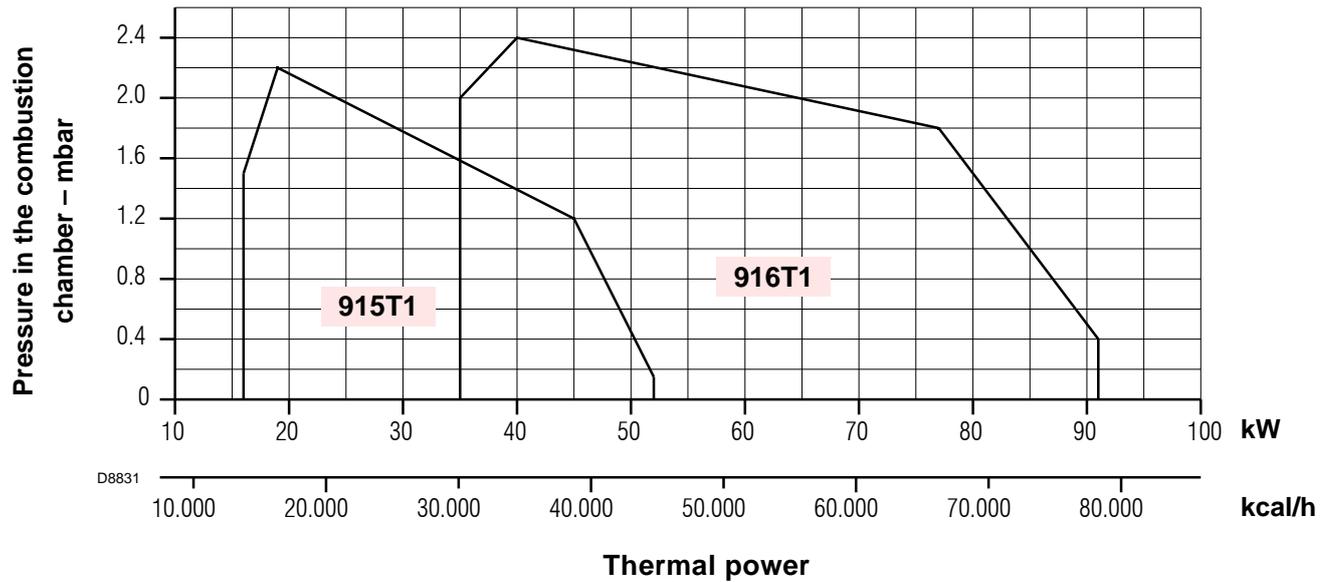
| COUNTRY | | | AT - IT - DK - CH | GB - IE | DE | FR | NL | LU | BE |
|--------------|-----|---|-------------------|---------|------------|---------|----------|----------|--------------|
| GAS CATEGORY | | | I12H3B/P | I12H3P | I12ELL3B/P | I12Er3P | I12L3B/P | I12E3B/P | I2E(R)B, I3P |
| GAS PRESSURE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

2.2 OVERALL DIMENSIONS



| TYPE | A | B | C | D | E | F | G | H | I | L-T | M | N | O | P | R | S |
|-------|-----|-----|-----|-------|-------|-----|-----------|-----------|-----|-----|-----|-----|------|-----|-----|-----|
| 915T1 | 234 | 254 | 295 | 122.0 | 112.0 | 346 | 230 – 276 | 116 – 70 | 174 | 89 | 210 | 192 | 66 | 167 | 140 | 170 |
| 916T1 | 255 | 280 | 325 | 125.5 | 125.5 | 352 | 238 – 252 | 114 – 100 | 174 | 106 | 230 | 192 | 66 | 167 | 140 | 170 |
| 917T1 | 300 | 345 | 391 | 150.0 | 150.0 | 390 | 262 – 280 | 128 – 110 | 196 | 129 | 285 | 216 | 76.5 | 201 | 160 | 190 |
| 918T1 | 300 | 345 | 392 | 150.0 | 150.0 | 446 | 278 – 301 | 168 – 145 | 216 | 137 | 286 | 218 | 80.5 | 203 | 170 | 200 |

2.3 FIRING RATES



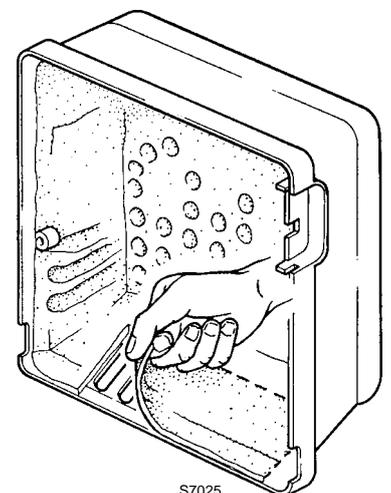
A In the BS4D model type 918T1, in order to guarantee the working with an output of 220 - 250 kW, remove the blank deadening to free the supplementary slits of the air inlet on the cover.

TEST BOILER

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

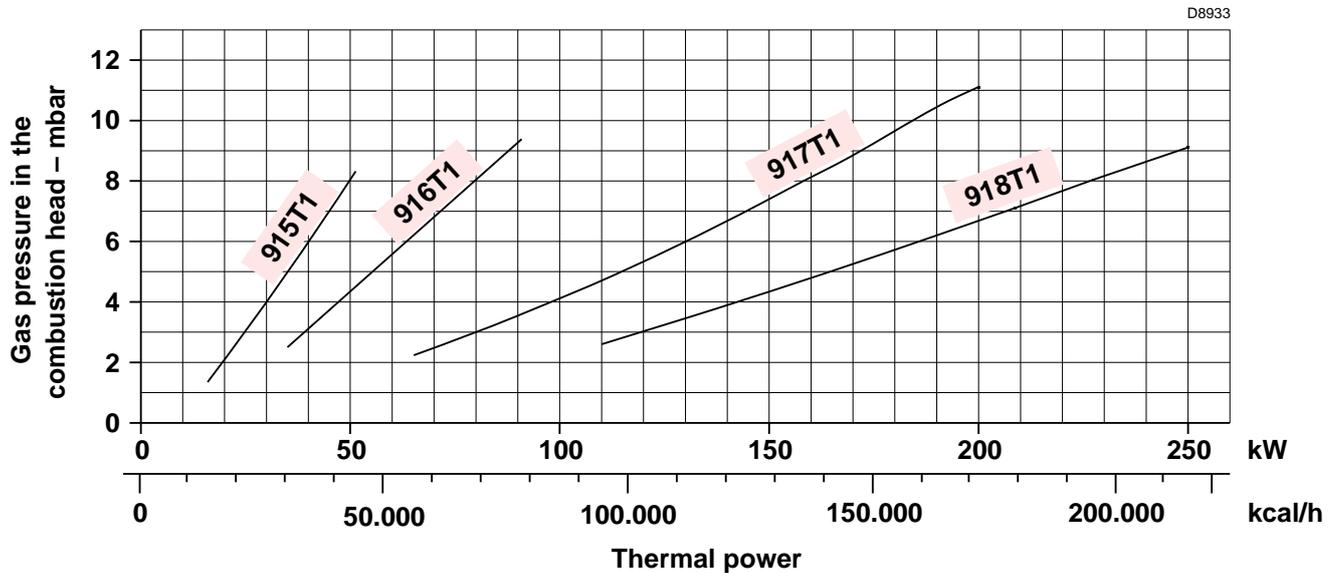
COMMERCIAL BOILERS

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 9.3 mbar, relatively to 916T1 model, is measured (M2, see chapter 3.6, page 7) with the combustion chamber at 0 mbar using gas G20 with a net heat value of 10 kWh/m³ (8.570 kcal/m³).



3. INSTALLATION

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

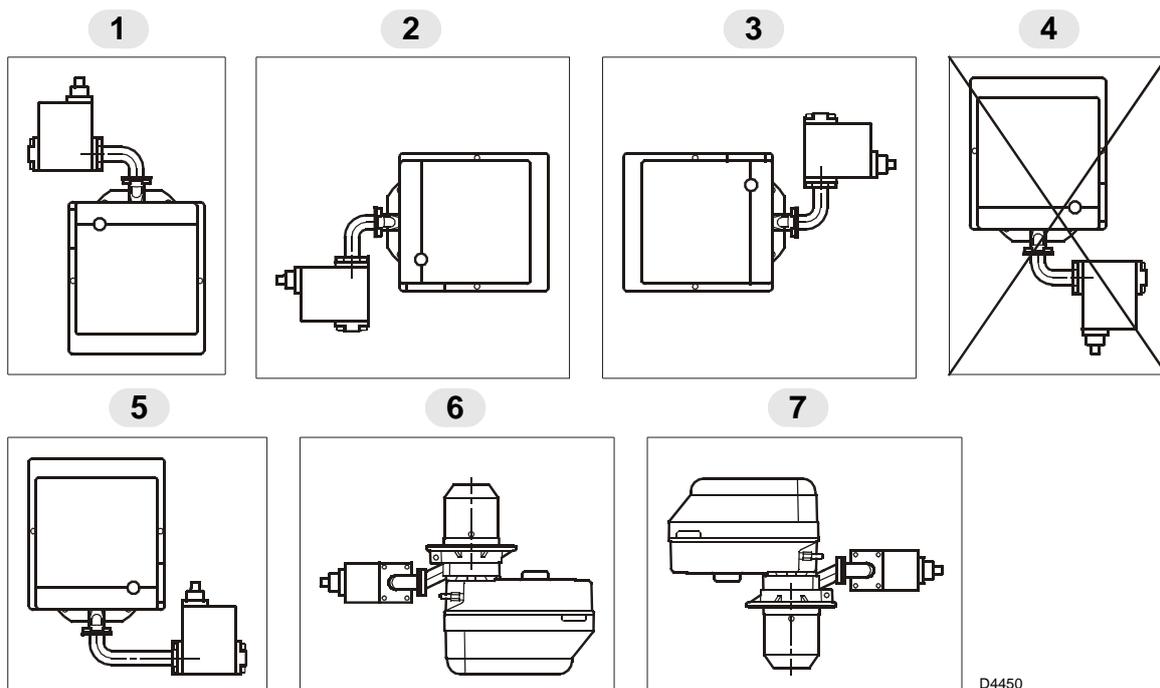
3.1 WORKING POSITION

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

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

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

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



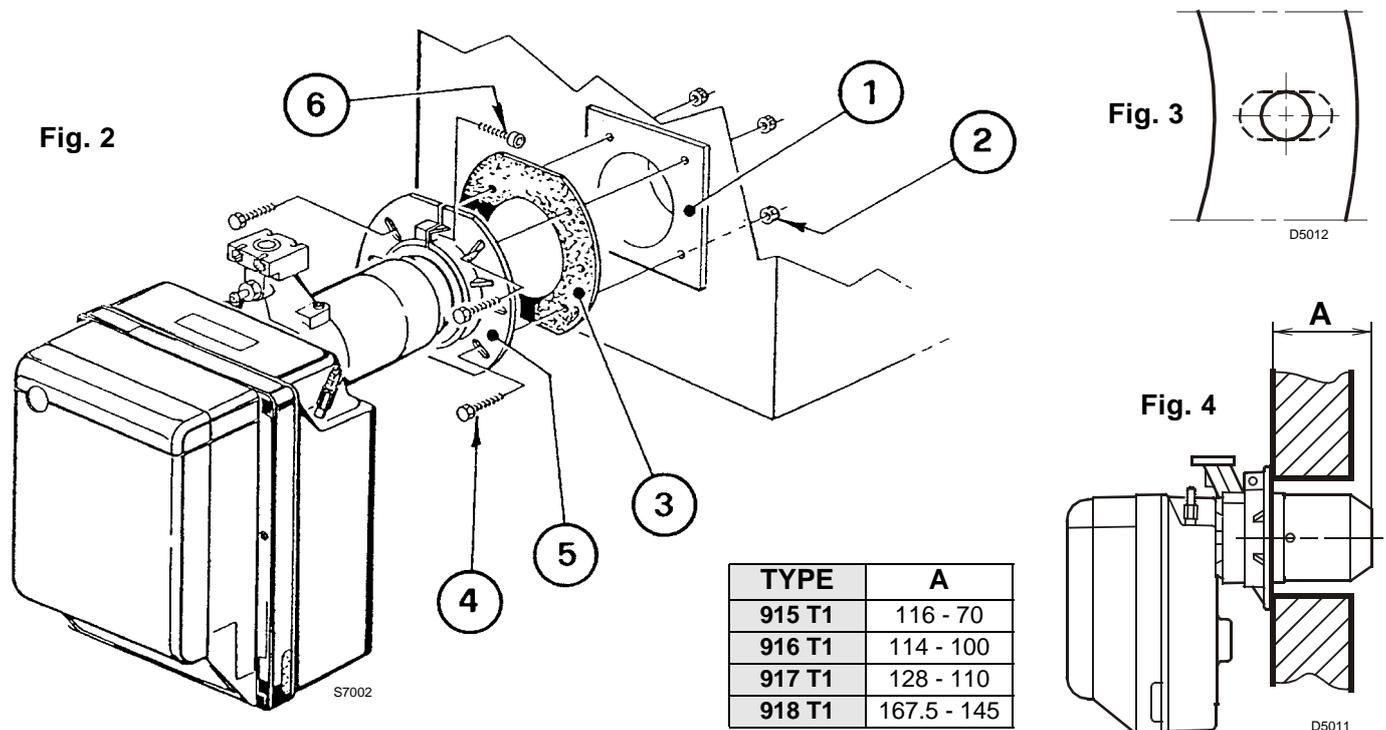
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3.2 BOILER FIXING

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

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

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

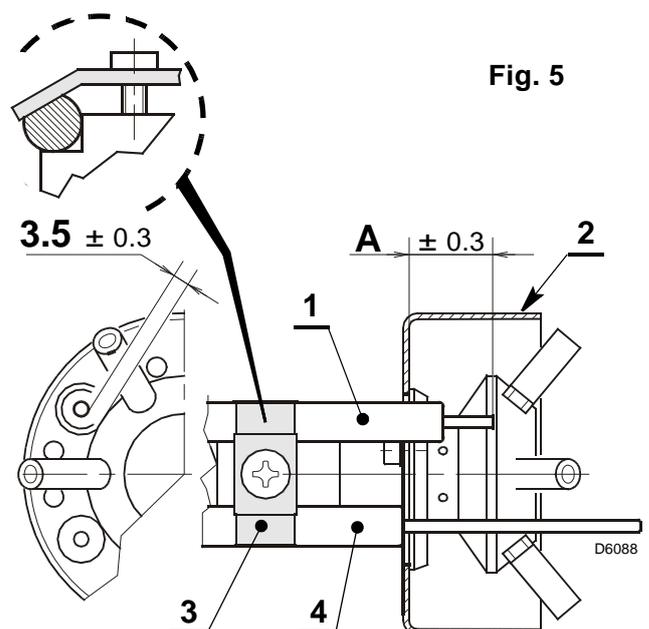


3.3 PROBE-ELECTRODE POSITIONING

ATTENTION

- Ensure that the plate (3, fig. 5) is always inserted in the flattening of the electrode.
- Lean the probe insulator (4) against the cup (2).

| TYPE | 915T1 | 916T1 | 917T1 | 918T1 |
|------|-------|-------|-------|-------|
| A | 17 | 30 | 31 | 31 |



3.4 GAS TRAIN, (as EN 676)

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

| GAS TRAIN | | MATCHED BURNER | CONNECTIONS | | USE |
|------------------|---------|----------------|-------------|----------|-----------------------------|
| TYPE | CODE | | INLET | OUTLET | |
| MB ZRDLE 405 B01 | 3970539 | BS1D | Rp 1/2 | Flange 1 | Natural gas and LPG |
| MB ZRDLE 405 B01 | 3970540 | BS2D | Rp 3/4 | Flange 2 | Natural gas and LPG |
| MB ZRDLE 407 B01 | 3970538 | BS2D | Rp 3/4 | Flange 2 | Natural gas and LPG |
| MB ZRDLE 407 B01 | 3970541 | BS3D - BS4D | Rp 3/4 | Flange 3 | Natural gas ≤ 150kW and LPG |
| MB ZRDLE 410 B01 | 3970542 | BS3D - BS4D | Rp 1 1/4 | Flange 3 | Natural gas and LPG |
| MB ZRDLE 412 B01 | 3970543 | BS3D - BS4D | Rp 1 1/4 | Flange 3 | Natural gas |

3.5 GAS TRAIN ELECTRICITY SUPPLY

The gas train's power cables can be fed to the right or left of the burner, as illustrated in figure 6.

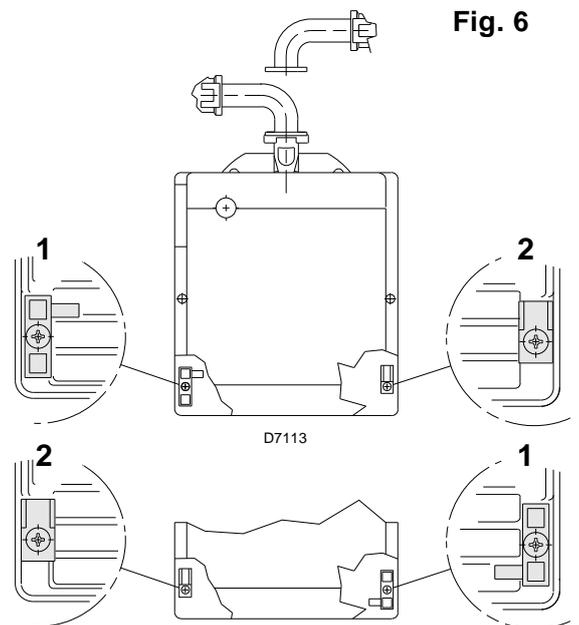
Depending on the entry point, the cable clamp with pressure test point (1) and simple cable clamp (2) may need swapping over.

Consequently, you must make sure:

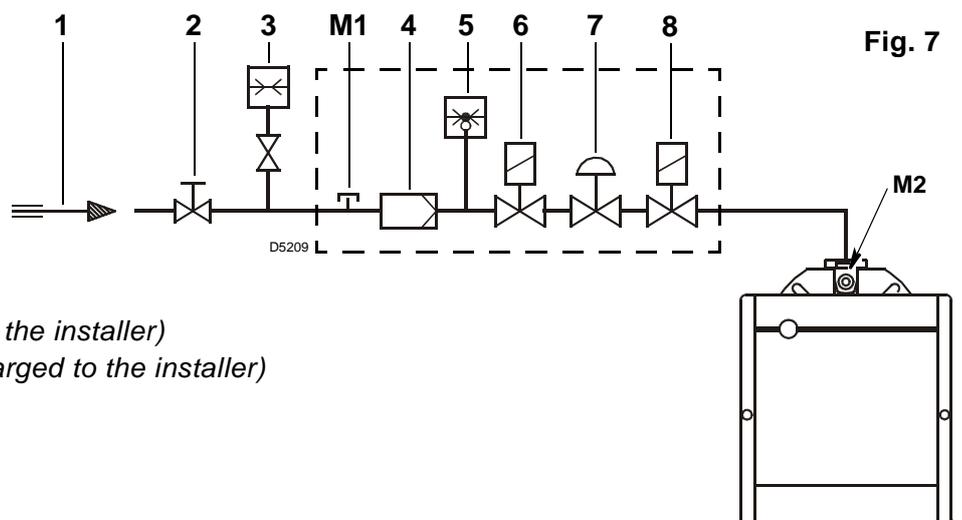
- cable clamp (1) is positioned correctly;
- the tube is positioned correctly so that there are no restrictions likely to impede air flowing to the pressure switch.

WARNING

If necessary, cut the tube to the right size.



3.6 GAS FEEDING LINE



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

3.7 ELECTRICAL WIRING

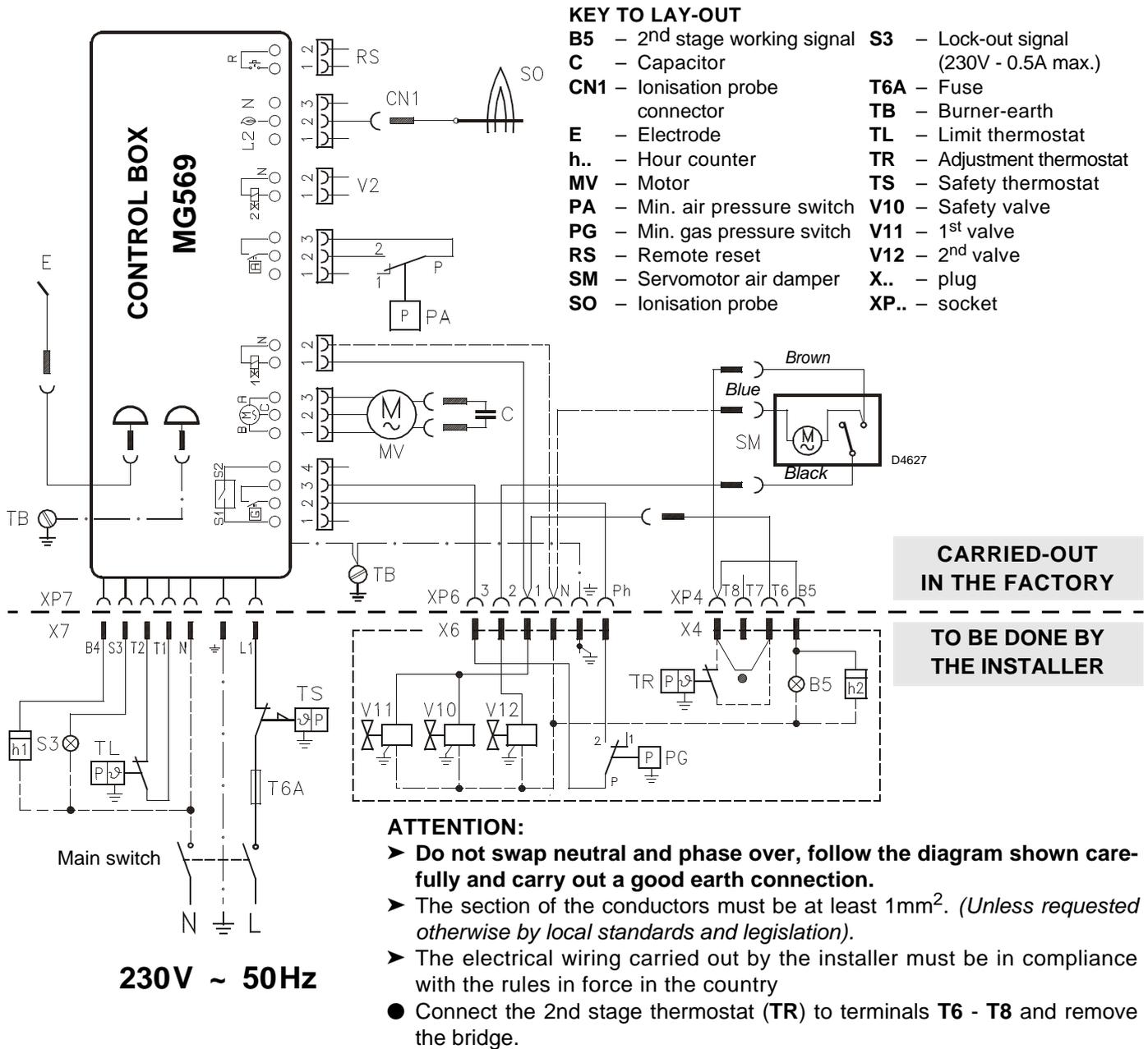
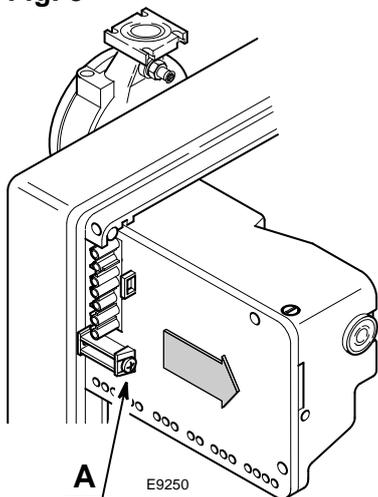


Fig. 8



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
- Connect the 2nd stage thermostat (TR) to terminals T6 - T8 and remove the bridge.

TESTING

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

CONTROL BOX, (see fig. 8)

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

- disconnect all the connectors, the 7-pin plug, the high voltage cables and the earth wire (TB);
- unscrew the bolt (A, fig. 8) and pull the control box in the direction of the arrow.

To install the control box it is necessary to:

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

NOTES

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

4. WORKING

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, (see fig. 9)

Setting depends on the output of the burner. Rotate the setting screw (6) in a clockwise or anticlockwise direction until set point marked on the regulating rod (2) is level with the outside plane of the head assembly (1).

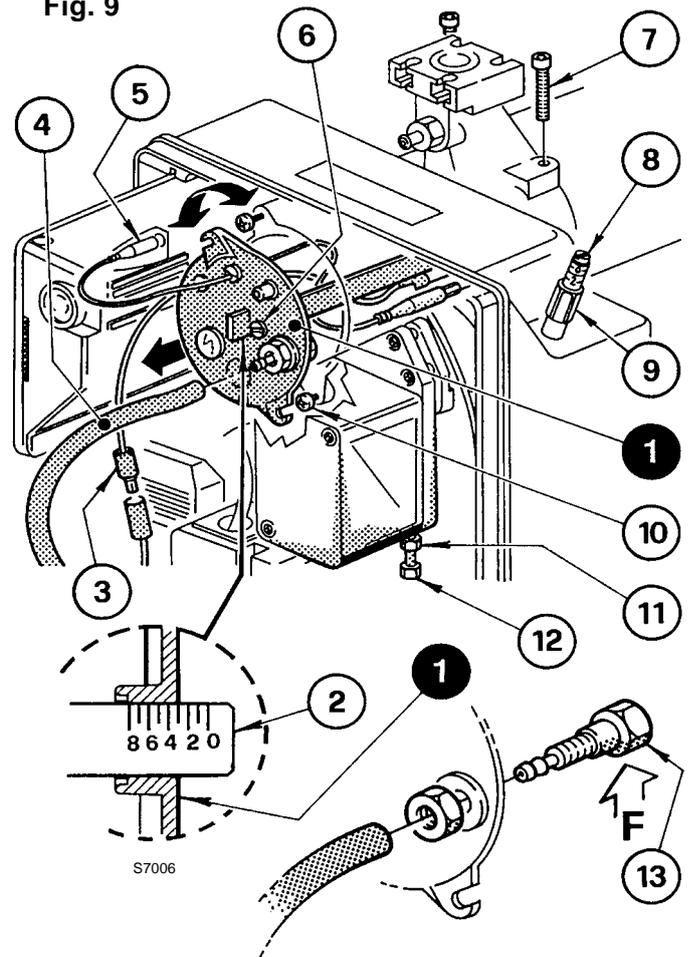
Figure 9 shows the head regulating rod set on set point 3.

Example for BS3D burners:

The burner is installed in a 100 kW boiler. Taking an efficiency level of 90% the burner should give an output of app. 110 kW with the regulating rod set at set point 3 as shown in the diagram.

The diagram is for indication purposes: to assure good working from the burner we suggest adjusting the combustion head according to the boiler.

Fig. 9



REMOVING THE HEAD ASSEMBLY

Proceed as follows to remove the head assembly:

- Disconnect the connections (3 and 5).
- Extract the small tube (4) and loosen the screws (10).
- Unscrew and remove the screws (7), pull out the head assembly support (1) turning it slightly to the right.

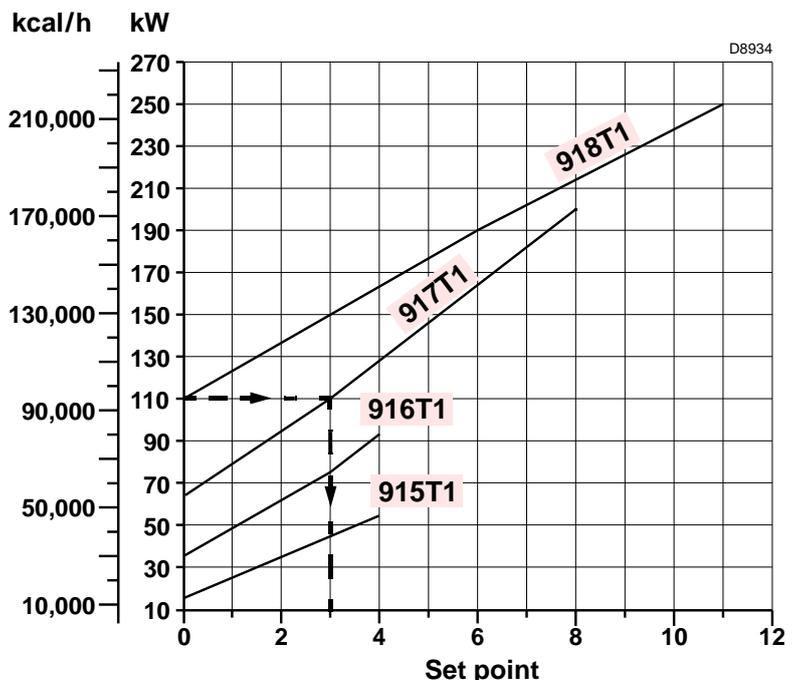
Take care not to change the setting position on the elbow-bracket (2) during dismantling.

REASSEMBLING THE HEAD ASSEMBLY

Follow the above instructions in reverse, returning the head assembly (1) to its original position.

WARNING

- Tighten the screws (7) completely (without locking them); then lock them with a torque wrench setting of 3-4 Nm.
- Check there are no gas leaks from the screws during these operations.
- If the pressure test point (13) should work loose, it must be correctly fixed ensuring that the hole (F) inside the head assembly (1) is facing downwards.



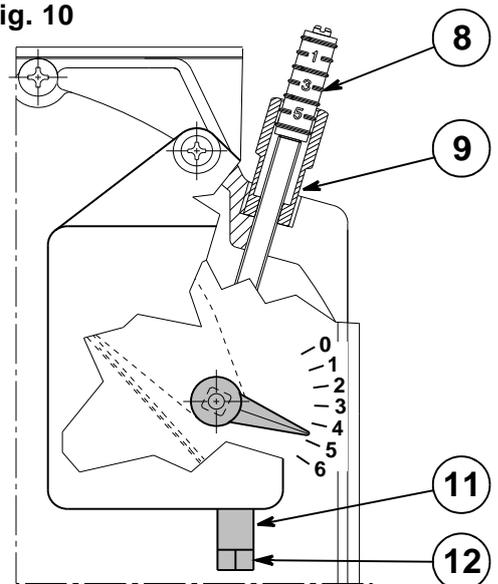
4.3 AIR DAMPER ADJUSTMENT, (fig. 10)

First start-up must always be performed, adjusting screw (12), so that the 1st stage air damper position pointer is beyond mark 1, (factory setting mark 1).

To adjust, proceed as follows:

- Take the burner to 2nd stage by closing the **T6-T8** connection found in the 4-pin plug (**X4**, wiring on page 8).
- Fan thrust causes the air damper to go to the 2nd-stage position with reference to the factory setting (screw 8 on mark 3).
- Loosen nut (9) and turn screw (8) to adjust 2nd-stage air flow (see CO₂ values given in the table below).
- Take the burner to 1st stage by opening the **T6-T8** connection found in the 4-pin plug (**X4**, page 8).
- Adjust 1st stage by turning screw (12), loosening (*clockwise*) nut (11) first, referring to the table below for CO₂ values.
- Once you have achieved the optimal setting, tighten (*anticlockwise*) nut (11). When the burner stops, the air damper closes automatically under its own weight until maximum negative flue pressure is 0.5 mbar.

Fig. 10



ATTENTION

To adjust 1st and 2nd stage output, follow the instructions below:

Output ratio between 1st and 2nd stage must be no more than 1:2.

Example for BS3D: 2nd stage output required 140 kW;

Minimum 1st stage output no less than 70 kW.

Whatever the case, the burner's minimum 1st stage output must not be lower than the value indicated in the operating range.

Example for BS3D: 2nd stage output required 110 kW;

Minimum 1st stage output no less than 65 kW (minimum in operating range page 4).

4.4 COMBUSTION CHECK

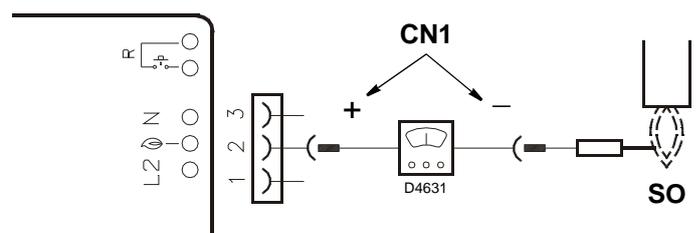
It is advisable to set the burner according to the type of gas used and following the indications of the table:

| 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 mg/kWh | NO _x mg/kWh |
| | | $\lambda = 1.2$ | $\lambda = 1.3$ | | |
| G 20 | 11.7 | 9.7 | 9.0 | ≤ 100 | ≤ 170 |
| G 25 | 11.5 | 9.5 | 8.8 | ≤ 100 | ≤ 170 |
| G 30 | 14.0 | 11.6 | 10.7 | ≤ 100 | ≤ 230 |
| G 31 | 13.7 | 11.4 | 10.5 | ≤ 100 | ≤ 230 |

IONIZATION CURRENT

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

The burner normally supplies a higher current value, so that no check is needed. Anyway, if you want to measure the ionization current, you have to open the connector (**CN1**) (see electrical scheme page 8) fitted on the wire and insert a microammeter.



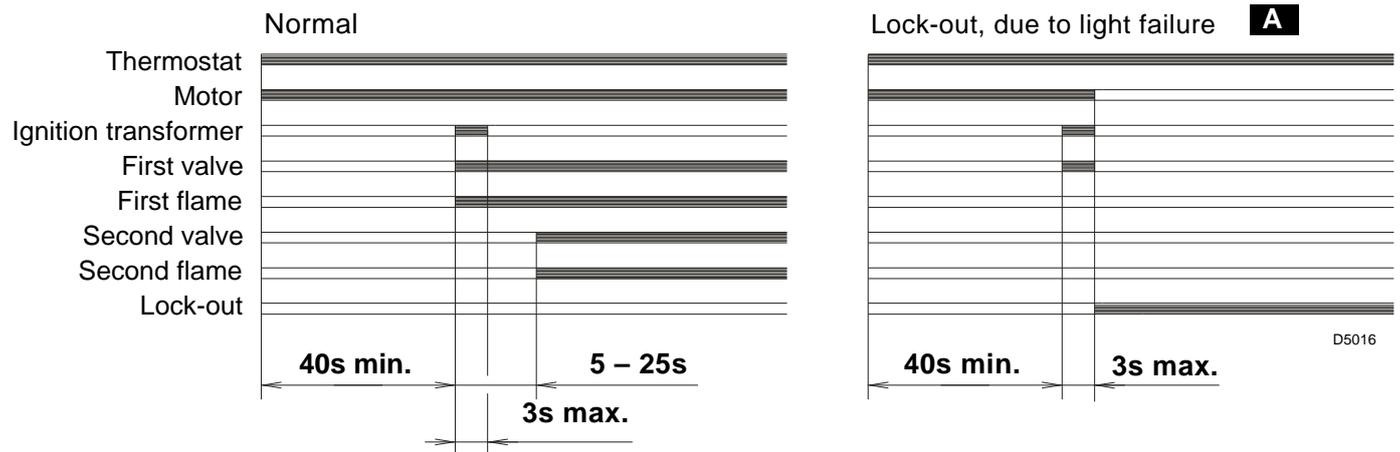
4.5 AIR PRESSURE SWITCH

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 required 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 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



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

4.7 RE-CYCLE FUNCTION

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

4.8 POST-VENTILATION FUNCTION

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

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

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

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

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

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

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

4.9 CONTROL BOX RESET

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

- Press the reset button for at least 1 second.

In the event of the burner not restarting it is necessary to check if the limit thermostat (TL) is closed.

5. MAINTENANCE

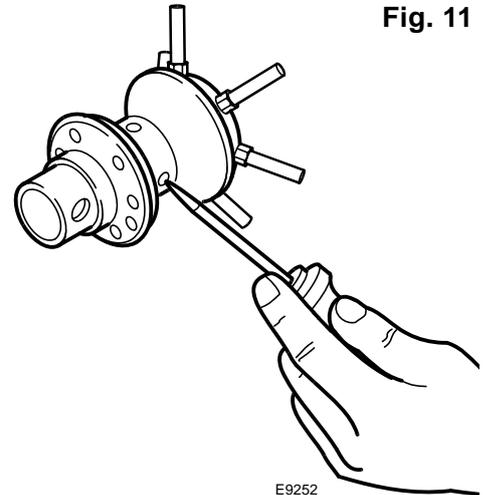
Disconnect the electric supply to the burner by switching off the main power switch and close the gas shut-off valve before maintaining or checking the system.

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

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

THE FUNDAMENTAL OPERATIONS TO CARRY OUT ARE AS FOLLOWS:

- Check at regular intervals that the holes of the gas head are not obstructed. If they are, clean them with a suitable tool as shown in the figure 11.
- Check there are no occlusions or obstructions in the inlet or return pipes, in the air suction areas and in the combustion product waste pipe.
- Check that the burner and gas train electrical connections are correct.
- Check that the positioning of the air pressure test point (6, fig. 1, page 2) is correct.
- Check that the gas train is suited to the burner capacity, the type of gas used and the network gas pressure.
- Check that the positioning of the combustion head is correct and that it is properly fixed to the boiler.
- Check that the air damper is positioned correctly.
- Check that the ionisation probe and the electrode are positioned correctly (see fig. 5, page 6).
- Check that the air pressure switch and the gas pressure switch are set correctly.



Leave the burner operating in steady state for approx. ten minutes, checking to ensure that all elements indicated herein have the proper settings for 1st and 2nd stage.

Then carry out the analysis of the combustion by checking:

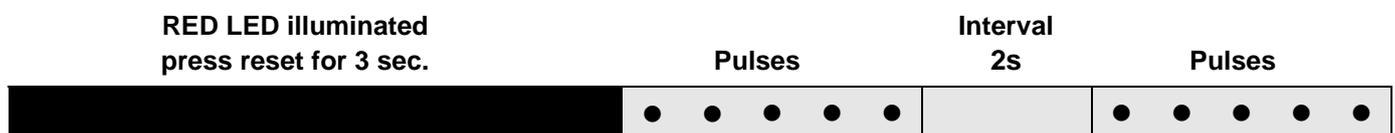
- CO₂ percentage (%); ● CO content (ppm); ● NO_x content (ppm); ● Ionisation current (μA);
- Flue gases temperature at the stack.

5.1 VISUAL DIAGNOSTIC CONTROL BOX

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

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

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



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

| SIGNAL | PROBABLE CAUSE |
|-----------------|--|
| 2 pulses ● ● | The flame does not stabilise at the end of the safety time: <ul style="list-style-type: none"> – faulty ionisation probe; – faulty or soiled gas valves; – neutral/phase exchange; – faulty ignition transformer – poor burner regulation (insufficient gas). |

| SIGNAL | PROBABLE CAUSE |
|---------------------------|--|
| 3 pulses ● ● ● | Min. air pressure switch does not close or is already closed before the limit thermostat closed: – air pressure switch faulty; – air pressure switch incorrectly regulated. |
| 4 pulses ● ● ● ● | Light present in the chamber before the burner's switching on or off: – presence of a strange light before or after the limit thermostat switching over; – presence of a strange light during pre-ventilation; – presence of a strange light during post-ventilation. |
| 6 pulses ● ● ● ● ● ● | Loss of ventilation air: – air loss during pre-ventilation; – air loss during and after safety time. |
| 7 pulses ● ● ● ● ● ● ● | Loss of flame during operations: – poor burner regulation (insufficient gas); – faulty or soiled gas valves; – short circuit between ionisation probe and earth. |

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

6. FAULTS / SOLUTIONS

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

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

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

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

6.1 START-UP PROBLEMS

| FAULTS | POSSIBLE CAUSES | SOLUTION |
|--|--|---|
| The burner doesn't start when the limit thermostat closes. | Lack of electrical supply. | Check presence of voltage in the L1-N clamps of the 7 pin plug. |
| | | Check the condition of the fuses. |
| | | Check that safety thermostat is not lock out. |
| | Lack of gas. | Check the manual cock opening. |
| | | Check that the valves change over to the opening position and there are not short circuits. |
| | The gas pressure switch does not close its contact. | Adjust them. |
| | The connections in the control box are wrongly inserted. | Check and connect all the plugs. |
| The air pressure switch is changed over to the operational position. | Replace the pressure switch. | |

| FAULTS | POSSIBLE CAUSES | SOLUTION |
|---|---|---|
| Burner tends to pull the flame when switching from 1st to 2nd stage. | Output ratio between 1 st and 2 nd stage greater than 1:2. | Restore correct maximum ratio of 1:2, making sure 1 st stage output is no less than the operating range's minimum. |
| | High air excess in 1 st stage. | Restore the correct air excess value (λ min. = 1.3) see section "4.4 combustion control". |
| The burner runs normally in the prepurge and ignition cycle and locks out after about 3 seconds. | Phase and neutral connection is inverted. | Invert them. |
| | The earth connection lacks or is inefficient. | Make the earth connection efficient. |
| | The ionization probe is earthed or not in contact with the flame, or its wiring to the control box is broken, or there is a fault on its insulation to the earth. | Check the right position and if necessary set it according to the instructions of this manual. |
| | | Reset the electrical connection. |
| The burner starts with an ignition delay. | The ignition electrodes is wrongly positioned. | Adjust it according to the instructions of this manual. |
| | Air output is too high. | Set the air output according to the instructions of this manual. |
| | Valve brake is too close with insufficient gas output. | Adjust it. |
| The burner doesn't change over the 2nd stage. | The air damper is locked. | Check the right working. |
| | | Check the right electrical connection. |
| | The 2 nd stage gas valve doesn't pull in. | Failed valve: replace it. |
| The burner locks out after the prepurge phase due to flame-failure. | The solenoid valves is passing too little gas. | Check the pressure in the network and/or adjust the solenoid valve according to the instructions of this manual. |
| | The solenoid valves are defective. | Change them |
| | The ignition arc is irregular or has failed. | Check the right insertion of the connectors. |
| | The pipe has not been purged from the air. | Check the right position of the electrode according to the instructions of this manual. |
| | | Carry out a complete breathing of the line of gas-supply. |

| FAULTS | POSSIBLE CAUSES | SOLUTION |
|--|---|---|
| The burner locks out during the prepurge phase. | The air pressure switch does not change over to the operational position. | The pressure switch is faulty, change it. The air pressure is too low, (the head is bad adjusted). |
| | The flame exists. | Faulty valves: replace them. |
| | The pressure test point (13, fig. 9, page 9) is badly positioned. | Place it in the right position according to the instructions of this manual on page 9, chapter 4.2. |
| | The burner continues to repeat the starting cycle without going on lock-out. | The gas pressure in the gas-mains lies very close to the value to which the gas pressure switch has been set. The sudden falling-off pressure at the opening of the valve causes the opening of the pressure switch. However this only temporarily, because the valve immediately closes again, so then does the pressure switch, because the pressure builds-up again, causing the cycle to be repeated over and over. |

6.2 OPERATING IRREGULARITIES

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

7. SAFETY WARNINGS

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

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

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

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

7.1 BURNER IDENTIFICATION

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

7.2 BASIC SAFETY RULES

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

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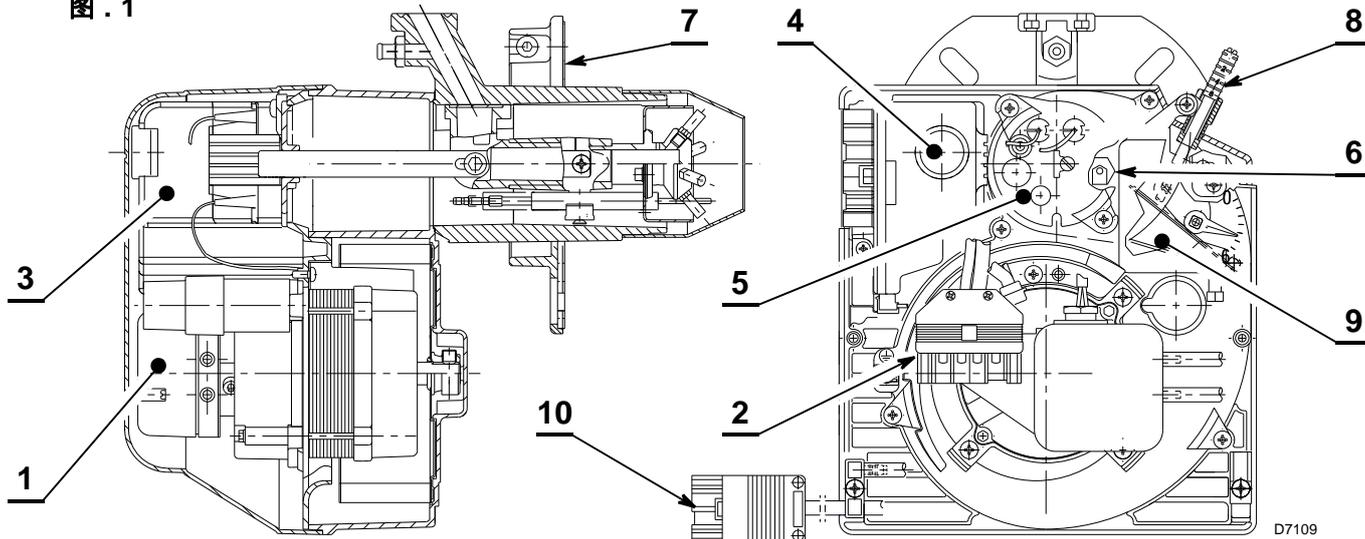
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1. 燃烧器描述

两段火燃气燃烧器

- ▶ 燃烧器符合 IP 40, EN 60529 电气保护等级。
符合标准：EMC 89/336/CEE - 2004/108/CE, 低电压 73/23/CEE - 2006/95/CE, 机械 98/37/EEC - 2006/42/EC.
- ▶ 燃气阀组符合 EN 676 标准。
- ▶ 遵循 EN 676 标准，燃烧器间断运行。
- ▶ **对瑞士用户的提示。** 瑞士国家规定，地方和州规定以及 SVGW 权威机构有关燃气使用的相关规定，和 Fire Brigade (VKF) 的所有规则均符合。

图 . 1



- 1 - 空气压力开关
- 2 - 连接阀门组的 6 孔插座
- 3 - 带 7 孔插座的控制盒
- 4 - 带锁定指示灯的复位按钮
- 5 - 燃烧头组件
- 6 - 压力测点
- 7 - 带绝热垫的法兰
- 8 - 风门挡板调节组件
- 9 - 风门伺服马达
- 10 - 控制燃烧器二段火的 4 孔插座

1.1 燃烧器随机附件

| | | | |
|----------|--------|-----------------|-------|
| 带绝热垫的法兰 | No. 1 | 将法兰安装到锅炉上的螺栓和螺母 | No. 4 |
| 法兰用螺栓和螺母 | No. 17 | 针插头 | No. 1 |
| 4 针插头 | No. 1 | 远程复位连线 | No. 1 |

1.2 辅助装置

软件诊断组件

此组件通过红外线连接计算机，可以显示燃烧器的运行时间，型号和故障类型，序列号等。

按如下步骤进行诊断：

- ▶ 将单独提供的组件连接到控制盒插座上。
启动组件附带的专用软件程序，察看燃烧器相关信息。

远程复位组件

燃烧器有远程复位组件 (RS) 由连接线和按钮组成 (最长的有效距离为 20 米)。

取下在工厂安装的锁定保护套，将附带的远程复位组件插入即可连接该组件。(详见第 8 页的电气接线图)。

旋转安装组件

该特殊组件能使燃烧器的安装位置旋转 180°，参见第 5 页 "3.1 安装位置" 的图 5。该组件能确保燃气阀组工作正常。该组件的安装和使用必须符合法律和地方的规定。

2. 技术参数

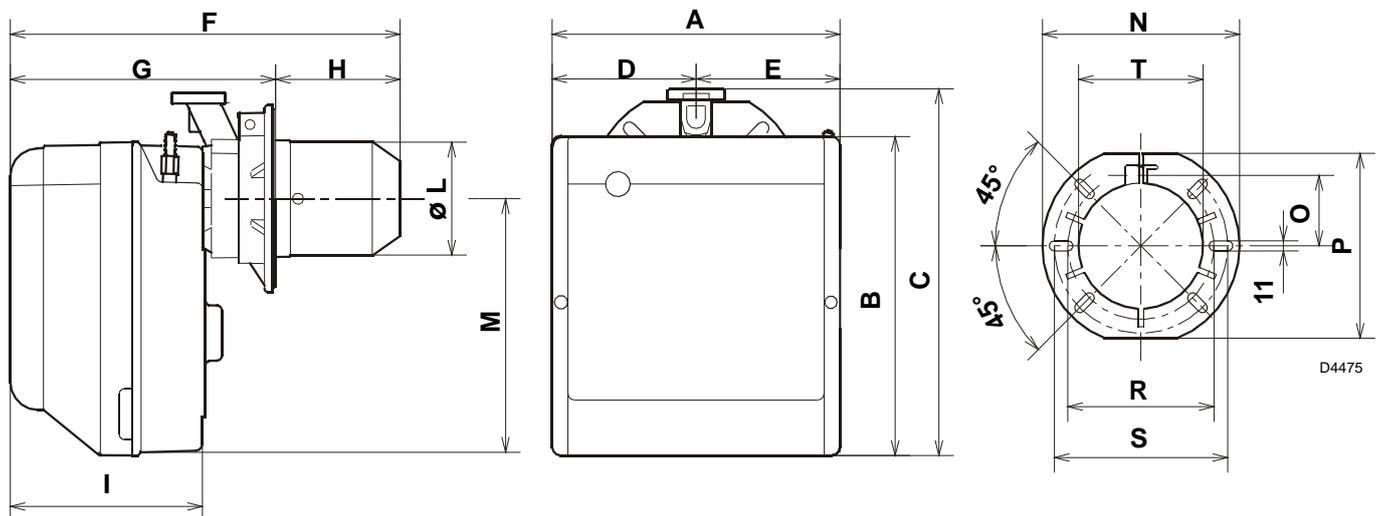
2.1 技术参数

| 类型 | | 915 T1 | 916 T1 | 917 T1 | 918T1 |
|---|--------|---|------------------------------------|------------------------------------|------------------|
| 燃烧器出力 (1) | kW | 16/19 – 52 | 35/40 – 91 | 65/80 ÷ 200 | 110/140 ÷ 250 |
| | Mcal/h | 13.8/16.3 – 44,7 | 30.1/34.4 – 78.2 | 55,9/68,8 ÷ 172 | 94,6/120,4 ÷ 215 |
| 天然气 (品种 2) | | 净热值：8 – 12 kWh/m ³ = 7000 – 10,340 kcal/m ³ | | | |
| | | 压力：最小 . 20 mbar – 最大 . 100 mbar | | | |
| 电源 | | 单相，230V ± 10% ~ 50Hz | | | |
| 马达 | | 运行电流 0.8A 2750 rpm 288 rad/s | 运行电流 1.8A 2800 rpm 294 rad/s | 运行电流 1.9A 2720 rpm 288 rad/s | |
| 马达启动电容 | | 4 μF | 6.3 μF | 8 μF | |
| 点火变压器 | | 初级 230V / 0.2A – 次级 8 kV / 12 mA | | | |
| 电功耗 | | 0.15 kW | 0.18 kW | 0.35 kW | 0.53 kW |
| (1) 参考条件： 温度 20°C - 大气压力 1013 mbar – 海拔 0 m。 | | | | | |

燃用 LPG (品种 3) 须配特殊附件。

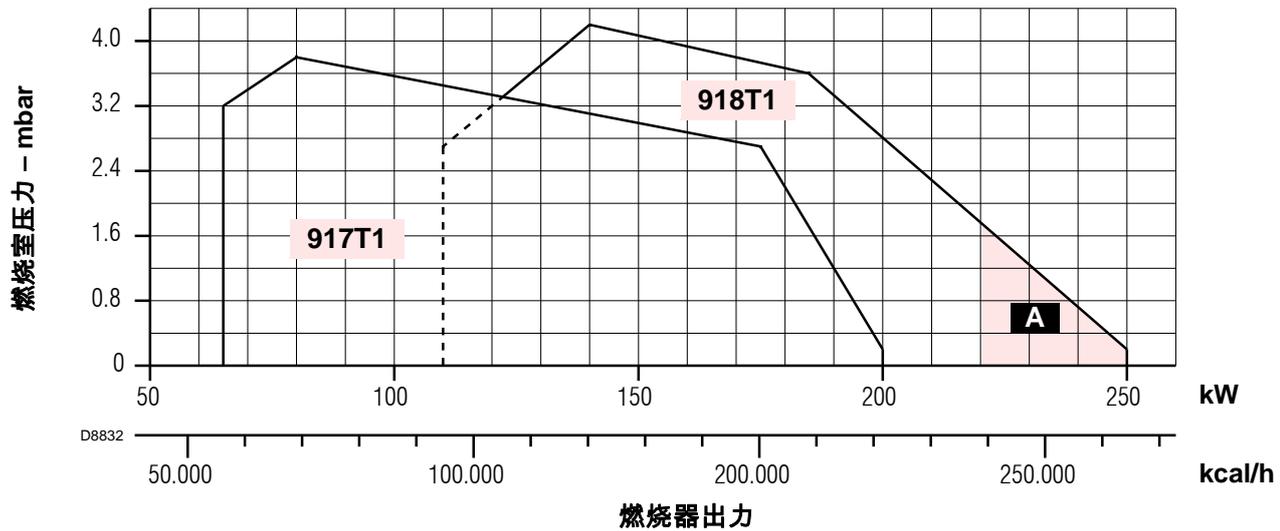
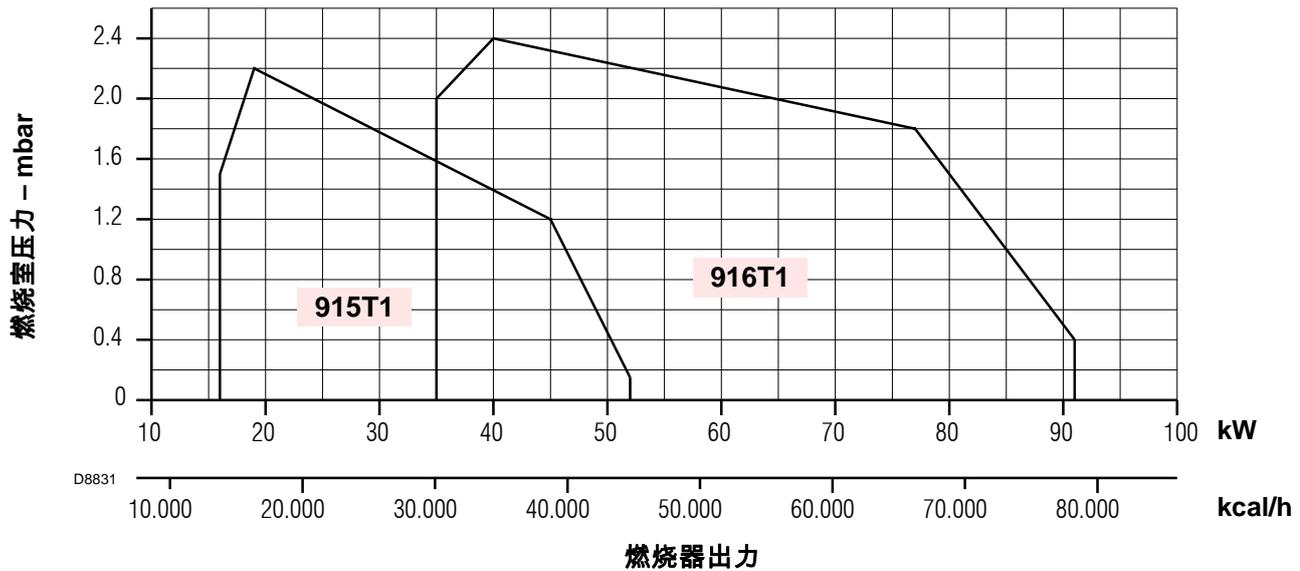
| 国家 | | | AT - IT - DK - CH | GB - IE | DE | FR | NL | LU | BE |
|------|-----|---|-------------------|---------|------------|---------|----------|----------|--------------|
| 燃气种类 | | | II2H3B/P | II2H3P | II2ELL3B/P | II2Er3P | II2L3B/P | II2E3B/P | I2E(R)B, I3P |
| 燃气压力 | G20 | H | 20 | - | - | -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

2.2 外观尺寸



| 类型 | A | B | C | D | E | F | G | H | I | L-T | M | N | O | P | R | S |
|-------|-----|-----|-----|-------|-------|-----|-----------|-----------|-----|-----|-----|-----|------|-----|-----|-----|
| 915T1 | 234 | 254 | 295 | 122.0 | 112.0 | 346 | 230 – 276 | 116 – 70 | 174 | 89 | 210 | 192 | 66 | 167 | 140 | 170 |
| 916T1 | 255 | 280 | 325 | 125.5 | 125.5 | 352 | 238 – 252 | 114 – 100 | 174 | 106 | 230 | 192 | 66 | 167 | 140 | 170 |
| 917T1 | 300 | 345 | 391 | 150.0 | 150.0 | 390 | 262 – 280 | 128 – 110 | 196 | 129 | 285 | 216 | 76.5 | 201 | 160 | 190 |
| 918T1 | 300 | 345 | 392 | 150.0 | 150.0 | 446 | 278 – 301 | 168 – 145 | 216 | 137 | 286 | 218 | 80.5 | 203 | 170 | 200 |

2.3 工作范围



A 若用 BS4D 型号燃烧器 (918T1) , 为了保证燃烧器的出力能达到 220 - 246 kW, 撕掉隔音材料露出外壳上的空气入口。

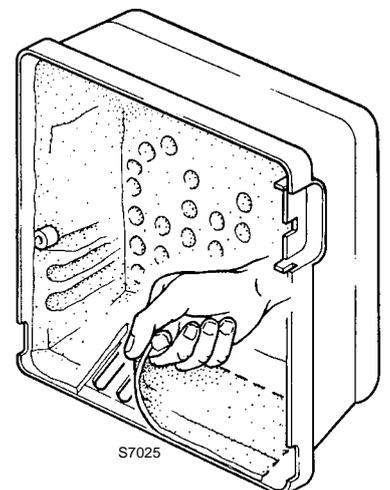
实验锅炉

以上工作曲线是用符合 EN 676 和 LRV92 标准的锅炉测量得到。

商用锅炉

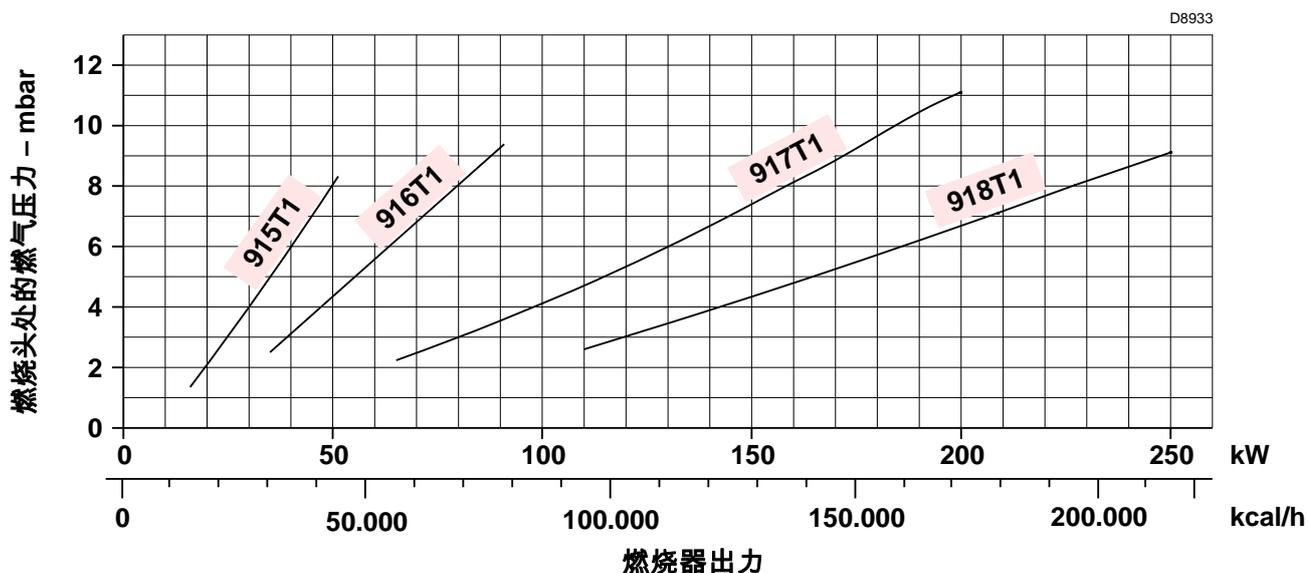
如果锅炉的设计和制造是符合 EN 303 标准, 且燃烧室尺寸与 EN 676 标准中图表所示相近时, 则燃烧器与锅炉是匹配的。

如果锅炉的设计和制造不符合 EN 303 标准, 且燃烧室尺寸比 EN 676 标准中图表所示的尺寸更小, 请咨询生产厂家。



燃气压力与燃烧器出力的关系

在用净热值为 10 kWh/m³ (8.570 kcal/m³) 的 G20 燃气和锅炉背压为 0 mbar 进行测试时，916T1 型燃烧器最大出力时燃烧器头的压降为 9.3 mbar(M2, 参见第 7 页章节 3.6)。



3. 安装

燃烧器的安装必须符合当地法规和标准。

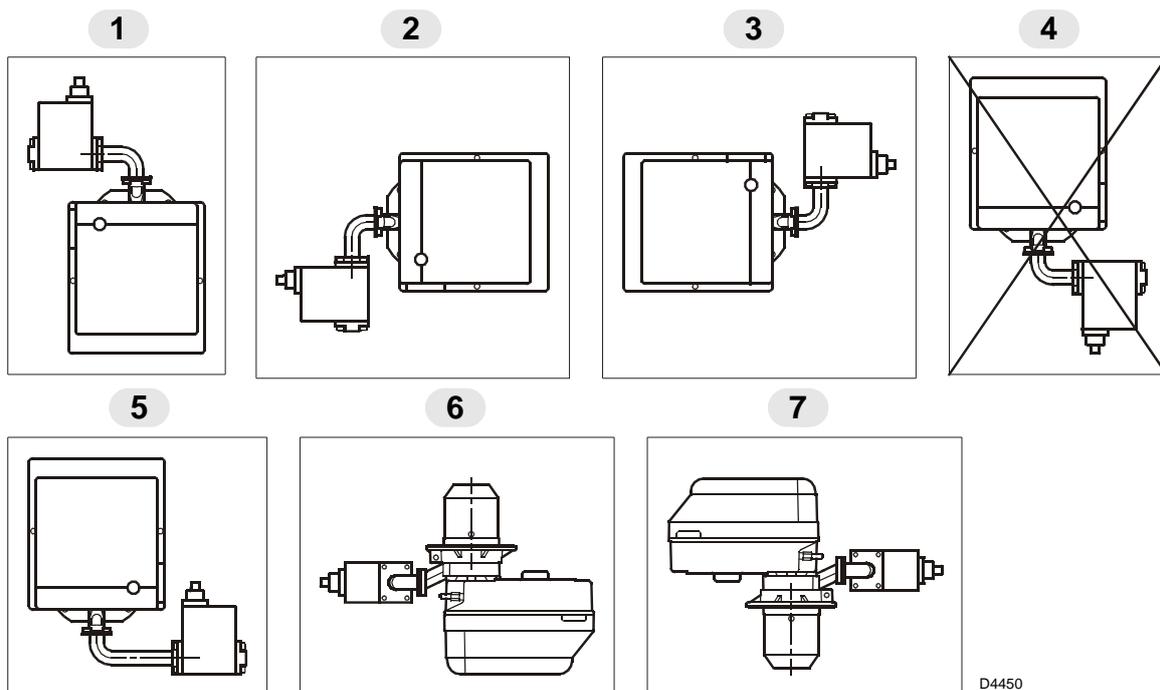
3.1 安装位置

燃烧器是按图 1 的安装方式设计的。

不推荐使用安装方式 2, 3, 6 和 7，这些方式有可能妨碍燃烧器的正常运行，因为当燃烧器停止时不能保证风门完全关闭。

安装方式 5 仅在使用“MULTIBLOC 旋转组件”可以采用，该组件须单独订货。

安装方式 4 由于安全原因是被禁止采用的。

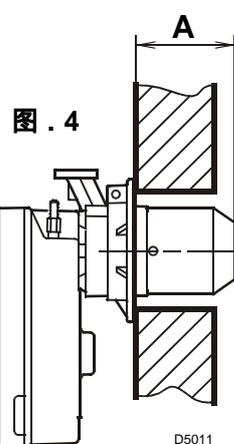
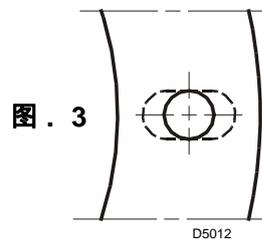
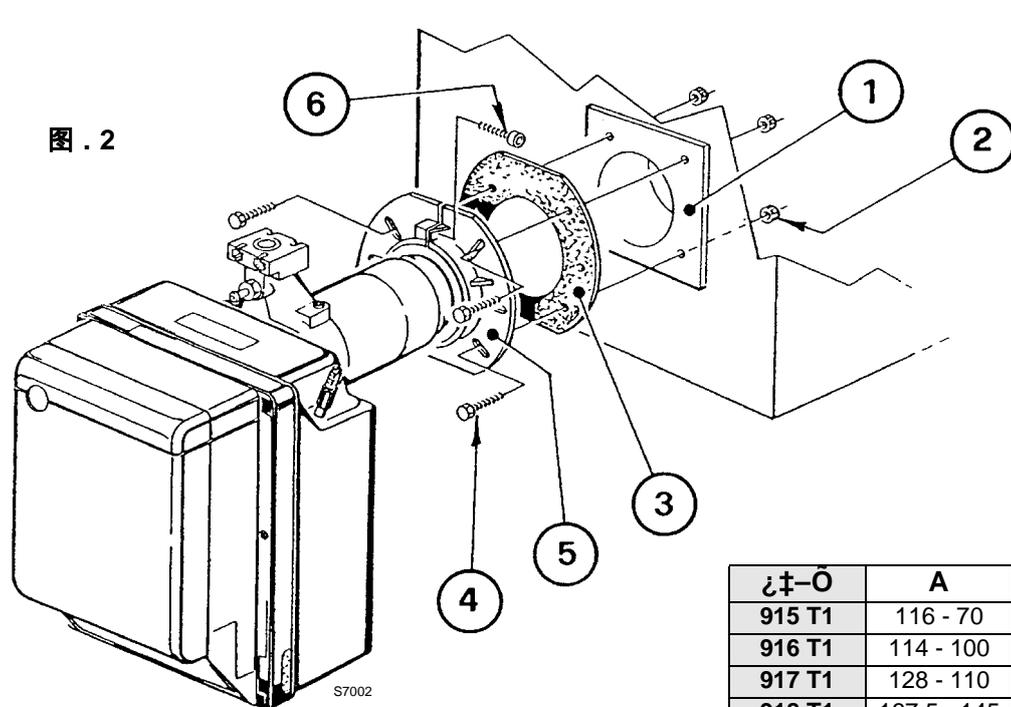


D4450

3.2 燃烧器安装

安装燃烧器时，需要按如下步骤操作：

- ▶ 如有必要，对绝热垫扩孔 (3) (参见图 . 3)。
 - ▶ 用4个螺钉 (4) 和螺母 (2) 将法兰 (5) 安装到炉门 (1) 上. 必须将绝热垫 (3) 放在中间，但应保持上部两颗螺钉中的一颗松动 (4) (参见图 . 2)。
 - ▶ 将法兰 (5) 与燃烧头放好，用螺钉 (6) 紧固，拧紧未拧紧的螺钉 (4)。
- 注意：燃烧器具有可调的燃烧头安装长度 (A) (参见图 . 4)。总之，要保证燃烧头完全穿过锅炉前墙。



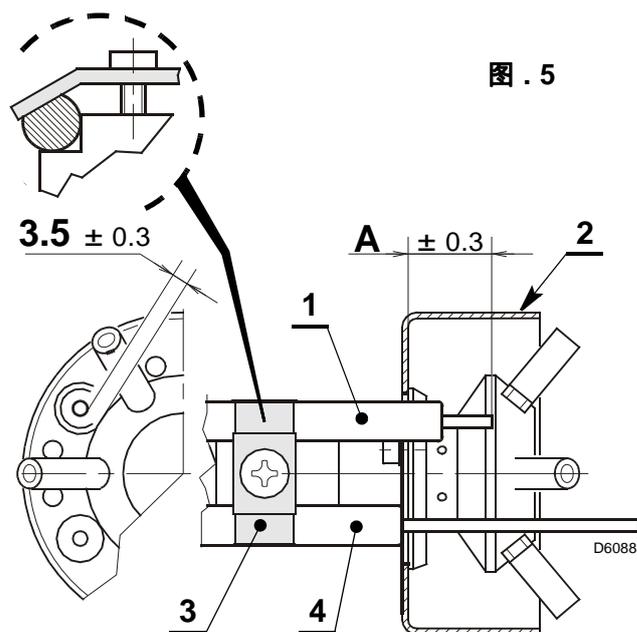
| 灶型 | A |
|--------|-------------|
| 915 T1 | 116 - 70 |
| 916 T1 | 114 - 100 |
| 917 T1 | 128 - 110 |
| 918 T1 | 167.5 - 145 |

3.3 离子探针 - 点火电极定位

注意

- ▶ 确认固定板 (3, 图.5) 总在 电极 (2) 的固定面上。
- ▶ 使探针绝缘体 (4) 稍微倾斜靠着护罩 (2)。

| 灶型 | 915T1 | 916T1 | 917T1 | 918T1 |
|----|-------|-------|-------|-------|
| A | 17 | 30 | 31 | 31 |



3.4 燃气阀组, (参照 EN 676)

燃气阀组单独提供, 它的调整参考附带的说明书

| 燃气阀组 | | 相匹配的燃烧器 | 连接方式 | | 应用 |
|------------------|---------|-------------|----------|------|------------------------|
| 类型 | 编码 | | 入口 | 出口 | |
| MB ZRDLE 405 B01 | 3970539 | BS1D | Rp 1/2 | 法兰 1 | 天然气和 LPG |
| MB ZRDLE 405 B01 | 3970540 | BS2D | Rp 3/4 | 法兰 2 | 天然气和 LPG |
| MB ZRDLE 407 B01 | 3970538 | BS2D | Rp 3/4 | 法兰 2 | 天然气和 LPG |
| MB ZRDLE 407 B01 | 3970541 | BS3D - BS4D | Rp 3/4 | 法兰 3 | 天然气 (出力 ≤ 150kW) 和 LPG |
| MB ZRDLE 410 B01 | 3970542 | BS3D - BS4D | Rp 1 1/4 | 法兰 3 | 天然气和 LPG |
| MB ZRDLE 412 B01 | 3970543 | BS3D - BS4D | Rp 1 1/4 | 法兰 3 | 天然气 |

3.5 燃气阀组电气连接

燃气阀组连接电线可从左边或右边进入燃烧器, 如图 6 所示。

根据进入燃烧器的方向, 带压力测试点的电缆孔堵 (1) 和简易电缆孔堵 (2) 可能需要互换。

因此, 必须确认:

- ▶ 电缆孔堵 (1) 位置正确;
- ▶ 气管位置应正确, 以保证空气通畅, 不会对空气压力开关造成阻塞。

警告

如有必要, 可将气管切至正确的位置。

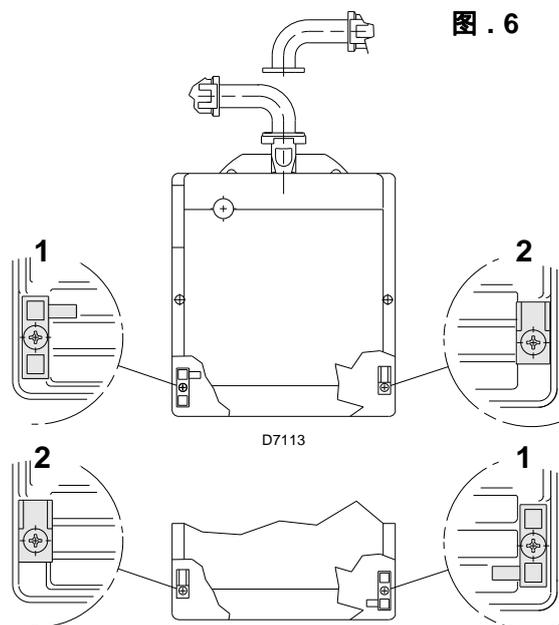


图 . 6

3.6 燃气管线

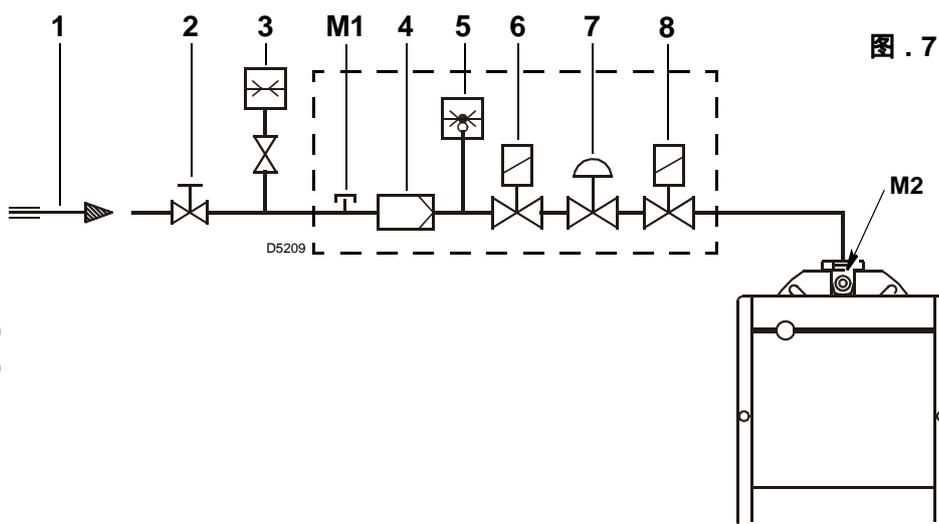


图 . 7

- 1 - 供气管
- 2 - 手动截止阀 (安装方负责)
- 3 - 燃气压力表 (安装方负责)
- 4 - 过滤器
- 5 - 燃气压力开关
- 6 - 安全阀
- 7 - 稳压阀
- 8 - 1 段火和 2 段火调节阀
- M1 - 供气压力测试点
- M2 - 燃气阀组后压力测点

3.7 电气连接

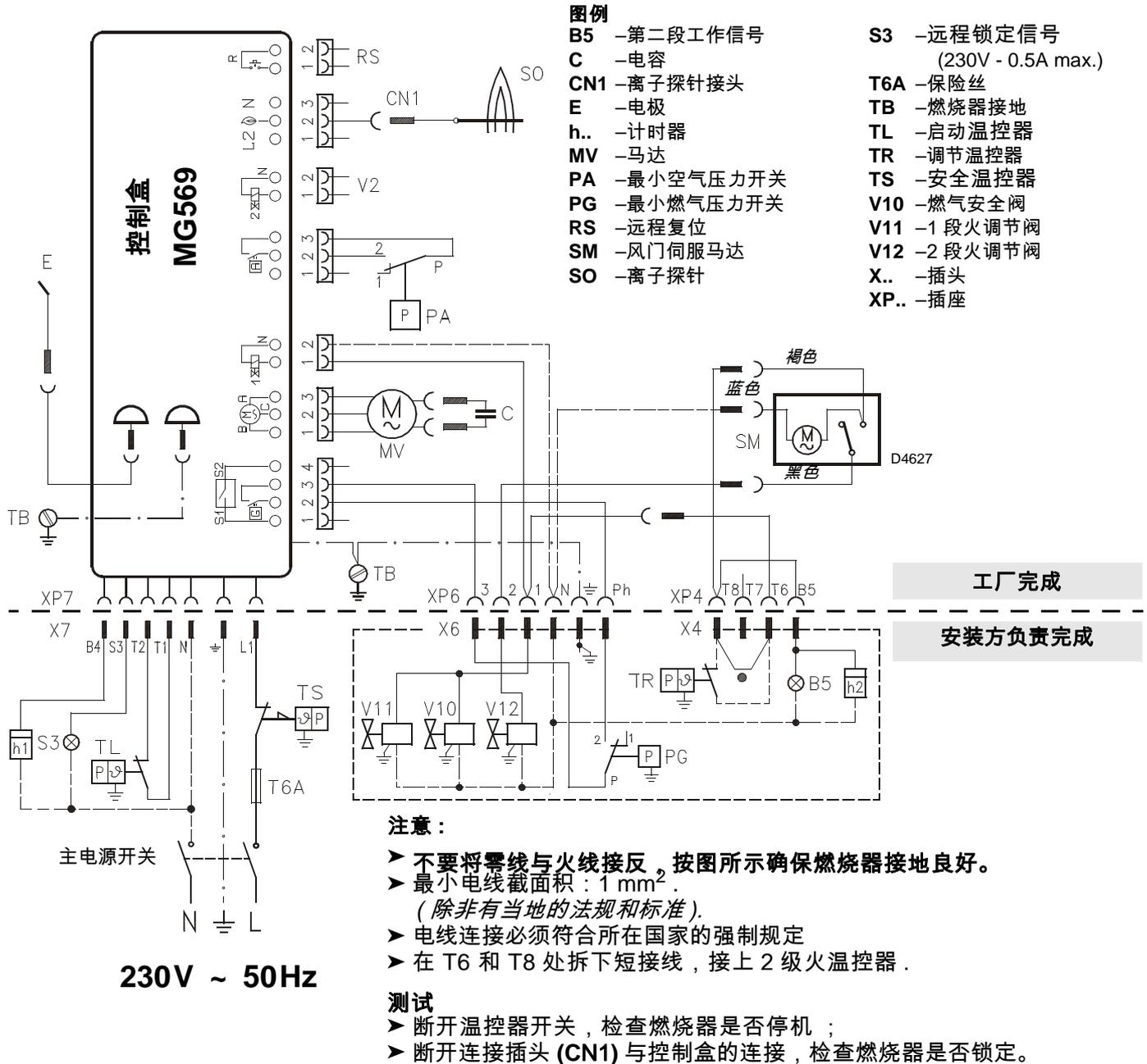
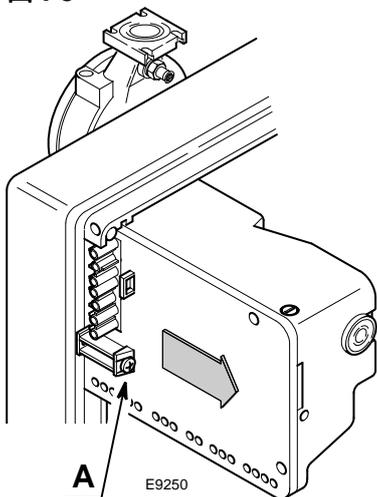


图 . 8



控制盒, (见图 . 8)

从燃烧器上拆卸控制盒时，需按如下步骤：

- ▶ 断开所有接头，7 针插头，高压电缆和接地电缆 (TB)；
- ▶ 卸掉螺栓 A (A, 图 . 8) 后沿箭头方向拉出控制盒。

安装控制盒时按如下步骤：

- ▶ 用螺丝刀 (1 - 1.2 Nm) 紧上螺钉 (A)。
- ▶ 重新连接所有被断开的插接头。

注意：

燃烧器是间断运行，这意味着每 24 小时至少停机一次以便于控制盒进行启动自检，保证控制盒有效控制。正常情况下锅炉启动温控器 (TL) 能保证燃烧器停机，如果失效可以在启动温控器 (TL) 上加一个控时断路器来保证燃烧器每 24 小时至少停机一次。

4. 工作

4.1 燃烧调节

根据燃烧器运用于锅炉上的效率标准 92/42/EEC，调试燃烧器必须参考锅炉的使用说明书，这一工作包括调整烟气中的 CO 和 CO₂ 含量，烟温及锅炉的平均水温。

要达到所需要的出力，要选择正确的燃烧头设置和风门设定值。

4.2 燃烧头设置，(参见图.9)

根据燃烧器的出力，通过顺时针和逆时针旋转设定螺丝(6)来进行，直到标尺(2)上的刻度与燃烧头座(1)的外边缘对齐。

在图9中的燃烧头的设定值是3。

以 BS3D 燃烧器为例：

燃烧器安装在出力为 100 kW 的锅炉上。考虑到锅炉效率为 90%，燃烧器出力应为 110 kW。如图所示，燃烧器燃烧头应设在刻度 3。

此图表仅供参考；为了获得较好的燃烧效果，建议可根据锅炉调整燃烧头的设定

拆卸燃烧头组件

按下列顺序操作：

- ▶ 断开连接插头(3和5)。
 - ▶ 拆下小管(4)并拧松螺钉(10)。
 - ▶ 拧下螺钉(7)，稍微向右转移开燃烧头座(1)。
- 在拆卸时不要改变肘型弯管(2)的设定

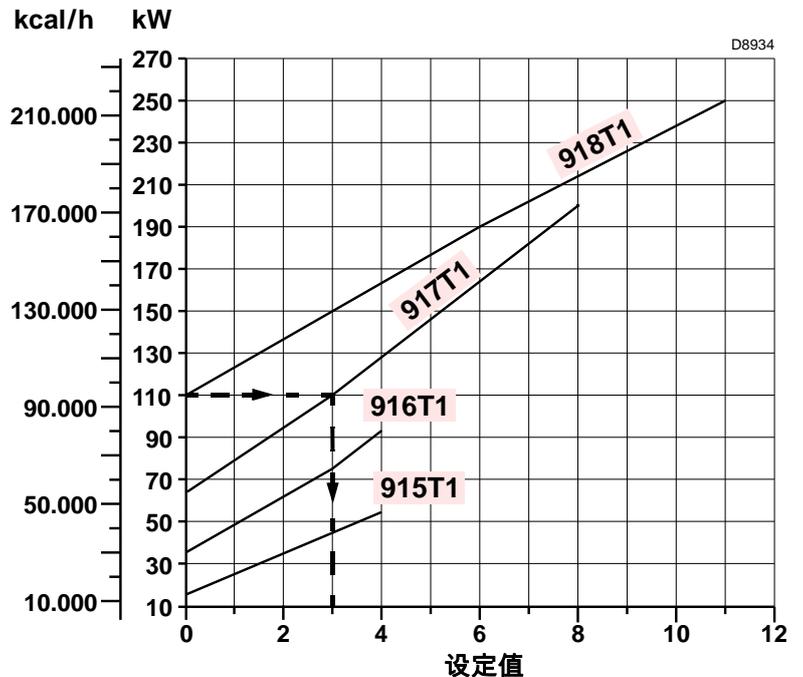
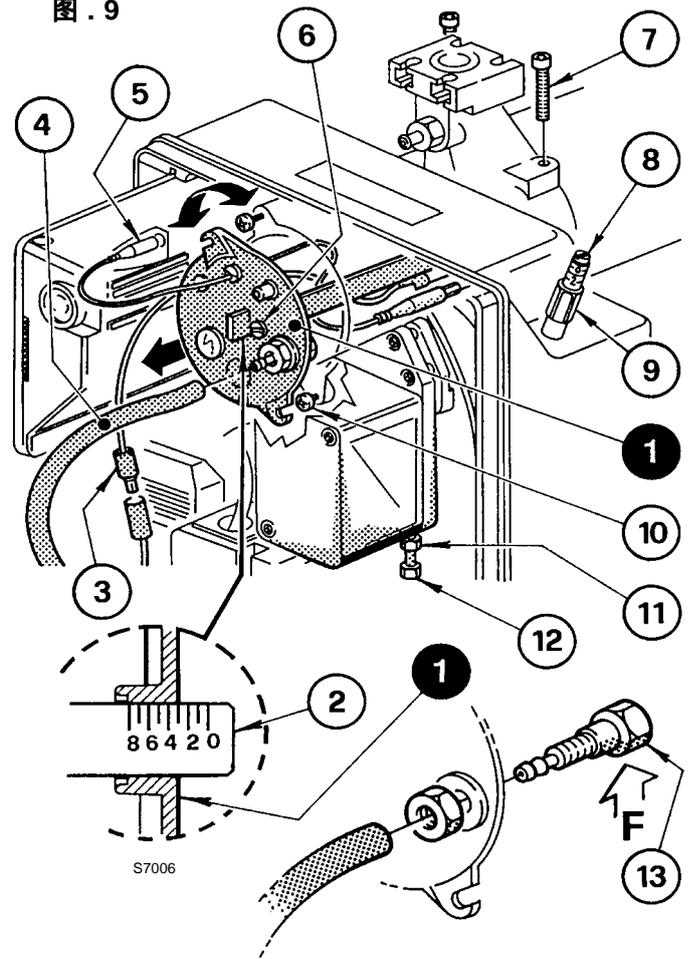
重新安装燃烧头组件

反过来根据以上步骤，将燃烧头座(1)装回到原来的位置。

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- ▶ 在安装燃烧头时，拧紧螺钉(7)(不要拧太紧)；然后用力矩扳手(3-4 Nm)锁紧。
- ▶ 确保燃烧器在运行时螺钉处不会有燃气泄露。
- ▶ 若压力测点(13)松动，应正确固定并确保燃烧头组件(1)外部的孔(F)安装在正确的位置上。

图.9



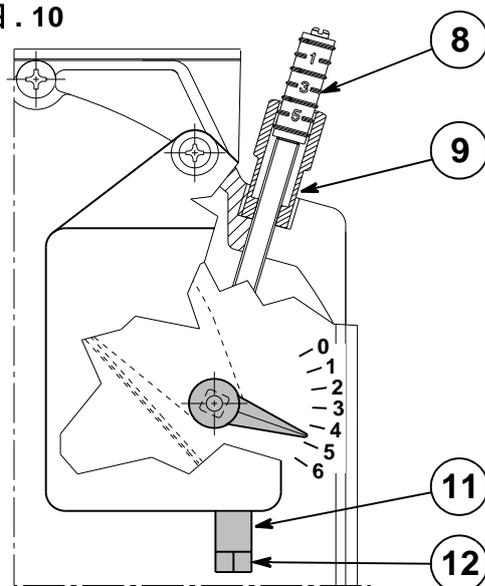
4.3 风门挡板设置, (参见图 . 10)

在首次点火时,必须调整螺钉12,使风门挡板设定不小于1。(工厂设定值为1)

改变设置点按下列步骤进行:

- 短接4针插头的T6-T8端子(X4,参见8页电气接线图)使燃烧器转到2段火。
- 由于风机风力的驱动,风门转到工厂设置的2段火位置(旋钮8对准刻度3)。
- 松开螺母(9)并旋转旋钮(8)来调整合适的2段火风量(根据烟气中CO₂含量来调整,参见下表)。
- 断开4针插头的T6-T8端子的短接线(X4,参见8页电气接线图)使燃烧器转到1段火。
- 在1级火调整风量时,先顺时针松开螺母(11)再调整螺钉(12),参考下表所示烟气中CO₂含量值。
- 调整好以后逆时针锁紧螺母(11)。燃烧器停机时风门会自动关闭,除非烟囱处最大压降大于0.5 mbar。

图 . 10



注意

在进行1级火和2级火出力调节时:

- 1级火和2级火出力比不能超过1:2。

以BS3D为例:2段火额定出力为140kW,那么一段火出力最小不低于70kW。

在任何情况下燃烧器的最小出力,即1段火出力,不得小于工作曲线的所示值。

以BS3D为例:要求2段火额定出力为110kW,1段火最小出力不能低于65kW(参见4页负荷曲线图)。

4.4 燃烧检查

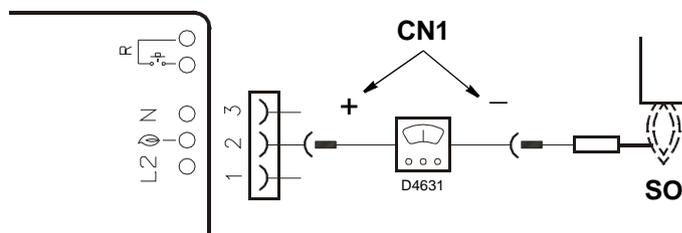
建议根据燃气种类和下表来设定燃烧器:

| EN 676 | | 空气过剩系数: 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 |

离子探针电流

燃烧器正常运行时控制器所需最小离子探针电流为5 μA 。

一般情况下离子探针电流会远大于该值,不必检查。如需要检查时,可打开离子探针连接插头(CN1)(参见第8页)串入微安电流表,(参见图. 10)。



4.5 空气压力开关

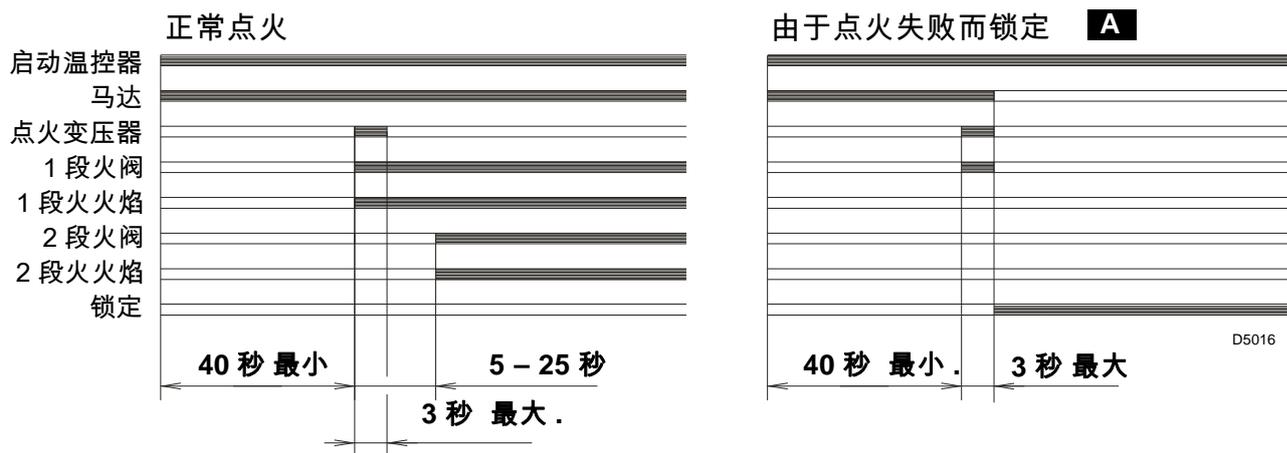
空气压力开关的调整工作应在燃烧器的上述调整工作完成后进行。此时空气压力开关的设定值应在初始位置。燃烧器工作在额定出力时，缓慢顺时针加大设定值，直至燃烧器锁定。然后将设定值逆时针旋转减少一个刻度值，并再次检查燃烧器是否能正常启动。如燃烧器锁定，应再减少半个刻度值。

注意：

作为标准条例，当排烟中的 CO 超过 1% (10,000 ppm) 时空气压力开关应动作。

如要检查这一点，请在烟囱中插入烟气分析仪，缓慢关闭风机的进气口（例如用纸板）并检查在排烟中的 CO 超过 1% 之前是否会锁定。

4.6 燃烧器启动程序



A 由控制盒上的信号灯指示燃烧器锁定 (4, 图 .1, 第 2 页)

4.7 重复启动功能

控制盒允许重复启动，也就是运行期间熄火的情况下，最多可以自动重复 3 次完整的启动程序。

4.8 后吹扫功能

后吹扫是指燃烧器因启动温控器 (TL) 断开而停机且燃料供应阀关闭后继续保持通风。为了使用此功能，在启动温控器 (TL) 重新闭合前 (燃烧器已停机) 按复位按钮。

后吹扫时间最长可设为 6 分钟，操作步骤如下：

- ▶ 按住复位按钮并保持至少 5 秒钟直到 LED 指示灯变红。
- ▶ 重复按复位按钮来设定想要设的值。每按一次 = 后吹扫 1 分钟
- ▶ 5 秒钟后控制盒通过红色 LED 灯闪烁来显示设定的分钟数。

每闪烁一次表示后吹扫时间为 1 分钟。

解除此功能时，可按住复位按钮并保持至少 5 秒钟直到 LED 指示灯变红色，然后放开按钮即可。燃烧器启动需等待 20 秒钟。

后吹扫期间如果需要启动燃烧器，后吹扫暂停，当启动温控器 (TL) 闭合后燃烧器开始新的启动运行程序。

控制盒出厂设置为：不进行后吹扫。

4.9 控制盒复位

控制盒复位，可按如下步骤操作：

- ▶ 按住复位按钮至少 1 秒钟。

如果燃烧器没有重新启动，需要检查启动温控器 (TL) 是否处于闭合状态。

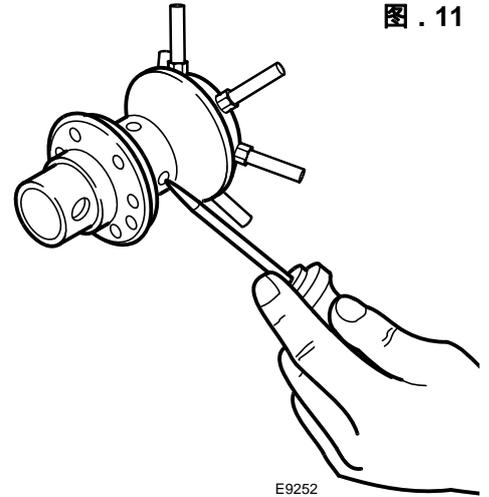
5. 维护

在进行维修和保养之前，必须将系统的主电源开关断开以切断燃烧器的电源。并关闭手动燃气截止阀。燃烧器必须由授权的和有资格的技术人员按照当地法规和标准进行定期的维护和保养。定期保养和维护对于燃烧器运行的可靠性是很关键的，可避免燃料的过量消耗以及随之而来的污染。

基本的检查步骤如下：

- 每隔一段时间检查燃气头的孔是否有被堵塞的，如果有被堵塞，使用图 11 所示的合适的工具清理即可。
- 检查燃烧器的空气流通部分和烟气流通部分是否有堵塞。
- 检查燃烧器和燃气阀组电气接线是否正确。
- 检查空气压力测试点的位置是否正确 (6, 图 1, 第 2 页)。
- 检查燃气阀组是否与燃烧器出力、所使用的燃气种类、燃气管网压力匹配。
- 检查燃烧头设置是否正确，与锅炉的固定是否牢固。
- 检查风门位置是否适当。
- 检查离子探针与点火电极位置是否恰当 (见第6页图 . 5)。
- 检查空气压力开关和燃气压力开关设置是否正确。

让燃烧器不间断地运行 10 分钟，检查并确保这里列出的各部件在 1 段火和 2 段火状态下设置无误。



然后进行燃烧测试以检查以下各项：

- CO₂ (%) 的百分比含量；
- CO (ppm) 的含量；
- NO_x (ppm) 的含量；
- I 离子探针电流 (μA)；
- 烟气温度。

5.1 可视故障诊断控制盒

控制盒的诊断功能可以识别大部分故障的可能原因。(指示器：红色 LED 发光二极管)。要激活此功能，在燃烧器锁定状态下，按住复位按钮并保持至少 3 秒钟即可。控制盒上的红色 LED 灯每间隔 2 秒重复的连续闪烁若干次，闪烁次数表示可能的故障。

| 红色 LED 亮 按住复位按钮 3 秒 | 闪烁 | 间隔 2 秒 | 闪烁 |
|------------------------|-----------|-----------|-----------|
| | ● ● ● ● ● | | ● ● ● ● ● |

该连续闪烁的次数代表可能的故障信息，参见如下的故障表。

| 信号 | 可能的原因 |
|-----------------|--|
| 闪烁 2 次 ● ● | 在安全时间后没有稳定的火焰： - 离子探针故障； - 燃气阀组故障或需要清理； - 零线 / 火线接反； - 点火变压器故障； - 燃烧器调整不当。(燃气不足)。 |
| 闪烁 3 次 ● ● ● | 最低空气压力开关没有闭合或在启动温控器闭合前就已经闭和： - 空气压力开关故障； - 空气压力开关调整不当。 |

| 信号 | 可能的原因 |
|-------------------------|--|
| 闪烁 4 次 ● ● ● ● | 在燃烧器启动前锅炉炉膛有亮光： - 在启动温控器闭合的前或后存在可疑的自然光； - 在预吹扫阶段存在自然光； - 在后吹扫阶段存在自然光。 |
| 闪烁 6 次 ● ● ● ● ● ● | 吹扫风量不足： - 在预吹扫阶段风量不足； - 在安全时间的前或后风量不足。 |
| 闪烁 7 次 ● ● ● ● ● ● ● | 运行期间熄火： - 燃烧器调整不当（燃气不足）； - 燃气阀组故障或需要清理； - 离子探针和地线短路。 |

注意 按复位按钮来复位控制盒的故障诊断状态。

6. 故障 / 可能的解决方法

下表是造成燃烧器启动故障或非正常运行等问题的原因及相应的解决方法。

故障通常会造成控制盒 (4, 图 . 1, 第 2 页) 复位按钮键中的锁定指示灯亮红灯。

当锁定灯亮时，只有按复位按钮燃烧器才会重新启动，此后如果燃烧器运行正常，锁定可以归因于偶然故障。

如果继续锁定，一定要查找原因，并加以解决。

6.1 启动故障

| 故障 | 可能原因 | 解决方法 |
|----------------------|----------------------|--|
| 当启动温控器闭合时，燃烧器不启动。 | 没有电源供应 | 检查 7 针插头中的 L1-N 线之间的电压是否正确。 |
| | | 检查保险丝的状况。 |
| | | 检查安全温控器是否锁定 |
| | 没有燃气供应。 | 检查手动截止阀是否打开。 |
| | | 检查燃气阀组是否打开并且是否有短路 |
| | 燃气压力开关不闭合。 | 调整。 |
| | 控制盒中的连接错误 | 检查并连接插头。 |
| 空气压力开关切换到了运行位置。 | 更换压力开关。 | |
| 燃烧器 1 段火转 2 段火时火焰不稳定 | 1 段火和 2 段火出力比超过 1:2。 | 保证出力比例不大于 1:2, 确保 1 段火出力不小于负荷曲线图中最小值 |
| | 1 段火时空气过量。 | 调整到合适的过量空气系数 (λ 最小 = 1.3) 参考“4.4 燃烧控制”。 |

| 故障 | 可能原因 | 解决方法 |
|-----------------------------|--|------------------------------------|
| 在预吹扫及点火周期时燃烧器运行正常，但 3 秒后锁定。 | 火线与零线接反。 | 调换接线。 |
| | 没有地线或接地不良。 | 确保接地良好。 |
| | 离子探针接地，或离子探针未与火焰接触，或离子探针与控制盒连线断开，或与地短路。 | 按说明书检查并设置离子探针的位置 |
| | | 重新电气连接。 更换损坏的接地线。 |
| 燃烧器点火延迟。 | 点火电极位置不对。 | 按说明书所示进行调整。 |
| | 风量太大。 | 按说明书所示进行调整。 |
| | 阀门开度太小，燃气量不够。 | 调整。 |
| 燃烧器不能转换到2段火。 | 风门挡板卡住。 | 检查风门挡板工作状态。 检查电气连接。 |
| | 2 段火燃气阀不能到位。 | 阀故障：更换。 |
| | | 风门没有完全打开，造成燃气阀组不能转到 2 级火：检查阀组工作状态。 |
| 燃烧器在预吹扫后因火焰故障而锁定。 | 电磁阀过气量较小。 | 检查管网压力 / 按说明书所示调整电磁阀。 |
| | 电磁阀损坏。 | 更换。 |
| | 点火脉动或失败。 | 检查接头。 |
| | | 按说明书所示检查电极的位置。 |
| | 管道内空气未排净 | 用燃气排空空气。 |
| 燃烧器在预吹扫时锁定。 | 空气压力开关不切换。 | 压力开关故障，更换。 |
| | | 空气压力过低，(燃烧头调整不当) |
| | 火焰出现。 | 阀门故障：更换。 |
| | 压力测试点 (13, 第 9 页 图 .9) 位置不对 | 按说明书所示 第 9 页，章节 4.2 调整好位置 |
| 燃烧器不锁定，重复启动。 | 主燃气压力接近于最低燃气压力开关所设定的数值。 燃气阀组开启后造成压力降低从而引起燃气压力开关的断开，燃气阀组立刻关闭，燃烧器停机。压力又升高，压力开关再次闭合，又重复点火周期，该过程无休止地进行。 | 减小最低燃气压力开关的设定值。 |

6.2 运行中故障

| 故障 | 可能的原因 | 解决方法 |
|---------|------------|---------------------------------------|
| 燃烧器锁定 | 探针接地 . | 按本说明手册检查并设置合适的位置。 |
| | | 清洁或更换离子探针 . |
| | 火焰消失 4 次 . | 检查管网燃气压力和 / 或根据说明书调整电磁阀设置。 |
| | 空气压力开关断开 . | 空气压力太低 (燃烧头设置错误). 空气压力开关故障 , 更换。 |
| 燃烧器停机 . | 燃气压力开关断开 . | 检查管网燃气压力和 / 或根据说明书调整电磁阀设置。 |

7. 安全警告

为了确保最低的污染物排放，锅炉燃烧室的大小应该具有合适的比例。

为了使燃烧器能匹配锅炉，我们的专业技术人员可以提供所有的相关信息和参数。本燃烧器不能超出设计的范围使用。由于安装、调试和维护错误或不当使用造成的人、动物、财产等损失，本公司概不负责。

7.1 燃烧器标识

产品铭牌标示出序列号、型号、主要技术和性能参数。如果铭牌损坏或丢失，导致无法辨别产品型号及技术参数可能给安装和维护工作带来麻烦和危险。

7.2 安全规则

- ▶ 未成年人或非专业人员不能使用。
- ▶ 燃烧器安装场所的进气格栅、排气格栅、通风孔决不允许覆盖衣物、报纸及其他任何东西。
- ▶ 非授权人员不能维修此设备。
- ▶ 不准随意拉扯或缠绕电线接头。
- ▶ 清洁设备前必须断开主电源开关。
- ▶ 不能使用易燃物（如汽油、酒精等）擦拭燃烧器。燃烧器盖只能用肥皂水清洗。
- ▶ 不能在燃烧器上放置任何东西。
- ▶ 不能阻挡或减小安装燃烧器的场所的通风孔大小。
- ▶ 包装箱和其他易燃物不能堆积在燃烧器安装的场所里。

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