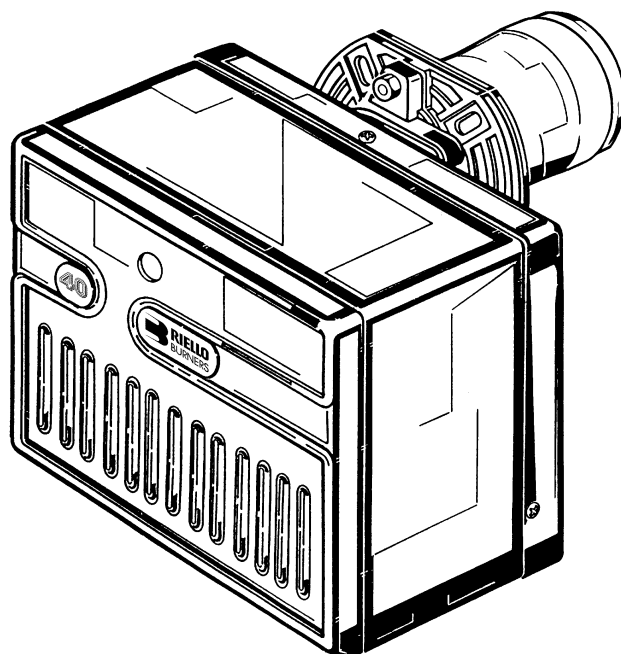


## Kerosene and light oil burners

One stage operation



**RIELLO 40**

CODE	MODEL	TYPE
3743757	G3B FIREBIRD 70K	510 T1K
3743771	G3B FIREBIRD 90K	510 T3K
3743772	G3B FIREBIRD 90D	510 T3K



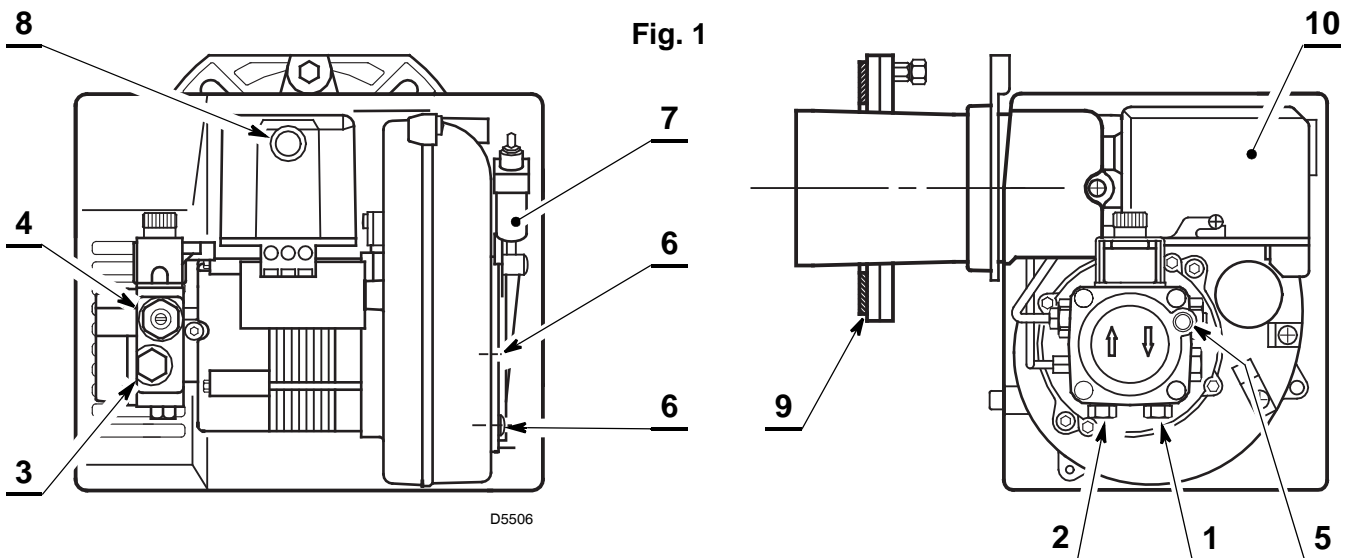
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## 1. BURNER DESCRIPTION

One stage kerosene and light oil burner.

- Burner with CE marking in conformity with EEC Directives: Electromagnetic Compatibility 2004/108/EC, Low Voltage 2006/95/EC, Machines 2006/42/EC and Efficiency 92/42/EEC.
- CE Certification No.: **0036 0315/01** as 92/42/EEC.
- The burner meets protection level of IP 40, EN 60529.



- 1 – Return line
- 2 – Suction line
- 3 – Gauge connection
- 4 – Pump pressure regulator
- 5 – Vacuum gauge connection
- 6 – Screws fixing air damper
- 7 – Hydraulic jack with air damper
- 8 – Reset button with lock-out lamp
- 9 – Flange with insulating gasket
- 10 – Control box

### HYDRAULIC JACK OPERATION 7)(Fig. 1)



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

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

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

## 1.1 BURNER EQUIPMENT

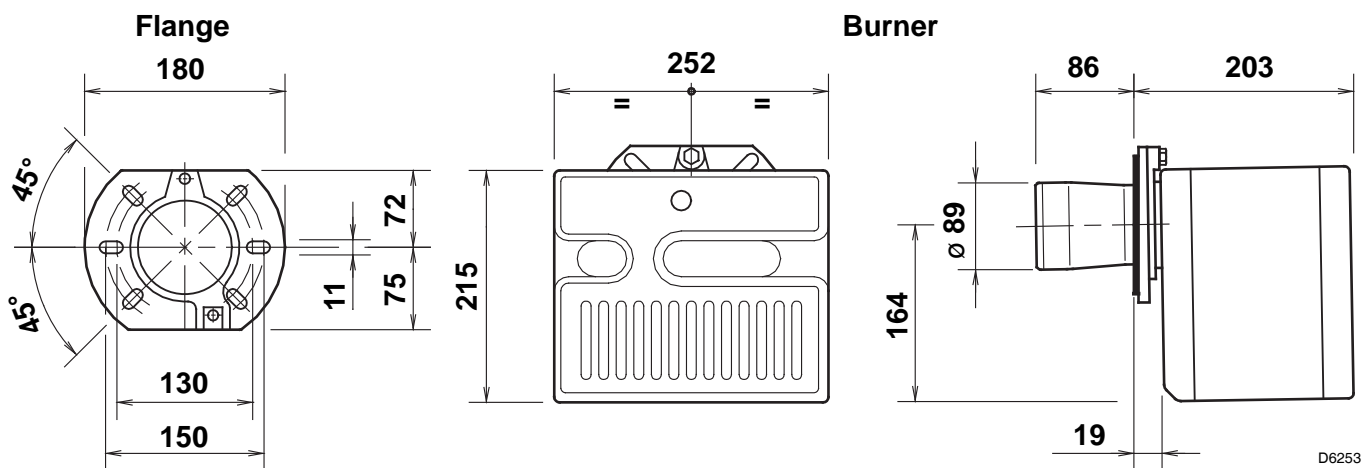
Flange with insulating gasket . . . . .	No. 1	4 pole socket . . . . .	No. 1
Screw and nut for flange . . . . .	No. 4	Cable grommet . . . . .	No. 1
Flexible pipe with nipple . . . . .	No. 1	Screw with two nuts for flange . . . . .	No. 1
Screw of by-pass pump . . . . .	No. 1	4 pin plug . . . . .	No. 1

## 2. TECHNICAL DATA

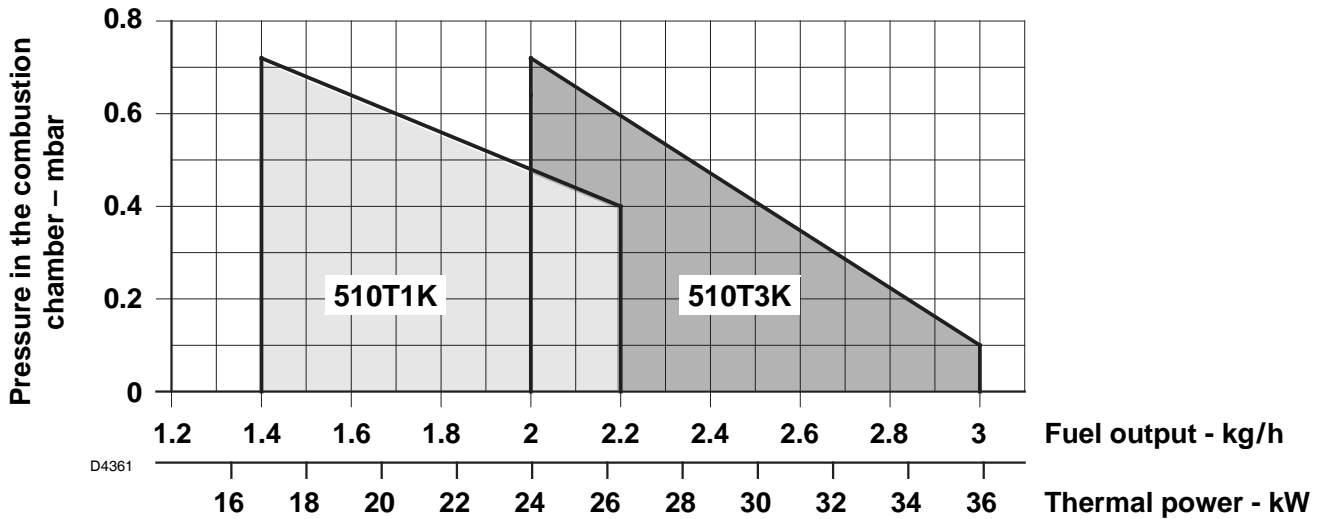
### 2.1 TECHNICAL DATA

TYPE	510 T1K	510 T3K
Output	1.4 – 2.2 kg/h	2 – 3 kg/h
Thermal power	16.8 – 26.3 kW	24 – 35.9 kW
Fuel	Kerosene, viscosity 1.6 – 6 mm <sup>2</sup> /s at 20 °C Light oil, viscosity 4 – 6 mm <sup>2</sup> /s at 20 °C	(H <sub>i</sub> = 11.97 kWh/kg) (H <sub>i</sub> = 11.86 kWh/kg)
Electrical supply	Single phase, ~ 50Hz 230V ± 10%	
Motor	Run current 0.7 A – 2850 rpm – 298 rad/s	
Capacitor	4 µF	
Ignition transformer	Secondary 8 kV – 16 mA	
Pump	Kerosene, maximum pressure 10 bar (145 psi) Light oil, maximum pressure 15 bar (218 psi)	
Absorbed electrical power	0.115 kW	

### 2.2 OVERALL DIMENSIONS



## 2.3 WORKING FIELD (as EN 267)



## 3. INSTALLATION

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

### 3.1 MOUNTING THE BURNER

- › Fix the flange (1) to the boiler door using screw and nuts, interposing the insulating gasket (see fig. 2).
- › The insulating gasket has **six holes**, which, if necessary, can be modified as shown in the figure 3.
- › Verify that the installed burner is lightly leaned towards the button (see fig. 4).
- › The burner is designed to allow entry of the flexible oil-lines on either side of the burner.

Fig. 2

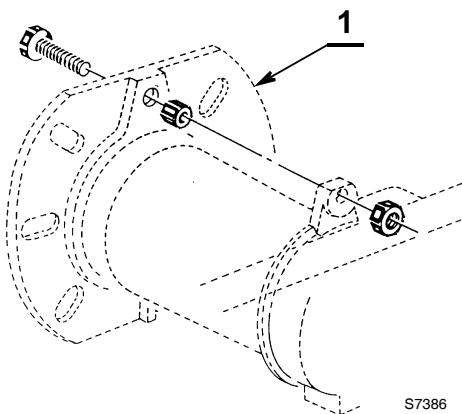


Fig. 3

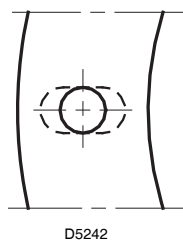
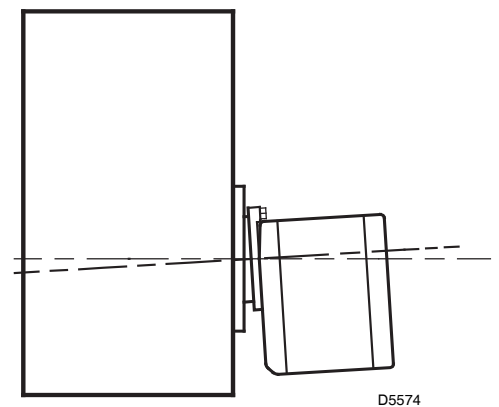


Fig. 4



## 3.2 HYDRAULIC SYSTEMS

### WARNING

- ▶ Check periodically the flexible pipes conditions. Using kerosene, they have to be replaced at least every 2 years.
- ▶ A metal bowl filter with replaceable micronic filter must be fitted in the oil supply pipe.
- ▶ The pump is designed to allow working with one pipe. In order to obtain two pipes working it is necessary to unscrew the return plug (2), screw the by-pass screw (3) and then screw again the plug (2). (See fig. 5).
- ▶ In the two pipes systems, before starting the burner make sure that the return pipe-line is not clogged. An excessive back pressure would cause the damage of the pump seal.

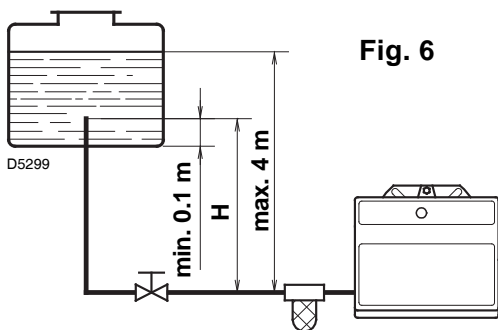
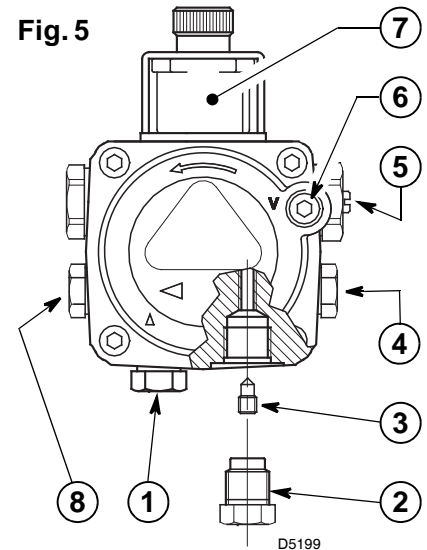


Fig. 6

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



- 1 - Suction line
- 2 - Return line
- 3 - By-pass screw
- 4 - Gauge connection
- 5 - Pressure adjuster
- 6 - Suction gauge connection
- 7 - Valve
- 8 - Auxiliary pressure test point

### PRIMING PUMP:

On the system in fig. 6 it is sufficient to loosen the suction gauge connection (6, fig. 5) and wait until oil flows out.

On the systems in fig. 7 and 8 start the burner and wait for the priming. Should lock-out occur prior to the arrival of the fuel, await at least 20 seconds before repeating the operation.

The pump suction should not exceed a maximum of 0,4 bar (30 cm Hg). Beyond this limit gas is released from the oil. Oil pipes must be completely tight.

In the vacuum systems (fig. 8) the return line should terminate within 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 arrive over the fuel level, a non-return valve is required. This solution however is less safe than previous one, due to the possibility of leakage of the valve.

H meters	L meters	
	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

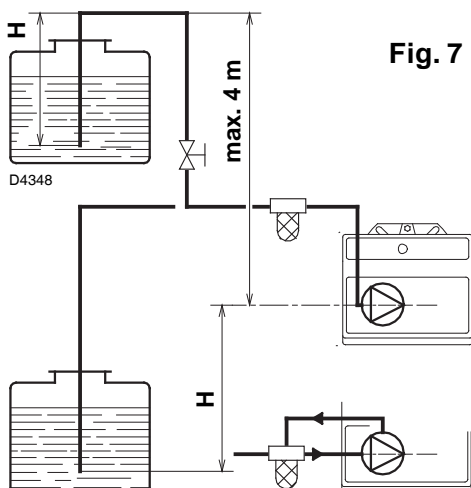


Fig. 7

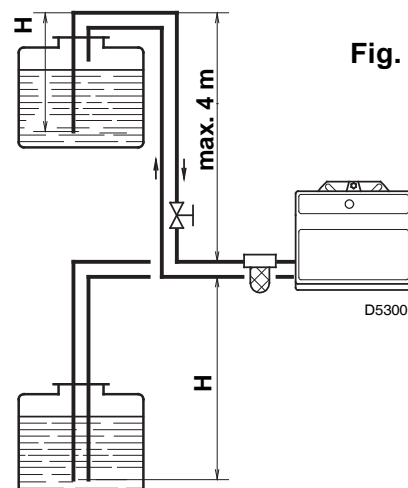


Fig. 8

H = difference of level; L = Max. length of the suction line; I.D. = Interminal diameter of the oil pipes.

### 3.3 ELECTRICAL WIRING

#### WARNING

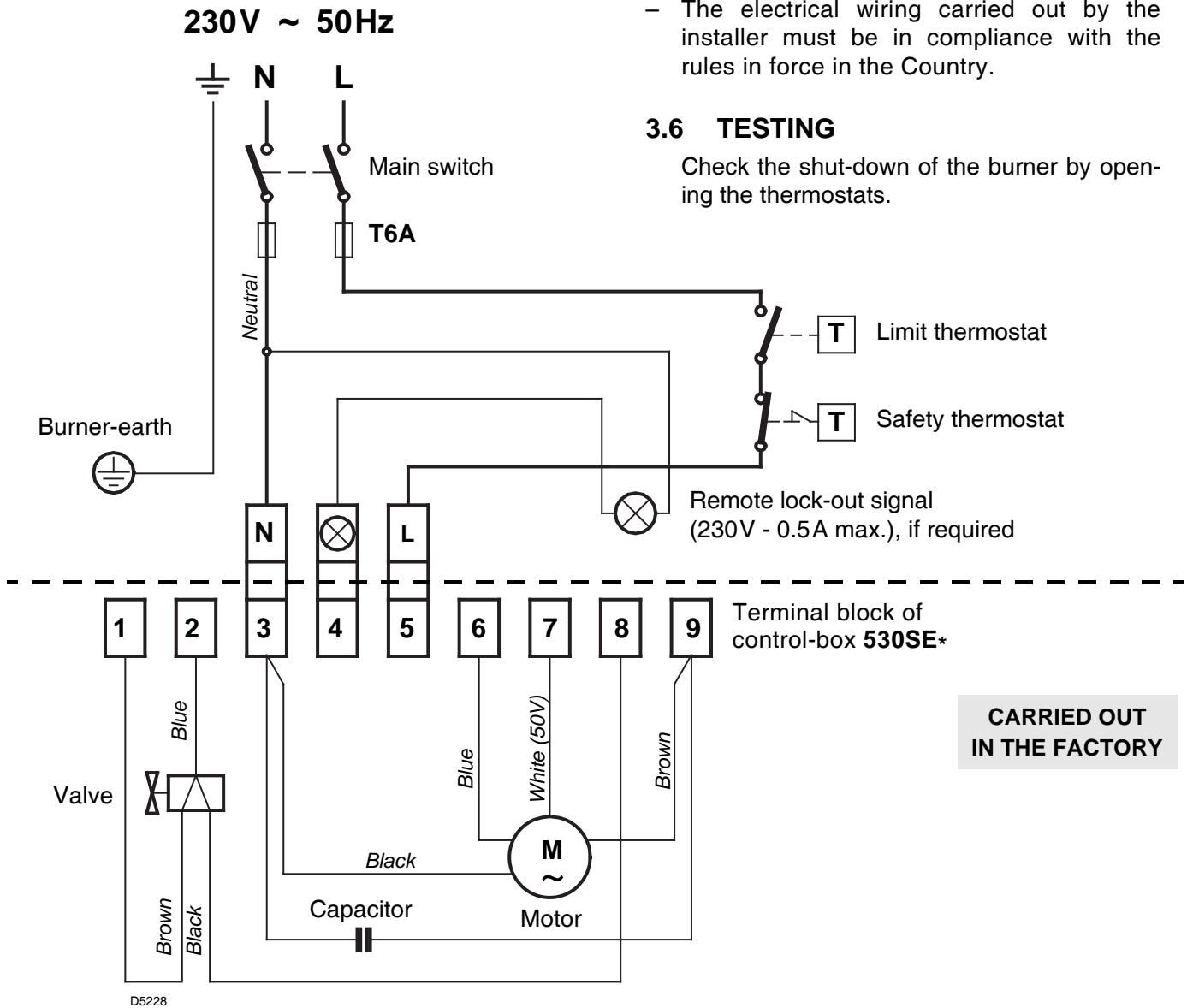
Do not exchange the neutral with the phase.

### 3.5 NOTES

- Wires of min. 1 mm<sup>2</sup> section.  
(Unless requested otherwise by local standards and legislation).
- The electrical wiring carried out by the installer must be in compliance with the rules in force in the Country.

### 3.6 TESTING

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



CARRIED OUT  
IN THE FACTORY

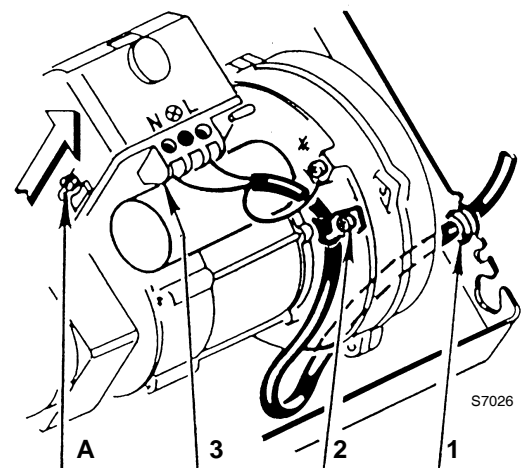
#### CONTROL BOX (see fig. 9)

- To remove the control box from the burner, loosen screw (A) and pull towards the arrow.
- The photoresistance is fitted directly into the control-box (underneath the ignition-transformer) on a plug-in support.

#### 3.4 RUN OF THE ELECTRICAL CABLE

- |                    |                  |
|--------------------|------------------|
| 1 - Cable grommet  | N - Neutral      |
| 2 - Cable clamp    | L - Phase        |
| 3 - Terminal block | ⊕ - Burner-earth |

Fig. 9



## 4. WORKING

### 4.1 COMBUSTION ADJUSTMENT

In conformity with Efficiency Directive 92/42/EEC the application of the burner on the boiler, adjustment and testing must be carried out observing the instruction manual of the boiler, including verification of the CO and CO<sub>2</sub> concentration in the flue gases, their temperatures and the average temperature of the water in the boiler. To suit the required appliance output, fit the proper nozzle, then adjust the pump pressure and the air damper opening in accordance with the following schedule.

The values shown in the table are measured on a CEN boiler (as per EN 267). They refer to 12.5% CO<sub>2</sub> at sea level and with light oil and room temperature of 20 °C.

TYPE	Nozzle		Pump pressure	Burner output	Air damper adjustment
	GPH	Angle	bar	kg/h ± 4%	Set-point
510 T1K	0.50	60°	7	1.40	1.6
	0.50	60°	8	1.50	1.7
	0.60	60°	8	1.79	2.2
	0.65	60°	8	1.94	2.4
	0.75	60°	8	2.20	3.3
510 T3K	0.65	60°	8.5	2.00	2.3
	0.75	60°	8	2.24	2.6
	0.85	60°	8	2.54	3.4
	1.00	60°	8	3.00	8

### 4.2 NOZZLES RECOMMENDED

Monarch type R - NS; Delavan type W - E; Steinen type Q - H; Danfoss type H - S.

### 4.3 PUMP PRESSURE

#### KEROSENE

**8 bar:** pressure suitable for kerosene in most cases.

**10 bar:** maximum pressure for kerosene.

#### LIGHT OIL INCREASE PRESSURE

**12 bar:** pressure suitable for light oil in most cases.

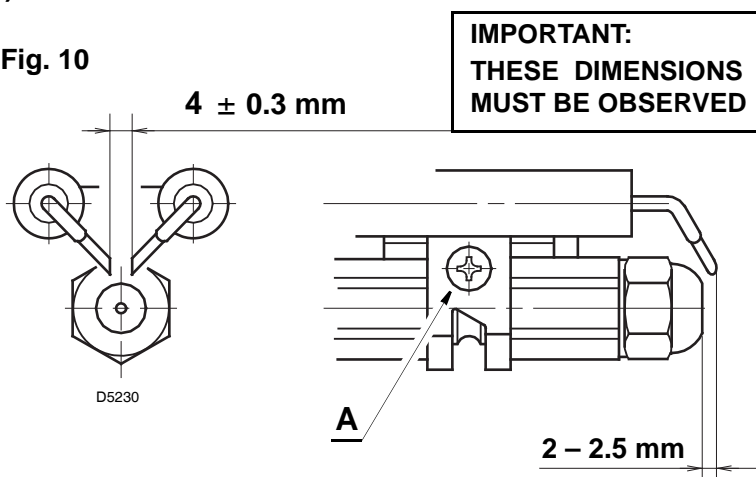
**14 bar:** maximum pressure light oil.

### 4.4 ELECTRODES SETTING, (see fig. 10)

#### ATTENTION

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

Fig. 10







## 5. MAINTENANCE

The burner requires periodic maintenance carried out by a qualified and authorised technician **in conformity with legislation and local standards**.

Maintenance is essential for the reliability of the burner, avoiding the excessive consumption of fuel and consequent pollution.

**Before carrying out any cleaning or control always first switch off the electrical supply to the burner acting on the main switch of the system.**

### THE BASIC CHECKS ARE:

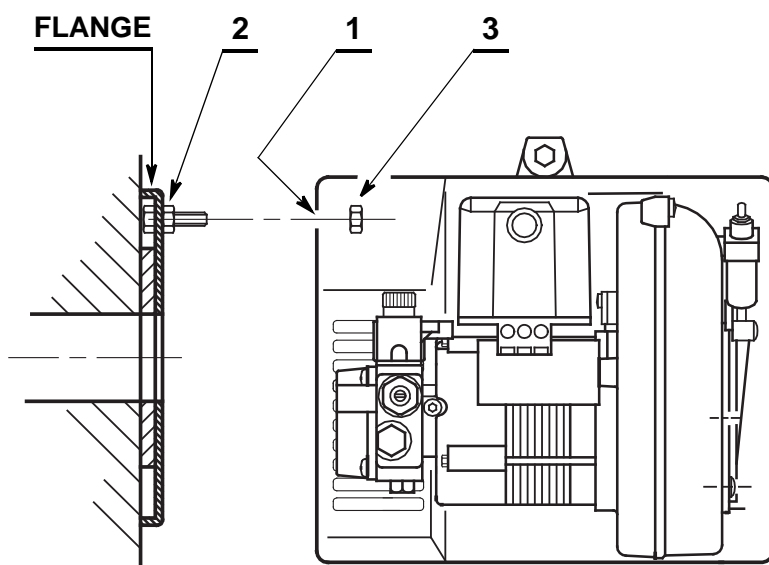
Leave the burner working without interruption for 10 min., checking the right settings of all the components stated in this manual.

Then carry out a combustion check verifying:

- CO<sub>2</sub> (%) content
- Smoke temperature at the chimney
- CO content (ppm).

### 5.1 MAINTENANCE POSITION

Insert in the hole (1) the pin (2) and fix the burner with the nut (3) fitted wrong-side up.



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## 6. FAULTS / SOLUTIONS

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

A fault usually makes the lock-out lamp gas which is situated inside the reset button of the control box (8, fig. 1, page 1).

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

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

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

### WARNING

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



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