

**GB** Light oil burners



CODE	MODEL	TYPE
3478985	P300 T/G	478 T80
3478986	P300 T/G	478 T80



## TECHNICAL DATA

Model	P300 T/G
Thermal power	712/1779 - 3560 kW
Capacity	60/150 - 300 kg/h
Operation	1 <sup>st</sup> stage - 2 <sup>nd</sup> stage - 3 <sup>rd</sup> stage
Fuel	Light oil, max. viscosity at 20° C: 6 mm <sup>2</sup> /s (1.5° E)

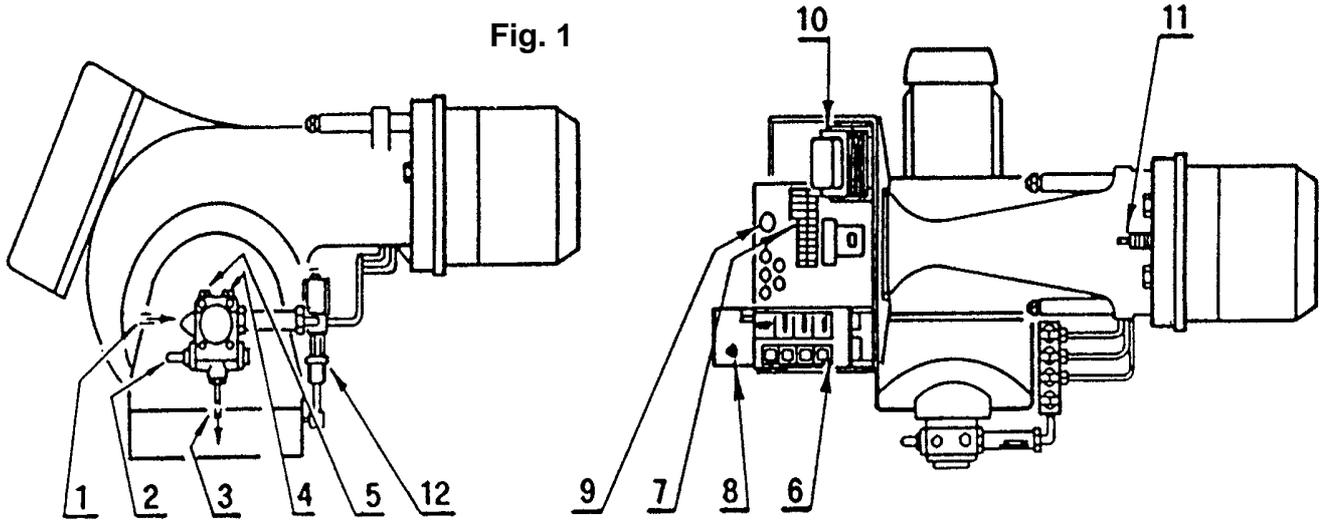
## ELECTRICAL DATA

Model	P300 T/G	
Electrical supply	3 ~ 220/380V - 60Hz	
Fan motor IE2	rpm kW V A	3500 9.2 220/380 29.1/16.8
Ignition transformer	Primary: 2 A Secondary: 2x 6.5 kV - 35 mA V	
Electrical intake power	kW max	12

Model	P300 T/G	
Electrical supply	3 ~ 220/380V - 60Hz	
Fan motor IE3	rpm kW V A	3540 9.2 220/380 30.5/17.6
Ignition transformer	Primary: 2 A Secondary: 2x 6.5 kV - 35 mA V	
Electrical intake power	kW max	10.7

## BURNER DESCRIPTION

Fig. 1

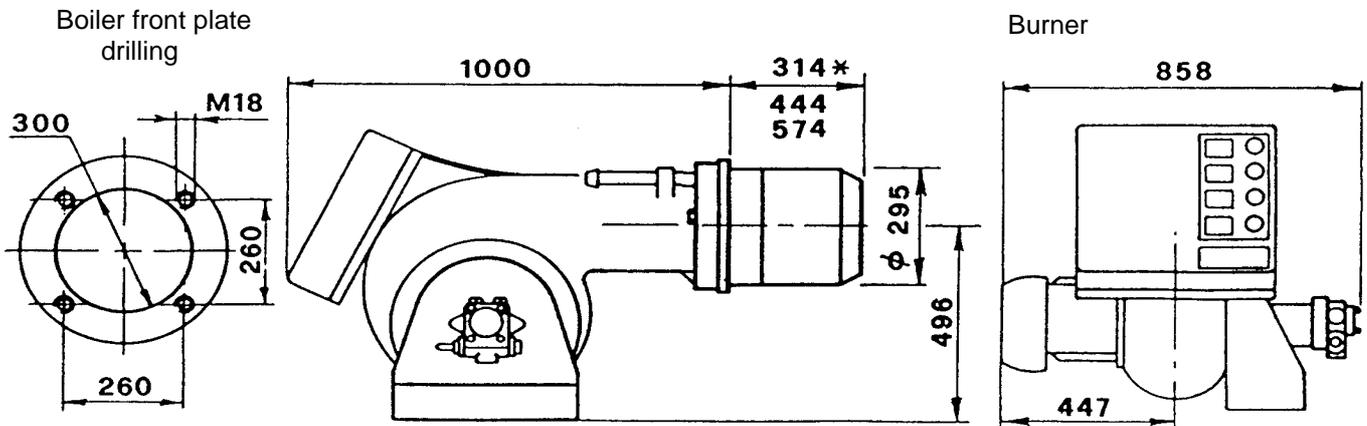


- 1 - Suction line
- 2 - Pump pressure adjustment screws
- 3 - Return line
- 4 - Manometer plug (G 1/4)
- 5 - Vacuometer plug (G 1/4)
- 6 - Electric board
- 7 - Wiring terminal board
- 8 - Control box reset push-button and lock-out lamp
- 9 - Cable clamps
- 10 - Ignition transformer
- 11 - Regulating bush for combustion head
- 12 - Valves group with hydraulic jacks

### EQUIPMENT

Flexible tubes .....	No. 2
Nipples .....	No. 2
Cable clamps.....	No. 4
Screws .....	No. 4
Extensions (only long head) .....	No. 2
Gasket for flange.....	No. 1

### DIMENSIONS (mm)



\* It is possible with a spacer upon request.

**OPERATION AND EFFICIENCY OF THE BURNER**

<b>1<sup>st</sup> STAGE</b>	<b>POWER AND OUTPUT</b>			
	<b>MINIMUM</b>		<b>MAXIMUM</b>	
	<b>kW</b>	<b>kg/h</b>	<b>kW</b>	<b>kg/h</b>
1 <sup>st</sup> nozzle: ignition phase	593	50	1186	100
1 <sup>st</sup> + 2 <sup>nd</sup> nozzle: intermediate phase	1186	100	2372	200
1 <sup>s</sup> + 2 <sup>nd</sup> + 3 <sup>rd</sup> nozzle: operation phase	1779	<b>150</b>	3558	<b>300</b>

<b>2<sup>nd</sup> STAGE</b>	<b>POWER AND OUTPUT</b>			
	<b>MINIMUM</b>		<b>MAXIMUM</b>	
	<b>kW</b>	<b>kg/h</b>	<b>kW</b>	<b>kg/h</b>
1 <sup>st</sup> nozzle: ignition phase	593	50	1186	100
1 <sup>st</sup> + 2 <sup>nd</sup> nozzle: 1 <sup>st</sup> stage of operation	1186	<b>100</b>	2372	<b>200</b>
1 <sup>st</sup> + 2 <sup>nd</sup> + 3 <sup>rd</sup> nozzle: 2 <sup>nd</sup> stage of operation	1779	<b>150</b>	3558	<b>300</b>

<b>3<sup>rd</sup> STAGE</b>	<b>POWER AND OUTPUT</b>			
	<b>MINIMUM</b>		<b>MAXIMUM</b>	
	<b>kW</b>	<b>kg/h</b>	<b>kW</b>	<b>kg/h</b>
1 <sup>st</sup> nozzle: 1 <sup>st</sup> stage of operation	712	<b>60</b>	1186	<b>100</b>
1 <sup>st</sup> + 2 <sup>nd</sup> nozzle: 2 <sup>nd</sup> stage of operation	1245	<b>105</b>	2372	<b>200</b>
1 <sup>st</sup> + 2 <sup>nd</sup> + 3 <sup>rd</sup> nozzle: 3 <sup>rd</sup> stage of operation	1779	<b>150</b>	3558	<b>300</b>

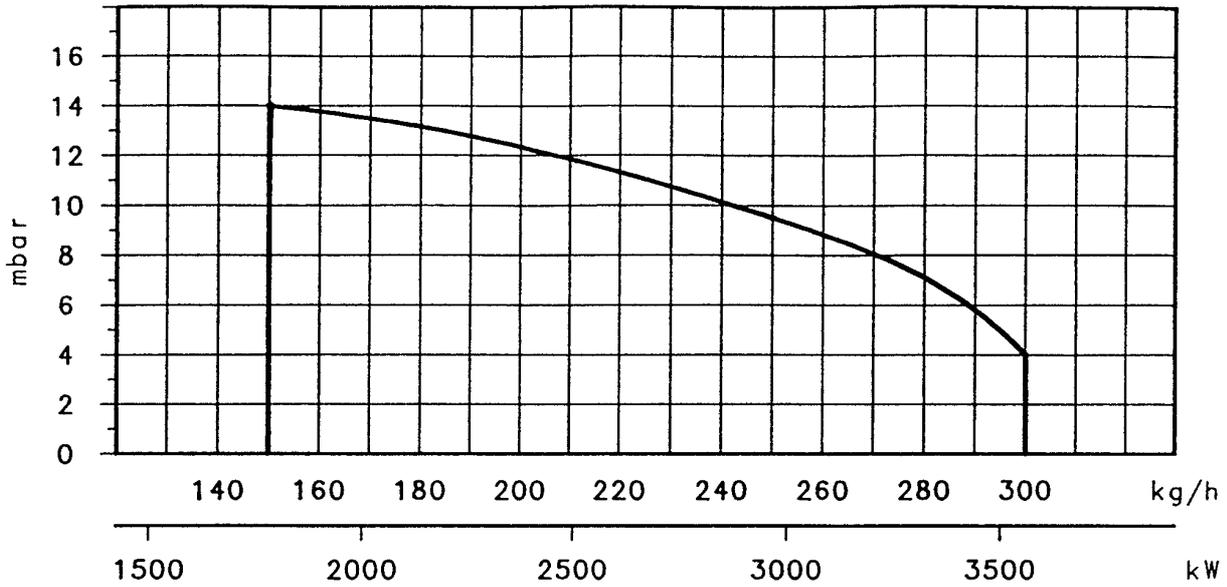
**ACCESSOIRES**
**RADIO DISTURBANCE PROTECTION KIT: Code 3010386**

If the burner is installed in places particularly subject to radio disturbance (emission of signals exceeding 10 V/m) owing to the presence of an INVERTER, or in applications where the length of the thermostat connections exceeds 20 metres, a protection kit is available as an interface between the control box and the burner.

## COMBUSTION CHAMBER PRESSURE - MAXIMUM OUTPUT

(three nozzles in operation)

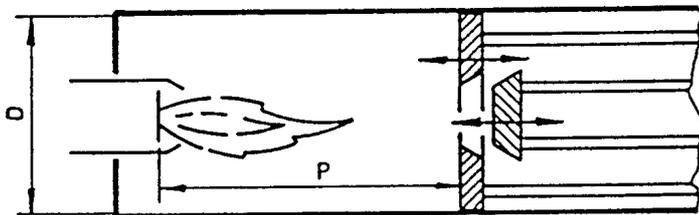
Operation field in accordance with DIN 4787



When the burner operates with only one, or two nozzles, the pressurization conditions are improved and no problems arise.

## DIMENSIONS OF THE TESTING COMBUSTION CHAMBER

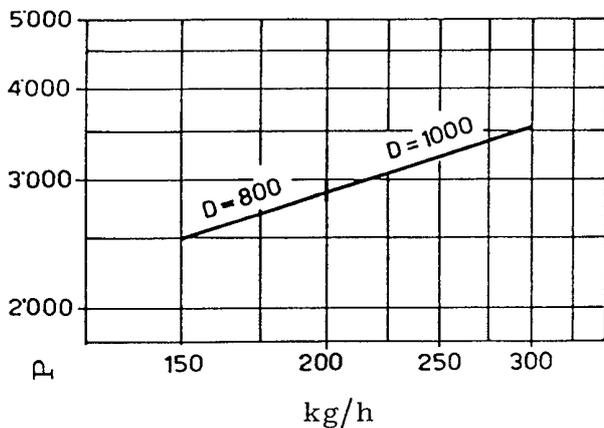
(in compliance with ISO 5063 - 1978)



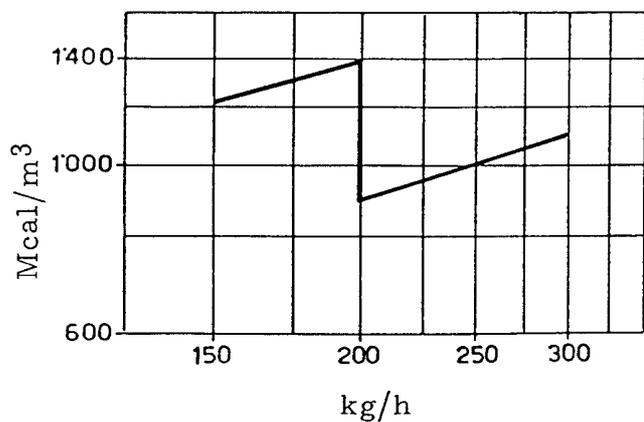
For the combustion head projection carefully follow the boiler manufacturer indications. A proper protection with refractory material on the combustion chamber shall be made, when the boilers with frontal smoke box are used.

D = Boiler diameter in mm

P = Position of the boiler movable wall (mm)



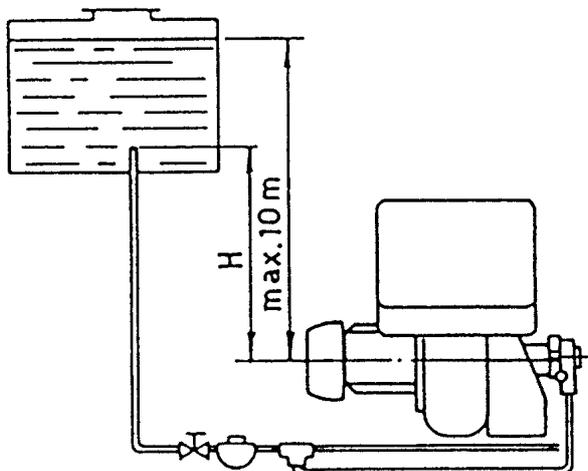
Testing thermal load



**SUPPLY LINE**

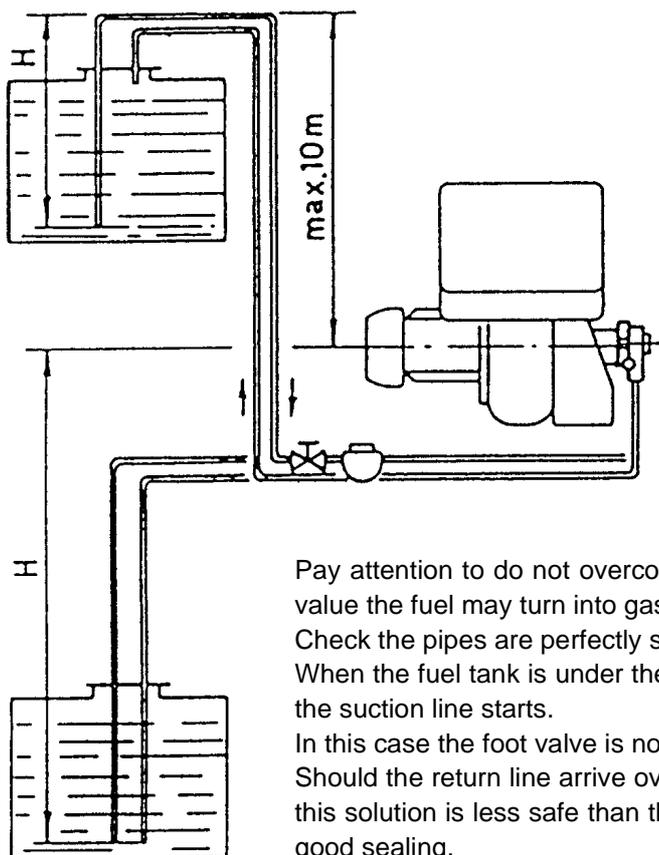
**NOTICE**

Before placing the burner in operation, ensure that the return line is open.  
Any obstruction may damage the pump seal.



**Pump priming:** Loose the tap from the vacuumeter plug 5 (fig. 1) and wait for the flow of the fuel.

H meters	L meters	
	I.D. 14 mm	I.D. 16 mm
0	0	5
0.5	5	10
1	10	20
1,5	20	40
2	30	50



H meters	L meters	
	I.D. 14 mm	I.D. 16 mm
0	50	100
0.5	40	80
1	30	60
1,5	20	40
2	10	20
3	5	10

Pay attention to do not overcome the max. depression of 0.45 bar (35 cm Hg), over this value the fuel may turn into gas.  
Check the pipes are perfectly sealed.  
When the fuel tank is under the burner level we suggest to let the return line arrive where the suction line starts.  
In this case the foot valve is not necessary.  
Should the return line arrive over the fuel level, the foot valve is indispensable. Notice that this solution is less safe than the previous one, because it is possible the valve has not a good sealing.

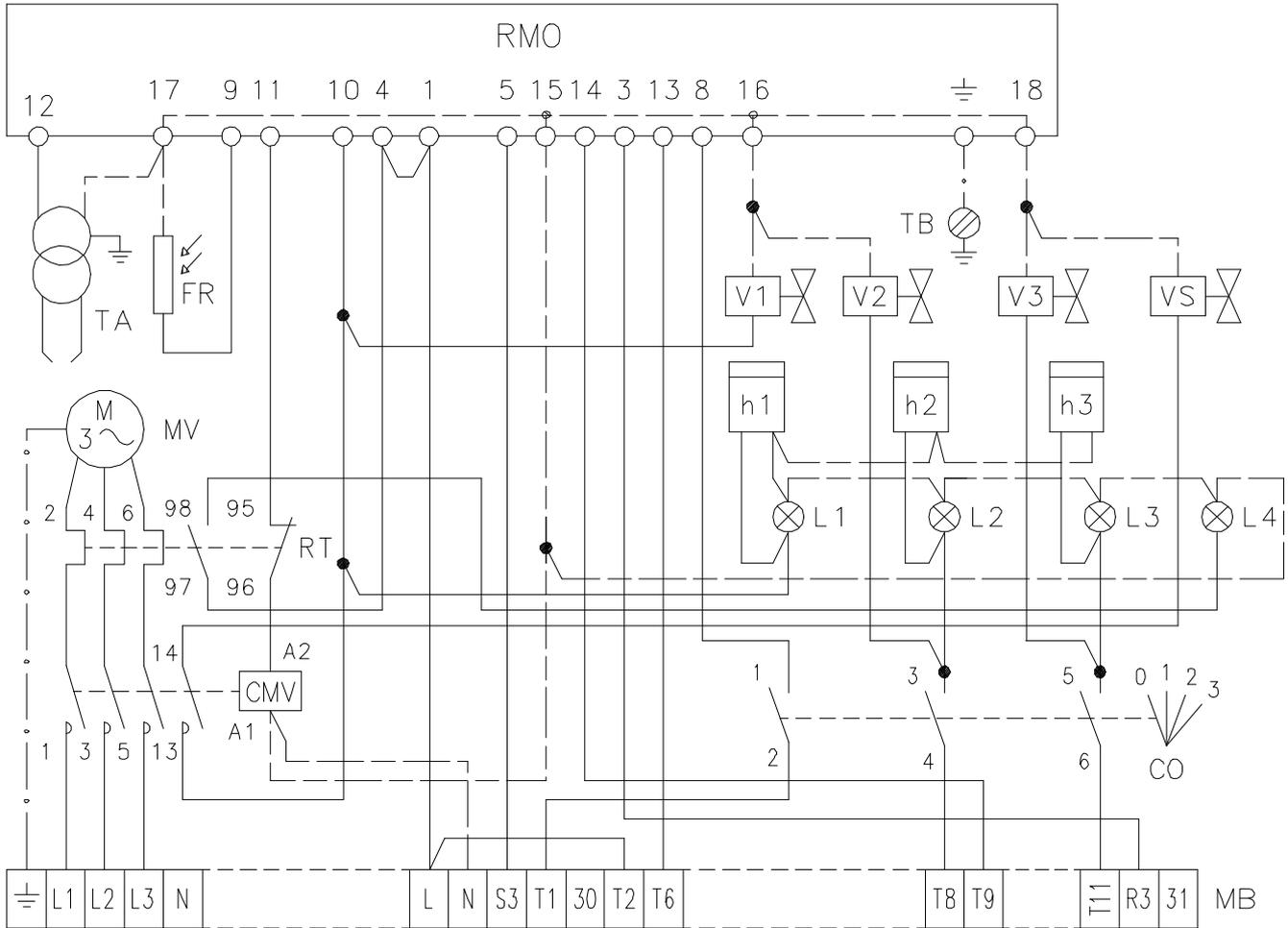
**Pump priming:** Fill the pump with the light oil from the vacuumeter plug (5) (fig. 1), put the burner in operation, purge the air from the manometer plug (4) (fig. 1) and wait for the pump priming. If lock-out occurs repeat the procedure.

**H** = Difference in the pipes height

**L** = Total length of the suction tube

**øi** = Internal diameter of the tube. Copper tubes ø 14 and 16 mm could be replaced by steel tubes G 1/2" and G3/4".

**INTERNAL WIRING DIAGRAM**  
(carried out by the factory)

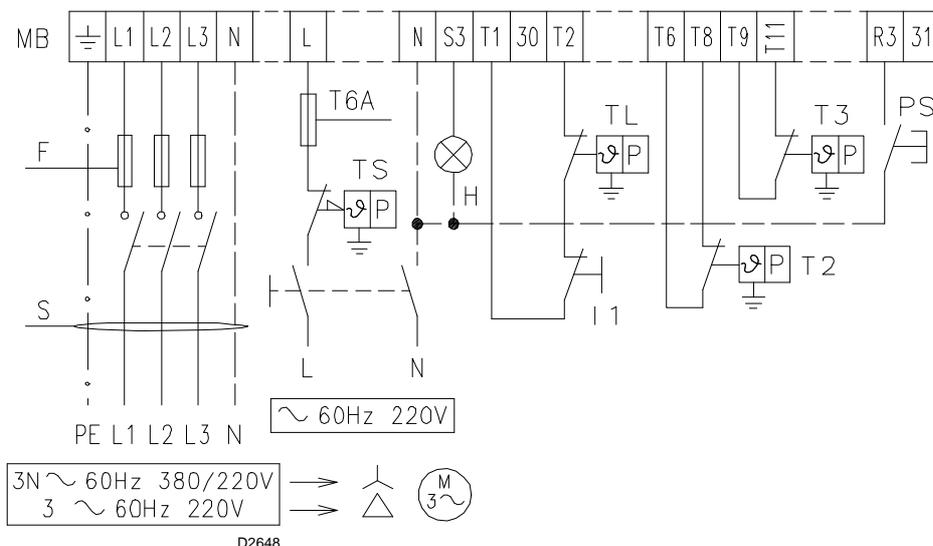


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**KEY TO LAYOUT**

<b>CMV</b>	Fan motor contactor	<b>MB</b>	Wiring terminal board
<b>CO</b>	Commutator	<b>MV</b>	Fan motor
<b>FR</b>	Photocell	<b>RT</b>	Thermal relay
<b>h 1</b>	1 <sup>st</sup> stage hourcounter	<b>TA</b>	Ignition transformer
<b>h 2</b>	2 <sup>nd</sup> stage hourcounter	<b>TB</b>	Burner ground (earth) connection
<b>h 3</b>	3 <sup>rd</sup> stage hourcounter	<b>VS</b>	Safety solenoid valve
<b>L1</b>	1 <sup>st</sup> stage lamp	<b>V1</b>	1 <sup>st</sup> stage solenoid valve
<b>L2</b>	2 <sup>nd</sup> stage lamp	<b>V2</b>	2 <sup>nd</sup> stage solenoid valve
<b>L3</b>	3 <sup>rd</sup> stage lamp	<b>V3</b>	3 <sup>rd</sup> stage solenoid valve
<b>L4</b>	Lock - out motor lamp		

**ELECTRICAL CONNECTIONS TO THE WIRING TERMINAL BLOCK**  
(to be carried out by the installer)



	220V	380V
F A gG/gL	63	50
S mm <sup>2</sup>	6,0	4,0

**KEY TO LAYOUT**

- |           |                                  |           |   |
|-----------|----------------------------------|-----------|---|
| <b>H</b>  | Remote lock - out signal         | <b>TL</b> | Load limit remote control system          |
| <b>I1</b> | Burner manual stop switch        | <b>TS</b> | Safety load control system                |
| <b>MB</b> | Wiring terminal board            | <b>T2</b> | 2 <sup>nd</sup> stage load control system |
| <b>PS</b> | Reset push - button              | <b>T3</b> | 3 <sup>rd</sup> stage load control system |
| <b>TB</b> | Burner ground (earth) connection |           |   |

**Important:**

Check the lock-out by darkening the photo-cell after removal of the cover.  
**ATTENTION: HIGH VOLTAGE**

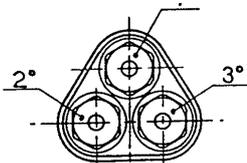
**Note:**

In systems where the run of wiring connecting the thermostat exceeds 20 metres in length, or in places where the burner is subject to particularly disturbing electromagnetic interference (over 10 v/m), you must insert the relay-inter face kit item number 3010386.

**CHOICE OF: NOZZLES - PUMP PRESSURE -  
COMBUSTION HEAD ADJUSTMENT**

- State, first of all, the maximum output required with all three nozzles in operation.
- On the base of the maximum required output, choose-from table A or B - three related nozzles.  
Nozzles: 60° - Pump pressure: 12 bar  
For three-stage operation (up to 193 kg/h) 1<sup>st</sup> and 2<sup>nd</sup> nozzle are not equal to the 3<sup>rd</sup> one. Follow this procedure in order to obtain higher values of CO<sub>2</sub> (during 1<sup>st</sup> and 2<sup>nd</sup> stage of operation), complying with German Standard DIN.
- The references on the table C have to be followed in case of need of:
  - modification of the pump pressure in order to vary the output;
  - diverse composition of the 3 nozzles group;
  - knowledge of the output in 1<sup>st</sup> and 2<sup>nd</sup> stage.

**SUGGESTED NOZZLES.**



1<sup>st</sup> Stage / 2<sup>nd</sup> Stage

<b>A</b>			
Nozzles 60° Pump 12 bar (1)			Total delivery kg/h
GPH			
1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	1 <sup>st</sup> + 2 <sup>nd</sup> + 3 <sup>rd</sup>
12.00	12.00	12.00	154.50
13.00	13.00	13.00	167.40
13.80	13.80	13.80	177.60
14.00	14.00	14.00	180.30
15.00	15.00	15.00	193.20
15.30	15.30	15.30	197.10
16.00	16.00	16.00	206.10
17.00	17.00	17.00	219.00
17.50	17.50	17.50	225.30
18.00	18.00	18.00	231.90
19.00	19.00	19.00	244.80
19.50	19.50	19.50	251.10
20.00	20.00	20.00	257.70
21.50	21.50	21.50	276.90
22.00	22.00	22.00	283.20
24.00	24.00	24.00	309.00

3<sup>rd</sup> Stage

<b>B</b>			
Nozzles 60° Pump 12 bar (1)			Total delivery kg/h
GPH			
1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	1 <sup>st</sup> + 2 <sup>nd</sup> + 3 <sup>rd</sup>
13.80	10.50	10.50	149.40
13.80	11.00	11.00	153.60
13.80	12.00	12.00	162.20
14.00	13.00	13.00	171.70
15.30	13.80	13.80	184.10
15.00	14.00	14.00	184.60
15.00	15.00	15.00	193.20
15.30	15.30	15.30	197.10
16.00	16.00	16.00	206.10
17.00	17.00	17.00	219.00
17.50	17.50	17.50	225.30
18.00	18.00	18.00	231.90
19.00	19.00	19.00	244.80
19.50	19.50	19.50	251.10
20.00	20.00	20.00	257.70
21.50	21.50	21.50	276.90
22.00	22.00	22.00	283.20
24.00	24.00	24.00	309.00

(1) The pump pressure is referred to all three nozzles operating, the pressure increases automatically with two nozzles in operation and more with only one.

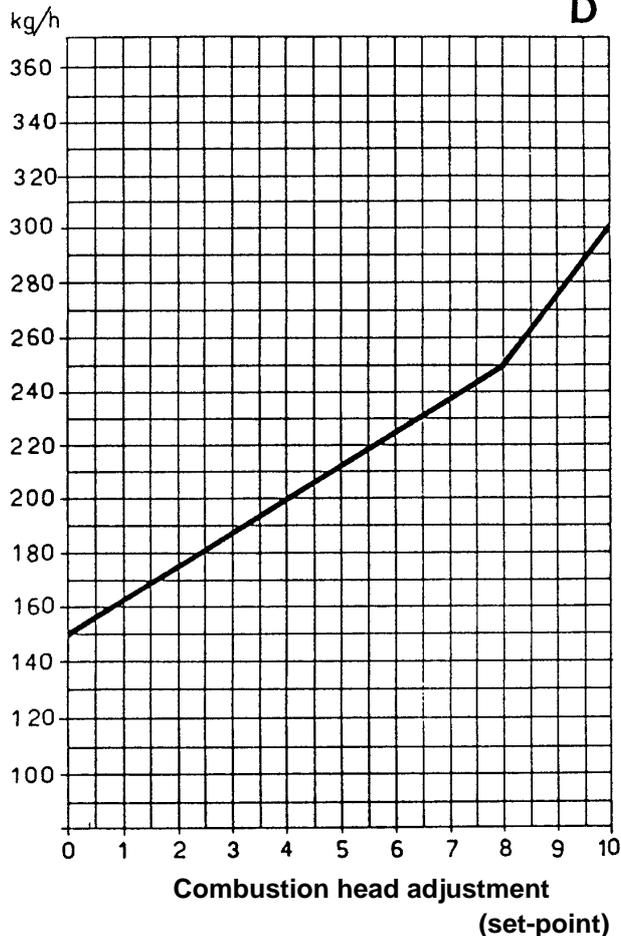
**Nozzles delivery  
Pump pressure**

**C**

bar GPH	10	11	12	13	14
10.50	40.8	43.0	45.1	47.1	49.0
11.00	42.8	45.0	47.2	49.3	51.3
12.00	46.7	49.1	51.5	53.8	56.0
13.00	50.6	53.2	55.8	58.3	60.6
13.80	53.7	56.5	59.2	61.9	64.4
14.00	54.5	57.3	60.1	62.8	65.3
15.00	58.4	61.4	64.4	67.2	70.0
15.30	59.5	62.7	65.7	68.6	71.4
16.00	62.2	65.5	68.7	71.7	74.6
17.00	66.1	69.6	73.0	76.2	79.3
17.50	68.1	71.7	75.1	78.4	81.6
18.00	70.0	73.7	77.3	80.7	84.0
19.00	73.9	77.8	81.6	85.2	88.6
19.50	75.9	79.9	83.7	87.4	91.0
20.00	77.8	81.9	85.9	89.7	93.3
21.50	83.6	88.1	92.3	96.4	100.3
22.00	85.6	90.1	94.4	98.6	102.6
24.00	93.4	98.3	103.0	107.6	112.0

**Combustion head adjustment  
Maximum output**

**D**



Rated nozzles delivery are shown in the table.

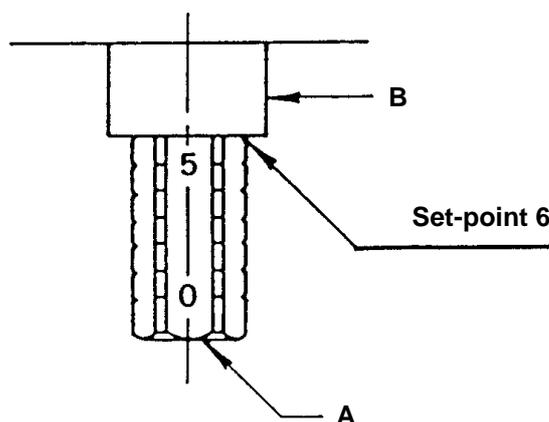
The real nozzle delivery may vary from the rated one up to  $\pm 5\%$ , its detection is made by weighing the oil sprayed out from the nozzle inserted in a tube.

The pump leaves the factory rated at 12 bar.

Pay attention to not overcome the pump pressure values of 10 and 14 bar.

- At the end, on the base of the maximum output, you obtain the combustion head adjustment from the diagram D.

The adjustment should be made by turning the screws A till the set-point (see diagram) is on the line with the washer B.



## AIR DAMPER ADJUSTMENT

The air dampers adjustment shall be set each time in relation with the nozzles delivery and the combustion chamber pressurization.

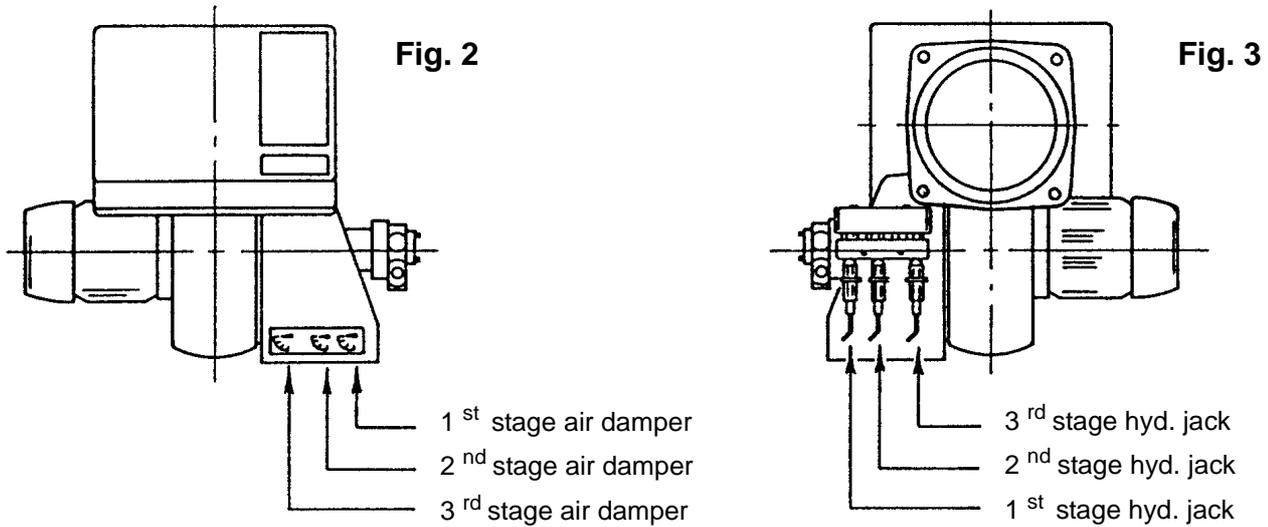
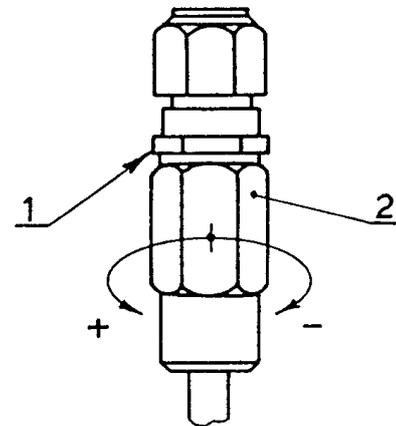


Fig. 2 shows the placement of the air dampers as fig. 3 their correspondent hydraulic jacks.

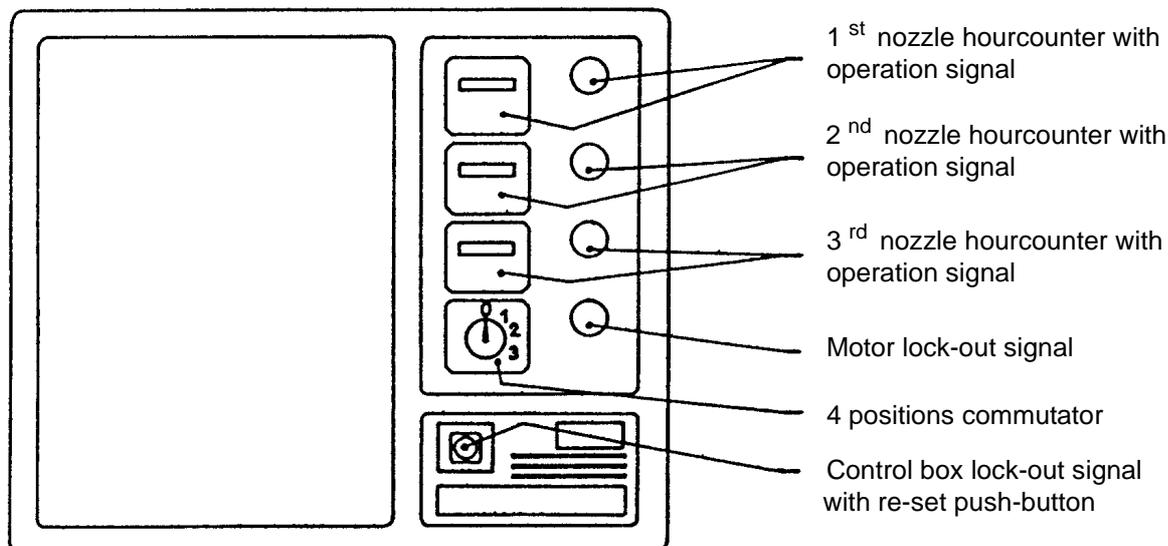
To open or close the air dampers proceed as follows:  
Loose the ring nut (1), turn clockwise the hexagonal body (2) in order to decrease the air flow, and counterclockwise to increase it.



The right adjustment of the air dampers may be detect by checking the combustion results in the three stages of burner operation.

To check the combustion during the different stages, the commutator (see page 11) should be set to the position corresponding to the burner stage to be controlled.

## ELECTRIC PANEL



### Hourcounter

Deducting the number of hours of 2<sup>nd</sup> nozzle hourcounter from those indicated in the 1<sup>st</sup> nozzle hourcounter you could know how many hours the burner has been performing only at 1<sup>st</sup> stage; the same procedure to detect the performance hours of the 2<sup>nd</sup> stage alone - deduct from the 2<sup>nd</sup> stage hourcounter the hours indicated in the 3<sup>rd</sup> nozzle hourcounter-. The hours of 3<sup>rd</sup> stage operation are shown rightly on the 3<sup>rd</sup> nozzle hourcounter.

### Commutator

Pos. 0: Burner stop

Pos. 1: Burner operation only at 1<sup>st</sup> stage

Pos. 2: Burner operation at 1<sup>st</sup> and 2<sup>nd</sup> stage

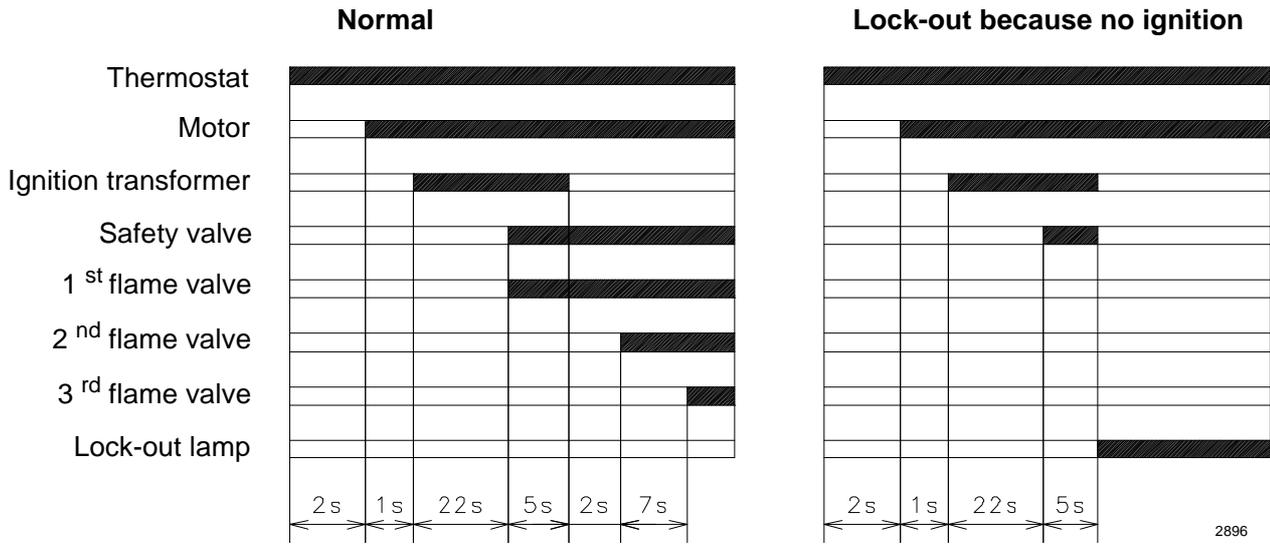
Pos. 3: Burner operation at 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> stage

### Motor lock-out

It is caused by the overload relay in case of overload or no electric supply.

Push the proper reset button (after removal of the protective cover).

**BURNER START-UP CYCLE**

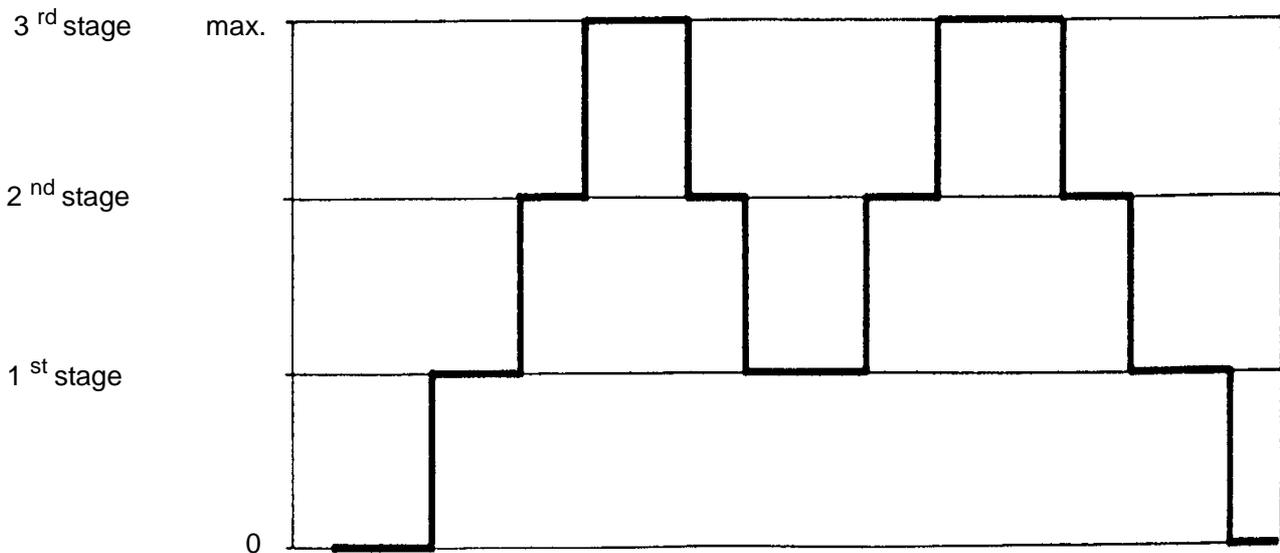


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**ALTERNATIVE START-UP CYCLES**

- 1) If you desire the pre-ignition being present during the complete pre-purge phase (29,5 s) remove the bridge from the terminals 11 - 3 and put it on the terminals 11 - 7 of the control box.
- 2) If you desire to reduce the pre-purge period from 29,5 s to 16 s with contemporaneous presence of the pre-ignition remove the wire from the terminal no. 7 to the no. 3 of the control box, maintaining the bridge to the terminals 11 - 3.

**THREE STAGE OPERATION**





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**RIELLO**

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