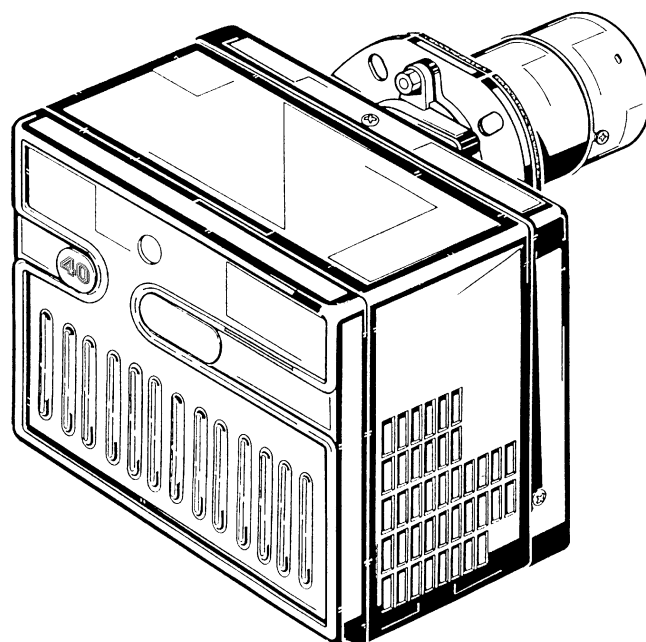


## Light oil - kerosene burner

One stage operation



**RIELLO 40**

CODE	MODEL	TYPE
3747455	G20KI	474T52

## INFORMATION ABOUT THE INSTRUCTION MANUAL

### INTRODUCTION

The instruction manual supplied with the burner:

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

### DELIVERY OF THE SYSTEM AND THE INSTRUCTION MANUAL

When the system is delivered, it is important that:

- The instruction manual is supplied 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 carefully informs the user about:
  - the use of the system,
  - any further tests that may be necessary before the system is started up,
  - maintenance and the need to have the system checked at least once a year by the manufacturer or another specialised technician.

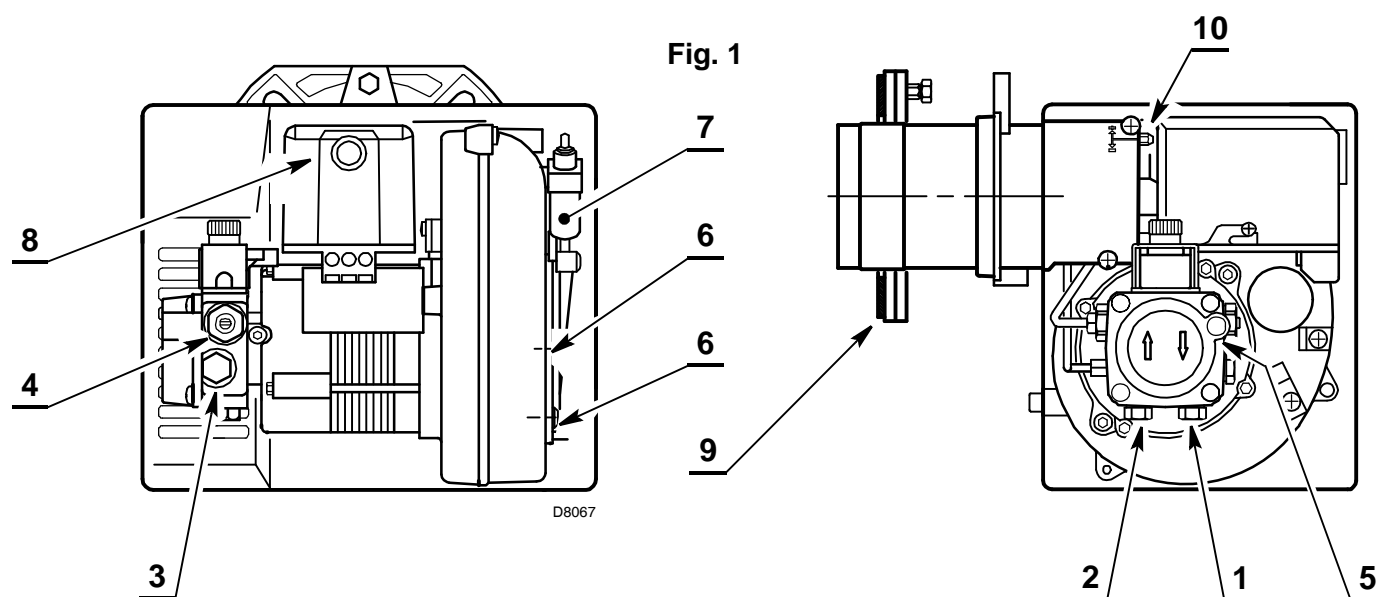
To ensure a periodic check, **RIELLO** recommends the drawing up of a Maintenance Contract.

## TECHNICAL DATA

Thermal power – output	95 – 213 kW – 8 – 18 kg/h
Fuel	Light oil, max. viscosity at 20 °C: 4 ÷ 6 mm <sup>2</sup> /s (H <sub>i</sub> = 11.86 kWh/kg)
	Kerosene, max. viscosity at 20 °C: 1.6 ÷ 6 mm <sup>2</sup> /s (H <sub>i</sub> = 11.97 kWh/kg)
Electrical supply	Single phase, 230V ± 10% ~ 50Hz
Motor	Run current 1.4A – 2750 rpm – 288 rad/s
Capacitor	5 µF
Ignition transformer	Secondary 8 kV – 16 mA
Pump	Maximum pressure 14 bar (203 psi)
Absorbed electrical power	0.320 kW

■ Burner with CE marking in conformity with EEC Directives: Electromagnetic Compatibility 2004/108/EC, Low Voltage 2006/95/EC, Machines 2006/42/EC.

■ 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 – Lock-out lamp and reset button
- 7 – Flange with insulating gasket
- 10 – Combustion head adjustment screw

### 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.

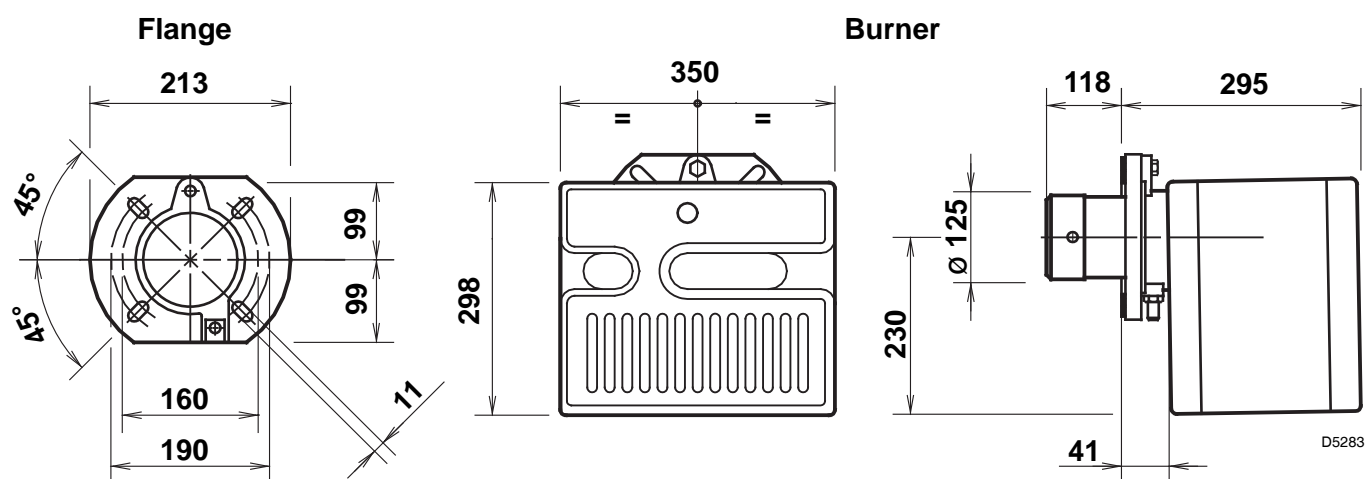
## BURNER EQUIPMENT

Quantity	Description
2	Flexible pipes with nipples
1	Flange with insulating gasket
4	Screws and nuts for flange
1	Maintenance assembly
1	Cable gland
1	Screw with two nuts for flange

## FIRING RATE



## OVERALL DIMENSIONS



## INSTALLATION

### BOILER FIXING

- Put on the flange (1) the screw and two nuts, (see fig. 2).
- Widen, if necessary, the insulating gasket holes (5), (see fig. 3).
- Fix the flange (1) to the boiler door (4) using screws (2) and (if necessary) the nuts (3) **interposing the insulating gasket (5)**, (see fig. 4).

### MAINTENANCE POSITION

**Access to the combustion head, diffuser disc / electrodes unit and nozzle, (see fig. 5).**

- Remove the burner out of the boiler, after loosening the fixing nut to the flange.
- Hook the burner to the flange (1), by removing the combustion head (6) after loosening the fixing screws (7).
- Remove the diffuser disc-holder assembly (9) from the nozzle-holder (8) after loosening its fixing screw.
- Screw the nozzle (10).

Fig. 2

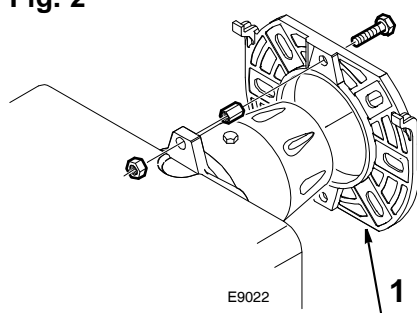


Fig. 3

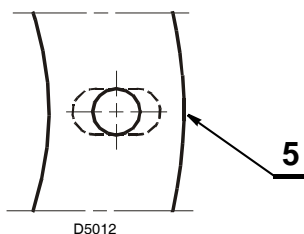


Fig. 4

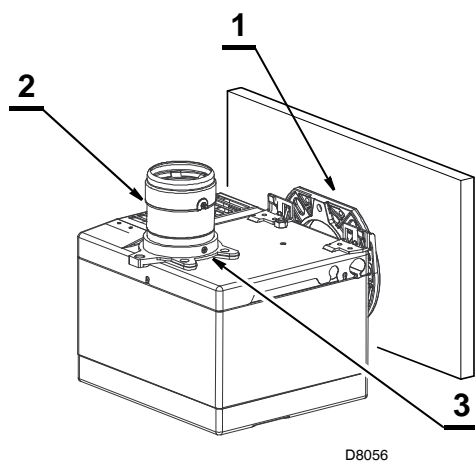
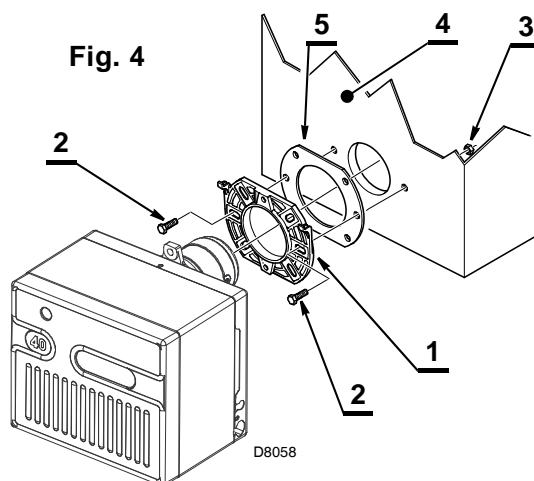
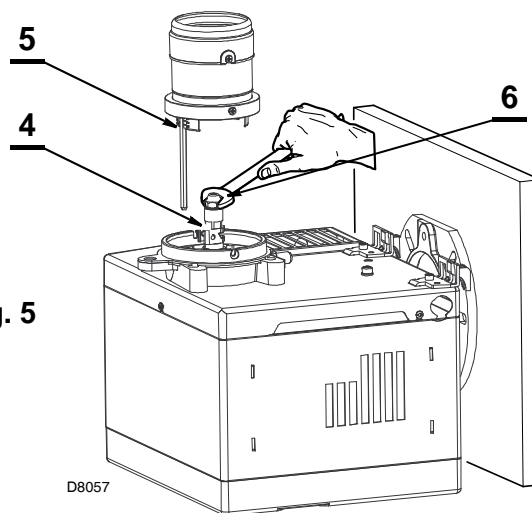


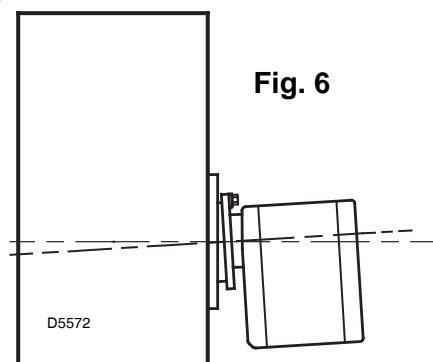
Fig. 5



**Verify that the installed burner is lightly leaned towards the button.**  
(See figure 6).

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

Fig. 6



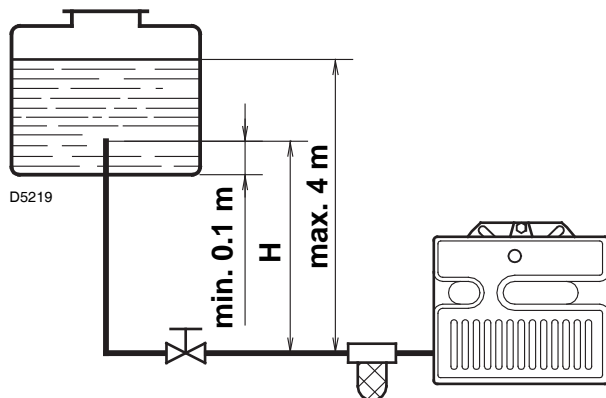
## HYDRAULIC SYSTEM

**WARNING ONLY FOR TWO PIPE SYSTEM:** before starting the burner make sure that the return pipe-line is not clogged: any obstruction would cause the pump seals to break.

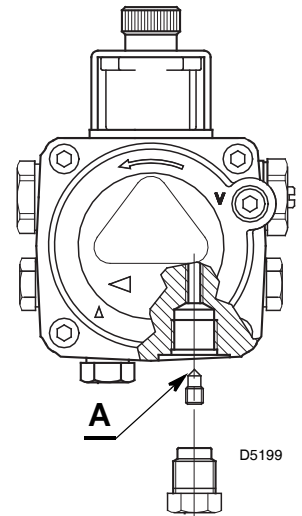
### WARNING:

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

For use on a two pipe system, it is necessary to **screw the by-pass screw (A)**, hang up to the pump.



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



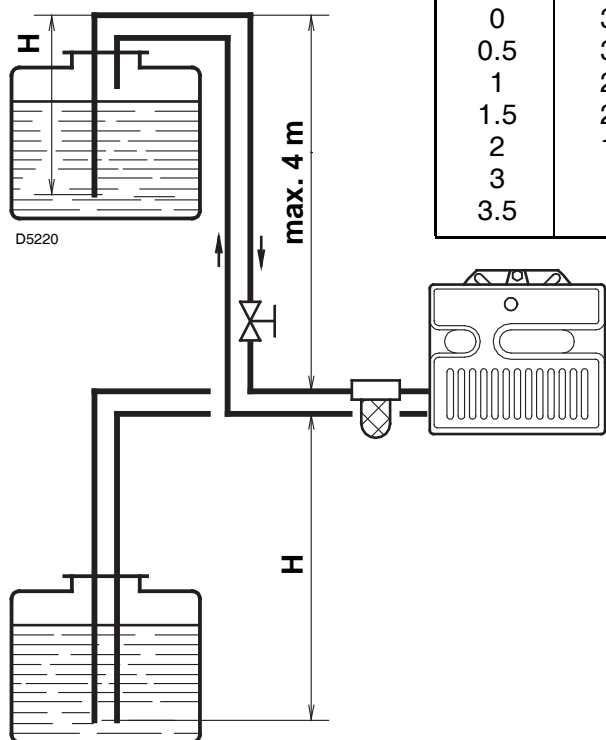
### PRIMING THE PUMP

Loosen the plug of the vacuum gauge (5, fig. 1) and wait until the fuel flows out.

**H** = Difference of level.

**L** = Max. length of the suction line.

**I.D.** = Internal diameter of the oil pipes.



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

The pump vacuum should not exceed a maximum of 0.4 bar (30 cm Hg).

Beyond this limit gas is released from the oil.

**Oil lines must be completely airtight.**

**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.

When the return line arrives over the fuel level, a non-return valve must be used.

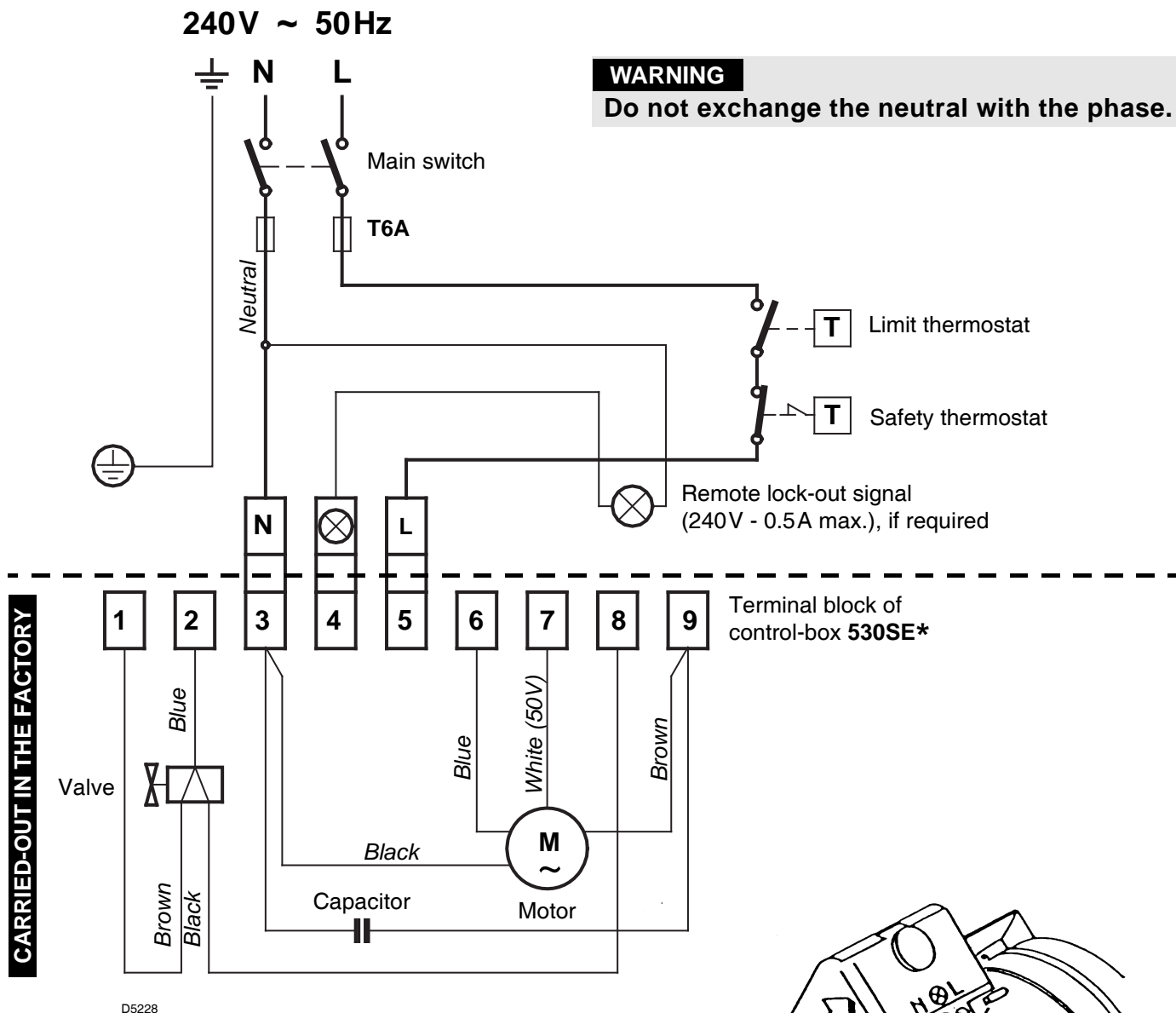
This solution however is less safe than previous one, due to the possibility of leakage of the valve.

### PRIMING THE PUMP:

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.

- ◆ **A metal bowl filter with replaceable micron filter must be fitted in the oil supply pipe.**
- ◆ Check periodically the flexible pipes conditions. Using kerosene, they have to be replaced at least **every 2 years**.

## BURNER ELECTRICAL WIRING

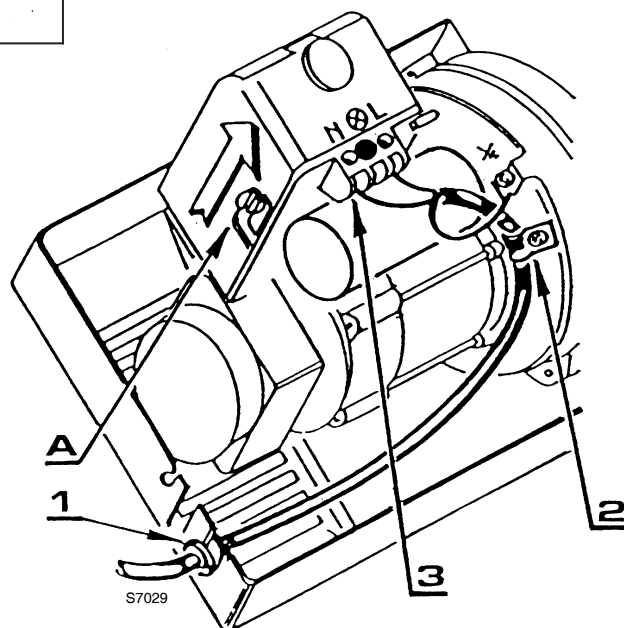


### NOTES

- Wires of 1 mm<sup>2</sup> section.
- The electrical wiring carried out by the installer must be in compliance with the rules in force in the Country.
- **To remove the control-box from the burner, loosen screw (A) (see figure) and pull towards the arrow.**
- The photoresistance is fitted directly into the control-box (underneath the ignition-transformer) on a plug-in support.

### TESTING

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



### RUN OF THE ELECTRICAL CABLE

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

## 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 nozzle then adjust the pump pressure, the setting of the combustion head and the air damper opening in accordance with the following schedule.

### FUEL LIGHT OIL

1		2		3	4
Nozzle		Pump pressure	Burner output	Comb. head adjustment	Air damper adjustment
GPH	Angle	bar	kg/h $\pm$ 4%	Set-point	Set-point
2.00	60°	12	8.6	1	3
2.25	60°	12	9.7	1.5	3.2
2.50	60°	12	10.7	2	3.5
3.00	60°	12	12.9	2.5	4.3
3.50	60°	12	15.0	3.5	5.5
4.00	60°/45°	12	17.2	5	6.5
4.00	60°/45°	13	17.9	6	7

### FUEL KEROSENE

1		2		3	4
Nozzle		Pump pressure	Burner output	Comb. head adjustment	Air damper adjustment
GPH	Angle	bar	kg/h $\pm$ 4%	Set-point	Set-point
2.75	60°	8	8.1	0.5	2.2
3.00	60°	8	8.9	1	2.4
3.50	60°	8	10.3	1.5	3.0
4.00	60°	8	11.8	2.5	3.2
4.50	60°	8	13.3	3	4.0
5.00	60°	8	14.8	3.5	6.0
5.50	60°/45°	8	16.2	5	6.5
6.00	60°/45°	8	17.7	6	7.0

**1 NOZZLES RECOMMENDED:** Monarch type R - PLP; Delavan type B - W  
Steinen type S - SS ; Danfoss type S - B

**Angle 60°:** in most cases.  
Particularly suitable to avoid flame-detachment during ignition.

**45°:** for narrow and long combustion-chamber.

### 2 PRESSURE:

**8 bar:** the pump leaves the factory set at this value, which is suitable only for kerosene.  
**10 bar:** maximum pressure for kerosene.

#### FOR LIGHT OIL INCREASE PRESSURE

**12 bar:** in most cases.

**14 bar:** improves flame retention; it is therefore suitable for ignitions at low temperatures.



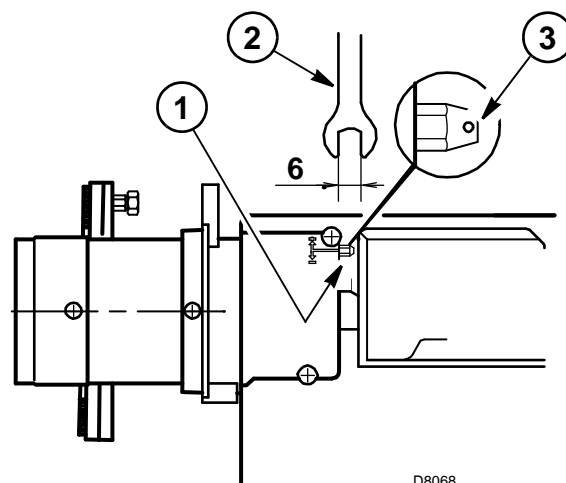
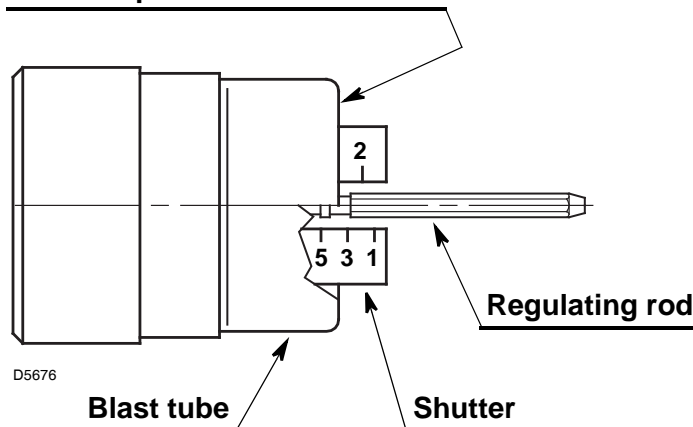
### 3 COMBUSTION HEAD SETTING

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 schedule.

In the sketch below, the combustion head is set for an output of 3.50 GPH at 12 bar (for light oil) or 5.00 GPH at 8 bar (for kerosene).

The shutter is level with set-point **3.5**, as required by the schedule at page 6.

#### Terminal plane of the blast tube



Combustion head settings indicated in the schedule are valid for most cases.

The setting of the fan output according to the installation should normally be done only through the air damper. Should one subsequently want to retouch also the setting of the combustion head, with the burner running, operate on the rod (1) with a 6 mm spanner (2) as follows:

#### TURN TO THE RIGHT: (SIGN +)

In order to increase the volume of air entering the combustion chamber and thus diminishing its pressure.

There is a reduction of CO<sub>2</sub> and the adhesion of the flame to the air diffuser disc improves. (Setting advisable for ignitions at low temperatures).

#### TURN TO THE LEFT: (SIGN -)

In order to reduce the volume of air entering the combustion chamber and thus increasing its pressure. The CO<sub>2</sub> improves and the adhesion of the flame to the diffuser tends to reduce. (This setting is not advisable for ignitions at low temperatures).

In any case do not bring the combustion head setting more than one point away from that indicated in the schedule. One set-point corresponds to 3 turns of the rod; a hole (3) at its end facilitates counting the number of turns.

#### 4 AIR DAMPER ADJUSTMENT:

The mobile air damper (1) operated by the jack (2) assures the complete opening of the air intake.

The regulation of the air-rate is made by adjusting the fixed air damper (3), after loosening the screws (4). When the optimal regulation is reached, **screw tight the screws (4)** to assure a free movement of the mobile air damper (1).

*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.*

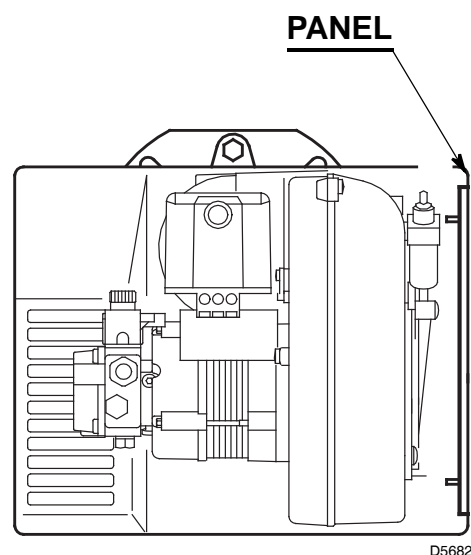
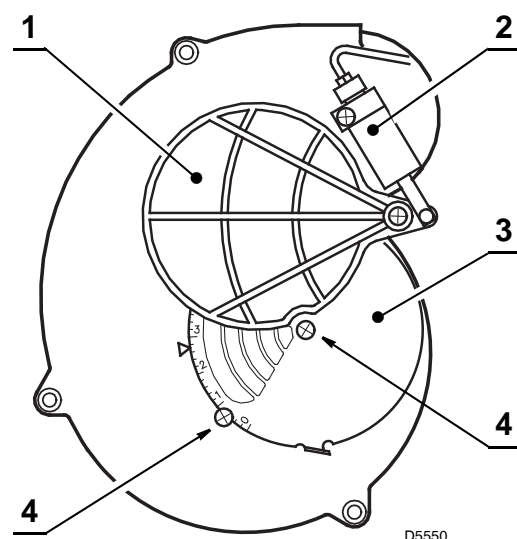
*Each installation however, has its own unpredictable working conditions: actual nozzle output; positive or negative pressure in the combustion-chamber, the need of excess air, etc. All these conditions may require a different air-damper setting.*

**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 schedule (4);
- 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.

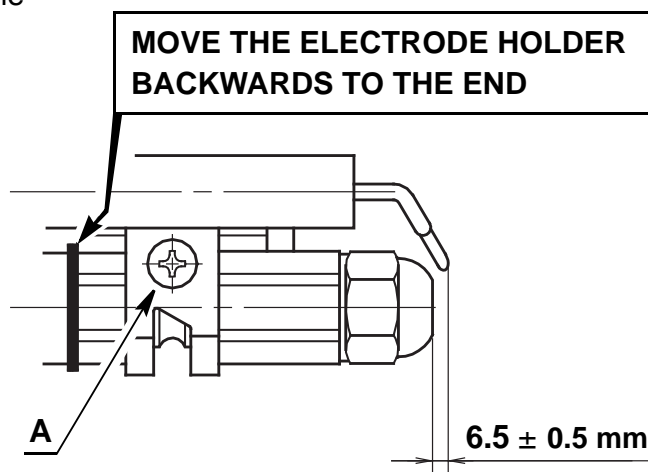
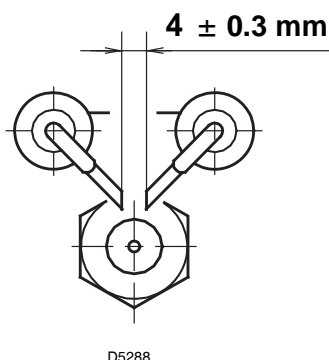
**NOTE:** When the burner works at a firing rate higher than 17 kg/h remove the panel fitted inside the metal cover (see figure).



#### ELECTRODE SETTING

##### Attention:

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



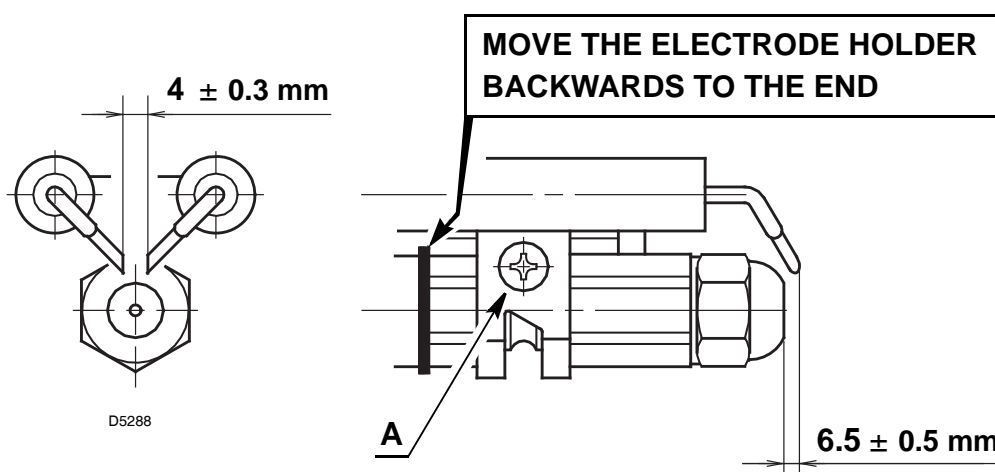
## START-UP CYCLE



### ONLY FOR LIGHT OIL

## ADJUSTMENTS TO AVOID FLAME DETACHMENT AT BURNER IGNITION

### 1) CORRECT POSITIONING OF THE ELECTRODES



### 2) NOZZLE: ATOMIZING ANGLE: Choose $60^\circ$ nozzle.

### 3) PUMP - SETTING

When the temperature of the light oil decreases below  $+5^\circ \text{C}$ , increase the pressure to 14 bar.

### 4) 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 2.5.  
Instead, the setting is made on set-point 3.5.

### 5) FAN - AIR DAMPER ADJUSTMENT

Adjust the damper, reducing the excess air until the Bacharach number is not near 1 (i.e. a combustion with the lowest possible excess-air).

---

The logo consists of the word "RIELLO" in a bold, red, sans-serif typeface.

RIELLO S.p.A.  
I-37045 Legnago (VR)  
Tel.: +39.0442.630111  
[http:// www.riello.it](http://www.riello.it)  
[http:// www.rielloburners.com](http://www.rielloburners.com)