

## Light oil burners

Low-high-low or modulating operation



CODE	MODEL
C9511300	RL 28/M
C9511320	RL 28/M
C9512353	RL 38/M
C9512300	RL 38/M
C9512301	RL 38/M
C9512310	RL 38/M
C9512320	RL 38/M
C9513303	RL 50/M
C9513353	RL 50/M
C9513300	RL 50/M
C9513301	RL 50/M
C9513310	RL 50/M



**Original instructions**

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### N.B.

Figures mentioned in the text are identified as follows:

- 1)(A) = part 1 of figure A, same page as text;
- 1)(A)p.4 = part 1 of figure A, page number 4.

## INFORMATION ABOUT THE INSTRUCTION MANUAL

### INTRODUCTION

The instruction manual supplied with the burner:

- is an integral and essential part of the product and must not be separated from it; it must therefore be kept carefully for any necessary consultation and must accompany the burner even if it is transferred to another owner or user, or to another system. If the manual is lost or damaged, another copy must be requested from the Technical Assistance Service of the area;
- is designed for use by qualified personnel;
- offers important indications and instructions relating to the installation safety, start-up, use and maintenance of the burner.

### DELIVERY OF THE SYSTEM AND THE INSTRUCTION MANUAL

When the system is delivered, it is important that:

- the instruction manual is delivered to the user by the system manufacturer, with the recommendation to keep it in the room where the heat generator is to be installed.
- The instruction manual shows:
  - the serial number of the burner;

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- the address and telephone number of the nearest Assistance Centre.

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- The system supplier must carefully inform the user about:
  - the use of the system;
  - any further tests that may be required before activating the system;
  - maintenance, and the need to have the system checked at least once a year by a representative of the manufacturer or another specialised technician.To ensure a periodic check, the manufacturer recommends the drawing up of a Maintenance Contract.

## GUARANTEE AND RESPONSIBILITY

The manufacturer guarantees its new products from the installation date, in accordance with the regulations in force and/or the sales contract. At the moment of the first start-up, check that the burner is integral and complete.



Failure to observe the information given in this manual, operating negligence, incorrect installation and carrying out of non authorised modifications will result in the annulment by the manufacturer of the guarantee that it supplies with the burner.

In particular, the rights to the guarantee and the responsibility will no longer be valid, in the event of damage to things or injury to people, if such damage/injury was due to any of the following causes:

- incorrect installation, start-up, use and maintenance of the burner;
- improper, incorrect or unreasonable use of the burner;
- intervention of unqualified personnel;
- carrying out of unauthorised modifications on the equipment;
- use of the burner with safety devices that are faulty, incorrectly applied and/or not working;
- installation of untested supplementary components on the burner;
- powering of the burner with unsuitable fuels;
- faults in the fuel supply system;
- use of the burner even following an error and/or an irregularity;
- repairs and/or overhauls incorrectly carried out;
- modification of the combustion chamber with inserts that prevent the regular development of the structurally established flame;
- insufficient and inappropriate surveillance and care of those burner components most likely to be subject to wear and tear;
- the use of non-original components, including spare parts, kits, accessories and optional;
- force majeure.

**The manufacturer furthermore declines any and every responsibility for the failure to observe the contents of this manual.**

## SAFETY AND PREVENTION

### INTRODUCTION

The burners have been designed and built in compliance with current regulations and directives, applying the known technical rules of safety and envisaging all the potential danger situations.

It is necessary, however, to bear in mind that the imprudent and clumsy use of the equipment may lead to situations of death risk for the user or third parties, as well as the damaging of the burner or other items. Inattention, thoughtlessness and excessive confidence often cause accidents; the same applies to tiredness and sleepiness.

It is a good idea to remember the following:

- The burner must only be used as expressly described. Any other use should be considered improper and therefore dangerous.

In particular:

it can be applied to boilers operating with water, steam, diathermic oil, and to other uses expressly named by the manufacturer;

the type and pressure of the fuel, the voltage and frequency of the electrical power supply, the minimum and maximum deliveries for which the burner has been regulated, the pressurisation of the combustion chamber, the dimensions of the combustion chamber and the room temperature must all be within the values indicated in the instruction manual.

- Modification of the burner to alter its performance and destinations is not allowed.
- The burner must be used in exemplary technical safety conditions. Any disturbances that could compromise safety must be quickly eliminated.
- Opening or tampering with the burner components is not allowed, apart from the parts requiring maintenance.
- Only those parts envisaged by the manufacturer can be replaced.



The manufacturer guarantees safety and proper functioning only if all burner components are intact and positioned correctly.

### PERSONNEL TRAINING

The user is the person, body or company that has acquired the machine and intends to use it for the specific purpose. He is responsible for the machine and for the training of the people working around it.

The user:

- undertakes to entrust the machine exclusively to suitably trained and qualified personnel;
- undertakes to inform his personnel in a suitable way about the application and observance of the safety instructions. With that aim, he undertakes to ensure that everyone knows the use and safety instructions for his own duties;
- Personnel must observe all the danger and caution indications shown on the machine.
- Personnel must not carry out, on their own initiative, operations or interventions that are not within their province.
- Personnel must inform their superiors of every problem or dangerous situation that may arise.
- The assembly of parts of other makes, or any modifications, can alter the characteristics of the machine and hence compromise operating safety. The manufacturer therefore declines any and every responsibility for any damage that may be caused by the use of non-original parts.

## TECHNICAL DATA

MODEL			RL 28/M	RL 38/M	RL 38/M	RL 50/M	RL 50/M
Output <sup>(1)</sup>	High	MBtu/hr <sup>(3)</sup>	630 - 1260	896 - 1708	896 - 1708	1120 - 2240	1120 - 2240
		GPH	4.5 - 9	6.4 - 12.2	6.4 - 12.2	8 - 16	8 - 16
	Low	MBtu/hr <sup>(3)</sup>	336 - 630	378 - 896	378 - 896	490 - 1120	490 - 1120
		GPH	2.4 - 4.5	2.7 - 6.4	2.7 - 6.4	3.5 - 8	3.5 - 8
Fuel			# 2 fuel oil				
Operation			Low - high or modulating				
Nozzle		number	1 (nozzle with return)				
Standard applications			Boilers: water, steam, thermal oil				
Ambient temperature		°F	32 - 104 (0 - 40 °C)				
Combustion air temperature		°F max	140 (60 °C)				
Main power supply (+/- 10%)		V/Ph/Hz	120/1/60		208-230 / 460 / 575 / 3/ 60		120-230/1/60
Fan motor	rpm		3400	3400	3400	3400	3400
	W - HP		370 - 0.5	370 - 0.5	550 - 0.75	550 - 0.75	550 - 0.75
	V		120	120	208 - 230 / 460 / 575	208 - 230 / 460 / 575	120 - 230
	A		5.2	5.2	3.2 - 1.6 - 1.3	3.2 - 1.6 - 1.3	9.8 - 4.9
Motor capacitor		µF	45			20	
Ignition transformer		V1 - V2 I1 - I2	120 V - 2 x 5 kV 3.7 A - 35 mA				
Pump	delivery (at 290 PSI)	GPH	32				
	pressure range	PSI	145 - 290				
	fuel temperature	°F max	140 (60 °C)				
Electrical power consumption		W max	550	600	700	800	750
Electrical protection			NEMA 1				
Noise levels <sup>(2)</sup>		dBA	68	70	70	75	75

(1) Reference conditions: Ambient temperature 68 °F (20 °C) - Barometric pressure 394" W.C. - Altitude 329 ft.

(2) Sound pressure measured in manufacturer's combustion laboratory, with burner operating on test boiler and at maximum rated output.

(3) Equivalent Btu values based on 1 USGPH = 140,000 Btu/hr.

### Burner models designations

Model	RIELLO Code	RBNA Code	Voltage	Flame safeguard
RL 28/M	3471070	C9511300	120/1/60	Burner mounted
		C9511320		
RL 38/M	3471270	C9512353	120/1/60	Burner mounted
	3471470	C9512300	208-230/460/3/60	
		C9512301	575/3/60	
		C9512310		
		C9512320		
	RL 50/M	3471675	C9513303	
C9513353				
3471670		C9513300	208-230/460/3/60	
		C9513301	575/3/60	
		C9513310		

### ACCESSORIES (optional):

#### Modulating control kit

Two components should be ordered:

- modulating control to install on the burner;
- probe to install on the boiler.

PARAMETER TO BE CHECKED		PROBE		MODULATING CONTROL	
	Range	Type	Code	Type	Code
Temperature	- 212...+ 932 °F (- 100...+ 500 °C)	PT 100	3010110	RWF50	20082208
Pressure	0...36.3 PSI (0...2.5 bar)	Probe with output 4...20 mA	3010213	RWF55	20099657
	0...232 PSI (0...16 bar)		3010214		

### Kit for lengthening the combustion head

L = Standard length

L1 = Length obtainable with the kit

COD. 3010277 L = 9 15/32"

L1 = 13 13/16"

• RL 28/M

COD. 3010278 L = 9 15/32"

L1 = 13 13/16"

• RL 38/M

COD. 3010279 L = 9 15/32"

L1 = 13 13/16"

• RL 50/M

### Flame inversion boiler kit

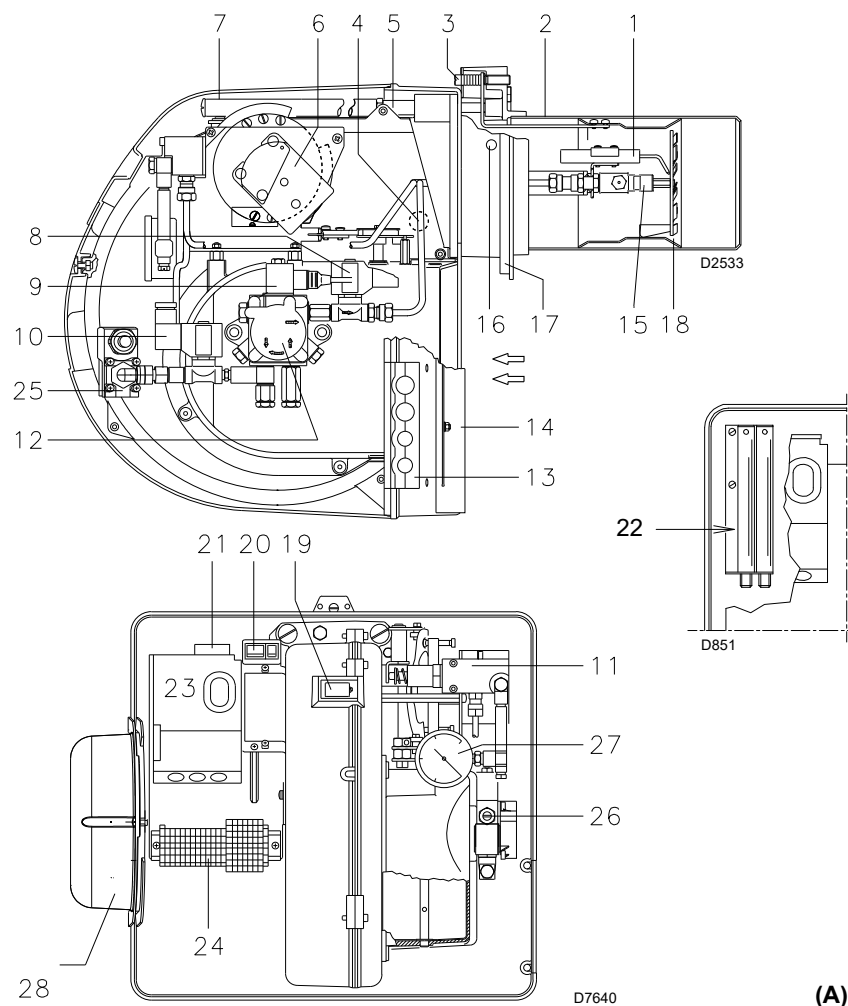
COD. 3010178 • RL 28/M - RL 38/M

COD. 3010179 • RL 50/M



#### Important:

The installer is responsible for the supply and installation of any safety device(s) not indicated in this manual.



## BURNER DESCRIPTION (A)

- 1 Ignition electrodes
- 2 Combustion head
- 3 Screw for combustion head adjustment
- 4 Flame sensor (cad sensor)
- 5 Screw for fixing fan to flange
- 6 Servomotor provides adjustment of fuel delivery regulator and of air damper. When the burner is not operating the air damper is fully closed in order to reduce heat dispersion from the boiler due to the flue draft which draws air from the fan suction inlet.
- 7 Slide bars for opening the burner and inspecting the combustion head
- 8 Safety solenoid valve
- 9 Pump delivery valve
- 10 Valve on nozzle return
- 11 Pressure regulator on nozzle return
- 12 Pump
- 13 Plate prearranged to drill 4 holes for the passage of hoses and electrical cables.
- 14 Air damper
- 15 Non-drip nozzle holder
- 16 Fan pressure test point
- 17 Boiler mounting flange
- 18 Flame stability disk
- 19 Flame inspection window
- 20 Power switch for different operation: automatic - manual - off  
Button for:  
power increase - power reduction
- 21 Motor contactor and thermal overload with reset button (RL 38 - 50/M)
- 22 Extensions for slide bars 7)
- 23 Flame safeguard with lock-out pilot light and lock-out reset button
- 24 Terminal strip
- 25 High oil pressure switch
- 26 Pump pressure adjustment
- 27 Pressure gauge for pressure on nozzle return
- 28 Protection (for RL 50/M single-phase burner)

Two types of burner failure may occur:

### Flame safeguard lock-out:

If the flame relay 23)(A) push-button lights up, it indicates that the burner is in lock-out.

To reset, press the push-button.

### Motor trip (RL 38 - 50/M):

release by pressing the push-button on thermal overload 21)(A).

## PACKAGING - WEIGHT (B) - Approximate measurements

- The burners are shipped in cardboard boxes with the maximum dimensions shown in Table (B).
- The weight of the burner complete with packaging is indicated in Table (B).

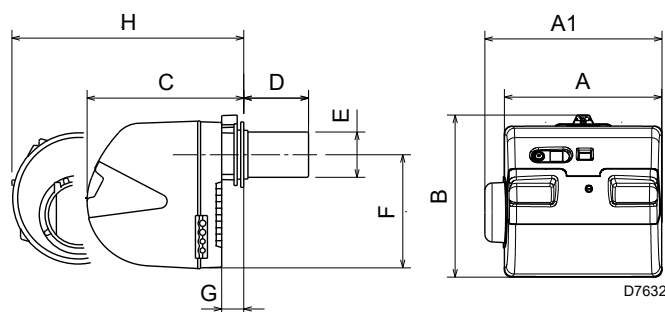
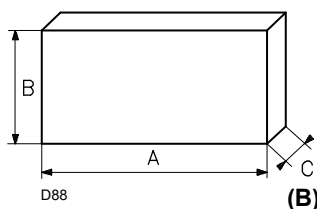
## MAX. DIMENSIONS (C) - Approximate measurements

The maximum dimensions of the burner are given in (C). Inspection of the combustion head requires the burner to be opened and the rear part withdrawn on the slide bars. The maximum dimension of the burner, without casing, when open is give by measurement H.

## STANDARD EQUIPMENT

- 2 - Flexible hoses
- 2 - Gaskets for flexible hoses
- 1 - Burner head gasket
- 4 - Screws to secure the burner flange to the boiler  
3/8 W x 1"
- 1 - Adaptor G 1/8" / 1/8" NPT
- 1 - Instruction booklet
- 1 - Spare parts list

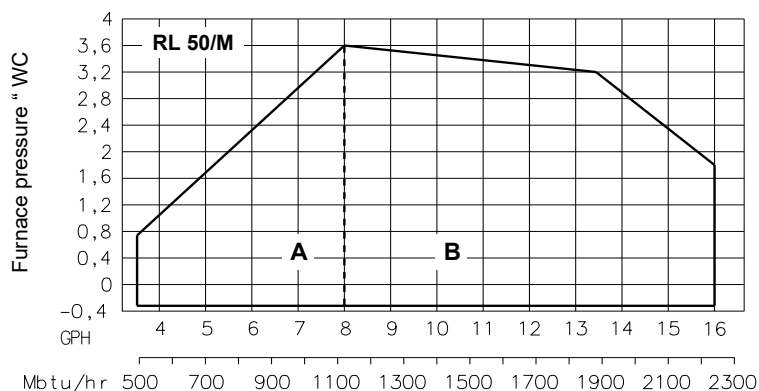
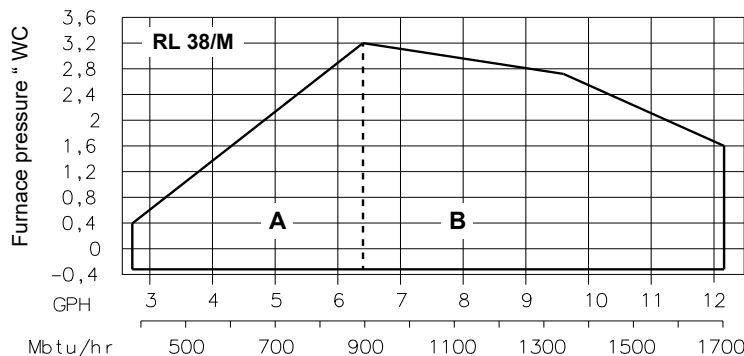
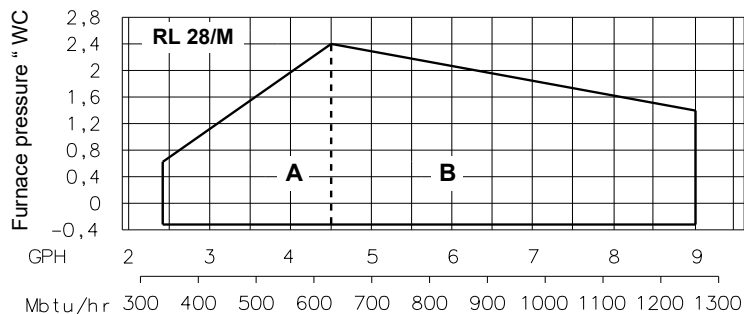
inch	A	B	C	lbs
RL 28/M	39 <sup>31/32</sup> "	24 <sup>13/16</sup> "	19 <sup>11/16</sup> "	86
RL 38/M	39 <sup>31/32</sup> "	24 <sup>13/16</sup> "	19 <sup>11/16</sup> "	90
RL 50/M	39 <sup>31/32</sup> "	24 <sup>13/16</sup> "	19 <sup>11/16</sup> "	92
RL 50/M	39 <sup>31/32</sup> "	24 <sup>13/16</sup> "	21 <sup>11/16</sup> "	94



inch	A	A1	B	C	D (1)
RL 28/M	18 <sup>23/32</sup> "	-	18 <sup>21/32</sup> "	18 <sup>13/32</sup> "	9 <sup>15/32</sup> " - 13 <sup>13/16</sup> "
RL 38/M	18 <sup>23/32</sup> "	-	18 <sup>21/32</sup> "	18 <sup>13/32</sup> "	9 <sup>15/32</sup> " - 13 <sup>13/16</sup> "
RL 50/M three-phase	18 <sup>23/32</sup> "	-	18 <sup>21/32</sup> "	18 <sup>13/32</sup> "	9 <sup>15/32</sup> " - 13 <sup>13/16</sup> "
RL 50/M single-phase	-	21 <sup>3/16</sup> "	18 <sup>21/32</sup> "	18 <sup>13/32</sup> "	9 <sup>15/32</sup> " - 13 <sup>13/16</sup> "

inch	E	F	G	H (1)
RL 28/M	5 <sup>1/2</sup> "	13 <sup>27/32</sup> "	2 <sup>1/16</sup> "	26 <sup>15/32</sup> " - 31 <sup>3/4</sup> "
RL 38/M	5 <sup>1/2</sup> "	13 <sup>27/32</sup> "	2 <sup>1/16</sup> "	26 <sup>15/32</sup> " - 31 <sup>3/4</sup> "
RL 50/M three-phase	5 <sup>31/32</sup> "	13 <sup>27/32</sup> "	2 <sup>1/16</sup> "	26 <sup>15/32</sup> " - 31 <sup>3/4</sup> "
RL 50/M single-phase	5 <sup>31/32</sup> "	13 <sup>27/32</sup> "	2 <sup>1/16</sup> "	26 <sup>15/32</sup> " - 31 <sup>3/4</sup> "

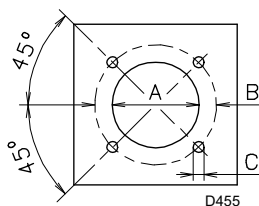
(1) Blast tube: short - long (obtainable with the kit)



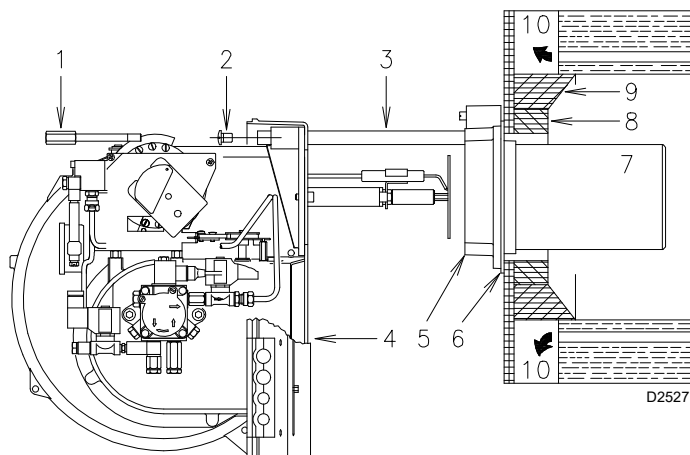
(A)

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inch	A	B	C
RL 28/M	6 <sup>5</sup> / <sub>16</sub> "	8 <sup>13</sup> / <sub>16</sub> "	3/8 W
RL 38/M	6 <sup>5</sup> / <sub>16</sub> "	8 <sup>13</sup> / <sub>16</sub> "	3/8 W
RL 50/M	6 <sup>5</sup> / <sub>16</sub> "	8 <sup>13</sup> / <sub>16</sub> "	3/8 W



(B)



(C)

## FIRING RATES (A)

During operation, burner output varies between:

- **MINIMUM OUTPUT** : area A
- **MAXIMUM OUTPUT** : area B

Graphs (A):

Horizontal axis : Burner output

Vertical axis : Heater furnace pressure

The firing rate may be found by plotting a vertical line from the desired delivery and a horizontal line from the pressure in the combustion chamber. The intersection of these two lines is the firing rate which must lie within area A, for MIN output, and within area B, for MAX output.

**Important:**

The FIRING RATE area values have been obtained considering a surrounding temperature of 68 °F (20 °C), and an atmospheric pressure of 394" W.C. and with the combustion head adjusted as shown on page 6.

**Note:**

The FIRING RATE areas given in figure (A) have been reduced by 10% with respect to the maximum range that can be reached.

Consult Appendix on page 22 for operation at different ambient temperatures and / or altitudes.

## MINIMUM FURNACE DIMENSIONS

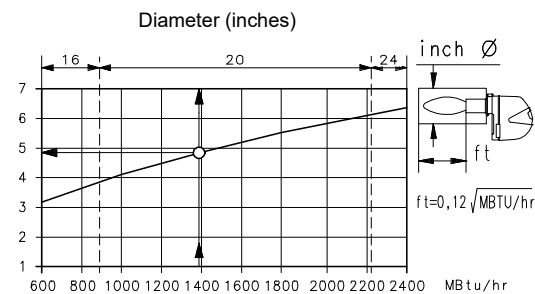
The firing rates were set in relation to certified test boilers.

Figure below indicates the diameter and length of the test combustion chamber.

**Example:**

output 1388 MBTU/h:

diameter 20 inch - length 4.9 ft.



D2918

## INSTALLATION

### BOILER PLATE (B)

Drill the combustion chamber mounting plate as shown in (B). The position of the threaded holes can be marked using the burner head gasket supplied with the burner.

### BLAST TUBE LENGTH (C)

The length of the blast tube (7) must be selected according to the indications provided by the manufacturer of the boiler, and in any case it must be greater than the thickness of the boiler door complete with its insulation. The range of lengths available, (inch), is as follows:

Blast tube 7):	RL 28/M	RL 38/M	RL 50/M
• short	9 <sup>15</sup> / <sub>32</sub> "	9 <sup>15</sup> / <sub>32</sub> "	9 <sup>15</sup> / <sub>32</sub> "
• long	13 <sup>13</sup> / <sub>16</sub> "	13 <sup>13</sup> / <sub>16</sub> "	13 <sup>13</sup> / <sub>16</sub> "

For boilers with front flue passes (10) or flame inversion chambers, protective insulation (8) must be inserted between the boiler refractory (9) and the blast tube (7). This protective insulation must not compromise the extraction of the blast tube.

For boilers having a water-cooled front the insulation (8)-(9)(C) is not required unless it is required by the boiler manufacturer.

### SECURING THE BURNER TO THE BOILER (C)

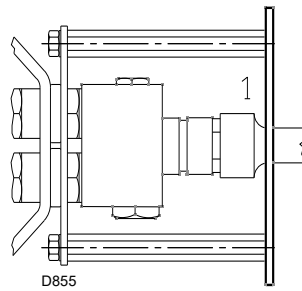
Disassemble the blast tube (7) from the burner (4) by proceeding as follows:

- remove the screws (2) from the two slide bars (3).
- Remove the screw (1) fixing the burner (4) to the flange (5).
- Withdraw the blast tube (7) complete with flange (5) and slide bars (3).

Secure flange (5)(C) to the boiler plate inserting the supplied gasket (6). Use the 4 screws provided after having protected the thread with an antilocking product.

The burner-boiler seal must be airtight.

1 A3 - A4	2 GPH	3 PSI	4 PSI
15	4.2	290	246.5
20	6.4	290	246.5
30	7.7	290	217.5
40	9.6	290	232
50	10.6	290	232
60	13.4	290	232
70	16	290	217.5



## CHOICE OF NOZZLE (A)



It is advisable to replace nozzles once a year during periodical maintenance.

The use of nozzles other than those specified by the Manufacturer and inadequate regular maintenance may result into emission limits non-conforming to the values set forth by the regulations in force, and in extremely serious cases, into potential hazards to people and objects.

The Manufacturer shall not be liable for any such damage arising from non-observance of the requirements contained in this manual.

Nozzle must be chosen among those in table (A):

- 1 = Type A3 or A4 return flow nozzle
- 2 = MAX nozzle delivery
- 3 = Pump delivery pressure
- 4 = MAX pressure on nozzle return

In case an intermediate delivery between the two values indicated in the table is required, a nozzle with higher delivery must be chosen. Delivery reduction will be obtained by means of the pressure regulator.

## RECOMMENDED NOZZLES:

Type A4 return flow nozzles - 45° angle.

## NOZZLE ASSEMBLY

At this stage of installation the burner is still disassembled from the blast tube; it is therefore possible to install the nozzle with a box wrench 1)(B), fitting the wrench through the central hole in the flame stability disk. Do not use any sealing products such as gaskets, sealing compound, or tape. Be careful to avoid damaging the nozzle sealing seat.

Make sure that the electrodes are positioned as shown in Figure (C).

Finally remount the burner 4)(D) on the slide bars 3) and slide it up to the flange 5), keeping it slightly raised to prevent the flame stability disk from pressing against the blast tube.

Tighten the screws 2) on the slide bars 3) and screw 1) that attaches the burner to the flange.

If it proves necessary to change a nozzle with the burner already fitted to the boiler, proceed as outlined below:

- Pull back the burner on its slide bars as shown in fig. (C)p.5.
- Remove the nuts 1)(E) and the disk 2).
- Use wrench 3)(E) to change the nozzles.

## COMBUSTION HEAD SETTING

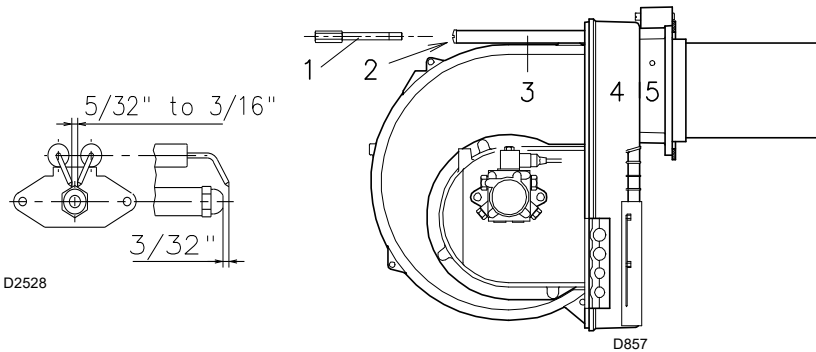
The setting of the combustion head depends exclusively on the maximum burner delivery at which it will be operating. Turn screw 4)(F) until the notch shown in diagram (G) is level with the front surface of flange 5)(F).

### Example:

RL 50/M, maximum fuel oil delivery = 10.2 GPH. Diagram (G) indicates that for a delivery of 10.2 GPH the RL 50/M Model requires the combustion head to be set to approx. three notches, as shown in Figure (F).

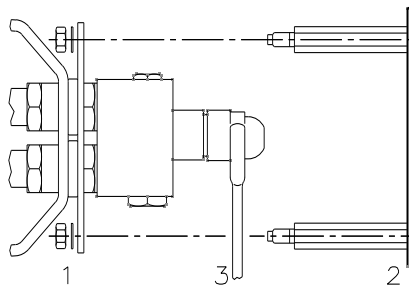
(A)

(B)



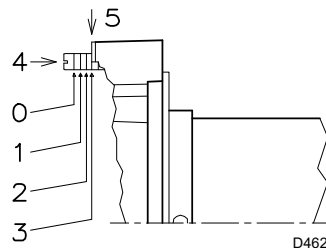
(C)

(D)



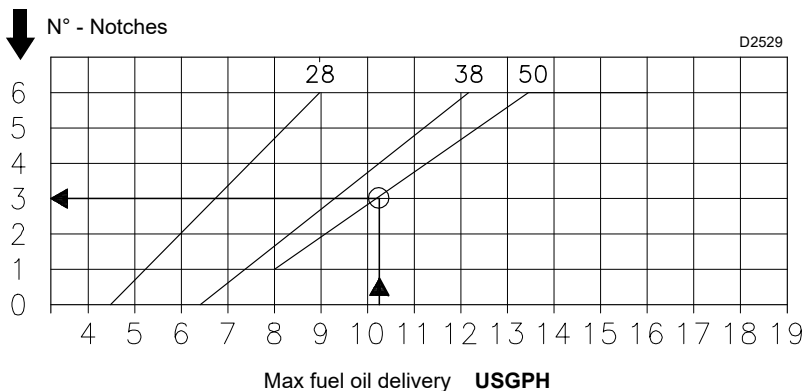
(E)

D858



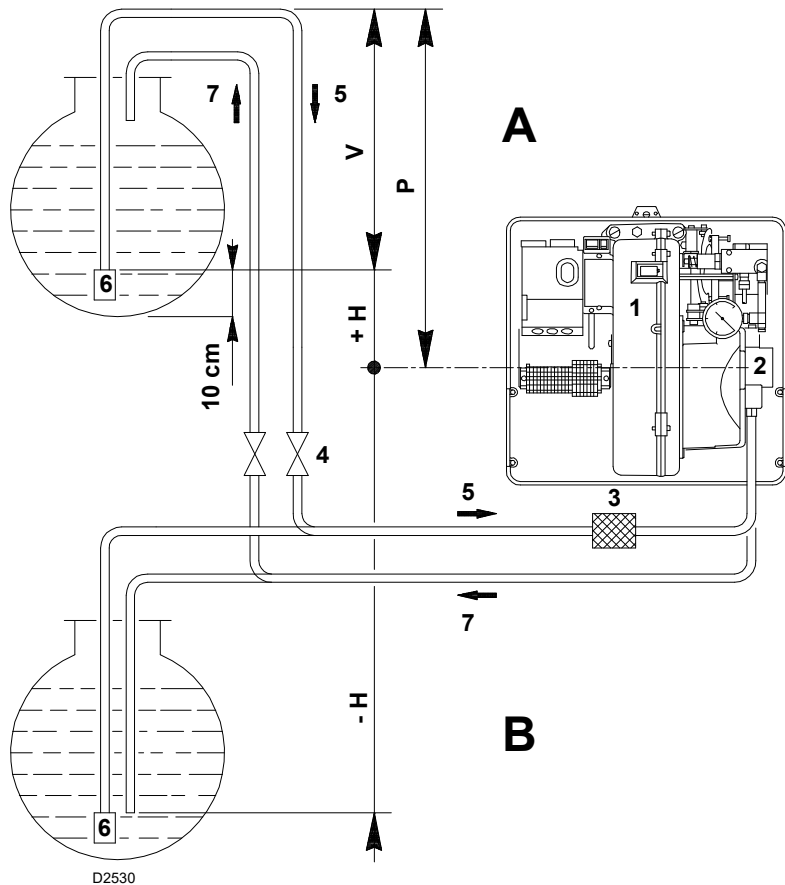
(F)

D462



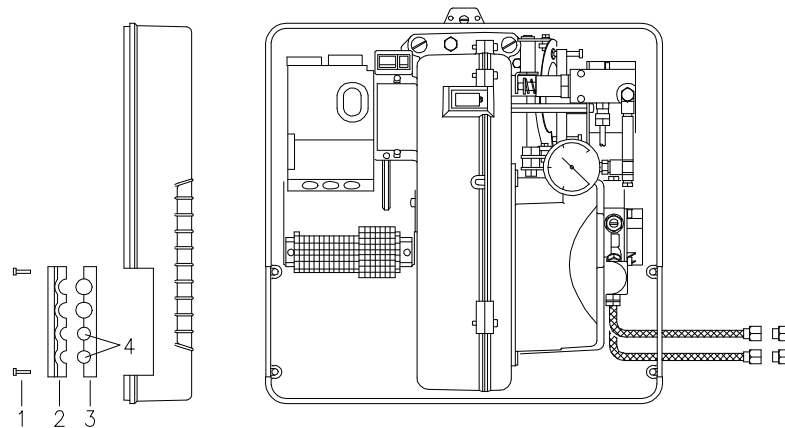
(G)





± H ft	L ft		
	Ø inch		
	3/8"	1/2"	5/8"
+ 13	168	368	493
+ 10	148	326	493
+ 6.6	128	283	493
+ 3.3	105	240	474
+ 1.6	95	217	434
0	85	197	395
- 1.6	76	178	355
- 3.3	66	155	316
- 6.6	43	112	234
- 10	23	69	151
- 13	-	26	69

(A)



(B)

## FUEL SUPPLY

### Double-pipe circuit (A)

The burner is equipped with a self-priming pump which is capable of supplying itself within the limits listed in the table at the side.

#### The tank higher than the burner A

Distance "P" must not exceed 33 ft in order to avoid subjecting the pump's seal to excessive strain; distance "V" must not exceed 13 ft in order to permit pump self-priming even when the tank is almost completely empty.

#### The tank lower than the burner B

Pump suction values higher than 13 "Hg must not be exceeded because at higher levels gas is released from the fuel, the pump starts making noise and its working life-span decreases.

It is good practice to ensure that the return and suction lines enter the burner from the same height; in this way it will be less probable that the suction line fails to prime or stops priming.

### The loop circuit

A loop circuit consists of a loop of piping leaving and returning to the tank with an auxiliary pump that circulates the fuel under pressure. A branch connection from the loop goes to feed the burner. This circuit is extremely useful whenever the burner pump does not succeed in self-priming because the tank distance and/or height difference are higher than the values listed in the Table.

### Key

H = Pump/foot valve height difference

L = Piping length

Ø = Inside pipe diameter

1 = Burner

2 = Pump

3 = Filter

4 = Manual on/off valve

5 = Suction line

6 = Foot valve

7 = Return line

### HYDRAULIC CONNECTIONS (B)

The pumps are equipped with a by-pass that connects return line to the suction line. The pumps are installed on the burner with the by-pass closed by screw 6)(A)p.12.

It is therefore necessary to connect both hoses to the pump.

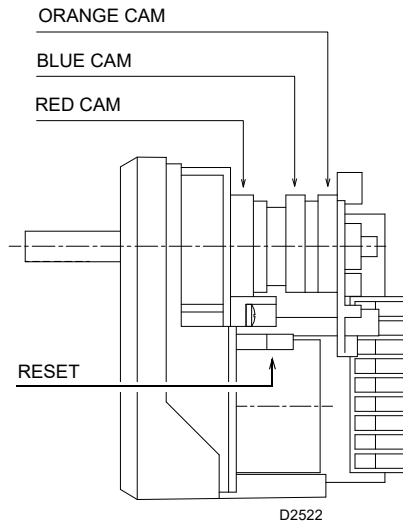
**The pump seal will be damaged immediately if it is run with the return line closed and the by-pass screw inserted.**

Remove the plugs from the suction and return connections of the pump.

Insert the hose connections with the supplied seals into the connections and tighten.

Take care that the hoses are not stretched or twisted during installation.

Route the hoses through the holes in the plate, preferably using those on the right side, fig. (B): unscrew the screws 1), now divide the insert piece into its two parts 2) and 3) and remove the thin section blocking the two passages 4). Install the hoses where they cannot be stepped on or come into contact with hot surfaces of the boiler. Now connect the other end of the hoses to the suction and return lines.



## SERVOMOTOR (A)

The servomotor provides simultaneous adjustment of the air damper 11)(B) page 9 and the pressure regulator 9) by means of a double variable profile cam, 4) and 7). The servomotor rotates through 90° in 25 seconds.

Do not alter the factory setting for the cams; simply check that they are set as indicated below:

**Red cam** : 90°

Limits rotation toward maximum position.

**Blue cam** : 0°

Limits rotation toward the minimum position. When the burner is shut down the air damper must be closed: 0°.

**Orange cam** : 15°

Adjusts the ignition position and the MIN output.

## PUMP (B)

- 1 - Suction 1/4" NPT
- 2 - Return 1/4" NPT
- 3 - Pressure gauge attachment G 1/8"
- 4 - Vacuum gauge attachment G 1/8"
- 5 - Pressure adjustment screw

A - Min. delivery rate at 290 PSI pressure

B - Delivery pressure range

C - Max. suction pressure

D - Viscosity range

E - Max fuel oil temperature

F - Max. suction and return pressure

G - Pressure calibration in the factory

H - Filter mesh width

## PUMP PRIMING

- **Before starting the burner, make sure that the tank return line is not clogged. Obstructions in the line could cause the seal located on the pump shaft to break.**
- In order for self-priming to take place, one of the screws 3)(B) of the pump must be loosened to bleed off the air contained in the suction line.
- Start the burner by closing the control circuit with switch 1)(C) in the "MAN" position. As soon as the burner starts, check the direction of rotation of the fan blade, by looking through the flame inspection window 19)(A)p.4.
- The pump can be considered primed when the fuel oil starts coming out of the screw 3). Stop the burner: switch 1)(C) set to "OFF" and tighten the screw 3).

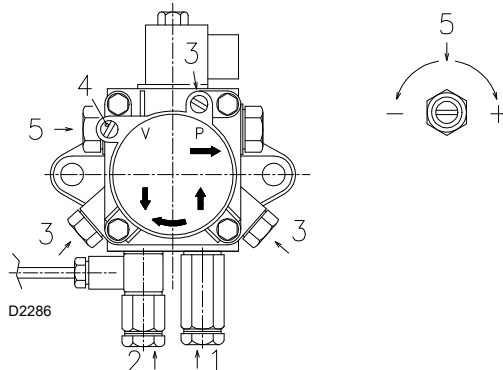
The time required for this operation depends upon the diameter and length of the suction tubing. If the pump fails to prime at the first cycle of the burner and the burner locks out, wait approx. 15 seconds, reset the burner, and then repeat the starting operation as often as required. After 5 or 6 starting operations allow 2 or 3 minutes for the transformer to cool.

## Important

The priming operation is possible because the pump is already full of fuel when it leaves the factory. If the pump has been drained, fill it with fuel through the opening for the vacuum gauge prior to starting; otherwise, the pump will seize. Whenever the length of the suction piping exceeds 66 - 99 ft, the supply line must be filled using a separate pump.

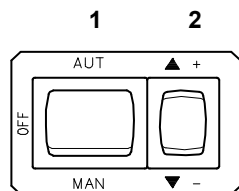
(A)

SUNTEC AL 95 C



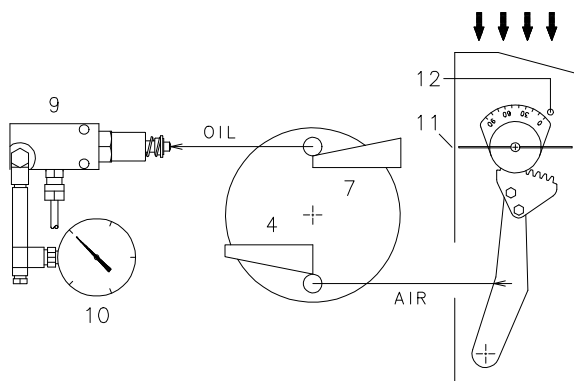
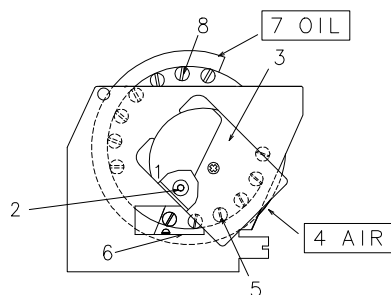
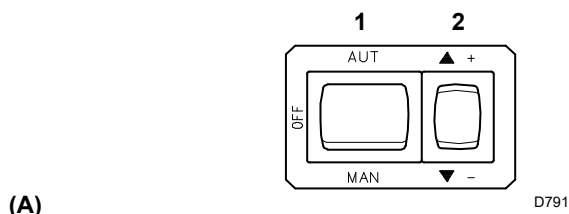
		AL 95 C
A	GPH	32
B	PSI	145 - 290
C	"Hg	13
D	cSt	2 - 12
E	°F - °C	140 - 60
F	PSI	29
G	PSI	290
H	inch	0,006

(B)

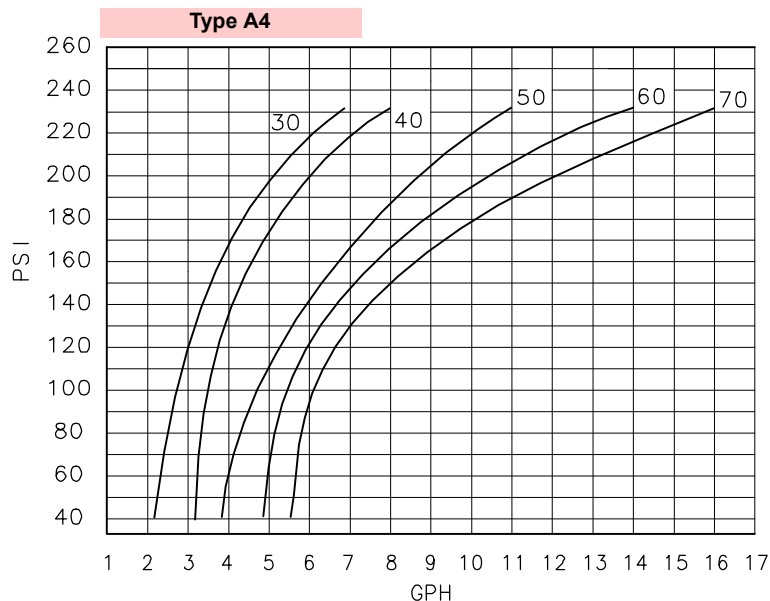


D791

(C)



**(B)**



**(C)**

## BURNER FIRING

Close load controls and set switch 1)(A) to "MAN".  
After burner firing a complete burner adjustment should be performed.

## BURNER CALIBRATION



All the installation, maintenance and disassembly operations must be carried out with the electricity supply disconnected.



The installation of the burner must be carried out by qualified personnel, as indicated in this manual and in compliance with the standards and regulations of the laws in force.

The optimum calibration of the burner requires an analysis of the flue gases at the boiler outlet.

The following settings that have already been made do not require modification under normal circumstances:

- Combustion head;
- Servomotor, red and blue cams

The settings listed below must be adjusted in sequence:

- 1 - MAX burner output
- 2 - MIN burner output
- 3 - Intermediate outputs between MAX and MIN output

### 1 - MAX power

Max output of the burner must be set within the firing rate range shown on page 5.

In the above instructions we left the burner running in MIN output operation. Now press button 2)(A) "+" until servomotor arrives at 90°.

### Adjusting the nozzle flow rate

The nozzle flow rate varies according to the fuel pressure on the nozzle return. Diagram (C) indicates this relationship for type A4 return flow nozzles with pump delivery pressure of 290 PSI.

Diagrams (C):

Horizontal axis : GPH, nozzle flow rate

Vertical axis : PSI, nozzle return pressure

### NOTE

With a pump delivery pressure of 290 PSI, the pressure on the nozzle return must not exceed 246.5 PSI.

The pressure difference between pump delivery and nozzle return must be at least 43.5 PSI. With smaller pressure differences, the pressure on the nozzle return can be unstable.

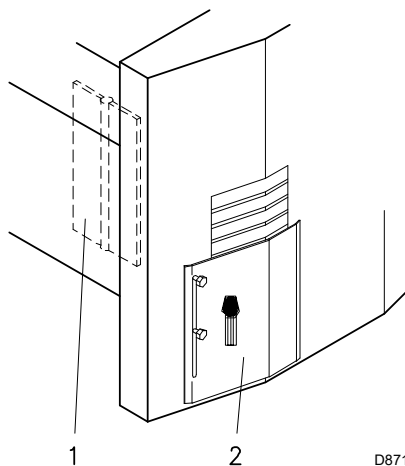
To fix the maximum nozzle flow rate, vary the final profile on the upper cam 7)(B) via the screws 8).

The nozzle return pressure value is indicated by the pressure gauge 10).

### Key (B)

- 1 Servomotor
- 2 Reset
- 3 Servomotor cover
- 4 Cam for controlling air damper
- 5 Cam 4) adjustable screws
- 6 Opening for access to screws 5)
- 7 Cam for controlling pressure regulator
- 8 Cam 7) adjustable screws
- 9 Pressure regulator
- 10 Gauge for pressure on nozzle return
- 11 Air damper
- 12 Index

(A)



### Adjusting air delivery

Two shutters 1) and 2) are provided to adjust the air. These shutters are factory set to maximum opening. Firstly, with burner at maximum operation, adjust shutter 2) which must be closed gradually until optimum combustion is obtained. If total closure of shutter 2) is not sufficient, also close shutter 1) (secondly) as follows: vary the final profile of the lower cam 4)(B) via the screws 5) inside the opening 6).

If the burner is operated at maximum power, the fan air may not be sufficient even with both shutters 1) and 2) fully open. In this case, remove shutter 2) and adjust the air using shutter 1) only as described above.

Cams 7) - 4)(B):

- tighten screws 8)-5) to increase air delivery;
- unscrew screws 8)-5) to reduce air delivery.

### 2 - MIN power

The MIN power must be chosen from within the working range given on page 5. Press the "-" button 2)(A) page 9 and keep it pressed until the servomotor has reached 15° (factory setting).

### Nozzle flow rate adjustment

The nozzle flow rate is given in diagram (C)p.9 corresponding to the pressure on the nozzle return read on the pressure gauge 10)(B). To vary the nozzle minimum flow rate, modify the initial profile of the upper cam 7)(B) via the screws 8).

### Adjusting air delivery

Modify the initial profile of the lower cam 4)(B) via the screws 5) inside the opening 6).

If possible, do not rotate the first screw as this is the one that provides for total closure of the air damper.

### 3 - INTERMEDIATE power

#### Air/oil flow rate adjustment

Slightly press the "+" button 2)(A) page 9 so that a new screw 5)(B) appears inside the opening 6)(B).

Adjust screw 8)(B) which varies the profile of the upper cam 7) and the corresponding screw 5) which controls the lower cam 4) until you obtain optimum combustion. Proceed in the same way with the next screws except for the last one, previously adjusted to obtain maximum power.

Ensure that variation of the cams profile is gradual.

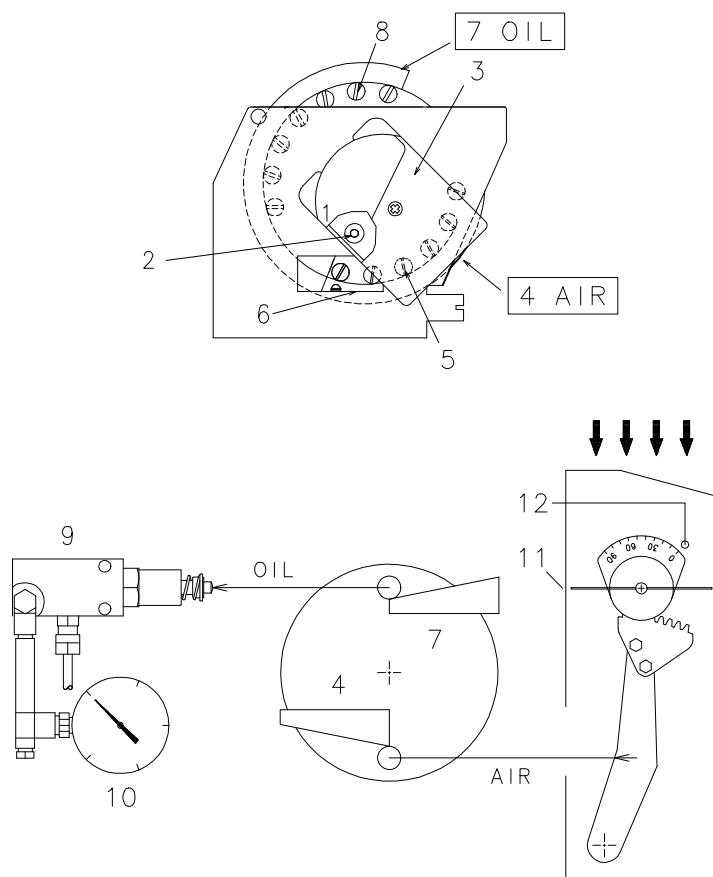
Turn the burner off via switch 1)(A) page 9, OFF position, release the cam with variable profile by pressing the reset button 2)(B) and check that the movement is smooth by manually rotating the cam backwards and forwards several times.

### NOTE

Red and blue cams of the servomotor do not require adjustment. Only orange cam may need adjusting.

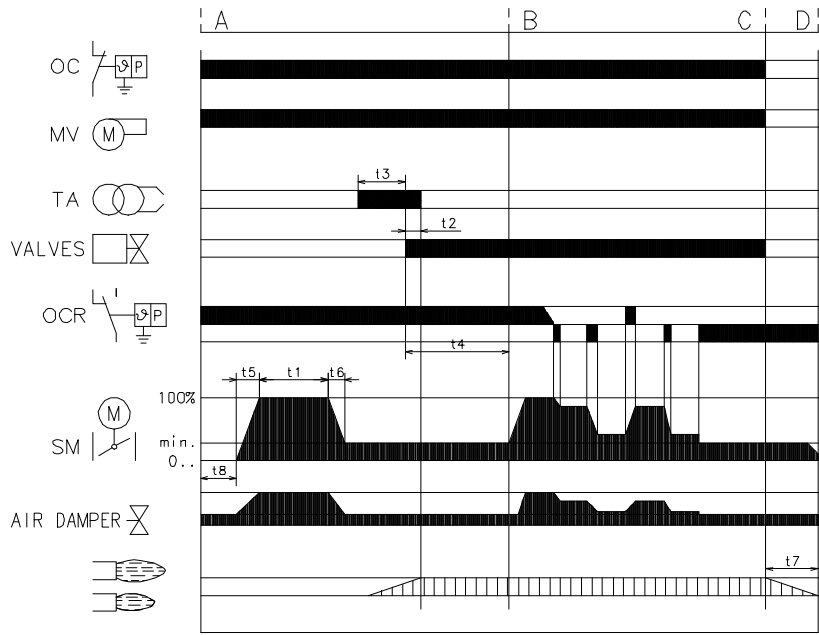
The servomotor follows the adjustment of cam III only when the cam angle is reduced. If you need to increase the cam angle (15..16..17°.), first increase the servomotor angle via the "+" button, then increase the angle of orange cam and finally reset the servomotor to the MIN power position via the "-" button.

(B)



D2523

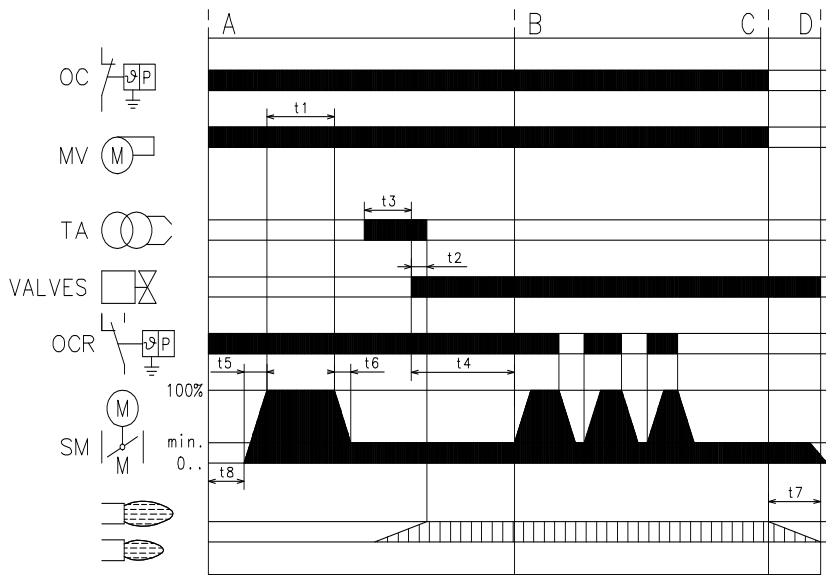
### Full Modulation



D2882

(A)

### Low-High



D2883

(B)

### SEQUENCE OF OPERATION

Switching times are given in seconds, in the burner start-up sequence.

#### LAL 2.25

<b>t1</b>	18	<b>t5</b>	optional
<b>t2</b>	4	<b>t6</b>	optional
<b>t3</b>	2	<b>t7</b>	12
<b>t4</b>	12	<b>t8</b>	4

#### Key for the times

- t1** Pre-purge time with air damper open
- t2** Safety time
- t3** Pre-ignition time, short ("Z" connected to terminal "16")
- t4** Interval between voltage at terminals "18" and "20"
- t5** Air damper running time to OPEN position
- t6** Air damper running time to low-flame position (MIN)
- t7** Permissible after-burn time
- t8** Interval to the OPEN command for the air damper

## BURNER OPERATION

### BURNER STARTING - See figure (A)

Control circuit closes, the motor starts.

The pump 3) sucks the fuel from the tank through the piping 1) and the filter 2) and pumps it under pressure to delivery. The piston 4) rises and the fuel returns to the tank through the piping 5) - 7). The screw 6) closes the by-pass heading towards suction and the de-energized solenoid valves 8) - 15) - 16) close the passage to the nozzle.

Servomotor starts: 90° rotation to right, until contact is made on red cam.

The air damper is positioned on MAX. output.

Pre-purge stage with air delivery at MAX. output.

Servomotor rotates to left until contact is made on orange cam.

Air damper and pressure regulator are positioned on MIN output.

Ignition electrode spark.

Solenoid valves 8) - 15) - 16) open; the fuel passes through the piping 9) and filter 10), finally it enters the nozzle.

A part of the fuel is then sprayed out through the nozzle, igniting when it comes into contact with the spark: flame at a low output level, point A; the rest of the fuel passes through piping 11) at the pressure adjusted by the regulator 12), then, through piping 7), it goes back into the tank.

The spark goes out.

The starting cycle ends.

### STEADY STATE OPERATION

At the end of the starting cycle, the servo-motor control then passes to load control for boiler pressure or temperature.

- If the temperature or pressure is low, the burner progressively increases output up to MAX.
- If subsequently the temperature or pressure is high, the burner progressively decreases output down to MIN.
- The burner shuts down when demand for heat is less than the heat supplied by the burner in the MIN output. Load control opens. The servomotor returns to the 0° angle limited by contact with blue cam. The air damper closes completely to reduce thermal dispersion to a minimum.

Every time output is changed, the servomotor automatically modifies oil delivery (pressure regulator) and air delivery (fan air damper).

### FIRING FAILURE

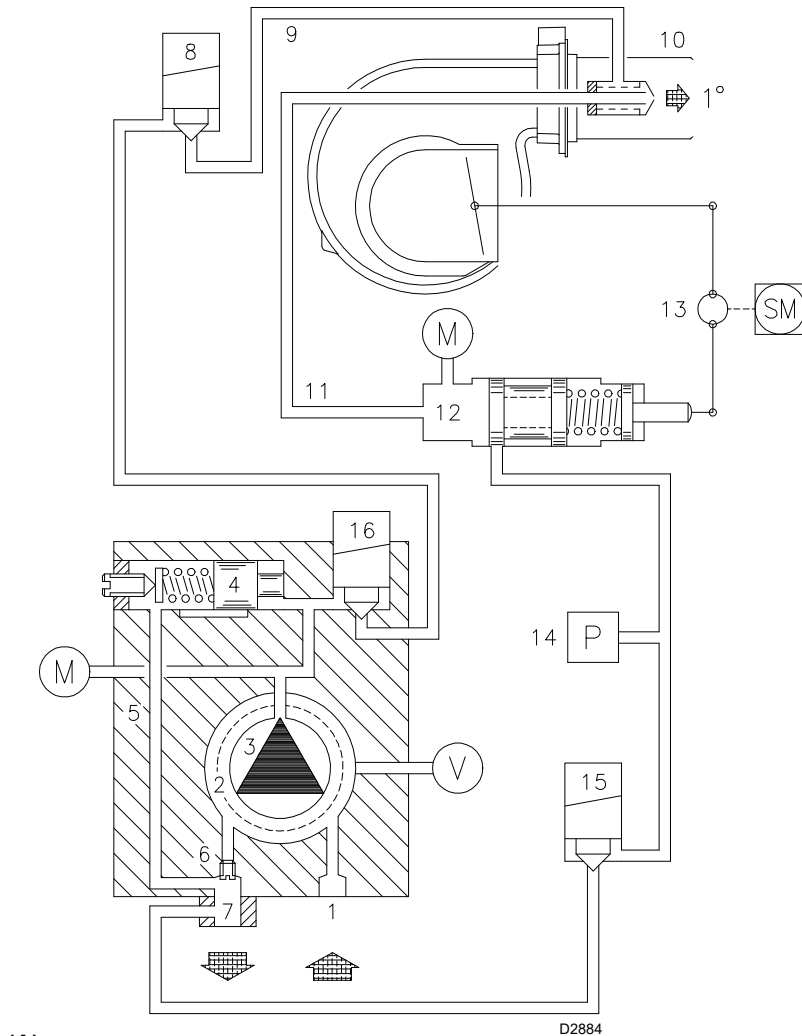
If the burner does not fire, it goes into lock-out within 5 s of the opening of the fuel oil valve.

### FIRING FAILURE

If the flame should go out for accidental reasons during operation, the burner will lock out in 1 s.

### OIL PRESSURE SWITCH

The oil pressure switch 25)(A) page 4 and 14)(A) page 12 is factory set to 43.5 PSI (3 bar). If the gas oil pressure reaches this value in the return piping, the pressure switch stops the burner. Burner starts again automatically if the pressure goes down under 43.5 PSI (3 bar) after burner shut down. If a loop circuit with Px pressure feeds the burner, the pressure switch should be adjusted to  $Px + 43.5$  PSI.



(A)

## BURNER FAULT INDICATIONS

### Control program fault conditions and lock-out indication

Whenever a fault occurs, the sequence switch stops and with it the lock-out indicator.  
The symbol above the reading mark of the indicator gives the type of fault:

◀	No start	One of the contacts has not closed	<ul style="list-style-type: none"><li>- Air damper opened. The limit switch (blue cam) for the closed position do not supply voltage from terminal 11 to terminal 8.</li><li>- The contact of the limit thermostat or any other switching devices in the control loop of terminal 4 to terminal 5 are opened.</li></ul>
		Extraneous light	Lock-out during or after completion of the control program <b>Examples:</b> <ul style="list-style-type: none"><li>– Flame not extinguished</li><li>– Leaking fuel valves</li><li>– Faulty flame supervision circuit</li></ul>
▲	Interruption of start-up sequence	OPEN signal of changeover limit switch (red cam) has not been delivered to terminal 8	
		Terminals 6, 7 and 15 remain under voltage until fault has been corrected	
■	Lock-out		Defect in the flame supervision circuit, faulty flame signal, extraneous light
▼	Interruption of start-up sequence		Position signal of auxiliary switch (orange cam) for the low flame position has not been delivered to terminal 8
			Terminals 6, 7 and 15 remain under voltage until fault has been corrected
1	Lock-out		No flame signal is present on completion of the safety time
I	Lock-out		Flame signal has been lost during operation



**WARNING**

In the event of a burner lockout, more than two consecutive burner reset operations could cause damage to the installation. On the third lockout, contact the Aftersales Service.



**DANGER**

If further lockouts or burner faults occur, interventions must only be made by qualified, authorised personnel (as indicated in this manual, and in compliance with the laws and regulations currently in force).

## MAINTENANCE



All the installation, maintenance and disassembly operations must be carried out with the electricity supply disconnected.



The installation of the burner must be carried out by qualified personnel, as indicated in this manual and in compliance with the standards and regulations of the laws in force.

### Combustion

An analysis of the flue gases at the boiler outlet is required. Significant differences with respect to the previous measurements indicate the points where more care should be exercised during maintenance.

### Pump

The pump delivery pressure must be stable at 290 PSI. The suction must be less than 6.5 PSI.

Unusual noise must not be evident during pump operation.

If the pressure is found to be unstable or if the pump runs noisily, the flexible hose must be detached from the line filter and the fuel must be sucked from a tank located near the burner. This test permits the cause of the anomaly to be traced to either the suction line or the pump.

If the pump is found to be responsible, check to make sure that the filter is not dirty. The vacuum gauge is installed up-line from the filter and consequently will not indicate whether the filter is clogged or not.

If the problem lies in the suction line, check to make sure that the filter is clean and that air is not entering the piping.

### Servomotor

Disengage servomotor and turn it backward and forward by hand to make sure it is free moving.

### Filters (A)

Check the following filters:

- on line 1) • in pump 2) • at nozzle 3),

and clean or replace as required.

If rust or other impurities are observed inside the pump, use a separate pump to suck out any water and other impurities that may have deposited on the bottom of the tank.

### Combustion head

Check to make sure that all the parts of the combustion head are in good condition, positioned correctly, free of all impurities, and that no deformation has been caused by operation at high temperatures.

### Nozzle

Do not clean the nozzle orifices.

It is advisable to replace nozzles once a year during periodical maintenance. Combustion must be checked after the nozzles have been changed.

### Flame sensor (cad sensor) (B)

Clean the glass cover from any dust that may have accumulated. Flame sensor 1) is held in position by a pressure fit and can therefore be removed by pulling it outward.

### Flame inspection window (C)

Clean the glass.

### Flexible hoses

Check to make sure that the flexible hoses are still in good condition.

### Fuel tank

Every 5 years, or whenever necessary, suck out any water or other impurities present on the bottom of the tank using a separate pump.

### Burner

Make sure that the screws are fully tightened.

### TO OPEN THE BURNER (D):

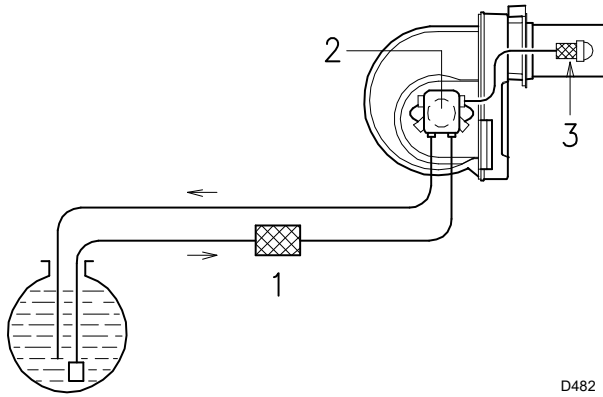
- switch off the electrical power.
- Remove screw 1 and withdraw the casing 2).
- Unscrew screw 3).
- Fit the two extensions 4) supplied with the burner onto the slide bars 5) (models with long blast tube).
- Pull part A backward keeping it slightly raised to avoid damaging the disk 6) on blast tube 7).

### Fuel pump and/or couplings replacement (E)

See fig. (E). Dimension X should be set as follows:

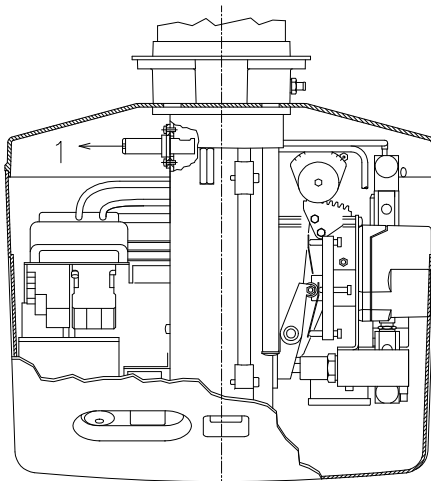
- RL28/M -  $\frac{1}{4}$ "
- RL38/M -  $\frac{3}{16}$ "
- RL50/M -  $\frac{5}{16}$ "

(A)



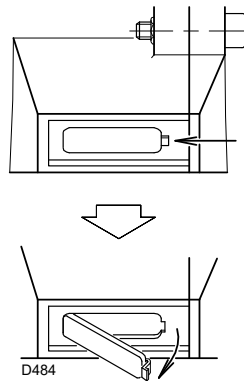
D482

(B)



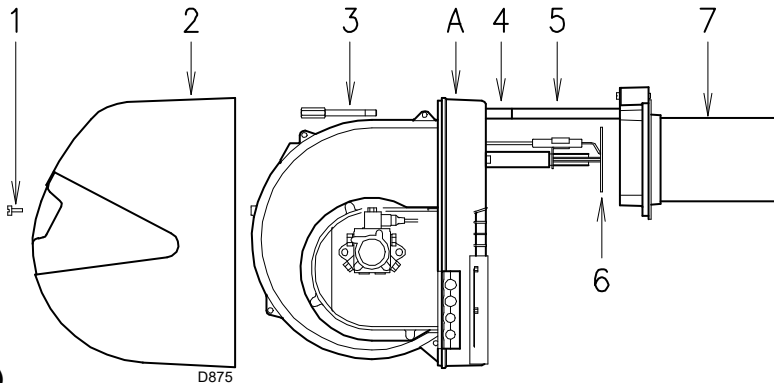
D2532

(C)



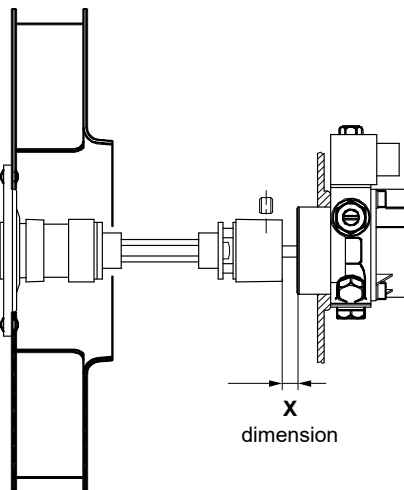
D484

(D)



D875

(E)



X  
dimension

D2854



APPENDIX - ELECTRICAL CONNECTIONS



The electrical wirings must be carried out in conformity with the regulations in force in the countries of destination, and by qualified personnel.  
Riello S.p.A. cannot accept any responsibility for modifications or connections other than those shown in these diagrams.

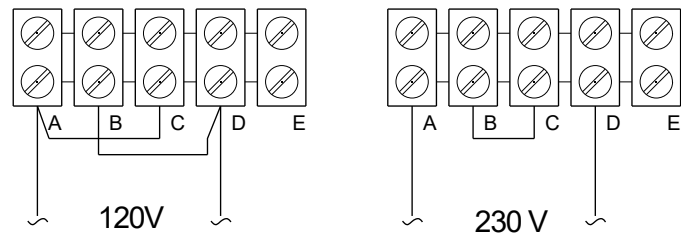
IMPORTANT

The burner is factory set for low - high operation and it must be connected to the OCR control device to control fuel oil valve V2.  
If on - off operation is required, instead of control device OCR install a jumper lead between terminals T6 and T8 of burner terminal strip.

NOTES

FIELD WIRING CONNECTIONS

- For electrical connection use flexible cables according to local Regulations.
- The setting of the thermal overload must be according to the total burner amperage draw.
- The RL 38/M - 50/M three-phase burners leave the factory preset for:
  - **208-230V** power supply: only in this case, if 460V power supply is required, change the fan motor connection from delta to double star and change the setting of the thermal overload as well;
  - or **575V** power supply;  
depending on the burner model (see page 3).
- The RL 50/M single-phase burner leaves the factory preset for **120V** power supply: if 230V power supply is required, change the fan motor connection as shown in Figure below.



The RL 28/M - 38/M - 50/M burners have been type-approved for intermittent operation. This means they should compulsorily be stopped at least once every 24 hours to enable the control box to check its own efficiency at start-up. Burner halts are normally provided for automatically by the boiler load control system.  
If this is not the case, a time switch should be fitted in series to **OC** to provide for burner shut-down at least once every 24 hours.

EXTERNAL FUSES (TO SEE THE ELECTRICAL DIAGRAM)

RL 28/M - 38/M - 50/M Single-phase burners				
	RL 28/M	RL 38/M	RL 50/M	
	120V	120V	120V	230V
FU1 (A)	T10	T10	T15	T10
FU2 (A)	T6			
RL 38/M- 50/M Three-phase burners				
	208/230V	460V	575V	
FU1 (A)	T6	T6	T4	
FU2 (A)	T6	T6	T6	



- Do not invert the neutral with the phase wire in the electricity supply line.
- Only use original spare parts to replace the components.

**APPENDIX - PROCEDURE TO REFER BURNER OPERATING CONDITION AT AN ALTITUDE AND/OR AT A COMBUSTION SUPPORTER AIR TEMPERATURE DIFFERENT TO THE STANDARD VALUES (328 FT ABOVE SEA LEVEL, 68 °F).**

**AIR TEMPERATURE**

Altitude	Altitude	bar. press.	bar. press.	0	5	10	15	20	25	30	40	°C
ft a.s.l.	m a.s.l.	"w.c.	mbar	32	41	50	59	68	77	86	104	°F
0	0	399	1013.00	1.087	1.068	1.049	1.031	1.013	0.996	0.980	0.948	
328	100	394	1000.00	1.073	1.054	1.035	1.017	1.000	0.983	0.967	0.936	
1.000	305	385	977.40	1.049	1.030	1.012	0.994	0.977	0.961	0.945	0.915	
2.000	610	371	942.80	1.012	0.994	0.976	0.959	0.943	0.927	0.912	0.883	
3.000	915	358	908.20	0.975	0.957	0.940	0.924	0.908	0.893	0.878	0.850	
4.000	1.220	345	875.80	0.940	0.923	0.907	0.891	0.876	0.861	0.847	0.820	
5.000	1.525	332	843.50	0.905	0.889	0.873	0.858	0.844	0.829	0.816	0.790	
6.000	1.830	320	811.85	0.871	0.856	0.841	0.826	0.812	0.798	0.785	0.760	
7.000	2.135	307	779.80	0.837	0.822	0.807	0.793	0.780	0.767	0.754	0.730	
8.000	2.440	294	747.80	0.803	0.788	0.774	0.761	0.748	0.735	0.723	0.700	

**F** - Correction factor of discharge head and delivery in relation to temperature and altitude.

**Reference conditions:**

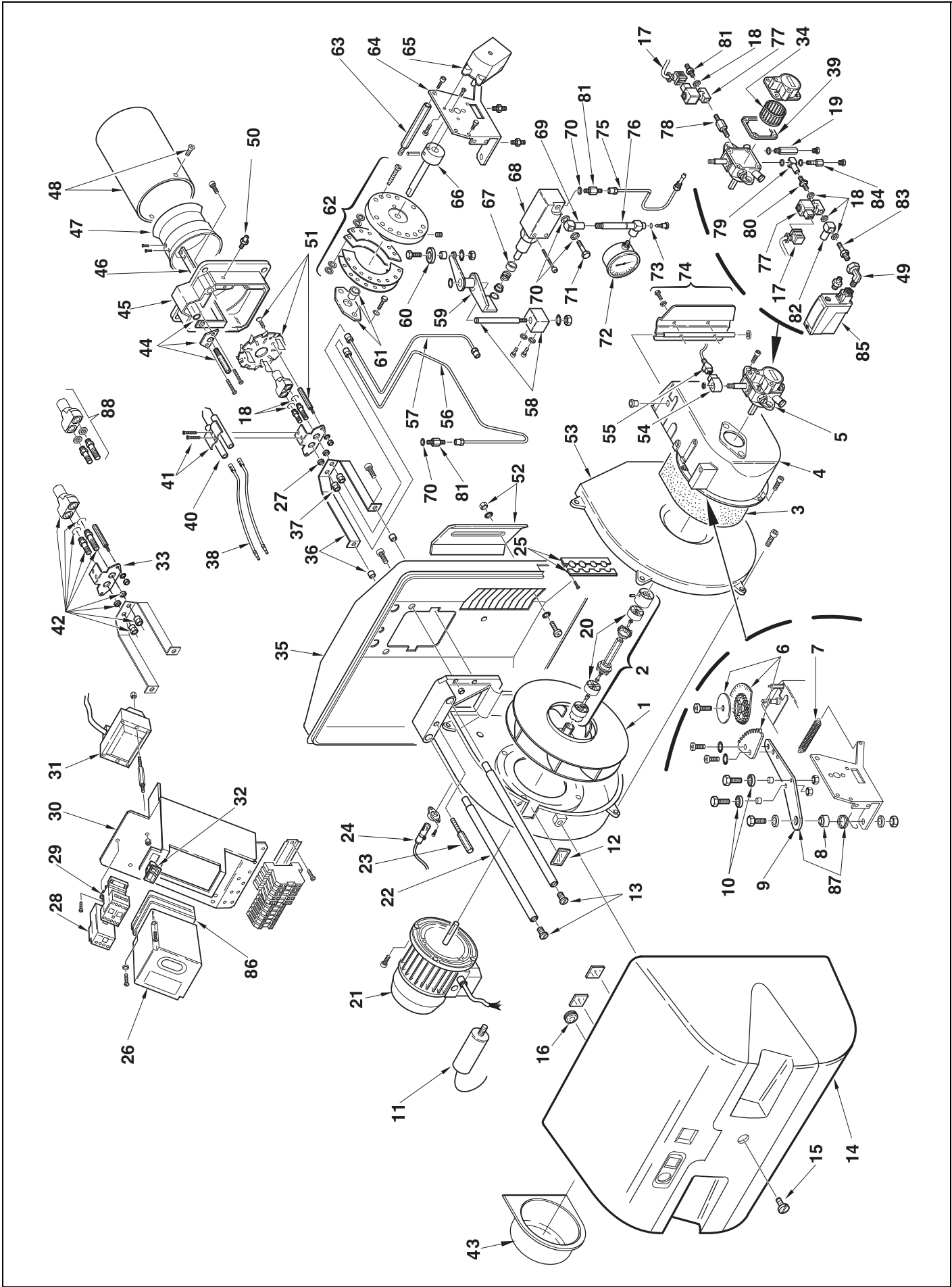
- Air temperature 68 °F (20 °C)
- Barometric pressure 394 "w.c. (1000 mbar)
- Altitude 328 ft a.s.l. (100 m a.s.l.)

**Example**

Using the , for an altitude of 3000 ft and an air temperature of 68 °F, an F factor value is obtained equal to 0.908; if the capacity at the boiler furnace is  $Q_{foc} = 4.500$  Mbtu/h, the correct output will be equal to:

$$Q_{burner} = Q_{foc} / F = 4.500 / 0.908 = 4.956 \text{ Mbtu/h}$$

APPENDIX - SPARE PARTS LIST



N.	CODE	3471070	3471470	3471470	3471270	3471670	3471670	3471675	DESCRIPTION	BURNER SERIAL NUMBER	*
1	3012985	•							FAN		C
1	3012986		•	•	•				FAN		C
1	3003760					•	•	•	FAN		C
2	3003758	•	•	•	•	•	•	•	DRIVE COUPLING		A
3	3003830	•	•	•	•	•	•	•	SOUND DAMPING		
4	3012090	•	•	•	•	•	•	•	AIR INTAKE		
5	3013030	•	•	•	•	•	•	•	PUMP		C
6	3012063	•	•	•	•	•	•	•	GRADUATE SECTOR		
7	3003879	•	•	•	•	•	•	•	SPRING	≤ 02394000000	A
8	3003843	•	•	•	•	•	•	•	SCREW		C
9	3012064	•	•	•	•	•	•	•	LEVER	≤ 02394000000	C
10	3003841	•	•	•	•	•	•	•	BEARING		B
11	3012988	•			•				CAPACITOR 45 µF		
11	20063531								• CAPACITOR 20 µF		
12	3003763	•	•	•	•	•	•	•	INSPECTION WINDOW		
13	3003776	•	•	•	•	•	•	•	SCREW		
14	3012987	•	•	•	•	•	•	•	COVER		
14	3013873								• COVER		
15	3003766	•	•	•	•	•	•	•	SCREW		
16	3007627	•	•	•	•	•	•	•	MEMBRAN		
17	3012953	•	•	•	•	•	•	•	SOCKET		
18	3007079	•	•	•	•	•	•	•	SEAL		C
19	3013037	•	•	•	•	•	•	•	CONNECTOR		C
20	3012622	•	•	•	•	•	•	•	DRIVE DISK		
21	3012993	•			•				MOTOR 120V		C
21	3012994		•		•	•			MOTOR 208-230/460V		C
21	3013057			•				•	MOTOR 575V		C
21	3013869								• MOTOR 120V		C
22	3003777	•	•	•	•	•	•	•	BAR		C
23	3003778	•	•	•	•	•	•	•	SHORT SHAFT		
24	3006216	C5360027	•	•	•	•	•	•	FLAME SENSOR		A
25	3003780	•	•	•	•	•	•	•	FAIRLEAD		
26	3012933	C5830009	•	•	•	•	•	•	CONTROL BOX LAL 2.25		B
27	3012127	•	•	•	•	•	•	•	SPACER		
28	3012991		•			•	•		OVERLOAD 208-230/460V		C
29	3012989	•			•				CONTACTOR		C
29	3012990		•	•		•	•		CONTACTOR		C
29	20049911								• CONTACTOR		C
30	3012747	•	•	•	•	•	•	•	SUPPORT		
30	3013871								• SUPPORT		
31	3012938	•	•	•	•	•	•	•	TRANSFORMER		C
32	3012080	•	•	•	•	•	•	•	SWITCH		C
33	3012092	•	•	•	•	•	•	•	SUPPORT		
34	3003082	•	•	•	•	•	•	•	FILTER		A
35	3012089	•	•	•	•	•	•	•	FRONT SHIELD		
35	3013872								• FRONT SHIELD		
36	3012094	•	•	•	•	•	•	•	SUPPORT		
37	3012095	•	•	•	•	•	•	•	NUT		

N.	CODE	3471070	3471470	3471470	3471270	3471670	3471670	3471675	DESCRIPTION	BURNER SERIAL NUMBER	*
38	3012995	•	•	•	•	•	•	•	H.T.LEAD		A
39	3003081	•	•	•	•	•	•	•	SEAL		C
40	3003796	•	•	•	•	•	•	•	ELECTRODE		A
41	3003495	•	•	•	•	•	•	•	U BOLT		
42	20066897	•	•	•	•	•	•	•	NOZZLE HOLDER ASSEMBLY		C
43	3013874								PROTECTION		
44	3003797	•	•	•	•	•	•	•	CONTROL DEVICE		
45	3003798	•	•	•	•				FRONT PIECE		
45	3003838					•	•	•	FRONT PIECE		
46	3012098	•							SQUARE		
46	3012099		•	•	•				SQUARE		
46	3012100					•	•	•	SQUARE		
47	3003805	•	•	•	•				SHUTTE		C
47	3003806					•	•	•	SHUTTER		C
48	3012101	•							END CONE		B
48	3012102		•	•	•				END CONE		B
48	3012103					•	•	•	END CONE		B
49	3013064	•	•	•	•	•	•	•	CONNECTOR		C
50	3003893	•	•	•	•	•	•	•	CONNECTOR		C
51	3012104	•							DIFFUSER DISC		A
51	3012106		•	•	•				DIFFUSER DISC		A
51	3012108					•	•	•	DIFFUSER DISC		A
52	3012110	•	•	•	•	•	•	•	ANCHOR PLATE		
53	3012111	•	•	•	•	•	•	•	HALF-SHELL		
54	3013016	•	•	•	•	•	•	•	COIL		B
55	3013015	•	•	•	•	•	•	•	LEAD		A
56	3012112	•	•	•	•	•	•	•	TUBE		
57	3012113	•	•	•	•	•	•	•	TUBE		
58	3012114	•	•	•	•	•	•	•	SHORT SHAFT		
59	3012115	•	•	•	•	•	•	•	LEVER		C
60	3012116	•	•	•	•	•	•	•	BEARING		
61	3012117	•	•	•	•	•	•	•	ANCHOR PLATE		
62	3012118	•	•	•	•	•	•	•	CAM ASSEMBLY		
63	3013005	•	•	•	•	•	•	•	STUD		
64	3013032	•	•	•	•	•	•	•	SUPPORT		
65	3013008	•	•	•	•	•	•	•	SERVOMOTOR		B
66	3013033	•	•	•	•	•	•	•	SHAFT		
67	3012121	•	•	•	•	•	•	•	SEAL		C
68	3012122	•	•	•	•	•	•	•	MODULATOR		B
69	3012123	•	•	•	•	•	•	•	CONNECTOR		C
70	3007077	•	•	•	•	•	•	•	SEAL		C
71	3012617	•	•	•	•	•	•	•	SCREW		C
72	3006140	•	•	•	•	•	•	•	PRESSURE GAUGE		A
73	3007169	•	•	•	•	•	•	•	O RING		A
74	3013034	•	•	•	•	•	•	•	AIR DAMPER ASSEMBLY		
75	3012124	•	•	•	•	•	•	•	TUBE		
76	3006540	•	•	•	•	•	•	•	NEEDLE VALVE		B
77	3012952	•	•	•	•	•	•	•	NEEDLE VALVE		B

N.	CODE	3471070	3471470	3471470	3471270	3471670	3471670	3471675	DESCRIPTION	BURNER SERIAL NUMBER	*
78	3013035	•	•	•	•	•	•	•	CONNECTOR		C
79	3013036	•	•	•	•	•	•	•	CONNECTOR		C
80	3009087	•	•	•	•	•	•	•	CONNECTOR		C
81	3006720	•	•	•	•	•	•	•	CONNECTOR		C
82	3006722	•	•	•	•	•	•	•	CONNECTOR		C
83	3013058	•	•	•	•	•	•	•	CONNECTOR		C
84	3012954	•	•	•	•	•	•	•	SCREW		C
85	3012384	•	•	•	•	•	•	•	OIL PRESSURE SWITCH		B
86	3012950 C5360001	•	•	•	•	•	•	•	CONTROL BOX BASE		
87	3013478	•	•	•	•	•	•	•	SPRING - LEVER	≥ 02404000001	A
88	20088026	•	•	•	•	•	•	•	NOZZLE HOLDER		C

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#### ADVISED PARTS

A = Spare parts for minimum fittings  
A+B = Spare parts for basic safety fittings  
A+B+C = Spare parts for extended safety fittings

## **BURNER START UP REPORT**

Model number:	_____	Serial number:	_____
Project name:	_____	Start-up date:	_____
Installing contractor:	_____	Phone number:	_____

### **OIL OPERATION**

Oil supply pressure:	_____	CO <sub>2</sub> : Low Fire	_____	High Fire	_____
Oil suction pressure:	_____	O <sub>2</sub> : Low Fire	_____	High Fire	_____
Control Power Supply:	_____	CO: Low Fire	_____	High Fire	_____
Burner Firing Rate:	_____	NO <sub>x</sub> : Low Fire	_____	High Fire	_____
Low Fire Flame Signal:	_____	Net Stack Temp - Low Fire:	_____	High Fire	_____
High Fire Flame Signal:	_____	Comb. Efficiency - Low Fire:	_____	High Fire	_____
Low Fire Nozzle Size:	_____	Overfire Draft:	_____		
High Fire Nozzle Size:	_____	Smoke number:	_____		

### **CONTROL SETTINGS**

Operating Setpoint:	_____	Low Oil Pressure:	_____
High Limit Setpoint:	_____	High Oil Pressure:	_____
Low Gas Pressure:	_____	Flame Safeguard Model	_____
High Gas Pressure:	_____	Number:	_____
		Modulating Signal Type:	_____

### **NOTES**


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# RIELLO

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

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# RIELLO

35 Pond Park Road  
Hingham, Massachusetts,  
U.S.A. 02043

RIELLO BURNERS NORTH AMERICA  
**<http://www.riello.ca>**

1-800-4-RIELLO

2165 Meadowpine Blvd  
Mississauga, Ontario  
Canada L5N 6H6