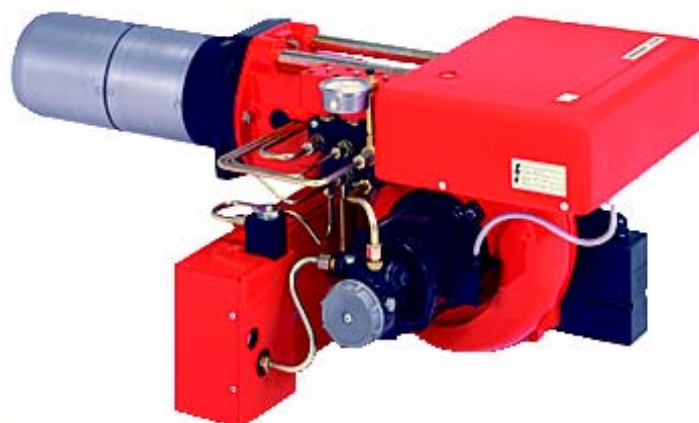


GB Heavy oil burner

Two-stage operation



CODE	MODELE - MODEL	TYPE
3435023	PRESS 60 N/ECO	628 T
3435024	PRESS 60 N/ECO	628 T

INDEX

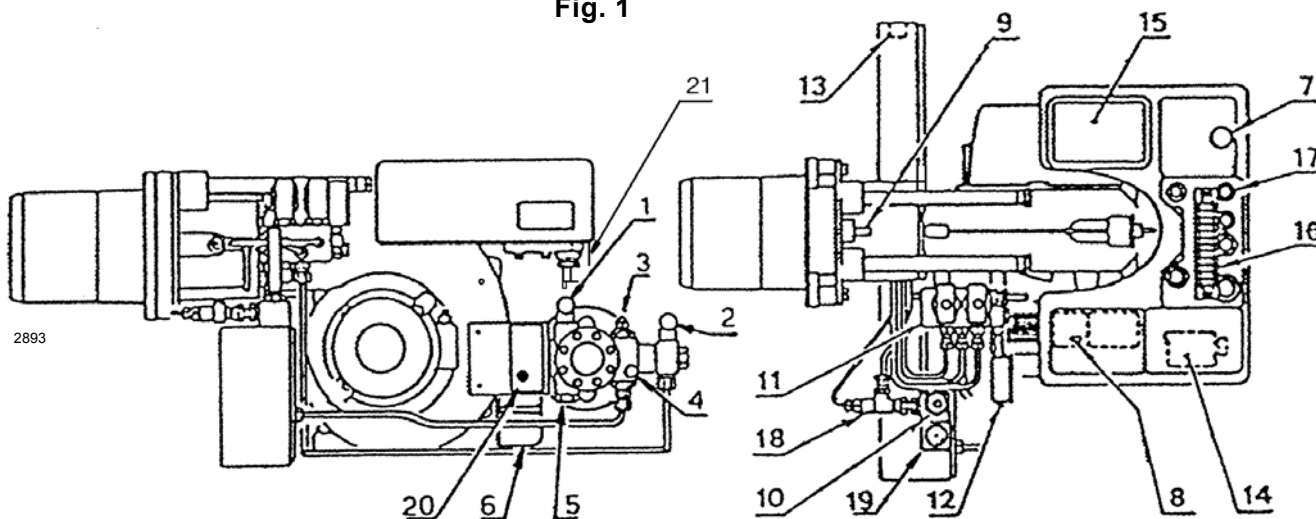
1. BURNER DESCRIPTION	1	4. OPERATION	6
1.1 Equipment	1	4.1 Choice of nozzles	6
2. TECHNICAL DATA	2	4.2 Pump pressure	6
2.1 Technical data	2	4.3 Combustion head setting.....	6
2.2 Dimensions	2	4.4 Adjustment of the air damper motor	6
2.3 Field of operation	2	4.5 Air pressure switch	7
3. INSTALLATION	3	4.6 Atomisation temperature adjustment	7
3.1 Fuel oil supply systems	3	4.7 Start-up programme.....	9
3.2 Electrical system	4	4.8 Ecological oil burners	9
3.3 Electrical connections	5	4.9 Emulsified fuel oil functioning	9
		4.10 Start-up programme diagnostics	10
		4.11 Operating fault diagnostics	10

1. BURNER DESCRIPTION

Two stage heavy oil burner.

- The burner meets protection level of IP 40, EN 60529
- Burner with CE marking in conformity with EEC directives: EMC 89/336/EEC, Low Voltage 73/23/EEC and Machines 98/37/EEC .

Fig. 1



- | | |
|--|--------------------------------------|
| 1 - Suction line | 11 - Valve group |
| 2 - Return fitting | 12 - Manometer with protection valve |
| 3 - Pump pressure regulator | 13 - Adjustment thermostat |
| 4 - Manometer fitting(G1/8) | 14 - Pre-heater contact maker |
| 5 - Vacuumeter fitting (G1/2) | 15 - Ignition transformer |
| 6 - Air damper opening motor | 16 - Terminal board |
| 7 - Control box reset push-button and lock-out light | 17 - Cable glands |
| 8 - Fan overload cutout reset | 18 - Antigas valve |
| 9 - Regulating screw for combustion head | 19 - Thermometer |
| 10 - Double filter | 20 - Pump motor starter with reset |
| | 21 - Air pressure switch |

1.1 EQUIPMENT

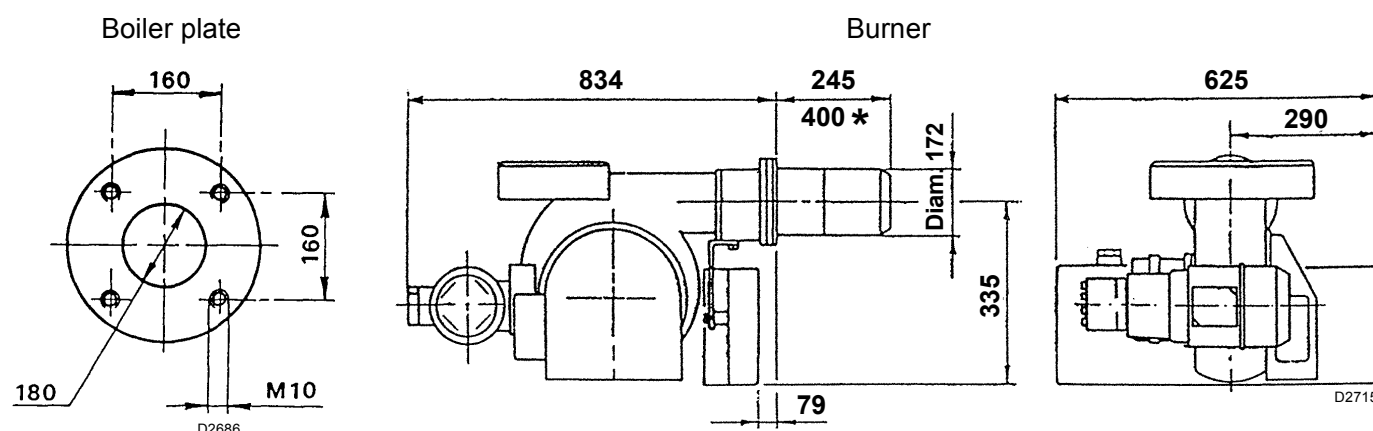
Flexible tubes	No. 2	Nipples.....	No. 2
Seals	No. 2	Screws	No. 4
Flange shield	No. 1	Nozzles	No. 2
Guide extensions (for the lengthened head version).....	No. 2	Gasket	No. 1
Fitting for operation with emulsified fuel oil (see page 9).....	No. 1		

2. TECHNICAL DATA

2.1 TECHNICAL DATA

TYPE	628 T
Thermal power - Capacity	171/342 - 684 kW – 15/30 - 60 kg/h
Fuel	Oil with max. viscosity at 50° C 115 sq.mm/s (15° E)
Electrical supply	Three-phase, 230V \pm 10% \sim 50Hz without neutral 400V \pm 10% \sim 50Hz with neutral
Motor 230V - 400V	Fan: 3.4A - 2A Pump: 2.1A - 1.2A
Ignition transformer	Primary 2 A – Secondary 2 x 6.5 kV – 35 mA
Heaters	4.2 kW
Electrical intake power	5.9 kW
Pump	100 kg/h at 20 bar

2.2 DIMENSIONS



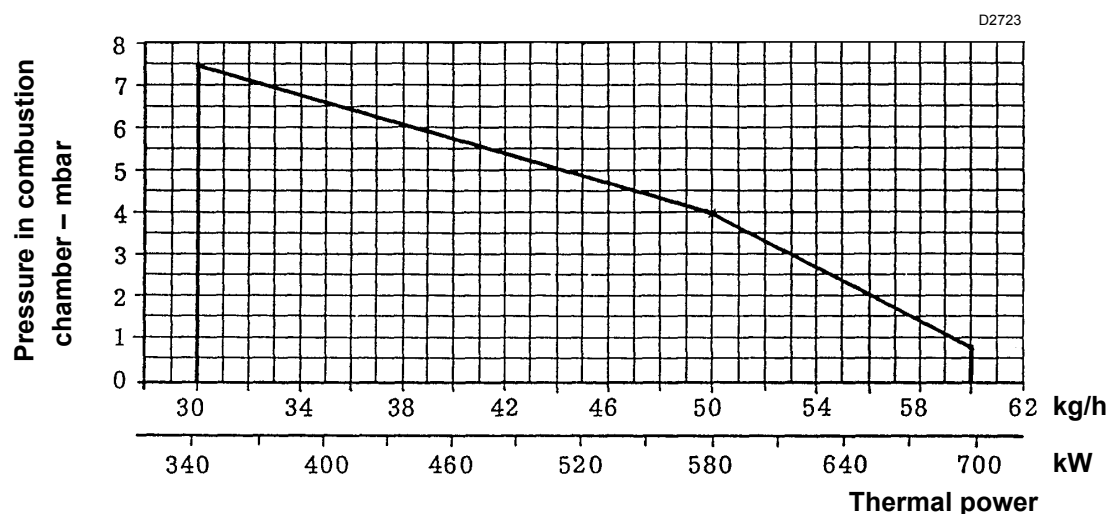
NOTE

The weight of the rear part of the pumping assembly exerts flexure stress on the guides; you are advised to hold the burner while it is being extracted so as not damage the flame disc and the said guides.

★ For long - head version.

Use the pin extensions provided to move the burner back.

2.3 FIELD OF OPERATION (2 nozzles in operation)



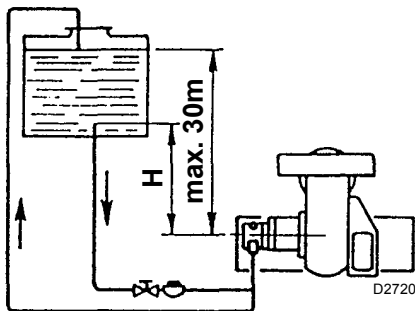
When the burner operates with only one nozzle, the pressurization conditions are better and no problems arise. Minimal fuel capacity with one only nozzle: 15 kg/h - 171 kW.

3. INSTALLATION

3.1 FUEL OIL SUPPLY SYSTEMS

GRAVITY SYSTEM

For fuel oil with viscosity max. 7°E at 50°C.



Pump priming:

loosen the cap of the vacuumeter fitting (5, fig. 1) and wait for the fuel flow.

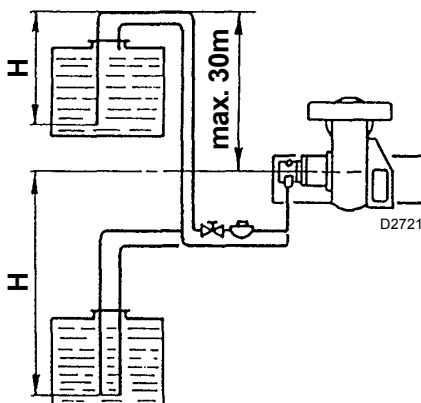
H: Difference in height

L: Length of the suction tube

H metres	L metres	
	diam. 1" gas	diam. 1 1/4" gas
0	6	10
0,5	11	17
1	16	24
1,5	21	31
2	26	38

SUCTION SYSTEM

For light fuel oil with viscosity max. 7°E at 50°C.



Not advised, to be used only if there is a previously existing system.

Never exceed the max. vacuum of 0.5 bar (38 cm Hg) measured at the vacuumeter fitting (5, fig. 1).

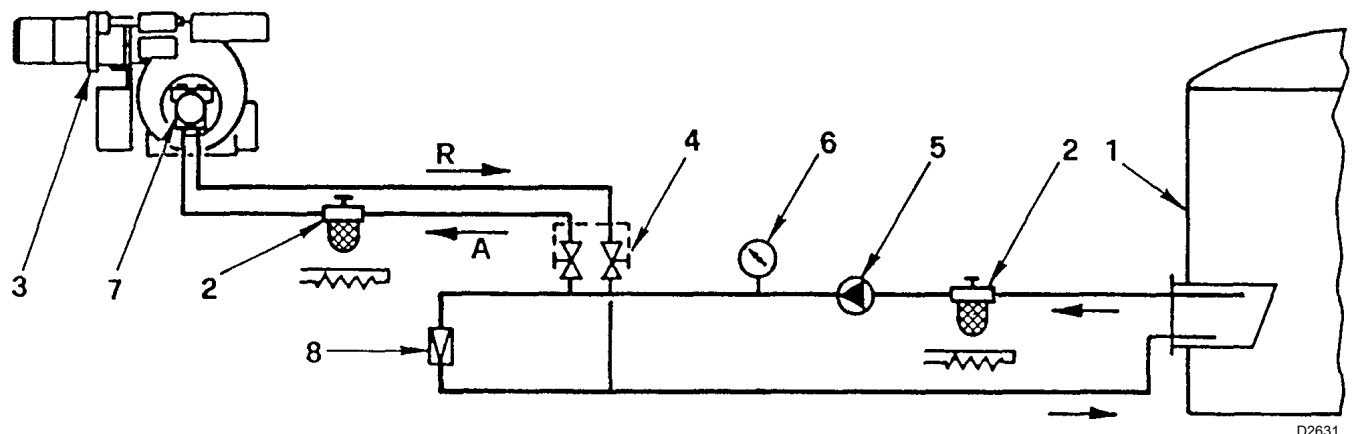
The pipes should be perfectly airtight. When the tank is placed below of the burner level, the return pipe should arrive at the same level of the suction pipe.

In this case the foot valve is not required.

H metres	L metres	
	diam. 1 1/4" gas	diam. 1 1/2"
0	22	45
0,5	19	39
1	16	33
1,5	13	27
2	10	21
2,5	7	15
3	0	8

LOOP SYSTEM (max loop system 3 bar)

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



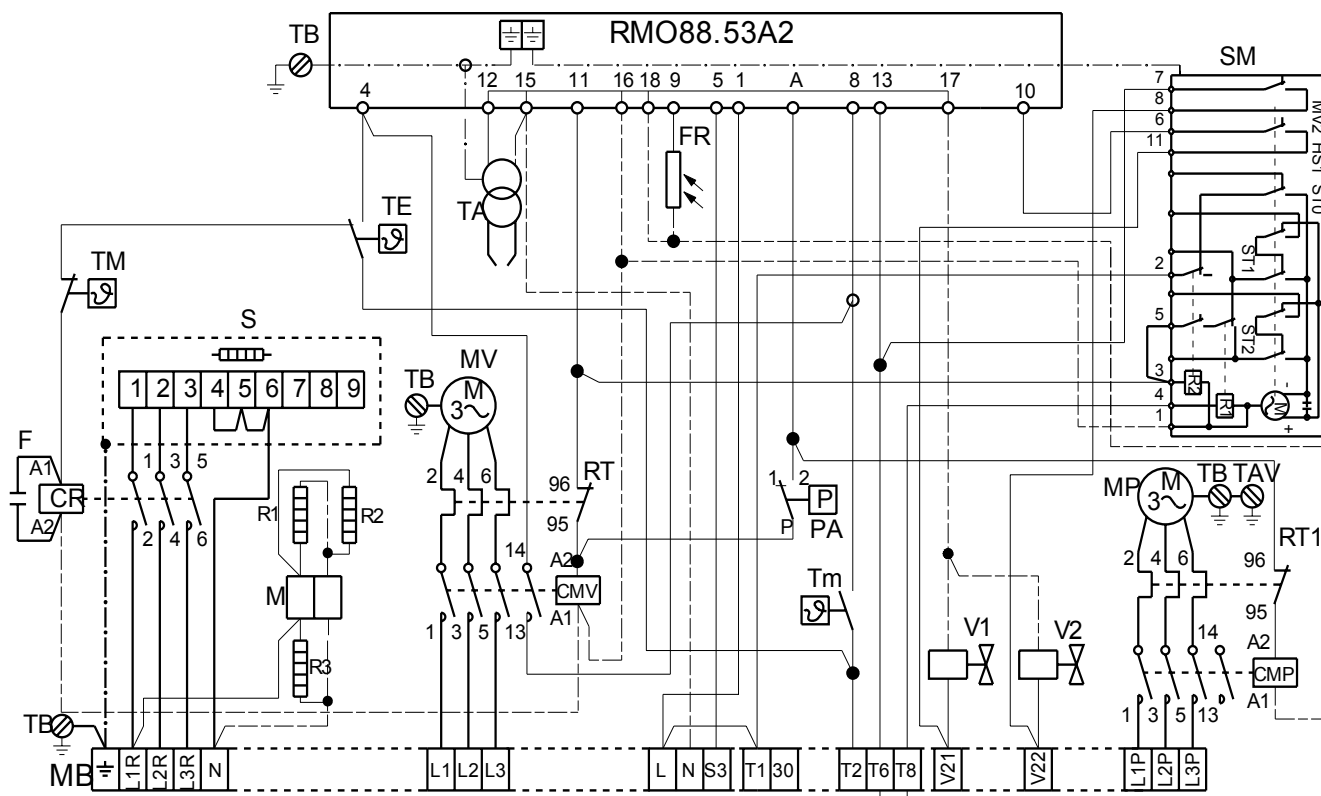
- 1 - Tank (properly heated for heavy oil)
- 2 - Filter (with resistor for oil > 7°E / 50°C)
- 3 - Burner
- 4 - Air dampers for excluding burner (coupled)

- 5 - Transfer pump
- 6 - Manometer
- 7 - Burner pump
- 8 - Pressure adjuster

Notice: to ensure proper fuel flow all the pipes have to be properly sized, insulated and heated. (elec. resistor or steam or hot water).

Warning: before starting up the burner make sure that there is no obstruction in the pipes, any obstruction may damage the sealing of the pump.

3.2 BURNER ELECTRICAL SYSTEM (made in the factory)

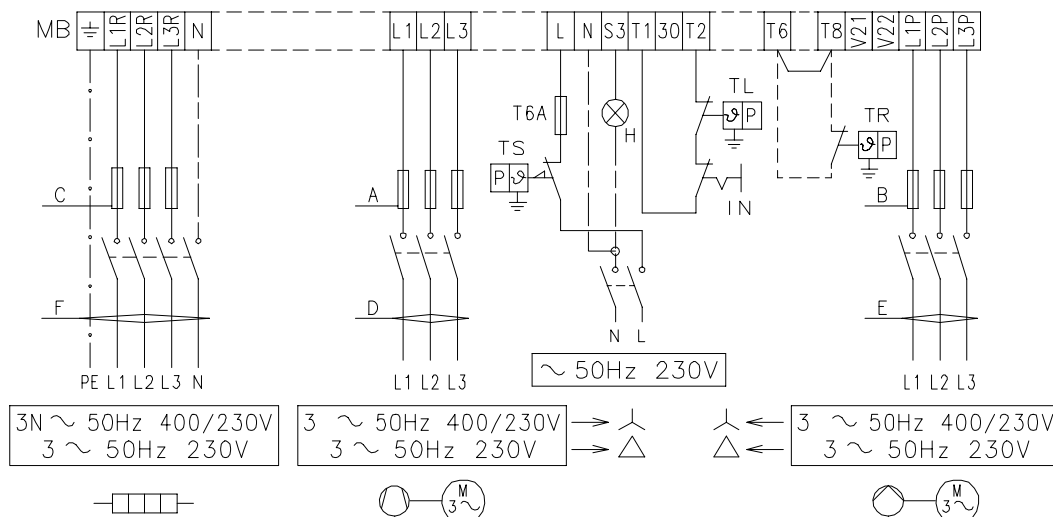


2615

CMP Pump motor contact maker
CR Pre-heater contact maker
F Suppressor
FR photocell
MB Burner terminal strip
MP Pump motor
MV Fan motor
PA Air pressure switch
R1 Atomiser holder resistor
R2 Pump resistor
R3 Valve assembly resistor
RMO Electrical control box

RT Fan motor thermal relay
RT1 Pump motor thermal relay
S Pre-heater tank
SM Servomotor
TA Ignition transformer
TB Burner earth
TE Regulation thermostat and start-up enabling signal
Tm Minimum contact thermostat
Tm Maximum contact thermostat
V1 Oil valve for 1st stage
V2 Oil valve for 2nd stage

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



2616

IN Manual stop switch

MB Burner terminal strip

H Lock-out signal

TL Limit remote control

TR Regulation remote control

TS Safety control device system

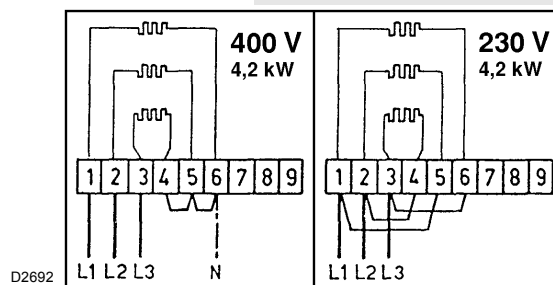
NOTE

- Wire section: min. 1 sq. mm.
(Unless required otherwise by local standards and legislation).
- For supply at 230V make the triangle connection on the pre-heater and on the motor (the original connection is "star" for 400V).

TWO STAGE OPERATION

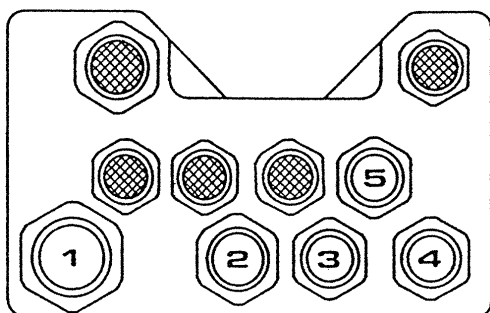
This is achieved by the remote control device connected to terminals 5-6 (removing the jumper), that controls 2nd valve.

PREHEATER RESISTORS CONNECTIONS



FASTENING OF THE ELECTRICAL WIRES

All the wires, to be connected to the burner terminal strip (16, fig. 1) shall pass through the cable entries (17, fig. 1), see the figure below.



D2635

- 1 - Single phase pre-heated resistor
power supply:cable entry Pg 21
- 2 - Motor three phase supply:cable entry Pg 16
- 3 - Single phase power supply and
safety thermostat:cable entry Pg 13.5
- 4 - Control thermostat:cable entry Pg 13.5
- 5 - 2nd stage thermostat:cable entry Pg 13.5

Further prospective signals or controls can be connected to the burner terminal strip by presheared disk inserting a common cable gland for the passage and the clamping of the leads. To ensure the IP 40 degree of protection in compliance with EN 60529 close the passage holes of the cables and any unused entry leads with appropriate disks.

NOTES

- Make a safe earth connection.
- Verify the burner stop by opening the boiler thermostat and the burner lock-out by darkening the photocell.

4. OPERATION

4.1 CHOICE OF NOZZLES

Recommended nozzle:

- Monarch F 80 H0.

4.2 PUMP PRESSURE

Recommended pressure:

- Light oil: 20 bar
- Heavy oil: 25 bar

The flow rate of the nozzles indicated in the table are nominal, obtained for a light oil having viscosity from 3 to 5°E at 50° C pre-heated at 100°C. The actual flow rate may vary by $\pm 5\%$ against the rated flow rate.

if flow rate values between those indicated in the table are required, it is possible to vary the pump pressure or arrange the nozzles differently.

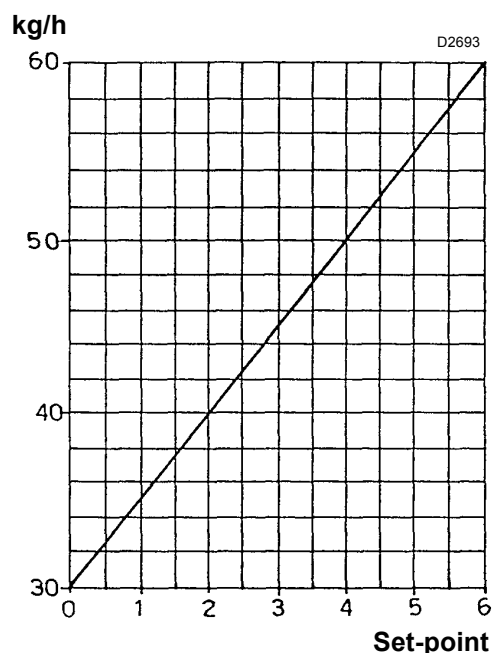
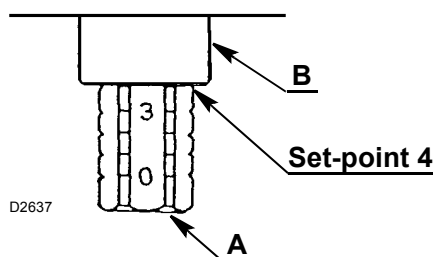
The pump leaves the factory set at 20 bar.

Nozzle GPH (45° - 60°)	20 bar kg/h	25 bar kg/h
2.50 + 2.50	30.00	34.00
3.00 + 3.00	36.00	40,60
3.50 + 3.50	42.00	47,40
4.00 + 4.00	48.00	54,20
4.50 + 4.50	54.00	61.00
5.00 + 5.00	60.00	—

4.3 COMBUSTION HEAD ADJUSTMENT

Turn the screw **A**, fig. 2 to the set-point, shown in the diagram, lines up with sleeve **B**, fig. 2.

Fig. 2



4.4 ADJUSTMENT OF THE AIR DAMPER MOTOR

STOP - Blue lever

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

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

The new position of the air damper is detectable when the burner is off.

Do not exceed the position of the orange lever for the 1st stage.

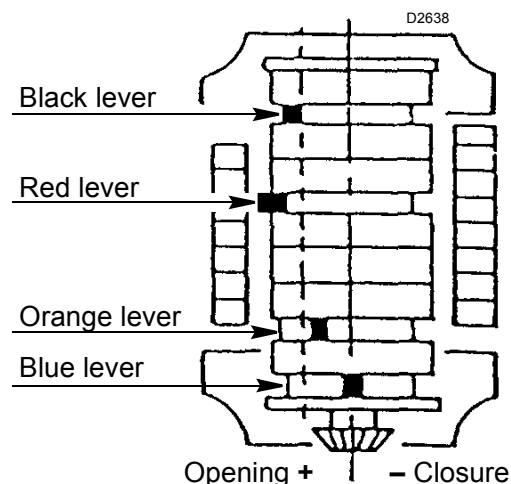
1st STAGE - Orange lever

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

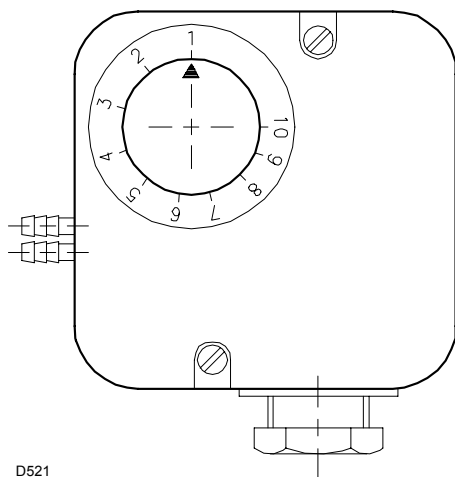
2nd STAGE - Red and black levers

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 anticipate - for a bit - the red lever, but never the orange one.



4.5 AIR PRESSURE SWITCH



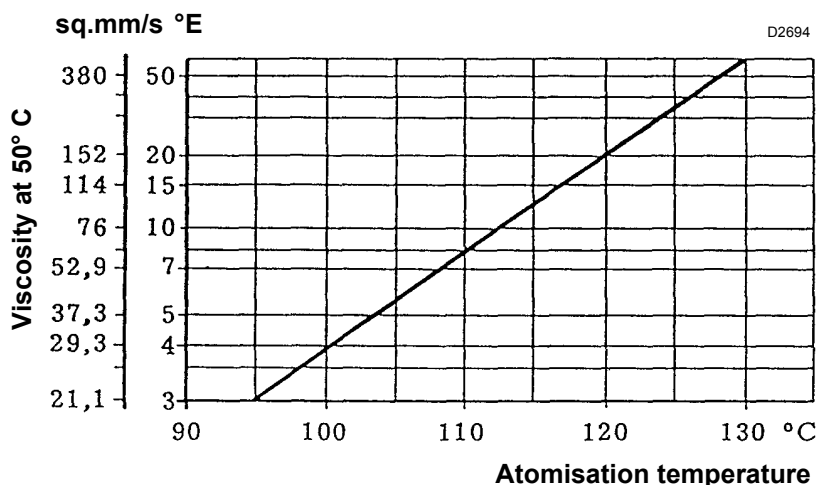
D521

Regulate 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 burner start up. If the burner locks out again turn the knob a bit further in a counterclockwise direction.

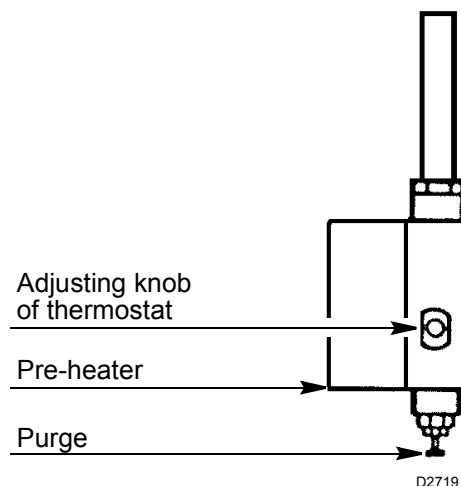
4.6 ATOMISATION TEMPERATURE ADJUSTMENT

Adjustment thermostat - maximum value - minimum value

Adjustment thermostat prevents the burner start up if the fuel temperature has not reached the required value for a better atomisation as indicated in the diagram below.



D2694



D2719

Example

Fuel oil with viscosity of 7 °E at 50 °C is pre-heated to approximately 110 °C.

The thermostat has to be generally set at a value higher than the required one (120°C indicated on the knob to get approximately 100°C at the nozzles).

The value has to be read after some minutes of operation and later the necessary adjustments might be carried out.

Minimum value contact thermostat intervenes by stopping the burner if the fuel temperature decreases under the value necessary for better combustion.

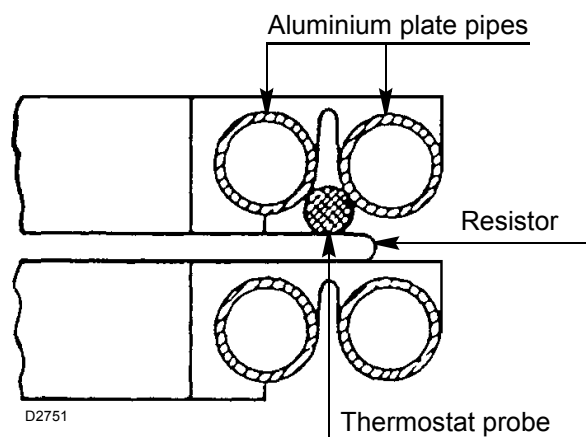
Maximum value contact thermostat switches off the resistors when in case of failure of the adjustment thermostat, the temperature increases inside the pre-heater. In case of abnormal temperature, make sure of the regular functioning of control thermostat and of the resistor in contact with the probe of the thermostat. The thermostat is calibrated by the factory at 180 °C.

IMPORTANT NOTES

Pre-heater thermostat replacement.

Replace the probe of the new thermostat, after loosening the fixing screws of the plates pack, taking care of better contact between the probe and the pipes and the resistor, see drawing. The same precautions should be taken when renewing the resistors in contact with the thermostat probes.

If during operation exceptional changes or excessive temperatures should be detected, verify the continuity of the resistor, using an ohmmeter, in contact with the temperature probe (approximately 35 Ohm). Use only filters with a groove on the tightening hexagon.



NOTE

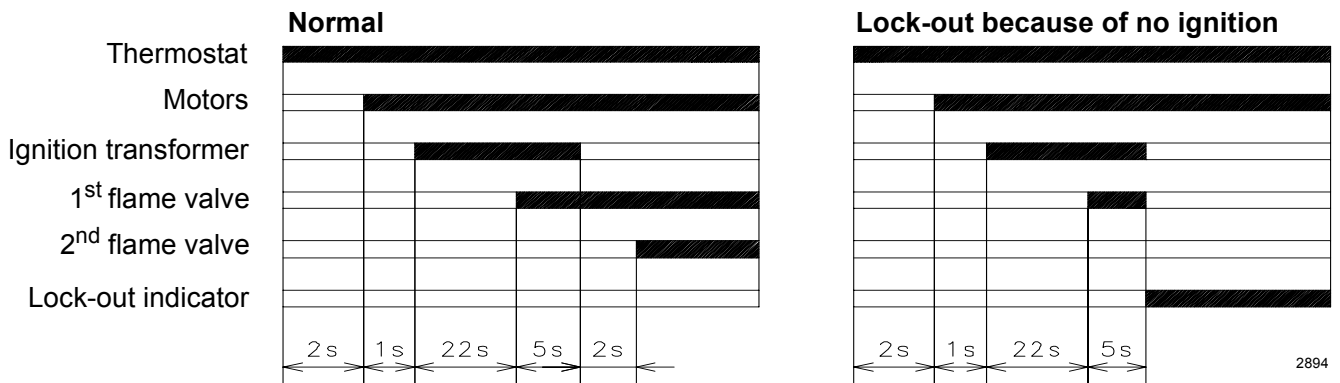
- The pre-heater might be provided with a second thermostat in contact of maximum value.
This thermostat can be used to act as a switch on an external contact maker to cut off the current to the pre-heater if there is excess temperature (kit code no. 3000800).
- Before burner start-up, verify that the pump is filled with fuel to prevent it running empty for too long.
- Filter cleaning:
periodically clean the filters in order to avoid any burner operation problems.
- Supply line filter:
positioned on the suction line, it causes the increase of the vacuum in the pump with the consequent flow of gas and noise. Do not exceed the vacuum of 38 cm Hg (5 m W.c.), measured at the vacuum fitting (5, fig. 1).
- Pre-heater filter (10, fig. 1):
positioned on the suction line, it causes a decrease of the atomising pressure which is detectable by use of a manometer (12, fig. 1).

MANOMETER PROTECTION VALVE

After atomisation pressure has been checked during opportunity, the manometer should be turned off (12, fig. 1) to avoid the pressure shocks that it might be subjected to each time the burner is turned on.

Close the protection valve when the burner is not in operation and the manometer indicates 0 bar.

4.7 BURNER START-UP PROGRAMME



Motor lock-out

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

4.8 ECOLOGICAL OIL BURNERS

WARNING

In all cases the transition from normal fuel oil to ecological fuel oil requires:

- The tank to be emptied of normal fuel oil.
- Cleaning of the cistern 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.

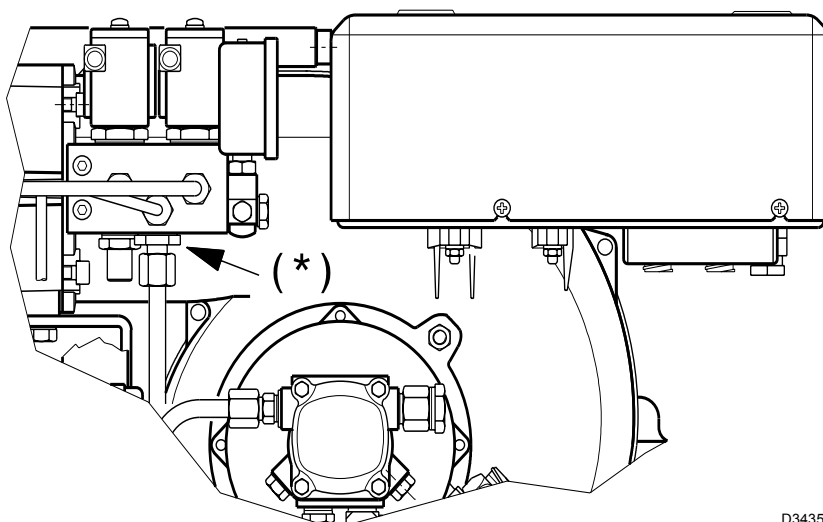
NOTES

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.

4.9 EMULSIFIED FUEL OIL OPERATION



WARNING

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

D3435

4.10 BURNER START-UP PROGRAM DIAGNOSTICS

During start-up, indication is according to the following table:

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

4.11 OPERATING FAULT DIAGNOSTIC

The control box has a self-diagnostic system with which it is possible to easily identify the possible causes of operating faults (**RED LED** signal).

To use this function, wait at least ten seconds from the moment the control box goes into safety mode of the control box and press the reset button for at least three seconds.

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



The pulses of the LED constitute a signal at approximately three-second intervals.

The number of pulses will provide the information on the possible faults, according to the table below:

SIGNAL	PROBABLE CAUSE
2 blinks ● ●	No stable flame is indicated in the safety period: – faulty photocell; – oil valve fault; – neutral/phase reversal; – faulty ignition transformer – poor burner regulation (insufficient fuel oil).
3 blinks ● ● ●	Min. air pressure switch (if installed) does not close: – air pressure switch faulty; – air pressure switch not regulated; – max. air pressure switch triggered (if installed).
4 blinks ● ● ● ●	Min. air pressure switch (if installed) does not switch or light in the chamber before ignition: – air pressure switch faulty; – air pressure switch not regulated.
7 blinks ● ● ● ● ● ● ●	Loss of flame during operation: – no burner regulation (insufficient fuel oil); – oil valve fault; – short circuit between photocell and earth.
8 blinks ● ● ● ● ● ● ● ●	– Not used.
10 blinks ● ● ● ● ● ● ● ● ● ●	– Wiring error or internal fault.



RIELLO S.p.A.
I - 37048 San Pietro di Legnago (VR)
Tel.: +39.0442.630111
[http:// www.rielloburners.com](http://www.rielloburners.com)