

Light oil burners



CODE	MODEL	TYPE
3477785	P200 T/G	477 T80
3477786	P200 T/G	477 T80

TECHNICAL DATA

Thermal power - Output	530 / 2370 kW - 45 / 200 kg/h (see page 2)
Operation	1 st stage - 2 nd stage - 3 rd stage
Fuel	Light oil, max. viscosity at 20° C: 6 mm ² /s (1.5° E)

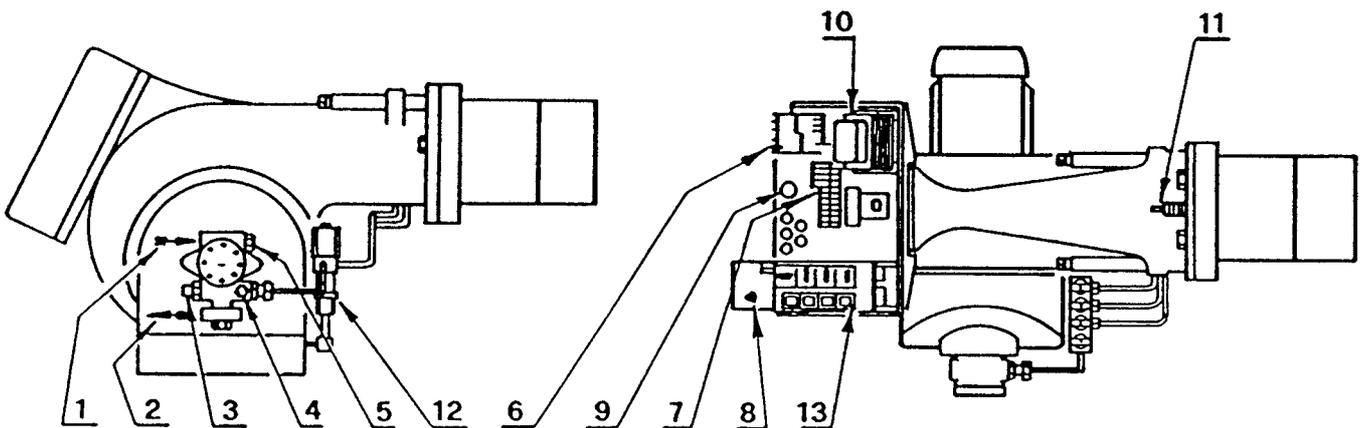
ELECTRICAL DATA

Motor IE1

Electrical supply	Three-phase 220V +10% -10% ~ 60Hz without neutral 380V +10% -10% ~ 60Hz with neutral
Motor	15.9 A / 220V - 9.2A / 380V
Ignition transformer	Primary: 2 A - Secondary: 2x 6.5 kV - 35 mA
Absorbed electrical power	5.5 kW

Motor IE2

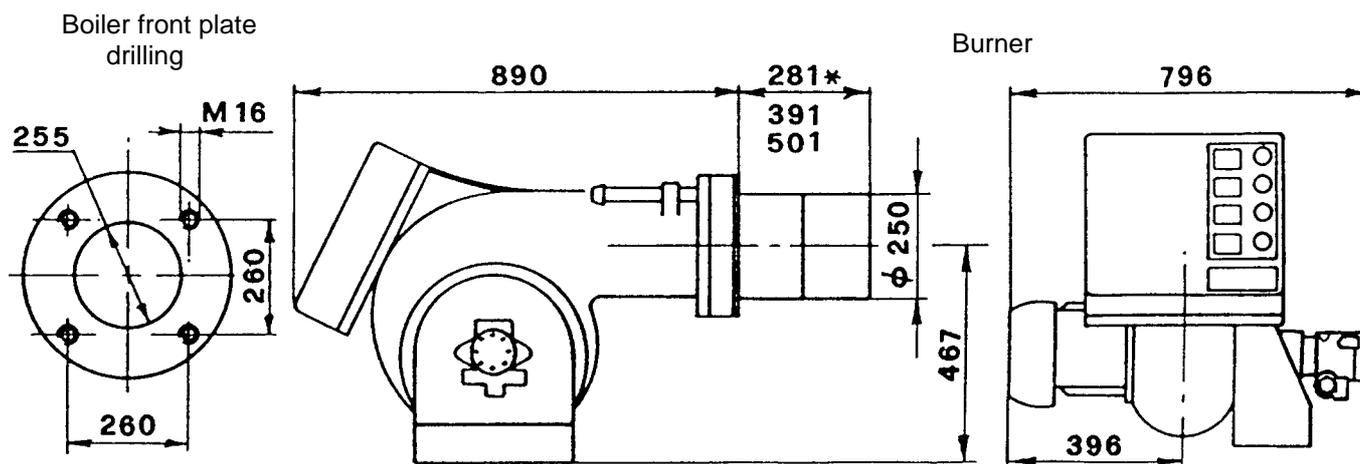
Electrical supply	Three-phase 220V +10% -10% ~ 60Hz without neutral 380V +10% -10% ~ 60Hz with neutral
Motor	14.6 A / 220V - 8.5A / 380V
Ignition transformer	Primary: 2 A - Secondary: 2x 6.5 kV - 35 mA
Absorbed electrical power	5.5 kW



- 1 - Suction line
- 2 - Return line
- 3 - Pump pressure adjustment screws
- 4 - Manometer plug (G 1/8)
- 5 - Vacuumeter plug (G 1/2)
- 6 - Reset push-button of the motor overload relay
- 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
- 13 - Electric board

Quantity	Accessories
2	Flexibles tubes
2	Nipples
4	Screws
1	Gasket for flange
4	Cable clamps

DIMENSIONS (mm)



* It is possible with a spacer upon request.

OPERATION AND EFFICIENCY OF THE BURNER

1 st STAGE	POWER AND OUTPUT			
	MINIMUM		MAXIMUM	
	kW	kg/h	kW	kg/h
1 st nozzle: ignition phase	391	33	782	66
1 st + 2 nd nozzle: intermediate phase	794	67	1576	133
1 st + 2 nd + 3 rd nozzle: operation phase	1186	100	2372	200

2 nd STAGE	POWER AND OUTPUT			
	MINIMUM		MAXIMUM	
	kW	kg/h	kW	kg/h
1 st nozzle: ignition phase	391	33	782	66
1 st + 2 nd nozzle: 1 st stage of operation	794	67	1576	33
1 st + 2 nd + 3 rd nozzle: 2 nd stage of operation	1186	100	2372	200

3 rd STAGE	POWER AND OUTPUT			
	MINIMUM		MAXIMUM	
	kW	kg/h	kW	kg/h
1 st nozzle: 1 st stage of operation	557	47	794	67
1 st + 2 nd nozzle: 2 nd stage of operation	1067	90	1576	133
1 st + 2 nd + 3 rd nozzle: 3 rd stage of operation	1186	100	2372	200

ACCESSOIRES

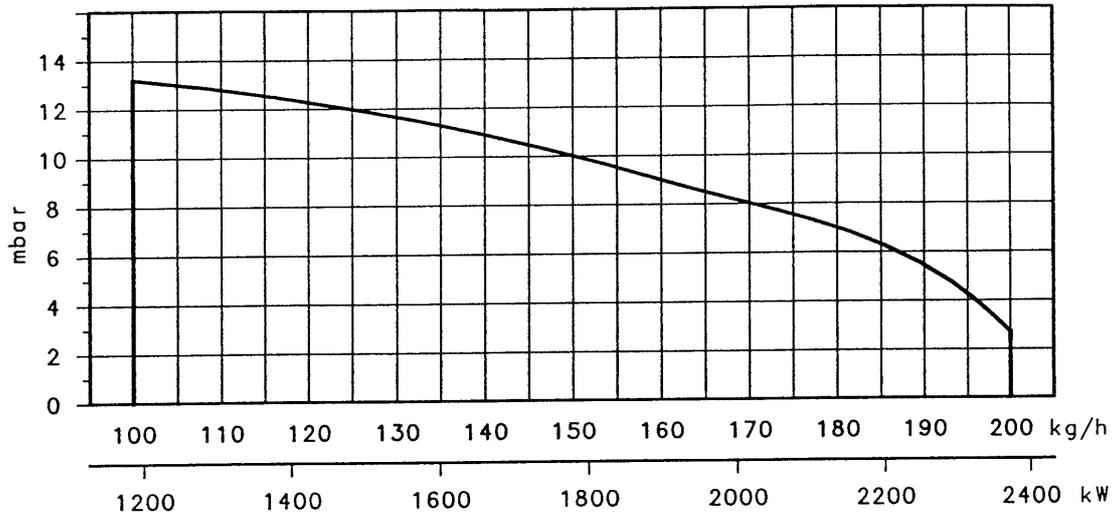
RADIO DISTURBANCE PROTECTION KIT: Code 3010386

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)

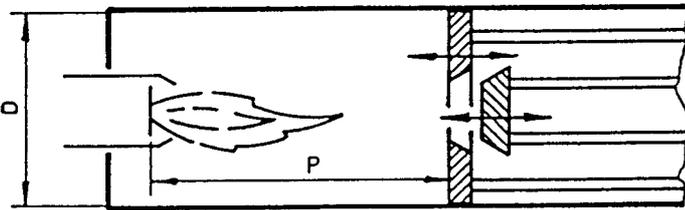
Operation field in accordance with DIN 4787



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)

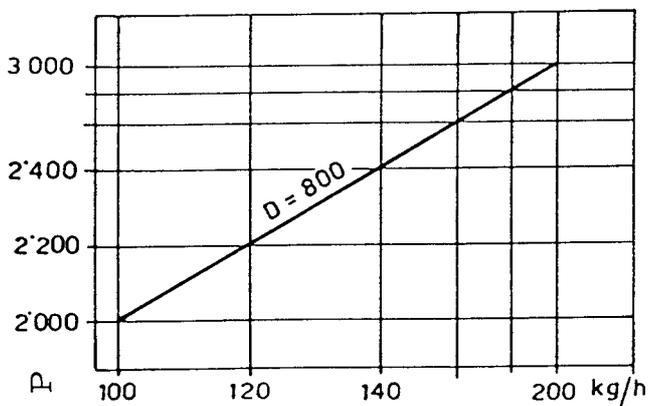


For the combustion head projection carefully follow the boiler manufacturer indications.

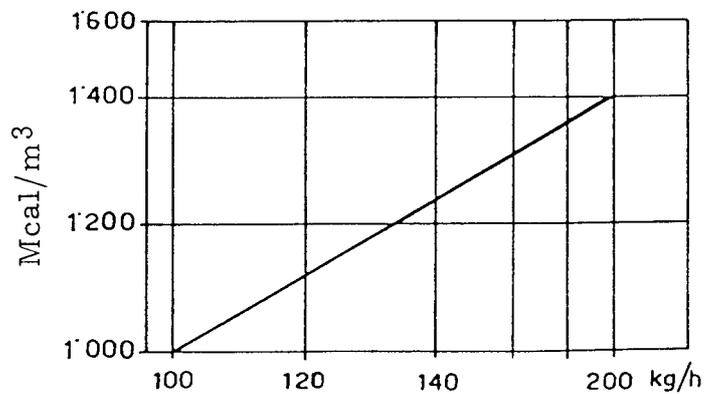
A proper protection with refractory material on the combustion chamber shall be made, when the boilers with frontal smoke box are used.

D = Boiler diameter in mm

P = Position of the mobile movable wall (mm)



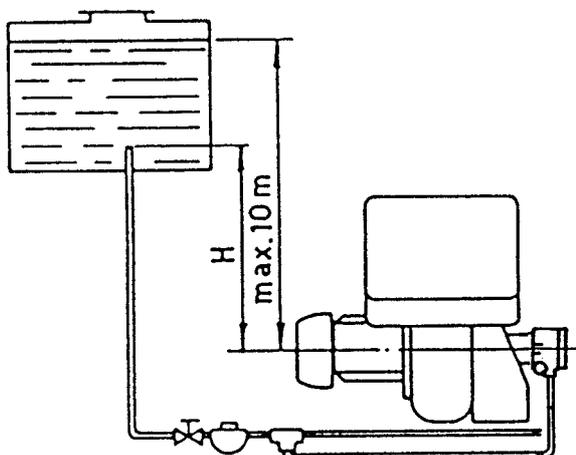
Testing thermal load



SUPPLY LINE

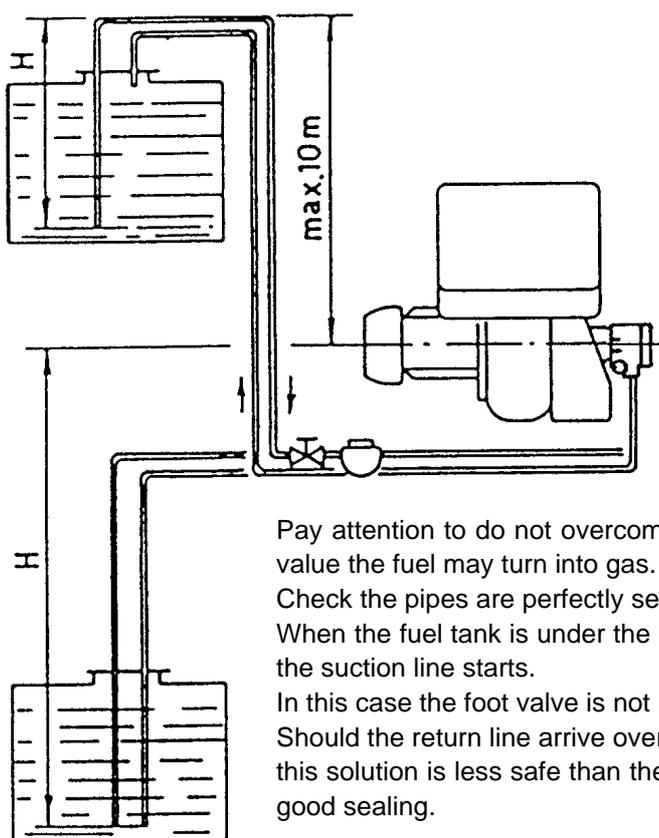
NOTICE

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 vacuometer 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.

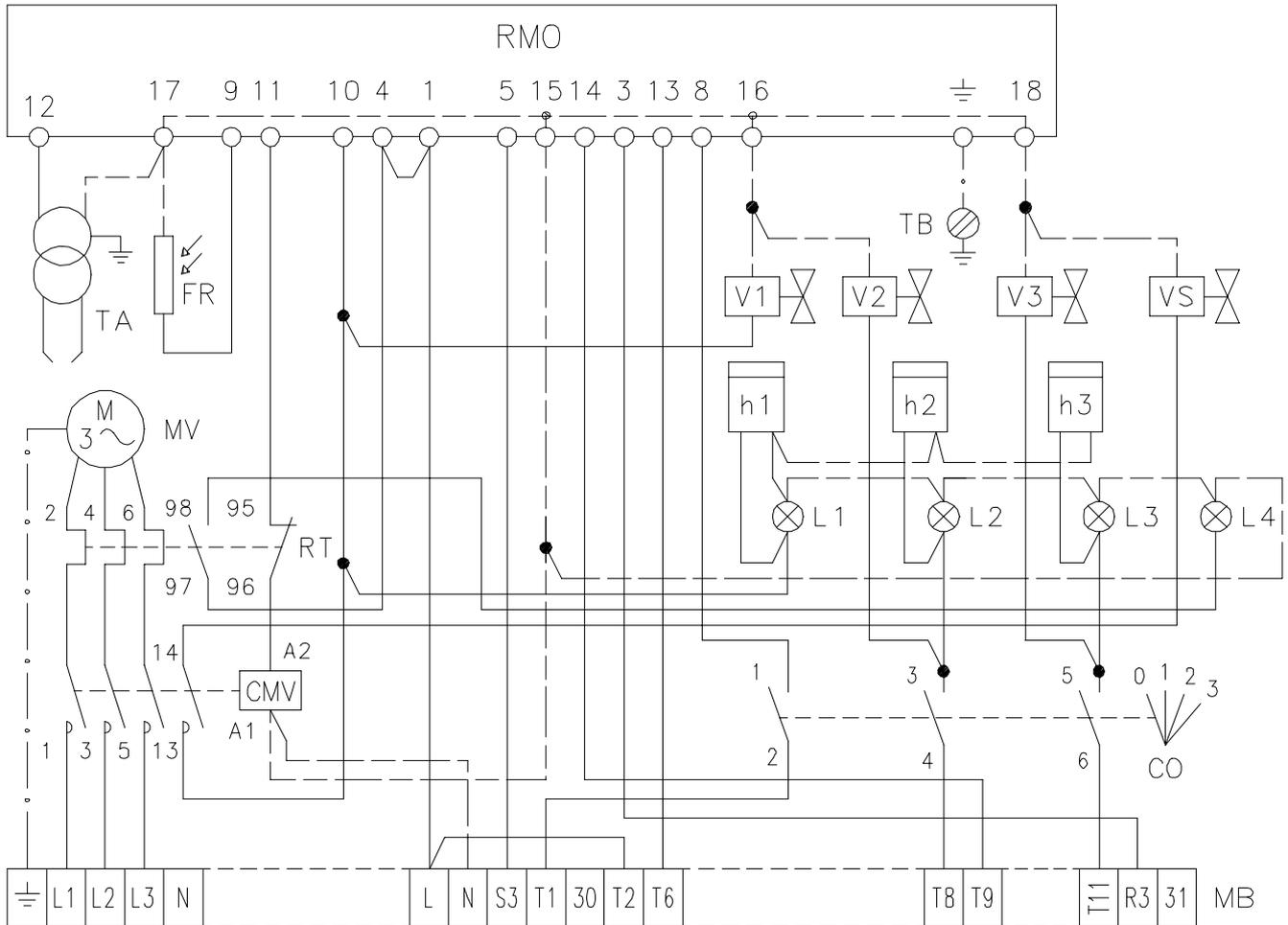
Pump priming: Fill the pump with the light oil from the vacuometer plug (5) (fig. 1), put the burner in operation, purge the air from the manometer plug (4) (fig. 1) and wait for the pump priming. If lock-out occurs repeat the procedure.

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 G 3/4".

INTERNAL WIRING DIAGRAM (carried out by the factory)

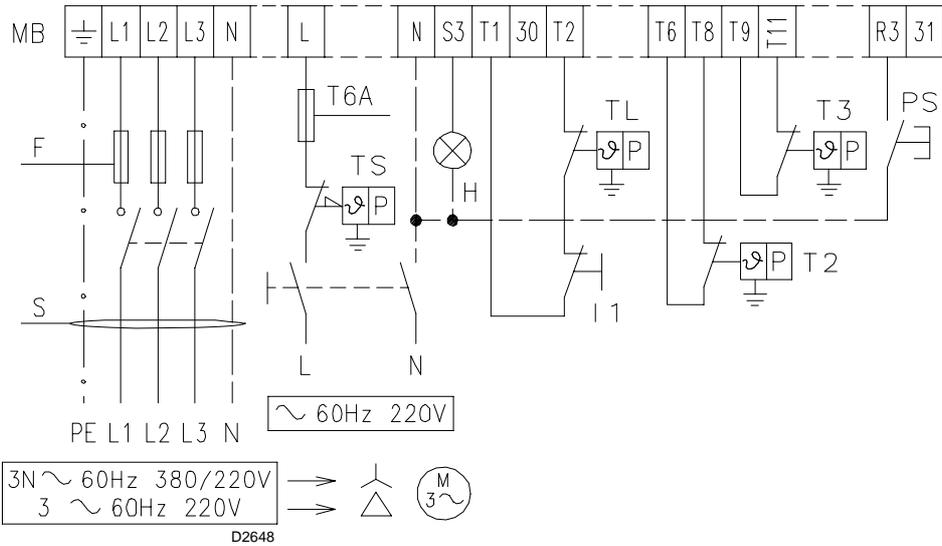


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KEY TO LAYOUT

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

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



	220V	380V
F Ampere	T35	T25
S mm ²	4,0	2,5

KEY TO LAYOUT

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

Important:

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

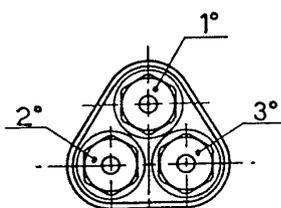
Note:

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 170 kg/h) 1st and 2nd nozzle are not equal to the 3rd one. Follow this procedure in order to obtain higher values of CO₂ (during 1st and 2nd 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 1st and 2nd stage.

SUGGESTED NOZZLES



1st Stage / 2nd Stage

A	Nozzles 60° Pump 12 bar (1)			Total delivery kg/h
	GPH			
	1 st	2 nd	3 rd	1 st + 2 nd + 3 rd
8.00	8.00	8.00	102.90	
8.30	8.30	8.30	106.80	
8.50	8.50	8.50	109.50	
9.00	9.00	9.00	115.80	
9.50	9.50	9.50	122.40	
10.00	10.00	10.00	128.70	
10.50	10.50	10.50	135.30	
11.00	11.00	11.00	141.60	
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	

3rd Stage

B	Nozzles 60° Pump 12 bar (1)			Total delivery kg/h
	GPH			
	1 st	2 nd	3 rd	1 st + 2 nd + 3 rd
10.00	10.00	5.00	107.30	
10.50	10.50	5.00	111.70	
10.50	10.50	6.00	115.90	
11.00	11.00	6.50	122.30	
12.00	12.00	6.50	130.90	
12.00	12.00	7.50	135.20	
13.00	13.00	7.50	143.80	
13.80	13.80	7.50	150.70	
13.80	13.80	10.00	161.30	
13.80	13.80	12.00	169.90	
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	

(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.

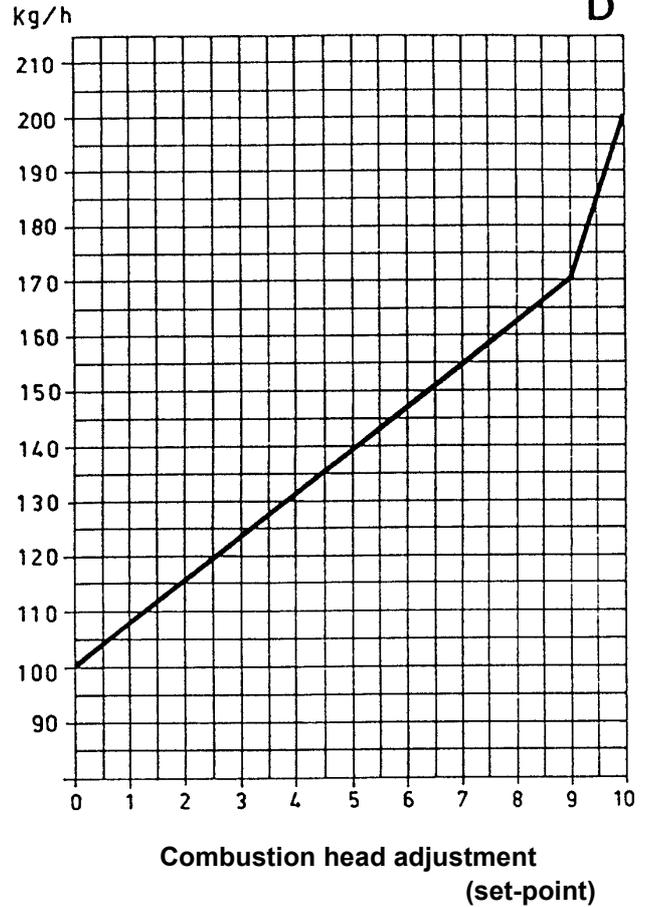
**Nozzles delivery
Pump pressure**

C

bar GPH	10	11	12	13	14
8.00	31.1	32.8	34.3	35.9	37.3
8.30	32.3	34.0	35.6	37.2	38.7
8.50	33.1	34.8	36.5	38.1	39.7
9.00	35.0	36.9	38.6	40.3	42.0
9.50	37.0	38.9	40.8	42.6	44.3
10.00	38.9	41.0	42.9	44.8	46.7
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	62.8	65.7	68.6	71.4

**Combustion head adjustment
Maximum output**

D



Rated nozzles delivery are shown in the table.

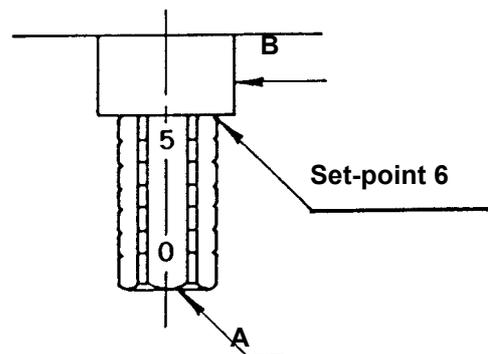
The real nozzle delivery may vary from the rated one up to $\pm 5\%$, its detection is made by weighing the oil sprayed out from the nozzle inserted in a tube.

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.

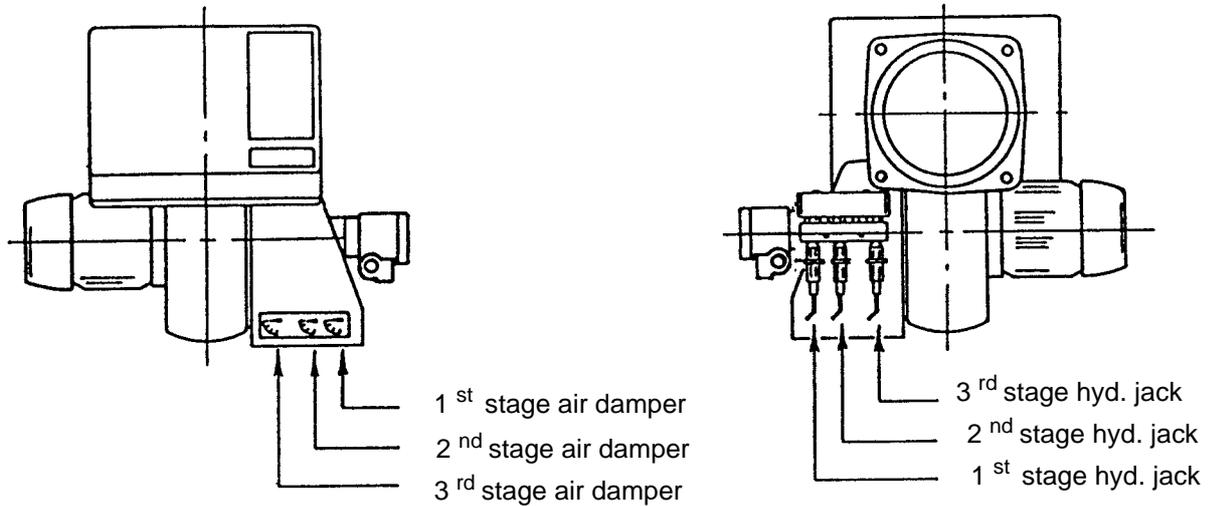
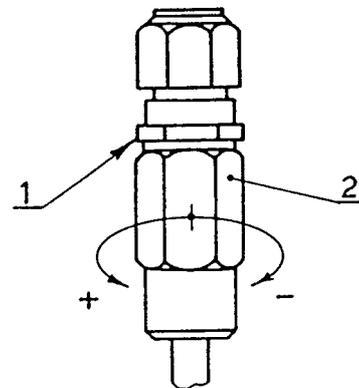


Fig. 2 shows the placement of the air dampers as fig. 3 their correspondent hydraulic jacks.

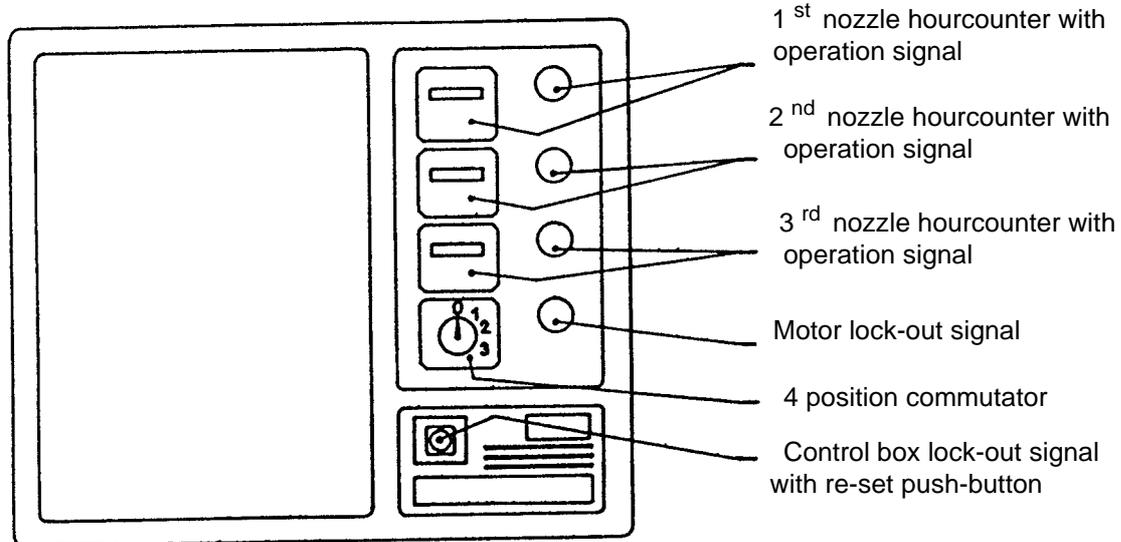
To open or close the air dampers proceed as follows:
Loose the ring nut (1), turn clockwise the hexagonal body (2)
in order to decrease the air flow, and counterclockwise to in-
crease it.



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 10) should be set to the position corresponding to the burner stage to be controlled.

ELECTRIC PANEL



Hourcounter

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

Commutator

Pos. 0: Burner stop

Pos. 1: Burner operation only at 1st stage

Pos. 2: Burner operation at 1st and 2nd stage

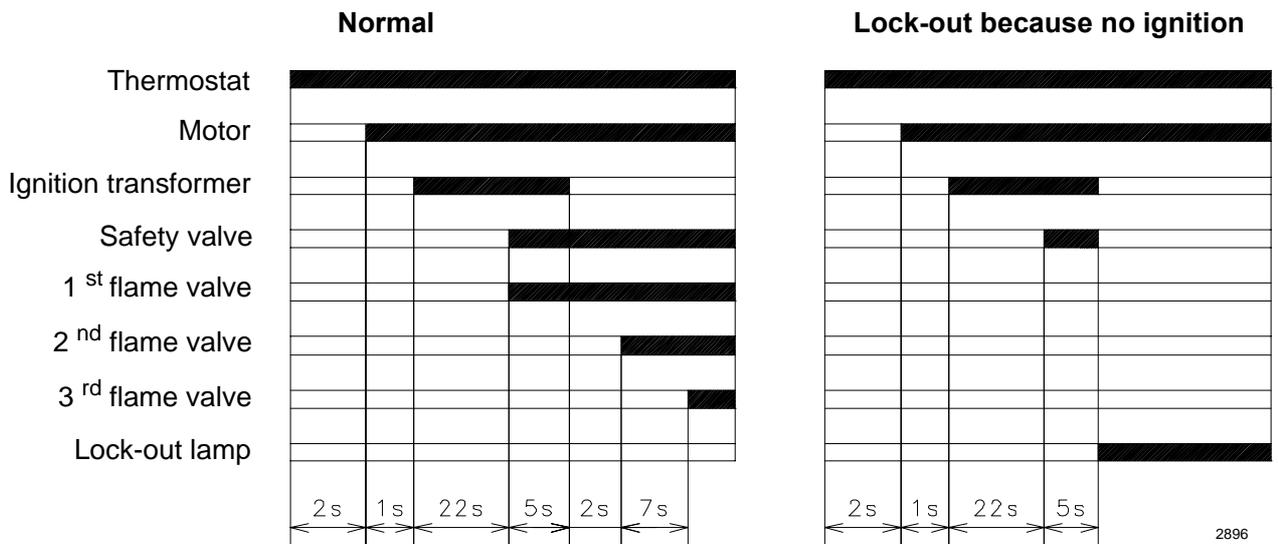
Pos. 3: Burner operation at 1st, 2nd and 3rd stage

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).

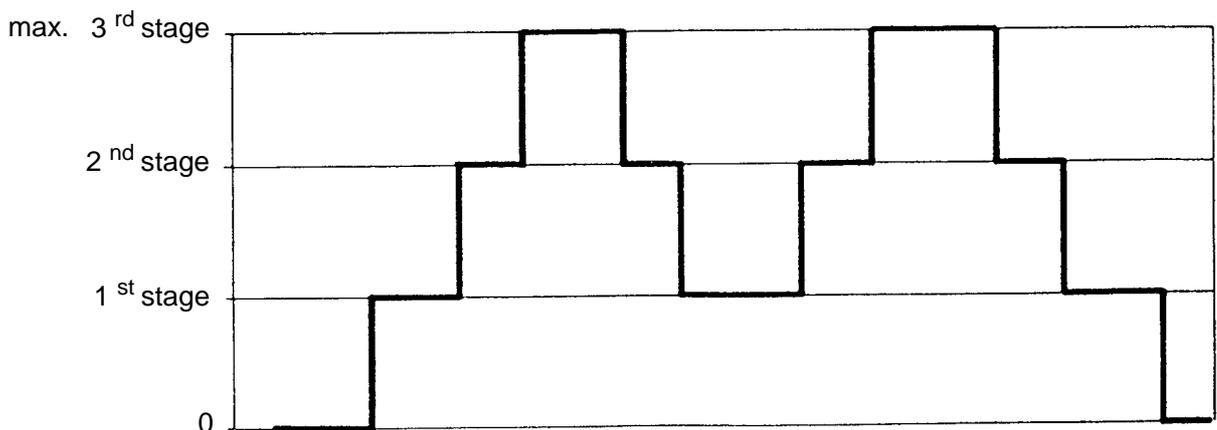
BBURNER START-UP CYCLE



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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