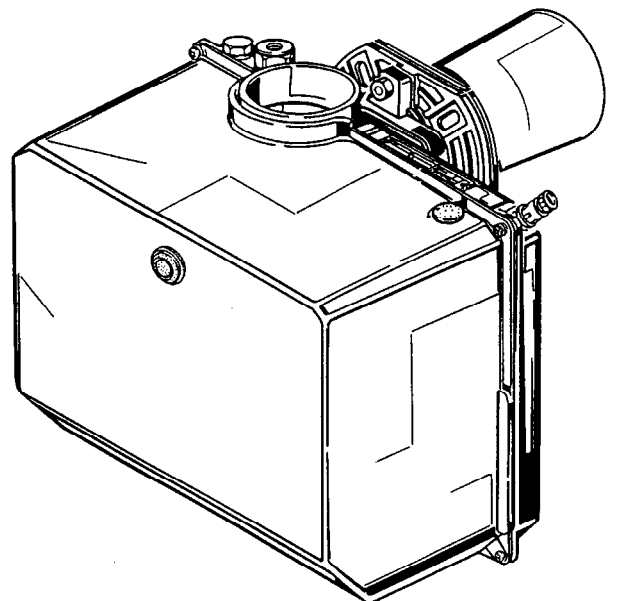


**GB** Kerosene and Gas oil burner

One stage operation



CODE	MODEL	TYPE
3749251	RIELLO 40 G5 BF	492T51



**Original instructions**

<b>1</b>	<b>Declaration of Conformity</b>	<b>2</b>
<b>2</b>	<b>Information and general warnings</b>	<b>3</b>
2.1	Information about the instruction manual	3
2.1.1	Introduction	3
2.1.2	General dangers	3
2.1.3	Other symbols	3
2.1.4	Delivery of the system and the instruction manual	4
2.2	Guarantee and responsibility	4
<b>3</b>	<b>Safety and prevention</b>	<b>5</b>
3.1	Introduction	5
3.2	Personnel training	5
<b>4</b>	<b>Technical description of the burner</b>	<b>6</b>
4.1	Models available	6
4.2	Technical data	6
4.3	Electrical data	6
4.4	Burner equipment	6
4.5	Maximum dimensions	7
4.6	Firing rate (as EN 267)	7
4.7	Burner description	8
4.8	Electrical control box	9
<b>5</b>	<b>Installation</b>	<b>10</b>
5.1	Notes on safety for the installation	10
5.2	Instructions to avoid burnout or bad combustion of the burner	10
5.3	Handling	10
5.4	Preliminary checks	11
5.5	Operating position	11
5.6	Securing the burner to the boiler	12
<b>6</b>	<b>Hydraulic systems</b>	<b>13</b>
6.1	Fuel supply	13
6.1.1	Pump	13
6.2	One-pipe system	14
6.2.1	Priming pump	14
6.3	Two-pipe system	15
6.3.1	Priming pump	15
<b>7</b>	<b>Electrical system</b>	<b>16</b>
7.0.1	Control box	16
7.1	Electrical diagram	17
7.2	Operating programme	18
<b>8</b>	<b>Start-up, calibration and operation of the burner</b>	<b>19</b>
8.1	Notes on safety for the first start-up	19
8.2	Combustion adjustment	19
8.3	Recommended nozzles	20
8.4	Pump pressure	20
8.5	Air damper adjustment	20
8.6	Electrodes setting	21
<b>9</b>	<b>Maintenance</b>	<b>22</b>
9.1	Notes on safety for the maintenance	22
9.2	Maintenance programme	22
9.2.1	Maintenance frequency	22
9.2.2	Checking and cleaning	22
9.3	Opening and closing the burner	23
<b>10</b>	<b>Faults / Solutions</b>	<b>24</b>
<b>11</b>	<b>Appendix - Accessories</b>	<b>25</b>

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

These products are in compliance with the following Technical Standards:

- EN 12100
- EN 267

According to the European Directives:

MD	2006/42/EC	Machine Directive
LVD	2014/35/EU	Low Voltage Directive
EMC	2014/30/EU	Electromagnetic Compatibility

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**Quality is ensured by means of an ISO 9001:2015 certified quality and management system.**

**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 equipment;
- use of the burner with safety devices that are faulty, incorrectly applied and/or not working;
- installation of untested supplementary components on the burner;
- powering of the burner with unsuitable fuels;
- faults in the fuel supply system;
- continuation of use of the burner when a fault has occurred;
- 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 optional;
- force majeure.

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

**3 Safety and prevention**

**3.1 Introduction**

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

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

It is a good idea to remember the following:

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

In particular:

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

the type and pressure of the fuel, the voltage and frequency of the electrical power supply, the minimum and maximum deliveries for which the burner has been regulated, the pressurisation of the combustion chamber, the dimensions of the combustion chamber and the 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:



- 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	Combustion head	Voltage	Code
RIELLO 40 G5 BF	TC	1/230/50	3749251

Tab. A

#### 4.2 Technical data

Model	RIELLO 40 G5 BF	
Delivery <sup>(1)</sup>	kg/h	1.5 – 3.5
Thermal power <sup>(1)</sup>	kW	17 – 42
Fuel	Light oil, viscosity 4 – 6 mm <sup>2</sup> /s a 20°C Kerosene 1.6 - 6 mm <sup>2</sup> /s at 20°C	
Operation	Intermittent (FS1)	
Use	Boilers: water and diathermic oil	
Ambient temperature	°C	0 - 40
Combustion air temperature	°C max	40
Pump	bar	Maximum pressure: 14
Noise levels <sup>(2)</sup>		
Sound pressure	dB (A)	29
Sound power		70
Burner weight	kg	12

Tab. B

(1) Reference conditions: Ambient temperature 20°C - Barometric pressure 1013 mbar - Altitude 0 m a.s.l. (H<sub>i</sub> = 11.86 kWh/kg)

(2) Sound pressure measured in manufacturer's combustion laboratory, with burner operating on test boiler and at maximum 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	RIELLO 40 G5 BF	
Power supply	Single-phase, 230V ± 10% ~ 50Hz	
Motor	A	0.85A
	rpm	2850
	rad/s	298
Capacitor	µF	4
Ignition transformer	Secondary 8 kV – 16 mA	
Absorbed electrical power	kW	0.16
Protection level	IP 40	

Tab. C

#### 4.4 Burner equipment

Flange with insulating gasket ..... No. 1  
 Screw and nuts for flange ..... No. 1  
 Nuts for flange ..... No. 2



**4.5 Maximum dimensions**

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

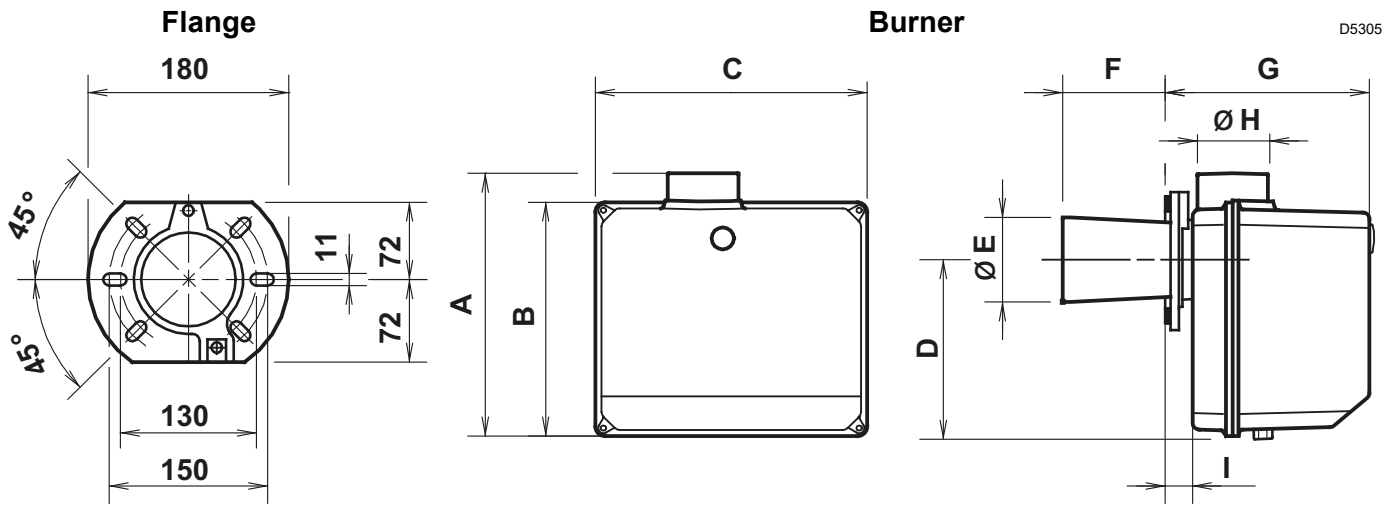


Fig. 1

Model	A	B	C	D	E	F	G	H	I
RIELLO 40 G5 BF	271	249	288	191	90	93	226	75	26

Tab. D

**4.6 Firing rate (as EN 267)**

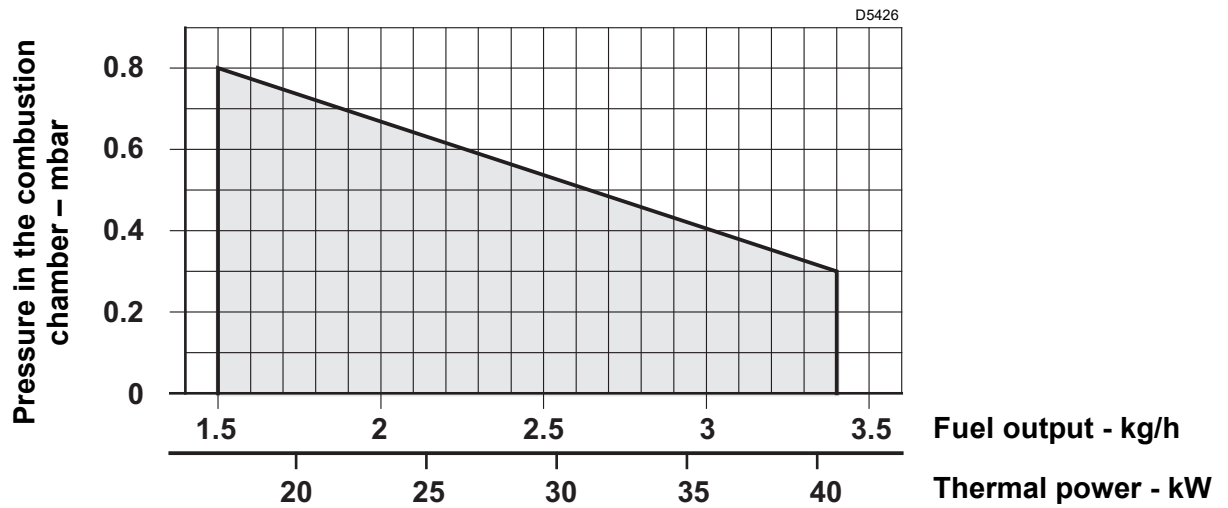


Fig. 2

4.7 Burner description

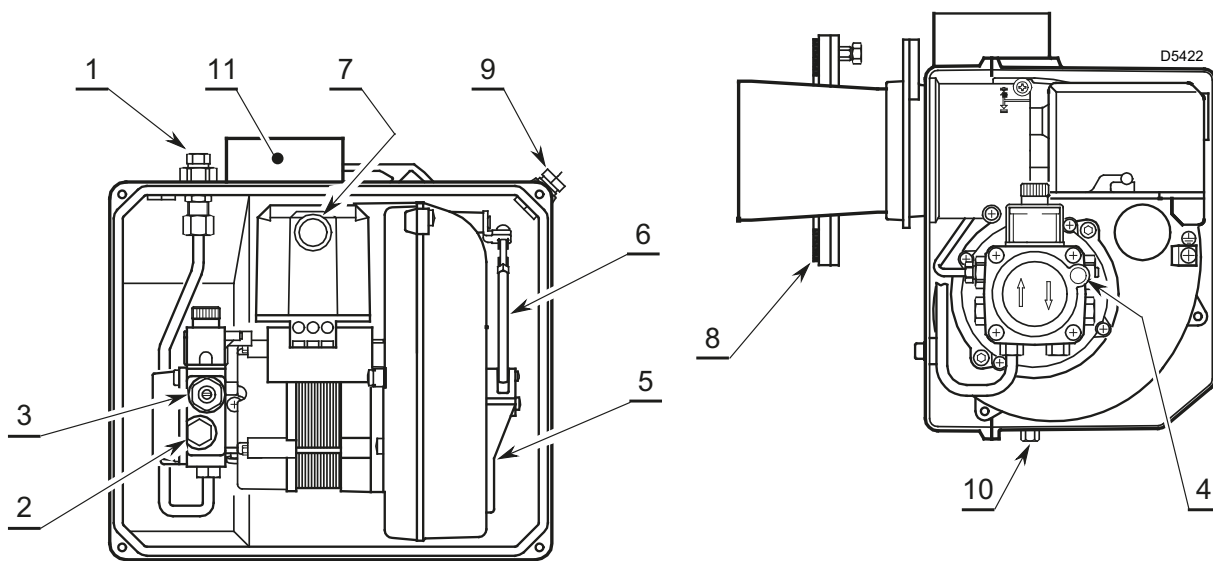


Fig. 3

- 1 Suction line
- 2 Gauge connection
- 3 Pump pressure regulator
- 4 Vacuum gauge connection
- 5 Air-damper
- 6 Regulating air-damper rod
- 7 Lock-out lamp and reset button
- 8 Flange with insulating gasket
- 9 Wiring loom fitting
- 10 Relief valve
- 11 Air socket from the outside

**4.8 Electrical control box**

The control box is a control and supervision system for forced draught burners, for intermittent operation (at least one controlled shutdown every 24 hours).

**Important notes**



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

The control box is a safety device! Avoid opening or modifying it, or forcing its operation. The Manufacturer cannot assume any responsibility for damage resulting from unauthorised work!

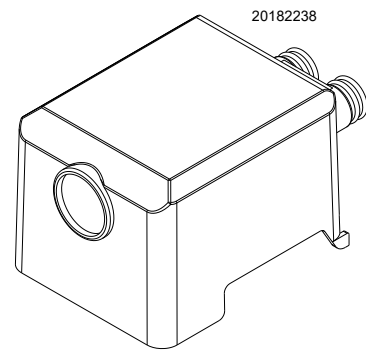
- All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
- Before modifying the wiring in the control box connection area, fully disconnect the system from the power supply (omnipolar separation).
- Protection against electrocution from 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.

For safety and reliability, comply with the following instructions:

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

**Installation notes**

- Check the electrical wiring inside the boiler complies with the national and local safety regulations.
- Install switches, fuses, earth connection etc. in compliance with local regulations.
- Do not confuse the powered conductors with the neutral ones.
- Ensure that spliced wires cannot get into contact with neighbouring terminals. Use adequate ferrules.
- Arrange the H.V. ignition cables separately, as far as possible from the control box and the other cables.
- When wiring the unit, make sure the 230V AC mains voltage cables are run strictly separate from extra low-voltage cables, to avoid the risk of electrocution.



**Fig. 4**

**NOTE:**

The burners have been approved for intermittent operation. This means that they must stop once every twenty four hours to permit the electrical control box to check its efficiency at start-up. The boiler thermostat of heat request normally ensures the stopping of the burner. If this is not the case, it is necessary to apply a timer switch in series to the thermostat of heat request that turns off the burner at least once every 24 hours.

**Technical data**

Mains voltage	230 VAC -15 %/+10 %
Mains frequency	50/60 Hz ±5 %
Built-in fuse	5A 250 V
Energy consumption during the operation	75 VA
Energy consumption	1.5 VA
Protection level	IP40

**Tab. E**

**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 Instructions to avoid burnout or bad combustion of the burner**

- 1 The burner can not be installed outside as it is suitable for operation in closed rooms only.
- 2 The premises the burner operates in must have openings for the air need for the combustion. To be sure about this, you have to control CO<sub>2</sub> and CO in the exhaust gases with all the windows and doors closed.
- 3 If there are air extractors in the premises the burner works, make sure that there are openings for air to be taken in that

are big enough to ensure the required air change; In any case, check that when the burner stops the extractors do not draw hot fumes from pipes through the burner.

- 4 When the burner is stopped, the flue must be kept open and a natural draft created in the combustion chamber. If the smoke pipe is closed, the burner must be drawn back till the extraction of blast tube from the furnace. Before operating in this way take the voltage off.

**5.3 Handling**

Observe the permissible ambient temperatures for storage and transport: - 20... + 70 °C, with max. relative air humidity 80%.



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.



The operator must use the required equipment during installation.

**5.4 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.

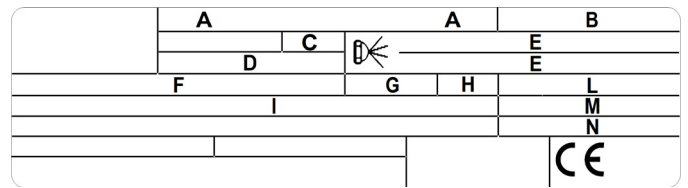


The packaging elements (wooden cage or cardboard box, nails, clips, plastic bags, etc.) must not be abandoned as they are potential sources of danger and pollution; they should be collected and disposed of in the appropriate places.

**Checking the characteristics of the burner**

Check the identification label of the burner, showing:

- the model **A**) (Fig. 5) and type of burner **B**);
- the year of manufacture, in cryptographic form **C**);
- the serial number **D**);
- the electrical power consumption **G**);
- the types of fuel used **I**);
- the data of the burner's possible minimum and maximum output **E**);
- the data for electrical supply **F**);
- the protection level **H**);
- maximum current in case of failure **L**);
- maximum operating current **M**);
- burner weight **N**).



**Fig. 5**



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



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

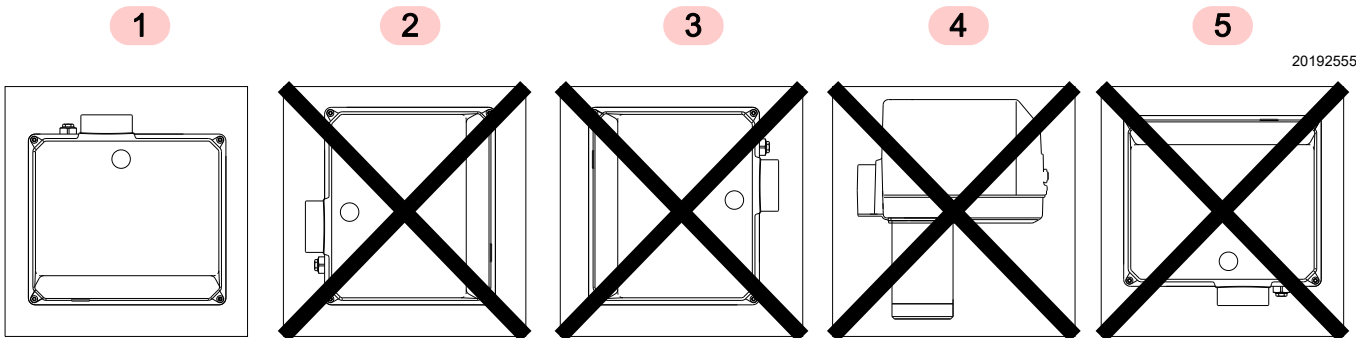
**5.5 Operating position**



The burner is designed to work only in positions 1. Installation 1 is preferable, as it is the only one that allows the maintenance operations as described later in this manual.



Any other position could compromise the correct operation of the appliance. Installations 2, 3, 4 and 5 are forbidden for safety reasons (Fig. 6).



**Fig. 6**

### 5.6 Securing the burner to the boiler



Provide an adequate lifting system of the burner.

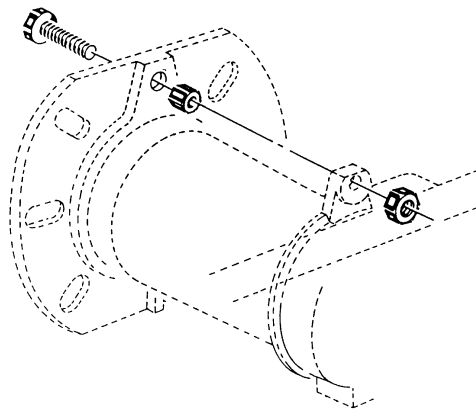
Fix the flange to the boiler door using screws and (if necessary) the nuts **interposing the insulating gasket**, (see Fig. 7).

It is necessary that the insulating gasket (**A**) (Fig. 8) is placed between the boiler door and the burner flange.



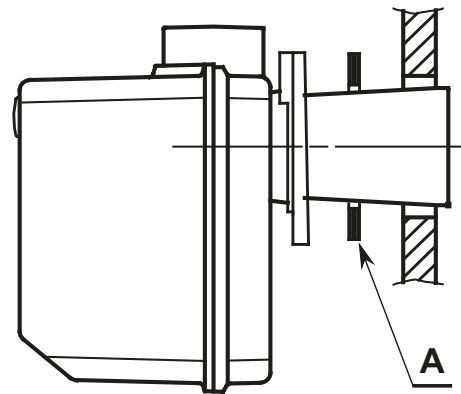
WARNING

**The seal between burner and boiler must be airtight.**



S7386

Fig. 7



D5306

Fig. 8

## 6 Hydraulic systems

### 6.1 Fuel supply



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

Precautions: avoid knocking, attrition, sparks and heat.

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



WARNING

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



WARNING

It is necessary to install a filter on the fuel feed line.

The burner is designed to allow entry of the flexible oil lines on either side of the burner.

#### 6.1.1 Pump

The pump is supplied for use with a one pipe system.

For use on a two pipes system, it is necessary to screw the bypass screw **(A)** supplied with kit code **3000970** (Fig. 9).

Before starting up the burner, make sure that the return pipeline is not clogged.

An excessive back pressure ( $\geq 1$  bar) would cause the damage of the pump seal, with subsequent fuel leaks inside the burner.



WARNING

The suction line plug **1**(Fig. 9) is made of plastic. Once removed, it must not be used again.

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

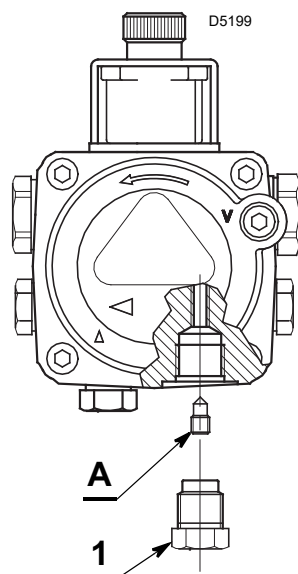


Fig. 9

**6.2 One-pipe system**

Pressurised one-pipe systems (Fig. 10) have a positive fuel pressure at the burner inlet.

Usually the tank is higher than the burner, or the fuel pumping systems are on the outside of the boiler.

The one pipe vacuum systems (Fig. 11) have a negative pressure (depression) at the burner inlet.

Usually the tank is lower than the burner.



You are advised to use additional filters on the fuel supply line.

The Manufacturer recommends the use of a good quality fuel filter on the tank (Fig. 10-Fig. 11), and a secondary filter (60µ for light oil), to protect the burner pump and nozzle from contamination.

**6.2.1 Priming pump**

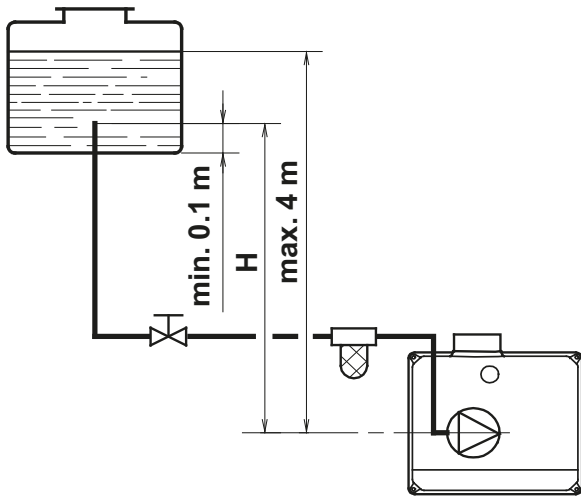
On the system in Fig. 10 just loosen the plug of the vacuumeter (Fig. 11) and wait until the fuel comes out.

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



The installer must ensure that the supply pressure is not above 0.5 bar.

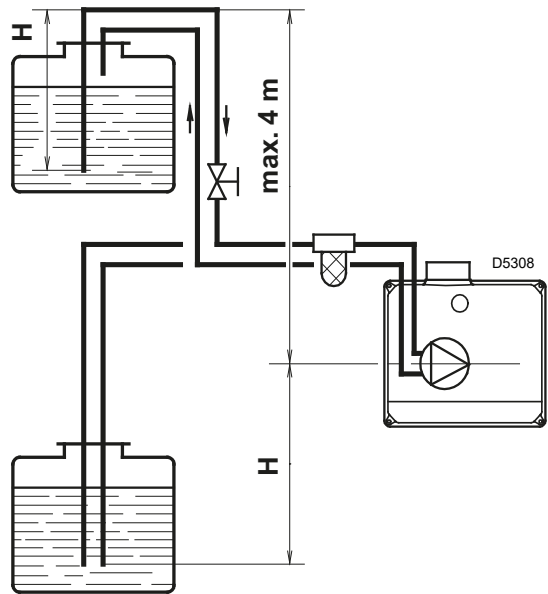
Above that level, the pump seal is subject to too much stress.



**Fig. 10**

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

**Tab. F**



**Fig. 11**

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

**Tab. G**

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

Tab. F, and Tab. G the approximate maximum lengths for the supply pipes, according to the difference of level, length and diameter of the fuel line.



**6.3 Two-pipe system**

The two-pipe vacuum systems (Fig. 12) have a negative fuel pressure (depression) at the burner input. Usually the tank is lower than the burner.

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

Should however the return line arrives over the fuel level, the non-return valve is indispensable.

This solution however is less safe than previous one, due to the possibility of leakage of the valve.



You are advised to use additional filters on the fuel supply line.

The Manufacturer recommends the use of a good quality fuel filter on the tank (Fig. 12), and a secondary filter (60µ for light oil) to protect the burner pump and nozzle from contamination.

**6.3.1 Priming pump**



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

On the system in Fig. 12 switch on the burner and wait for the priming. Should lockout occur prior to the arrival of the fuel, await at least 20 seconds before repeating the operation.



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

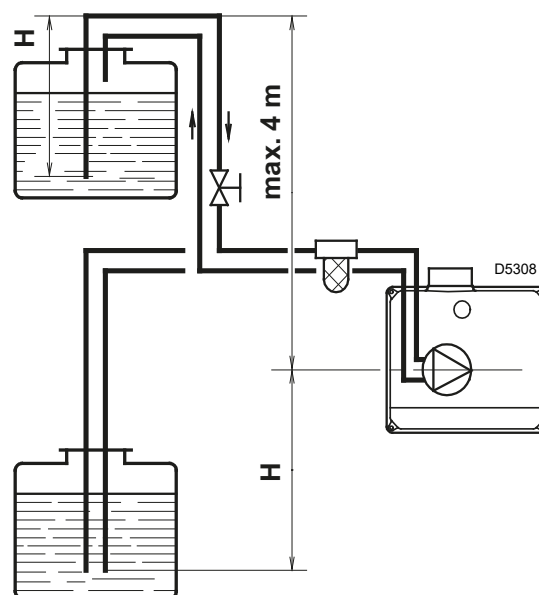


Fig. 12

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

Tab. H

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

**NOTE:**

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

**7 Electrical system**

**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.
- Do not invert the neutral with the phase in the electrical supply line.
- 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. In the event of continuous operation, a cycle arrest must be ensured within 24 hours with the use of a time switch positioned in series with the thermostatic line. Refer to the wiring diagrams.
- The electrical safety of the device is obtained only when it is correctly connected to an efficient earthing system, made according to current standards. It is necessary to check this fundamental safety requirement. In the event of doubt, have the electrical system checked by qualified personnel.
- The electrical system must be suitable for the maximum 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;
  - use a multiple pole switch with at least a 3 mm gap between the contacts (overvoltage category III), as envisaged by the present safety standards.
- Do not touch the device with wet or damp body parts and/or in bare feet.
- Do not pull the electric cables.

Before carrying out any maintenance, cleaning or checking operations:



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



Close the fuel interception tap.



Condensation, the formation of ice and the entry of water are prohibited!

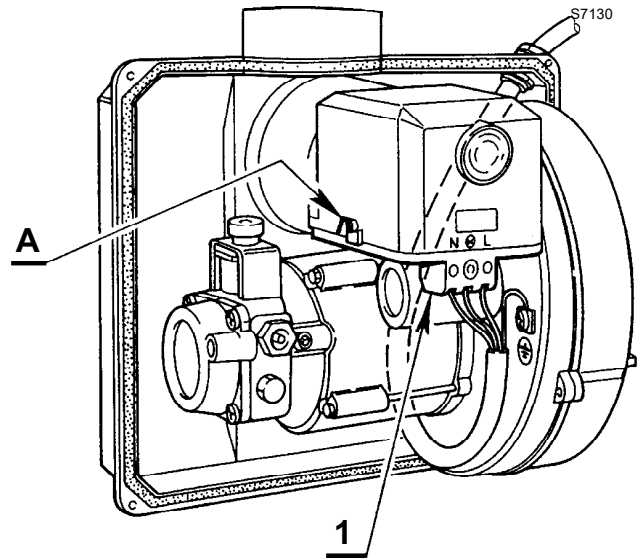
**7.0.1 Control box**

To remove the control-box from the burner, loosen screw (A) (Fig. 13) and pull towards the arrow.

The flame sensor is fitted directly into the control-box (underneath the ignition-transformer) on a plug-in support.

**Run of the electrical cable**

- 1 - Terminal block
- N - Neutral
- L - Phase
- Burner-earth



**Fig. 13**



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

7.1 Electrical diagram

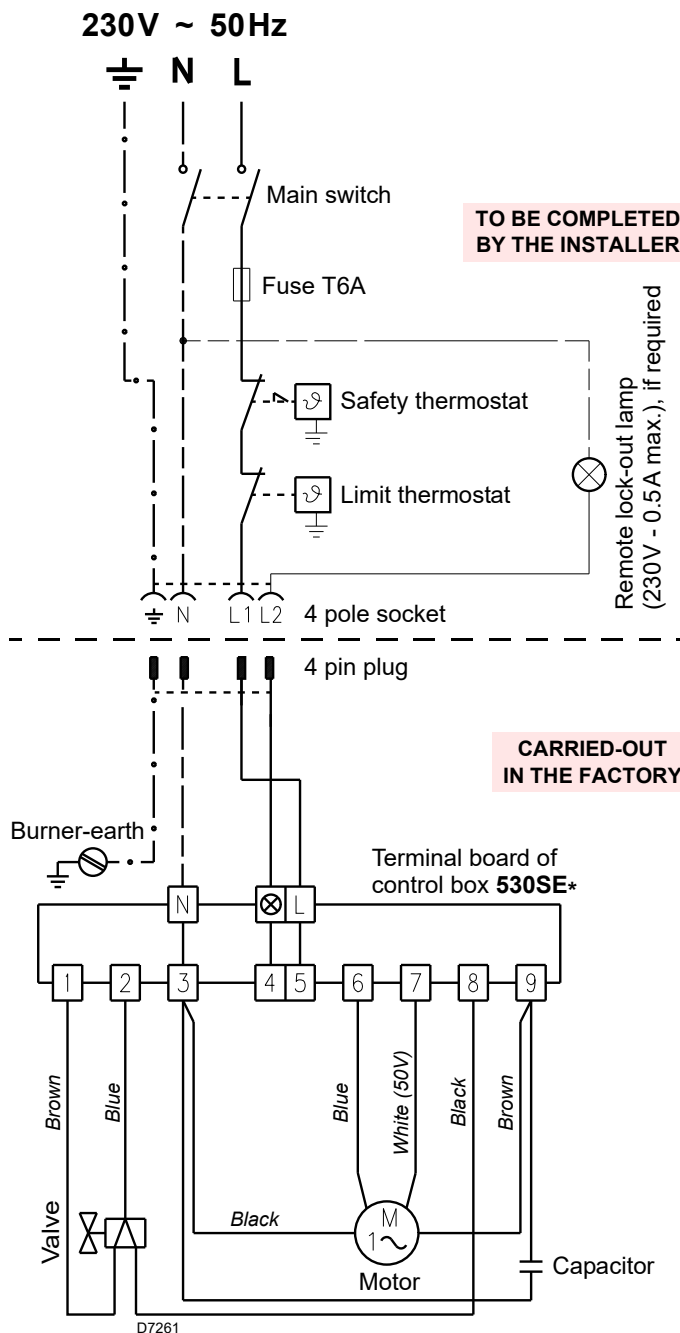


Fig. 14



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



Test the burner by checking the shut-down of the burner by opening the thermostats and the lockout by blocking out the flame sensor.



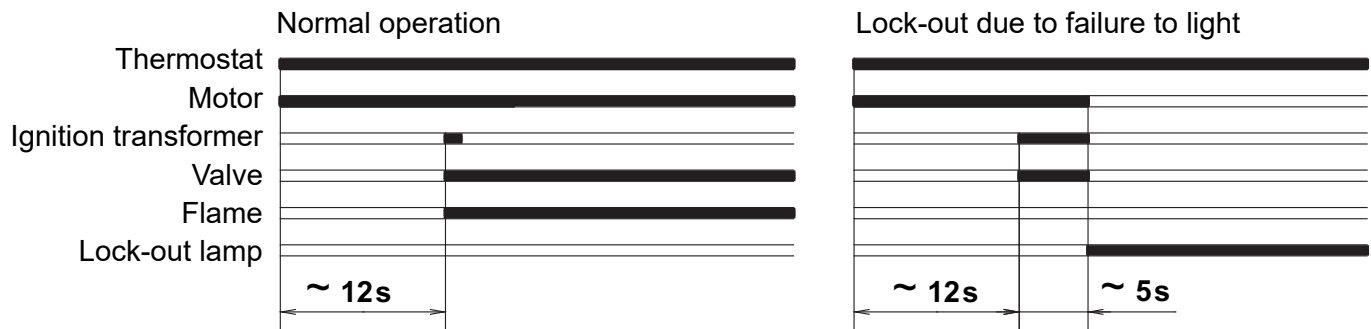
If the cover is still on, remove it and proceed with the electric wiring following the wiring diagrams. Use flexible cables in compliance with EN 60 335-1 standards.



Do not connect burner's grounding, to failure indicator terminal ⊗. This may result the destroy of the control box.

**7.2 Operating programme**

D5229

**Fig. 15**

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

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



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



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

**8.2 Combustion adjustment**

In conformity with EN 267, the application of the burner on the boiler, adjustment and testing must be carried out observing the instruction manual of the boiler, including verification of the CO and CO<sub>2</sub> concentration in the flue gases, their temperatures and the average temperature of the water in the boiler.



The combustion air is sucked from outside, therefore, there can be sensitive temperature variations that can influence the percentage value of the CO<sub>2</sub>. It is advisable to adjust the CO<sub>2</sub> according to the diagram.

For example: with a combustion air temperature of 20°C, adjust the CO<sub>2</sub> to 12.5% (± 0.2%).

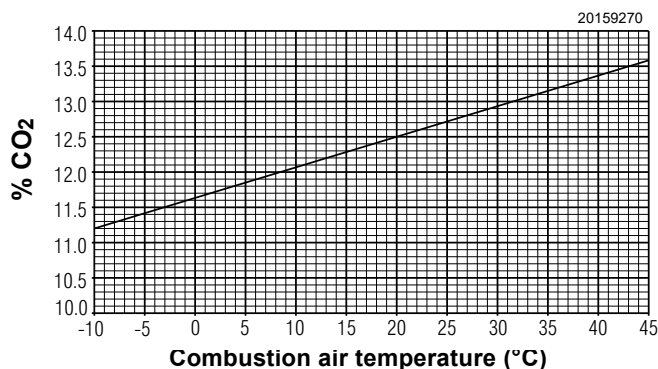


Fig. 16

The values in Tab. I refer to 12.5% CO<sub>2</sub>, at sea level and with ambient temperature and light oil at 20 °C.

Nozzle		Pump pressure	Burner output	Air damper adjustment
GPH	Angle	bar	kg/h ± 4%	Set-point
0.50	60°	8	1.5	2.2
0.60	60°	8	1.7	2.4
0.65	60°	8	1.9	2.6
0.75	60°	8	2.2	3.0
0.85	60°	8	2.5	3.2
1.00	60°	8	2.9	3.9
1.10	60°	8	3.4	5.2

Tab. I



For 1.00 - 1.10 GPH nozzles it is advisable to use, if possible, full cones.

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

The burners leave the factory set at these values (Tab. J):

Nozzle		Pump pressure	Comb. head adjustment	Air damper adjustment
GPH	Angle	bar	Set-point	Set-point
0.75	60° ES	9	-	3.7

Tab. J

### 8.3 Recommended nozzles

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

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



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



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

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

Monarch type R - NS  
 Delavan type W - A - E - B  
 Steinen type H - Q  
 Danfoss type B - H - S

**Angle 60°:** in most cases.

**Angle 80°:** in case of flame detachment, during ignitions at low temperatures.

### 8.4 Pump pressure

**9 bar** The pump leaves the factory set at this value.

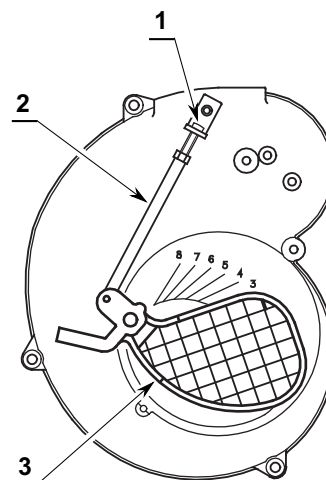
**10 bar** Maximum pressure for kerosene.

### 8.5 Air damper adjustment

The air-output setting can be carried out acting with the rod 2) on the screw 1) that makes the air-damper 3) turn (Fig. 17).

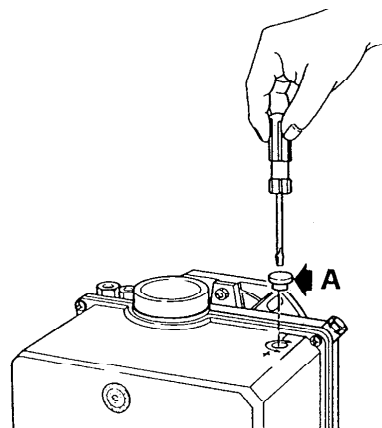
Further adjustments can be carried out without removing the cover but unscrewing the plug (A) as shown in Fig. 18.

Turn to the right (**sign +**) to increase the air quantity in the combustion chamber, turn to the left (**sign -**) to decrease it (Fig. 18).



D5141

Fig. 17



S7021

Fig. 18

## 8.6 Electrodes setting

D5230



WARNING

These dimensions Fig. 19 must be respected.

Before assembling or removing the nozzle, loosen the screw **(A)** and move the electrodes ahead (Fig. 19).

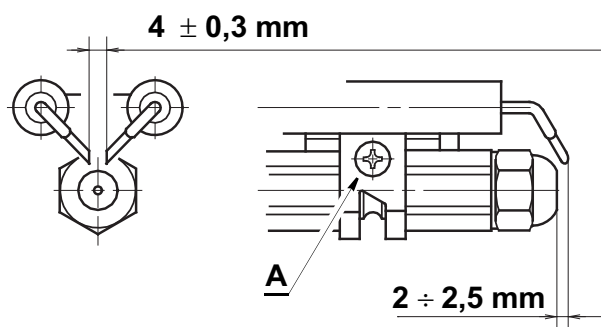


Fig. 19

**9 Maintenance**

**9.1 Notes on safety for the maintenance**

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

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



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

Before carrying out any maintenance, cleaning or checking operations:



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



close the fuel interception tap.



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

**9.2 Maintenance programme**

**9.2.1 Maintenance frequency**



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

**9.2.2 Checking and cleaning**



The operator must use the required equipment during maintenance.

**Pump**

If the pressure is unstable, or the pump runs noisily, the flexible hose must be detached from the line filter and the fuel must be sucked from a tank located near the burner. This measure permits the cause of the fault to be traced to either the suction piping or the pump.

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

**Hoses**

Check there are no occlusions or obstructions in the fuel supply or return lines, in the air suction areas, and in the combustion product waste pipe.



- Check periodically the hoses conditions.
- Using kerosene, they have to be replaced at least every 2 years.
- A metal bowl filter with replaceable micron filter must be fitted.

**Filters**

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

**Electrical wiring**

Check that the electrical wiring of the burner has been made properly (page 17).

**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. If necessary, clean the impeller

**Combustion head**

Check that all the parts of the combustion head are undamaged, not deformed by the high temperatures, free of all impurities and positioned correctly. Clean the combustion head in the fuel outlet area. Check that the positioning of the combustion head is correct and that it is properly fixed to the boiler.

**Nozzles**

Do not clean the nozzle openings. It is advisable to replace nozzles every year during regular maintenance operations or whenever necessary. The change of nozzle requires the combustion to be controlled.

**Electrodes**

Check the correct positioning of the electrodes (page 21).

**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.

Leave the burner working without interruptions for 10 min. and set rightly all the components stated in this manual. **Then carry out a combustion check verifying:**

- smoke index (Bacharach);
- CO2 percentage (%);
- CO content (ppm);
- NOx content (ppm);
- flue gas temperature at the flue.



### 9.3 Opening and closing the burner



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



Close the fuel shut-off valve.



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

For accessing to the interior of the burner, loosen the screws that secure the cover and proceed with the maintenance operation.



#### Operating safety hazards

Repairs to the following components may only be carried out by the respective manufacturers or by personnel instructed by them:

- fan motor
- electromagnetic valves
- burner programmer

#### Check the operation

- Start-up of the burner following the instructions of the manual
- Ignition device
- Flame monitoring
- Seal test of components to the passage of fuel



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

### 10 Faults / Solutions

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

A fault usually makes the lockout LED signal which is situated inside the reset button of the control box.

When lockout lamp comes on the burner will attempt to light only after pushing the reset button. After this if the burner functions

correctly, the lockout can be attributed to a temporary fault that is not dangerous.

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

FAULTS	POSSIBLE CAUSE	SOLUTION
<b>The burner does not start when the limit thermostat closes.</b>	Lack of electrical supply.	Check presence of voltage in the L1 - N clamps of the 7 pin plug. Check the conditions of the fuses. Check that safety thermostat is not lock out.
	Heater or enabling thermostats are faulty.	Replace them.
	The connections in the control box are wrongly inserted.	Check and connect completely all the plugs.
<b>The burner goes into lockout mode before or during the pre-purging.</b>	The flame sensor sees extraneous light.	Eliminate the light.
<b>Burner runs normally in the prepurge and ignition cycle and locks out after 5 seconds ca.</b>	The flame sensor is dirty.	Clear it.
	The flame sensor is faulty.	Replace it.
	Flame moves away or fails.	Check pressure and output of the fuel.
		Check air output.
Change nozzle.		
	Check the coil of solenoid valve.	
<b>Burner starts with an ignition delay.</b>	The ignition electrodes are wrongly positioned.	Adjust them according to the instructions of this manual.
	Air output is too high.	Set the air output according to the instructions of this manual.
	Nozzle dirty or worn.	Replace it.
<b>The burner goes into lockout mode during operation.</b>	Flame disappears four times.	Clean or replace the flame sensor.
		Replace the dirty or deteriorated nozzle.
	Failure to go off.	Check the efficiency of the flame sensor.
		Check the efficiency of the piston on the pressure adjuster.
	Check the efficiency of the pump cut off valve.	

Tab. K



**WARNING**

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

## 11 Appendix - Accessories

## Long combustion head kit

Burner	Standard length (mm)	Extended head length (mm)	Code
RIELLO 40 G5 BF	107	121	3000686
RIELLO 40 G5 BF	107	121 (INOX)	3000687

## Spacer kit

Burner	Spacer thickness (mm)	Code
RIELLO 40 G5 BF	25	3000642

## Light oil filter kit

Burner	Filtration grade ( $\mu\text{m}$ )	Code
RIELLO 40 G5 BF	60	3006561 <sup>(1)</sup>
		3075011 <sup>(2)</sup>

(1) Filter made up of aluminium body and stainless steel filtering cartridge; available singularly.

(2) Filter made up of aluminium cover, plastic tank and nylon filtering cartridge; available in packaging of 50 pieces.

## Line filter kit

Burner	Filtration grade ( $\mu\text{m}$ )	Code
RIELLO 40 G5 BF	100	3000926

## Remote reset kit

Burner	Code
RIELLO 40 G5 BF	3001030

## Kit for two pipes system

Burner	Code
RIELLO 40 G5 BF	3000970

## Hour counter kit

Burner	Code
RIELLO 40 G5 BF	3000904



WARNING

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

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