Light oil burners

Low - High Operation

CODE	MODEL	TYPE
C9514200 (3475070)	RL 70	660T70
C9514201 (3475075)	RL 70	660T70
C9515200 (3475270)	RL 100	661T70
C9515201 (3475275)	RL 100	661T70
C9516200 (3475470)	RL 130	662T70
C9516201 (3475475)	RL 130	662T70

CONTENTS

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.

WARNING

Do not store flammable or hazardous materials in the vicinity of fuel burning appliances.

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or death. Refer to this manual for instructional or additional information. Consult a certified installer, service representative or the gas supplier for further assistance.

Burner shall be installed in accordance with manufacturers requirements as outlined in this manual, local codes and authorities having jurisdiction.

TECHNICAL DATA

MODEL			RL 70	RL 100	RL 130
Output (1)	High fire	MBtu/hr (3)	1792 - 3136	2688 - 4480	3584 - 5824
Delivery (1)		GPH	12.8 - 22.4	19.2 - 32	25.6 - 41.6
	Low fire	MBtu/hr (3)	966 - 1792	1344 - 2688	1834 - 3584
		GPH	6.9 - 12.8	9.6 - 19.2	13.1 - 25.6
Fuel			# 2 Fuel oil		
Operation			Low - high		
Nozzles		number	2		
Standard applications			Hot water, steam, thermal oil		
Ambient temperature		°F	32 - 104 (0 - 40 °C)		
Combustion air temperature		°F max	140 (60 °C)		
Pump	delivery (174 Psi)	GPH	54		
	pressure range	PSI	145 - 290		
Noise levels (2)		dBA	68.0	70.0	70.0

(1) Reference conditions: Ambient temperature 68° F (20° C) - Barometric pressure 394" WC - Altitude 329 ft.
(2) Sound pressure measured in manufacturers 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.

Fan motor IE1

Three phase burner

Model		RL 70	RL 100	RL 130
Control circuit power supply	V/Ph/Hz		120/1/60	
Main electrical supply (+/- 10%)	V/Ph/Hz		208-230/3/60	
Fan and pump motor	rpm	3400	3400	3400
	W - HP	1100 - 1.5	2200 - 3	2200 - 3
	V	208-230	208-230	208-230
	A	4.7	8.5	8.5
Ignition transformer	V1 - V2		120 V - 2 X 5 kV	
	I1 - I2		2.7 A - 30 mA	
Electrical power consumption	W max	1550	2750	2750
Electrical control circuit coms.	W		750	
Total electrical consumption	W	2300	3500	3500
Electrical protection			NEMA 1	

Model		RL 70	RL 100	RL 130
Control circuit power supply	V/Ph/Hz		120/1/60	
Main electrical supply (+/- 10%)	V/Ph/Hz		460/3/60	
Fan and pump motor	rpm	3400	3400	3400
	W - HP	1100 - 1.5	2200 - 3	2200 - 3
	V	460	460	460
	A	2.7	4.9	4.9
Ignition transformer	V1 - V2		120 V - 2 X 5 kV	
	I1 - I2		2.7 A - 30 mA	
Electrical power consumption	W max	1750	3150	3150
Electrical control circuit coms.	W		750	
Total electrical consumption	W	2500	3900	3900
Electrical protection			NEMA 1	

Model		RL 70	RL 100	RL 130
Control circuit power supply	V/Ph/Hz		120/1/60	
Main electrical supply (+/- 10%)	V/Ph/Hz		575/3/60	
Fan and pump motor	rpm	3360	3400	3400
	W - HP	1100 - 1.5	2200 - 3	2200 - 3
	V	575	575	575
	A	2	3.7	3.7
Ignition transformer	V1 - V2		120 V - 2 X 5 kV	
	I1 - I2		2.7 A - 30 mA	
Electrical power consumption	W max	1550	2900	2900
Electrical control circuit coms.	W		750	
Total electrical consumption	W	2300	3650	3650
Electrical protection			NEMA 1	

Fan motor IE2/EPACT

Three phase burner

Model		RL 70	RL 100	RL 130
Control circuit power supply	V/Ph/Hz		120/1/60	
Main electrical supply (+/- 10%)	V/Ph/Hz		208-230/3/60	
Fan and pump motor	rpm	3475	3500	3500
	W - HP	1100 - 1.5	2200 - 3	2200 - 3
	V	208-230	208-230	208-230
	A	4	7.8	7.8
Ignition transformer	V1 - V2		120 V - 2 X 5 kV	
	I1 - I2		2.7 A - 30 mA	
Electrical power consumption	W max	1350	2600	2600
Electrical control circuit coms.	W		750	
Total electrical consumption	W	2100	3350	3350
Electrical protection			NEMA 1	

Model		RL 70	RL 100	RL 130
Control circuit power supply	V/Ph/Hz		120/1/60	
Main electrical supply (+/- 10%)	V/Ph/Hz		460/3/60	
Fan and pump motor	rpm	3475	3500	3500
	W - HP	1100 - 1.5	2200 - 3	2200 - 3
	V	460	460	460
	A	2	3.9	3.9
Ignition transformer	V1 - V2		120 V - 2 X 5 kV	
	I1 - I2		2.7 A - 30 mA	
Electrical power consumption	W max	1350	2600	2600
Electrical control circuit coms.	W		750	
Total electrical consumption	W	2100	3350	3350
Electrical protection			NEMA 1	

Model		RL 70	RL 100	RL 130
Control circuit power supply	V/Ph/Hz		120/1/60	
Main electrical supply (+/- 10%)	V/Ph/Hz		575/3/60	
Fan and pump motor	rpm	3475	3500	3500
	W - HP	1100 - 1.5	2200 - 3	2200 - 3
	V	575	575	575
	A	1.6	3.1	3.1
Ignition transformer	V1 - V2		120 V - 2 X 5 kV	
	I1 - I2		2.7 A - 30 mA	
Electrical power consumption	W max	1350	2600	2600
Electrical control circuit coms.	W		750	
Total electrical consumption	W	2100	3350	3350
Electrical protection			NEMA 1	

Burner models designations:

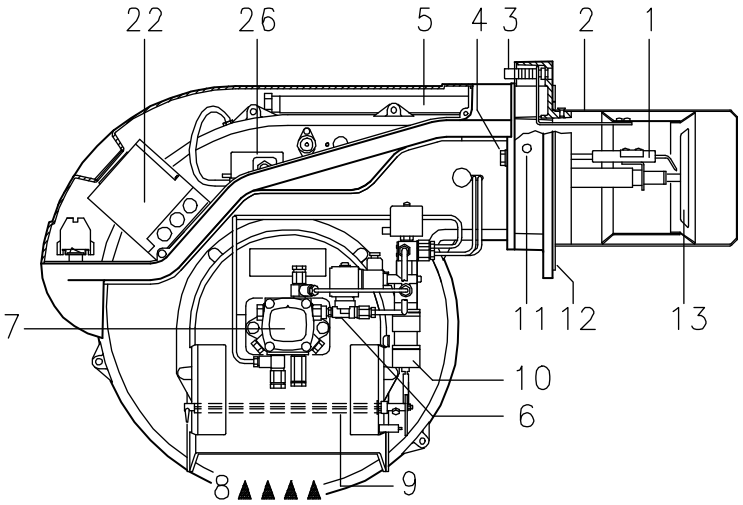
Model	Code	Voltage	Flame safeguard
RL 70	**C9514200** (3475070)	208-230/460/3/60	Burner mounted
	C9514201 (3475075)	575/3/60	Burner mounted
RL 100	**C9515200** (3475270)	208-230/460/3/60	Burner mounted
	C9515201 (3475275)	575/3/60	Burner mounted
RL 130	**C9516200** (3475470)	208-230/460/3/60	Burner mounted
	C9516201 (3475475)	575/3/60	Burner mounted

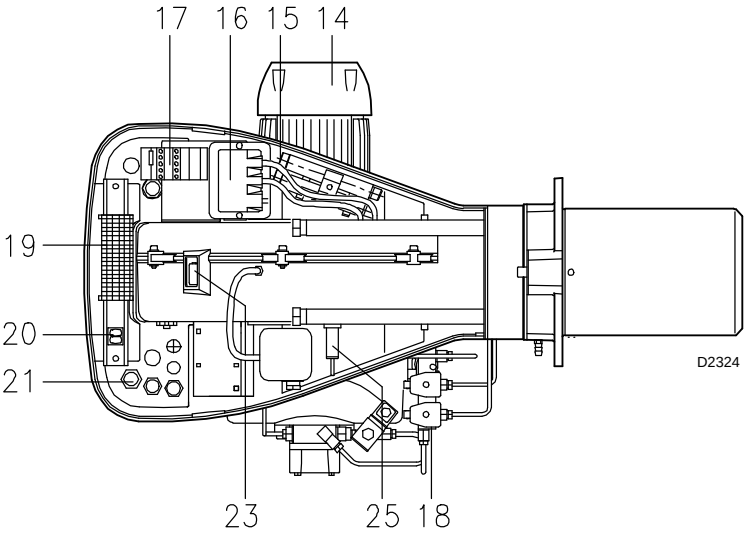
ACCESSORIES (optional):

- **Kit for lengthening the combustion head**
  L = Standard length
  L1 = Length obtainable with the kit

COD. **3010253**	L = $9\frac{27}{32}$“	L1 = $15\frac{5}{32}$“	• RL 70
COD. **3010254**	L = $9\frac{27}{32}$“	L1 = $15\frac{5}{32}$“	• RL 100
COD. **3010255**	L = $9\frac{27}{32}$“	L1 = $15\frac{5}{32}$“	• RL 130

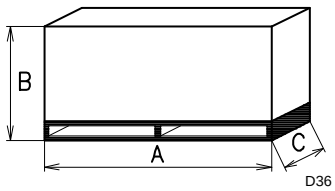
Important:
The installer is responsible for the supply and installation of any safety device(s) not indicated in this manual.



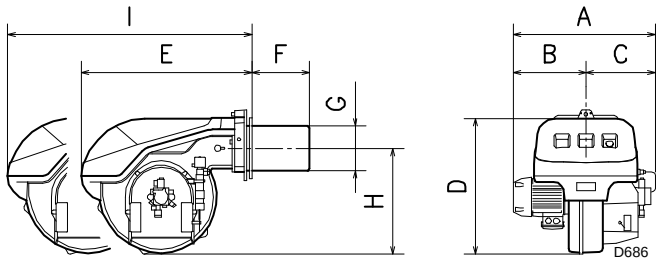


(A)

inch	$A_{(1)}$	B	C	lbs
RL70	37 25/32" - 45 9/32"	23 5/8"	25 11/16"	132
RL100	37 25/32" - 45 9/32"	23 5/8"	25 11/16"	139
RL130	37 25/32" - 45 9/32"	23 5/8"	25 11/16"	146



(B)



(C)

RL	A	B	C	D	E	F (1)	G	H	I (1)
70	22 27/32"	11 21/32"	11 3/16"	21 27/32"	26 25/32"	9 27/32" - 15 5/32"	7 1/16"	16 15/16"	37 7/16" - 42 3/4"
100	23 19/32"	12 9/32"	11 5/16"	21 27/32"	26 25/32"	9 27/32" - 15 5/32"	7 1/16"	16 15/16"	37 7/16" - 42 3/4"
130	24 5/8"	13 5/16"	11 5/16"	21 27/32"	26 25/32"	9 27/32" - 15 5/32"	7 7/16"	16 15/16"	37 7/16" - 42 3/4"

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

BURNER DESCRIPTION (A)

1 Ignition electrodes
2 Combustion head
3 Screw for combustion head adjustment
4 Screw for fixing fan to flange
5 Slide bars for opening the burner and inspecting the combustion head
6 Safety solenoid valve
7 Pump
8 Air inlet to fan
9 Air damper
10 Hydraulic cylinder for regulation of the air damper at low and high positions. When the burner is not operating the air damper is fully closed in order to reduce heat loss from the boiler.
11 Fan pressure test point
12 Boiler mounting flange
13 Flame stability disk
14 Electrical motor
15 Extensions for slide bars 5)
16 Ignition transformer
17 Motor contactor and thermal cut-out with reset button
18 Low and high fire valve assembly
19 Terminal strip
20 Two switches:
- one "burner off - on"
- one low - high operation"
21 Knockouts for wiring carried out by the installer
22 Flame safeguard with lock-out pilot light and lock-out reset button
23 Flame inspection window
24 Pump pressure adjustment
25 Photocell (cad cell)
26 Air pressure switch

Two types of burner failure may occur:

- **FLAME SAFEGUARD LOCK-OUT:**
  if the Flame relay 22)(A) pushbutton lights up, it indicates that the burner is in lock-out.
  To reset, press the pushbutton.
- **MOTOR TRIP:**
  release by pressing the pushbutton on thermal relay.

PACKAGING-WEIGHT (B)

Approximate measurements

- The burner is shipped on a skid. Outer dimensions of packaging are indicated in (B)
- The weight of the burner complete with packaging is indicated in table (B).

MAX. DIMENSIONS (C)

Approximate measurements

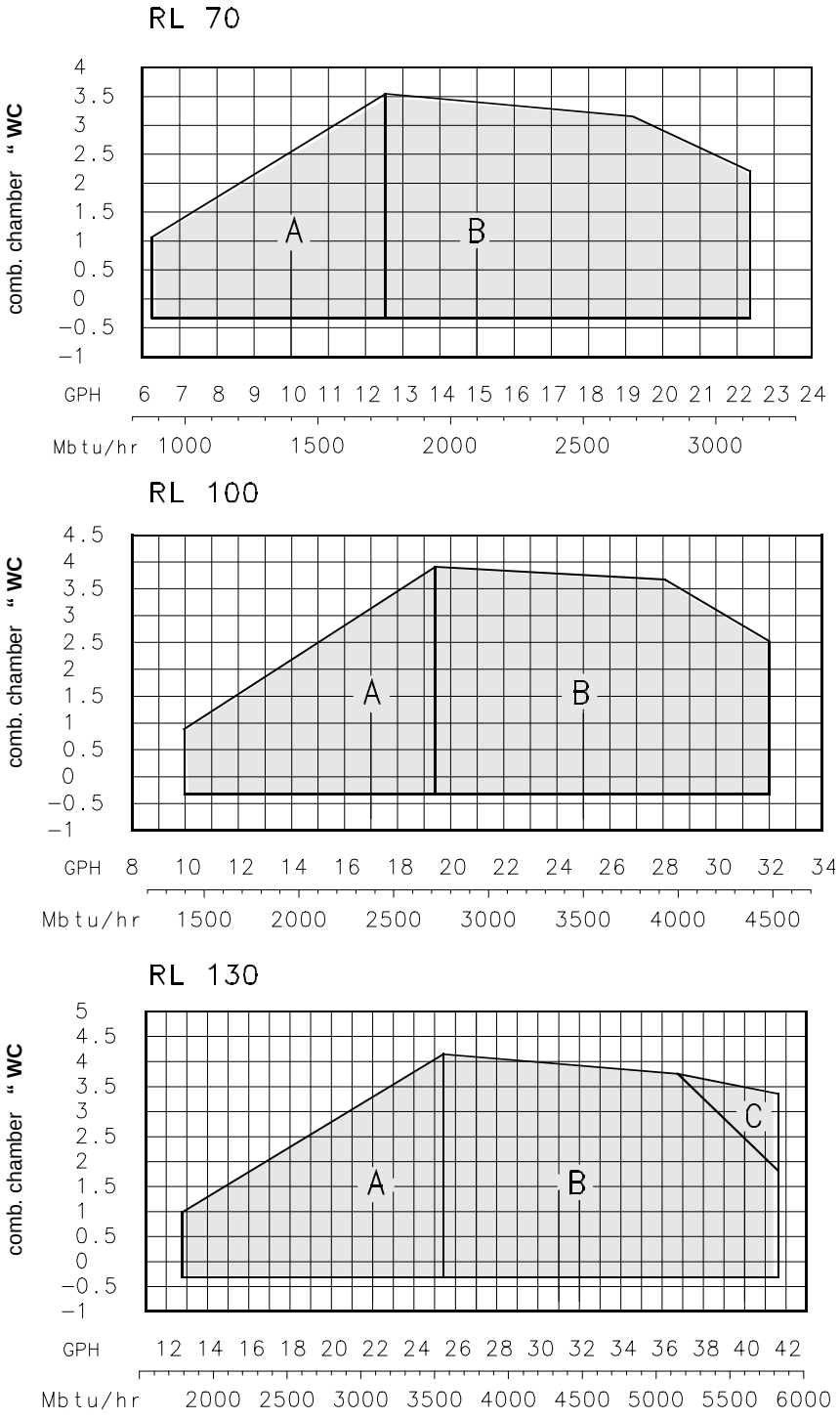
The maximum dimensions of the burners are given in (C).

Inspection of the combustion head requires the burner to be opened and the rear part withdrawn on the slide bars.

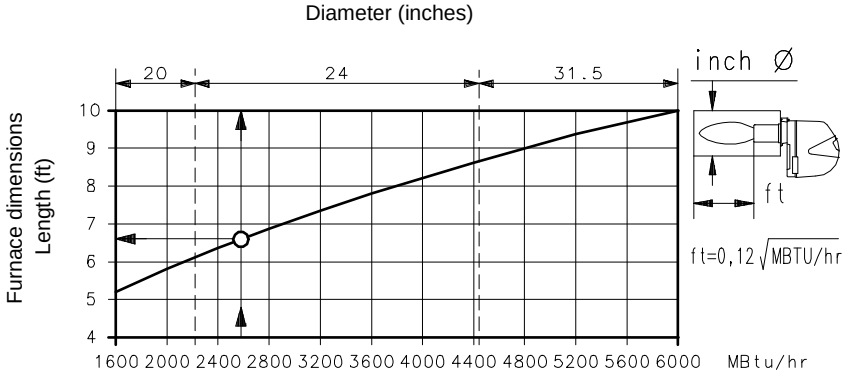
The maximum dimension of the burner when open is given in measurement I.

STANDARD EQUIPMENT

2 - Flexible hoses
1 - Head gasket
4 - Screws to secure the burner flange to the boiler: 1/2 W x 13/8"
1 - Instruction booklet
1 - Spare parts list
1 - Adaptor G1/8" - 1 3/8" NPT



(A) D2325



(B) D2919

FIRING RATE (A)

The RL 70 - 100 - 130 Model burners can work in two ways: Low and High fire.

LOW FIRE DELIVERY must be selected within area A of the adjacent diagrams.

HIGH FIRE DELIVERY must be selected within area B (and C for model RL 130). This area provides the maximum delivery of the burner in relation to the pressure in the combustion chamber.

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 B. In order to also utilize area C (RL 130) it is necessary to perform the calibration of the combustion head as explained on page 7.

Important:
the FIRING RATE area values have been obtained considering an ambient temperature of 68° F (20 °C), and an atmospheric pressure of 394" WC (approx. 329 ft above sea level) and with the combustion head adjusted as shown on page 8.

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

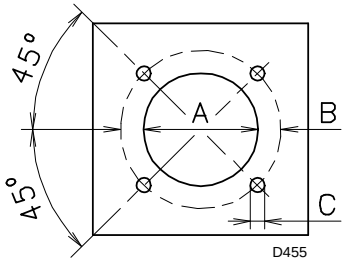
Consult Procedure on page 14 to refer burner operating condition in high altitude plants.

MINIMUM FURNACE DIMENSIONS (B)

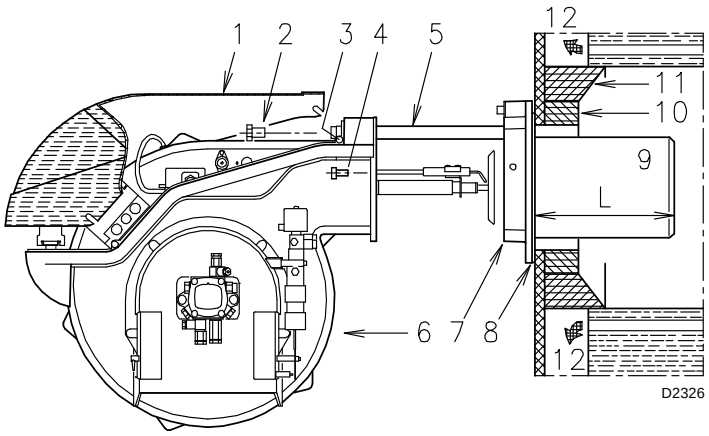
The firing rates were set in relation to certified test boilers.
Figure (B) indicates the diameter and length of the test combustion chamber.

Example
Output 2579 MBTU/hr:
diameter 24 inch - length 6.6 ft.

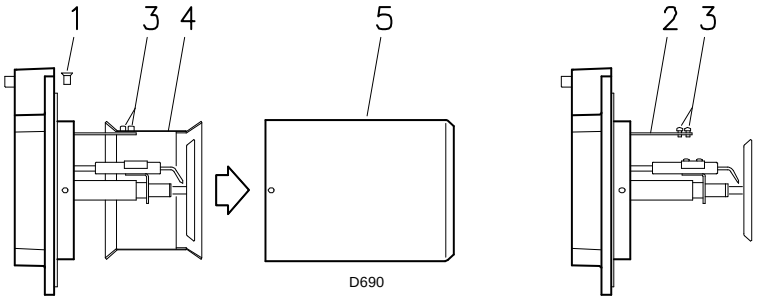
inch	A	B	C
RL 70	7 9/32“	10 27/32“ - 12 13/16“	1/2 W
RL 100	7 9/32“	10 27/32“ - 12 13/16“	1/2 W
RL 130	7 9/32“	10 27/32“ - 12 13/16“	1/2 W



(A)



(B)



(C)

Nozzle size	GPH 145 PSI	GPH 174 PSI	GPH 203 PSI	MBtu/hr 174 PSI
5.0	6.15	6.79	7.40	951
5.5	6.76	7.46	8.13	1044
6.0	7.40	8.17	8.87	1144
6.5	8.00	8.84	9.60	1238
7.0	8.61	9.51	10.34	1331
7.5	9.22	10.18	11.08	1425
8.0	9.86	10.85	11.81	1519
8.3	10.21	11.27	12.26	1578
8.5	10.47	11.56	12.55	1618
9.0	11.08	12.23	13.29	1712
9.5	11.69	12.90	14.06	1806
10.0	12.30	13.58	14.76	1901
10.5	12.94	14.28	15.50	1999
11.0	13.54	14.95	16.23	2093
12.0	14.76	16.30	17.71	2282
12.3	15.15	16.71	18.16	2339
13.0	16.01	17.64	19.18	2470
13.8	17.00	18.73	20.27	2622
14.0	17.23	19.02	20.65	2663
15.0	18.48	20.37	22.16	2852
15.3	18.83	20.78	22.57	2909
16.0	19.69	21.74	23.63	3044
17.0	20.94	23.09	25.10	3233
17.5	21.55	23.76	25.84	3326
18.0	22.16	24.46	26.58	3424
19.0	23.38	25.81	28.05	3613
19.5	24.01	26.48	28.79	3707
20.0	24.62	27.15	29.52	3801
21.5	26.48	29.20	31.73	4088
22.0	27.09	29.86	32.47	4180

(D)

INSTALLATION

BOILER PLATE (A)

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

BLAST TUBE LENGTH (B)

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

Blast tube 9):	RL 70	RL 100	RL 130
• short	9 27/32	9 27/32	9 27/32
• long (with the kit)	15 5/32	15 5/32	15 5/32

For boilers with front flue passes 12) or flame inversion chambers, protective insulation material 10) must be inserted between the boiler's refractory 11) and the blast tube 9).
This protective insulation must not compromise the extraction of the blast tube.
For boilers having a water-cooled front, the insulation 10)-11)(B) is not required unless it is required by the boiler manufacturer.

SECURING THE BURNER TO THE BOILER (B)

Disassemble the blast tube 9) from the burner 6) by proceeding as follows:
- Loosen the four screws 3) and remove the cover 1).
- Remove the screws 2) from the two slide bars 5).
- Remove the two screws 4) fixing the burner 6) to the flange 5).
- Withdraw the blast tube 9) complete with flange 7) and slide bars 5).

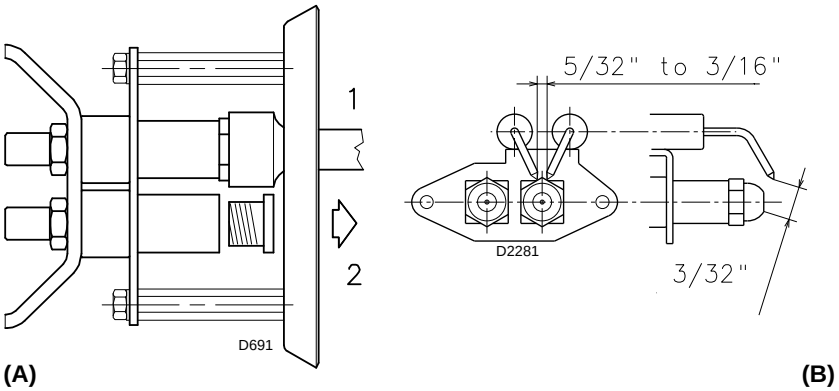
COMBUSTION HEAD CALIBRATION

At this point check, for model RL 130, whether the maximum delivery of the burner in high fire operation is contained in area B or in area C of the firing rate.
See page 5.
If it is in area B then no operation is required.
If, on the other hand, it is in area C:
- Unscrew the screws 1)(C) and disassemble the blast tube 5).
- Unscrew the screws 3) and remove the shutter 4).
- Tighten the screws 3) on the rod 2).
- Now refit the blast tube 5) and the screws 1).

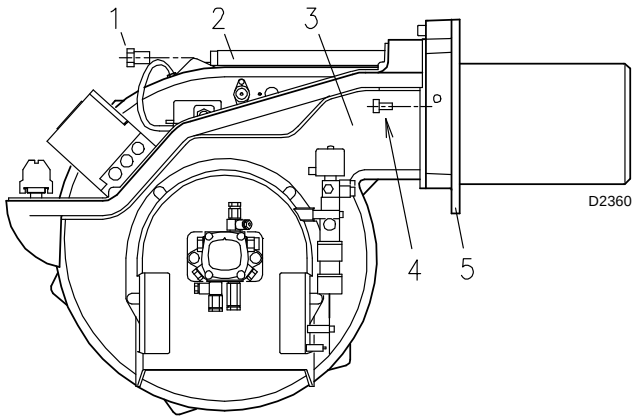
Once this operation has been carried out (if required), secure flange 7)(B) to the boiler plate inserting the supplied gasket 8). Use the 4 screws provided after having protected the thread with an antiseize product (high-temperature grease, compounds, graphite). The burner-boiler seal must be airtight.

CHOICE OF NOZZLES FOR LOW AND HIGH FIRE

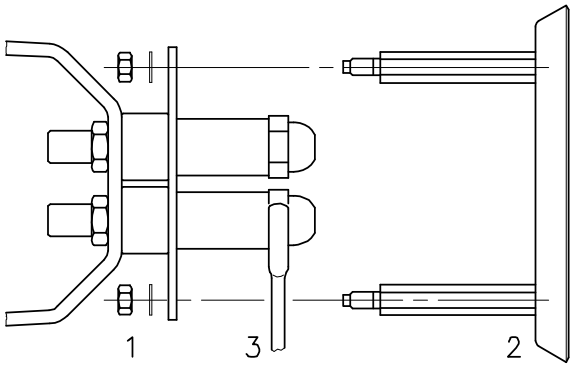
Both nozzles must be chosen from among those listed in Table (D).
The first nozzle determines the delivery of the burner at low fire.
The second nozzle works in combination with the low fire nozzle to determine the delivery of the burner at high fire.
The total deliveries of low and high fire must be contained within the value range indicated on page 3.
Use nozzles with a 60° spray angle at the recommended pressure of 174 PSI.



(A) **(B)**

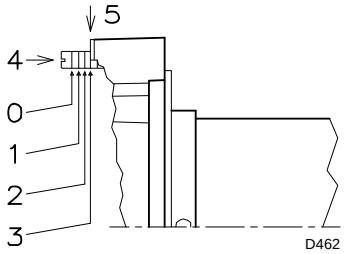


(C)

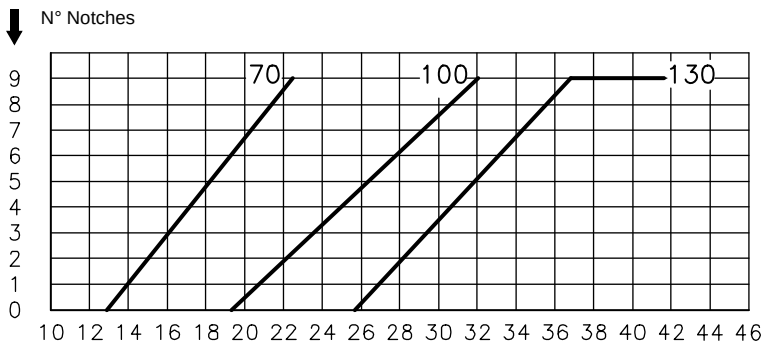


(D)

SETTING THE COMBUSTION HEAD



(E)



(F)

The two nozzles usually have equal deliveries, but the low fire nozzle may have the following specifications if required:

- a delivery less than 50% of the total delivery whenever the back-pressure peak must be reduced at the moment of firing: the burner allows good combustion values also with a ratio 40 - 100 % between low and high fire;
- a delivery higher than 50% of the total delivery whenever the combustion during low fire must be improved.

Example with the RL 70 Model:
Boiler output = 2130 MBTU/hr - efficiency 80 %
Output required by the burner =
2130 : 0.8 = 2662 MBTU/hr;
2662 : 2 = 1331 MBTU/hr per nozzle;

therefore, two equal, 60°, 174 PSI nozzles are required:
1° = 7.0 GPH - 2° = 7.0 GPH,

or the following two different nozzles:
1° = 6.0 GPH - 2° = 8.0 GPH,

or:
1° = 8.0 GPH - 2° = 6.0 GPH.

NOZZLE ASSEMBLY

At this stage of installation the burner is still disassembled from the blast tube; it is now possible to install the two nozzles, after having removed the plastic plugs 2)(A), 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. The nozzles must be screwed into place tightly but carefully.
The nozzle for low fire operation is the one lying beneath the firing electrodes Fig. (B).

Make sure that the electrodes are positioned as shown in Figure (B).
Finally remount the burner 3)(C) to the slide bars 2) 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 1) on the slide bars 2) and screws 4) fixing the burner to the flange.

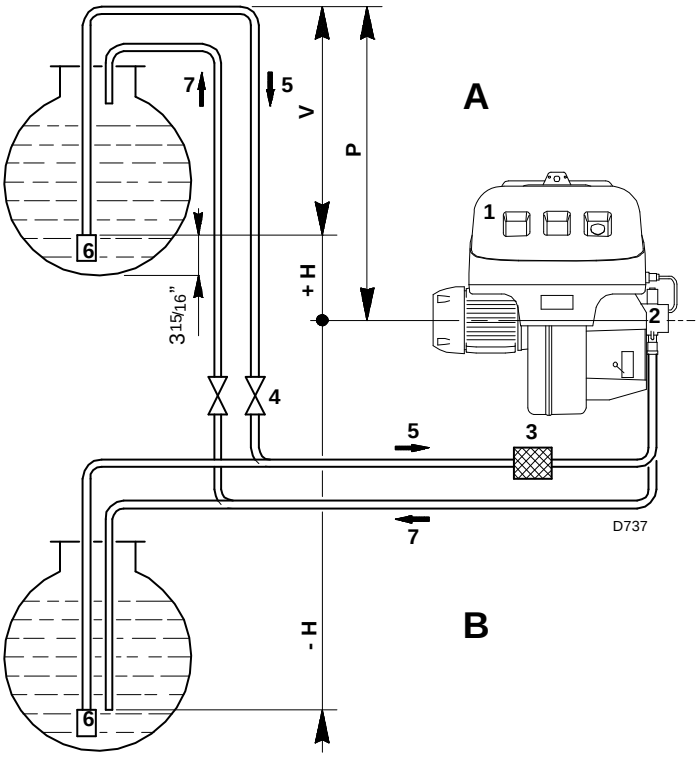
If it proves necessary to change a nozzle with the burner already fitted to the boiler, proceed as outlined below:

- Retract the burner on its slide bars as shown in fig. (B)p.6.
- Remove the nuts 1)(D) and the disk 2).
- Use wrench 3)(D) to change the nozzles.

COMBUSTION HEAD SETTING

The setting of the combustion head depends exclusively on the delivery of the burner at high fire - in other words, the combined delivery of the two nozzles selected on page 7. Turn screw 4)(E) until the notch shown in diagram (F) is level with the front surface of flange 5)(E).

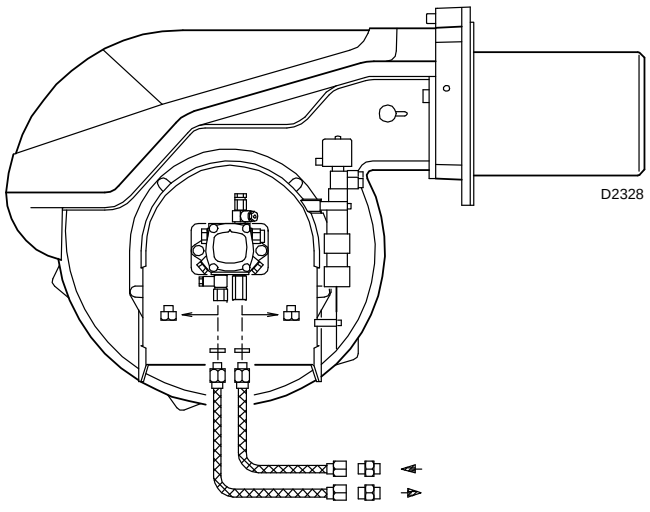
Example:
The RL 70 Model with two 6.00 GPH nozzles and 174 PSI pump pressure.
Find the delivery of the two 6.00 GPH nozzles in table (D), page 7:
8.17 + 8.17 = 16.34 GPH.
Diagram (F) indicates that for a delivery of 16.34 GPH the RL 70 Model requires the combustion head to be set to approx. three notches, as shown in Figure (E).



+ H - H ft	L ft RLS 70 - 100 - 130 Ø inch		
	3/8"	1/2"	5/8"
+ 13	100	210	320
+ 10	88	180	320
+ 6.6	75	155	320
+ 3.3	68	140	320
+ 1.6	52	110	270
0	45	98	240
- 1.6	39	85	200
- 3.3	26	55	140
- 6.6	19	42	104
- 10	--	13	36

(A)

HYDRAULIC CONNECTIONS



(B)

HYDRAULIC SYSTEM

FUEL SUPPLY

Double-pipe circuit (A)

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

The tank higer than the burner **A**

The distance "P" must not exceed 32 ft in order to avoid subjecting the pump's seal to excessive strain; the 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 exiting 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 (A)

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 and suction line.

The pumps are installed on the burner with the by-pass closed by screw 6)(A)p.13.

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 bi-pass screw inserted.

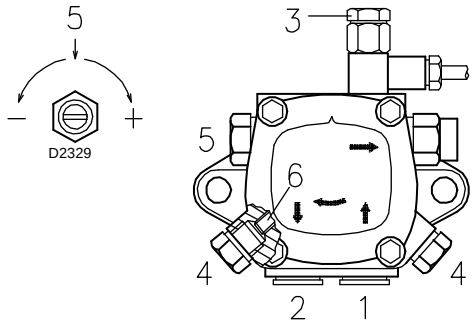
Remove the plugs from the suction and return connections of the pump.

Insert the hose connectors with the supplied seals into the connections and screw them down.

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

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 supplied nipples, using two wrenches, one to hold the nipple steady while using the other one to turn the rotary union on the hose.



PUMP		AJ4
A	GPH	54
B	PSI	145 - 290
C	“Hg	13
D	cSt	2,8 - 75
E	°F - °C	140 - 60
F	PSI	29
G	PSI	174
H	inch	0,006

(A)

PUMP (A)

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	
6 - Screw for by-pass	

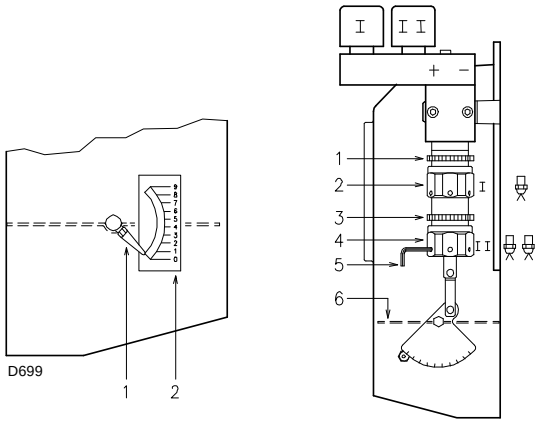
A - Min. delivery rate at 174 PSI pressure
B - Delivery pressure range
C - Max. suction pressure
D - Viscosity range
E - Light oil max. temperature
F - Max. suction and return pressure
G - Pressure calibration in the factory
H - Filter mesh width

PUMP PRIMING

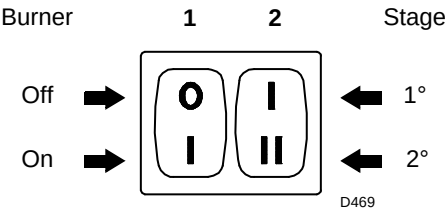
- **Before starting the burner, make sure that the tank return line is not clogged.**
  Obstructions in the line could cause the seal located on the pump shaft to break. (The pump leaves the factory with the by-pass closed).
- In order for self-priming to take place, one of the screws 3)(A) of the pump must be loosened in order to bleed off the air contained in the suction line.
- Start the burner by closing the control circuit and with switch 1)(C)p.11 in the "ON" position. The pump must rotate in the direction of the arrow marked on the cover.
- The pump can be considered to be primed when the light oil starts coming out of the screw 3). Stop the burner: switch 1)(C)p.11 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 starting 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.
Do not illuminate the photocell or the burner will lock out; the burner should lock out anyway about 10 seconds after it starts.

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 on 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) **(B)**



(C)

Low fire

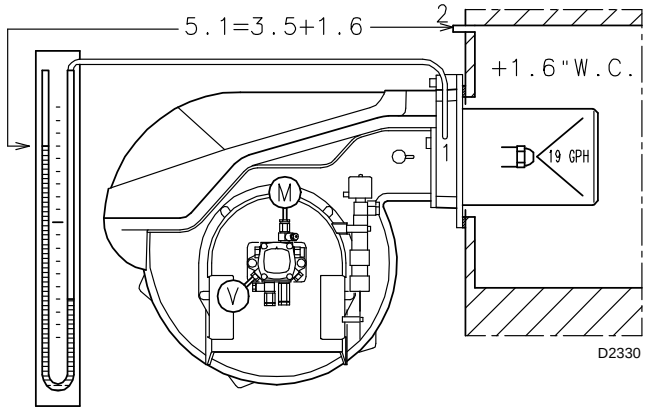
RL 70		RL 100		RL 130	
Nozzle size GPH	N°	Nozzle size GPH	N°	Nozzle size GPH	N°
5	2	7	2	10	2
6	2.3	8	2.1	11	2.1
7	2.6	9	2.2	12	2.2
8	2.7	10	2.4	13	2.3
9	2.8	11	2.6	14	2.5
		12	2.7	15	2.6
		13	2.8	16	2.7
		14	2.9	17	2.8
				18	2.9
				19	3

(D)

High fire

RL 70		RL 100		RL 130	
Nozzle size GPH	"WC	Nozzle size GPH	"WC	Nozzle size GPH	"WC
13	3.3	19	2.8	26	2.7
16	3.4	22	3.0	29	2.8
19	3.5	26	3.3	32	3.0
22	3.6	29	3.7	35	3.2
		32	4.3	38	3.5
				42	4.3
					3.3 (1)

"WC = Air pressure in 1) with zero pressure in 2)
(1) Without shutter 4)(C)p.6



(E)

BURNER CALIBRATION

FIRING

Set switch 1)(C) to "ON".
During the first firing, during the switch over from low to the high fire, there is a momentary lowering of the fuel pressure caused by the filling of the high fire nozzle tubing.
This lowering of the fuel pressure can cause the burner to lock-out and can sometimes give rise to pulsations.
Once the following adjustments have been made, the firing of the burner must generate a noise similar to the noise generated during operation.

OPERATION

The optimum calibration of the burner requires an analysis of the flue gases at the boiler outlet and adjustments at the following points:

- **Low and high fire nozzles**
  See the information listed on page 7.

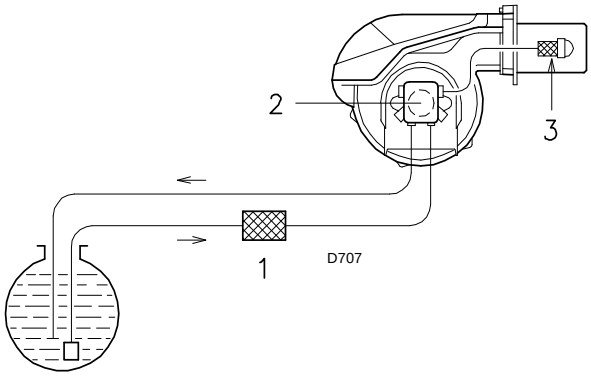
- **Combustion head**
  The adjustment of the combustion head already carried out need not be altered unless the high fire delivery of the burner is changed.

- **Pump pressure**
  174 PSI: this is the pressure calibrated in the factory which is usually sufficient for most purposes.
  Sometimes, this pressure must be adjusted to:
  145 PSI in order to reduce fuel delivery.
  This adjustment is possible only if the ambient temperature remains above 0°C.
  Never calibrate to pressures below 145 PSI, at which pressures the cylinders may have difficulty in opening;
  203 PSI order to increase fuel delivery or to ensure firings even at temperatures of less than 0°C.
  In order to adjust pump pressure, use the relevant screw 5)(A)p.11.

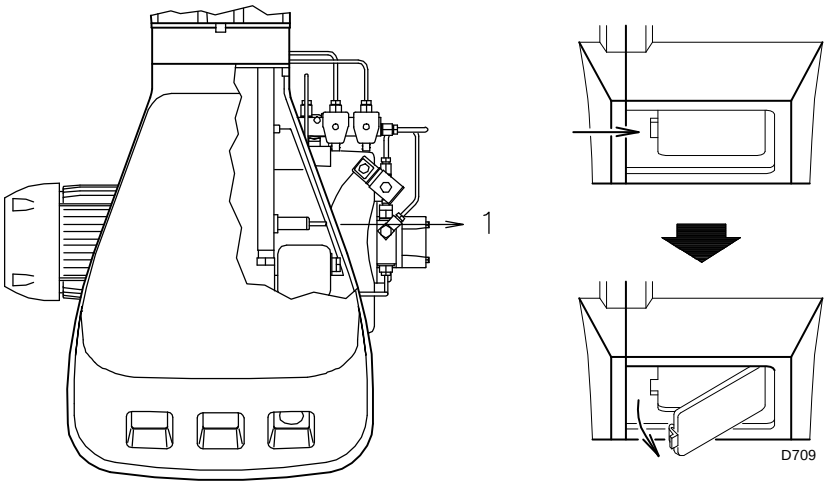
- **Low fire air damper**
  Keep the burner operating at low fire by setting the switch 2)(C) to the low position.
  Opening of the air damper 6)(B) must be adjusted in proportion to the selected nozzle: the index 1)(A) must be aligned with the notch 2)(A) specified in table (D).
  This adjustment is achieved by turning the hex element 2)(B):
  - in rh direction (- sign) the opening is reduced
  - in lh direction (+ sign) the opening increases.
  Example RL 70 - Low fire nozzle 6.00 GPH:
  2.3 (A) notch aligned with index 1)(A).
  When the adjustment is done lock the hex element 2)(B) with the ring nut 1).

- **High fire air damper**
  Set switch 2)(C) to the high position and adjust the air damper 6)(B) by turning the hex element 4)(B), after having loosened the ring nut 3)(B).
  Air pressure at attachment 1)(E) must be approximately the same as the pressure specified in table (E) plus the combustion chamber pressure measured at attachment 2).
  Refer to the example in the adjacent figure.

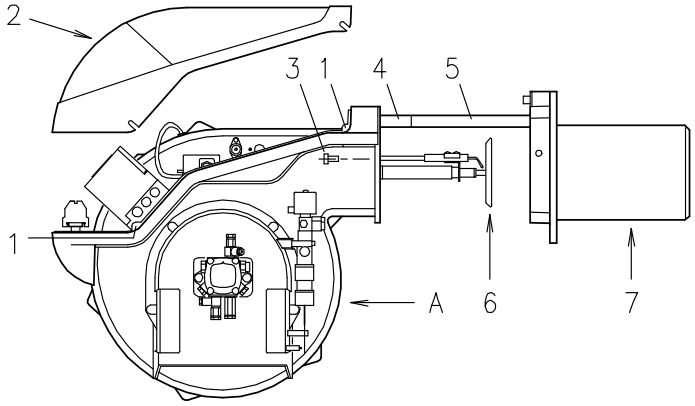
NOTE:
in order to facilitate adjustment of hex elements 2) and 4)(B), use a 1/8" Allen key 5)(B).



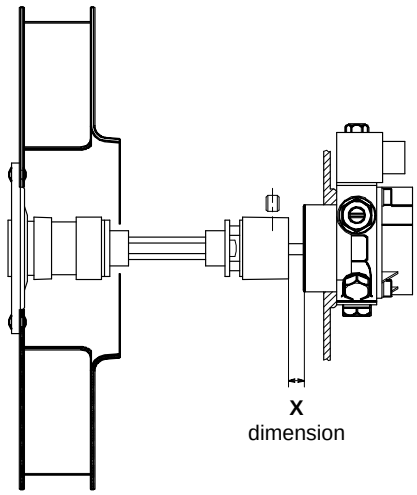
(A)



(B) (C)



(D)



(E)

FINAL CHECKS

- Obscure the photocell and switch on the control devices: the burner should start and then lock-out about 5 s after opening of the low fire nozzle operation valve.
- Illuminate the photocell and switch on the control circuit: the burner should go into lock-out .
- Obscure the photocell while the burner is in high fire operation, the following must occur in sequence: flame extinguished within 1 s, pre-purging for about 20 s, sparking for about 5 s, burner goes into lock-out.
- Switch off control device TL followed by control device TS while the burner is operating: the burner should stop.

MAINTENANCE

Combustion

An analysis of the flue gases is required at the boiler outlet. 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 174 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 measure permits the cause of the anomaly to be traced to either the suction line or the pump.
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.

Filters (A)

Check the following filter boxes:
• on line 1) at 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.

Fan

Check to make sure that no dust has accumulated inside the fan or on its blades, as this condition will cause a reduction in the air flow rate and produce incomplete combustion.

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.

Nozzles

Do not clean the nozzle orifices.
Replace the nozzles every 2-3 years or whenever necessary. Combustion must be checked after the nozzles have been changed.

Photocell (cad cell) (B)

Clean the glass cover from any dust that may have accumulated. Photocell 1) can be removed by pulling it outward forcefully.

Flame inspection window (C)

Clean the glass.

Flexible hoses

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

Boiler

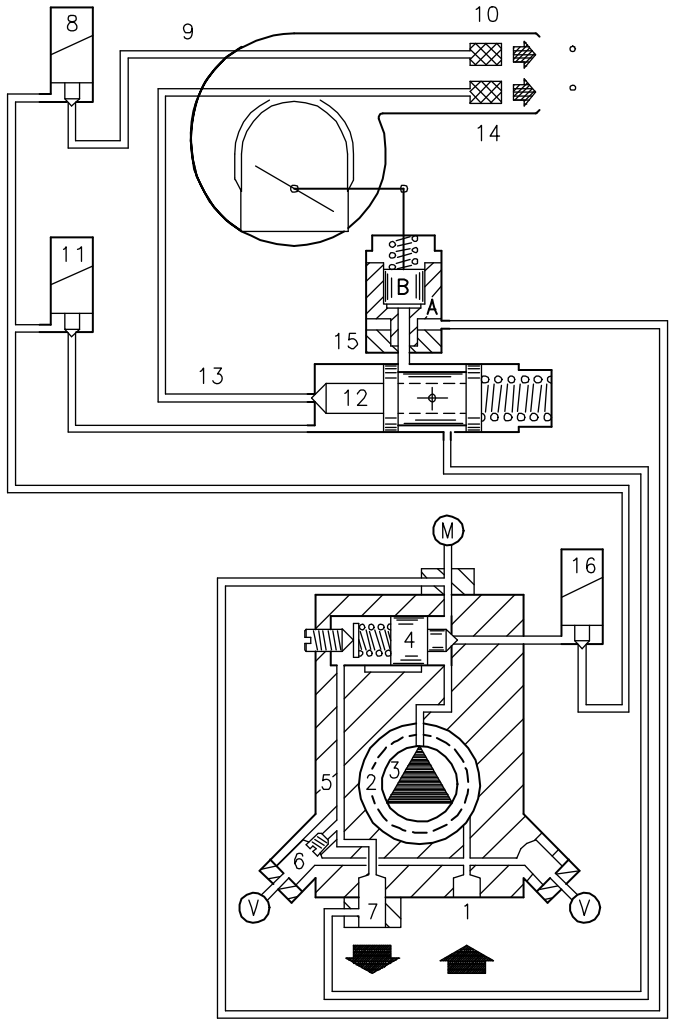
Clean the boiler as indicated in its accompanying instructions in order to maintain all the original combustion characteristics intact, especially the flue gas temperature and combustion chamber pressure. Lastly, check the condition of the flue gas stack.

TO OPEN THE BURNER (D)

- Switch off the electrical power.
- Loosen screws 1) and withdraw the cover 2).
- Unscrew screws 3).
- Fit the two extensions 4) supplied with the burner onto the slide bars 5) (model with long blast tube, obtainable rwith the kit).
- 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)

As per fig. (E), dimension X should set as follows:
RL70 - 1 1/2"
RL100 - 1 7/16"
RL130 - 1 7/16"



(A) D2331

BURNER OPERATION

BURNER STARTING (A)

Operating control closes.
The motor starts and the ignition transformer is connected.
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 solenoid valves 8) - 11) - 16), de-energized, close the passage to the nozzles.
The hydraulic cylinder 15), piston A, opens the air damper: pre-purging begins with the low fire air delivery.

At the opening of the solenoid valves 8) and 16) open and the fuel passes through the piping 9) and filter 10) and is then sprayed out through the nozzle, igniting when it comes into contact with the spark.
This is the low fire flame.

If the high fire control device is closed or has been replaced by with a jumper wire, the high fire solenoid valve 11) is opened and the fuel enters the valve 12) and raises the piston which opens two passages: one to piping 13), filter 14), and the high fire nozzle, and the other to the cylinder 15), piston B, that opens the fan air damper at high fire.

FIRING FAILURE

If the burner does not fire, it goes into lock-out within 5 s of the opening of the low fire solenoid valve.
The flame relay pilot light will light up.

LOCKOUT DURING OPERATION

If the flame goes out during operation, the burner shuts down automatically within 1 second and automatically attempts to start again by repeating the starting cycle.

PROCEDURE TO REFER BURNER OPERATING CONDITION IN HIGH ALTITUDE PLANTS

- Find the **corrected burner capacity** for the plant's altitude in chart **1** and the **corrected pressure** in chart **2**.
- Check in the firing rate graph of the burner (page 6), if the working point defined by the values above is within the range limits. If not, higher burner size is needed.

Note
Charts are based only on altitude variation (reference temperature = 68°F , 20°C)

To get the combined correction in case of different air temperature, a compensation of **1000 ft each 20°F (305 m each 11°C)** is applicable.

Example
Rated capacity = 3000 MBtu/hr - Rated air pressure = 1.5"w.c.
Real altitude = 5000 ft - Real temperature = 108°F
Δ = 108°F - 68°F (reference temp.) = 40°F (equivalent 2000 ft variation)
Proceeding as descripted above and considering a "virtual altitude" of (5000 + 2000) ft:
- the corrected capacity is 3847 MBtu/hr;
- the corrected burner air pressure is 1.92.

➡ **Burner RL 100 is OK**

1 CORRECTED BURNER CAPACITY ACCORDING TO ALTITUDE

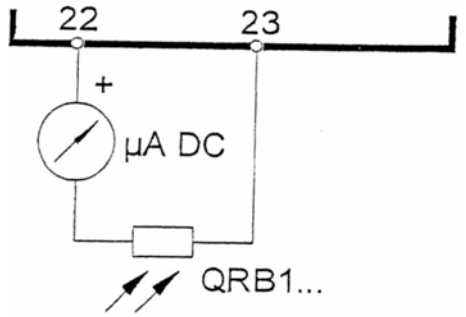
Rated Capacity	Altitude										
	m. a.s.l.	0	100	305	610	915	1220	1525	1830	2135	2440
	ft a.s.l	0	328	1000	2000	3000	4000	5000	6000	7000	8000
500		494	500	512	530	551	571	593	616	641	669
1000		987	1000	1023	1061	1101	1142	1186	1232	1282	1337
1500		1481	1500	1535	1591	1652	1713	1778	1848	1924	2006
2000		1974	2000	2046	2121	2202	2284	2371	2464	2565	2675
2500		2468	2500	2558	2652	2753	2855	2964	3079	3206	3343
3000		2962	3000	3069	3182	3303	3425	3557	3695	3847	4012
3500		3455	3500	3581	3712	3854	3996	4149	4311	4488	4680
4000		3949	4000	4092	4243	4404	4567	4742	4927	5130	5349
4500		4442	4500	4604	4773	4955	5138	5335	5543	5771	6018
5000		4936	5000	5116	5303	5505	5709	5928	6159	6412	6686
5500		5429	5500	5627	5834	6056	6280	6520	6775	7053	7355
6000		5923	6000	6139	6364	6606	6851	7113	7391	7694	8024
6500		6417	6500	6650	6894	7157	7422	7706	8006	8335	8692
7000		6910	7000	7162	7425	7708	7993	8299	8622	8977	9361
7500		7404	7500	7673	7955	8258	8564	8892	9238	9618	10029
8000		7897	8000	8185	8485	8809	9135	9484	9854	10259	10698
8500		8391	8500	8697	9016	9359	9705	10077	10470	10900	11367
9000		8885	9000	9208	9546	9910	10276	10670	11086	11541	12035
9500		9378	9500	9720	10076	10460	10847	11263	11702	12183	12704
10000		9872	10000	10231	10607	11011	11418	11855	12318	12824	13373
Average barometric Pressure (20°C)	**mbar**	**1013**	**1000**	**977,4**	**942,8**	**908,2**	**875,8**	**843,5**	**811,85**	**779,8**	**747,8**
Average barometric Pressure (68°F)	**"w.c.**	**399**	**394**	**385**	**371**	**358**	**345**	**332**	**320**	**307**	**294**

2 CORRECTED BURNER AIR PRESSURE ACCORDING TO ALTITUDE

Rated Pressure	Altitude										
	m. a.s.l.	0	100	305	610	915	1220	1525	1830	2135	2440
	ft a.s.l	0	328	1000	2000	3000	4000	5000	6000	7000	8000
0,50		0,49	0,50	0,51	0,53	0,55	0,57	0,59	0,62	0,64	0,67
1,00		0,99	1,00	1,02	1,06	1,10	1,14	1,19	1,23	1,28	1,34
1,50		1,48	1,50	1,53	1,59	1,65	1,71	1,78	1,85	1,92	2,01
2,00		1,97	2,00	2,05	2,12	2,20	2,28	2,37	2,46	2,56	2,67
2,50		2,47	2,50	2,56	2,65	2,75	2,85	2,96	3,08	3,21	3,34
3,00		2,96	3,00	3,07	3,18	3,30	3,43	3,56	3,70	3,85	4,01
3,50		3,46	3,50	3,58	3,71	3,85	4,00	4,15	4,31	4,49	4,68
4,00		3,95	4,00	4,09	4,24	4,40	4,57	4,74	4,93	5,13	5,35
4,50		4,44	4,50	4,60	4,77	4,95	5,14	5,33	5,54	5,77	6,02
5,00		4,94	5,00	5,12	5,30	5,51	5,71	5,93	6,16	6,41	6,69
5,50		5,43	5,50	5,63	5,83	6,06	6,28	6,52	6,77	7,05	7,35
6,00		5,92	6,00	6,14	6,36	6,61	6,85	7,11	7,39	7,69	8,02
6,50		6,42	6,50	6,65	6,89	7,16	7,42	7,71	8,01	8,34	8,69
7,00		6,91	7,00	7,16	7,42	7,71	7,99	8,30	8,62	8,98	9,36
7,50		7,40	7,50	7,67	7,96	8,26	8,56	8,89	9,24	9,62	10,03
8,00		7,90	8,00	8,18	8,49	8,81	9,13	9,48	9,85	10,26	10,70
8,50		8,39	8,50	8,70	9,02	9,36	9,71	10,08	10,47	10,90	11,37
9,00		8,88	9,00	9,21	9,55	9,91	10,28	10,67	11,09	11,54	12,04
9,50		9,38	9,50	9,72	10,08	10,46	10,85	11,26	11,70	12,18	12,70
10,00		9,87	10,00	10,23	10,61	11,01	11,42	11,86	12,32	12,82	13,37
Average barometric Pressure (20°C)	**mbar**	**1013**	**1000**	**977,4**	**942,8**	**908,2**	**875,8**	**843,5**	**811,85**	**779,8**	**747,8**
Average barometric Pressure (68°F)	**"w.c.**	**399**	**394**	**385**	**371**	**358**	**345**	**332**	**320**	**307**	**294**

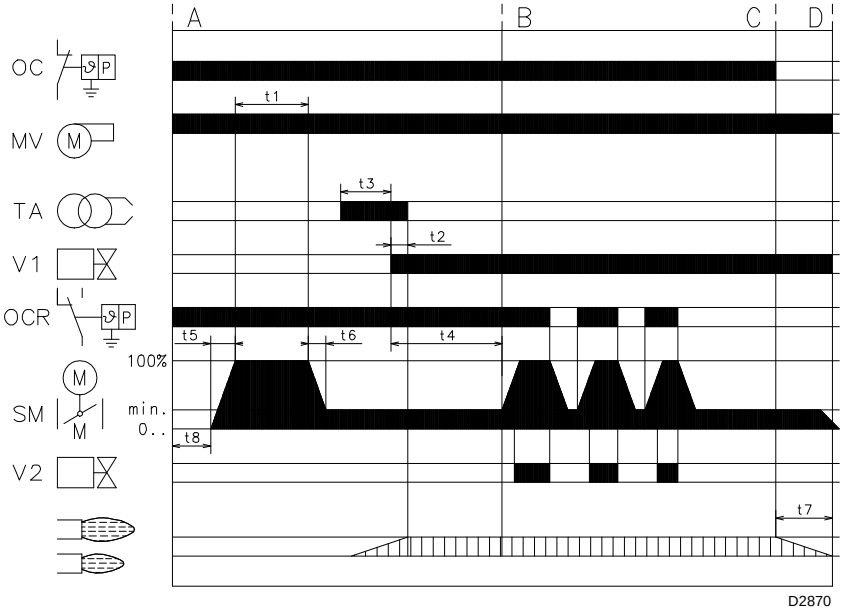
Reference conditions (Charts 1-2): Ambient temperature 68 °F (20 °C) - Barometric pressure 394" WC (1000 mbar) - Altitude 328 ft a.s.l. (100 m a.s.l.).

LAL2... Sub-base



(A) D3206

Siemens LAL control



(B)

FLAME SIGNAL MEASUREMENT (A)

Min value for a good signal: 8 μA.
If the value is lower, it can be due to:
• Worn photocell;
• Low current;
• Bad set up of the burner.
In order to measure the current, use a microammeter of 100 µA c.c., connected to the scanner, as in the diagram.

Min. detector current required at AC 230 V	8 µA
Max. detector current required without flame	0.8 µA
Max. detector current that can occur	35 µA
Instrument's + pole	to term. 22
Length of detector line	
In the same cable as the control lines	not perm.
Separate cable in the cable duct	20 m
Three-wire cable	---
Two-wire cable for the detector line (bl, sw); separate single-wire cable for the line (br)	---
Shielded cable (e.g. RG62, shielding insulated)	200 m
Shielding	to term. 23

SEQUENCE OF OPERATION (B)

See fig. (B).

Switching times are given in seconds, in the burner startup sequence.

LAL 2.25

t1	18	**t5**	optional
t2	4	**t6**	optional
t3	2	**t7**	12
t4	12	**t8**	4

Legend 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 FAULTS

SYMBOL (1)	FAULT	PROBABLE CAUSE	SUGGESTED REMEDY
◀	The burner does not start	1 - A limit or safety control device is open	Adjust or replace
		2 - Control box lock-out	Reset control box
		3 - Oil pressure switch tripped	Adjust pressure switch or eliminate pressure
		4 - Motor protection tripped	Reset thermal cut-out
		5 - No electrical power supply	Close all switches - Check connections
		6 - Flame safeguard fuse blown	Replace
		7 - Contact II of servomotor does not operate, flame safeguard terminals 11 - 8	Adjust cam II or replace servomotor
		8 - Pump is jammed	Replace
		9 - Defective motor command control device	Replace
		10 - Defective Flame safeguard	Replace
		11 - Defective electrical motor	Replace
	The burner does not start and a function lock-out occurs	12 - Flame simulation	Replace control box
		13 - Photocell short-circuit	Replace photocell
		14 - Missing phase. thermal cut-out trips	Reset thermal cut-out when third phase is re-connected
▲	The burner starts but stops at maximum air damper setting	15 - Contact I of servomotor does not operate, flame safeguard terminals 9-8	Adjust cam I or replace servomotor
■	The burner starts and then goes into lock-out	16 - Fault in flame detection circuit	Replace flame safeguard
▼	The burner remains in pre-purging phase	17 - Contact III of servomotor does not operate, flame safeguard terminals 10-8	Adjust cam III or replace servomotor
1	After pre-purge and the safety time, the burner goes to lock-out and the flame does not appear	18 - No fuel in tank; water on tank bottom	Top up fuel level or suck up water
		19 - Inappropriate head and air damper adjustments	Adjust
		20 - Light oil solenoid valves fail to open	Check connections; replace coil
		21 - Nozzle clogged, dirty, or deformed	Replace
		22 - Dirty or poorly adjusted firing electrodes	Adjust or clean
		23 - Grounded electrode due to broken insulation.	Replace
		24 - High voltage cable defective or grounded	Replace
		25 - High voltage cable deformed by high temperature	Replace and protect
		26 - Ignition transformer defective	Replace
		27 - Poor electrical connections of valves or transformer	Check
		28 - Defective flame safeguard	Replace
		29 - Pump unprimed	Prime pump and see "Pump unprimes"
		30 - Pump/motor coupling broken	Replace
		31 - Pump suction line connected to return line.	Correct connection
		32 - Valves up-line from pump closed	Open
		33 - Filters dirty: line - pump - nozzle.	Clean
		34 - Incorrect motor rotation direction	Change motor electrical connections
	The flame ignites normally but the burner locks out when the safety time has elapsed	35 - Defective photocell or flame safeguard	Replace photocell or flame safeguard
		36 - Dirty photocell	Clean
	Firing with pulsations or flame detachment, (lift off) delayed firing	37 - Poorly adjusted head	Adjust
		38 - Poorly adjusted or dirty firing electrodes	Adjust
		39 - Poorly adjusted fan air gate: too much air	Adjust
		40 - Nozzle unsuited for burner or boiler	See Nozzle Table
		41 - Defective nozzle	Replace
		42 - Inappropriate pump pressure	Adjust
2	The burner does not pass to 2nd stage	43 - Control device TR does not close.	Adjust or replace
		44 - Defective control box	Replace
	Uneven fuel supply	45 - Check if cause is in pump or fuel supply system	Feed burner from tank located near burner
	Internally rusted pump	46 - Water in tank	Remove water from tank bottom with separate pump
	Noisy pump, unstable pressure	47 - Air has entered the suction line	Tighten connectors
		- Depression value too high (higher than 35 cm Hg):	
		48 - Tank/burner height difference too great	Feed burner with loop circuit
		49 - Piping diameter too small	Increase
		50 - Suction filters clogged	Clean
		51 - Suction valves closed	Open
		52 - Paraffin solidified due to low temperature	Add additive to light oil
	Pump loses prime after prolonged pause	53 - Return pipe not immersed in fuel	Bring to same height as suction pipe
		54 - Air enters suction piping	Tighten connectors
	Pump leaks light oil	55 - Leakage from sealing organ	Replace pump
	Smoke in flame - dark Bacharach	56 - Not enough air	Adjust head and fan damper
		57 - Nozzle worn or dirty	Replace
		58 - Nozzle filter clogged	Clean or replace
		59 - Erroneous pump pressure	Adjust
		60 - Flame stability disk dirty, loose, or deformed	Clean, tighten in place, or replace
		61 - Boiler room air vents insufficient.	Increase
	- yellow Bacharach	62 - Too much air.	Adjust head and fan damper
	Dirty combustion head	63 - Nozzle or filter dirty.	Replace
		64 - Unsuitable nozzle delivery or angle	See recommended nozzles
		65 - Loose nozzle	Tighten
		66 - Impurities on flame stability disk.	Clean
		67 - Wrong head adjustment or not enough air	Adjust, open air damper
		68 - Blast tube length unsuited to boiler	Contact boiler manufacturer
I	During operation, the burner stops in lock out	69 - Dirty or defective photocell	Clean or replace

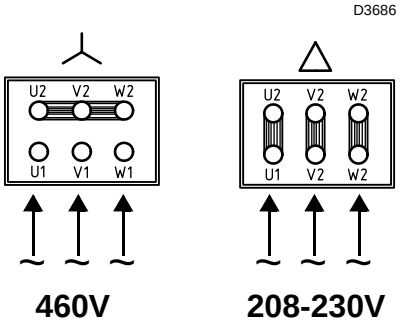
(1) When the burner does not fire or stops following a fault, the symbol which appears on control box after lockout indicates type of problem.

(2) The fuse is located in the rear part of the control box. A spare fuse is also available located under a break off tang.

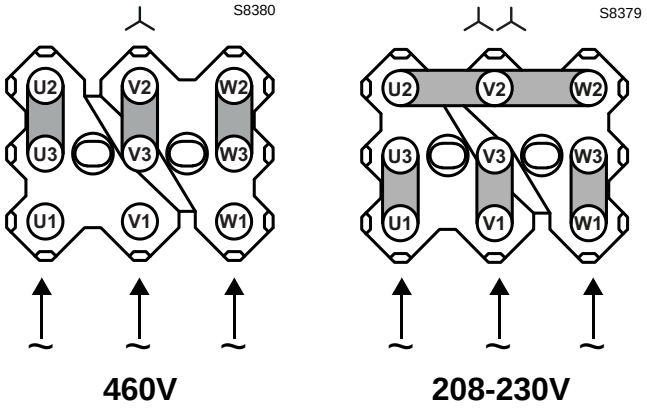
Motor connection at 208-230 or 460V

WARNING:
the motors, manufactured for 208-230/460 **IE2/Epact** voltage, have a different connection than **IE1** motors, no more star/delta but star/ double star. Please, pay attention to the indications in case of modification of voltage, maintenance, or substitution.

IE1

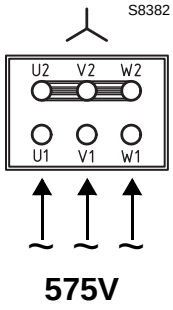


IE2/Epact



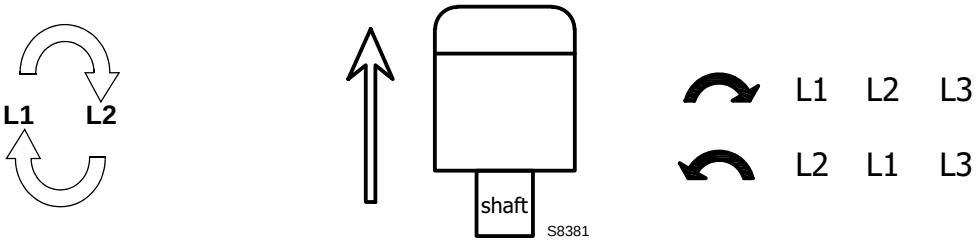
Motor connection at 575V

WARNING:
the motors, manufactured for 575V **IE2/Epact** voltage, have the same control box base of the IE1 motors. Please pay attention to the indications in case of maintenance or substitution.



Reversible direction

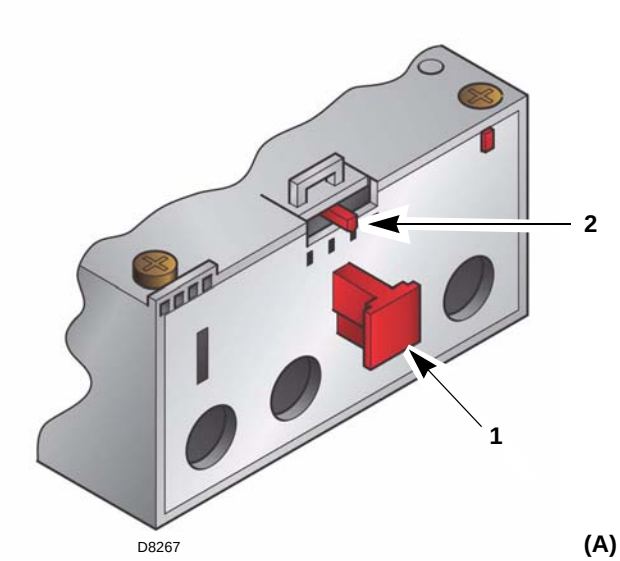
WARNING:
If it is necessary to reverse the direction then reverse the two main supply phases. For example: L1 with L2, there is not difference between **IE1** and **IE2/Epact.**



Calibration of the thermal relay

The thermal relay is used to avoid damage to the motor owing to a strong increase in absorption or the lack of a phase.

For the calibration, refer to the table below.
To reset, in the case of an intervention of the thermal relay, press the button 1) of (A).



(A)

IE 1

		RL 70			RL 100			RL 130		
		208 - 230 V	460 V	575 V	208 - 230 V	460 V	575 V	208 - 230 V	460 V	575 V
F (A) Fuse	Non time Delay	15 A	8 A	6 A	25 A	15 A	10 A	25 A	15 A	10 A
	Time Delay	8 A	5 A	4 A	15 A	9 A	6 A	15 A	9 A	6 A
S (AWG)		14	14	14	14	14	14	14	14	14

IE 2/Epact

		RL 70			RL 100			RL 130		
		208 - 230 V	460 V	575 V	208 - 230 V	460 V	575 V	208 - 230 V	460 V	575 V
F (A) Fuse	Non time Delay	15 A	6 A	5 A	25 A	10 A	10 A	25 A	10 A	10 A
	Time Delay	7 A	4 A	3 A	15 A	7 A	5 A	15 A	7 A	5 A
S (AWG)		14	14	14	14	14	14	14	14	14

Thermal overload calibration

IE 1

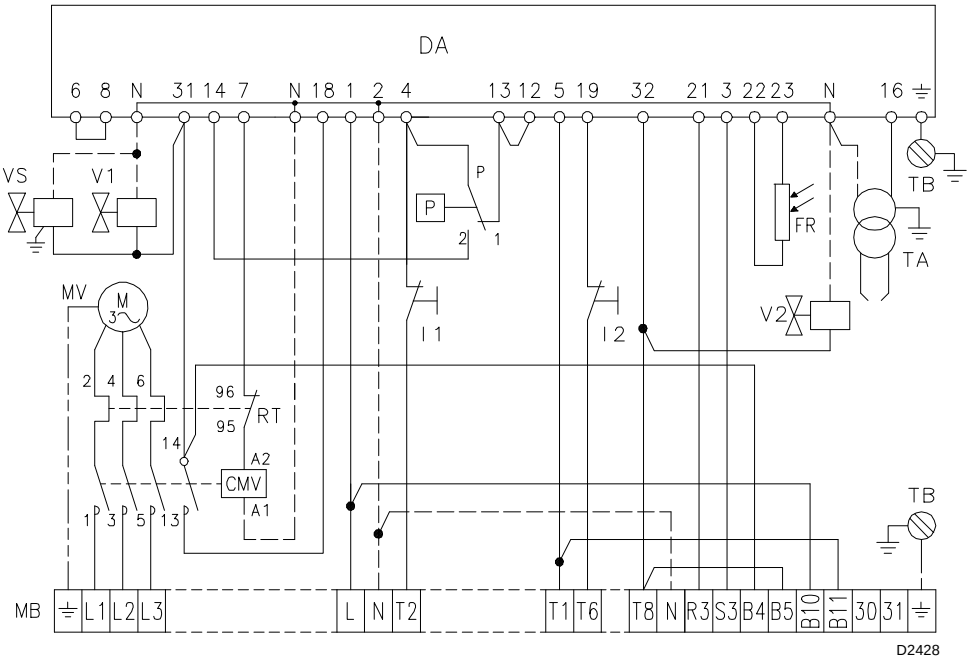
	RL 70			RL 100			RL 130		
	208 - 230 V	460 V	575 V	208 - 230 V	460 V	575 V	208 - 230 V	460 V	575 V
Thermal overload Set to Max:	5.4 A	3.1 A	2.3 A	9.8 A	5.6 A	4.3 A	9.8 A	5.6 A	4.3 A

IE 2/Epact

	RL 70			RL 100			RL 130		
	208 - 230 V	460 V	575 V	208 - 230 V	460 V	575 V	208 - 230 V	460 V	575 V
Thermal overload Set to Max:	4.6 A	2.3 A	1.8 A	9 A	4.5 A	3.6 A	9 A	4.5 A	3.6 A

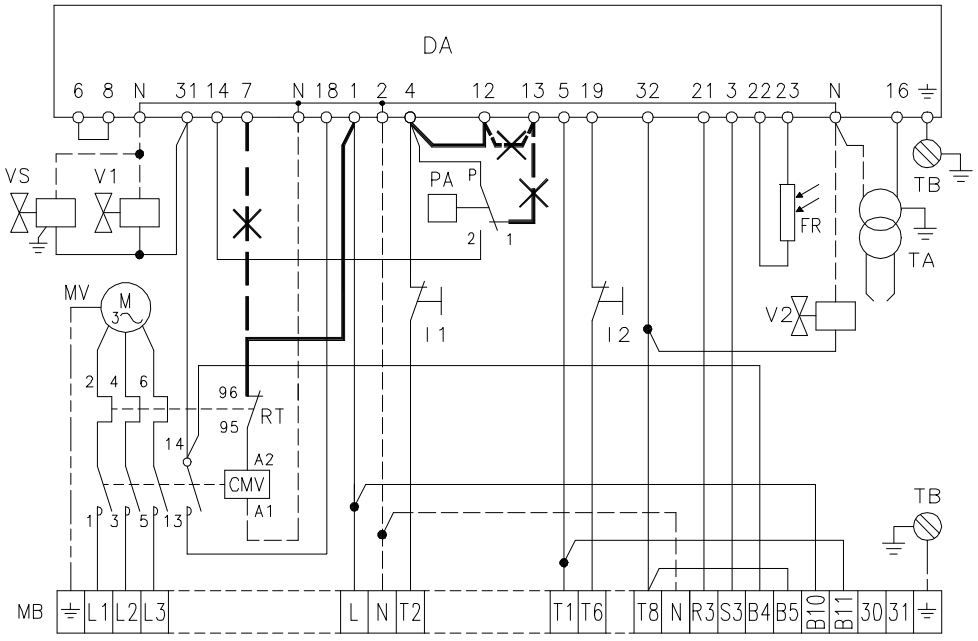
Factory Wiring Diagram

RL70 - 130 three phase with burner mounted Siemens LAL control



Continuous fan operation

Change the wire connection from terminal 7 to terminal 1, remove the jumper between terminals 12-13 and the wire from terminal 13 of control box.



(A)

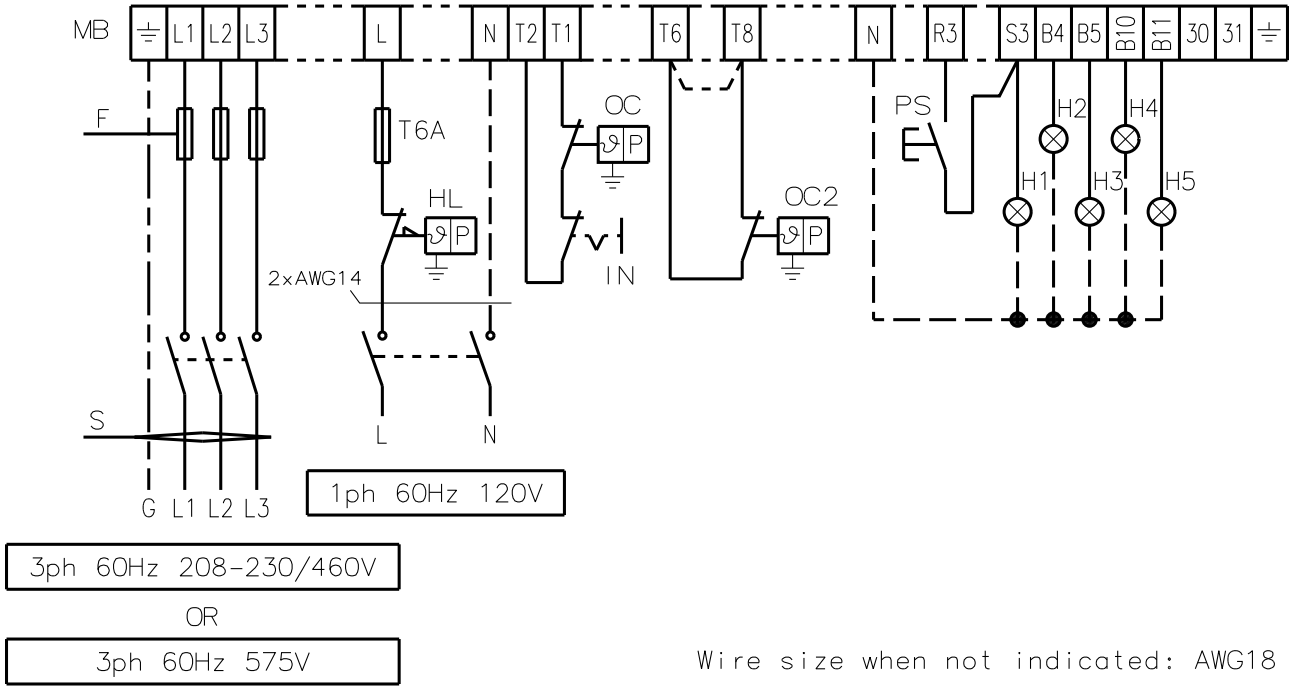
LAYOUT (A)
Burners RL 70 - 100 - 130
The flame safeguard is on burner mounted

Key to Layout (A)

CMV	- Motor contactor
DA	- Control box
FR	- Photocell
I1	- Switch: burner off - on
I2	- Switch: low - high fire operation
MV	- Fan motor
MB	- Burner terminal strip
P	- Air pressure switch
TA	- Ignition transformer
TB	- Burner ground (earth) connection
V1	- Low fire solenoid valve
V2	- High fire solenoid valve
VS	- Safety solenoid valve
RT	- Thermal relay

Field Wiring Diagram

RL 70 - 130 three phase burner with burner mounted LAL flame safeguard



(A) D11616

FIELD WIRING CONNECTIONS

As set by installer

Use flexible cables according to local regulation.

LAYOUT (A)
RL 70 - 100 - 130 Burners three-phase 208-230/460/575 V power supply .

Key to wiring layout (A)

MB - Burner terminal strip
PS - Remote lock-out reset
H1 - Remote lock-out signal
H2 - Low fire signal
H3 - High fire signal
H4 - Power on signal
H5 - Limit satisfied
IN - Manual burner stop switch
OC - Operating control.
OC2 - High-low control.
HL - High limit.

Important:
the burner is factory set for high operation and must be connected to the OC2 control to control fuel oil valve V2.
If on-off operation is required, install a jumper lead between terminals T6 and T8 of burner terminal strip.

NOTE

- The setting of the thermal overload must be according to the table at page 18.
- The RL 70-100-130 burners leave the factory preset for:
  - **208-230 V** power supply: only in this case, if 460 V power supply is required, change the fan motor connection from delta to star for IE1 and double star to star for IE2/EPACT according to the indications of page 17 and change the setting of the thermal overload according to the table at page 18;
  - or **575 V** power supply;
    depending on the burner model (see page 4).
- The RL 70 - 100 - 130 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 perform checks of its own efficiency at start-up.
  Burner halts are normally provided for automatically by the boiler load control system.

BURNER START UP REPORT

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

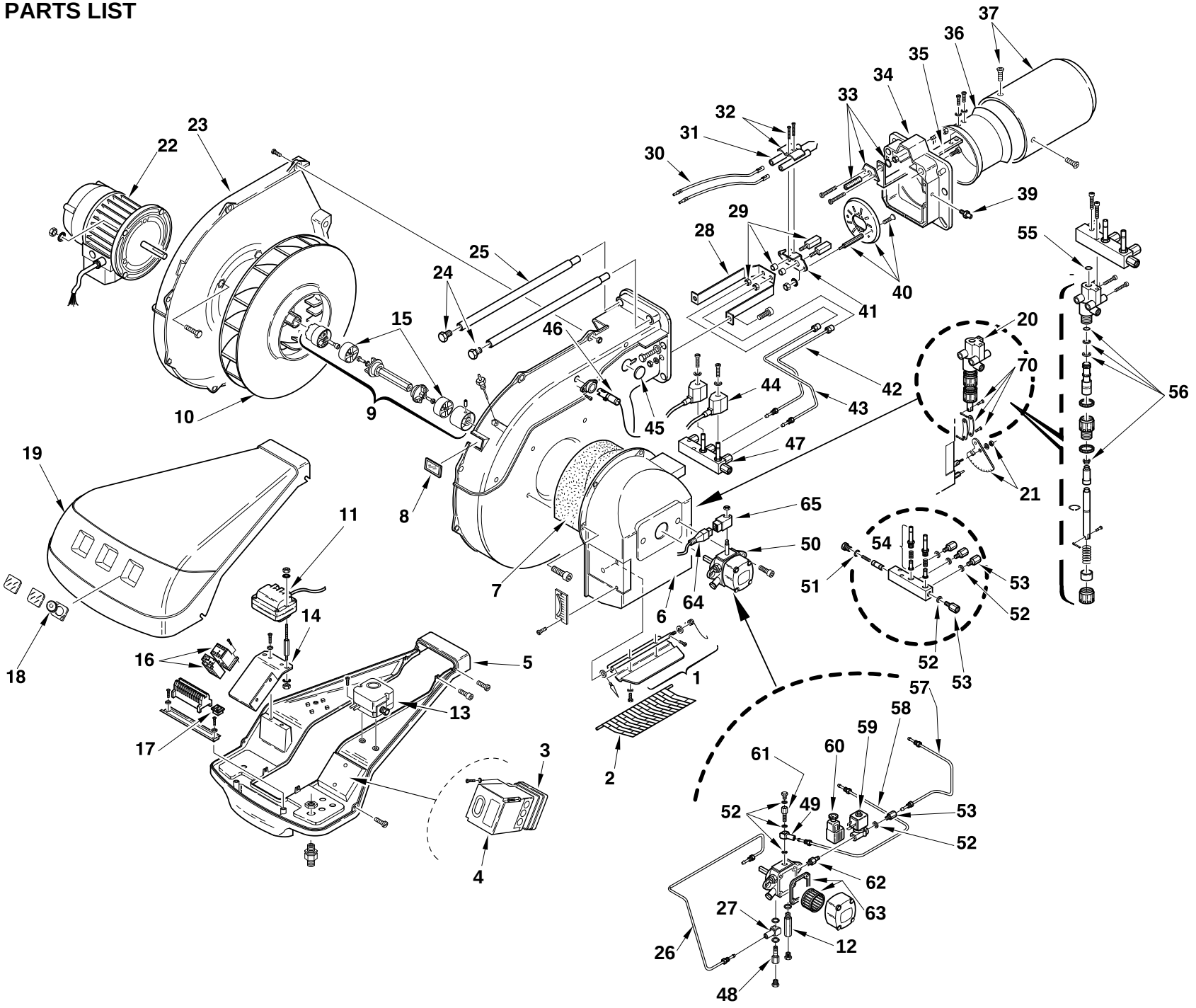
GAS OPERATION					
Gas Supply Pressure:		CO_2: Low Fire		High Fire	
Main Power Supply:		O_2: Low Fire		High Fire	
Control Power Supply:		CO: Low Fire		High Fire	
Burner Firing Rate:		NO_X: Low Fire		High Fire	
Manifold Pressure:		Net Stack Temp - Low Fire:		High Fire:	
Pilot Flame Signal:		Comb. Efficiency - Low Fire:		High Fire:	
Low Fire Flame Signal:		Overfire Draft:			
High Fire Flame Signal:					

OIL OPERATION					
Oil supply pressure:		CO_2: Low Fire		High Fire	
Oil suction pressure:		O_2: Low Fire		High Fire	
Control Power Supply:		CO: Low Fire		High Fire	
Burner Firing Rate:		NO_X: 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 Number:	
High Gas Pressure:		Modulating Signal Type:	

NOTES

SPARE PARTS LIST



N.	COD.		C9514200 (3475070)	C9514201 (3475075)	C9515200 (3475270)	C9515201 (3475275)	C9516200 (3475470)	C9516201 (3475475)	DESCRIPTION	DESCRIZIONE	BURNER SERIAL NUMBER MATRICOLA BRUCIATORE
1		3003948	•	•	•	•	•	•	AIR DAMPER ASSEMBLY	GRUPPO SERRANDA	
2		3003949	•	•	•	•	•	•	GRID	PROTEZIONE	
3	C5360001	3012950	•	•	•	•	•	•	CONTROL BOX BASE	ZOCCOLO	
4	C5830009	3012933	•	•	•	•	•	•	CONTROL BOX LAL 2.25	APPARECCHIATURA LAL 2.25	
5		3013127	•	•	•	•	•	•	BASE PLATE	MENSOLA	
6		3003951	•	•	•	•	•	•	AIR INTAKE	BOCCA D'ASPIRAZIONE	
7		3003952	•	•	•	•	•	•	SOUND DAMPING	FONOASSORBENTE	
8		3003763	•	•	•	•	•	•	INSPECTION WINDOW	VISORE	
9		3013056	•	•					DRIVE COUPLING	GRUPPO GIUNZIONE	
9		3003954			•	•	•	•	DRIVE COUPLING	GRUPPO GIUNZIONE	
10		3012939	•	•					FAN	GIRANTE	
10		3012403			•	•			FAN	GIRANTE	
10		3012940					•	•	FAN	GIRANTE	
11		3012938	•	•	•	•	•	•	TRANSFORMER	TRASFORMATORE	
12		3013037	•	•	•	•	•	•	CONNECTOR	RACCORDO	
13		3012948	•	•	•	•	•	•	AIR PRESSURE SWITCH	PRESSOSTATO ARIA	
14		3003957	•	•	•	•	•	•	SUPPORT	SUPPORTO	
15		3012622	•	•	•	•	•	•	DRIVE DISC	DISCO ELASTICO	
16		3012935	•						OVERLOAD+CONTACTOR 208-230/460V	RELE' TERMICO+CONTATTORE 208-230/460V	
16		3012936			•				OVERLOAD+CONTACTOR 208-230/460V	RELE' TERMICO+CONTATTORE 208-230/460V	
16		3012937					•		OVERLOAD+CONTACTOR 208-230/460V	RELE' TERMICO+CONTATTORE 208-230/460V	
16		3012991		•					OVERLOAD+CONTACTOR 575V	RELE' TERMICO+CONTATTORE 575V	
16		3013124				•			OVERLOAD+CONTACTOR 575V	RELE' TERMICO+CONTATTORE 575V	
16		3013125						•	OVERLOAD+CONTACTOR 575V	RELE' TERMICO+CONTATTORE 575V	
17		3003770	•	•	•	•	•	•	SWITCH	INTERRUTTORE	
18		3007627	•	•	•	•	•	•	MEMBRAN	MEMBRANA	
19		3012934	•	•	•	•	•	•	COVER	COFANO	
20		3003825	•	•	•	•	•	•	HYDRAULIC JACK	MARTINETTO	
21		3003824	•	•	•	•	•	•	GRADUATE SECTOR	QUADRANTE	
22		3012941	•						MOTOR 208-230/460V	MOTORE 208-230/460V	
22		3012943			•		•		MOTOR 208-230/460V	MOTORE 208-230/460V	
22		3013059		•					MOTOR 575V	MOTORE 575V	

N.	COD.		C9514200 (3475070)	C9514201 (3475075)	C9515200 (3475270)	C9515201 (3475275)	C9516200 (3475470)	C9516201 (3475475)	DESCRIPTION	DESCRIZIONE	BURNER SERIAL NUMBER MATRICOLA BRUCIATORE
22		3013060				•			MOTOR 575V	MOTORE 575V	
22		3013061						•	MOTOR 575V	MOTORE 575V	
23		3003969	•	•	•	•	•	•	HALF-SHELL	GUSCIO	
24		3003481	•	•	•	•	•	•	SCREW	VITE	
25		3003970	•	•	•	•	•	•	BAR	PERNO	
26		3012006	•	•	•	•	•	•	TUBE	TUBO	
27		3006784	•	•	•	•	•	•	CONNECTOR	RACCORDO	
28		3003971	•	•	•	•	•	•	SUPPORT	SUPPORTO	
29		3003814	•	•	•	•	•	•	NOZZLE HOLDER	PORTASPRUZZO	
30		3012959	•	•	•	•	•	•	H.T. LEAD	COLLEGAMENTO	
31		3003796	•	•	•	•	•	•	ELECTROD	ELETTRODO	
32		3003495	•	•	•	•	•	•	U BOLT	CAVALLOTTO	
33		3003974	•	•	•	•	•	•	CONTROL DEVICE	GRUPPO REGOLAZIONE	
34		3003975	•	•	•	•			FRONT PIECE	FRONTONE	
34		3003976					•	•	FRONT PIECE	FRONTONE	
35		3003977	•	•					SQUARE	SQUADRETTA	
35		3003979			•	•			SQUARE	SQUADRETTA	
35		3003981					•	•	SQUARE	SQUADRETTA	
36		3003983	•	•	•	•			SHUTTER	OTTURATORE	
36		3003984					•	•	SHUTTER	OTTURATORE	
37		3003985	•	•					END CONE	IMBUTO FIAMMA	
37		3003987			•	•			END CONE	IMBUTO FIAMMA	
37		3003989					•	•	END CONE	IMBUTO FIAMMA	
39		3003893	•	•	•	•	•	•	CONNECTOR	RACCORDO	
40		3003992	•	•					DIFFUSER DISC	ELICA	
40		3003993			•	•	•	•	DIFFUSER DISC	ELICA	
41		3003815	•	•	•	•	•	•	SUPPORT	SUPPORTO	
42		3003994	•	•	•	•	•	•	TUBE	TUBO	
43		3003995	•	•	•	•	•	•	TUBE	TUBO	
44		3006767	•	•	•	•	•	•	COIL	BOBINA	
45		3003996	•	•	•	•	•	•	PLUG	TAPPO	
46	C5360027	3006216	•	•	•	•	•	•	P.E. CELL	FOTORESISTENZA	

N.	COD.	C9514200 (3475070)	C9514201 (3475075)	C9515200 (3475270)	C9515201 (3475275)	C9516200 (3475470)	C9516201 (3475475)	DESCRIPTION	DESCRIZIONE	BURNER SERIAL NUMBER MATRICOLA BRUCIATORE
47	3003997	•	•	•	•	•	•	VALVE ASSEMBLY	GRUPPO VALVOLE	
48	3013525	•	•	•	•	•	•	CONNECTOR	RACCORDO	
49	3006722	•	•	•	•	•	•	CONNECTOR	RACCORDO	
50	3013523	•	•	•	•	•	•	PUMP	POMPA	
51	3007979	•	•	•	•	•	•	SEAL	GUARNIZIONE	
52	3007077	•	•	•	•	•	•	SEAL	GUARNIZIONE	
53	3006719	•	•	•	•	•	•	CONNECTOR	RACCORDO	
54	3005733	•	•	•	•	•	•	NEEDLE VALVE	VALVOLA	
55	3003823	•	•	•	•	•	•	PISTON SEAL	ANELLO	
56	3003820	•	•	•	•	•	•	PISTON SEAL	ANELLO	
57	3012000	•	•	•	•	•	•	TUBE	TUBO	
58	3012001	•	•	•	•	•	•	TUBE	TUBO	
59	3012952	•	•	•	•	•	•	SOLENOID VALVE	VALVOLA	
60	3012953	•	•	•	•	•	•	SOCKET	PRESA	
61	3012003	•	•	•	•	•	•	BAR	PERNO	
62	3009087	•	•	•	•	•	•	CONNECTOR	RACCORDO	
63	3003936	•	•	•	•	•	•	FILTER+SEAL	FILTRO+GUARNIZIONE	
64	3013015	•	•	•	•	•	•	LEAD	COLLEGAMENTO	
65	3013016	•	•	•	•	•	•	COIL	BOBINA	

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

RIELLO BURNERS NORTH AMERICA

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

1-800-4-RIELLO
1-800-474-3556

http://www.riello-burners.com

2165 Meadowpine Blvd
Mississauga, Ontario
Canada L5N 6H6