

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

One stage operation

**UK**  
**CA**

CODE	MODEL	TYPE
3751960	GAS 3	519 T55
3751961	GAS 3	516 T55



**Translation of the original instructions**

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**1** Declarations**Dichiarazione di conformità secondo ISO / IEC 17050-1**

Questi prodotti sono conformi alle seguenti Norme Tecniche:

- EN 12100
- EN 676

Secondo quanto disposto dalle Direttive Europee:

MD	2006/42/CE	Direttiva Macchine
LVD	2014/35/EU	Direttiva Bassa Tensione
EMC	2014/30/EU	Compatibilità Elettromagnetica

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**La qualità viene garantita mediante un sistema di qualità e management certificato secondo ISO 9001:2015.**

**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 Centre 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.



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



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



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: 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 cover 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 date of installation, 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 appliance;
- 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;
- use of non-original components, including spare parts, kits, accessories and optionals;
- 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 Background

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.

Namely:

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 ambient 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, the user undertakes to ensure that everyone knows the use and safety instructions for his own duties;
- 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 are obliged to 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 manufacturing company therefore accepts no responsibility whatsoever for any which may result from 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 Models available**

Designation		Voltage	Start-up	Code
GAS 3	TC	1/240/50	Direct	3751960
GAS 3	TL	1/240/50	Direct	3751961

**4.2 Technical data**

MODEL			GAS 3	
Type			519 T55	
Output <sup>(1)</sup>		kW	130 - 350	
		Mcal/h	130 - 300	
Fuel			NATURAL GAS: G20 - G25 - G31	
			G20	G25
- Net Calorific Value		kWh/Nm <sup>3</sup>	10	8.6
		Mcal/Nm <sup>3</sup>	8.6	7.4
- Absolute density		kg/Nm <sup>3</sup>	0.71	0.78
- Max output		Nm <sup>3</sup> /h	35	43
- Pressure at maximum output <sup>(2)</sup>		mbar	11.1	16.4
Operation			- Intermittent (min. 1 stop in 24) - One-stage	
Standard applications			Boilers: water, steam, diathermic oil	
Ambient temperature		°C	0 - 40	
Noise levels <sup>(3)</sup>	Sound pressure	dB(A)	75	
	Sound power		85	
Combustion air temperature		°C max	60	

**Tab. A**

- (1) Reference conditions: Ambient temperature 20°C - Gas temperature 15°C - Barometric pressure 1,013 mbar - Altitude 0 m a.s.l.
- (2) Pressure at test point with zero pressure in 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 accurate "Accuracy: Category 3" measurement, as described in EN ISO 3746.

**4.3 Electrical data**

MODEL			GAS 3	
Type			519 T55	
Electrical supply			1N ~ 240V 50 Hz	
Motor	rpm		2750	
	kW		0.250	
	V		240	
	A		2	
Motor capacitor	µF		6.3	
	V		450	
Ignition transformer	V1 - V2		230 V - 1x 9 kV	
	I1 - I2		2A - 33 mA	
Absorbed electric power	kW max		0.4	
Protection level			IP 40	

**Tab. B**

### 4.4 Maximum dimensions

The maximum dimensions of the burner are given in Fig. 1.

Note that to inspect the combustion head the burner must be moved backward and turned upward.

The maximum dimension of the burner when open, without cover, is given by measurement I.

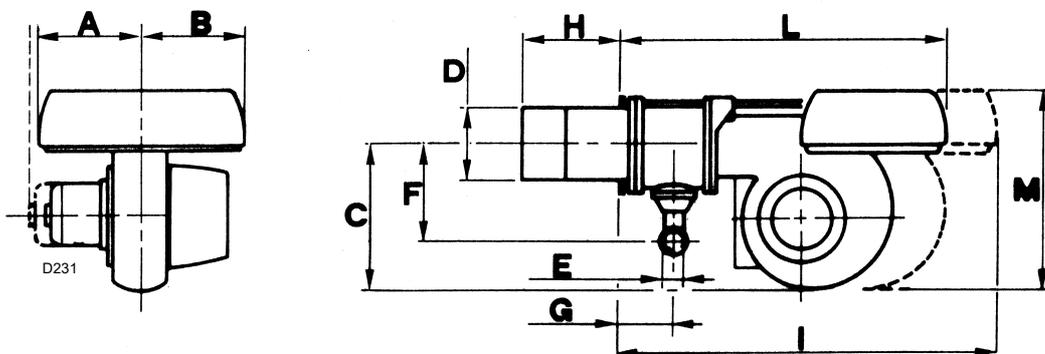


Fig. 1

mm	A	B	C	D	E	F	G	H <sup>(1)</sup>	I	L	M
GAS 3	205	205	292	145	Rp1 1/2	165	97	235-370	775	610	397

Tab. C

<sup>(1)</sup> Blast tube: short-long

### 4.5 Burner equipment

Flange for gas train .....	No. 1
Gasket for flange .....	No. 1
Screws .....	No. 8
Thermal insulation screen .....	No. 1
Manual .....	No. 1
Spare parts list .....	No. 1

**4.6 Firing rates**

The burner output is selected from within the area of the diagrams.

This area is known as the FIRING RATE and provides the burner output according to the pressure in the combustion chamber.

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

**Example:**

for GAS 3 the area is delimited by:

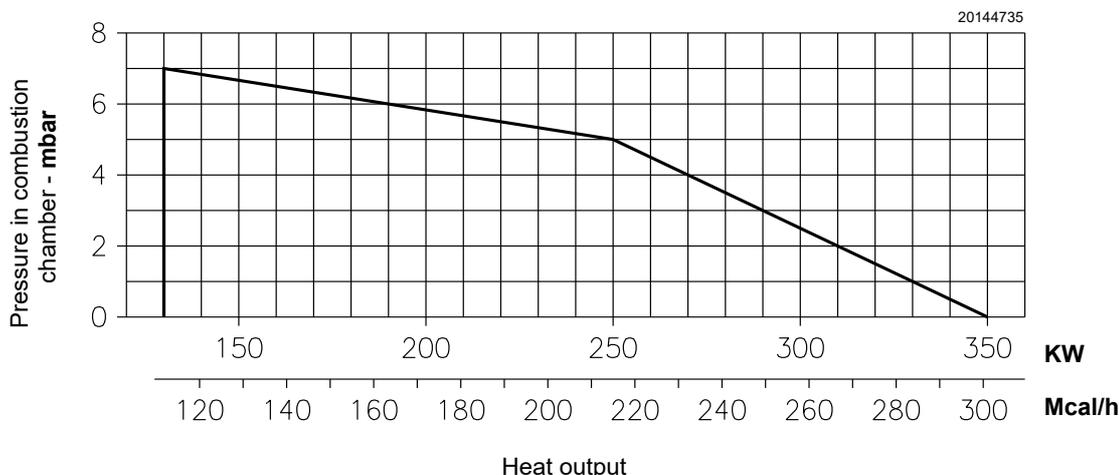
- the axis of the 130 - 350 kW outputs
- the axis of the pressures in the comb. chamber 0 + 7 mbar
- the maximum pressure curve in comb. chamber

If the burner develops an output of 240 kW at a pressure in combustion chamber of 5 mbar, the work point is found on the maximum pressure curve. This curve has been established with safety margins and therefore it is possible to use the entire area of the FIRING RATE beneath this curve.



The firing rate value (Fig. 2) has been obtained considering an ambient temperature of 20 °C, an atmospheric pressure of 1,013 mbar (approx. 0 m a.s.l.), and with the combustion head adjusted as shown on page 16.

The burner can also operate with the combustion chamber in depression.



**Fig. 2**

**4.6.1 Minimum gas pressure - output**

**Pressure:**

Detected at the pressure test-point 8) with mbar into the combustion chamber.

Should the combustion chamber be pressurized, the pressure necessary will be that of the graph plus the pressurization value.

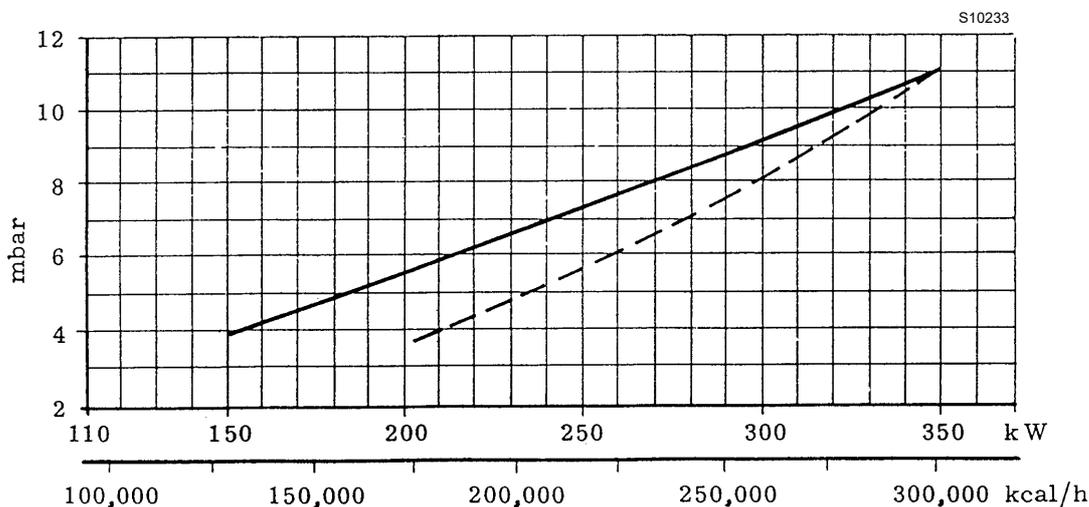
**Example:**

To obtain 270 kW it is necessary a gas pressure of 8 mbar and the combustion head set as indicated at page 9. If the combustion chamber is pressurized at 2 mbar, the pressure detected at the test-point 8) is: 8 + 2 = 10 mbar.

If this value is too high, for very low gas pipework pressures, the gas gear 6) (page 9) could be more open. Do not decrease the pressure at the coupling under the values shown in the diagram.

**Output:**

The maximum value is obtainable with gas Pci 8600 kcal/m<sup>3</sup>.



**Fig. 3**

**4.7 Test boiler**

The burner/boiler combination does not pose any problems if the boiler is EC approved and its combustion chamber dimensions are similar to those indicated in the diagram (Fig. 4).

If the burner must be combined with a boiler that has not been EC approved and/or its combustion chamber dimensions are clearly smaller than those indicated in the diagram, consult the manufacturer.

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

In Fig. 4 you can see the diameter and length of the test combustion chamber.

**Example:**

Output 1500 Mcal/h: diameter 80 cm - length 2.5 m.

**4.7.1 Commercial boilers**

The burner/boiler combination does not pose any problems if the boiler is EC approved and its combustion chamber dimensions are similar to those indicated in the diagram (Fig. 4).

If however the burner has to be combined with a commercial boiler that has not been EC approved and/or with combustion chamber dimensions clearly smaller than those indicated in the diagram (Fig. 4), consult the manufacturers.

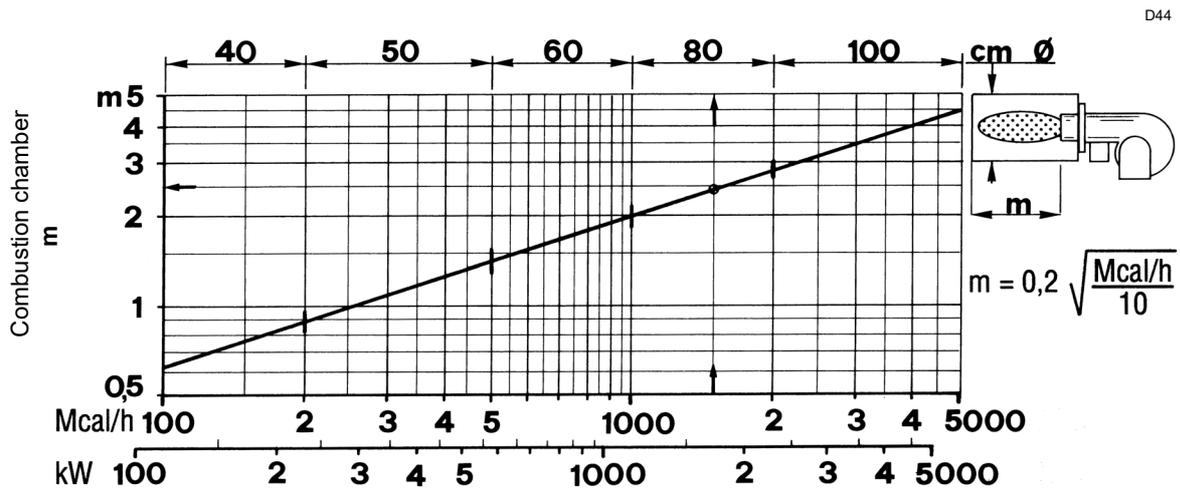


Fig. 4

4.8 Burner description

S10234

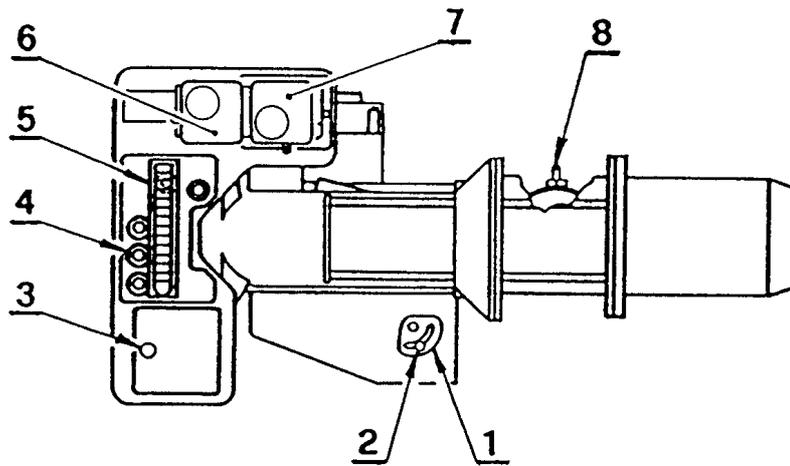


Fig. 5

- 1 Air shutter control
- 2 Air shutter lock-out
- 3 Control box reset button
- 4 Fair leads
- 5 Wiring terminal block
- 6 Over pressure switch (2)
- 7 Air pressure switch (1)
- 8 Gas pressure test-point

**4.9 Control box RMG88...**

**Important notes**



To avoid accidents, material or environmental damage, observe the following instructions!

The control box RMG88... is a safety device! Avoid opening or modifying it, or forcing its operation. Riello S.p.A. cannot assume any responsibility for damage resulting from unauthorised interventions!

- All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
- Before modifying the wiring in the control box connection area, fully disconnect the system from the power supply (omnipolar separation). Check the system is not powered and cannot be accidentally reconnected. Failure to do this will lead to the risk of electrocution.
- Protection against electrocution from the control box and all connected electric components is obtained with the correct assembly.
- Before any intervention (assembly and installation operations, assistance, etc.), ensure the wiring is in order and that the parameters are correctly set, then make the safety checks.
- Falls and collisions can negatively affect the safety functions.  
In this case, the control box must not be operated, even if it displays no evident damage.
- Press the reset button of the burner lockout command or the reset button (by applying a force of not more than 10 N), without the aid of tools or sharp objects.

For the safety and reliability of the control box, comply with the following instructions:

- avoid conditions that can favour the development of condensate and humidity. Otherwise, before switching on again, make sure that the entire control box is perfectly dry!
- Static charges must be avoided since they can damage the control box's electronic components when touched.



**Fig. 6**

S8906

**Technical data**

Mains voltage	AC 220...240 V +10 % / -15 %
Mains frequency	50 / 60 Hz ±6%
Power absorption	20 VA
Protection level	IP20
Safety class	I
Weight	approx. 260g
Cable length	
Thermostat cable	Max. 20 m at 100 pF/m
Air pressure switch	Max. 1 m at 100 pF/m
Gas pressure switch	Max. 20 m at 100 pF/m
Remote reset	Max. 20 m at 100 pF/m
CPI	Max. 1 m at 100 pF/m
Environmental conditions:	
Operation	DIN EN 60721-3-3
Climatic conditions	Class 3K3
Mechanical conditions	Class 3M3
Temperature range	-20...+60°C
Humidity	< 95 % r.h.

**Mechanical structure**

The control box is made of plastic to resist knocks, heat and flame propagation.

The control box contains the following components:

- a microprocessor that controls the program sequence, and a relay for controlling the load
- an electronic flame signal amplifier
- a built-in reset button with 3 signalling colours (LED) for status and error messages.

**5 Installation**

**5.1 Notes on safety for the installation**

After carefully cleaning all around the area where the burner is to be installed, and arranging for the environment to be illuminated correctly, 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.



Combustion air inside the boiler must be free from hazardous mixes (e.g.: chloride, fluoride, halogen); if present, it is highly recommended to carry out cleaning and maintenance more frequently.

**5.2 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). 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 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.

S9928

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

Fig. 7

**Checking the characteristics of the burner**

Check the identification label of the burner (Fig. 7), showing:

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



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

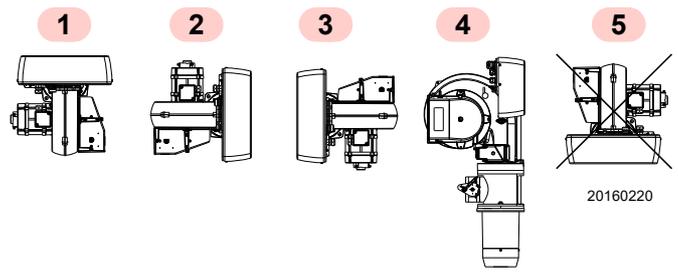
**5.4 Operating position**



- The burner is set up only to operate in positions **1, 2, 3** and **4** (Fig. 8).
- 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. 8**

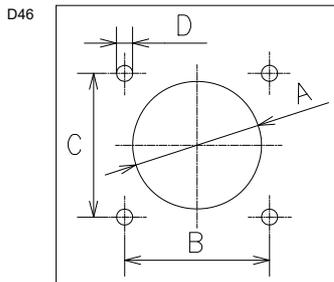
**5.5 Preparing the boiler**

**5.5.1 Boring the boiler plate**

Pierce the closing plate of the combustion chamber, as in Fig. 9. The position of the threaded holes can be marked using the thermal insulation screen supplied with the burner.

mm	A	B	C	D
GAS 3	155	160	160	M10

**Tab. D**



**Fig. 9**

**5.5.2 Blast tube length**

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 fettling. The range of lengths available, L, is as follows:

Blast tube L mm	GAS 3
Standard	235
Elongated	370

**Tab. E**

For boilers with a front flue gas wash 9)(Fig. 10) or flame inversion chamber, a protection device in refractory material 7) must be inserted between the boiler refractory 8) and the blast tube 6).

This protective fettling must not compromise the extraction of the blast tube.

**5.5.3 Securing the burner to the boiler**

S10235



Provide an adequate lifting system.

- Separate the combustion head from the burner body by loosening the screws 1) and 2) and withdrawing the group **A** from the holding bars 3).
- Fix the group **B** to the boiler front plate 4) using the gasket 5) provided as accessory.

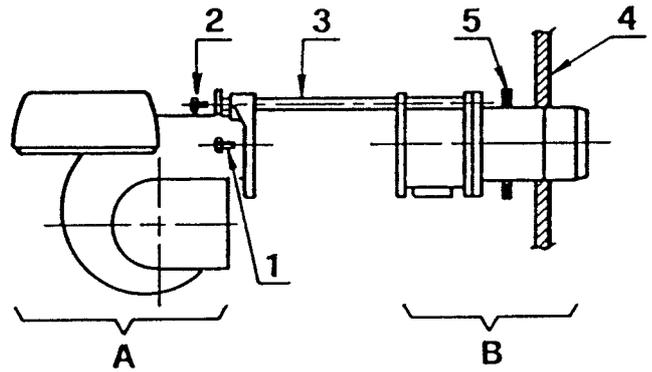


Fig. 10



The seal between burner and boiler must be airtight.

**5.6 Positioning the probe - electrode**



Do not turn the ionization probe, maintain the drawing position; should it be close to the ignition electrode, damage may occur to the control box amplifier.



Respect the dimensions shown in Fig. 11.

The right positions of the ionisation probe and of the ignition electrode (Fig. 11) is obtainable by coinciding their insulators planes with sloping planes of the fastening support.

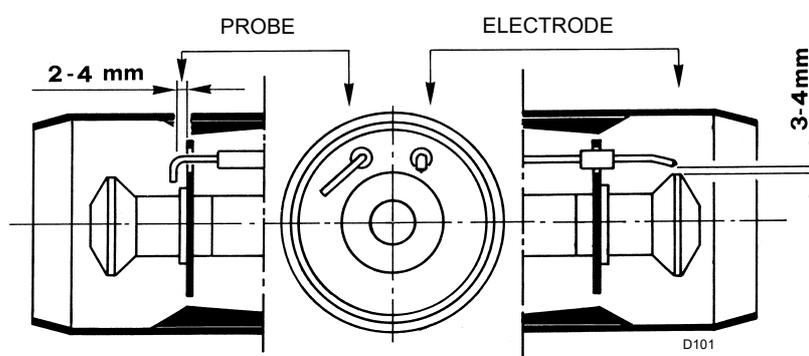


Fig. 11

### 5.7 Combustion head adjustment

Two separate adjustments have to be made: air and gas. These adjustments can be carried out when the burner is still open, during the installation ("Securing the burner to the boiler" on page 15).

#### Air setting

- Loosen the two screws 1) and move the internal part of the combustion head 2) so that its rear edge 3) is coincident with the desired set-point on the plate 4).
- Tighten the screws 1).

#### Gas setting

- Loosen the screw 5), move the ring 6) so that the pointer 7) is coincident with the desired set-point 8).
- Tighten the screw 5).

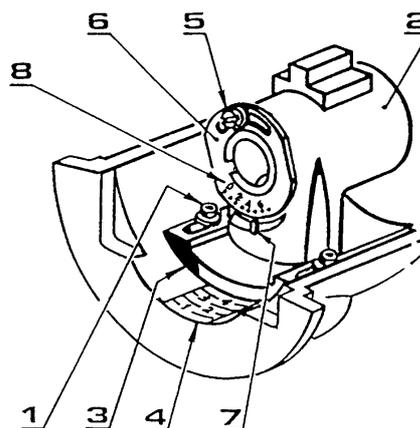


**WARNING**

The set-point number is the same for air and gas setting and is given by the following diagram.

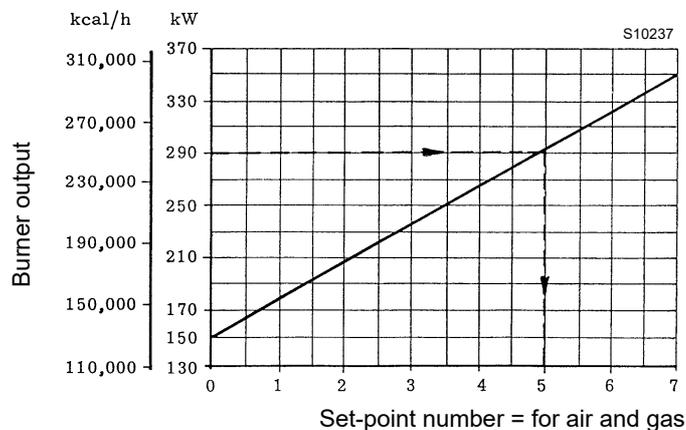
**Example:** The burner is installed on a boiler of 260 kW, assuming an efficiency of 90% the burner output should be 290 kW.

From the diagram (Fig. 13) it can be seen that the air and gas settings for this rating should be no. 5.



S10236

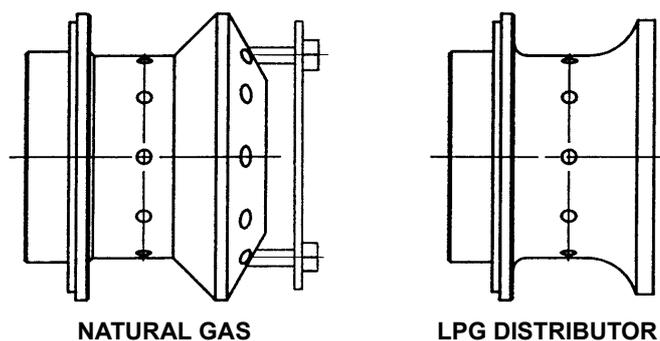
**Fig. 12**



S10237

**Fig. 13**

#### 5.7.1 Gas distributor



S10238

**Fig. 14**

**5.8 Gas feeding**



Explosion danger due to fuel leaks in the presence of a flammable source.

Precautions: avoid knocking, attrition, sparks and heat.

Make sure that the fuel interception tap is closed before performing any operation on the burner.



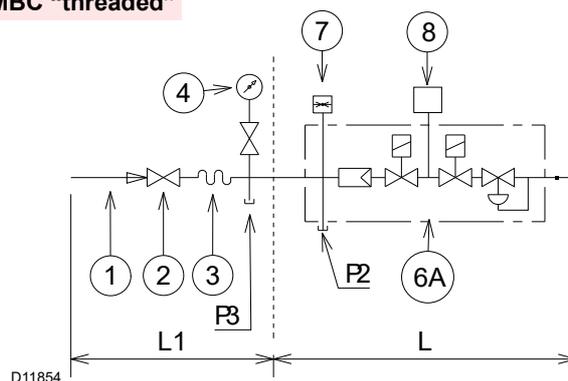
The fuel supply line must be installed by qualified personnel, in compliance with current standards and laws.

**5.8.1 Gas feeding line**

Key (Fig. 15 - Fig. 16 - Fig. 17 - Fig. 18)

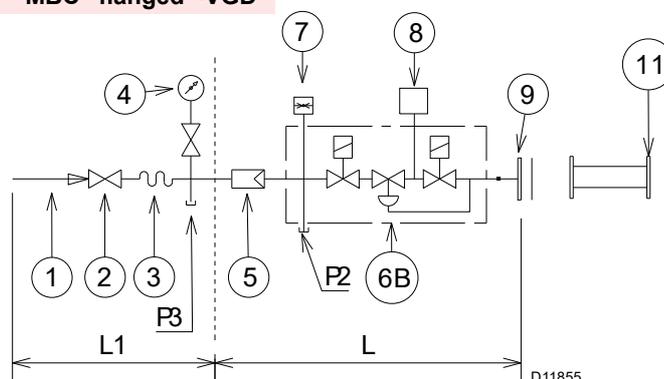
- 1 Gas input pipe
- 2 Manual valve
- 3 Vibration damping joint
- 4 Pressure gauge with push-button cock
- 5 Filter
- 6A Includes:
  - Filter
  - working valve
  - safety valve
  - pressure adjuster
- 6B Includes:
  - working valve
  - safety valve
  - pressure adjuster
- 6C Includes:
  - safety valve
  - working valve
- 6D Includes:
  - safety valve
  - working valve
- 7 Minimum gas pressure switch
- 8 Leak detection control, provided as an accessory or integrated, based on the gas train code. In compliance with the EN 676 standard, the leak detection control is compulsory for burners with maximum outputs over 1200 kW.
- 9 Gasket, for "flanged" versions only
- 10 Pressure adjuster
- 11 Train-Burner adaptor, supplied separately
- P2 Upstream pressure of valves/adjuster
- P3 Upstream pressure of the filter
- L Gas train, supplied separately
- L1 The responsibility of the installer

**MBC "threaded"**



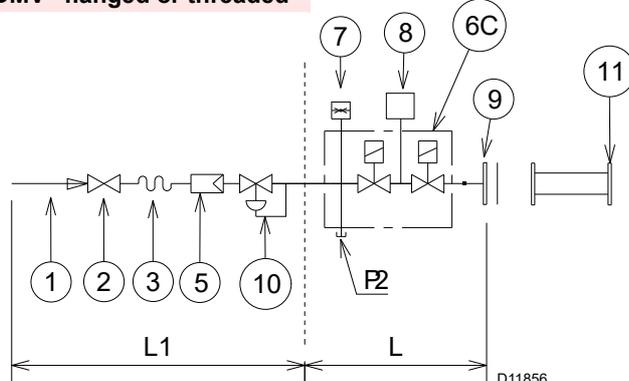
**Fig. 15**

**MBC "flanged"-VGD**



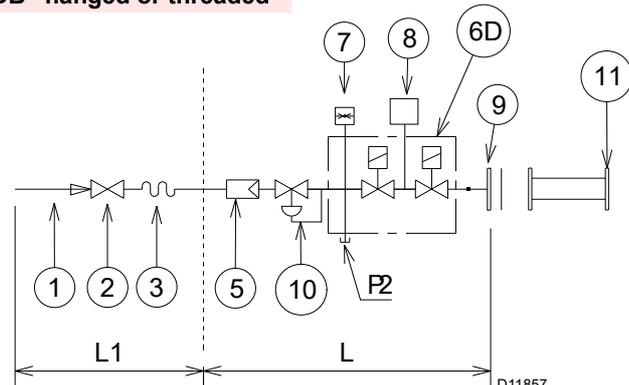
**Fig. 16**

**DMV "flanged or threaded"**



**Fig. 17**

**CB "flanged or threaded"**



**Fig. 18**

### 5.8.2 Gas train

Approved according to standard EN 676 and provided separately from the burner.

### 5.8.3 Gas train installation



Disconnect the electrical power using the main switch.



Check that there are no gas leaks.



Pay attention when handling the train: danger of crushing of limbs.



Make sure that the gas train is properly installed by checking for any fuel leaks.



The operator must use the required equipment during installation.

The train can enter the burner from the right or left side, depending on which is the most convenient, see Fig. 5.

### 5.8.4 Gas pressure

Tab. F indicates the pressure drops of the combustion head and gas butterfly valve, on the basis of the burner operating output.

kW	1 Δp (mbar)	
	G20	G25
130	3.6	5,3
154	4.1	6.1
179	4.8	7.1
203	5.5	8.1
228	6.3	9.4
252	7.2	10.8
277	8.3	12.3
301	9.4	13.9
326	10.6	15.8
350	11.9	17.7

Tab. F



The heat output and gas pressure in the head data refer to operating with the gas butterfly valve fully open (90°).

The values shown in Tab. F on page 18 refer to:

- Natural gas G 20 NCV 10 kWh/Sm<sup>3</sup> (8.6 Mcal/Sm<sup>3</sup>)
- Natural gas G 25 NCV 8.6 kWh/Sm<sup>3</sup> (7.4 Mcal/Sm<sup>3</sup>)

#### Column 1

Combustion head pressure drop.

Gas pressure measured at test point 12)(Fig. 5 on page 11), with:

- combustion chamber at 0 mbar;
- Gas G20 (methane)

To calculate the approximate output at which the burner operates:

- subtract the pressure in combustion chamber from the gas pressure measured at test point 12)(Fig. 5 on page 11).
- Find in Tab. F related to the burner concerned, the pressure value closest to the result of the subtraction.
- Read the corresponding output on the left.

#### Example GAS 3 with natural gas G20:

$$\begin{aligned} \text{Pressure of the gas at the socket} &= 10.3 \text{ mbar} \\ \text{Pressure in combustion chamber} &= 2 \text{ mbar} \\ 10.3 - 2 &= 8.3 \text{ mbar} \end{aligned}$$

A pressure of 5.3 mbar, column 1, corresponds in Tab. F to an output of 277 kW.

This value serves as a rough guide; the effective output must be measured at the gas meter.

To find out on the other hand the gas pressure required at the socket 12)(Fig. 5 on page 11), having fixed the output at which you want the burner to operate:

- find the nearest output value in Tab. F for the burner in question.
- Read on the right, column 1, the pressure at the test point 12)(Fig. 5 on page 11).
- Add this value to the estimated pressure in combustion chamber.

#### Example GAS 3 with natural gas G20:

Desired output: 277 kW

$$\begin{aligned} \text{Gas pressure at an output of 277 kW} &= 8.3 \text{ mbar} \\ \text{Pressure in combustion chamber} &= 2 \text{ mbar} \\ 8.3 + 2 &= 10.3 \text{ mbar} \end{aligned}$$

pressure required at test point 12)(Fig. 5 on page 11).

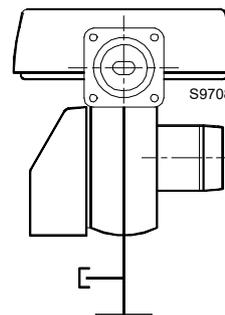


Fig. 19

**5.9 Electrical wiring**

**Notes on safety for the electrical wiring**



- The electrical wiring must be carried out with the electrical supply disconnected.
- Electrical wiring must be made in accordance with the regulations currently in force in the country of destination and by qualified personnel. Refer to the wiring diagrams.
- The manufacturer declines all responsibility for modifications or connections different from those shown in the wiring diagrams.
- Check that the electrical supply of the burner corresponds to that shown on the identification label and in this manual.
- The burner has been type-approved for intermittent use.  
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, burner stopping is guaranteed by the boiler's thermostat/pressure switch.
- If this is not the case, a time switch should be fitted in series to TL to stop the burner at least once every 24 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. Do not use the gas tubes as an earthing system for electrical devices.
- The electrical system must be suitable for the maximum power absorption of the device, as indicated on the label and in the manual, checking in particular that the section of the cables is suitable for that level of power absorption.
- For the main power supply of the device from the electricity mains:
  - do not use adapters, multiple sockets or extensions;
  - make provisions for an omnipolar switch with a gap between the contacts of at least 3 mm (over-voltage category III), as required by current safety regulations.
- 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:



Disconnect the electrical supply from the burner by means of the main system switch.



Close the fuel interception tap.



Avoid condensate, ice and water leaks from forming.

Use flexible cables according to EN 60 335-1 Regulations:

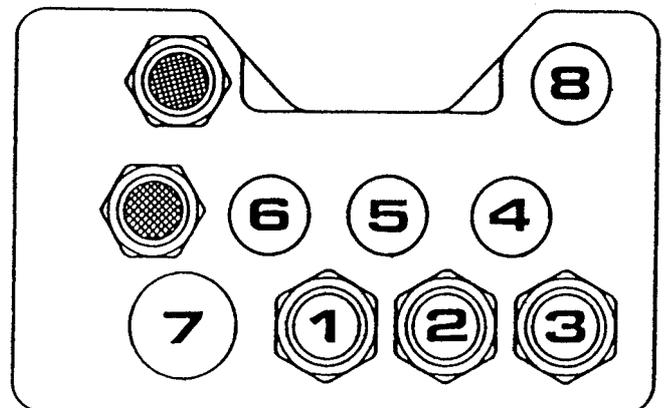
- if in PVC sheath, use at least H05 VV-F
- if in rubber sheath, use at least H05 RR-F.

All the electrical wires, which are to be connected to the terminal block 5)(Fig. 5 on page 11) shall pass through the fair leads 4)(Fig. 5 on page 11) (fig. 1) as for this scheme (Fig. 20).

Further prospective signals or controls can be connected to the burner wiring terminal board by removing the metal weldnuts from the pre-sheared holes and inserting a common fair lead for the passage and the clamping of the leads.



- Do not exchange the neutral wire with the phase (avoid the plug-pin connection).
- Carry out a safe earth connection.
- Check the stop of the burner, by opening the boiler thermostat and the burner lock-out, by disconnecting the lead from the flame probe.



S10239

**Fig. 20**

Key (Fig. 20)

- 1 - Single phase supply: fair lead Pg 13.5
- 2 - Adjustment thermostat: fair lead Pg 13.5
- 3 - Safety thermostat: fair lead Pg 13.5
- 4 - 5 - 6 - 7 - 8 - Pre-sheared holes



**When closing the burner on its slide-bars, pull towards the outside the high voltage cable and the cable of the flame detection probe, till to little tension.**

**Tab. G**



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

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

**6.1 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.



**Before igniting the burner, refer to paragraph “Safety test - with gas supply closed” on page 25.**

**6.2 Adjustments prior to ignition**

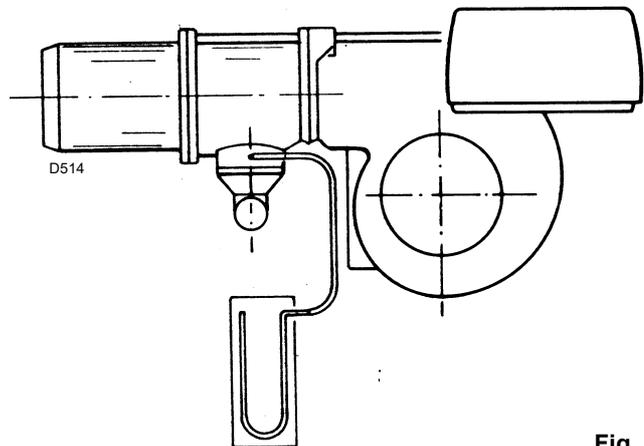
Combustion head adjustment is already described on page 16.

In addition, the following adjustments must also be made:

- open the manual valves upline of the gas train.
- Adjust the minimum gas pressure switch to the start of the scale (Fig. 24).
- Adjust the air pressure switch to the start of the scale (Fig. 22 on page 22).
- Purge the air from the gas line. We recommend using a plastic tube routed outside the building and to purge air until gas is smelt.
- Fit a U-type pressure gauge (Fig. 21) to the gas pressure test point on the pipe coupling.
- Used for getting an approximation of the burner output in the 2nd stage using Tab. F on page 18.
- Connect two lamps or testers parallel to the two gas line solenoids VR and VS in order to check the exact moment at which voltage is supplied. This operation is unnecessary if each of the two solenoids is equipped with a pilot light that signals voltage passing through.



Before starting up the burner, it is good practice to adjust the gas train so that ignition takes place in conditions of maximum safety, i.e. with gas delivery at the minimum.



**Fig. 21**

**6.3 Burner start-up**

Close the remote controls and turn:

As soon as the burner starts make sure that the lamps or testers connected to the solenoids, or indicator lights on the solenoids themselves, show that there is no voltage. If voltage is present, stop the burner **immediately** and check the electrical wiring.

**6.4 Burner ignition**

The burner should light after having performed the above steps. If the motor starts but the flame does not appear and the control box goes into lockout, reset and wait for a new ignition attempt.

If ignition is still not achieved, it may be that gas is not reaching the combustion head within the safety time period of 3 seconds; In this case increase gas ignition delivery.

The arrival of gas at the sleeve is indicated by the U-type manometer (Fig. 21).

In the event that the burner locks-out again, refer to chapter “Faults - Possible causes - Solutions” on page 28.



In the event the burner stops, in order to prevent any damage to the installation, do not unblock the burner more than twice in a row. If the burner locks out for a third time, contact the customer service.



In the event there are further lockouts or faults with the burner, the maintenance interventions 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.

Once the burner has fired, now proceed with global calibration operations.

## 6.5 Burner adjustment

The optimum adjustment of the burner requires an analysis of flue gases at the boiler outlet.

Adjust in sequence:

- 1 Ignition output
- 2 Maximum burner output
- 3 Air pressure switch
- 4 Minimum gas pressure switch

### 6.5.1 Ignition output

According to EN 676:

#### Burners with MAX output up to 120 kW

Ignition can occur at the maximum operation output level. Example:

- max. operation output: 120 kW
- max. ignition output: 120 kW

#### Burners with MAX output above 120 kW

Ignition must occur at a lower output than the max. operation output.

If ignition output does not exceed 120 kW, no calculations are required. If ignition output exceeds 120 kW, the regulatory standard sets that the value be defined according to the control box safety time "ts":

- for "ts" = 2s, ignition output must be equal to or lower than 1/2 of max. operation output;
- for "ts" = 3s, ignition output must be equal to or less than 1/3 of the max. operation output.

#### Example:

MAX operation output of 600 kW.

Ignition output must be equal to or lower than:

- 300 kW con ts = 2s
- 200 kW con ts = 3s

In order to measure the ignition output:

- Remove the UV sensor 29)(Fig. 5 on page 11) (the burner starts and locks out after the safety time).
- Perform 10 ignitions with consecutive lockouts.
- Read the quantity of gas burned on the meter. This quantity must be equal to or lower than the quantity given by the formula:

$$\frac{\text{Nm}^3/\text{h} \text{ (max. burner delivery)}}{360}$$

**Example** for G 20 gas (10 kWh/Nm<sup>3</sup>):

Max operation output of 600 kW corresponding to 60 Nm<sup>3</sup>/h.

After 10 ignitions with their lockouts, the delivery indicated on the meter must be equal to or less than:

$$60 : 360 = 0.166 \text{ Nm}^3.$$

### 6.5.2 Maximum burner output

#### MAX gas adjustment

Measure the gas flow rate.

- If you need to reduce it, close the 2nd stage gas valve a little.
- If you need to increase it, first fully open the 2nd stage gas valve and then, if that is not enough, increase the gas outlet pressure from the pressure regulator.

#### MAX air adjustment

Operate in sector 10)(Fig. 5 on page 11) with small movements. In the end lock the sector well.

#### NOTE:

- When modifying the calibration of the pressure regulator to obtain the desired output in the 2nd stage, you need to re-check the ignition.

- For guidance purposes the maximum 2nd stage output can be obtained, just read the gas pressure at the pipe coupling 12)(Fig. 5 on page 11) on the U pressure gauge (Fig. 21 on page 20) and follow the instructions on page 18.

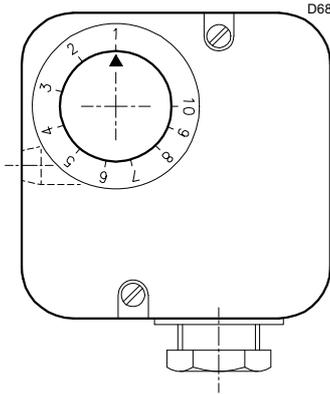
**6.6 Pressure switch adjustment**

**6.6.1 Air pressure switch “1”**

The air pressure switch is set after adjustment have been made. Begin with the switch at the lowest setting. With the burner working at the minimum output, adjust the dial clockwise, increasing its value until the burner locks out. Now reduce the value by one set point, turning the dial anti-clockwise.



Check for reliable burner operation. If the burner locks out, reduce the value by a further set point.



**Fig. 22**

**6.6.2 Over pressure switch “2”**

The over pressure switch must be set after all other adjustments have been made. its purpose is to cause the burner to shut down if the combustion chamber pressure increases above normal operational values.

Begin with the switch at the highest setting, with the burner working at the maximum output, adjust the dial anti-clockwise, decreasing its value until the burner shuts down. Now increase the value by one set point and re-start the burner. If the burner shuts down due to the pressure surge in the combustion chamber caused by the ignition gas, check that the start gas rate is less than 25% of the main gas rate. If it is, increase the value on the over pressure switch by a further half a set point and repeat the test.

**NOTE:**

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

**6.6.3 Minimum gas pressure switch**

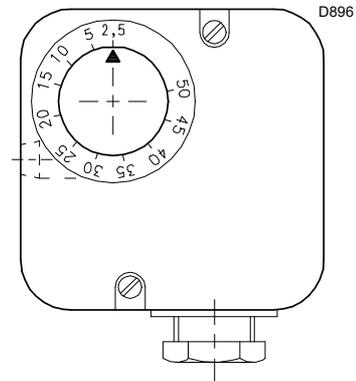
The purpose of the minimum gas pressure switch is to prevent the burner from operating in an unsuitable way due to too low gas pressure.

Adjust the minimum gas pressure switch (Fig. 23) after having adjusted the burner, the gas valves and the gas train stabiliser. With the burner operating at maximum output:

- install a pressure gauge downstream of the gas train stabiliser (for example at the gas pressure test point on the burner combustion head);
- choke slowly the manual gas cock until the pressure gauge detects a decrease in the pressure read of about 0.1 kPa (1 mbar). In this phase, verify the CO value which must always be less than 100 mg/kWh (93 ppm).
- Increase the adjustment of the gas pressure switch until it intervenes, causing the burner shut-down;
- remove the pressure gauge and close the cock of the gas pressure test point used for the measurement;
- open completely the manual gas cock.



1 kPa = 10 mbar



**Fig. 23**

**6.7 Burner operation**

**6.7.1 Burner start-up**

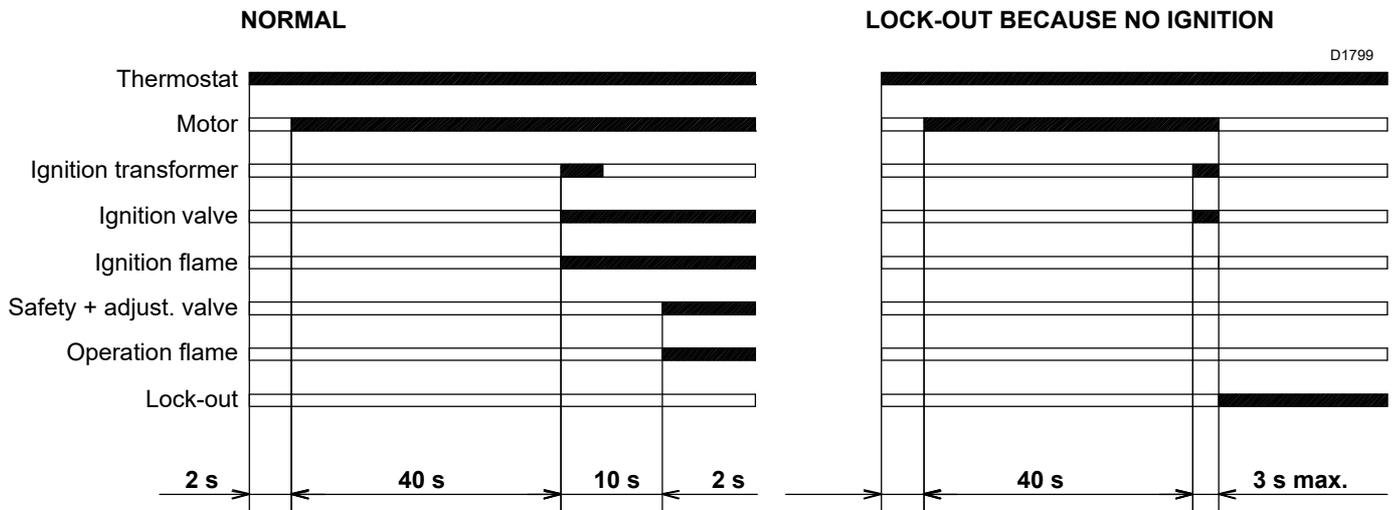


Fig. 24



If during operation the flame shuts off, lock-out occurs within 1 sec.

**WARNING**

**6.8 Final checks (with burner operating)**

<ul style="list-style-type: none"> <li>➤ Open the thermostat/pressure switch TL</li> <li>➤ Open the thermostat/pressure switch TS</li> </ul>	➡	The burner must stop
<ul style="list-style-type: none"> <li>➤ Turn the air pressure switch to the maximum end of scale position</li> </ul>	➡	The burner must stop in lockout
<ul style="list-style-type: none"> <li>➤ Turn off the burner and cut off the power</li> <li>➤ Disconnect the minimum gas pressure switch connector</li> </ul>	➡	The burner must not start
<ul style="list-style-type: none"> <li>➤ Obscure the flame sensor</li> </ul>	➡	the burner must stop in lockout due to flame loss

Tab. H



Make sure that the mechanical locking systems on the various adjustment devices are fully tightened.

**WARNING**

**6.9 Burner start-up cycle diagnostics**

During start-up, indication is according to the colour code table (Tab. I).

Sequences	Colour code
Pre-purging	●●●●●●●●●●
Ignition phase	●○●○●○●○●○
Operation, flame OK	□□□□□□□□
Operation with weak flame signal	□○□○□○□○□○
Electrical supply below ~ 170V	●▲●▲●▲●▲●▲
Lockout	▲▲▲▲▲▲▲▲▲▲
Extraneous light	▲□▲□▲□▲□▲□

**Tab. I**

Key (Tab. I):

▲ Off    ○ Yellow    ● Green    □ Red

RED LED lit wait for at least 10s	Lockout	Press reset for > 3s	Pulses	3s interval	Pulses
■	■	■	●●●●●	■	●●●●●

**Tab. J**

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

**6.9.2 Control box reset**

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

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

**6.9.3 Visual diagnostics**

Indicates the type of burner malfunction causing lockout. To display the diagnostics proceed as follows:

- Hold the button down for more than 3 seconds once the red LED (burner lockout) remains steadily lit. A yellow light blink to tell you the operation is done.
- Release the button once the light has blinked. The number of blinks indicates the reason for the malfunctioning (refer to the coding in Tab. N on page 29).

**PRESSURE ON THE BUTTON**

**STATE OF CONTROL BOX**

From 1 to 3 seconds	Reset of the control box without visualisation of the visual diagnostics.
More than 3 seconds	Visual diagnostics of the lockout condition: (LED blinks at 1-second intervals).
More than 3 seconds starting from the condition of visual diagnostics	Software diagnostics, with the help of optical interface and PC (possibility to visualise the working hours, irregularities, etc.)

**Tab. K**

The sequence of led pulses issued by the control box identifies the possible types of malfunction, which are listed in the table Tab. N on page 29.

**6.9.1 Resetting of control box and diagnostics use**

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

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

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

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

**6.9.4 Software diagnostics**

Gives an analysis of the life of the burner, through optical connections with a PC showing the working hours, number and types of lockout, control box serial number etc...

To display diagnostics, proceed as follows:

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

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

## 7 Maintenance

### 7.1 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 electrical supply from the burner by means of the main system switch.



Close the fuel interception tap.



Wait for the components in contact with heat sources to cool down completely.

### 7.2 Maintenance programme

#### 7.2.1 Maintenance frequency



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



**IF THE ELECTRICAL SUPPLY TO THE GAS VALVES OCCURS AT UNEXPECTED TIMES, DO NOT OPEN THE MANUAL VALVE, DISABLE THE ELECTRICAL SUPPLY, CHECK THE WIRING; CORRECT THE ERRORS AND CARRY OUT THE ENTIRE TEST AGAIN.**

#### 7.2.2 Safety test - with gas supply closed

For a safe start up it is very important to check that the electrical wiring between the gas valves and the burner has been carried out correctly.

To this end, after checking that the wiring has been carried out in conformity with the burner's wiring diagrams, a starting cycle must be carried out with the gas tap closed (dry test).

- 1 The manual gas valve should be closed with the locking/releasing device ("lock-out / tag out" procedure).
- 2 Make sure the limit electric contacts of the burner close
- 3 Make sure that the minimum gas pressure switch contact closes
- 4 Proceed with a burner start up attempt.

The starting cycle should take place with the following phases:

- Starting of the fan motor for the pre-purging
- Control of the gas valve leak detection, if applicable.
- Completion of the pre-purging
- Attainment of the ignition point
- Power supply to the ignition transformer
- Power supply to the gas valves.

Since the gas is closed, the burner will not be able to start and its control box will stop or safely lockout.

The effective powering of the gas valves can be verified with the insertion of a tester; some valves have indicator lights (or opening/closing position indicators) that are activated when they are powered.

#### 7.2.3 Checking and cleaning



The operator must use the required equipment during maintenance.

##### Burner

Check that there are not excess wear or loosen screws. The screws securing the electrical leads in the burner plugs should also be fully tightened.

Clean the outside of the burner.

Clean and grease the adjustable profile of the cams.

##### Fan

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

##### 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.

##### Gas leaks

Make sure that there are no gas leaks on the pipe between the gas meter and the burner.

##### Gas filter

Change the gas filter when it is dirty.

**Combustion**

The optimum calibration of the burner requires an analysis of the flue gases.

Significant differences with respect to the previous measurements indicate the points where more care should be exercised during maintenance.

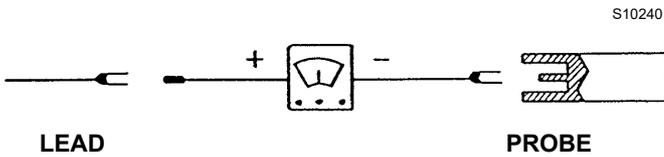
In case the combustion values found at the beginning of the intervention do not respect the standards in force or, in any case, do not correspond to a proper combustion, contact the Technical Assistance Centre in order to carry out the necessary adjustments.

**7.2.4 Ionisation current**

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

The burner normally supplies a higher current value, so that no check is needed.

However, if a measurement of the ionization current is required, it is necessary to disconnect the probe lead and insert a d.c. microamperometer.



**Fig. 25**

**7.2.5 Combustion control (gas)**

**CO<sub>2</sub>**

It is advisable to adjust the burner with a CO<sub>2</sub> not greater than about 10% (gas con Ncv 8600 kcal/m<sup>3</sup>). In this way it is avoided that a small decalibration (for example a variation in the tension) could cause a combustion with an air defect and with the subsequent formation of CO.

**CO**

It should not exceed 100 mg/kWh.

EN 676		Air excess		CO
		Max. output $\lambda \leq 1.2$	Max. output $\lambda \leq 1.3$	
GAS	Theoretical max CO <sub>2</sub> 0 % O <sub>2</sub>	CO <sub>2</sub> % Calibration		mg/kWh
		$\lambda = 1.2$	$\lambda = 1.3$	
G 20	11.7	9.7	9	≤ 100
G 25	11.5	9.5	8.8	≤ 100
G 30	14.0	11.6	10.7	≤ 100
G 31	13.7	11.4	10.5	≤ 100

**Tab. L**

**7.2.6 Safety components**

The safety components should be replaced at the end of their life cycle indicated in the following table.

The specified life cycles do not refer to the warranty terms indicated in the delivery or payment conditions.

Safety component	Life cycle
Flame control	10 years or 250,000 operation cycles
Flame sensor	10 years or 250,000 operation cycles
Gas valves (solenoid)	10 years or 250,000 operation cycles
Pressure switches	10 years or 250,000 operation cycles
Pressure adjuster	15 years
Servomotor (electronic cam)(if present)	10 years or 250,000 operation cycles
Oil valve (solenoid) (if present)	10 years or 250,000 operation cycles
Oil regulator (if present)	10 years or 250,000 operation cycles
Oil pipes/ couplings (metallic)(if present)	10 years
Flexible hoses (if present)	5 years or 30,000 pressurised cycles
Fan impeller	10 years or 500,000 start-ups

**Tab. M**

### 7.3 Opening the burner



Disconnect the electrical supply from the burner by means of the main system switch.



Close the fuel interception tap.



Wait for the components in contact with heat sources to cool down completely.

- Remove the screws 1) fixing the fan A) to the pipe coupling B);
- open the burner, drawing back unit A on the two slide bars 3). Unit B remains fixed to the boiler.

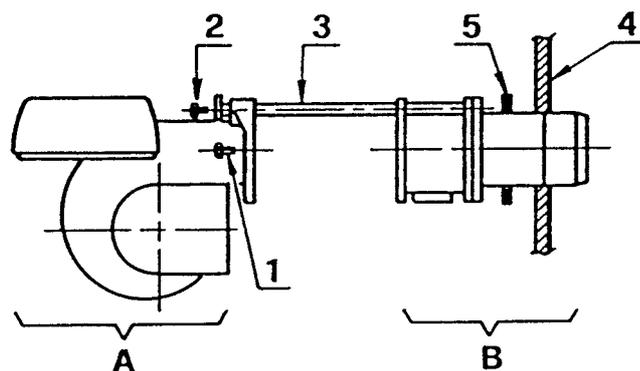


Fig. 26

### 7.4 Closing the burner



When the burner is closing on the two slide bars, the high voltage cable and the flame detection probe cable should be pulled outwards until they are slightly taut.



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

**8 Faults - Possible causes - Solutions**



In the event the burner stops, in order to prevent any damage to the installation, do not unblock the burner more than twice in a row. If the burner locks out for a third time, contact the customer service.



In the event there are further lockouts or faults with the burner, the maintenance interventions 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.

Signal	Problem	Possible cause	Recommended remedy	
2 blinks ● ●	Once the pre-purging phase and safety time have passed, the burner goes into lockout without the appearance of the flame.	The operation solenoid lets little gas through.	Increase	
		One of the two solenoid valves does not open	Replace	
		Gas pressure too low	Increase pressure at governor	
		Ignition electrode incorrectly adjusted	Adjust it	
		Electrode grounded due to broken insulation	Replace	
		High voltage cable defective	Replace	
		High voltage cable deformed by high temperature	Replace and protect	
		Ignition transformer defective	Replace	
		Incorrect valve or transformer electrical wiring	Check	
		Defective control box	Replace	
		A closed valve upline the gas train	Open	
		Air in pipework	Bled air	
		Gas valves unconnected or with interrupted coil	Check connections or replace coil	
3 flashes ● ● ●	The burner does not switch on, and the lockout appears	Air pressure switch in operating position	Adjust or replace	
	The burner switches on, but then stops in lockout	Air pressure switch does not switch owing to lack of air pressure:		
		Air pressure switch poorly adjusted	Adjust or replace	
		Pressure switch pressure point pipe blocked	Clean	
		Poorly adjusted head	Adjust	
		High pressure in the furnace	Connect air pressure switch to fan suction line	
	Lockout during pre-purging phase	Defective motor control contactor (only three-phase version)	Replace	
Defective electrical motor		Replace		
Motor lockout (only three-phase version)		Replace		
4 blinks ● ● ● ●	The burner switches on, but then stops in lockout	Flame simulation	Replace the control box	
	Lockout when burner stops	Permanent flame in the combustion head or flame simulation	Eliminate persistence of flame or replace control box	
6 blinks ● ● ● ● ● ●	The burner switches on, but then stops in lockout	Defective or incorrectly adjusted servomotor	Adjust or replace	
7 blinks ● ● ● ● ● ● ●	The burner goes into lockout immediately following the appearance of the flame	The operation solenoid lets little gas through	Increase	
		Ionisation probe incorrectly adjusted	Adjust	
		Insufficient ionisation (less than 5 A)	Check probe position	
		Earth probe	Withdraw or replace cable	
		Burner poorly earthed	Check earthing	
		Phase and neutral connections inverted	Invert them	
		Defective flame detection circuit	Replace the control box	
	Burner locks out when shifting from minimum to maximum output and vice versa	Too much air or too little gas	Adjust air and gas	
		Burner goes into lockout during operation	Probe or ionisation cable grounded	Replace worn parts

Signal	Problem	Possible cause	Recommended remedy
10 blinks ●●●●●● ●●●●●●	The burner does not switch on, and the lock-out appears	Incorrect electrical wiring	Check
	The burner goes into lockout	Defective control box	Replace
		Presence of electromagnetic disturbances in the thermostat lines	Filter or eliminate
		Presence of electromagnetic disturbance	Use the radio disturbance protection kit
No blink	The burner does not start	No electrical power supply	Check connections
		A limiter or safety control device is open	Adjust or replace
		Line fuse blocked	Replace
		Defective control box	Replace
		No gas supply	Open the manual valves between contactor and train
		Mains gas pressure insufficient	Contact your gas company
		Minimum gas pressure switch fails to close	Adjust or replace
		Servomotor fails to move to min. ignition position	Replace
	The burner continues to repeat the start-up cycle, without lockout	The gas pressure in the gas mains lies very close to the value to which the gas pressure switch has been set. The sudden drop in pressure after valve opening causes temporary opening of the pressure switch itself, the valve immediately closes and the burner comes to a halt. Pressure increases again, the pressure switch closes again and the ignition cycle is repeated. And so on	Reduce the minimum gas pressure switch intervention pressure. Replace the gas filter cartridge.
	Ignition with pulsations	Poorly adjusted head	Adjust
		Ignition electrode incorrectly adjusted	Adjust it
		Incorrectly adjusted fan air damper: too much air	Adjust
		Output during ignition phase is too high	Reduce
	Burner does not reach maximum output	Remote control device TR fails to close	Adjust or replace
Defective control box		Replace	
Defective servomotor		Replace	
Burner stops with air damper open	Defective servomotor	Replace	

Tab. N

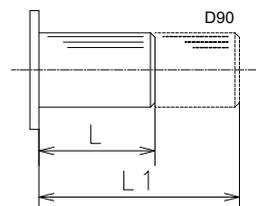
### A Appendix - Accessories

#### Extended head kit

L = standard head

L1 = extended head obtainable with the kit

MODEL	L	L1	CODE
GAS 3	185 mm	320 mm	3000605

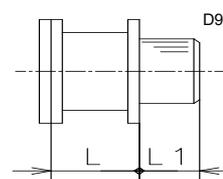


#### Spacer kit for shortening the combustion head

L = Spacer thickness

L1 = Length of the resulting blast tube

MODEL	L	L1	CODE
GAS 3	142 mm	43 mm	3000755



#### Kit for operation with LPG

It is indispensable for the burner to operate with LPG.

L = kit for standard head

L1 = kit for extended head

MODEL	L	CODE
GAS 3	L = 185 mm	3000657
	L1 = 320 mm	3000807

#### Soundproof casing kit

It is used to considerably reduce the noise produced by the burner (— 8/12 dBA). It is made of steel and a sound-damping material and fully encloses the burner.

The casing is mounted on wheels, can be easily moved for burner inspection.

MODEL	CODE
GAS 3	3010403

#### Continuous purging kit

It is composed of a small three-way solenoid valve to be installed between the air pressure switch and the fan. It allows the burner, which has remained in continual purging following a flame cut-out, to fire again.

MODEL	CODE
GAS 3	3010030

**Radio disturbance protection kit**

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If the burner is installed in places particularly subject to radio disturbance (emission of signals exceeding 10 V/m) owing to the presence of an INVERTER, or in applications where the length of the thermostat connections exceeds 20 metres, a protection kit is available as an interface between the control box and the burner.

MODEL	CODE
GAS 3	3010386

**Software interface kit**

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MODEL	CODE
GAS 3	3002719

**Gas trains in compliance with EN 676**

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Please refer to manual.



**WARNING**

The installer is responsible for the addition of any safety device not foreseen in this manual.

**B Appendix - Electrical panel layout**

<b>1</b>	<b>Index of layouts</b>
<b>2</b>	Indication of references
	Burner electrical wiring - to be carried out in the factory (DIAGRAM A)
	Electrical connections to the wiring terminal strip - to be carried out by the installer (DIAGRAM B)

**2 Indication of references**

DIAGRAM A

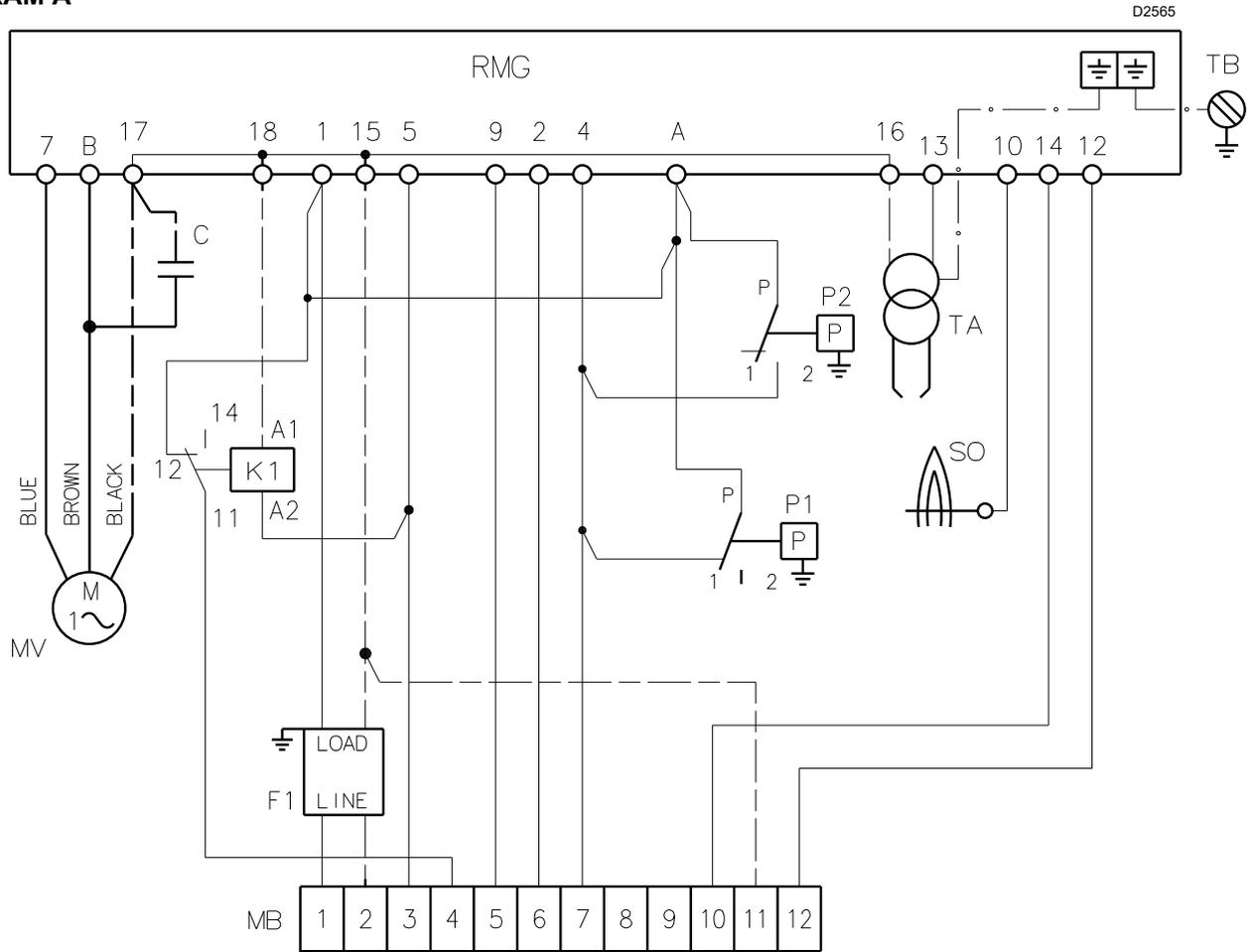
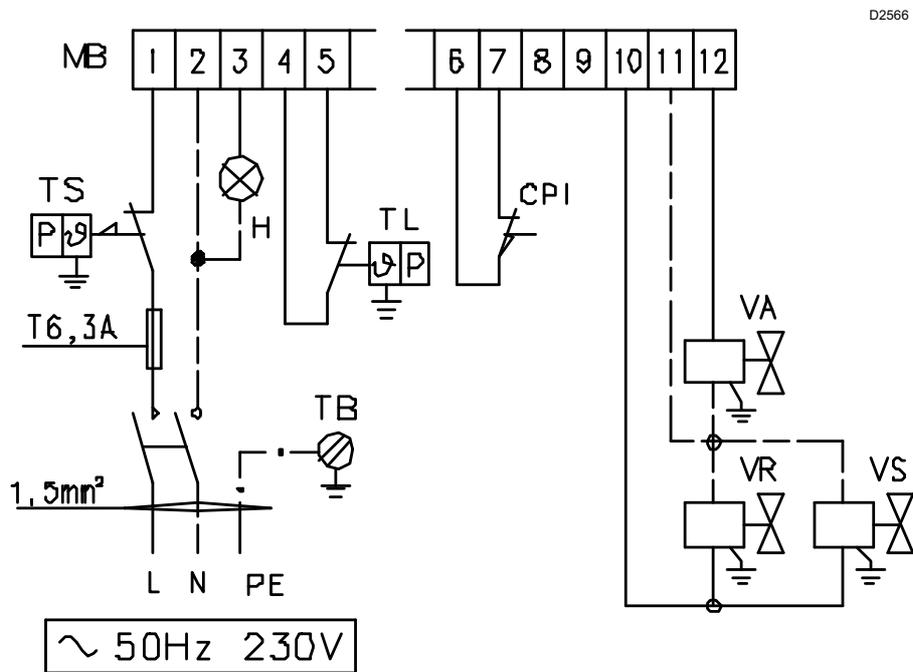


DIAGRAM B



**WIRING DIAGRAM KEY****DIAGRAM (A)**

<b>P1</b>	Air pressure switch
<b>P2</b>	Over pressure switch
<b>C</b>	Capacitor
<b>F1</b>	RFI Suppressor
<b>K1</b>	Relay
<b>MB</b>	Burner terminal strip
<b>MV</b>	Fan motor
<b>RMG</b>	Control box
<b>SO</b>	Ionisation probe
<b>TA</b>	Ignition transformer
<b>TB</b>	Burner earth

**WARNING**

In the case of phase-phase feed, a bridge must be fitted on the control box terminal board between terminal 6 and the earth terminal.

**DIAGRAM (B)**

<b>MB</b>	Terminal strip
<b>CPI</b>	Valve position switch
<b>H</b>	Remote lock out signal
<b>TB</b>	Burner earth
<b>TL</b>	Limit load control system
<b>TS</b>	Safety load control system
<b>VA</b>	Ignition valve
<b>VR</b>	Adjustment valve
<b>VS</b>	Safety valve

**WARNING**

Connect gas valves to terminals 10-11-12 only, exactly as shown on the diagram.







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