

## Dual fuel Gas-Oil/Gas burner

MODEL	TYPE
GI/EMME 300	495 T80

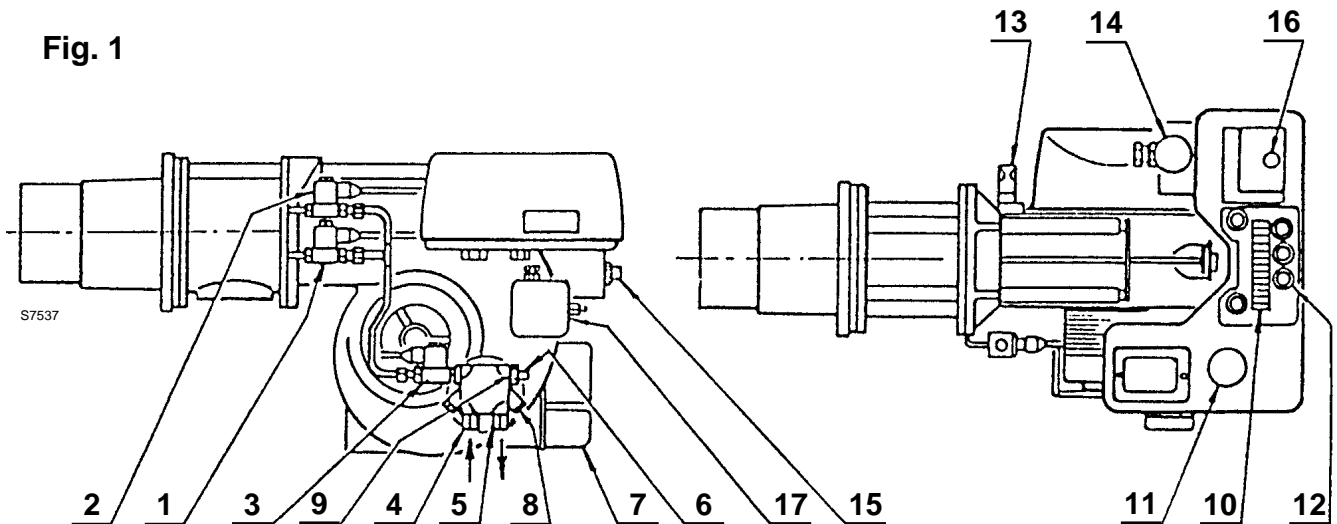


## TECHNICAL FEATURES

Thermal power	107/175 ÷ 340 kW - 92.000/150.000 ÷ 292.000 kcal/h
Fuels	Oil, max. viscosity at 20°C: 6mm <sup>2</sup> /s (1.5°E) natural gas with Pci 8600 kcal/m <sup>3</sup> Lpg with Pci 22.200 kcal/m <sup>3</sup>
Minimum gas pressure (measured at the test-point)	Maximum capacity requires 9.6 mbar with natural gas, 11.8 mbar with LPG. Combustion chamber at 0 mbar.
Maximum gas pressure	150 mbar
Electrical supply	Single-phase 220 V +10% -15% 60 Hz
Fan-capacitor motor	1.85A / 220 V - 6.3 µF
Pump-capacitor motor	1A / 220 V - 6.3 µF
Ignition transformer	Primary: 1.8A / 220 V - Secondary: 30 mA / 1x8 kV
Pump	Output 50 kg/h at 12 bar - max pressure 15 bar
Operation	Two stage: gas or oil

The burner conforms to IP 40 level of insulation as per CEI/70.1

Fig. 1



### KEY TO LAY-OUT

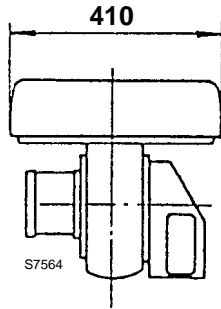
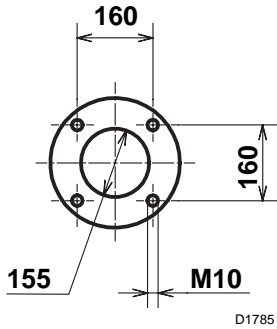
- 1 - Oil valve 1°
- 2 - Oil valve 2°
- 3 - Safety oil valve
- 4 - Oil supply port
- 5 - Oil return port
- 6 - Pressure regulator at the pump
- 7 - Air damper motor
- 8 - Pressure gauge port (G 1/8)
- 9 - Vacuum gauge port (G 1/8)
- 10 - Terminal board
- 11 - Fan motor capacitor
- 12 - Cable gland
- 13 - UV photocell
- 14 - Oil motor capacitor
- 15 - Oil-gas selector switch
- 16 - Control-box reset button
- 17 - Air pressure-switch

### EQUIPMENT

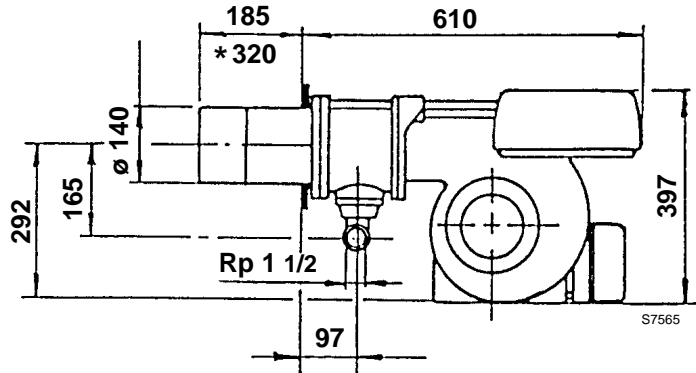
Quantity	Burner accessories
1	Gas-train's gasket
8	Screws
1	Insulating screen
3	Seal
2	Oil hoses
4	Connectors
4	Gaskets
1	Lpg transf. kit
2	Oil nozzles
1	Flange

## DIMENSIONS

Boiler front-plate drilling



Burner

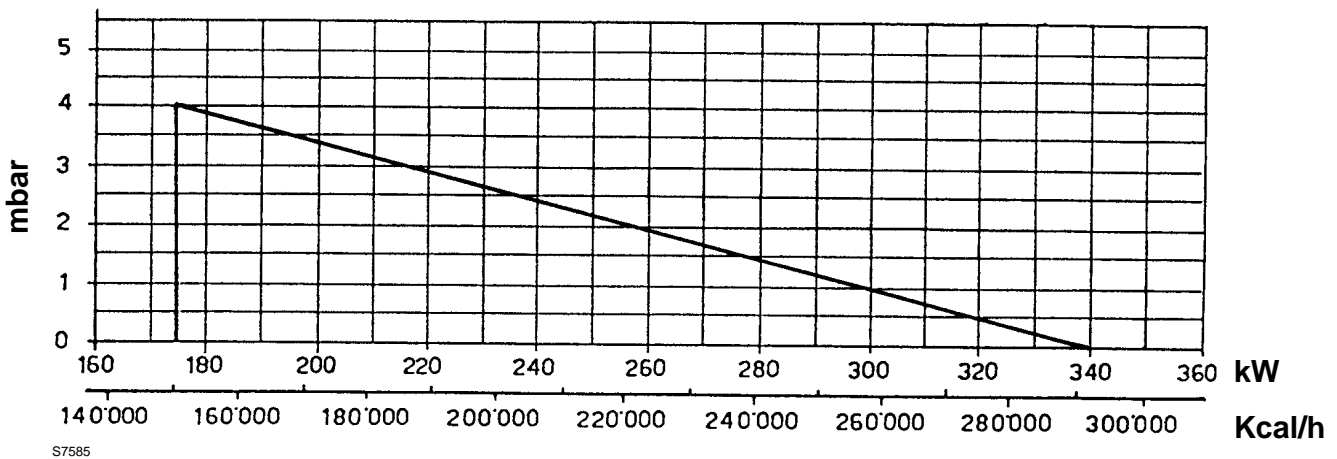


\* Extension that you can obtain with special extended head (to be requested separately).

## WORKING RANGE

### PRESSURE IN THE COMBUSTION CHAMBER - 2<sup>nd</sup> STAGE OUTPUT

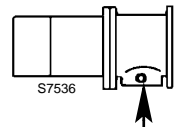
Min output at 1<sup>st</sup> stage 107kW - 9Kg/h



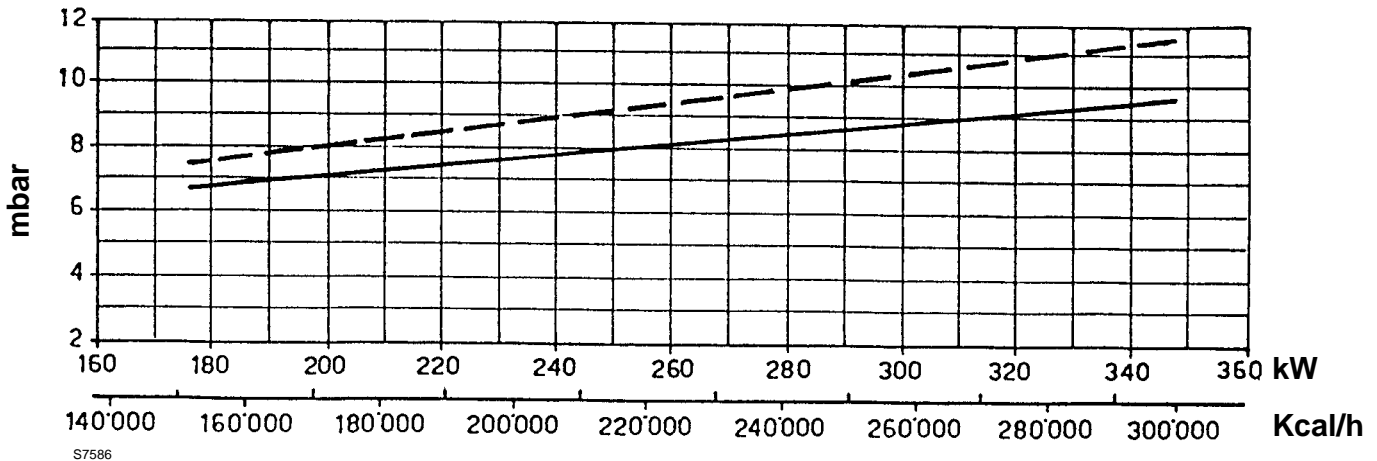
### MINIMUM GAS PRESSURE - 2<sup>nd</sup> STAGE OUTPUT

Pressure: measured at the test point with combustion chamber at 0 mbar.

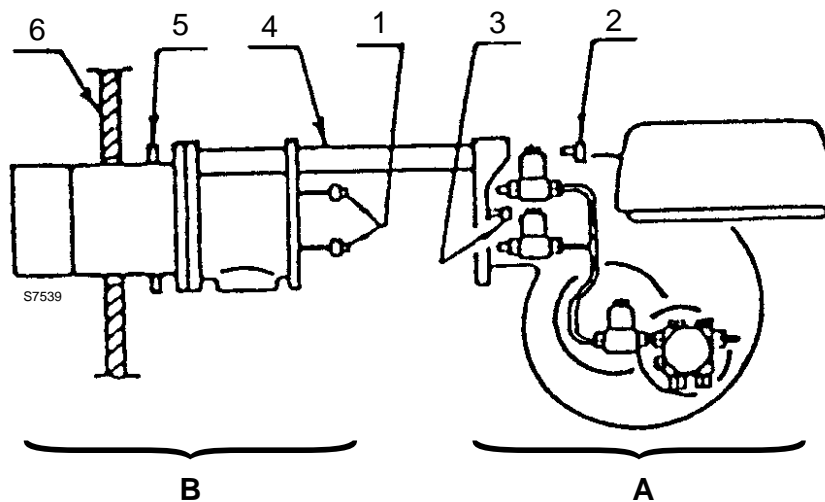
— Natural gas  
 - - - LPG



Gas pressure test point



## FIXING TO THE BOILER



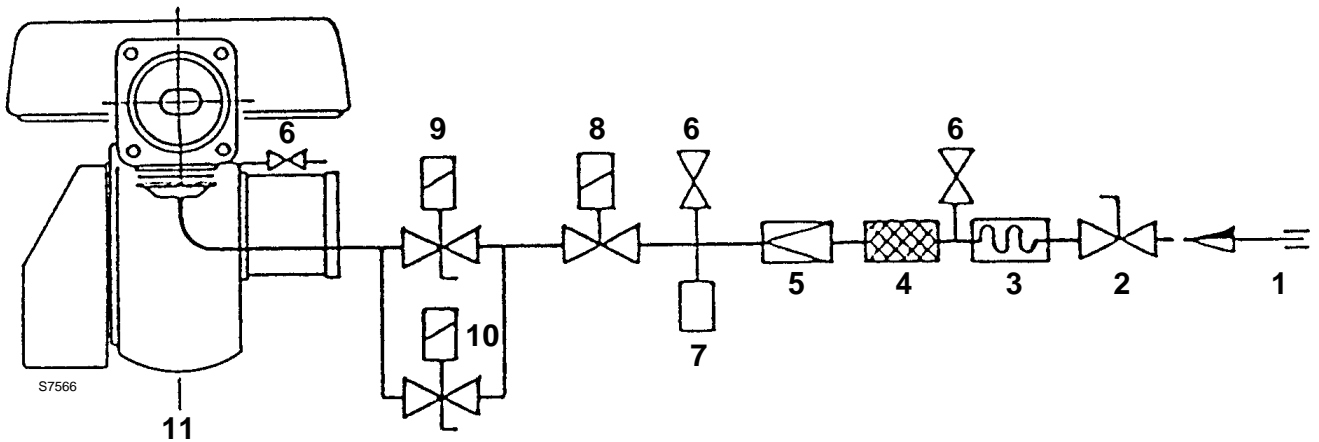
In order to divide the combustion head from the rest of the burner, you have to:

- remove the connection (1) from the two valves;
- remove the 4 screws (2 - 3);
- slide the burner body (A) along the rails (4);
- mount the group (B) to the boiler's plate (6) interposing gasket (5).

Mount the group (A) to the boiler front.

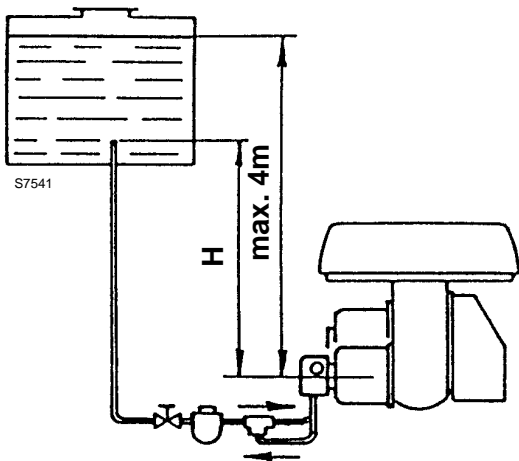
Fit the nozzles and regulate the combustion head (as specified below).

## GAS SUPPLY LINE

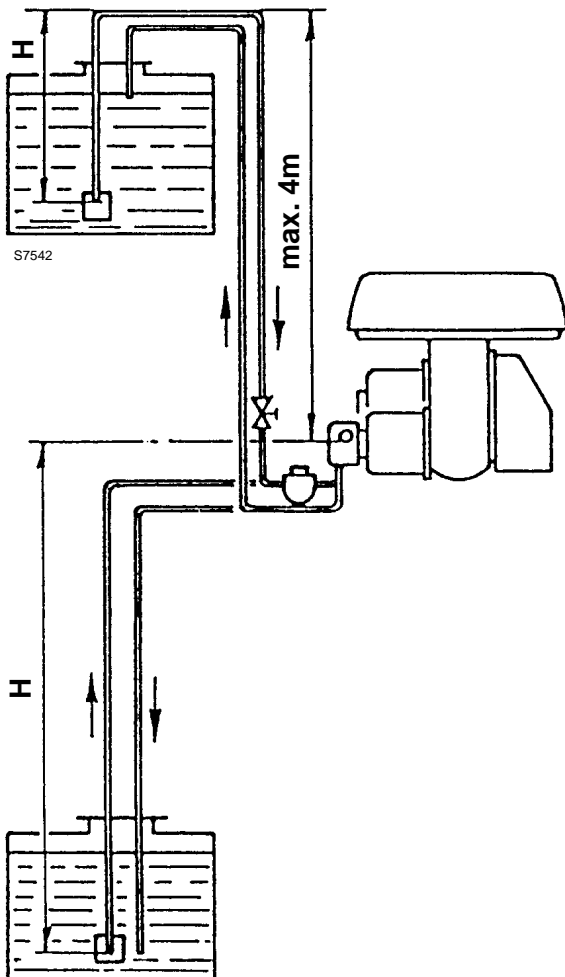


- |                         |                                  |
|-------------------------|----------------------------------|
| 1 - Gas supply pipe     | 7 - Min. gas pressure switch     |
| 2 - Manual valve        | 8 - Gas safety shut off valve    |
| 3 - Isolator joint      | 9 - 1° stage gas shut off valve  |
| 4 - Filter              | 10 - 2° stage gas shut off valve |
| 5 - Pressure governor   | 11 - Burner                      |
| 6 - Pressure test-point |                                  |

# OIL SUPPLY



H m	L m	
	Øi 8	Øi 10
0.5	5	10
1	10	20
1.5	15	30
2	20	40



H m	L m	
	Øi 8	Øi 10
0	32	70
0.5	28	62
1	24	55
1.5	20	48
2	16	40
3	7	25
3.5	-	10

**Please note:**

all oil lines must be airtight.

We suggest copper-piping. Level as the suction pipe, then a none return valve is not required and the section-pipe can be disconnected without causing any problems.

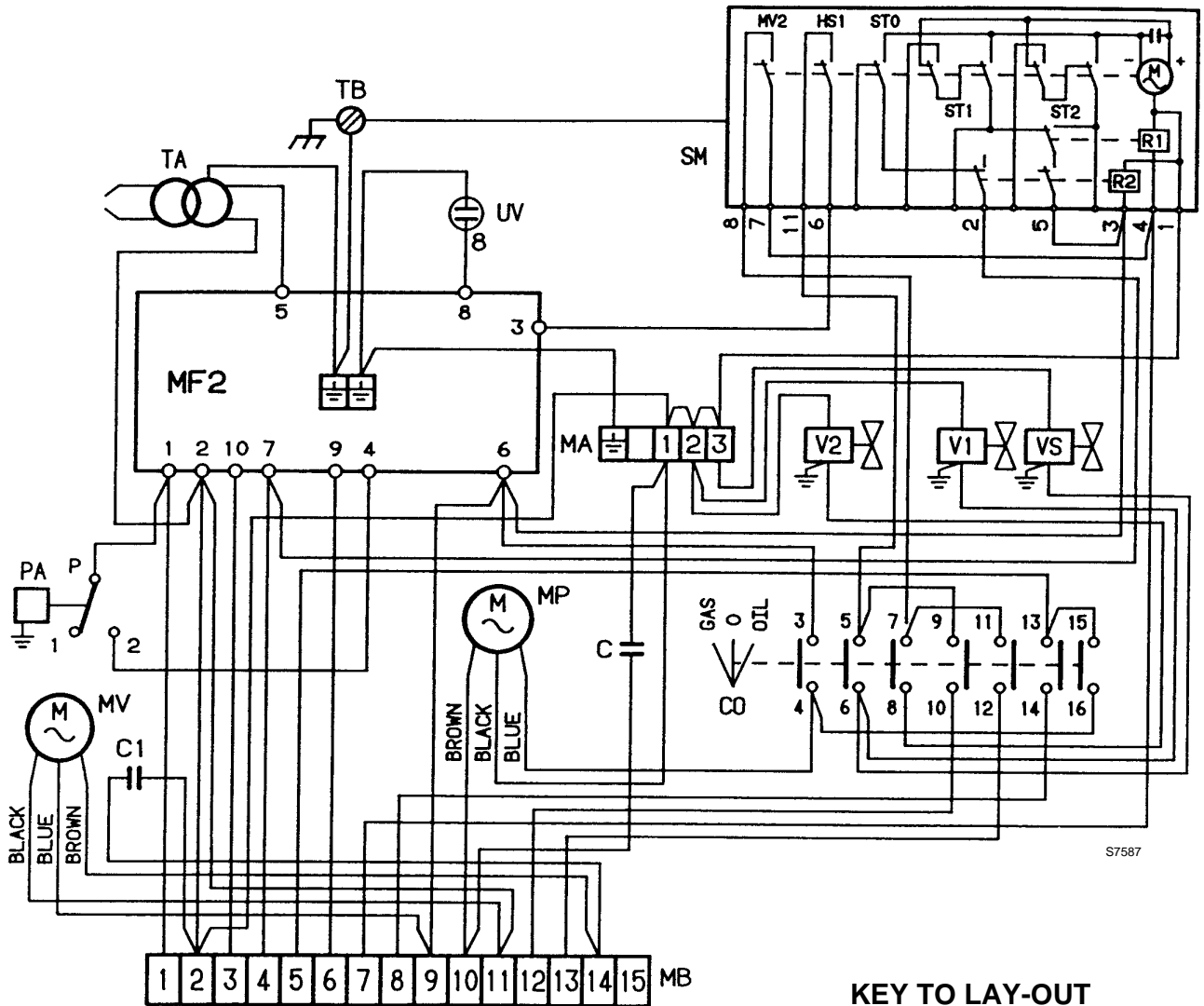
**H** = Margin;

**L** = Inlet-pipe's length, including the vertical line.

The copper pipes with diameter 8 and 10, shown in the schemes, can be replaced with 1/4 and 3/8 steel pipes, commercial gas without welding.

# BURNER ELECTRICAL WIRING

(carried out in the factory)



## SELECTOR SWITCH

	OIL O GAS	
3 - 4	X	
5 - 6	X	
7 - 8	X	
9 - 10		X
11 - 12		X
13 - 14		X
15 - 16	X	

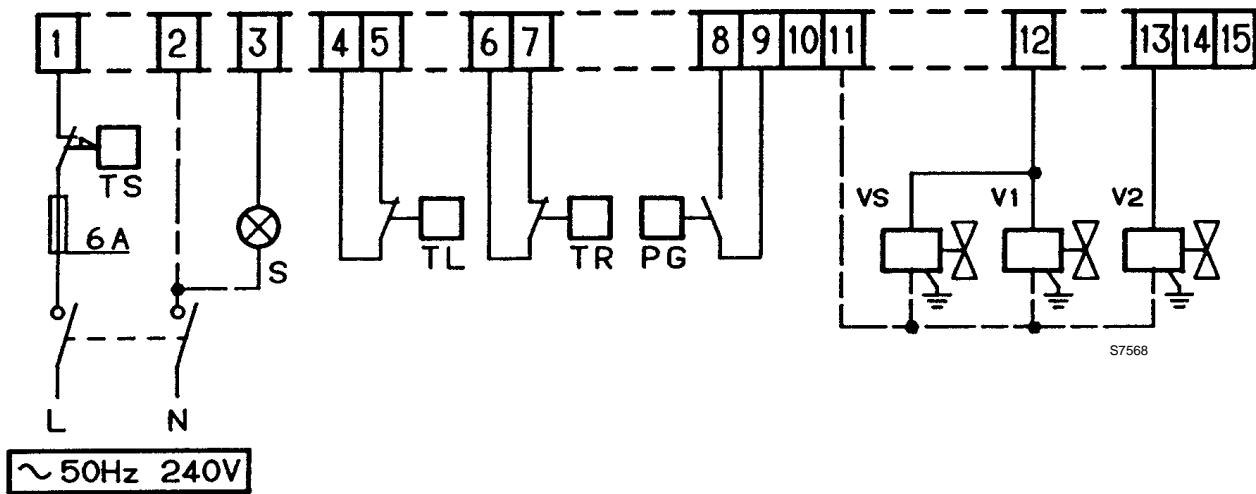
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## KEY TO LAY-OUT

- C: Pump motor capacitor
- C1: Fan motor capacitor
- CO: Selector switch
- MA: Auxiliary terminal strip
- MB: Burner terminal strip
- MP: Pump motor
- MV: Fan motor
- PA: Air pressure switch
- SM: Servo-motor
- TA: Ignition transformer
- TB: Burner earth
- UV: Probe U.V.
- V1: 1° stage valve
- V2: 2° stage valve
- VS: Oil safety valve

# ELECTRICAL CONNECTIONS TO THE WIRING TERMINAL BLOCK

(to be carried out by the installer)



## KEY TO LAYOUT

**MB** - Burner terminal strip

**TS** - Safety remote control system

**TL** - Limit control system

**TR** - 2° stage remote control system

**PG** - Min. gas pressure switch

**V1** - 1° stage gas shut off valve

**V2** - 2° stage gas shut off valve

**VS** - Gas safety shut off valve

**S** - Remote lock signal

## NOTICE

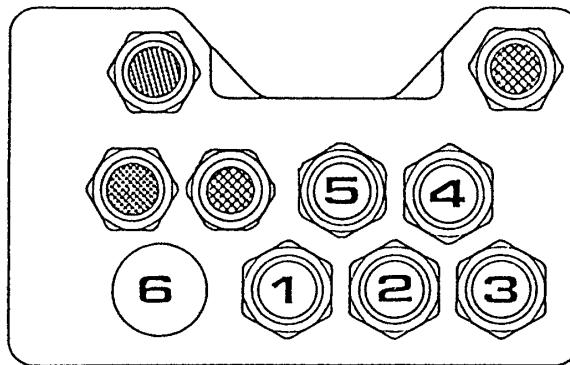
- The electric wiring carried out by the installer must be in compliance with the rules in force in the country.
- Leads minimal section 1.5 mm<sup>2</sup>.
- Burners with non-stop operation: for safety reasons, this type of burner must be stopped every 24 hours of operation, by means of an hours-counter to be connected in series with the adjustment devices.
- The flame modulation is obtainable through the 2° stage remote control system (TR). Connected to the terminals 6-7.



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## FIXING OF THE ELECTRICAL WIRES

All the electrical wires, which are to be connected into the terminal rail 10 (fig. 1) should pass through the cable glands hubs 12 (fig. 1), accordingly the scheme below.



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1 - Single phase supply	: gland Pg 13.5
2 - Regulation thermostat	: gland Pg 13.5
3 - Safety thermostat	: gland Pg 13.5
4 - GAS TRAIN	: gland Pg 13.5 - for sheath $\varnothing$ 13
5 - 2° stage thermostat	: gland Pg 13.5
6 - Precut hole	

Further starts or controls can be connected into the terminal rail of the burner, taking out the metal buttons from the precut holes and inserting a cable gland for the passage and extra cables.

To guarantee the IP 40 protection level, in accordance to CEI 70.1, seal the glands that are not used.

### NOTES

- Do not exchange "Neutral" with "Phase" (avoid a plug/socket connection).
- Make a good earth connection.

Verify that the burner will lockout by firing the burner and obscuring the UV cell.

### ATTENTION

When you close the burner on the two guide rail, all the slack should be pulled out the high voltage-cable.

This burner is in accordance to the CEE law n.76/889, D.M. 9/10/1980, for protection against radio-noises.

## COMBUSTION HEAD ADJUSTMENT

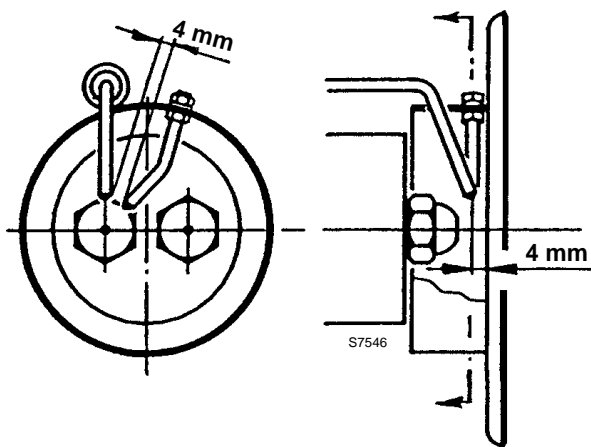
Adjustments can be made to the burner, when it is still open for installation (see page 3, fixing to the boiler).

### NOZZLE'S CHOICE

Spray angle:

- usually, 60°
- for narrow combustion chambers: 45°

#### Position of the ignition electrodes



Pump pressure	Nozzle				
	1°		2°		1°+2° kg/h
bar	GPH	kg/h	GPH	kg/h	
10	2.25	8.7	1.75	6.7	15.4
12	2.25	9.6	1.75	7.4	17.0
10	2.25	8.7	2.00	7.7	16.4
12	2.25	9.6	2.00	8.5	18.1
10	2.25	8.7	2.25	8.7	17.4
12	2.25	9.6	2.25	9.6	19.2
10	2.50	9.6	2.50	9.6	19.2
12	2.50	10.6	2.50	10.6	21.2
10	3.00	11.6	3.00	11.6	23.2
12	3.00	12.8	3.00	12.8	25.6
10	3.50	13.5	3.50	13.5	27.0
12	3.50	14.9	3.50	14.9	29.8
10	4.00	15.4	4.00	15.4	30.8

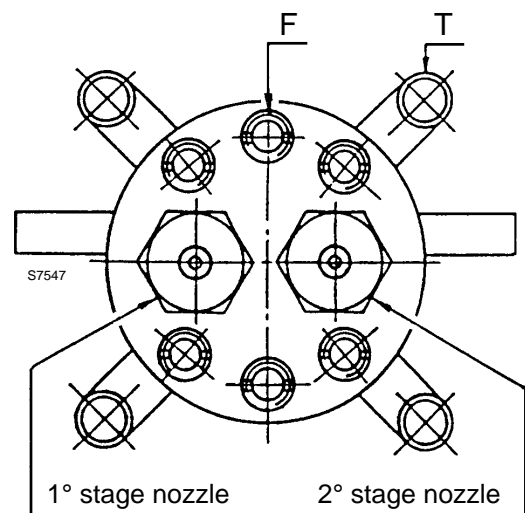
### SETTING OF GAS DISTRIBUTOR

The burner leaves the factory set for burning natural gas (see the drawing on the right):

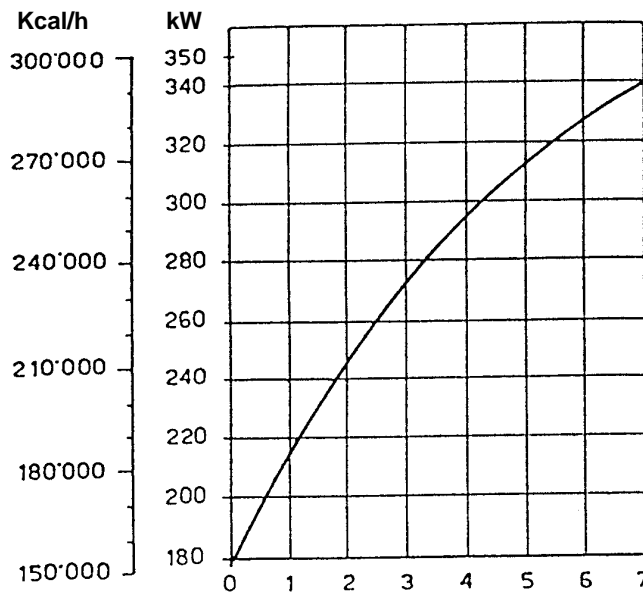
- Each hole (F) and each pipe (T) completely opened.
- For operation up to 200.000 kcal/h, close the NR. 1-2-3 and 4 holes (F) by means of 4 nozzles supplied together with the lpg - kit.

**To burn LPG fit the kit as detailed below:**

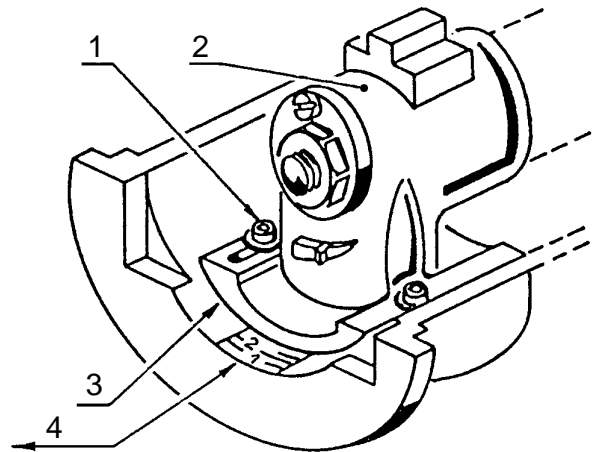
- Fit 6 nozzles with  $\varnothing$  5 mm on outlets to holes (F).



Loosen the two screws (1), move the elbow (2) so that the rear part (3) coincides to the desired set-point (4). Tighten the screws (1).



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## ADJUSTMENT OF THE AIR DAMPER MOTOR

### STOP - Blue lever

This lever leaves the factory vertically positioned and corresponds to the complete closing of the air damper.

A partial opening of the air damper might be obtained by moving leftwards this lever (+ on the label).

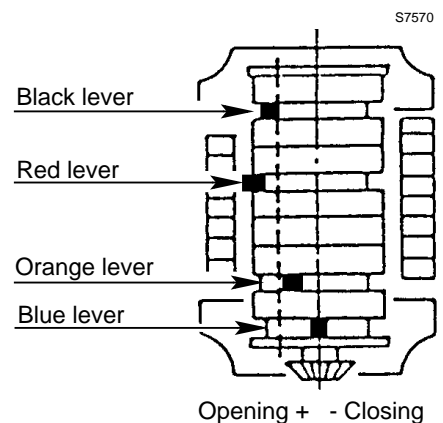
The new position the air damper is detectable when the burner is off. Do not overcome the position of the orange lever for the 1<sup>st</sup> stage.

### 1st STAGE - Orange lever

The orange lever controls the air damper position for the first flame, it is adjustable both for opening and closing.

### 2nd STAGE - Red and black levers

The red lever controls the air damper position for the second flame, it is adjustable both for closing and opening. The black lever controls the opening of the second oil valve and it must always - for a bit - the red lever, but never the orange one.

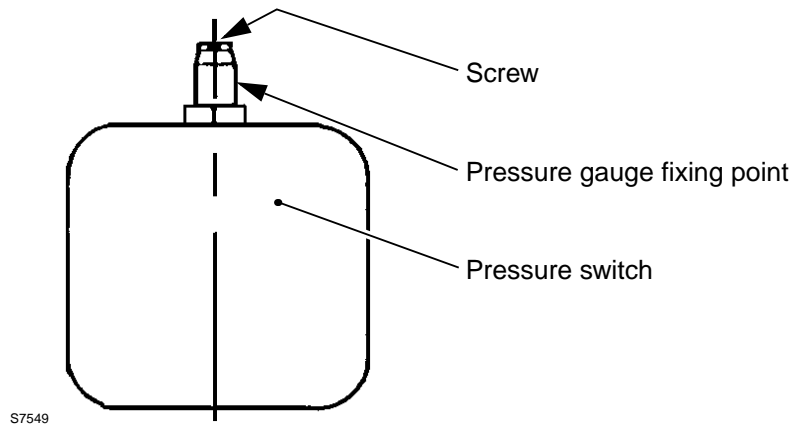


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## BURNER START-UP CYCLE

Venting the gas supply.

This is done by removing the screw from the gas pressure switch, or the pressure test point.

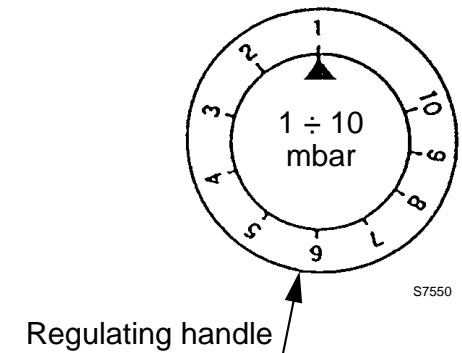


## AIR PRESSURE SWITCH (17 Fig.1)

Adjust the air pressure switch after adjustment of all the other parts of the burner, with air pressure switch setted at beginning of the scale.

When the burner works increase the regulating pressure, turning the handle slowly in the clockwise till the burner is locked out.

Then turn back of 1 mbar and repeat the burners starting, in order to verify the good work; if you have a lock out, turn back once again of 0.5 mbar.



## PUMP'S FIRING

In case of drop-plant with supply from the tank's bottom, back off the plug at the vacuumeter-joint 9) (fig. 1), till the leaking of fuel.

In the other two situations, start up the burner, bleed the air of manometer-joint 8) P (fig. 1); if you have a lock-out, repeat the cycle.

### ATTENTION

Before starting up the burner, check that the return pipe has no occlusions. Any occlusions will cause the break of the pump-sealing organ.

## WORK WITH OIL

At the first ignition, when there is the passage from the first to the second flame, there is a strong decrease of fuel-pressure owing to the filling of second nozzle's pipe. This decrease can cause the burn-out of the burner.

## COMBUSTION CHECKS

### CO<sub>2</sub>

It is better to set the burner with CO<sub>2</sub> not higher than 10% (gas with Pci 8600 kcal/m<sup>3</sup>).

So you avoid that a little unsetting (for example draft variation) causes combustion with few air and with the production of CO.

### CO

It must be not higher than 0.1% (thousand parts for million) in accordance to UNI-CIG 8042 norme.

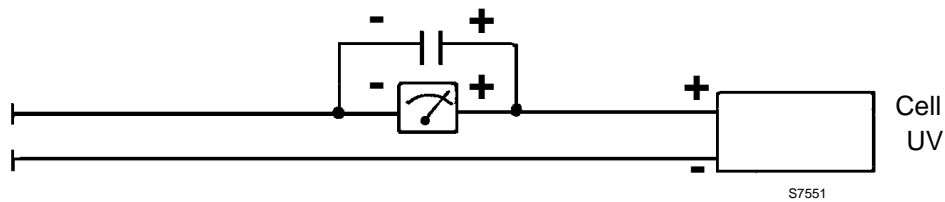
## CURRENT TO THE UV PHOTOCELL

Min. value for a good work: 15  $\mu$ A.

If the value is lower, it can depends on:

- worked out photocell;
- low current (lower than 187V);
- bad regulation of the burner.

In order to measure the current, use a microammeter of 100  $\mu$ A c.c., connected to the photocell, as in the scheme, with a capacitor of 100  $\mu$ F - 10VP c.c. at the same level of the instrument.



## ANOMALIES DURING THE WORK

Block out for: flame failure (°).

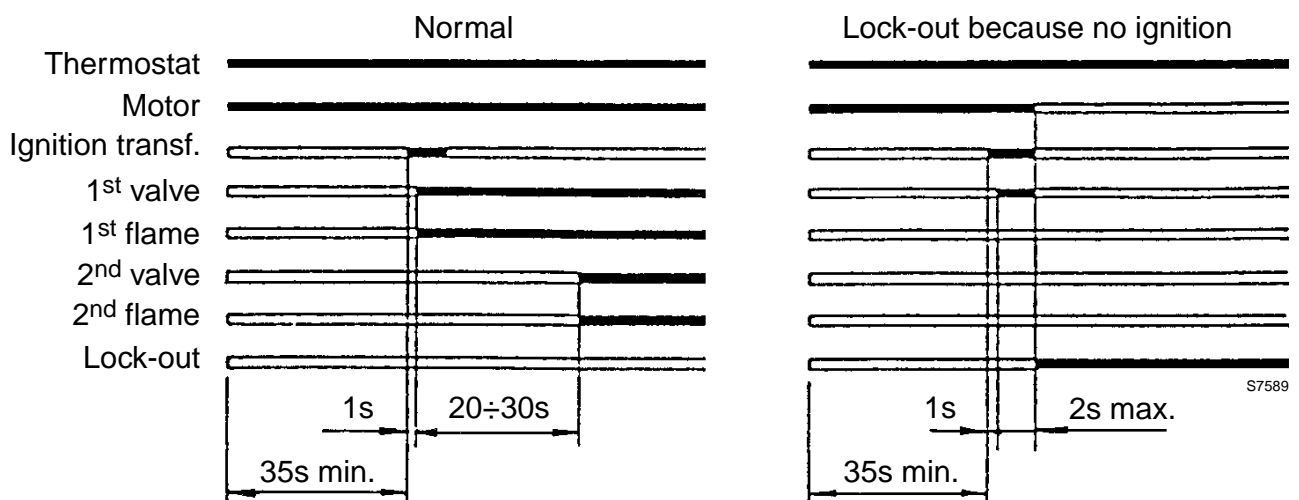
Stop for: opening of gas pressure switch.

Closing of the valves and continuous pre-purge for opening of air pressure switch (°).

## FLAME SIMULATION

If the photocell or the flame circuit do not work, it is possible to see the flame even if it does not exist. In this case there is a lock out either this occurs when the thermostat opens at the end of work, or when it closes at the starting up, or in every moment of pre-purge period.

## BURNER STARTING UP PROGRAMME



If during the work the flame burns off, there is a lock out within 1 second.

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## **BURNER STARTING DIFFICULTIES AND THEIR CAUSES**

With reference to gas working (it is valid also for oil working, when signed with "o").

### **1) The burner goes through the pre-purge period normally, the flame ignites but the burner goes on lock out within 3 seconds from the ignition:**

- the photocell does not see: dirty, worked out, low current (below 187V); (°);
- the gas pressure switch is regulated too close to the working pressure (see point 4).

### **2) The flame does not ignite and the burner goes to lock out after or during the pre-purge period:**

- through the valve passes few gas;
- it is not regular or there is no ignition electric arc; (°);
- from the pipe there is no air bleeding;
- the air pressure switch does not close the contact; it is wrong gly set or is defective; there is a continuous pre-purge (°).

### **3) The burner does not start when the thermostat is closed:**

- there is gas failure;
- the gas pressure switch does not close the contact; it is wrong gly set or is defective.

### **4) The burner continues to repeat the starting cycle without going on lock out:**

- this concerns a very particular irregularity caused by the fact that the gas pressure in the gas-mains lies very close to the value to which the gas pressure switch has been set.  
As a result of this, the sudden pressure decrease at the opening of the valve causes the opening of the pressure switch.  
However this only temporary, because the valve immediately closes again, so than does the pressure switch, because the pressure builds-up again, causing the cycle to be repeated over and over. Sometimes for this reason a burner lock out can take place.  
This can be remedied by lowering the setting of the pressure switch.



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**RIELLO**

RIELLO S.p.A.  
Via degli Alpini 1  
I - 37045 Legnago (VR)  
Tel.: +39.0442.630111 Fax: +39.0442.630375