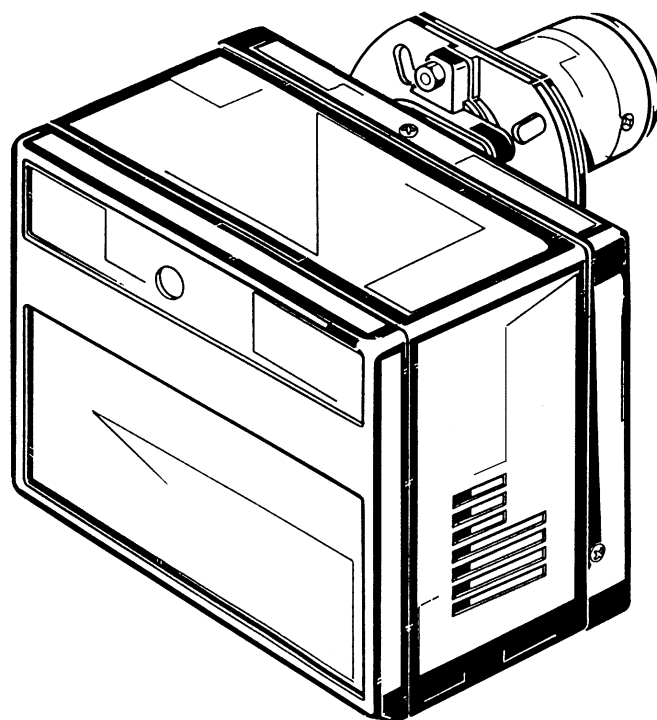


## **GB** Kerosene and light oil burners

One stage operation



# RIELLO 40

CODE	MODEL	TYPE
3745962	G7 FIREBIRD 150K	459T55
3745963	G7 FIREBIRD 150D	459T55



# INDEX

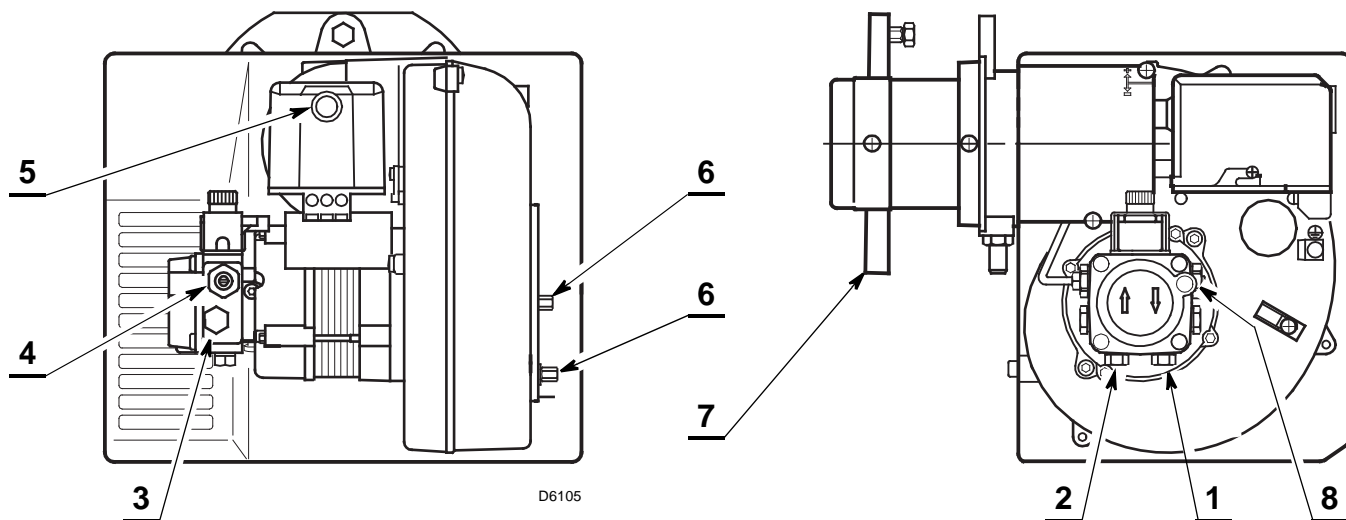
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## 1. BURNER DESCRIPTION

One stage kerosene and light oil burner.

- The burner meets protection level of IP 40, EN 60529.
- Burner with CE marking in conformity with EEC Directives: Machine Directive 2006/42/EC, Low Voltage Directive 2006/95/EC, Electromagnetic Compatibility 2004/108/EC and Efficiency 92/42/EEC.

Fig. 1



- |                             |                                     |
|-----------------------------|-------------------------------------|
| 1 – Return line             | 5 – Reset button with lock-out lamp |
| 2 – Suction line            | 6 – Screws fixing air-damper        |
| 3 – Gauge connection        | 7 – Flange                          |
| 4 – Pump pressure regulator | 8 – Vacuum gauge connection         |

### 1.1 BURNER EQUIPMENT

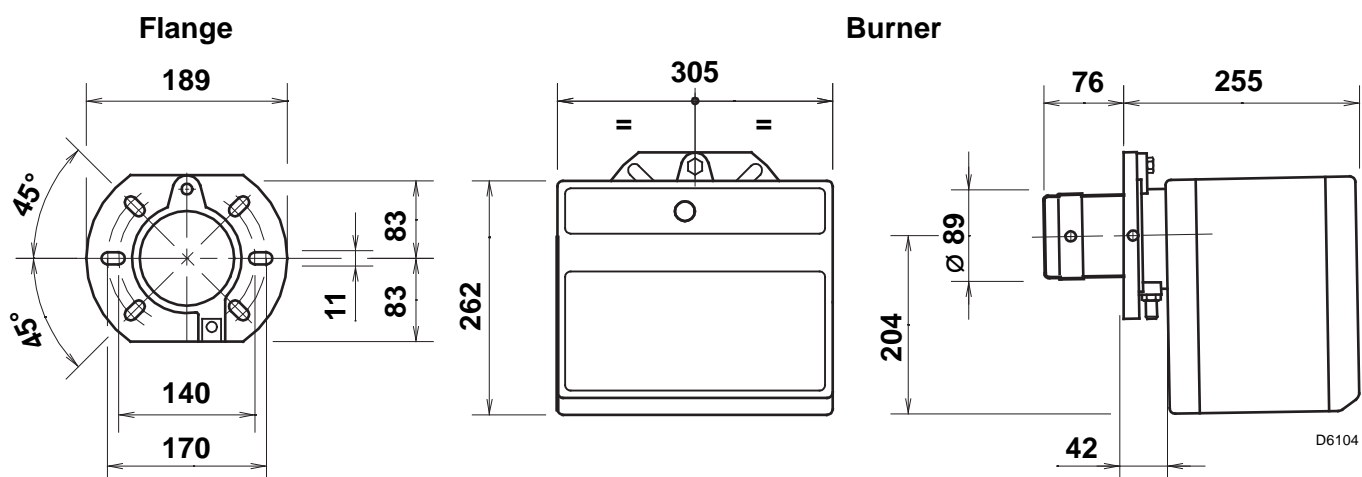
Flange .....	No. 1	Cable grommet .....	No. 1
4 pin plug .....	No. 1	4 pole socket .....	No. 1
Screw with two nuts for flange .....	No. 1	Screw of by-pass pump.....	No. 1

## 2. TECHNICAL DATA

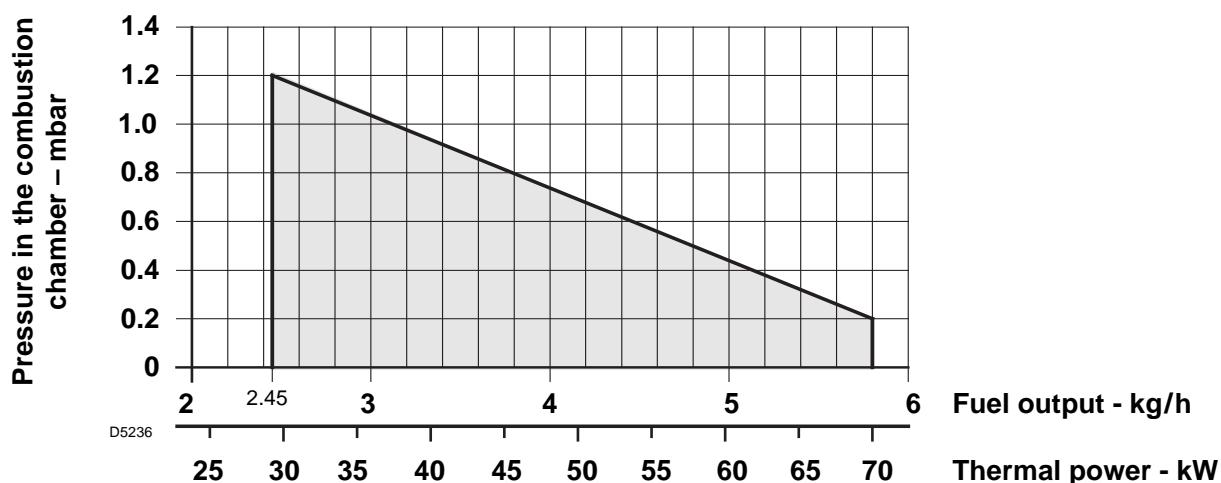
### 2.1 TECHNICAL DATA

TYPE	459 T55
Output - Thermal power	2.45 – 5.8 kg/h – 29.4 – 69 kW
Fuel	Kerosene, viscosity 1.6 – 6 mm <sup>2</sup> /s at 20 °C ( $H_i = 11.97 \text{ kWh/kg}$ ) Light oil, viscosity 4 – 6 mm <sup>2</sup> /s at 20 °C ( $H_i = 11.86 \text{ kWh/kg}$ )
Electrical supply	Single phase, ~ 50Hz 230V ± 10%
Motor	Run current 0.85A – 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	0.16 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

- Put on the flange (1) the screw and two nuts, (see fig. 2).

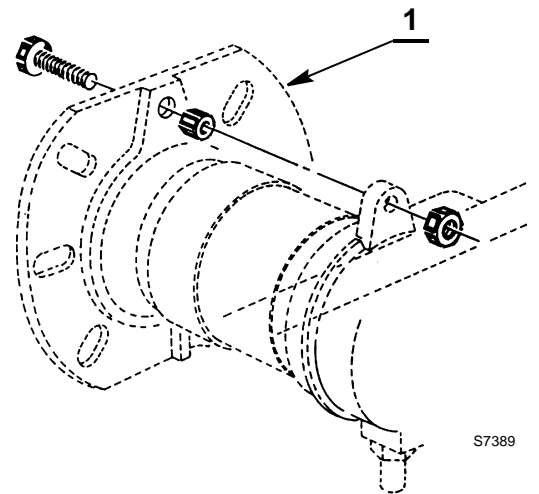


Fig. 2

## 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 micron 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. 3).
- 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.

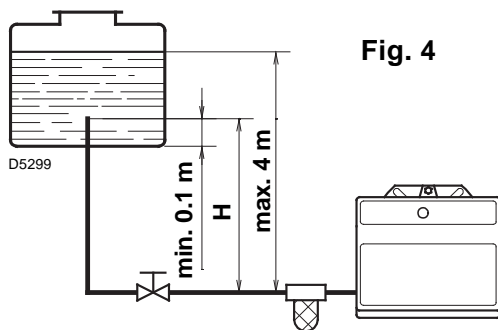
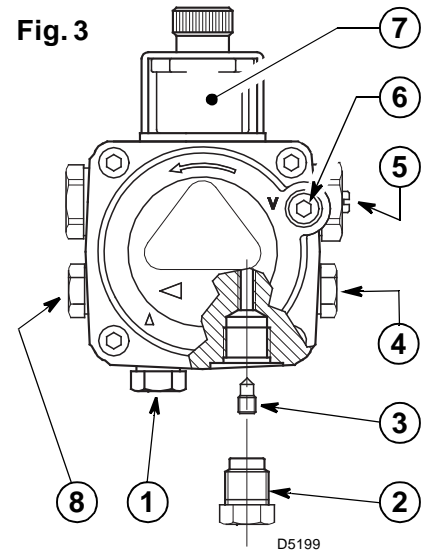


Fig. 4

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. 4 it is sufficient to loosen the suction gauge connection (6, fig. 3) and wait until oil flows out.

On the systems in fig. 5 and 6 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. 6) 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

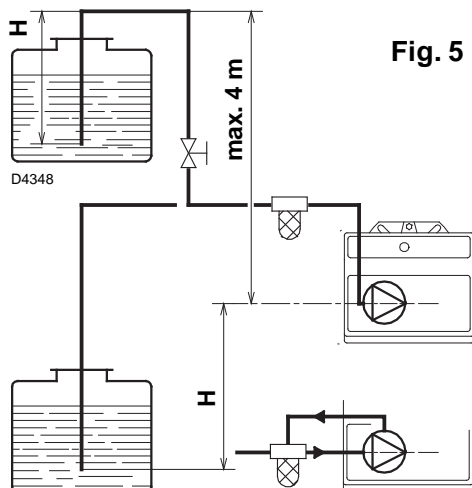


Fig. 5

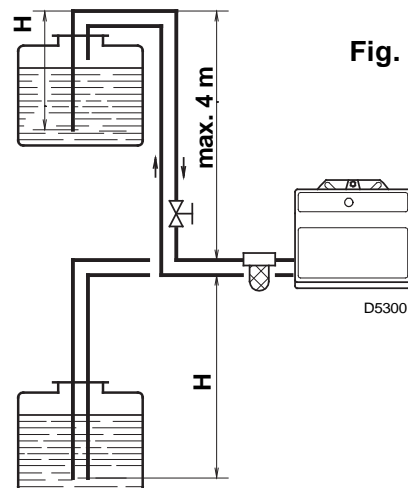


Fig. 6

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.

#### 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.

#### TESTING

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

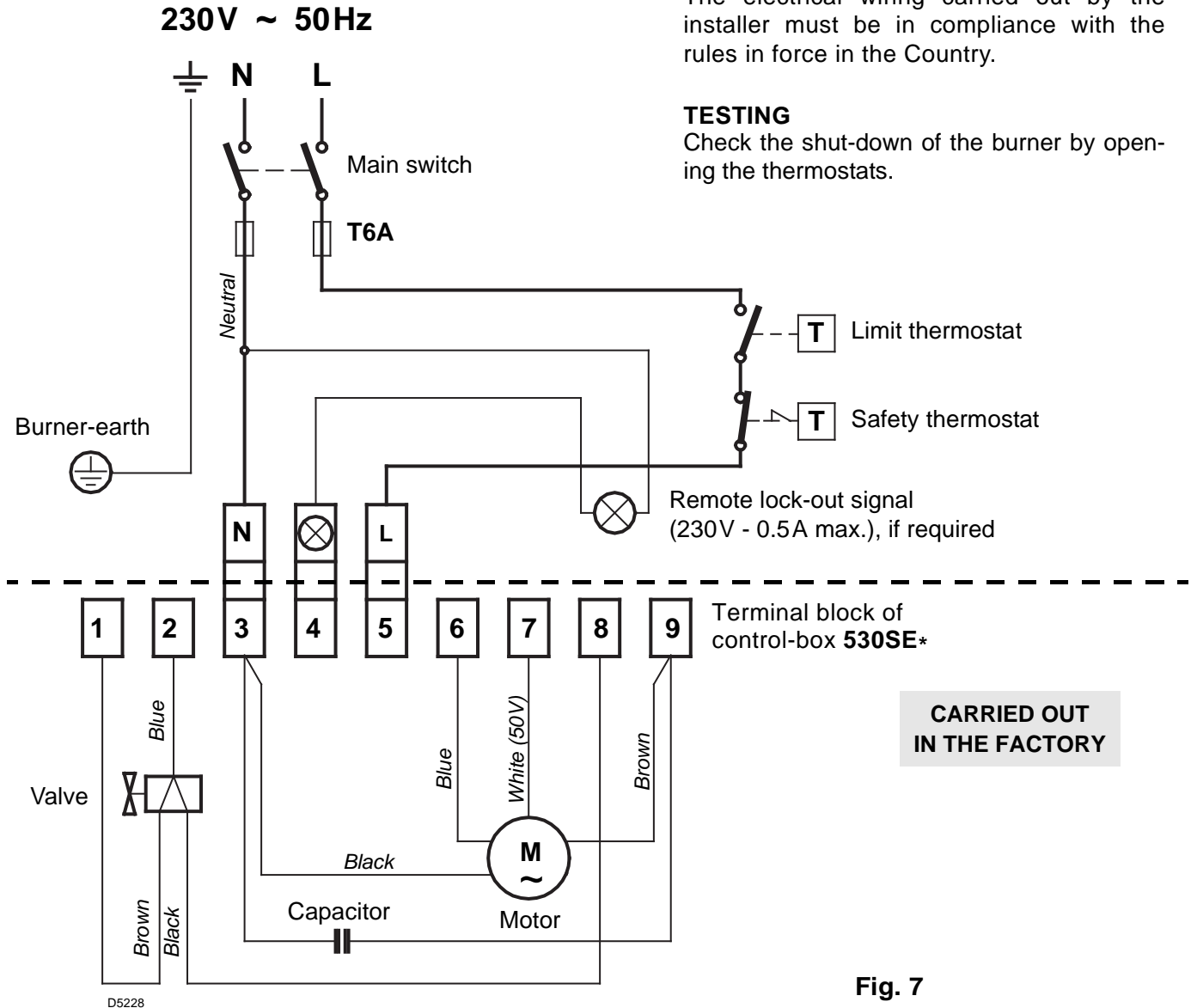


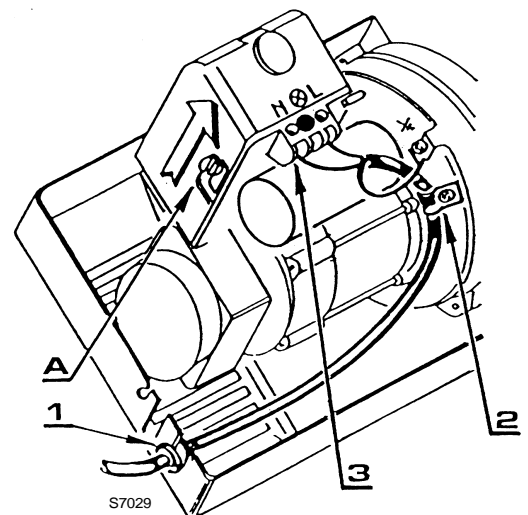
Fig. 7

#### CONTROL BOX (see fig. 7)

- 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.

#### RUN OF THE ELECTRICAL CABLE

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



## 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, choose the proper nozzle and adjust the pump pressure, the setting of the combustion head, 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 fuel and room temperature of 20°C.

FUEL	Nozzle		Pump pressure	Burner output	Combustion head adjustment	Air damper adjustment
	GPH	Angle	bar	kg/h ± 4%	Set-point	Set-point
KEROSENE	0.85	60°	8	2.5	1	1.2
	1.00	60°	8.5	3.0	0	2.6
	1.10	60°	8	3.3	2	1.8
	1.25	60°	7	3.5	1	2.9
	1.25	60°	8	3.7	3	2.2
	1.35	60°	8	4.0	3.5	2.4
	1.50	60°	8	4.4	4.5	2.7
	1.75	60°	8	5.2	6	3.2
LIGHT OIL	2.00	60°	8	5.8	6	4.2
	0.60	60°/80°	12	2.5	1	1.2
	0.65	60°/80°	12	2.8	1.5	1.4
	0.75	60°	12	3.1	2	1.8
	0.85	60°	12	3.6	2.5	2.2
	1.00	60°	12	4.3	3	2.6
	1.10	60°	12	4.7	4	3
	1.25	60°	12	5.3	5	3.5
1.35	60°	12	5.8	6	4.2	

**THE BURNER LEAVES THE FACTORY SET AT THE VALUES HIGHLIGHTED IN THE TABLE**

### 4.2 NOZZLES RECOMMENDED

Monarch type R - NS; Delavan type W - A - E - B; Steinen type Q - H; Danfoss type B - H - S;  
**Danfoss type ES** (only for kerosene).

**Angle:** 60° - In most cases.

80° - In case of flame detachment, during ignitions at low temperatures.

### 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.



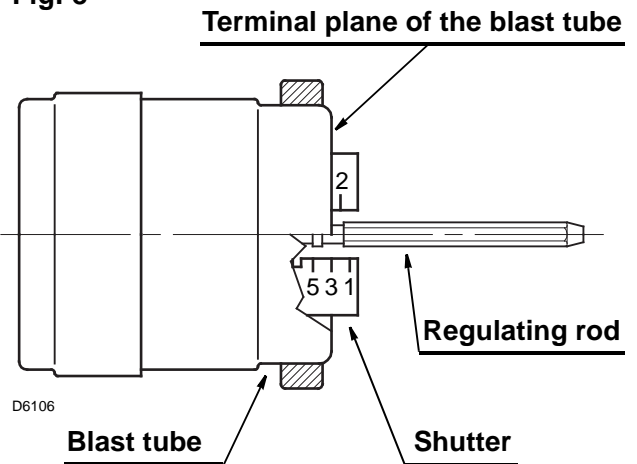
#### 4.4 COMBUSTION HEAD SETTING, (see fig. 8)

This is done when fitting the nozzle, with the blast tube removed. It depends on the output of the burner and is carried out by rotating the regulating rod, till the terminal plane of the blast tube is level with the set-point, as indicated in the table.

In the sketch on the right, the combustion head is set for an output of 1.00 GPH at 12 bar (for light oil) or 1.25 GPH at 8 bar (for kerosene).

The shutter is level with set-point 3, as required by the table at page 6.

Fig. 8



#### 4.5 AIR DAMPER ADJUSTMENT, (see fig. 9)

The regulation of the air-rate is made by adjusting the air damper (1), after loosening the screws (2).

The settings indicated in the schedule 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.

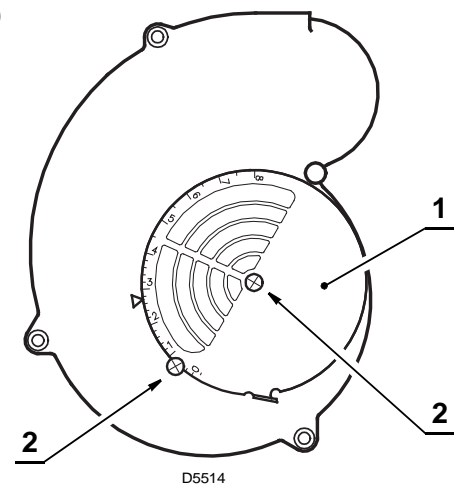
All these conditions may require a different air-damper setting.

**It is important to take account of the fact that the air output of the fan differs according to whether the burner has its metal cover fitted or not.**

**Therefore we recommended to proceed as follows:**

- adjust the air damper as indicated in the table;
- mount the cover, simply by means of the upper screw;
- check smoke number;
- should it become necessary to modify the air output, remove the cover by loosening the screw, adjust the air damper, remount the cover and finally recheck the smoke number.

Fig. 9

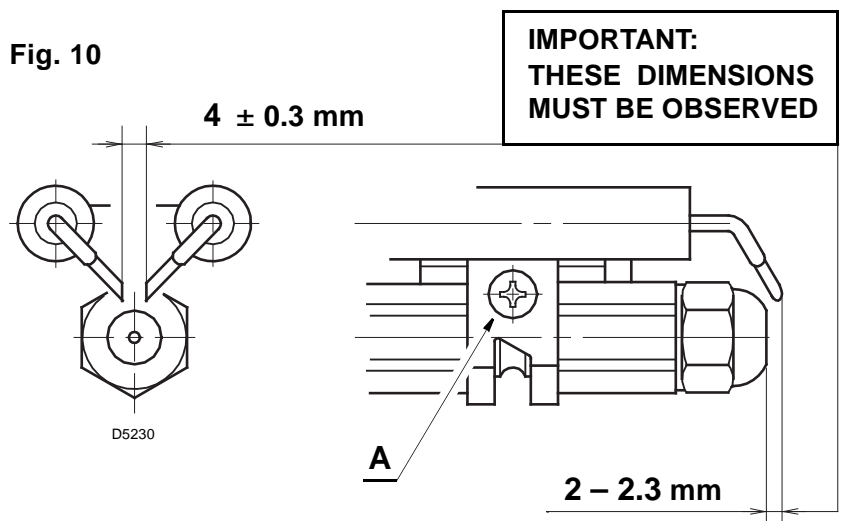


#### 4.6 ELECTRODES SETTING, (see fig. 10)

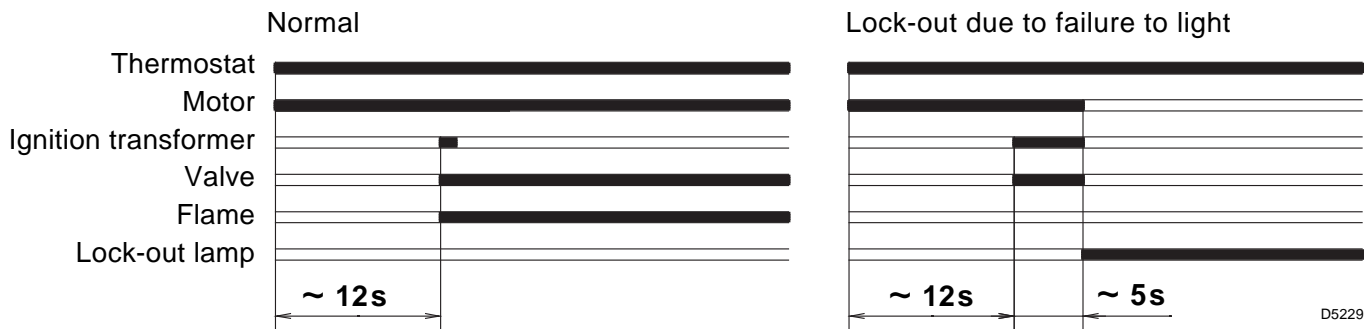
##### ATTENTION

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

Fig. 10



## 4.7 BURNER START-UP CYCLE



## 4.8 ADJUSTMENTS, TO AVOID FLAME - DETACHMENT, AT BURNER IGNITION

### ONLY FOR LIGHT OIL

This inconvenience can occur, when the temperature of the light oil decreases below +8 °C.

#### 1) CORRECT POSITIONING OF THE ELECTRODES

(See fig. 10, at page 7)

#### 2) PUMP - SETTING

When the temperature of the light oil decreases below +8 °C, increase the pressure to 14 bar.

#### 3) COMBUSTION-HEAD SETTING

Regulate the combustion-head one set-point further ahead than indicated in the instructions.

**Example:** *the instructions require to set the combustion-head on set-point 3.  
Instead, the setting is made on set-point 4.*

#### 4) FAN - AIR DAMPER ADJUSTMENT

Adjust the air damper of the fan, such as to obtain a smoke number not inferior to 1.  
(i.e. a combustion with the lowest possible excess-air).

## 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).

## 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 (5, 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.
		Check that safety thermostat is not lock out.
	The connections in the control box are wrongly inserted.	Check and connect completely all the plugs.
<b>Burner works only in the prepurge.</b>	The photoresistance sees false light.	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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