

**GB** **Forced draught gas burners**

**F** **Brûleurs gaz à air soufflé**

Progressive two-stage or modulating operation

Fonctionnement à deux allures progressif ou modulant



**RS**

| CODE              | MODEL - MODÈLE | TYPE   |
|-------------------|----------------|--------|
| 3781620 - 3781622 | RS 50/M MZ     | 826T1  |
| 3781621 - 3781623 | RS 50/M MZ     | 826T1  |
| 3781682           | RS 50/M MZ     | 826T80 |
| 3781683           | RS 50/M MZ     | 826T80 |



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

Manufacturer: RIELLO S.p.A.  
 Address: Via Pilade Riello, 7  
 37045 Legnago (VR)  
 Product: Forced draught gas burner  
 Model: RS 50/M MZ

These products are in compliance with the following Technical Standards:  
 EN 676  
 EN 12100  
 and according to the European Directives:

|     |             |                               |
|-----|-------------|-------------------------------|
| GAD | 90/396/EEC  | Gas Devices Directive         |
| MD  | 2006/42/EC  | Machine Directive             |
| LVD | 2006/95/EC  | Low Voltage Directive         |
| EMC | 2004/108/EC | Electromagnetic Compatibility |

Such products are marked as follows:



CE-0085AQ0709 (826T1)

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

**Manufacturer's Declaration**

RIELLO S.p.A. declares that the following products comply with the NOx emission limits specified by German standard "1. BImSchV release 26.01.2010".

| Product                   | Type           | Model      | Power           |
|---------------------------|----------------|------------|-----------------|
| Forced draught gas burner | 826T1 - 826T80 | RS 50/M MZ | 80/285 - 630 kW |

Legnago, 21.05.2015

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| Section  |   | Page      |
|----------|---|-----------|
| <b>1</b> | <b>Information and general warnings</b>                       | <b>3</b>  |
|          | 1.1 Information about the instruction manual                  | 3         |
|          | 1.2 Guarantee and responsibility                              | 3         |
| <b>2</b> | <b>Safety and prevention</b>                                  | <b>4</b>  |
|          | 2.1 Introduction  | 4         |
|          | 2.2 Personnel training  | 4         |
| <b>3</b> | <b>Technical description of the burner</b>                    | <b>5</b>  |
|          | 3.1 Burner designation  | 5         |
|          | 3.2 Models available  | 5         |
|          | 3.3 Burner categories - Countries of destination              | 5         |
|          | 3.4 Technical data  | 6         |
|          | 3.5 Burner weight   | 6         |
|          | 3.6 Overall dimensions  | 6         |
|          | 3.7 Firing rates  | 7         |
|          | 3.8 Burner components   | 8         |
|          | 3.9 Burner equipment  | 8         |
|          | 3.10 Control box for the air/fuel ratio                       | 9         |
|          | 3.11 Servomotor   | 9         |
| <b>4</b> | <b>Installation</b>   | <b>10</b> |
|          | 4.1 Notes on safety for the installation                      | 10        |
|          | 4.2 Handling  | 10        |
|          | 4.3 Preliminary checks  | 10        |
|          | 4.4 Operating position  | 11        |
|          | 4.5 Securing the burner to the boiler                         | 11        |
|          | 4.6 Combustion head adjustment                                | 13        |
|          | 4.7 Assembly of the gas train                                 | 15        |
|          | 4.8 Electrical wiring   | 16        |
|          | 4.9 Calibration of the thermal relay                          | 17        |
| <b>5</b> | <b>Start-up, calibration and operation of the burner</b>      | <b>18</b> |
|          | 5.1 Notes on safety for the first start-up                    | 18        |
|          | 5.2 Operations before start-up                                | 18        |
|          | 5.3 Burner start-up   | 19        |
|          | 5.4 Burner ignition   | 19        |
|          | 5.5 Burner adjustment   | 19        |
|          | 5.6 Operation sequence of the burner                          | 22        |
|          | 5.7 Burner flame goes out during operation                    | 22        |
|          | 5.8 Stopping of the burner                                    | 22        |
|          | 5.9 Measuring the ionisation current                          | 23        |
|          | 5.10 Checking the air and gas pressure on the combustion head | 23        |
|          | 5.11 Final checks (with burner operating)                     | 23        |
| <b>6</b> | <b>Faults - Probable causes - Solutions</b>                   | <b>24</b> |
|          | 6.1 Normal operation / flame detection time                   | 25        |
| <b>7</b> | <b>Maintenance</b>  | <b>26</b> |
|          | 7.1 Notes on safety for the maintenance                       | 26        |
|          | 7.2 Maintenance programme                                     | 26        |
|          | 7.3 Opening the burner  | 27        |
|          | 7.4 Closing the burner  | 27        |
| <b>A</b> | <b>Appendix - Electrical panel layout</b>                     | <b>28</b> |
| <b>B</b> | <b>Appendix - Accessories (optional)</b>                      | <b>33</b> |
| <b>C</b> | <b>Appendix - Gas supply pressure</b>                         | <b>35</b> |
| <b>D</b> | <b>Appendix - Firing rate on basis of air density</b>         | <b>36</b> |

## 1.1 Information about the instruction manual

### Introduction

The instruction manual supplied with the burner:

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

### 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.

#### 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.

## 1.2 Guarantee and responsibility

**RIELLO** 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 the carrying out of non authorised modifications will result in the annulment by **RIELLO** 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 non authorised modifications on the equipment;

### DANGER: LIVE COMPONENTS



DANGER

This symbol indicates operations which, if not carried out correctly, lead to electric shocks with lethal consequences.

### Other symbols



#### ENVIRONMENTAL PROTECTION

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



This symbol indicates a list.

### Abbreviations used

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

### 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 necessary before the system is started up,
  - maintenance and the need to have the system checked at least once a year by the Manufacturer or another specialised technician.
 To ensure a periodic check, **RIELLO** recommends the drawing up of a Maintenance Contract.

- 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 power 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 subject to wear and tear;
- use of non-original **RIELLO** components, including spare parts, kits, accessories and optionals;
- force majeure.

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

## 2.1 Introduction

The **RIELLO** 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 users 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.

## 2.2 Personnel training

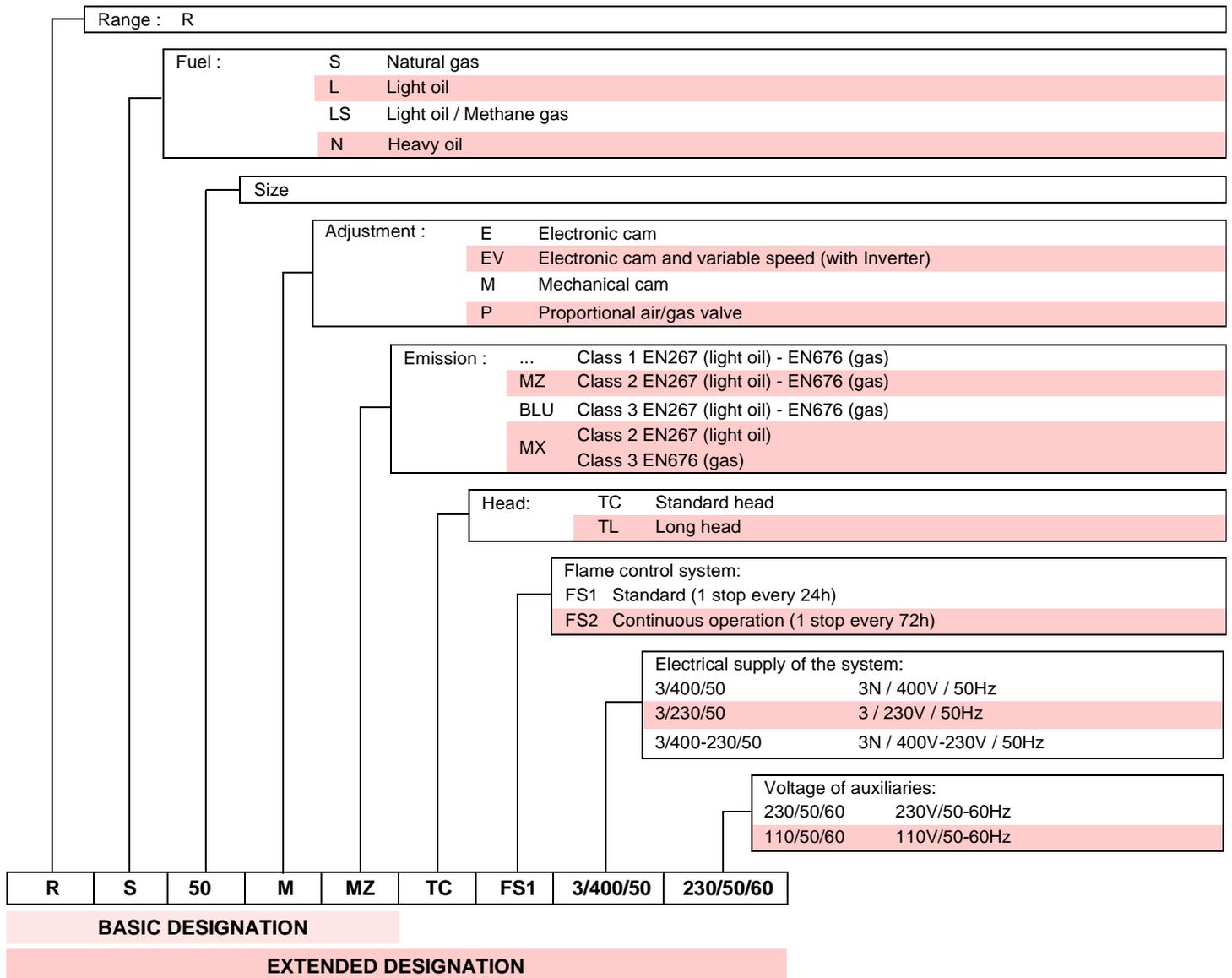
The user is the person, body or company that has acquired the machine and intends to use it for the specific purpose. He is responsible for the machine and for the training of the people working around it.

The user:

- undertakes to entrust the machine exclusively to suitably trained and qualified personnel;
- must take all the measures necessary to prevent unauthorised people gaining access to the machine;
- 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;
- 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.
- Personnel must follow 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.

## 3.1 Burner designation



## 3.2 Models available

| Designation |    | Voltage               | Code              |
|-------------|----|-----------------------|-------------------|
| RS 50/M MZ  | TC | 3 ~ 400/230V 50Hz     | 3781620 - 3781622 |
| RS 50/M MZ  | TL | 3 ~ 400/230V 50Hz     | 3781621 - 3781623 |
| RS 50/M MZ  | TC | 3 ~ 380/460/480V 60Hz | 3781682           |
| RS 50/M MZ  | TL | 3 ~ 380/460/480V 60Hz | 3781683           |

## 3.3 Burner categories - Countries of destination

| Country of destination  | Gas category |
|---|--------------|
| AT - CH - CZ - DK - EE - ES - FI - GB - GR - HU - IE<br>IS - IT - LT - LV - NO - PT - SE - SI - SK - TR | I2E          |
| NL  | I2L          |
| FR  | I2Er         |
| DE  | I2ELL        |
| BE  | I2E(R)B      |
| LU - PL   | I2E          |

## 3.4 Technical data

| Model   |                |                  | RS 50/M MZ                             |                       |
|---|----------------|------------------|--|-----------------------|
| Type  |                |                  | 826T1                                  | 826T80                |
| Output (1)  | maximum        | kW               | 285 - 630                              |                       |
|   |                | Mcal/h           | 245 - 542                              |                       |
|   | minimum        | kW               | 80                                     |                       |
|   |                | Mcal/h           | 69                                     |                       |
| Fuel  |                |                  | Natural gas: G20 - G23 - G25           |                       |
| Gas pressure at max. output (2) -<br>Gas: G20/G25 |                | mbar             | 8.5 - 11.3                             |                       |
| Operation   |                |                  | Intermittent (min. 1 stop in 24 hours) |                       |
| Standard applications                             |                |                  | Boilers: water, steam, diathermic oil  |                       |
| Ambient temperature                               |                | °C               | 0 - 40                                 |                       |
| Combustion air temperature                        |                | °C max           | 60                                     |                       |
| Main electrical supply                            |                |                  | 3 ~ 400/230V 50Hz                      | 3 ~ 380/460/480V 60Hz |
| Control circuit power supply                      |                |                  | 1N ~ 230V 50Hz                         | 1N ~ 220V 60Hz        |
| Fan motor (rating)                                |                | rpm              | 2800                                   | 3400                  |
|   |                | V                | 220/240 - 380/415                      | 208/230 - 380/460/480 |
|   |                | kW               | 0.65                                   | 0.56                  |
| Operating current                                 |                | A                | 3 - 1.7                                | 3.6 (λλ) - 1.8 (λ)    |
| Acceleration current                              |                | A                | 13.5 - 7.7                             | 22 - 20.5             |
| Ignition transformer                              | V1 - V2        | 230 V - 1 x 8 kV |  |                       |
|   | I1 - I2        | 1 A - 20 mA      |  |                       |
| Absorbed electrical power                         |                | kW max           | 0.75                                   | 0.66                  |
| Protection level                                  |                |                  | IP 44                                  |                       |
| Noise levels (3)                                  | Sound pressure | dB(A)            | 72                                     |                       |
|   | Sound power    |                  | 83                                     |                       |

(1) Reference conditions: Ambient temperature 20°C - Gas temperature 15°C - Barometric pressure 1013 mbar - Altitude 0 m above sea level.

(2) Gas pressure on the pipe coupling test point 8) (Fig. 5) with zero pressure in the combustion chamber and at maximum burner output.

(3) Sound pressure measured in manufacturer's combustion laboratory, with burner operating on test boiler and at maximum rated output. The sound power is measured with the "Free Field" method, as per EN 15036, and according to an "Accuracy: Category 3" measuring accuracy, as set out in EN ISO 3746.

## 3.5 Burner weight

The weight of the burner complete with its packaging is shown in table.

| mm         | kg |
|------------|----|
| RS 50/M MZ | 41 |

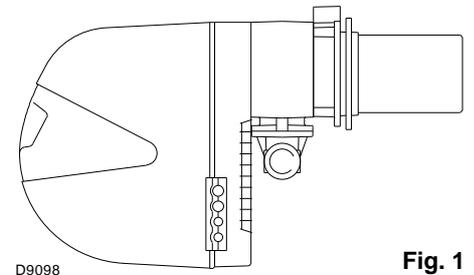


Fig. 1

## 3.6 Overall dimensions

The dimensions of the burner are shown in Fig. 2.

Bear in mind that inspection of the combustion head requires the burner to be opened and the rear part drawn back on the guides.

The dimensions of the open burner are indicated by position H.

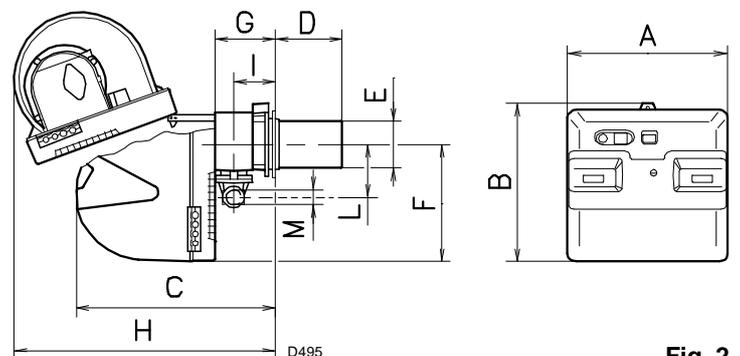


Fig. 2

| mm         | A   | B   | C   | D <sub>(1)</sub> | E   | F   | G   | H   | I   | L   | M     |
|------------|-----|-----|-----|------------------|-----|-----|-----|-----|-----|-----|-------|
| RS 50/M MZ | 476 | 474 | 580 | 216 - 351        | 152 | 352 | 164 | 810 | 108 | 168 | 1"1/2 |

(1) Blast tube: short-long

### 3.7 Firing rates

The **maximum output** is chosen within area A.

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

#### Important

The firing rate was obtained considering an ambient temperature of 20°C and an atmospheric pressure of 1013 mbar (approx. 0 m above sea level), with the combustion head adjusted as shown in Ch. 4.6.

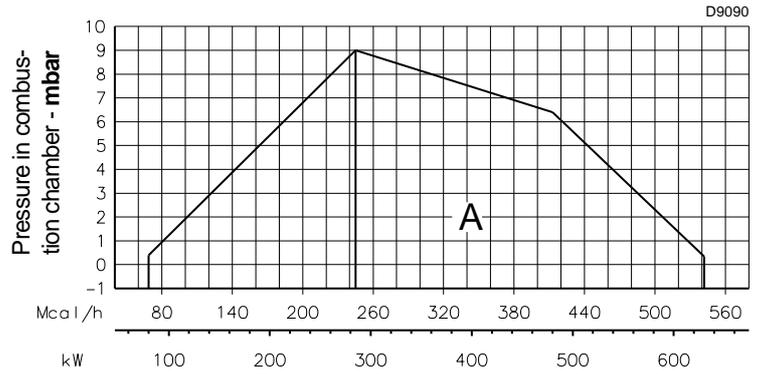


Fig. 3

The firing rates were obtained in special test boilers, according to EN 676 regulations.

Fig. 4 indicates the diameter and length of the test combustion chamber.

#### Example

Output 407 kW (350 Mcal/h):  
diameter 60 cm,  
length 1.5 m.

The coupling is ensured when the boiler is EC type-approved; for boilers or ovens with combustion chambers of very different dimensions compared to those shown in the diagram of Fig. 4, preliminary checks are recommended.

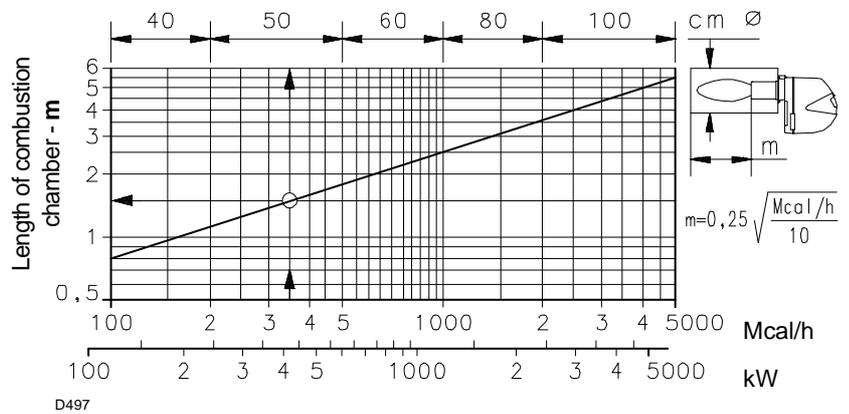


Fig. 4

## 3.8 Burner components

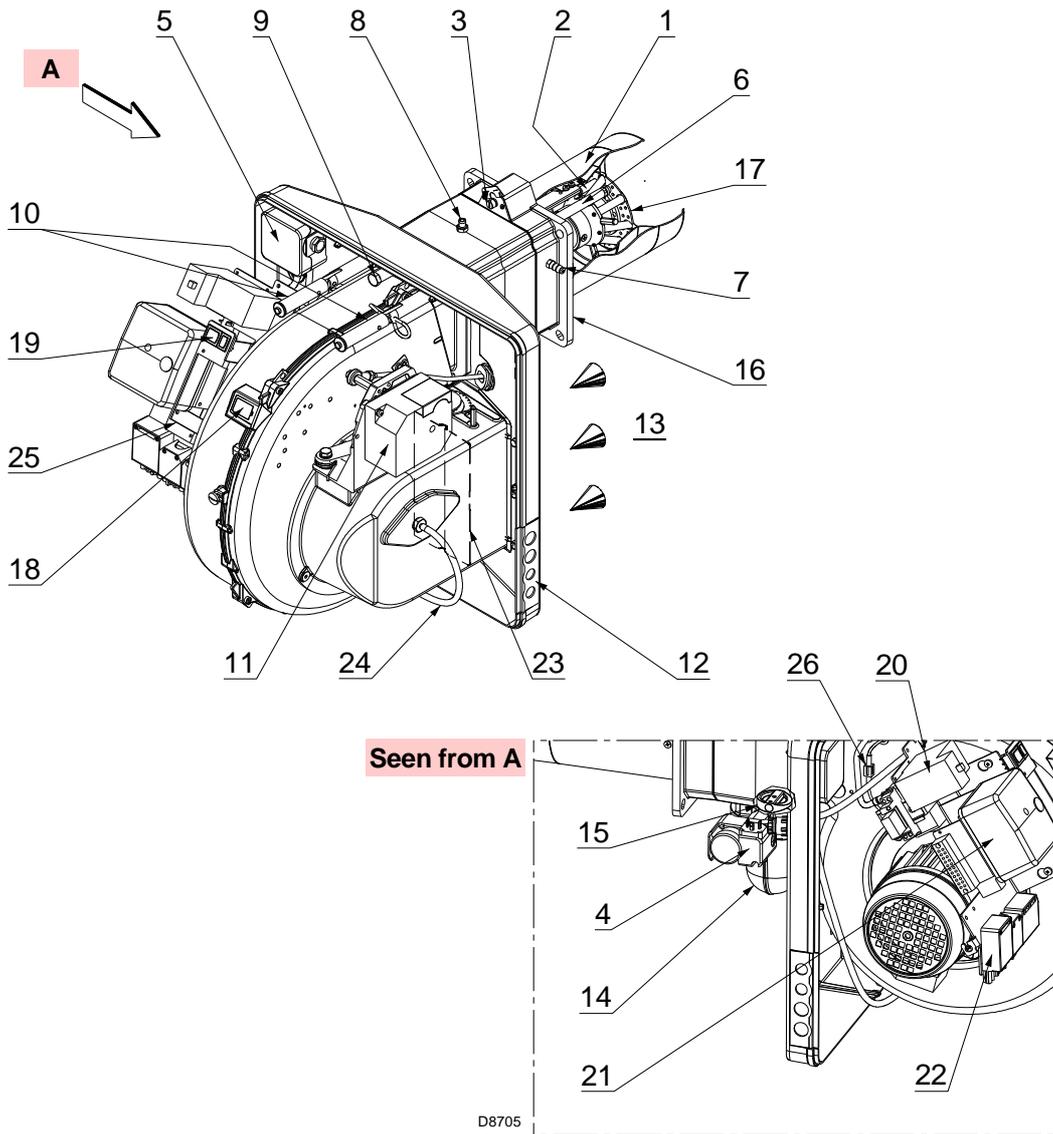


Fig. 5

- |   |  |  |
|---|--|--|
| 1 Combustion head   | cam mechanism).  | Button for: power increase - power reduction                       |
| 2 Ignition electrode  | When the burner is not operating the air gate valve is fully closed in order to reduce heat dispersion from the boiler due to the flue draught which draws air from the fan suction inlet. | 20 Motor contact maker and thermal relay with reset button         |
| 3 Screw for combustion head adjustment  |  | 21 Control box with lockout pilot light and lockout reset button   |
| 4 Maximum gas pressure switch   |  | 22 Terminal board for electrical wiring                            |
| 5 Air pressure switch (differential operating type)   |  | 23 Air damper  |
| 6 Flame sensor probe  | 12 Plate with four hole knock-outs for electrical cable routing  | 24 Tube connecting the fan suction line to the air pressure switch |
| 7 Air pressure socket   | 13 Fan air inlet   | 25 Bracket for application of output power regulator RWF           |
| 8 Gas pressure test point and head fixing screw   | 14 Gas input pipe  | 26 Plug-socket on ionisation probe cable                           |
| 9 Screw securing fan to pipe coupling   | 15 Gas butterfly valve   |  |
| 10 Slide bars for opening the burner and inspecting the combustion head                                       | 16 Boiler fixing flange  |  |
| 11 Servomotor controlling the gas butterfly valve and the air damper valve (by means of an adjustable profile | 17 Flame stability disc  |  |
|   | 18 Flame inspection window   |  |
|   | 19 Power switch for: automatic - manual - off  |  |

## 3.9 Burner equipment

The burner is supplied complete with:

- Gas train flange
- Flange gasket
- 4 screws to fix the M8x25 flange:
- 4 screws to fix the M8x25 burner flange to the boiler
- Thermal insulation screen
- N° 6 cable grommets for electrical wiring
- Instruction manual
- Spare parts list

### 3.10 Control box for the air/fuel ratio

#### Introduction

The RMG/M 88.62... control box included in burners of **RS** range is designed to control and start up forced draught gas burners with intermittent operation.

In compliance with:

- Technical Standard EN676 (gas burners)
- Technical Standard EN298 (gas appliances)



Fig. 6



All the installation, maintenance and disassembly operations must be carried out with the electricity supply disconnected.  
To avoid damaging things or injuring people, do not open or alter the control box.



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

#### Technical Data

|  |                               |
|--|-------------------------------|
| <b>Electrical supply</b>   | AC 220....240V<br>+10% / -15% |
| <b>Frequency</b>   | 50....60 Hz +/- 6%            |
| <b>Internal fuse</b>   | T6,3H250V                     |
| <b>Operation below the nominal value of electrical supply</b>                  |                               |
| Minimum operation value on reduction of electrical supply below nominal value  | approx. AC 160V               |
| Minimum operation value on increase in electrical supply towards nominal value | approx. AC 175V               |
| <b>Maximum load of the contacts:</b>   |                               |
| <b>Alarm exit</b>  |                               |
| Nominal power supply   | AC 230V, 50/60 Hz             |
| Maximum current  | 0.5 A                         |
| <b>Allowed cable length</b>  |                               |
| Thermostat   | max. 20 m at 100 pF/m         |
| Air pressure switch  | max. 1 m at 100 pF/m          |
| CPI  | max. 1 m at 100 pF/m          |
| Gas pressure switch  | max. 20 m at 100 pF/m         |
| Flame detector   | max. 1 m                      |
| Remote reset   | max. 20 m at 100 pF/m         |
| <b>M4 screws tightening torque</b>   | max. 0.8 Nm                   |

### 3.11 Servomotor

The servomotor provides simultaneous adjustment for the air damper, by means of the adjustable profile cam and the gas butterfly valve.

The angle of rotation of the servomotor is equal to the angle on the graduated sector controlling the gas butterfly valve.

The servomotor rotates by 90° in 24 seconds.



**Do not alter the factory setting for the 4 cams; simply check that they are set as indicated below:**

#### Cam I: 90°

Limits rotation toward maximum position.

When the burner is at MAX output, the gas butterfly valve must be fully open: 90°.

#### Cam II: 0°

Limits rotation toward minimum position.

When the burner is shut down, the air damper and gas butterfly valve must be closed: 0°.

#### Cam III: 15°

Adjusts the ignition position and the MIN output.

**Cam IV:** integrated to cam III.



D790

Fig. 7

4.1 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.

4.2 Handling

The packaging of the burner includes a wooden platform, 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). During the 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.

4.3 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 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.

Checking the characteristics of the burner

Check the identification label of the burner, showing:

- the model (see **A** in Fig. 8) and type of burner (**B**);
  - the year of manufacture, in cryptographic form (**C**);
  - the serial number (**D**);
  - the data for electrical supply and the protection level (**E**);
  - the electrical input power (**F**);
  - the types of gas used and the relative supply pressures (**G**);
  - the data of the burner's minimum and maximum output possibilities (**H**) (see Firing rate)
- Warning.** The output of the burner must be within the boiler's firing rate;
- the category of the appliance/countries of destination (**I**).

|   |   |                                    |         |
|---|---|------------------------------------|---------|
| RBL   | A | B                                  | C       |
| D   | E | F                                  |         |
| GAS-KAASU <input checked="" type="checkbox"/>   | G | H                                  |         |
| GAZ-AEPIO   | G | H                                  |         |
| I   |   | RIELLO SpA<br>I-37045 Legnago (VR) |         |
|  |   |                                    | CE 0085 |

Fig. 8

D7738



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

#### 4.4 Operating position

The burner is designed to work only in the positions 1, 2, 3 and 4.

Installation 1 is preferable, as it is the only one that allows the maintenance operations as described in this manual. Installations 2, 3 and 4 permit operation but make maintenance and inspection of the combustion head more difficult.

Any other position could compromise the correct operation of the appliance. Installation 5 is prohibited for safety reasons.

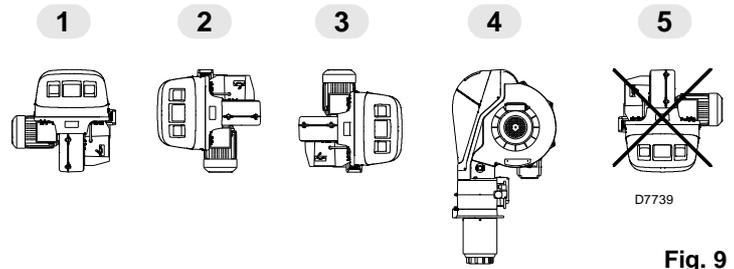


Fig. 9

#### 4.5 Securing the burner to the boiler

##### Preparing the boiler

##### Boring the boiler plate

Make holes in the plate shutting off the combustion chamber, as illustrated in Fig. 10. The position of the threaded holes can be marked using the thermal insulation screen supplied with the burner.

| mm         | A   | B   | C  |
|------------|-----|-----|----|
| RS 50/M MZ | 160 | 224 | M8 |

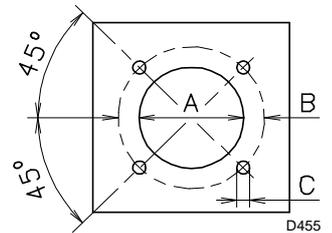


Fig. 10

##### Length of the blast tube

The length of the blast tube must be selected according to the indications provided by the manufacturer of the boiler, and in any case it must be greater than the thickness of the boiler door complete with its refractory.

The available lengths L are those indicated in the table below.

| Blast tube | short  | long   |
|------------|--------|--------|
| RS 50/M MZ | 216 mm | 351 mm |

For boilers with front flue passes (13) or flame inversion chamber, a protection in refractory material (11) must be inserted between the boiler fettling (12) and the blast tube (10).

This protection must not compromise the extraction of the blast tube. See Fig. 11.

For boilers with a water-cooled frontal, a refractory lining is not necessary (11)-12) unless expressly requested by the boiler manufacturer.

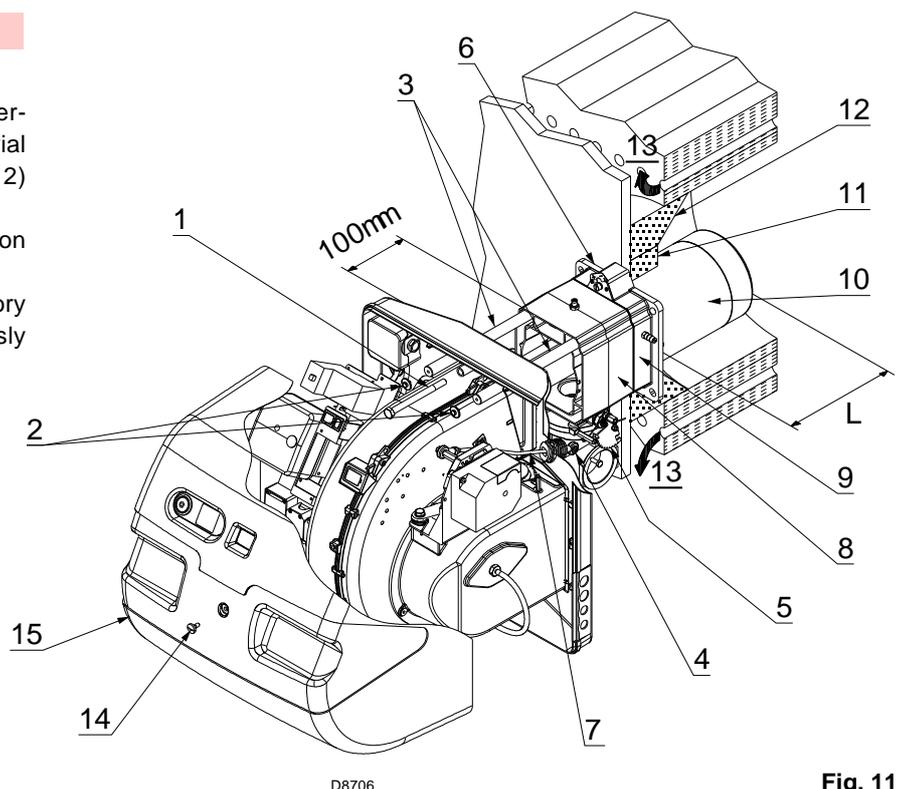


Fig. 11

### Securing the burner to the boiler

Before fixing the burner to the boiler, check from the opening of the blast tube that the probe and the electrode are correctly positioned, as in Fig. 12.

If, in the previous check, the position of the probe or electrode was not correct, remove the screw 1)(Fig. 13), extract the inner part 2)(Fig. 13) of the head, and calibrate them.

Do not rotate the probe: leave it as in Fig. 12 since if it is located too close to the ignition electrode, the control box amplifier may be damaged.

Separate the combustion head from the rest of the burner, Fig. 11.

To do this, proceed as follows:

- remove screw 14) and withdraw the cover 15);
- disengage the articulated coupling 4) from the graduated sector 5);
- remove screws 2) from the two slide bars 3);
- remove screw 1) and pull the burner back on slide bars 3) by about 100 mm;
- disconnect the wires from the probe and the electrode and then pull the burner completely off the slide bars, after removing the split pin from the slide bar 3).

Once this operation has been carried out, fix the flange 9)(Fig. 11) to the boiler plate, interposing the insulating gasket 6)(Fig. 11) supplied.

Use the 4 screws 2) supplied, with a tightening torque of  $35 \div 40$  Nm, after protecting their thread with anti-seize products.

The seal between burner and boiler must be airtight. After the start-up (see Ch. 5.3), check there is no leakage of flue gases into the external environment.

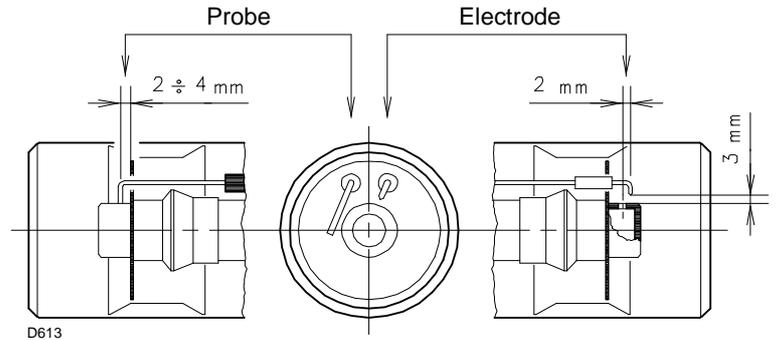


Fig. 12

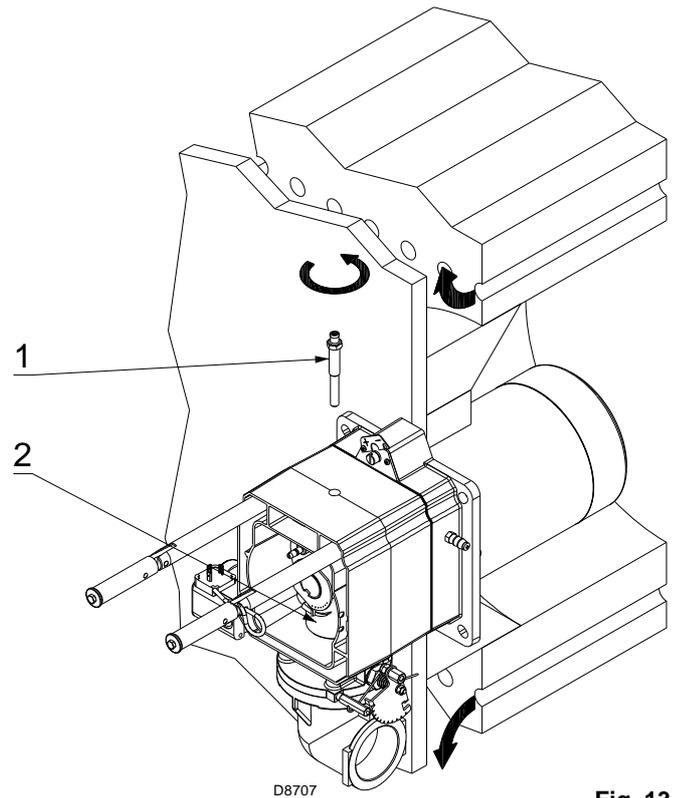


Fig. 13