

- I** Bruciatori di nafta
- D** Heizölbrenner
- F** Brûleurs à fioul lourd
- GB** Heavy oil burners



CODICE CODE	MODELLO - MODELL MODELE - MODEL	TIPO - TYP TYPE
3436921	PRESS 140 T/N ECO	630 M
3436922	PRESS 140 T/N ECO	630 M

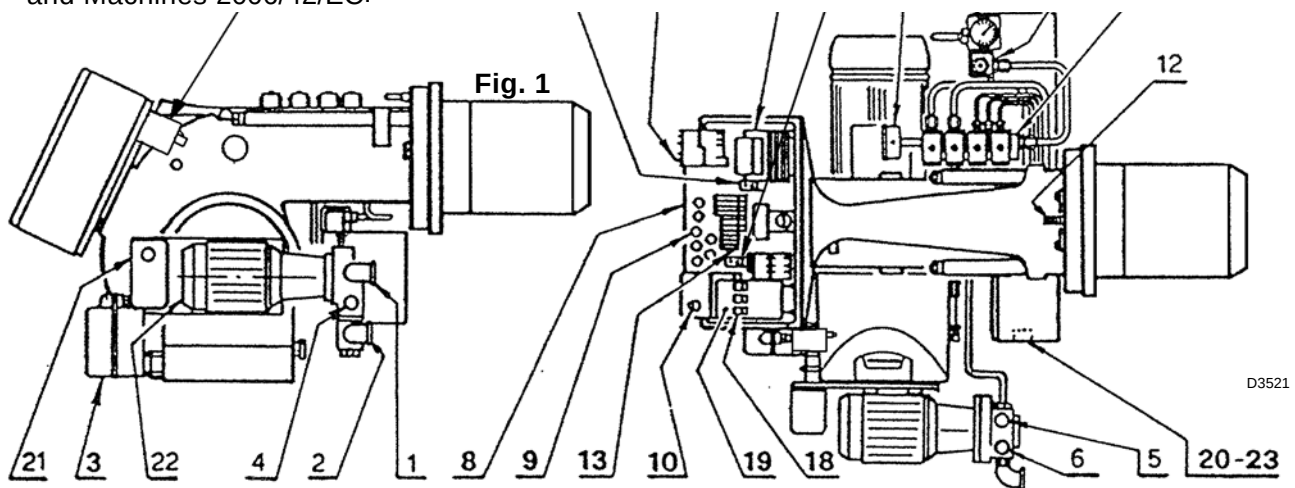
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1. BURNER DESCRIPTION

One, two, third stage fuel oil burner.

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



- | | |
|---|---------------------------|
| 1 - Suction line | 13 - Terminal board |
| 2 - Return fitting | 14 - Ignition transformer |
| 3 - Air damper opening motor | 15 - Double filter |
| 4 - Pump pressure regulator | 16 - Valve group |
| 5 - Manometer fitting (G1/8) | 17 - Manometer |
| 6 - Vacuumeter fitting (G1/2) | 18 - Indicator light |
| 7 - Reset push-button of the motor overload relay | 19 - Switch |
| 8 - Electric control panel | 20 - Minimum thermostat |
| 9 - Cable grommets | 21 - Pump motor starter |
| 10 - Control box reset push-button and lock-out indicator | 22 - Pump motor |
| 11 - Adjustment thermostat | 23 - Maximum thermostat |
| 12 - Regulating screw for combustion head | 24 - Timer |
| | 25 - Air pressure switch |

2. TECHNICAL DATA

2.1 TECHNICAL DATA

TYPE	630 M
Thermal power - Capacity	320 ÷ 1600 kW – 28 ÷ 140 kg/h (see tables below)
Fuel	Oil with max. viscosity at 50° C 115 sq.mm/secs (15° E)
Pump	210 kg/h at 25 bar

2.2 ELECTRICAL DATA

MOTOR IE1

Electrical supply	Three-phase, 230V ± 10% ~ 50Hz without neutral 400V ± 10% ~ 50Hz with neutral
Motor	230 / 400V Fan 13.5 / 8 A – Pump 3.1 / 1.8 A
Ignition transformer	Primary 2.35 A – Secondary 2 x 6 kV – 35 mA
Heaters	14 kW
Electrical intake power	19 kW

MOTOR IE2

Electrical supply	Three-phase, 230V ± 10% ~ 50Hz without neutral 400V ± 10% ~ 50Hz with neutral
Motor	230 / 400V Fan 13.5 / 7.8 A
Ignition transformer	Primary 2.35 A – Secondary 2 x 6 kV – 35 mA
Heaters	14 kW
Electrical intake power	19 kW

2.3 EQUIPMENT

Flexible tubes	No. 2
Flange for gasket	No. 1
Connectors	No. 2
Nozzles	No. 3
Cables grommet	No. 5
Screws	No. 4
Fitting for operation with fuel oil emulsified (see page 12).	No. 1
Seal	No. 1

OPERATION AND EFFICIENCY OF THE BURNER

SINGLE STAGE	Thermal power - Capacity			
	Minimum		Maximum	
	kW	kg/h	kW	kg/h
1 st nozzle: only ignition stage	262	23	536	47
1 st + 2 nd nozzle: intermediate phase	536	47	1060	93
1 st + 2 nd + 3 rd nozzle: operation phase	798	70	1595	140

TWO STAGE	Thermal power - Capacity			
	Minimum		Maximum	
	kW	kg/h	kW	kg/h
1 st nozzle: only ignition stage	262	23	536	47
1 st + 2 nd nozzle: 1 st stage of operation	536	47	1060	93
1 st + 2 nd + 3 rd nozzle: 2 nd stage of operation	798	70	1595	140

THREE STAGE	Thermal power - Capacity			
	Minimum		Maximum	
	kW	kg/h	kW	kg/h
1 st nozzle: 1 st stage of operation	319	28	536	47
1 st + 2 nd nozzle: 2 nd stage of operation	638	56	1060	93
1 st + 2 nd + 3 rd nozzle: 3 rd stage of operation	798	70	1595	140

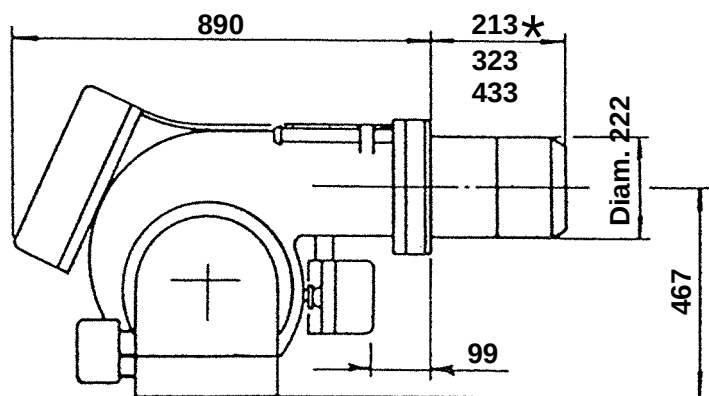
ACCESSOIRES

RADIO DISTURBANCE PROTECTION KIT: Code 3010386

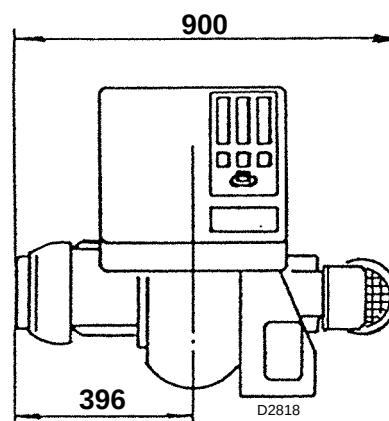
If the burner is installed in places particularly subject to radio disturbance (emission of signals exceeding 10 V/m) owing to the presence of an INVERTER, or in applications where the length of the thermostat connections exceeds 20 metres, a protection kit is available as an interface between the control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

2.4 DIMENSIONS

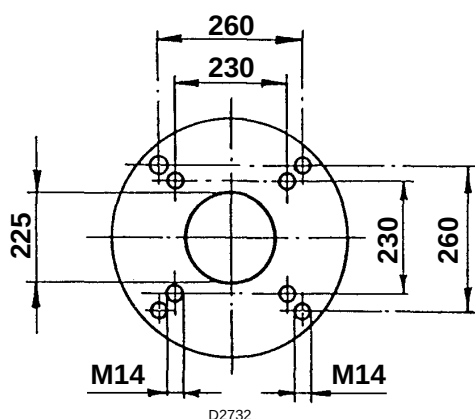
Burner



* Spacer available, upon request.



Boiler front plate hole

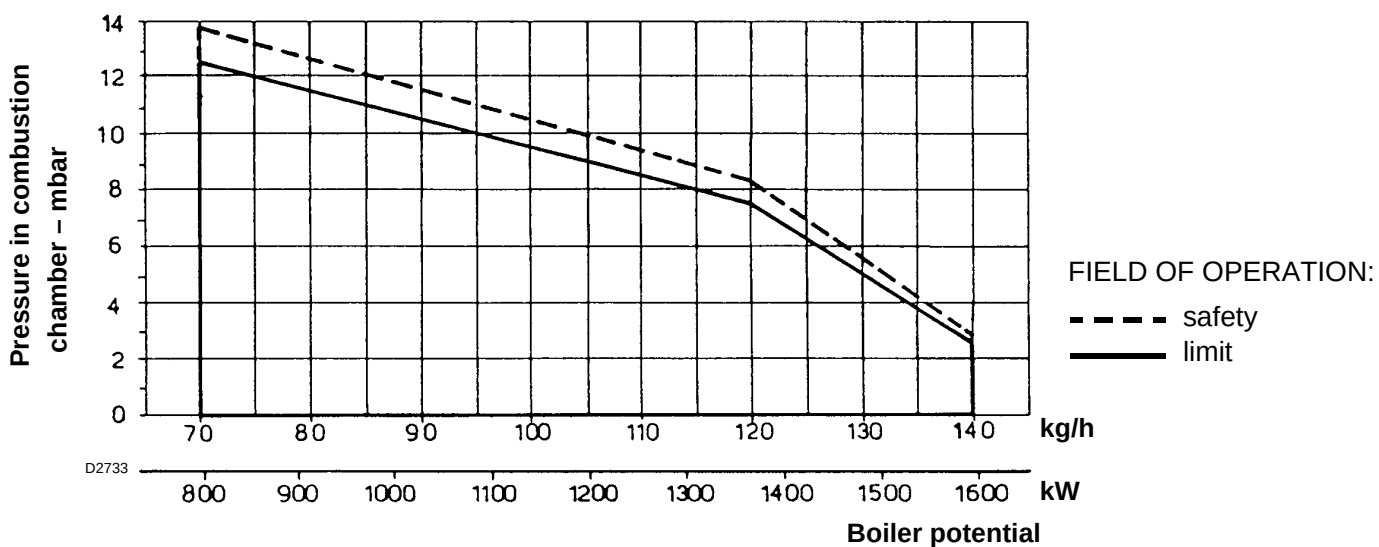


COMBUSTION HEAD PROJECTION

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

Make a proper protection with refractory material on the part of the combustion head projecting into the combustion chamber for boilers with a front smoke box.

2.5 FIELD OF OPERATION (3 functioning nozzles)



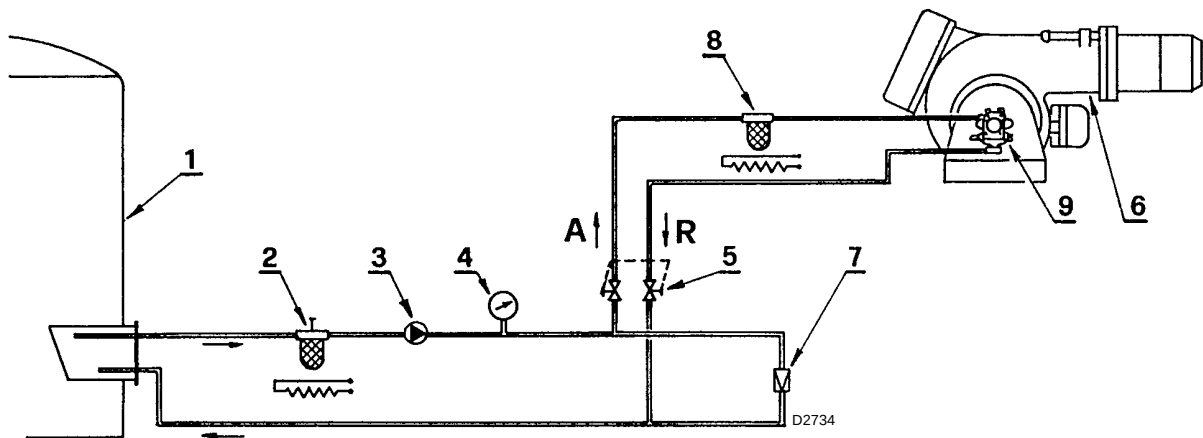
When the burner operates with only one or two nozzles, the pressurization conditions are improved and no problems arise.

3. INSTALLATION

3.1 FUEL OIL FEED SYSTEMS

LOOP SYSTEM

For heavy oil with viscosity up to 50°E/50°C.



- 1 - Tank (heated for heavy oil)
- 2 - Filter (with resistor for oil > 7°E/50°C)
- 3 - Transfer pump
- 4 - Monitoring manometer
- 5 - Damper valves to exclude the burner (coupled)

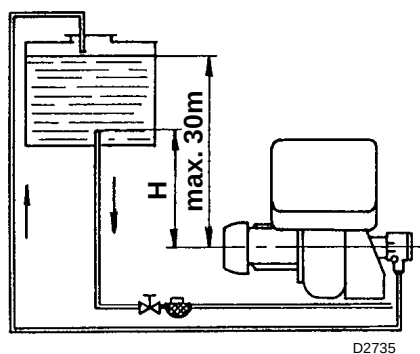
- 6 - Burner
- 7 - Pressure adjuster
- 8 - Filter (with resistor for oil > 7°E/50°C)
- 9 - Burner pump

WARNING

- To make the oil flow easily through the pipes they must be properly sized, insulated and heated (by electricity, steam or hot water).
- The transfer pump capacity should be all the least double of that of the burner pump.
If several burners are supplied through the same ring supply line, the transfer pump should have a capacity of approx. 30% more than the sum of the single burner capacities.
- For starting-up: after excluding the burner with the air damper valves (5), circulate the fuel in the supply ring; Once circulation is at full flow open the air dampers and supply the burner normally.

GRAVITY SYSTEM

Only for oil with viscosity up to 7°E/50°C.



Pump priming:

loosen the cap of the vacuumeter fitting (6, fig. 1) and wait for the oil to flow out.

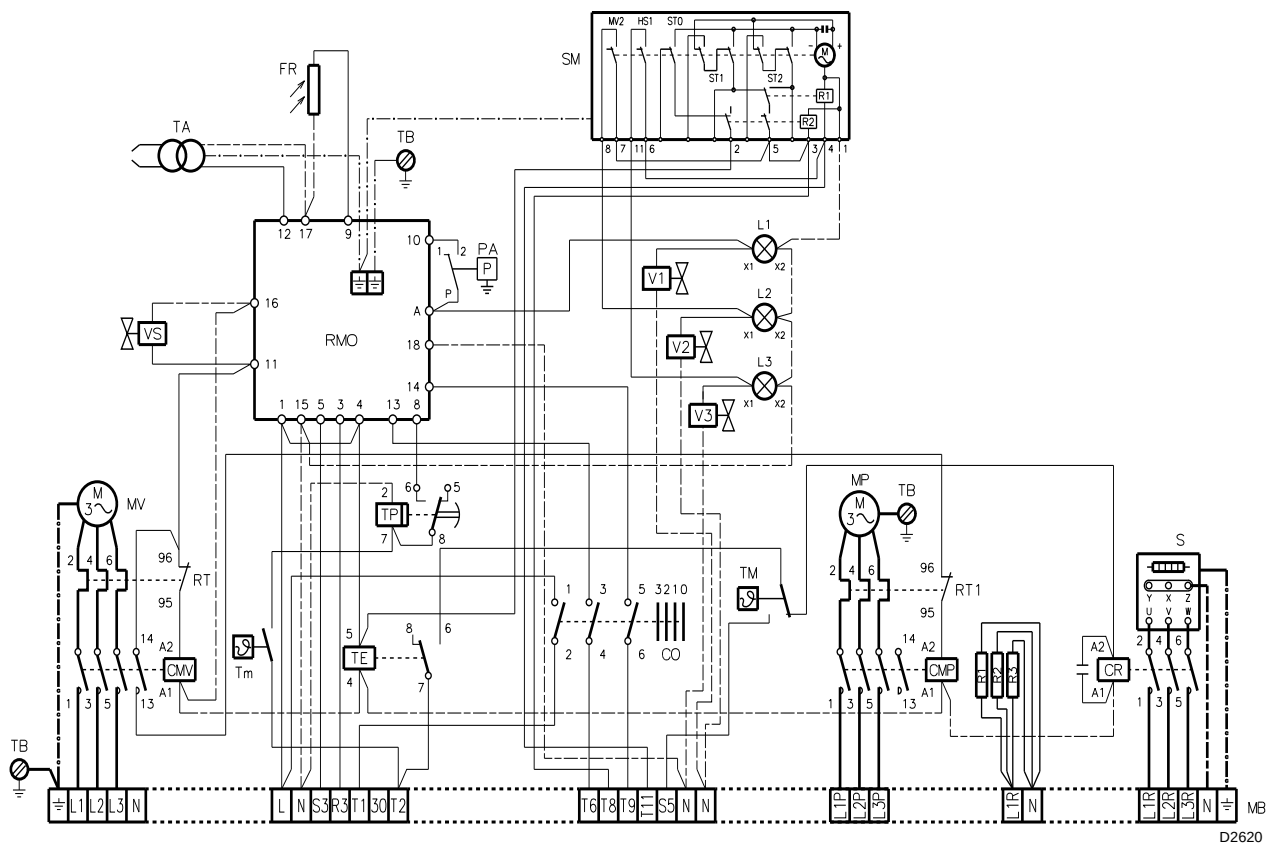
H: Difference in height
L: Length of the suction tube

H metres	L metres	
	diam. 1"	diam. 1 1/4"
0	2	10
0.5	3	11
1	4	12
1.5	5	13
2	6	14

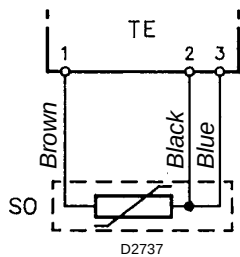
Attention:

before starting the burner, ensure that the return line is not clogged. any obstruction may damage the sealing of the pump.

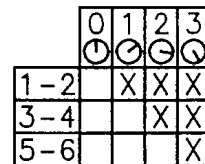
3.2 ELECTRICAL SYSTEM (made in the factory)



PROBE CONNECTION TO THE HEAT REGULATOR



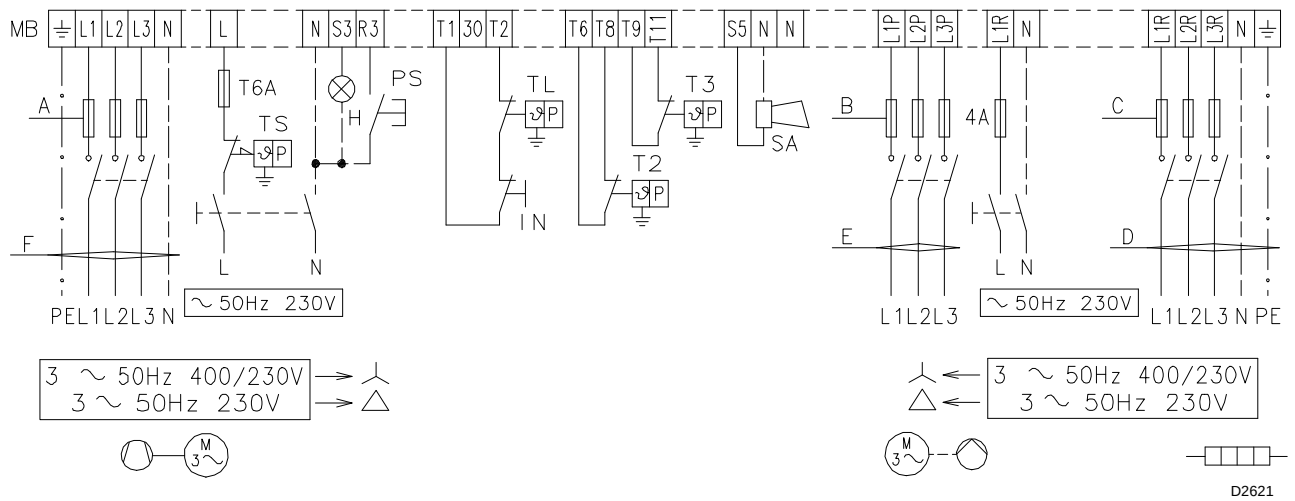
SWITCH SCHEMATIC



CMP Pump motor contact maker
CMV Fan motor contact maker
CR Pre-heater contact maker
CO Switch
FR photocell
L1 Indicator lights for 1st stage
L2 Indicator lights for 2nd stage
L3 Indicator lights for 3rd stage
MB Burner terminal strip
MP Pump motor
MV Fan motor
R1 Atomiser holder resistor
R2 Pump resistor
R3 Valve group resistor
RMO Electrical control box

RT CMV thermal relay
RT1 CMP thermal relay
S Pre-heater tank
SM Servomotor
SO Probe PT100
TA Ignition transformer
TB Burner earth
TE Thermoregulator
Tm Minimum thermostat
TM Maximum thermostat
TP Timer
V1 1st stage valve
V2 2nd stage valve
V3 3rd stage valve
VS Safety valve
PA Air pressure switch

3.3 ELECTRICAL CONNECTIONS TO THE BURNER TERMINAL STRIP (to be made by the installer)



	230V	400V
A Ampere	T 25	T 25
B Ampere	T10	T 6
C Ampere	T 50	T 35
D sq.mm	10	6
E sq.mm	1.5	1.5
F sq.mm	2.5	2.5

IN Optional manual on-off switch
MB Burner terminal strip
H Remote lock-out signal
PS Reset push - button
SA High temperature oil alarm

TL Limit remote control
TS Safety remote control
T2 Thermostat for 2nd stage
T3 Thermostat for 3rd stage

NOTE:

- Check the lock-out by darkening the photocell after removal of the cover.
ATTENTION HIGH VOLTAGE.
- This model leaves the factory for operation with 400V power supply.
 If the supply is 230V change the motor and the tank connection (from the star to delta) and the calibration of the thermal relay.
- NOTE**
 In systems where the lengths of wiring connecting the thermostat exceed 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-interface kit item number 3010386.

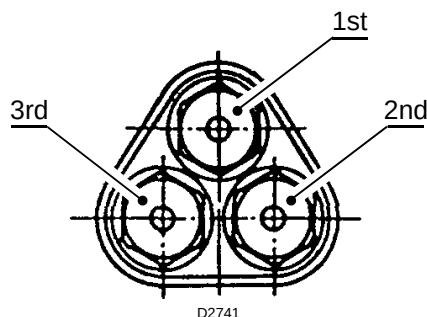
4. OPERATION

4.1 CHOICE OF NOZZLES

First of all establish the maximum flow rate required with all three nozzles in operation.

On the basis of the maximum flow rate choose, from **table A**, three related nozzles necessary.

Recommended nozzles: - **Monarch F 80 H0**.



If required:

- modify the pump pressure in order to vary the flow rate
 - rearrange the 3 nozzle group,
 - knowledge of the flow rate in 1st and 2nd stage.
- use **table B**.

4.2 PUMP PRESSURE

The pump pressure refers to all three nozzles operating.

The pump pressure increases automatically when two nozzles are operating and becomes higher with only one nozzle.

Recommended pressure:

- Fluid oil: 25 bar
- Heavy oil: 28 bar

Rated nozzle flow rates are listed on the table.

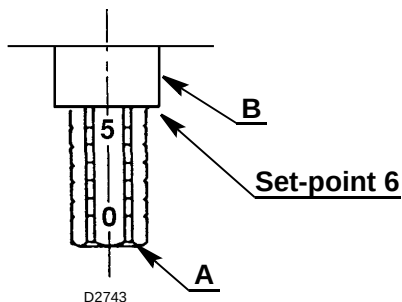
The actual flow rate may vary by $\pm 5\%$ against the rated one.

The pump leaves the factory set at 25 bar.

4.3 COMBUSTION HEAD ADJUSTMENT

On the basis of the maximum flow rate get the combustion head adjustment from **diagram C**.

The adjustment should be made by turning the screw **A** till the set-point shown in the diagram bring into line with the bushing **B** plane.



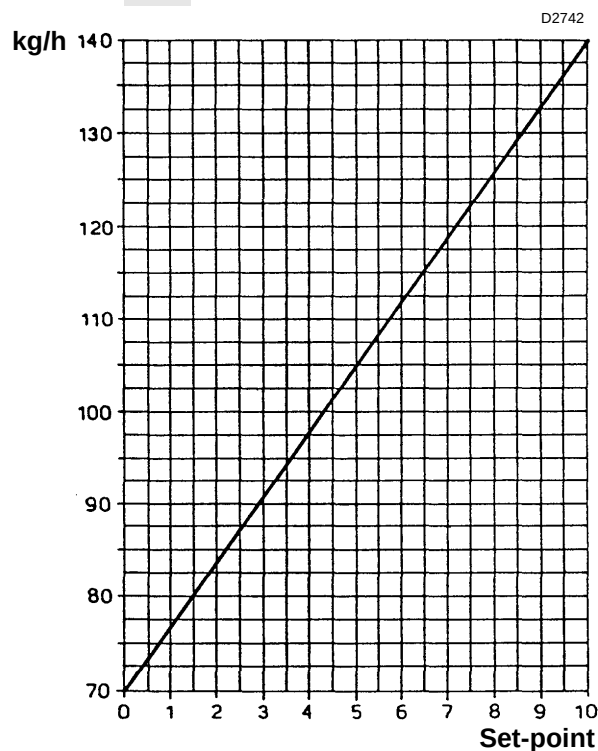
A

Nozzles GPH 60°			Total capacity kg/h 1 st +2 nd +3 rd	
1st	2nd	3rd	25 bar	28 bar
3.50	3.50	3.50	66	70
4.00	4.00	4.00	75	79
4.50	4,50	4.50	84	90
5.00	5.00	5.00	96	99
5.50	5.50	5.50	105	111
6.00	6.00	6.00	114	120
6.50	6,50	6.50	123	132
7.00	7.00	7.00	132	141
7.50	7.50	7.50	141	—

B

GPH	25 bar kg/h	28 bar kg/h
3.50	22	23.5
4.00	25	26.5
4.50	28	30
5.00	32	33
5.50	35	37
6.00	38	40
6.50	41	44
7.00	44	47
7.50	47	50

C



4.4 AIR DAMPER ADJUSTMENTS

The adjustment of the air dampers shall be set each time, with reference to the nozzle flow rate and the combustion chamber pressurization.

Fig. 2 shows the positioning of the air dampers.

Fig. 3 shows the positioning of the cams in the motor.

1st STAGE ADJUSTMENT:

manual regulation carried out by acting on the sector A, fig. 2.

2nd - 3rd STAGE ADJUSTMENT:

must be made by acting on the coloured levers of the motor fig. 3:

Blue lever:

adjustment not necessary. Positioned by the factory on the vertical of the motor axis. It keeps the dampers of the 2nd and 3rd stage closed during 1st stage operation and when stopped.

Do not turn clockwise (–) the lever to avoid air dampers sticking, turning it anticlockwise (+) the motor will take this position during the transition from 2nd to 1st stage or during the stop.

Orange lever:

for 2nd stage air damper adjustment, it is adjustable on both opening and closure.

Red lever:

for 3rd stage air dampers adjustment, it is adjustable both on opening and closure.

Black lever:

it controls the opening of the 2nd stage oil valve. It must always be before the orange lever. The control of the 3rd stage valve is automatic through one of the cams next to the red lever.

Fig. 2

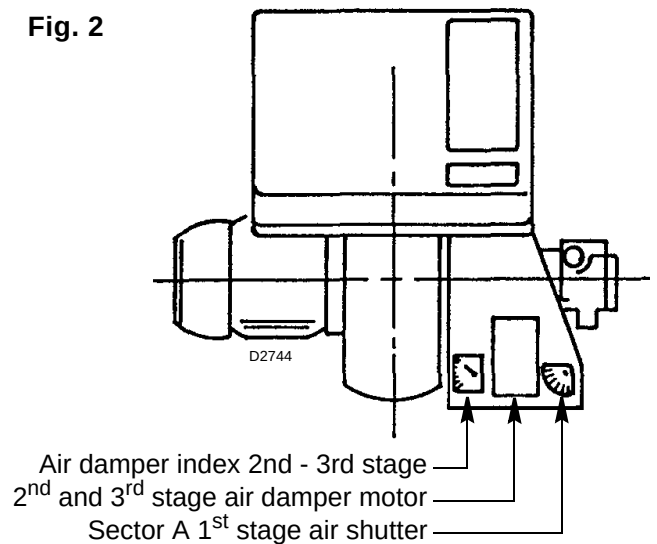
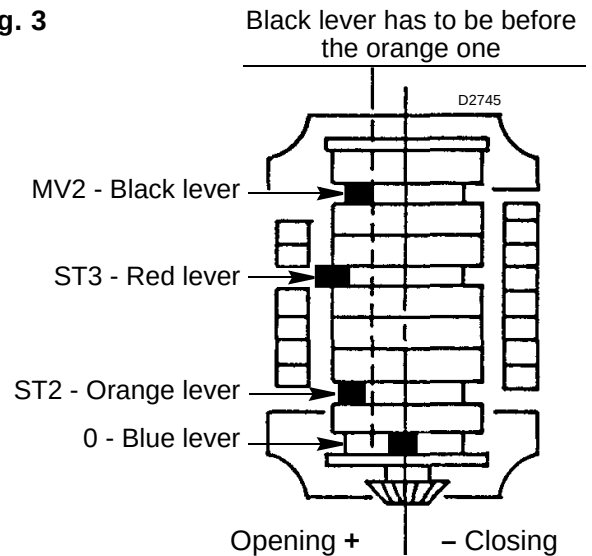


Fig. 3

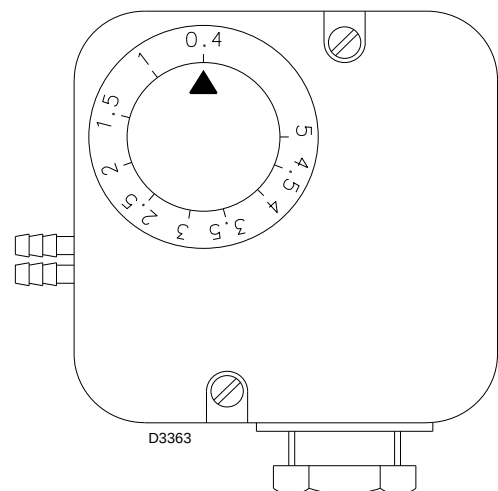


4.5 AIR PRESSURE SWITCH

Carry out the regulation of the air pressure switch after carrying out all the other regulations of the burner with the air pressure switch adjusted at the beginning of the scale.

With the burner operating at MIN power increase the pressure of the adjustment by slowly turning the appropriate knob clockwise until the burner locks out.

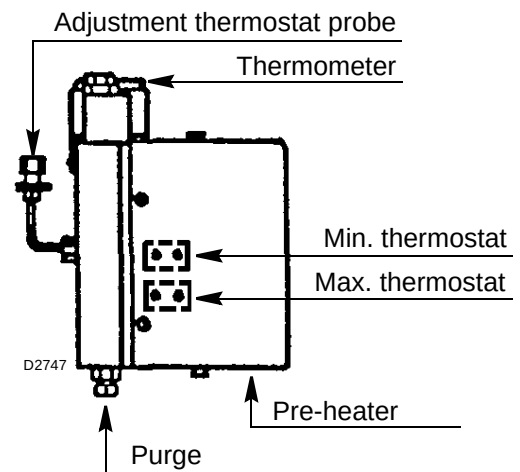
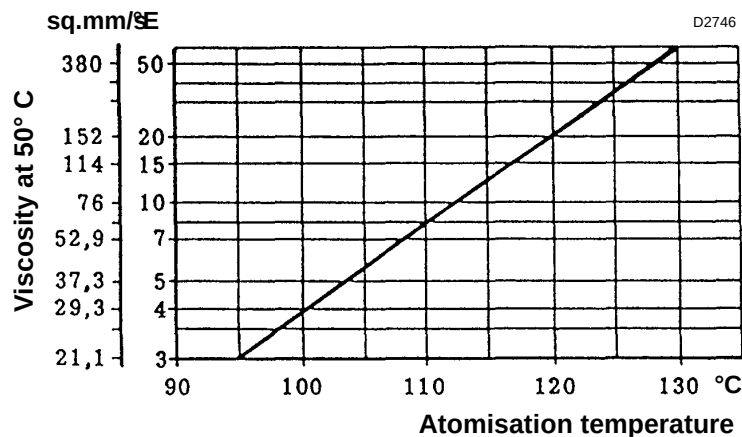
Then turn the knob counterclockwise to a value equal to about 20% of the regulated value and then check the correct ignition of the burner. If the burner locks out again turn the knob a bit further in a counterclockwise direction.



4.6 ATOMISATION TEMPERATURE ADJUSTMENT

Thermostat for adjustment - maximum value - minimum value

Electronic adjustment thermostat by means of information relayed from a PT 100 probe immersed in the oil in the delivery manifold, the thermostat adjusts atomisation temperature. (The correct conditions for fuel atomisation are shown in the temperature/viscosity graph below).



Example: fuel oil with 7 °E viscosity at 50 °C is pre-heated to approximately 110 °C.

Important: although the temperature set on the thermostat should correspond to the temperature of the fluid, it is better practice to check that the thermometer shows the correct reading once the unit has been in operation for a few minutes.

The LED will illuminate to indicate that the heating resistors are working properly.

Minimum temperature thermostat, in addition to shutting down the burner if the fuel temperature should fall below the critical value for correct combustion, this thermostat also provides a enabling signal at the time of burner start-up.

(Factory setting at approximately 80°C, adjustable by removing the pre-heater cover and relative plate).

Maximum temperature thermostat this switches off the resistor when, because of failure of the adjustment thermostat, the temperature of the pre-heater increases to unacceptable levels; a "high temperature" alarm output is provided on the burner terminal strip. (Factory setting is approximately 180°C).

Replacing the minimum and maximum temperature thermostats.

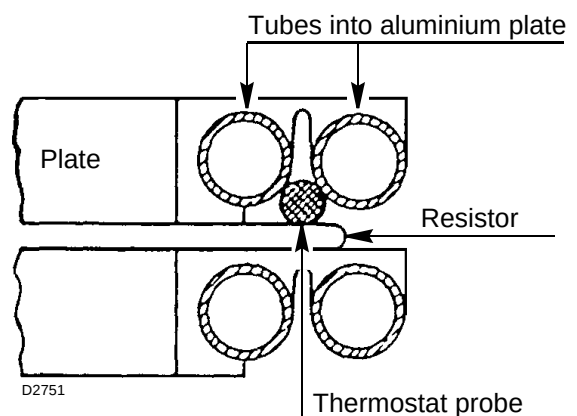
Reposition the probes of the new thermostat, after having first loosened the plate pack securing screws. Make sure that the probe is touching the resistor and the plate pack as shown in the figure opposite.

The same precautions should be taken when renewing the resistors in contact with the thermostat probes.

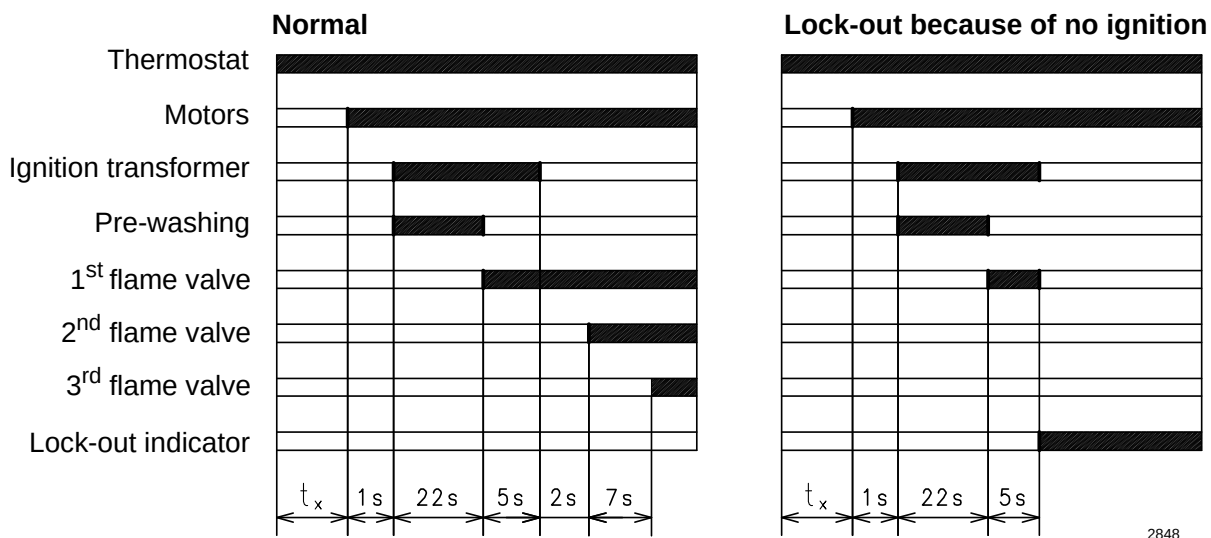
If the pre-heater should malfunction, use an ohmmeter to check that the resistors located in contact with the temperature probes are not burnt out (reading of approximately 35 Ohm).

Changing the PT 100 probe in the oil delivery manifold.

Fit the supplied nut and bi tapered collar on the new probe, insert a length of approximately 40mm in the manifold, and secure firmly into place. At this point, the section remaining outside the manifold can be bent as required, with no risk of damaging the resistor.



4.7 START-UP PROGRAMME



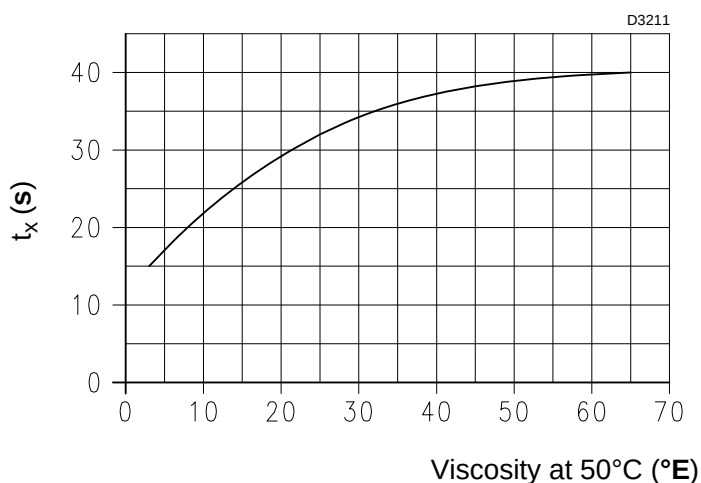
(t_x) Factory setting: 20 secs.
This time determines the fuel oil temperature at ignition. It can be adjusted, in accordance with the fuel's viscosity, by the timer 24) (Fig. 1). The diagram opposite shows the suggested settings.

$$t_x \text{ max} = 60 \text{ secs}$$

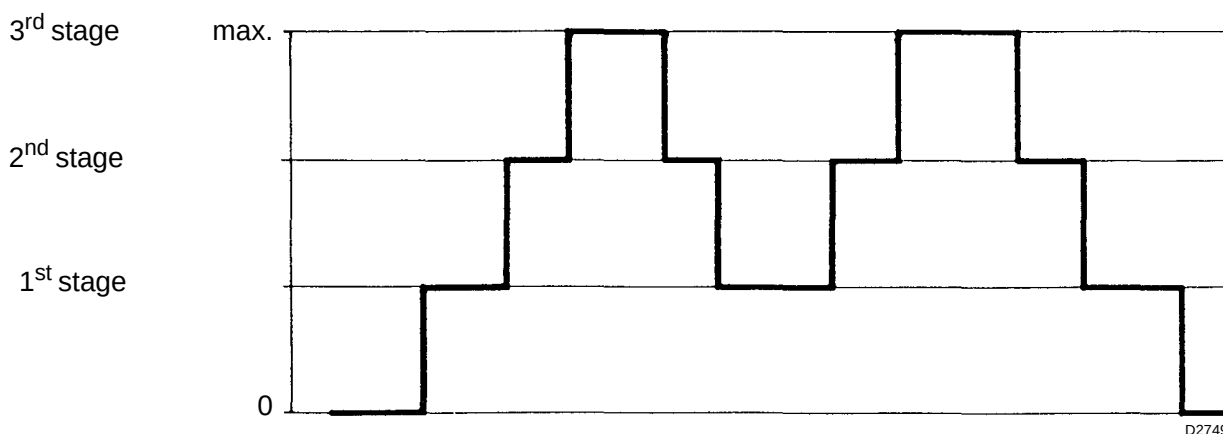
Motor lock-out

It is caused by the motor overload relay if an overload or no phase occurs.

NB.: Periodically clean the filter of the pre-heater tank.



4.8 THREE STAGE OPERATION



4.9 ECOLOGICAL OIL BURNERS

WARNING

The transition from normal fuel oil to ecological fuel oil requires:

- The tank to be emptied of normal fuel oil.
- Cleaning of the tank and the pipes that carry the fuel oil to the burner.
- Application of a filter if there is not one already on the burner fuel line with a filtering grade of 0.3 mm maximum.

If this is not done, Riello S.p.A. declines all liability if the burner fails to work properly or wears out prematurely.

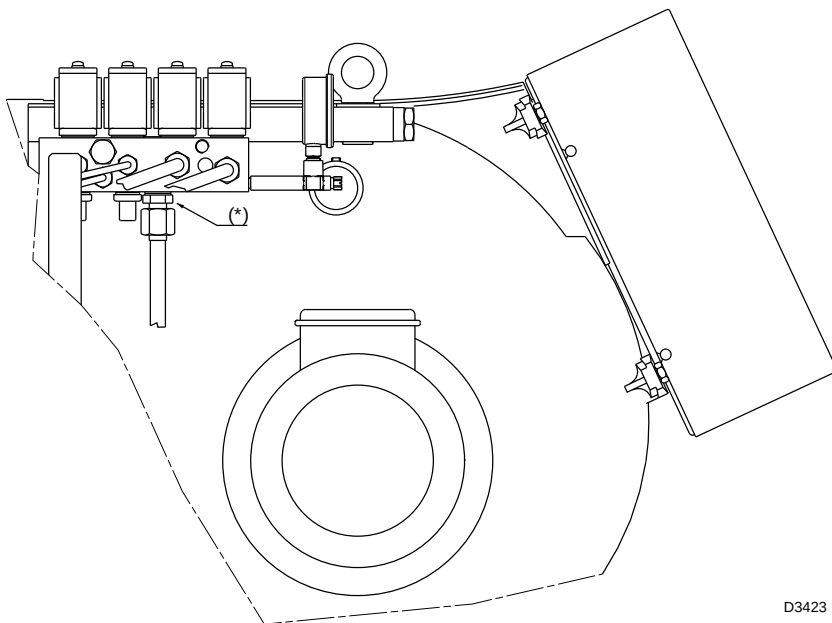
NOTES

These burners are the result of careful study that allows them to be used with ecological fuels as well; oils, that in certain temperature and speed conditions, are particularly aggressive for the vital parts of the burner.

The objective has been achieved with the reduction of the transiting speed in some of the parts and an appropriate choice of materials (in particular surface treatments) as well as a redefinition of the backlashes and coupling tolerances.

The burners for ecological oils are very different from normal fuel oil burners because they have a separate pump (worked by its own motor at 1400 rpm) and for the presence of double filtration between pump and nozzle.

4.10 EMULSIFIED FUEL OIL OPERATION



WARNING

In the case of operation with emulsified fuel oil it is necessary to change the fitting on the burner (*) with the one supplied with it.

4.11 BURNER START-UP PROGRAM DIAGNOSTICS

During start-up, indications are per the following table:

COLOUR CODE TABLE	
Sequences	Colour code
Pre-ventilation	●●●●●●●●●●
Ignition phase	●○●○●○●○●○
Operation with flame ok	□□□□□□□□□□
Operation with weak flame	□○□○□○□○□○
Electrical supply lower than ~ 170V	●▲●▲●▲●▲●▲●▲
Lock-out	▲▲▲▲▲▲▲▲▲▲
Extraneous light	▲□▲□▲□▲□▲□
Key:	○ Off ● Yellow □ Green ▲ Red

4.12 OPERATING FAULT DIAGNOSTICS

The control box has a self-diagnostic system, which enables the possible causes of the operating faults to be easily identified (**RED LED** signal).

To use this function, wait at least ten seconds from the safety lock out, and then press the reset button for a minimum of 3 seconds.

After releasing the button, the RED LED starts flashing as shown in the diagram below .



The pulses of the LED constitute a signal with intervals of approximately three seconds.
The number of pulses will provide the information on the possible faults, as the table below:

SIGNAL	PROBABLE CAUSE
2 blinks ● ●	No stable flame is indicated in the safety period: – faulty photocell; – oil valve fault; – faulty ignition transformer – poor burner regulation.
3 blinks ● ● ●	– Not used.
4 blinks ● ● ● ●	– Light in the chamber before ignition.
7 blinks ● ● ● ● ● ● ●	Loss of flame during operation: – poor burner regulation; – oil valve fault.
8 blinks ● ● ● ● ● ● ● ●	– Faulty thermostat for oil enabling signal; – Heating resistors blown.
10 flashes ● ● ● ● ● ● ● ● ● ●	– Wiring error or internal fault; – Presence of electromagnetic disturbance: use the radio disturbance protection kit.



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)