Installation, use and maintenance instructions
安装，使用和维护说明书

RIELLO

GB **Light oil burner**

CN **轻油燃烧器**

Two-stage operation
两段火运行

CODE - 编码	MODEL - 型号	TYPE - 类型
20033711	RL 50	654 T1

20033812 (4) - 10/2021

GB 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.3 = part 1 of figure A, page number 3.

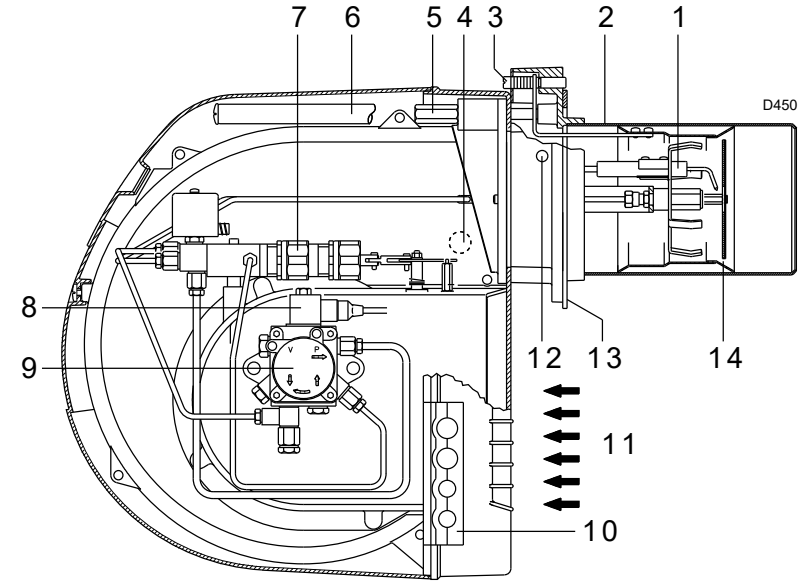
TECHNICAL DATA

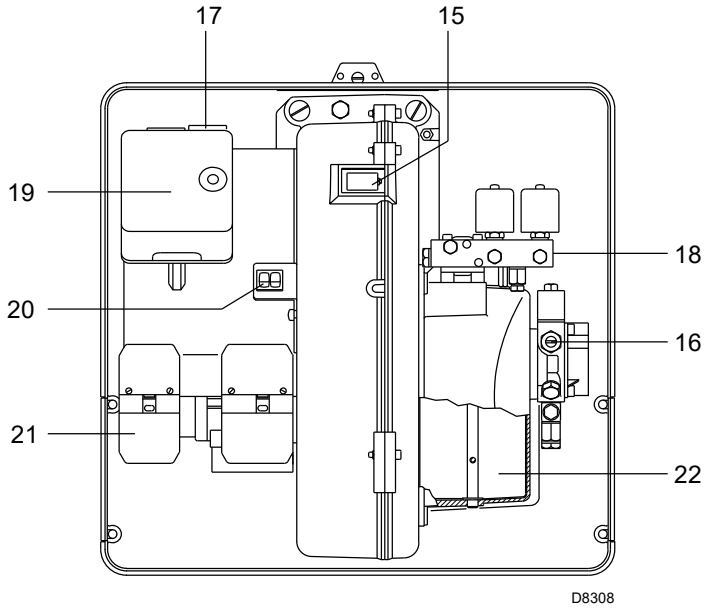
MODEL			RL 50
TYPE			654 T1
OUTPUT (1) DELIVERY (1)	2nd stage	kW Mcal/h kg/h	296 - 593 255 - 510 25 - 50
	1st stage	kW Mcal/h kg/h	148 - 296 127 - 255 12.5 - 25
FUEL			LIGHT OIL
- Net calorific value		kWh/kg Mcal/kg	11.8 10.2 (10.200 kcal/kg)
- Density		kg/dm^3	0.82 - 0.85
- Viscosity at 20 °C		mm^2/s max	6 (1.5 °E - 6 cSt)
OPERATION			• Intermittent (min. 1 stop in 24 hours). • Two-stage (high and low flame) and single-stage (all - nothing).
NOZZLES		number	2
STANDARD APPLICATIONS			Boilers: water, steam, diathermic oil
AMBIENT TEMPERATURE		°C	0 - 40
COMBUSTION AIR TEMPERATURE		°C max	60
ELECTRICAL SUPPLY		V Hz	230 - 400 with neutral ~ +/-10% 50 - three-phase
ELECTRIC MOTOR		rpm W V A	2800 650 220/240 - 380/415 3.0 - 1.7
IGNITION TRASFORMER		V1 - V2 I1 - I2	230 V - 2 x 5 kV 1.9 A - 30 mA
PUMP	delivery (at 20 bar) pressure range fuel temperature	kg/h bar ° C max	88 4 - 18 60
ELECTRICAL POWER CONSUMPTION		W max	750
ELECTRICAL PROTECTION			IP 44
IN CONFORMITY WITH EEC DIRECTIVES			2004/108 - 2006/95 - 2006/42
NOISE LEVELS (2)	SOUND PRESSURE SOUND POWER	dBA	75.0 86.0

(1) Reference conditions: Ambient temperature 20°C - Barometric pressure 1000 mbar - Altitude 100 m a.s.l.
(2) Sound pressure measured in manufacturer's combustion laboratory, with burner operating on test boiler and at maximum rated output. The sound power is measured with the “Free Field” method, as per EN 15036, and according to an “Accuracy: Category 3” measuring accuracy, as set out in EN ISO 3746.

VARIANTS

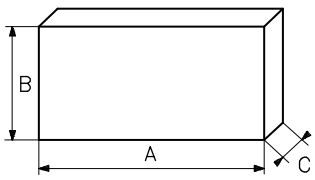
Model	Code	Electrical supply	Blast tube lenght mm
RL 50	3861602	three-phase	216



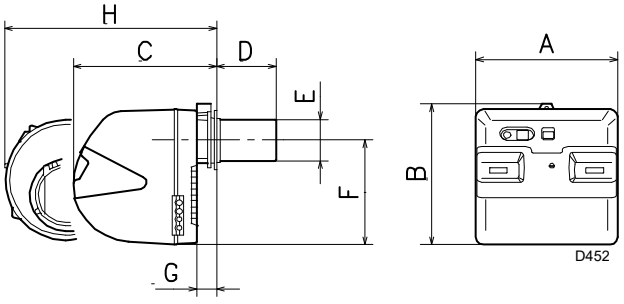


(A)

mm	A	B	C	kg
RL 50	1010	620	495	39



(B)



mm	A	B	C	D	E	F	G	H
RL 50	476	474	468	216 - 351*	152	352	52	672 - 807*

(*) Long blast tube: only with the Long Head Kit

(C)

BURNER DESCRIPTION (A)

1 Ignition electrodes
2 Combustion head
3 Screw for combustion head adjustment
4 Flame sensor for flame presence control
5 Screw for fixing fan to flange
6 Slide bars for opening the burner and inspecting the combustion head
7 Hydraulic cylinder for regulation of the air gate valve in 1st and 2nd stage positions. When the burner is not operating the air gate valve is fully closed in order to reduce heat dispersion from the boiler due to the flue draught which draws air from the fan suction inlet.
8 Safety solenoid valve
9 Pump
10 Plate prearranged to drill 4 holes for the passage of hoses and electrical cables.
11 Air inlet to fan
12 Fan pressure test point
13 Boiler mounting flange
14 Flame stability disk
15 Flame inspection window
16 Pump pressure adjustment
17 Motor contactor and thermal cut-out reset button
18 1st and 2nd stage valve assembly
19 Control box with lock-out pilot light and lock-out reset button
20 Two switches:
- one “burner off - on”
- one for “1st - 2nd stage operation”
21 Plugs for electrical connections
22 Air gate valve

Two types of burner failure may occur:
Control box lock-out: if the control box 19)(A) pushbutton (**red led**) lights up, it indicates that the burner is in lock-out.
To reset, hold the pushbutton down for between 1 and 3 seconds.
Motor trip: release by pressing the pushbutton on thermal cutout 17)(A).

PACKAGING-WEIGHT (B)

Approximate measurements
- The burner is shipped in cardboard boxe with the maximum dimensions shown in table (B).
- The weight of the burner complete with packaging is indicated in table (B).

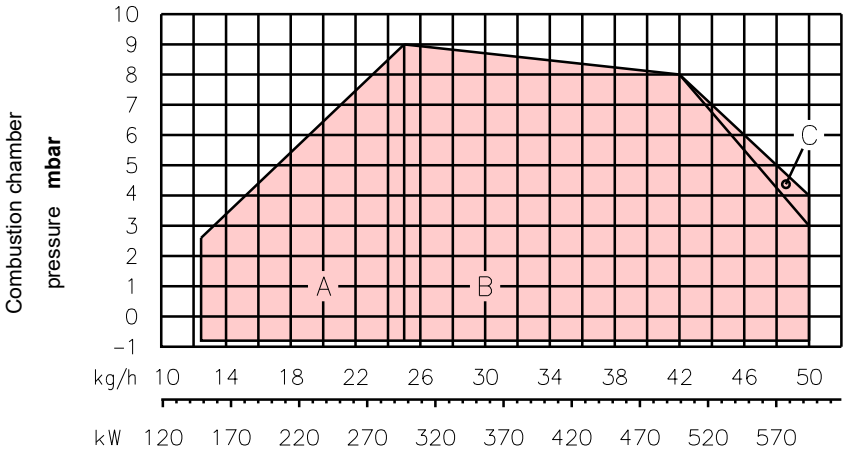
MAX. DIMENSIONS (C)

Approximate measurements.
The maximum dimensions of the burner are given in (C).
Bear in mind that 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.

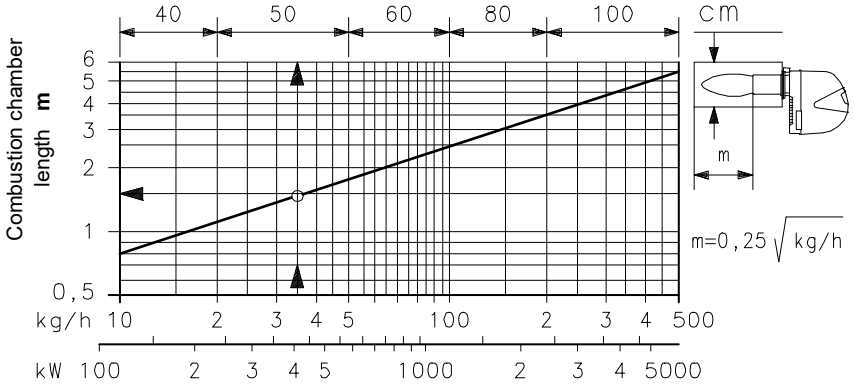
STANDARD EQUIPMENT

2 - Flexible hoses
2 - Gaskets for flexible hoses
2 - Nipples for flexible hoses
1 - Thermal insulation screen
4 - Screws to secure the burner flange to the boiler: M 8 x 25
4 - Fairleads for electrical connections
1 - Instruction booklet
1 - Spare parts lis

RL 50



(A) D8309



(B) D454

FIRING RATE (A)

The RL 50 Model burner can work in two ways: one-stage and two-stage.

1st stage DELIVERY must be selected within area A of the adjacent diagrams.

2nd stage DELIVERY must be selected within area B (and C for model RL 50). This area provides the maximum delivery of the burner in relation to the pressure in the combustion chamber.

The work point 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 work point which must lie within area B.
In order to utilize also area C it is necessary to perform the calibration of the combustion head as explained on page 5.

Important

The FIRING RATE area values have been obtained considering a surrounding temperature of 20 °C, and an atmospheric pressure of 1000 mbar (approx. 100 m above sea level) and with the combustion head adjusted as shown on page 6.

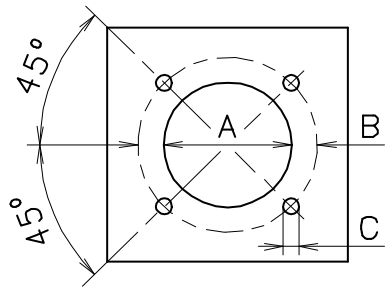
TEST BOILER (B)

The firing rate was set in relation to special test boilers in accordance with the methods defined in EN 267 standards.
Figure (B) indicates the diameter and length of the test combustion chamber.

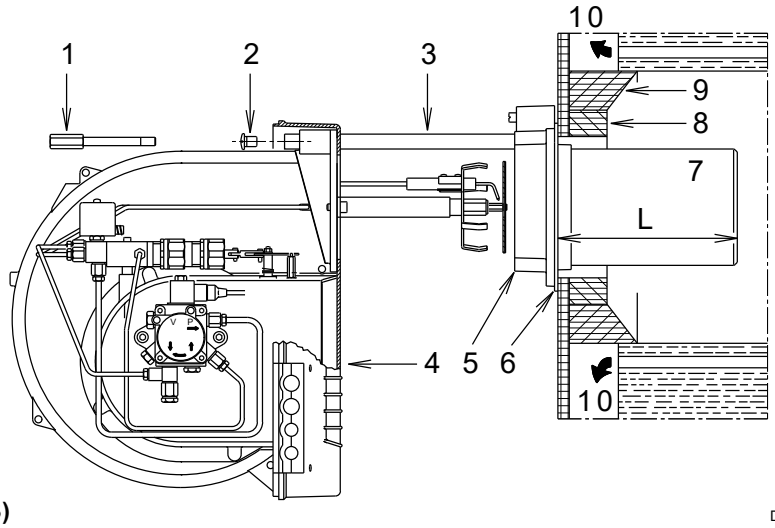
Example:
delivery 35 kg/hour:
diameter = 50 cm; length = 1,5 m.

Whenever the burner is operated in a much smaller commercially-available combustion chamber, a preliminary test should be performed.

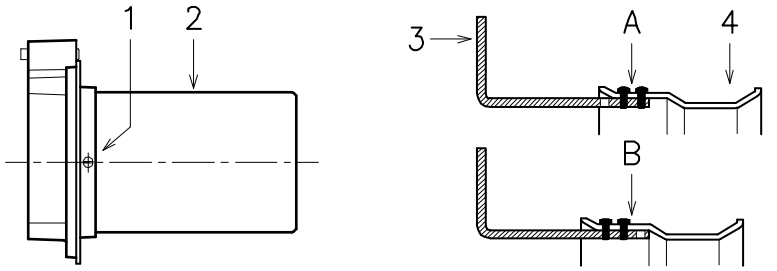
mm	A	B	C
RL 50	160	224	M 8



(A) D455



(B) D456



(C) D457

60	GPH	kg/h (1)			kW 12 bar
		10 bar	12 bar	14 bar	
RL 50	3.00	11.5	12.7	13.8	150.6
	3.50	13.5	14.8	16.1	175.5
	4.00	15.4	17.0	18.4	201.6
	4.50	17.3	19.1	20.7	226.5
	5.00	19.2	21.2	23.0	251.4
	5.50	21.1	23.3	25.3	276.3
	6.00	23.1	25.5	27.7	302.4

(1) light oil: density 0.84 kg/dm^3
viscosity 4.2 cSt/20 °C
temperature 10 °C

(D)

INSTALLATION

BOILER PLATE (A)

Drill the combustion chamber locking plate as shown in (A).
The position of the threaded holes can be marked using the thermal screen 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 in any case it must be greater than the thickness of the boiler door complete with its fettling. The range of lengths available, L, is as follows:

Blast tube 7):	RL 50
• short	216
• long*	351

(*) Long blast tube: only with the Long Head Kit

For boilers with front flue passes 10) or flame inversion chambers, protective fettling in refractory material 8) must be inserted between the boiler's fettling 9) and the blast tube 7).
This protective fettling must not compromise the extraction of the blast tube.
For boilers having a water-cooled front the refractory fettling 8)-9)(B) is not required unless it is expressly requested by the boiler manufacturer.

SECURING THE BURNER TO THE BOILER (B)

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).

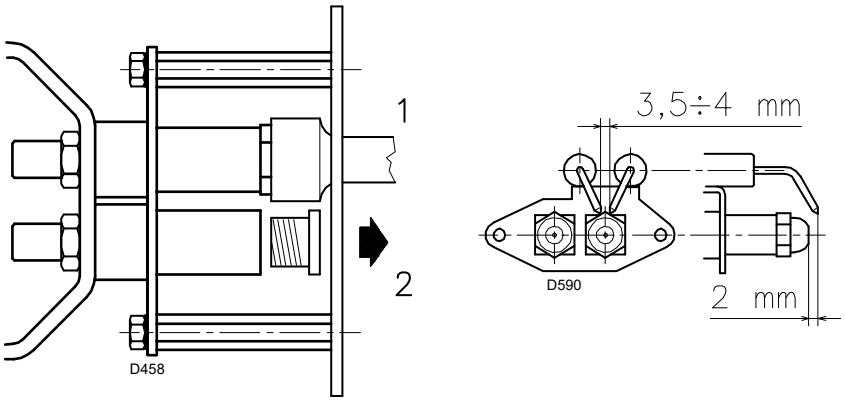
COMBUSTION HEAD CALIBRATION

At this point check, for model, whether the maximum delivery of the burner in 2nd stage operation is contained in area B or in area C of the firing rate. See page 4.
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 2).
- Move the fixing of the rod 3)(C) from position A to position B, thereby causing the shutter 4) to retract.
- Now refit the blast tube 2)(C) and the screws 1).

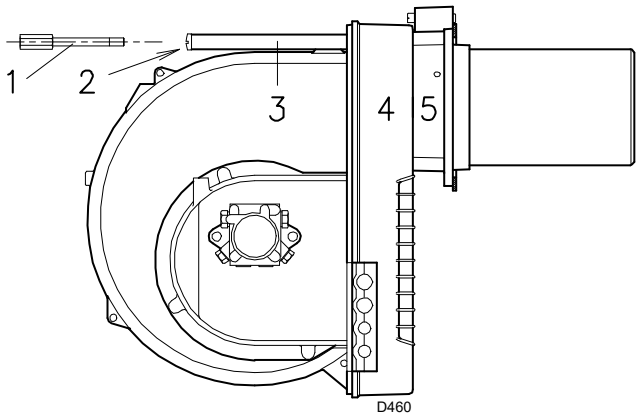
Once this operation has been carried out (if it was required), secure flange 5)(B) to the boiler plate interposing the supplied gasket 6). Use the 4 supplied screws provided after having protected the thread with antiscruffing products (high-temperature grease, compounds, graphite).
The burner-boiler seal must be airtight.

CHOICE OF NOZZLES FOR 1st AND 2nd STAGE

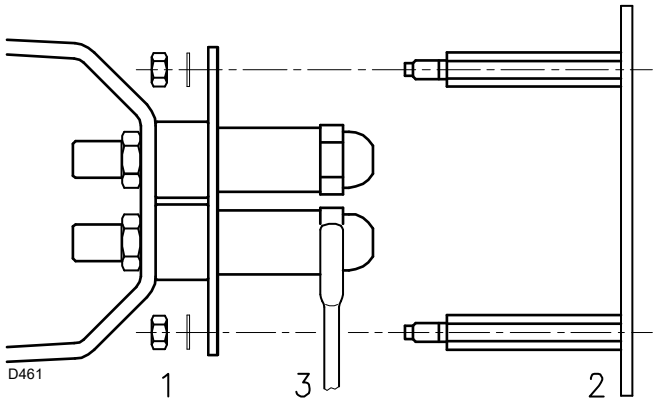
Both nozzles must be chosen from among those listed in Table (D).
The first nozzle determines the delivery of the burner in the 1st stage.
The second nozzle works together with the 1st nozzle to determine the delivery of the burner in the 2nd stage.
The deliveries of the 1st and 2nd stages must be contained within the value range indicated on page 2. Use nozzles with a 60° spray angle at the recommended pressure of 12 bar
The two nozzles usually have equal deliveries, but the 1st stage 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;
- a delivery higher than 50% of the total delivery whenever the combustion during the 1st stage must be improved.



(A) **(B)**

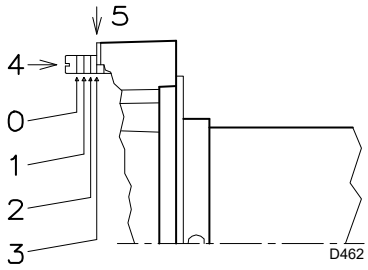


(C)

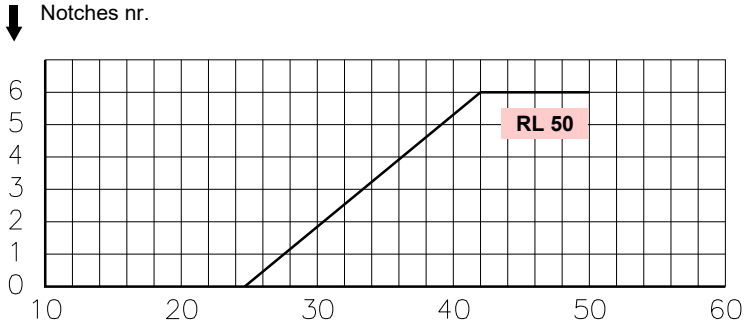


(D)

COMBUSTION HEAD SETTING



(E)



(F)

Example with RL 50
Boiler output = 405 kW - efficiency 90 %
Output required by the burner =
390 : 0.9 = 450 kW
450 : 2 = 225 kW per nozzle

therefore, two equal, 60°, 12 bar nozzles are required:
1° = 4.50 GPH - 2° = 4.50 GPH,

or the following two different nozzles:
1° = 4.00 GPH - 2° = 5.00 GPH,

or:
1° = 5.00 GPH - 2° = 4.00 GPH.

NOZZLE ASSEMBLY

At this stage of installation the burner is still disassembled from the blast tube; it is therefore possible to fit two nozzles with the box spanner 1)(A) (16 mm), after having removed the plastic plugs 2)(A), fitting the spanner 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 not to the maximum torque value provided by the wrench.
The nozzle for the 1st stage of operation is the one lying beneath the firing electrodes fig. (B).

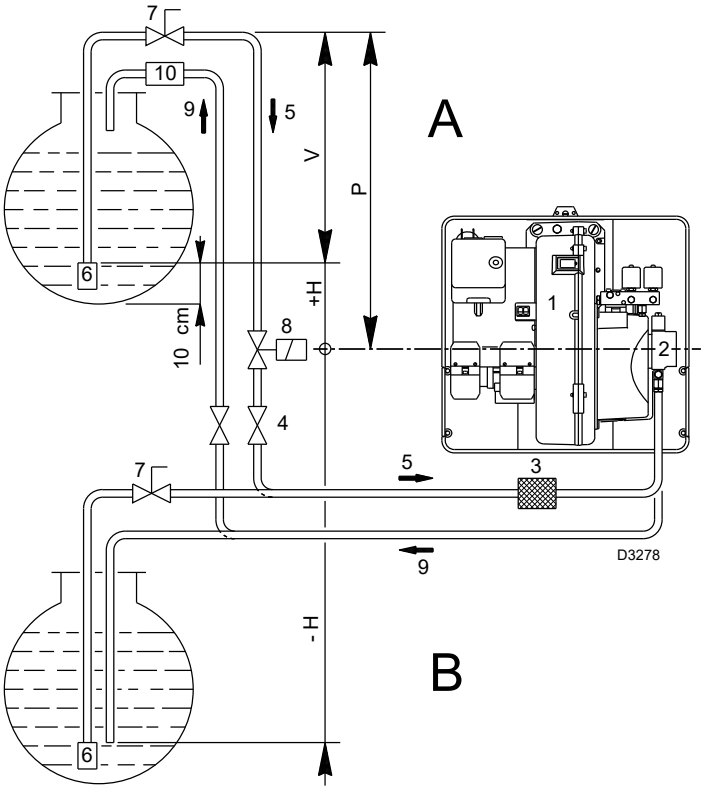
Make sure that the electrodes are positioned as shown in fig. (B).
Finally remount the burner 4)(C) to the slide bars 3) and slide it up to the flange 5), keeping it slightly raised to prevent the flame stability disk from pressing against the blast tube.
Tighten the screws 2) on the slide bars 3) and 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:
- Retract the burner on its slide bars as shown in fig. (B)p.5.
- Remove the nuts 1)(D) and the disk 2).
- Use spanner 3)(D) to change the nozzles.

COMBUSTION HEAD SETTING

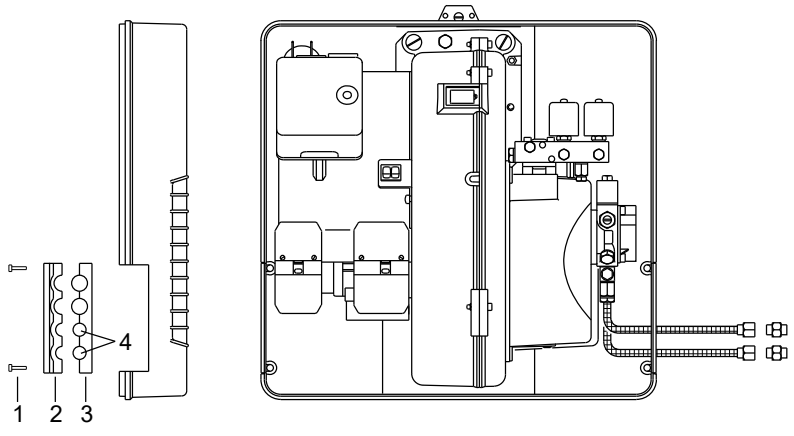
The setting of the combustion head depends exclusively on the delivery of the burner in the 2nd stage - in other words, the combined delivery of the two nozzles selected on page 6.
Turn screw 4)(E) until the notch shown in diagram (F) is level with the front surface of flange 5)(E).

Example:
The RL 50 Model with two 3.00 GPH nozzles and 12 bar pump pressure.
Find the delivery of the two 3.00 GPH nozzles in table (D), page 5:
19.1 + 19.1 = 38.2 kg/h.
Diagram (F) indicates that for a delivery of 38.2 kg/h the RL 50 model requires the combustion head to be set to approx. six notches, as shown in fig. (E).



+ H - H (m)	L (m) RL 50 Ø (mm)		
	10	12	14
+ 4.0	63	144	150
+ 3.0	55	127	150
+ 2.0	48	111	150
+ 1.0	40	94	150
+ 0.5	37	86	150
0	33	78	150
- 0.5	29	70	133
- 1.0	25	62	118
- 2.0	17	45	88
- 3.0	10	29	58
- 4.0	-	12	28

(A)



(B)

D3279

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 side.

The tank higer than the burner **A**

The distance "P" must not exceed 10 meters in order to avoid subjecting the pump's seal to excessive strain; the distance "V" must not exceed 4 meters in order to permit pump self-priming even when the tank is almost completely empty.

The tank lower than the burner **B**

Pump depression values higher than 0.45 bar (35 cm 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 departing from 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 = Rapid closing manual valve remote controlled (only Italy)
8 = On/off solenoid valve (only Italy)
9 = Return line
10 = Check valve (only Italy)

HYDRAULIC CONNECTIONS (B)

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

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

The pump will break down immediately if it is run with the return line closed and the bj-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 screw them down.

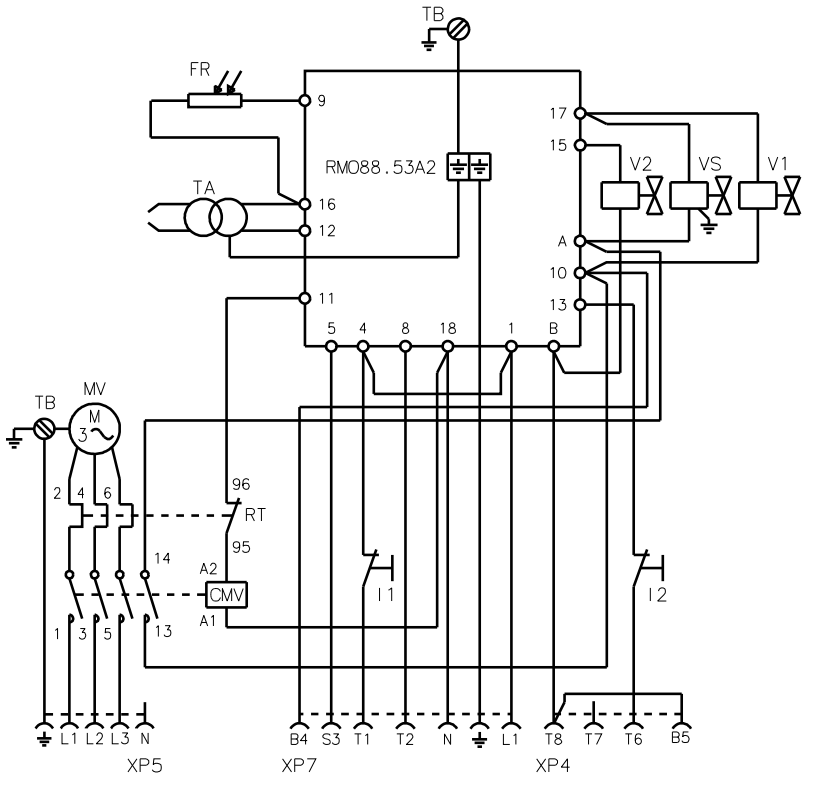
Take care that the hoses are not stretched or twisted during installation.

Route the hoses through the holes in the plate, preferably using those on the rh side, fig. (B): unscrew the screws 1), now divide the insert piece into its two parts 2) and 3) and remove the thin diaphragm 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 supplied nipples, using two wrenches, one to hold the nipple steady while using the other one to turn the rotary union on the hose.

ELECTRICAL EQUIPMENT FACTORY-SET
RL 50



(A)

20083051

ELECTRICAL SYSTEM

ELECTRICAL SYSTEM as set up by the manufacturer

LAYOUT (A)

Burners RL 50 (three-phase)

- Model RL 50 three-phase leave the factory preset for **400 V** power supply.
- If **230 V** power supply is used, change the motor connection from star to delta and change the setting of the thermal cut-out as well.

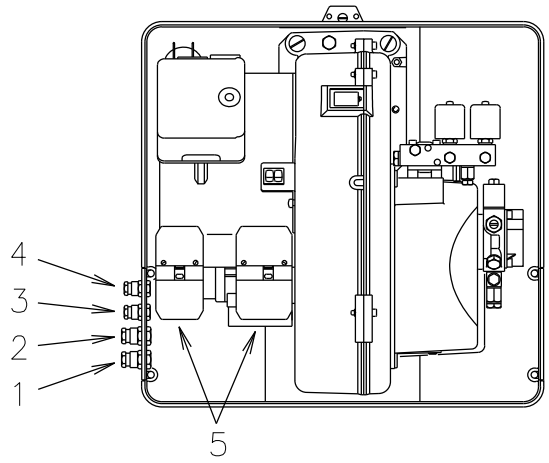
Key to Layouts (A)

C	- Capacitor
CMV	- Motor contactor
FR	- Flame sensor
I1	- Switch: burner off - on
I2	- Switch: 1st - 2nd stage operation
MV	- Fan motor
RMO88.53A2	- Control box
RT	- Thermal cut-out
TA	- Ignition transformer
TB	- Burner ground (earth) connection
V1	- 1st stage solenoid valve
V2	- 2nd stage solenoid valve
VS	- Safety solenoid valve
XP4	- 4 pole socket
XP5	- 5 pole socket
XP7	- 7 pole socket

NOTE

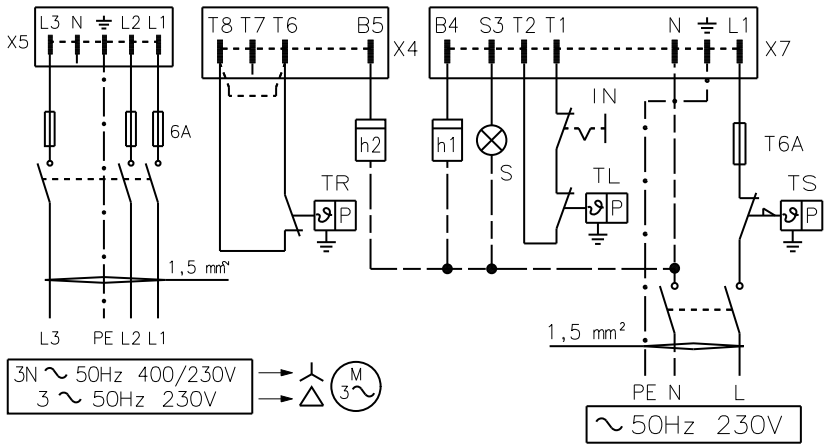
For remote-reset, connect a push-button switch (NO) between terminal 3 and neutral of the control box (terminals 15, 16, 17 and 18).

ELECTRICAL CONNECTIONS



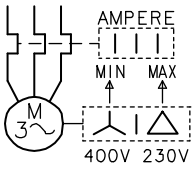
(A) D3277

ELECTRICAL CONNECTIONS



(B) D3228

RL 50 three-phase CALIBRATION OF THEREMAL RELAY



(C) D867

ELECTRICAL CONNECTIONS (A)
set up by the installer
Use flexible cables according to regulation EN 60 335-1:
- if in PVC boot, use at least H05 VV-F
- if in rubber boot, use at least H05 RR-F.

All the cables to be connected to the burner sockets 5)(A) must be routed through the fair-leads, supplied by the manufacturer for insertion into the holes in the plate, preferably those on the left side, after having removed the thin diaphragm effectively closing the aperture, as already explained above.

1 - Pg 11 Three-phase power supply
2 - Pg 11 Single-phase power supply
3 - Pg 9 Control device TL
4 - Pg 9 Control device TR
5 - Plug/Socket

LAYOUT (B)
The RL 50 Models electrical connection three-phase 230/400 V power supply with neutral phase wire

Cable section not indicated: 1,5 mm^2

Key to wiring layouts (B)
h1 - 1st stage hourcounter
h2 - 2nd stage hourcounter
IN - Manual burner stop switch
X4 - 4 pole plug
X5 - 5 pole plug
X7 - 7 pole plug
S - Remote lock-out signal
TL - Limit control device system:
This shuts down the burner when the boiler temperature or pressure exceeds the set-point value.
TR - High-low mode control device system:
This controls operating stages 1 and 2 and is necessary only for two-stage operation.
TS - Safety control device system:
This operates when TL is faulty.

Important: the burner is factory set for two-stage operation and it must therefore be connected to the TR remove control device to command light oil valve V2.
Alternatively, if single stage operation is required, instead of control device TR install a jumper lead between terminals T6 and T8 of connector X4.

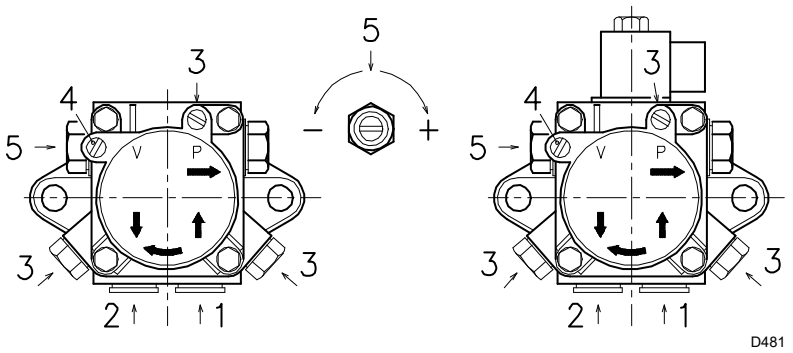
LAYOUT (C)
Calibration of thermal cut-out 17)(A)p.3
This is required to avoid motor burn-out in the event of a significant increase in power absorption caused by a missing phase.
- If the motor is star-powered, **400 V**, the cursor should be positioned to "MIN".
- If the motor is delta-powered, **230 V**, the cursor should be positioned to "MAX".

Even if the scale of the thermal cut-out does not include rated motor absorption at 400 V, protection is still ensured in any case.

NOTES
- Burner RL 50 three-phase leave the factory preset for 400 V power supply. If 230 V power supply is used, change the motor connection from star to delta and change the setting of the thermal cutout as well.
- The RL 50 burner have been type-approved for intermittent operation. This means they should compulsorily be stopped at least once every 24 houres 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.

WARNING:
Do not invert the neutral with the phase wire in the electricity supply line.

RL 50: SUNTEC AL 75 C



PUMP		AL 75 C
A	kg/h	88
B	bar	4 - 18
C	bar	0.45
D	cSt	2 - 12
E	°C	60
F	bar	2
G	bar	12
H	mm	0.150

(A)

PUMP (A)

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

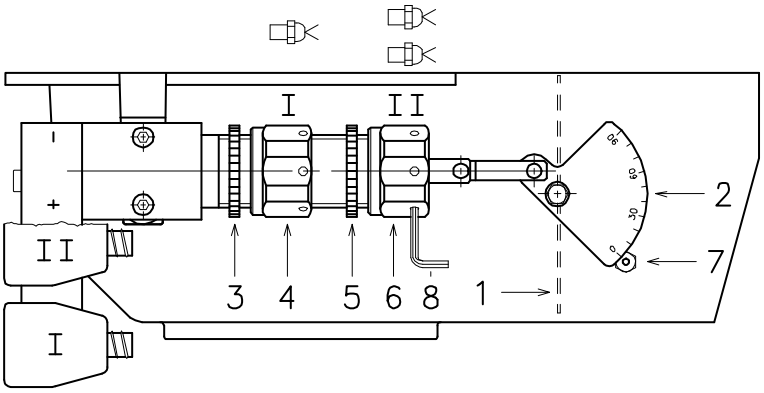
A - Min. delivery rate at 12 bar pressure
B - Delivery pressure range
C - Max. suction depression
D - Viscosity range
E - Light oil max. temperature
F - Max. suction and return pressure
G - Pressure calibration in the factory
H - Filter mesh width

PUMP PRIMING

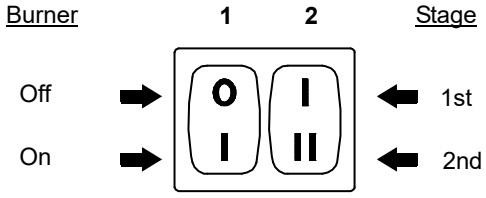
- **Before starting the burner, make sure that the tank return line is not clogged. Obstructions in the line could cause the sealing organ located on the pump shaft to break.** (The pump leaves the factory with the by-pass closed).
- In order for self-priming to take place, one of the screws 3)(A) of the pump must be loosened in order to bleed off the air contained in the suction line.
- Start the burner by closing the control devices and with switch 1)(B)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)(B)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 flame sensor or the burner will lock out; the burner should lock out anyway about 10 seconds after it starts.

Important: the a.m. 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 meter prior to starting; otherwise, the pump will seize. Whenever the length of the suction piping exceeds 20-30 meters, the supply line must be filled using a separate pump.



(A) D468



(B) D469

RL 50	
GPH	α
3.00	12
3.50	15
4.00	18
4.50	21
5.00	23
5.50	27
6.00	28

1st STAGE

α = Notch Nr.

1st STAGE

α = Notch Nr.

(C)

RL 50	
kg/h	mbar
25	6.1
29	6.2
33	6.4
37	6.5
41	6.6
45	8.0
50	10.1
50	9.1 (1)

2nd STAGE

mbar = air pressure in 1) with zero pressure in 2)

(1) With shutter 4)(C)p.5 retracted

(D)

BURNER CALIBRATION

FIRING

Set switch 1)(B) to "ON".

During the first firing, during the passage from the 1st to the 2nd stage, there is a momentary lowering of the fuel pressure caused by the filling of the 2nd stage 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. If one or more pulsations or a delay in firing in respect to the opening of the light oil solenoid valve occur, see the suggestions provided on p. 15: causes 34 to 42.

OPERATION

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

• 1st and 2nd nozzles

See the information listed on page 5.

• Combustion head

The adjustment of the combustion head already carried out need not be altered unless the 2nd stage delivery of the burner is changed.

• Pump pressure

12 bar: This is the pressure calibrated in the factory which is usually sufficient for most purposes. Sometimes, this pressure must be adjusted to:

10 bar in order to reduce fuel delivery. This adjustment is possible only if the surrounding temperature remains above 0°C. Never calibrate to pressures below 10 bar, at which pressures the cylinders may have difficulty in opening;

14 bar in 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 screw 5)(A), p. 10.

• 1st stage fan air gate valve

Keep the burner operating at 1st stage by setting the switch 2)(B) to the 1st stage position. Opening of the air gate valve 1)(A) must be adjusted in proportion to the selected nozzle: the index 7)(A) must be aligned with the specified in table (C). This adjustment is achieved by turning the hex element 4):

- in rh direction (- sign) the opening is reduced;
- in lh direction (+ sign) the opening increases.

Example RL 50

1st stage nozzle 3.00 GPH:

18° notch aligned with index 7(A).

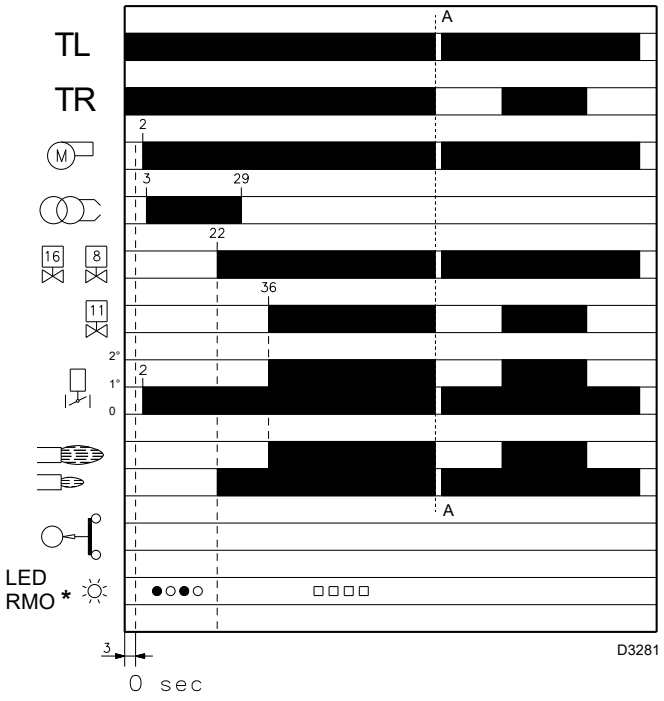
When the adjustment is terminated lock the hex element 4) with the ring nut 3).

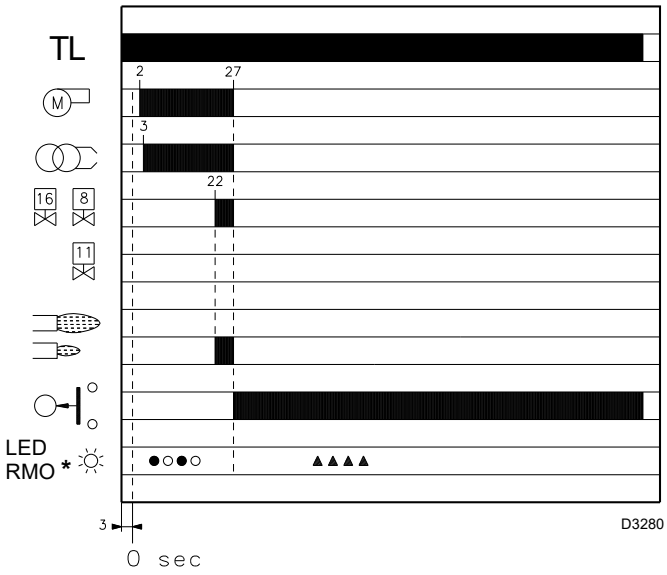
• 2nd stage fan air gate valve

Set switch 2)(B) to the 2nd stage position and adjust the air gate valve 1)(A) by turning the hex element 6)(A), after having loosened the ring nut 5)(A).

Air pressure at attachment 1)(D) must be approximately the same as the pressure specified in table (D) 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 4) and 6)(A), use a 3 mmc Allen key 8)(A).

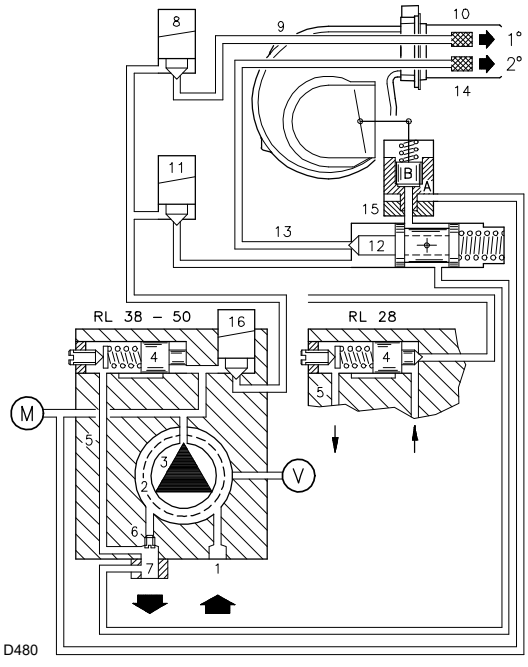




* ○ Off ● Yellow □ Green ▲ Red

For further details see page 14.

(A)



(B)

BURNER OPERATION

BURNER STARTING (A) - (B)

Starting phases with progressive time intervals shown in seconds:

- Control device TL closes.
  After about 3s:
- **0 s :** The control box starting cycle begins.
- **2 s :** The fan motor starts.
- **3 s :** 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 gate valve: pre-purging begins with the 1st stage air delivery.
- **22 s :** 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 1st stage flame.
- **29 s:** The ignition transformer switches off.
- **36 s:** If the control device TR is closed or has been replaced by a jumper wire, the 2nd stage 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 2nd stage nozzle, and the other to the cylinder 15), piston B, that opens the fan air gate valve in the 2nd stage.
  The starting cycle comes to an end.

STEADY STATE OPERATION

System equipped with one control device TR

Once the starting cycle has come to an end, the command of the 2nd stage solenoid valve passes on to the control device TR that controls boiler temperature or pressure.

- When the temperature or the pressure increases until the control device TR opens, solenoid valve 11) closes, and the burner passes from the 2nd to the 1st stage of operation.
- When the temperature or pressure decreases until the control device TR closes, solenoid valve 11) opens, and the burner passes from the 1st to the 2nd stage of operation, and so on.
- The burner stops when the demand for heat is less than the amount of heat delivered by the burner in the 1st stage. In this case, the control device TL opens, and solenoid valves 8)-16) close, the flame immediately goes out. The fan's air gate valve closes completely.

Systems not equipped with control device TR (jumper wire installed)

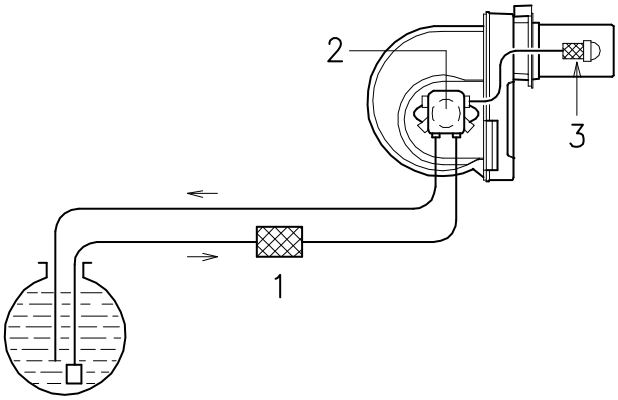
The burner is fired as described in the case above. If the temperature or pressure increase until control device TL opens, the burner shuts down (Section A-A in the diagram).
When the solenoid valve 11) de-energizes, the piston 12) closes the passage to the 2nd stage nozzle and the fuel contained in the cylinder 15), piston B, is discharged into the return piping 7).

FIRING FAILURE

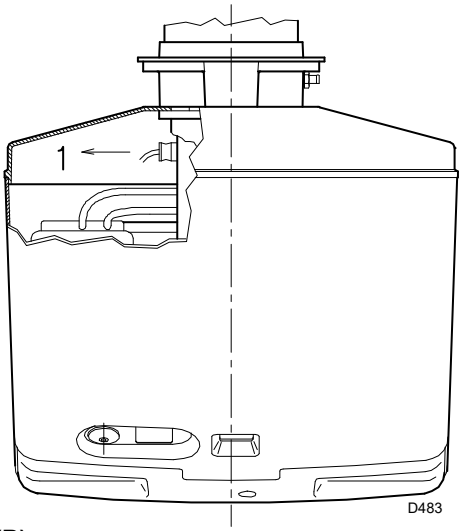
If the burner does not fire, it goes into lock-out within 5 s of the opening of the 1st nozzle valve and 30 s after the closing of control device TL.
The control box red pilot light will light up.

UNDESIRED SHUTDOWN DURING OPERATION

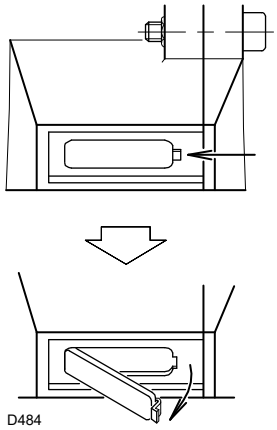
If the flame goes out during operation, the burner shuts down automatically within 1 second and automatically attempts to start again by repeating the starting cycle.



(A) D482

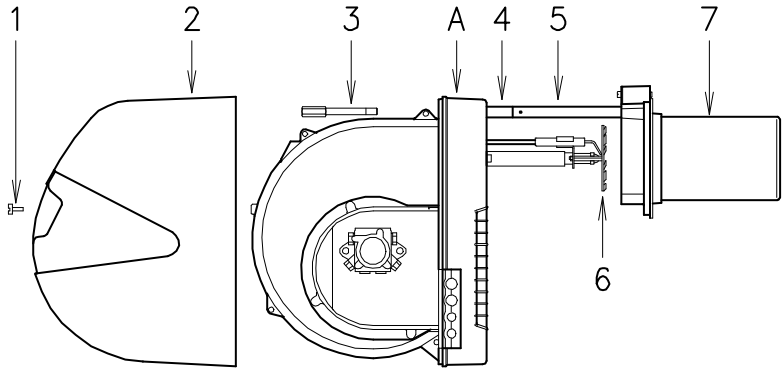


D483

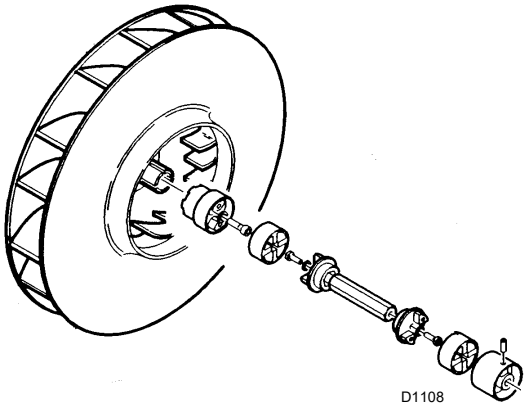


D484

(B) (C)



(D) D486



D1108

(E)

FINAL CHECKS

- Obscure the flame sensor and switch on the control devices: the burner should start and then lock-out about 5 s after opening of the 1st nozzle operation valve.
- Illuminate the flame sensor and switch on the control devices: the burner should start and then go into lock-out after about 10 s.
- Obscure the flame sensor while the burner is in 2nd stage 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

The optimum calibration of the burner requires an analysis of the flue gases. Significant differences with respect to the previous measurements indicate the points where more care should be exercised during maintenance.

Pump

The delivery pressure must be stable at 12 bar.
The depression must be less than 0.45 bar.
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 piping or the pump.
If the pump is found to be responsible, check to make sure that the filter is not dirty. The vacuum meter is installed upstream from the filter and consequently will not indicate whether the filter is clogged or not.
Contrarily, 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) • in the pump 2) • at the nozzle 3), and clean or replace as required.
If rust or other impurities are observed inside the pump, use a separate pump to lift any water and other impurities that may have deposited on the bottom of the tank.
Then clean the insides of the pump and the cover sealing surface.

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 provoke polluting 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 openings.
It is advisable to replace nozzles every year during regular maintenance operations. The change of nozzle requires the combustion to be controlled.

Flame 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 forcefully.

Flame inspection window (C)

Clean the glass whenever necessary.

Flexible hoses

Check to make sure that the flexible hoses are still in good condition and that they are not crushed or otherwise deformed.

Fuel tank

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

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.

TO OPEN THE BURNER (D)

- Switch off the electrical power
- Remove screw 1 and withdraw the casing 2)
- Unscrew screw 3)
- 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)

In conformity with fig. (E).

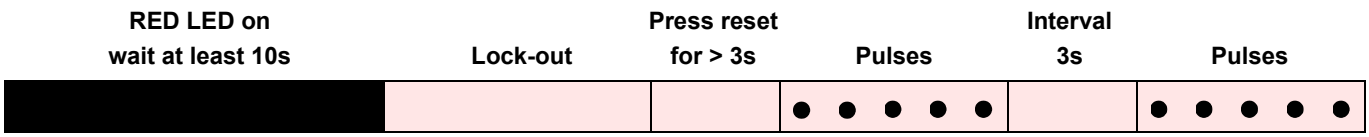
BURNER START-UP CYCLE DIAGNOSTICS

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

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

RESETTING THE CONTROL BOX AND USING DIAGNOSTICS

The control box features a diagnostics function through which any causes of malfunctioning are easily identified (indicator: **RED LED**).
To use this function, you must wait at least 10 seconds once it has entered the safety condition (**lock-out**), and then press the reset button.
The control box generates a sequence of pulses (1 second apart), which is repeated at constant 3-second intervals.
Once you have seen how many times the light pulses and identified the possible cause, the system must be reset by holding the button down for between 1 and 3 seconds.



The methods that can be used to reset the control box and use diagnostics are given below.

RESETTING THE CONTROL BOX

To reset the control box, proceed as follows:

- Hold the button down for between 1 and 3 seconds.
  The burner restarts after a 2-second pause once the button is released.
  If the burner does not restart, you must make sure the limit thermostat is closed.

VISUAL DIAGNOSTICS

Indicates the type of burner malfunction causing lock-out.
To view diagnostics, proceed as follows:

- Hold the button down for more than 3 seconds once the red LED (burner lock-out) remains steadily lit.
  A yellow light pulses to tell you the operation is done.
  Release the button once the light pulses. The number of times it pulses tells you the cause of the malfunction, according to the coding system indicated in the table on page 15.

SOFTWARE DIAGNOSTICS

Reports burner life by means of an optical link with the PC, indicating hours of operation, number and type of lock-outs, serial number of control box etc ...
To view diagnostics, proceed as follows:

- Hold the button down for more than 3 seconds once the red LED (burner lock-out) remains steadily lit.
  A yellow light pulses to tell you the operation is done.
  Release the button for 1 second and then press again for over 3 seconds until the yellow light pulses again.
  Once the button is released, the red LED will flash intermittently with a higher frequency: only now can the optical link be activated.

Once the operations are done, the control box's initial state must be restored using the resetting procedure described above.

BUTTON PRESSED FOR	CONTROL BOX STATUS
Between 1 and 3 seconds	Control box reset without viewing visual diagnostics.
More than 3 seconds	Visual diagnostics of lock-out condition: (LED pulses at 1-second intervals).
More than 3 seconds starting from the visual diagnostics condition	Software diagnostics by means of optical interface and PC (hours of operation, malfunctions etc. can be viewed)

The sequence of pulses issued by the control box identifies the possible types of malfunction, which are listed in the table on page 15.

SIGNAL	FAULT	PROBABLE CAUSE	SUGGESTED REMEDY
No blink	The burner does not start	1 - No electrical power supply	Close all switches - Check fuses
		2 - A limit or safety control device is open	Adjust or replace
		3 - Control box lock-out	Reset control box (no sooner than 10 s after the lock-out)
		4 - Pump is jammed	Replace
		5 - Erroneous electrical connections	Check connections
		6 - Defective control box	Replace
		7 - Defective electrical motor	Replace
2 x blinks ● ●	After pre-purge and the safety time, the burner goes to lock-out at the end of the safety time	8 - No fuel in tank; water on tank bottom	Top up fuel level or suck up water
		9 - Inappropriate head and air damper adjustments	Adjust, see page 6 and 11
		10 - Light oil solenoid valves fail to open (1st stage or safety)	Check connections; replace coil
		11 - 1st nozzle clogged, dirty, or deformed	Replace
		12 - Dirty or poorly adjusted firing electrodes	Adjust or clean
		13 - Grounded electrode due to broken insulation	Replace
		14 - High voltage cable defective or grounded	Replace
		15 - High voltage cable deformed by high temperature	Replace and protect
		16 - Ignition transformer defective	Replace
		17 - Erroneous valves or transformer electrical connections	Check
		18 - Control box defective	Replace
		19 - Pump unprimed	Prime pump and see “Pump unprimes”
		20 - Pump/motor coupling broken	Replace
		21 - Pump suction line connected to return line	Correct connection
		22 - Valves up-line from pump closed	Open
		23 - Filters dirty: line - pump - nozzle	Clean
		24 - Defective flame sensor or control box	Replace sensor or control box
		25 - Dirty flame sensor	Clean
		26 - 1st stage operation of cylinder is faulty	Change the cylinder
		27 - Motor protection tripped	Reset thermal cut-out
		28 - Defective motor command control device	Replace
		29 - Missing phase thermal cut-out trips	Reset thermal cut-out when third phase is re-connected
		30 - Incorrect motor rotation direction	Change motor electrical connections
4 x blinks ● ● ● ●	The burner starts and then goes into lock-out	31 - Flame sensor short-circuit	Replace sensor
		32 - Light is entering or flame is simulated	Eliminate light or replace control box
7 x blinks ● ● ● ● ● ● ●	Flame detachment	33 - Poorly adjusted head	Adjust, see page 6, fig. (F)
		34 - Poorly adjusted or dirty firing electrodes	Adjust, see page 6, fig. (B)
		35 - Poorly adjusted fan air gate: too much air	Adjust
		36 - 1st nozzle is too big (pulsation)	Reduce 1st nozzle delivery
		37 - 1st nozzle is too small (flame detachment)	Increase 1st nozzle delivery
		38 - 1st nozzle dirty, or deformed	Replace
		39 - Inappropriate pump pressure	Adjust to between 10 and 14 bar
		40 - 1st stage nozzle unsuited to burner or boiler	See Nozzle Table, page 5; reduce 1st stage
		41 - Defective 1st stage nozzle	Replace
	The burner does not pass to 2nd stage	42 - Control device TR does not close	Adjust or replace
		43 - Defective control box	Replace
		44 - 2nd stage sol. valve coil defective	Replace
		45 - Piston jammed in valve unit	Replace entire unit
	Fuel passes to 2nd stage but air remains in 1st	46 - Low pump pressure	Increase
		47 - 2nd stage operation of cylinder is faulty	Change cylinder
	Burner stops at transition between 1st and 2nd stage. Burner repeats starting cycle.	48 - Nozzle dirty	Renew nozzle
		49 - Flame sensor dirty	Clean
		50 - Excess air	Reduce
	Uneven fuel supply	51 - Check if cause is in pump or fuel supply system	Feed burner from tank located near burner
	Internally rusted pump	52 - Water in tank	Suck water from tank bottom with separate pump
	Noisy pump, unstable pressure	53 - Air has entered the suction line	Tighten connectors
		- Depression value too high (higher than 35 cm Hg):	
		54 - Tank/burner height difference too great	Feed burner with loop circuit
		55 - Piping diameter too small	Increase
		56 - Suction filters clogged	Clean
		57 - Suction valves closed	Open
		58 - Paraffin solidified due to low temperature	Add additive to light oil
	Pump unprimes after prolonged pause	59 - Return pipe not immersed in fuel	Bring to same height as suction pipe
		60 - Air enters suction piping	Tighten connectors
	Pump leaks light oil	61 - Leakage from sealing organ	Replace pump
	Smoke in flame - dark Bacharach	62 - Not enough air	Adjust head and fan gate, see page 6 and 11
		63 - Nozzle worn or dirty	Replace
		64 - Nozzle filter clogged	Clean or replace
		65 - Erroneous pump pressure	Adjust to between 10 - 14 bar
		66 - Flame stability spirat dirty, loose, or deformed	Clean, tighten in place, or replace
		67 - Boiler room air vents insufficient	Increase
	- yellow Bacharach	68 - Too much air	Adjust head and fan gate, see page 6 and 11
	Dirty combustion head	69 - Nozzle or filter dirty	Replace
		70 - Unsuitable nozzle delivery or angle	See recommended nozzles, page 5
		71 - Loose nozzle	Tighten
		72 - Impurities on flame stability spiral	Clean
		73 - Erroneous head adjustment or not enough air	Adjust, see page 11; open gate valve
		74 - Blast tube length unsuited to boiler	Contact boiler manufacturer
10 x blinks ● ● ● ● ● ● ● ● ● ●	The burner goes to lock-out	75 - Connection or internal fault	
		76 - Presence of electromagnetic disturbance	Use the radio disturbance protection kit

ACCESSORIES (optional):

- **RADIO DISTURBANCEPROTECTION KIT**

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

BURNER	**RL 50**
Code	3010386

- **DEGASSING UNIT**

It may occur that a certain amount of air is contained in the light oil sucked up by the pump. This air may originate from the light oil itself as a consequence of depressurization or air leaking past imperfect seals.
In double-pipe systems, the air returns to the tank from the return pipe; in single-pipe systems, the air remains in circulation causing pressure variations in the pump and burner malfunctions.
For this reason, we advise installing a degassing unit near the burner in single-pipe installations.
Degassing units are provided in two versions:

CODE **3010054** without filter
CODE **3010055** with filter

Degassing unit characteristics
• Burner delivery : 80 kg/h max
• Light oil pressure : 0,7 bar max
• Ambient temperature : 40 °C max
• Light oil temperature : 40 °C max
• Attachment connectors : 1/4 inch

CN 目录

注意
文中所涉及数字标识定义如下：
1)(A) =图 A 第 1 部分，内容见本页；
1)(A)p.3 =图 A 第 1 部分，内容见第 3 页。

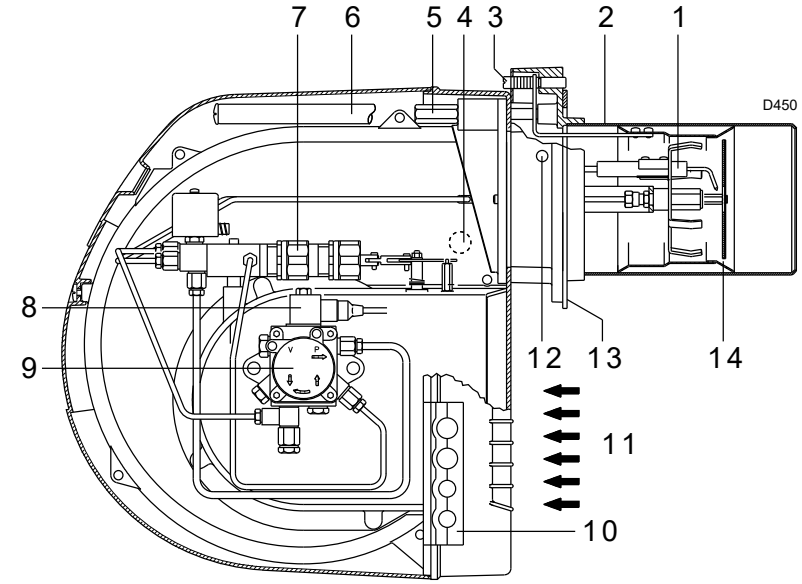
技术数据

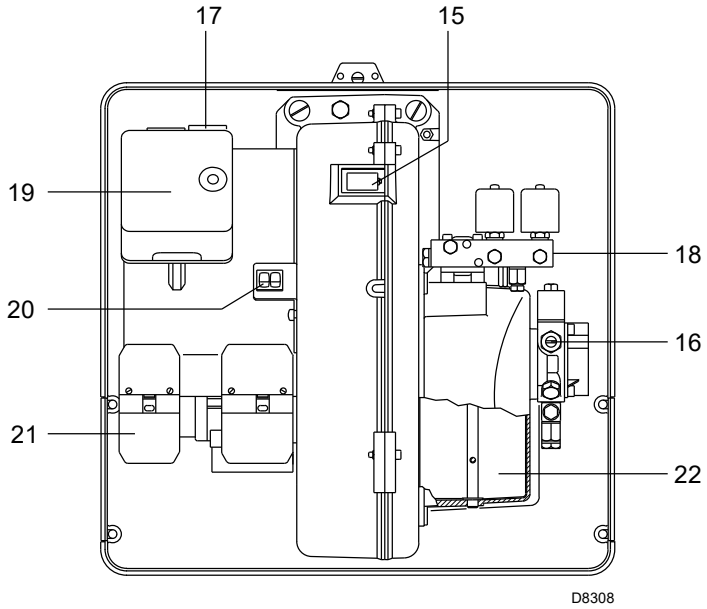
型号			RL 50
类型			654 T1
出力 (1) 油耗 (1)	2 段火	kW Mcal/h kg/h	296 - 593 255 - 510 25 - 50
	1 段火	kW Mcal/h kg/h	148 - 296 127 - 255 12.5 - 25
燃料			轻柴油
- 净热值		kWh/kg Mcal/kg	11.8 10.2 (10.200 kcal/kg)
- 密度		kg/dm^3	0.82 - 0.85
- 20 °C 时的粘度		mm^2/s 最大	6 (1.5 °E - 6 cSt)
运行			• 间歇式 (每 24 小时至少停机一次). • 两段火 (高 – 低火焰) 及单段火 (启动 - 停机).
喷嘴		数量	2
应用范围			锅炉：热水炉，蒸汽炉，导热油炉
环境温度		°C	0 - 40
助燃空气温度		最高 °C	60
电源		V Hz	230 - 400 带零线 ~ +/-10% 50 - 三相
电机		rpm W V A	2800 650 220/240 - 380/415 3.0 - 1.7
电机电容		µF/V	
点火变压器		V1 - V2 I1 - I2	230 V - 2 x 5 kV 1.9 A - 30 mA
油泵	流量 (油压为 12 bar 时) 压力范围 燃料温度	kg/h bar ° C 最高	88 4 - 18 60
耗电量		W 最大	750
电气保护等级			IP 44
符合 EEC 标准			2004/108 - 2006/95 - 2006/42
噪音水平 (2)	声压 声功率	dBA	75.0 86.0

(1) 参考条件：环境温度 20°C - 大气压力 1000 mbar - 海拔 100 m a.s.l。
(2) 声压在制造商的燃烧实验室内进行测量 , 测试时燃烧炉在测试锅炉上以最大的额定功率运行。声功率按照EN 15036标准中说明的“自由场法”以及 EN ISO 3746 标准中规定的测量精度 “ 精度：类别 3” 进行测量。

可选机型

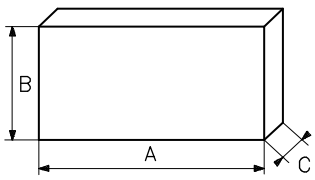
型号	代码	电源	燃烧筒长度 mm
RL 50	3861602	三相	216



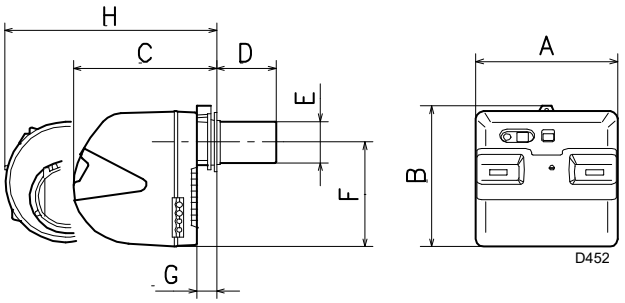


(A)

mm	A	B	C	kg
RL 50	1010	620	495	39



(B)



mm	A	B	C	D	E	F	G	H
RL 50	476	474	468	216 - 351*	152	352	52	672 - 807*

(*) 加长燃烧筒：仅随加长燃烧头组件提供

(C)

燃烧器描述 (A)

1 点火电极
2 燃烧头
3 燃烧头调节螺栓
4 火焰监测装置 （电眼）
5 安装风机到法兰上用螺栓
6 打开燃烧器及检查燃烧头用滑杆
7 一段火及二段火运行风门调节用液压缸。燃烧器停机时，风门完全关闭，以降低因通风造成空气从风机吸入口进入而产生的锅炉热量散发。
8 安全电磁阀
9 油泵
10 穿软管及电缆用 4 孔模板
11 风机进风口
12 风机压力测试点
13 锅炉安装用法兰
14 火焰稳定盘
15 火焰检查窗
16 油泵压力调节钮
17 电机接触器及热继电器复位按钮
18 一段火及二段火阀组
19 带锁定指示灯及锁定复位按钮的控制盒
20 两组开关：
- 之一 “ 燃烧器 关 - 开 ”
- 之二 “ 一段火 - 二段火 ” 运行转换开关
21 电气连接用插座
22 风门挡板

两种燃烧器故障：
控制盒锁定：如果控制盒按钮 19)(A)(**红色 led**) 灯亮起，则显示燃烧器锁定。
如要复位，按住该按钮 1-3 秒。
电机锁定：按下热继电器按钮 17)(A) 以恢复供电。

包装 - 重量 (B)

大概值
• 燃烧器外包装为纸箱，其最大尺寸参见表 (B)。
• 燃烧器连同包装箱重量参见表 (B)。

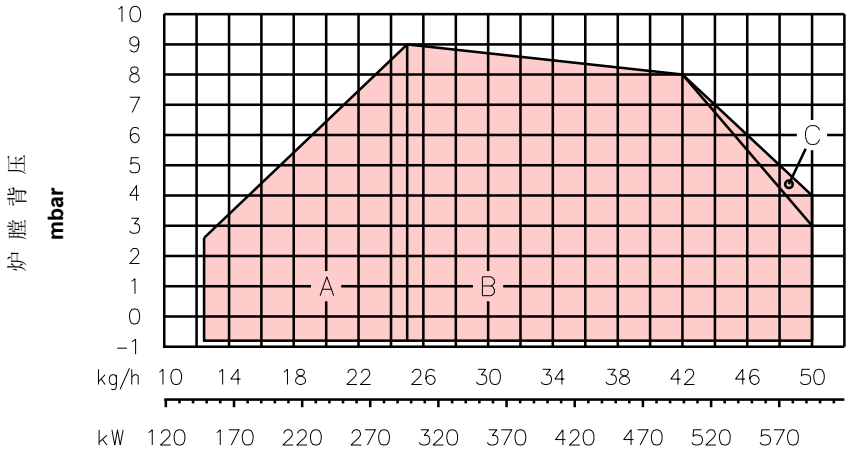
最大尺寸 (C)

大概值
燃烧器最大尺寸如表 (C) 所示。
注意检查燃烧头时需要打开燃烧器，将其后部沿滑杆拉出。
去除包装后，燃烧器的最大尺寸如 H 所示。

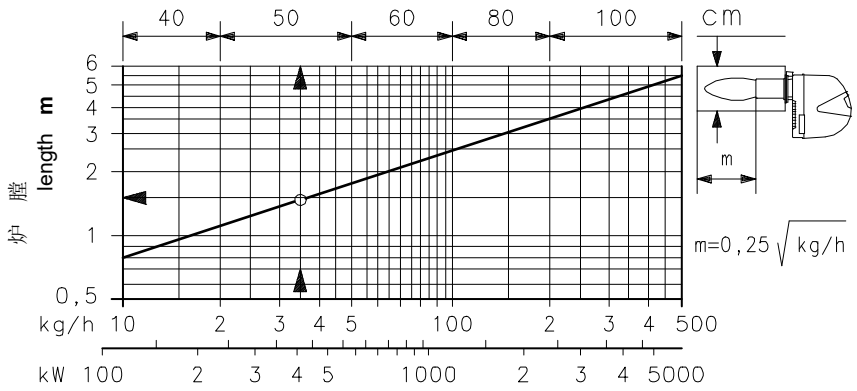
标准配置

2 - 软管
2 - 软管垫圈
2 - 带垫圈的软管接头
1 - 隔热垫
4 - 固定燃烧器法兰到锅炉上的螺栓：M 8 x 25
4 - 电气连接导缆孔
1 - 说明书
1 - 配件表

RL 50



(A) D8309



(B) D454

出力范围 (A)

RL 50 型燃烧器有下列两种工作模式：单段火及两段火。

一段火出力 范围必须在左图所示 A 区内选择。

二段火出力 范围必须在左图所示 B 区内选择（C 区为 RL 50 型）。根据炉膛内背压，此为燃烧器所供最大出力。

垂直线表示燃烧器出力，水平线表示炉膛背压，两线交叉点即为工作点，此点必须位于 B 区内。要使用 C 区，则需要按第 5 页说明对燃烧头进行校准。

重要

出力曲线的出力值在如下条件下获得：环境温度 20 °C, 大气压 1000 mbar (约 100 m 海拔) ，燃烧头按第 6 页所示调整。

试验锅炉 (B)

出力曲线是根据 EN 267 标准在专用试验锅炉上进行测试绘制而成的。

图 (B) 给出试验锅炉炉膛直径和长度。

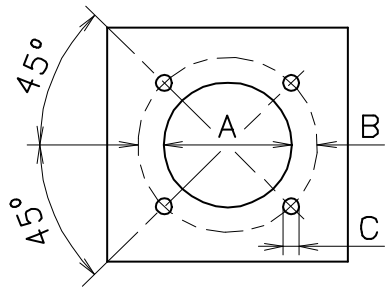
举例

出力 35 kg/ 小时：

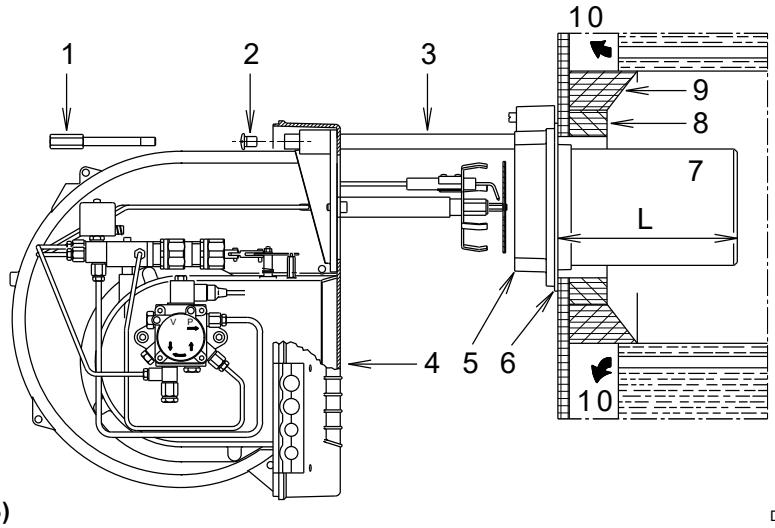
直径 = 50 cm ；长度 = 1.5 m。

若燃烧器安装于小于尺寸表所示燃烧室时，需进行预实验。

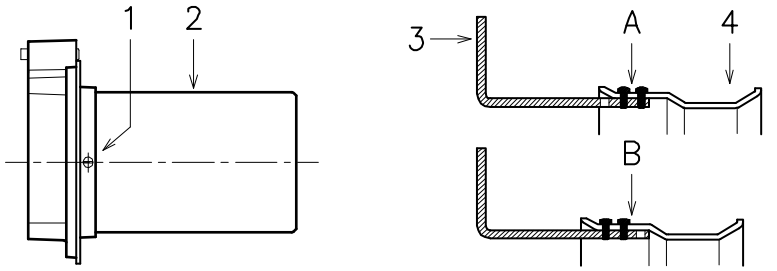
mm	A	B	C
RL 50	160	224	M 8



(A) D455



(B) D456



(C) D457

60	GPH	kg/h (1)			kW 12 bar
		10 bar	12 bar	14 bar	
RL 50	3.00	11.5	12.7	13.8	150.6
	3.50	13.5	14.8	16.1	175.5
	4.00	15.4	17.0	18.4	201.6
	4.50	17.3	19.1	20.7	226.5
	5.00	19.2	21.2	23.0	251.4
	5.50	21.1	23.3	25.3	276.3
	6.00	23.1	25.5	27.7	302.4

(1) 轻油 : 密度 0.84 kg/dm^3
粘度 4.2 cSt/20 °C
温度 10 °C

(D)

安装

锅炉法兰 (A)
按图 (A) 所示在锅炉上钻固定孔。
钻孔位置可以用随机带的隔热垫划线标记。

燃烧筒长度 (B)
燃烧筒的长度必须根据锅炉制造商所提供的说明书来选择，并且任何情况下必须大于锅炉前炉墙和炉衬的总厚度。可供选择的长度， L，如下：

燃烧筒 7):	RL 50
• 标准	216
• 加长 *	351

(*) 加长燃烧筒：仅随加长燃烧头组件提供

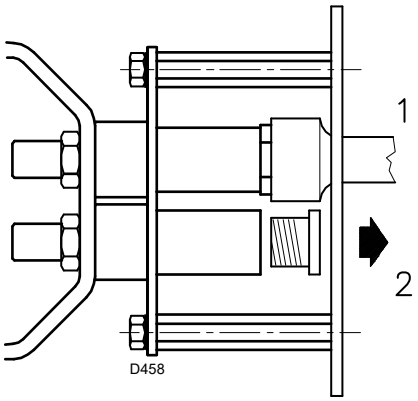
对于带前烟箱 10) 或反转火焰的锅炉，必须在炉衬 9) 及燃烧筒 7) 之间插入耐火材料制作的防护炉衬 8)。
防护炉衬不能妨碍燃烧筒的移动。
对于有前水冷壁的锅炉炉衬 8)-9)(B) 可以省略，除非锅炉厂商特别要求。

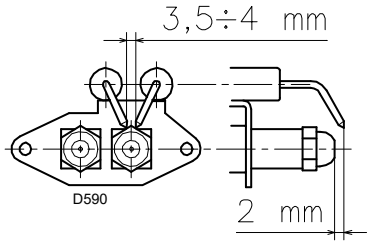
固定燃烧器到锅炉上 (B)
按如下步骤，从燃烧器 4) 上拆下喷嘴组件 7)
- 拆下两个滑杆 3) 上的螺栓 2)。
- 拆下螺栓 1)，固定燃烧器 4) 到法兰 5) 上。
- 将燃烧筒 7)、法兰 5) 和滑杆 3) 全部拉出。

燃烧头校准
对于此机型，此时需检查燃烧器二段火时的最大出力是否位于出力范围的B区或C区。见第4页。
如出力位于 B 区，则无需进行任何操作。
但如果出力位于 C 区，则：
- 拧下螺栓 1)(C)，拆下燃烧筒 2)。
- 将杆 3)(C) 的固定位置由A移至B，以使风筒4) 回缩。
- 再将燃烧筒 2)(C) 和螺栓 1) 重新进行安装。

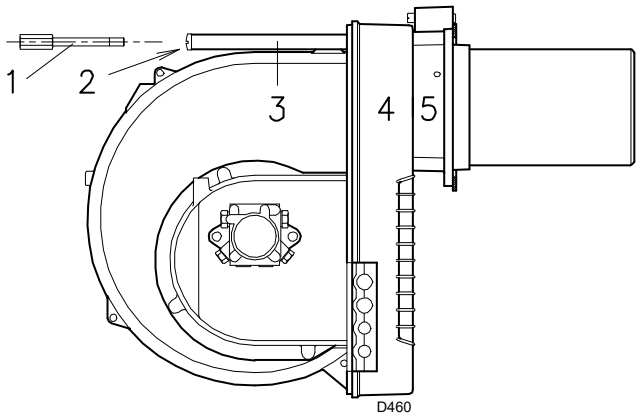
一旦进行此操作 (若必要)，固定法兰 5)(B) 到锅炉法兰上，二者中间插入随附的密封垫 6)。随机提供了 4 个螺栓，需使用防磨损产品 (高温润滑油，化合物，石墨) 保护螺栓螺纹后再使用它们。
燃烧器和锅炉之间的密封必须达到气密标准。

一段火及二段火喷嘴选择
两个喷嘴都必须由表 (D) 中选出。
1 号喷嘴 决定一段火时燃烧器流量。
2 号喷嘴 与 1 号喷嘴同时工作，决定二段火时燃烧器的流量。
一段火及二段火的流量必须在第 2 页所示数值范围之内。建议在压力为 12 bar 时，喷嘴喷射角度为 60° 。
两个喷嘴通常具有相等的流量，但也可根据需要对 1 号喷嘴进行如下调节：
- 当点火时，需要降低背压峰值，此时流量应小于总流量的 50% ；
- 当一段火运行时，需要提高燃烧效率，此时流量应大于总流量的 50% 。

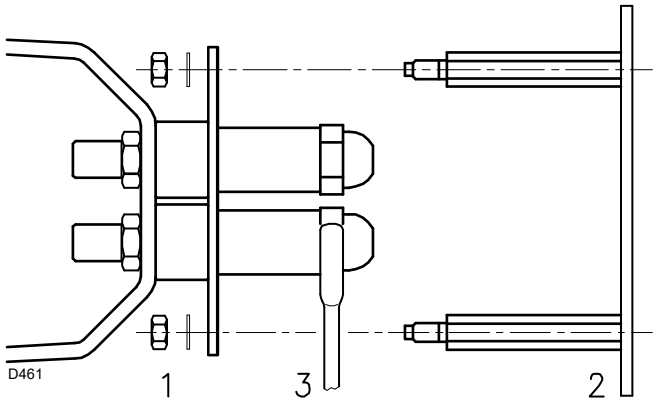




(A) **(B)**

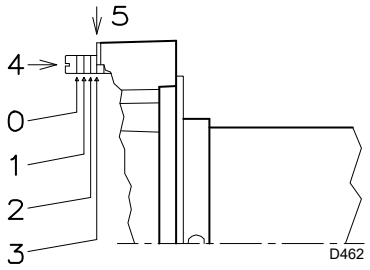


(C)

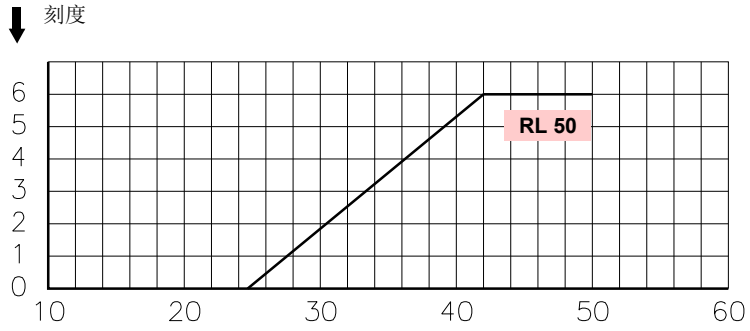


(D)

燃烧头设定



(E)



(F) 轻油流量 **kg/h**

举例 机型 RL 50
锅炉功率 = 405 kW - 效率 90 %
燃烧器所需出力 =
390 : 0.9 = 450 kW
450 : 2 = 225 kW 每一喷嘴

因此，所需两个喷嘴相同，喷射角度 60°，油压 12 bar：
1° = 4.50 GPH - 2° = 4.50 GPH,

或以下两个不同喷嘴：
1° = 4.00 GPH - 2° = 5.00 GPH,

或：
1° = 5.00 GPH - 2° = 4.00 GPH.

喷嘴安装

在安装的这一阶段，燃烧器和燃烧筒还未安装到一起，因此可以在取下塑料塞子 2)(A) 后，用 16 mm 扳手 1) (A) 将两个喷嘴从稳焰盘的中心进行安装。请勿使用任何密封材料，如密封垫、复合密封材料或密封胶带。注意不要损坏喷嘴的密封座。安装时必须将喷嘴拧到位，但不要拧脱扣。一段火的喷嘴位于点火电极下，如图 (B)。

请确认点火电极连接位置如图 (B) 所示。
最后将燃烧器 4)(C) 重新安装到滑杆 3) 上，并 将其一直推到法兰处 5)，滑动时将燃烧器轻微托起，避免稳焰盘与燃烧筒发生摩擦。
拧紧滑杆 3) 上的螺栓 2) 和的螺栓 1) 使燃烧器和法兰密封。

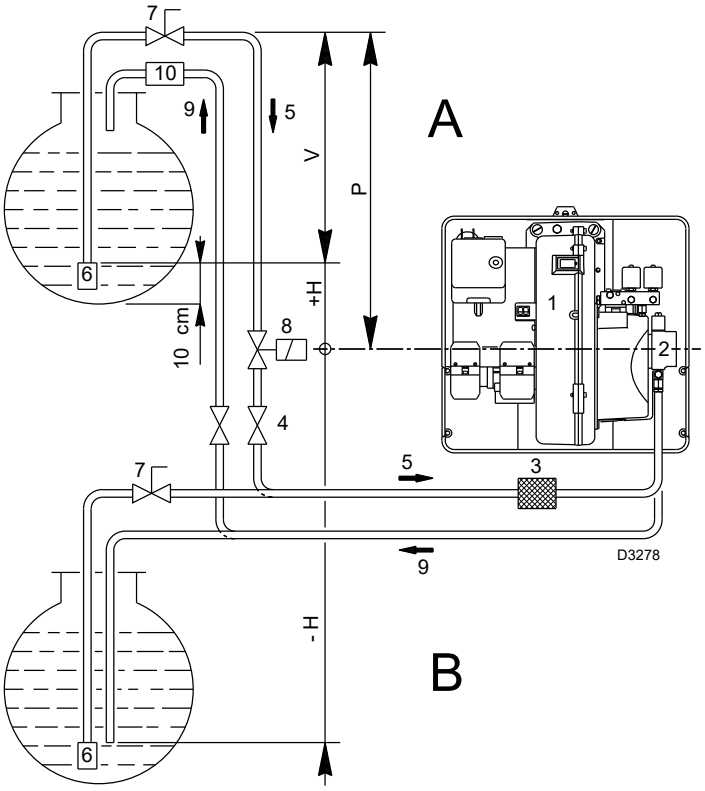
如确需为已安装到锅炉上的燃烧器更换喷嘴，则需按以下提示步骤操作：
- 按图 (B)p.5 所示，将燃烧器沿滑杆取下。
- 取下螺母 1)(D) 及稳焰盘 2)。
- 使用扳手 3(D) 更换喷嘴。

燃烧头设定

燃烧头的设置完全取决于燃烧器二段火的出力，即从第 6 页给出范围内选择的两个喷嘴的总出油量。
旋转螺栓 4)(E) 直至指示杆 (F) 上的刻槽与法兰 5)(E) 的表面对齐。

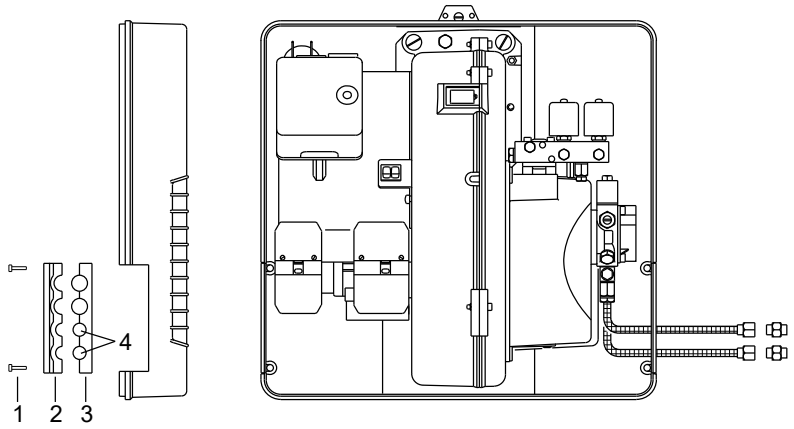
举例

RL 50 机型配2个 3.00 GPH喷嘴以及12 bar油泵压力。
两个 3.00 GPH 喷嘴的流量见表 (D)，第 5 页：
19.1 + 19.1 = 38.2 kg/h.
图 (F) 显示，在流量为 38.2 kg/h 时，RL 50 燃烧器需要将其燃烧头调整约至刻度接近 6，如图 (E) 所示。



+ H - H (m)	L (m) RL 50 Ø (mm)		
	10	12	14
+ 4.0	63	144	150
+ 3.0	55	127	150
+ 2.0	48	111	150
+ 1.0	40	94	150
+ 0.5	37	86	150
0	33	78	150
- 0.5	29	70	133
- 1.0	25	62	118
- 2.0	17	45	88
- 3.0	10	29	58
- 4.0	-	12	28

(A)



(B)

D3279

油管路系统

燃油供应

双管路系统 (A)

燃烧器必须配置一台自吸泵，自吸泵的高度见左表。

高位油箱 **A**

为了避免破坏油泵密封，高度“P”不能超过 10 米；为了油箱即使在油量极少的情况下能启动油泵，高度“V”不能超过 4 米。

低位油箱 **B**

油泵吸入口真空度不能超过 0.45 bar (35 cm Hg)，真空度过高会造成燃油汽化，油泵启动噪音大，且会降低油泵寿命。

保持燃烧器进油管和回油管在相同水平高度，这样可以避免进油管吸不到油。

循环回路

循环回路是一个闭合管路，燃油在压力下从油箱引出，经过一个循环油泵再回到油箱的。从此闭合管路中引出一个支管来为燃烧器供油。这一循环回路在以下情况下特别有用，即当油箱距离太远或高度差大于表中所列数据时，燃烧器不能自动注油启动。

图例 (A)

H = 油泵 / 底阀高度差
L = 管道长度
Ø = 管道内径
1 = 燃烧器
2 = 油泵
3 = 过滤器
4 = 手动 开 / 关 阀
5 = 进油管
6 = 底阀
7 = 快关手动阀远程控制 (仅限意大利)
8 = 开 / 关 电磁阀 (仅限意大利)
9 = 回油管
10 = 止回阀 (仅限意大利)

油管路系统连接 (B)

油泵配有旁路系统可以连接进油管和回油管。油泵安装在燃烧器上时，旁路系统被螺栓 6)(B)p.12 封住了。

需要连接两根软管到油泵上。

如回油管关闭且旁路系统螺栓为插入状态，运行油泵将导致油泵的立即损坏

拆下油泵入口及回油口的堵头。

将所附的密封垫加入到连接管连接到油泵并拧紧。

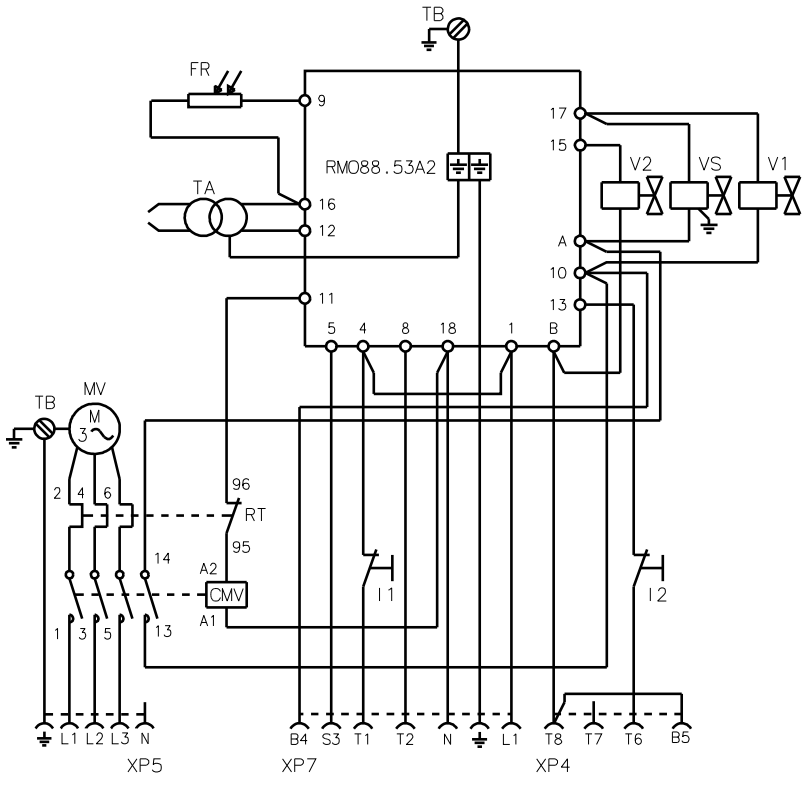
注意安装软管时不要拉伸或扭曲软管。

将软管从法兰孔中穿过，最好在右手侧操作，见图 (B)：拧松螺栓 1)，然后将连接件分成 2) 和 3) 两部分并去掉塞住两个管路 4) 的垫圈。

软管应安装在不易被绊倒的位置，不能接触到锅炉的高温表面，不能影响到燃烧器检修时的打开。

现在可以安装剩余零件，使用两个扳手，其一固定凸出部，另一个转动软管上的螺扣。

工厂设定的电气设备
RL 50



(A) 20083051

电气系统

电气系统由制造商设定

图示 (A)
RL 50 型燃烧器 (三相)

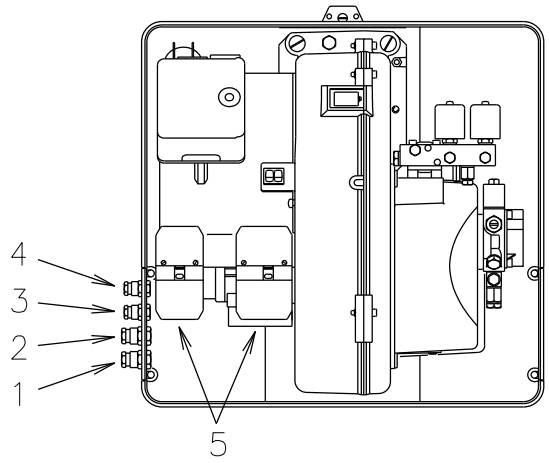
- RL 50 型燃烧器，三相供电，工厂预设为 **400 V** 电源。
- 如果使用 **230 V** 电源，将电机连接由星形改为角形，同时改变热继电器的设置。

图示 (A)

C	- 电容
CMV	- 电机电容
FR	- 光电管
I1	- 开关： 燃烧器 停机 - 启动
I2	- 开关： 1 段火 - 2 段火转换开关
MV	- 风机电机
RMO88.53A2	- 控制盒
RT	- 热断路器
TA	- 点火变压器
TB	- 燃烧器接地连接
V1	- 1 段火电磁阀
V2	- 2 段火电磁阀
VS	- 安全电磁阀
XP4	- 4 针插头
XP5	- 5 针插头
XP7	- 7 针插头

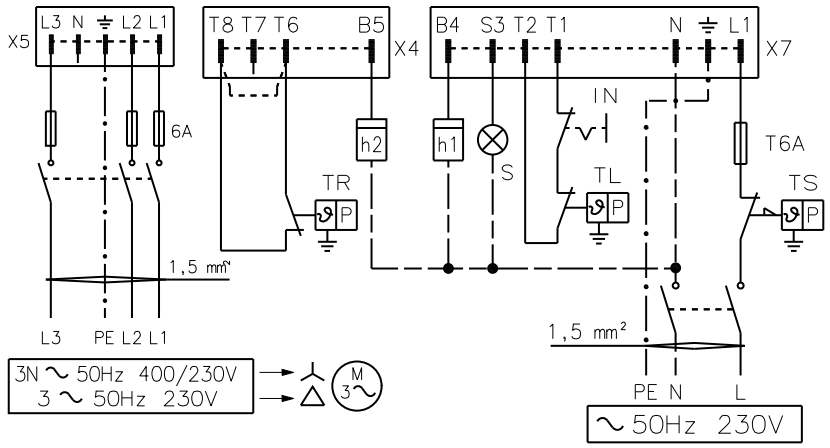
注意
要使用远程复位，将按钮开关 (NO) 与控制盒接线端子 3 及零线间的任意端子 (接线端子 15, 16, 17 和 18) 连接。

电气连接



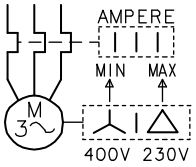
(A) D3277

电气连接



(B) D3228

RL 50 三相 热继电器校准



(C) D867

电气连接 (A)

由安装方负责
根据 EN 60 335-1 标准使用柔性电缆。
- 如使用 PVC 套管，电缆最低标准为 H05 VV-F。
- 如使用橡胶套管，电缆最低标准为 H05 RR-F。

如前所述，在移去塞住管路的垫圈后，所有连接到燃烧器插座 5)(A) 的电缆必须穿过导缆孔。导缆孔由制造商提供，专用于将电缆穿过法兰上的孔，最后在左手侧使用。

1 - Pg 11 三相电源
2 - Pg 11 单相电源
3 - Pg 9 控制装置 TL
4 - Pg 9 控制装置 TR
5 - **插头 / 插座**

图示 (B)

RL 50 型燃烧器电气连接

三相 230/400 V 电源，带零线和相线

导线截面积为给出，应为：1,5 mm^2。

电气接线图示 (B)

h1 - 1 段火计时器
h2 - 2 段火计时器
IN - 燃烧器手动停止开关
X4 - 4 针插头
X5 - 5 针插头
X7 - 7 针插头
S - 远程锁定信号
TL - 限位装置
此限位装置在锅炉温度或压力超过预设值时将燃烧器停机。
TR - 高－低火模式控制系统 :
此系统用来控制1段火和2段火，且仅在两段火运行模式下启动。
TS - 安全控制系统 :
TL 出现故障时启动此系统。

重要 : 工厂将燃烧器预设为两段火运行模式，因此需将燃烧器与远程控制装置 TR 连接以启动轻油阀 V2。
如果需要运行单段火模式，无需使用控制装置 TR，但需在连接器接线端子 T6 和 T8 间安装一个跳接线。

接线图 (C)

热断路器校准 17)(A)p.3

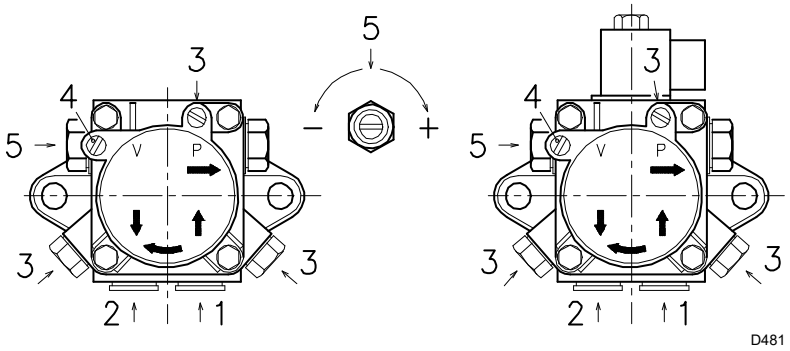
此操作系为避免由于掉相引起输入电流急剧增大而烧毁电机。
- 如果电机为星形驱动，电压 **400 V**，指示标位于 “MIN”。
- 如果电机为角形连接，电压 **230 V**，指示标位于 “MAX”。

即使电机在电压 400 V 时的额定输入功率超出热动继电器的量程，电气保护在任何情况下仍会发挥作用。

注意
- RL 50型燃烧器为三相电源，出厂时预设为使用 400V 电源。如果使用 230 V 电源，将电机连接由星形改为角形，同时改变热继电器的设置。
- RL 50 型燃烧器只能间歇运行，即燃烧器必须每 24 小时停机一次来检测控制盒在启动循环中的有效性。正常情况下，锅炉负荷控制系统会将燃烧器自动停机。

警告 :
不得将零线和相线反接。

RL 50: SUNTEC AL 75 C



D481

油泵		AL 75 C
A	kg/h	88
B	bar	4 - 18
C	bar	0.45
D	cSt	2 - 12
E	°C	60
F	bar	2
G	bar	12
H	mm	0.150

(A)

油泵 (A)

1 - 供油	G 1/4"
2 - 回油	G 1/4"
3 - 压力计表连接	G 1/8"
4 - 真空计连接	G 1/8"
5 - 压力调节螺栓	

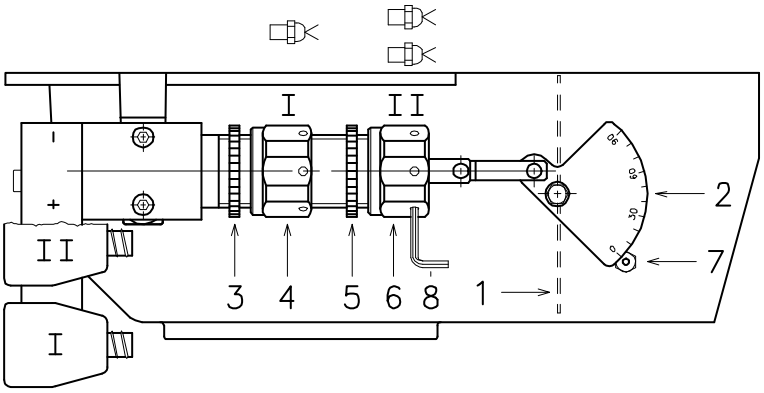
A - 压力为 12 bar 时的最小输油量
B - 压力范围
C - 吸入口最大真空度
D - 粘度范围
E - 轻油最高温度
F - 最大吸入及回油压力
G - 工厂预设定压力
H - 滤网孔宽度

油泵启动

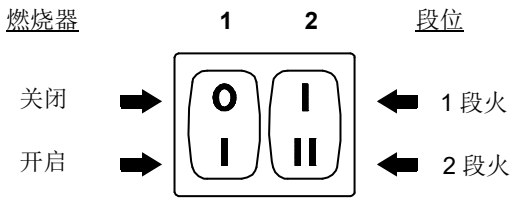
- **启动燃烧器前，确认油箱回油管路畅通。回油管路堵塞可能损坏油泵轴上的密封圈。**(油泵出厂时旁路系统已被堵塞)。
- 启动时，松开油泵上的螺栓 3)(A)，排除进油管路中的空气。
- 将控制盒及电气开关闭合，启动燃烧器。将开关 1)(B)p.11 置于 "ON" 位置。油泵转动方向必须与燃烧器外壳上所标箭头方向一致。
- 若从螺栓3)处有油漏出，则可认为能正常运行。关闭燃烧器，将开关 1)(B)p.11 置于 “OFF” 位置并拧紧螺栓 3)。

启动所需时间取决于进油管直径及长度。如果首次启动油泵失败且燃烧器锁定，等待大约 15 秒后，复位燃烧器，之后按规定的启动间隔再次启动燃烧器。启动 5 或 6 次后请间隔 2 至 3 分钟，以利于变压器的冷却。
不要遮挡光电管，否则燃烧器会锁定；燃烧器将在启动后 10 秒锁定。

注意: 油泵在出厂时已经注满油。如果有油泻出，请从油泵的真空测量孔处将油注满，否则会损坏油泵。当供油管的长度超过 20-30 米时，请另加一台独立的油泵。



(A) D468



(B) D469

RL 50	
GPH	α
3.00	12
3.50	15
4.00	18
4.50	21
5.00	23
5.50	27
6.00	28

1 段火

α = Notch Nr.

1 段火

α = Notch Nr.

(C)

RL 50	
kg/h	mbar
25	6.1
29	6.2
33	6.4
37	6.5
41	6.6
45	8.0
50	10.1
50	9.1 (1)

2 段火

mbar = 在 2) 压力为零时 1) 的气压

(1) 风挡 4)(C)p.5 关闭

(D)

燃烧器校准

点火

将开关 1)(B) 置于 “ON” 处。

首次点火时，当一段火运行转换为二段火运行时，会因燃油需将 2 段火喷嘴管路注满而出现短暂的油压下降现象。这一压力的下降可能会导致燃烧器锁定，有时还会引起燃烧器震动。

如果能进行如下调整，燃烧器点火时的噪音就会接近其运行时的噪音。如果燃烧器在开启轻油电磁阀时出现一两次震动或延迟点火现象，请查看 15 页上第 34-42 项原因。

运行

燃烧器的优化校核需要在锅炉排烟口安装烟气分析仪，并对以下部分进行调整：

• 1 号及 2 号喷嘴

内容详见第 5 页 “ 喷嘴选择 ”。

• 燃烧头

除改变二段火时燃烧器的送油量外，其它有关燃烧头调整之事宜按之前相关内容进行操作。

• 油泵压力

12 bar：此压力为出厂时的预设值，可以满足大部分用户的需求。有些情况下，也需对此压力做出调整，如：

10 bar 压力调

整至此水平以减小燃油输送量。只有在燃烧室温度高于 0 °C 时，才能作此调整，但绝对不可调至低于 10 bar。如果压力低于 10 bar，液压缸将难以开启；

14 bar 压力调整至此水平以增加燃油输送量，保证燃烧室温度低 于 0°C 时的点火启动。

调整油泵压力，可使用螺栓 5)(A)p.10。

• 一段火风机风门挡板

将开关2)(B)置于一段火运行处以保持燃烧器在一段火时的平稳运行。风门挡板 1)(A) 的开启程度必须根据所选喷嘴进行调整; 指针 7)(A) 必须与表 (C) 所示一致。可以用六角螺丝 4) 来进行调整：

- 向右旋 (- 号方向) 减小风量；
- 向左旋 (+ 号方向) 增大风量。

举例 RL 50

一段火喷嘴 3.00 GPH：

指针 7(A) 与刻度 18° 对齐。

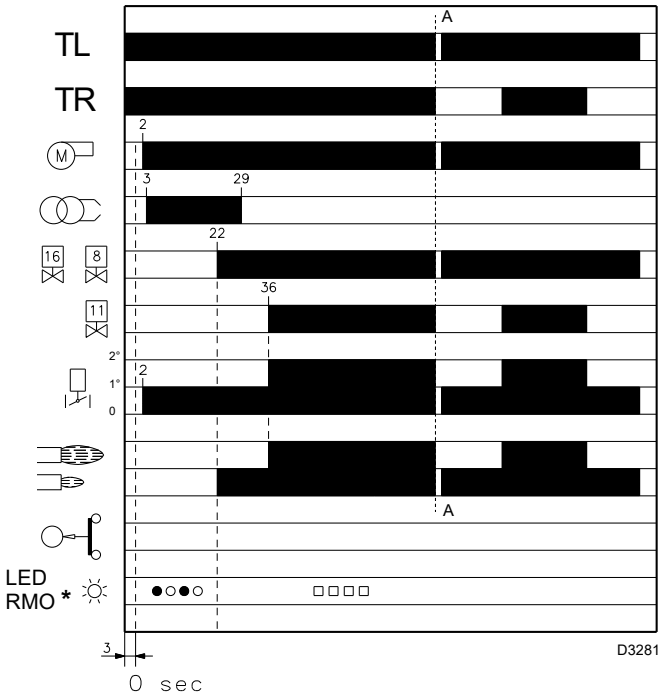
调整结束后，用螺母 3) 将六角螺丝 4) 拧紧。

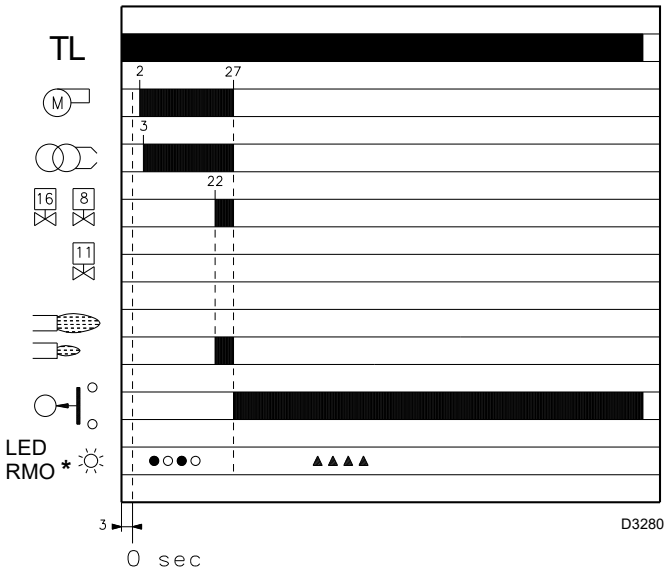
• 二段火风机风门挡板

将开关2)(B)置于二段火运行位置，松开螺母5)(A)后，转动六角螺丝 6)(A) 调整风门挡板 1)(A)。

附件 1)(D) 的气压值必须接近表 (D) 所示压力与附件 2) 所测燃烧室压力的和。参见左图所示。

注意：为了刚好的调整六角螺丝 4) 和 6)(A)，可使用 3 mm 六角扳手 8)(A)。



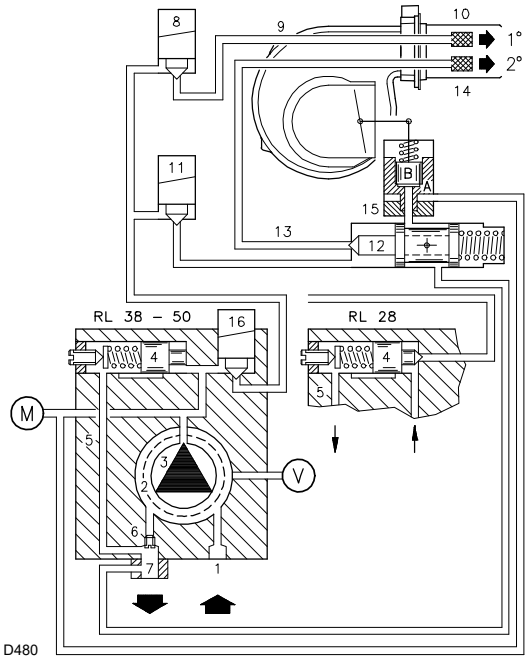


*

○ 灯灭	● 黄灯	□ 绿灯	▲ 红灯

详见第 14 页。

(A)



(B)

燃烧器运行

燃烧器启动 (A) - (B)

启动阶段各步骤的时间间隔以秒计，显示如下：

- 启动控制装置 TL 闭合。

  大约 3 秒后：
- **0 秒 :** 控制盒启动阶段开始。
- **2 秒 :** 风机电机开始启动。
- **3 秒 :** 点火变压器通电。

  油泵 3) 通过油管 1) 及滤油器 2) 将燃油吸入泵中，并开始加压送油。活塞 4) 升高，油通过油管 5)-7) 流回油箱。螺栓 6) 将泵内旁路关闭，电磁阀 8)-11)- 16) 断电，关闭油路。

  液压缸 15) 及活塞 A 开启风门挡板：一段火开始送风进行预吹扫。
- **22 秒 :** 电磁阀8)和16)开启，燃油流经油管9)和滤油器 10)，由喷嘴喷出，遇点火电极产生的火花后点然。此为一段火火焰。
- **29 秒 :** 点火变压器断开。
- **36 秒 :** 如果控制装置TR未开启或被替换，二段火电磁阀 11) 打开，燃油进入控制阀 12) 并抬升活塞，同时打开两个油路：一路流向油管 13)，滤油器 14) 及二段火喷嘴，另一路流向液压缸 15) 及活塞 B，开启二段火运行风门挡板。

  至此，启动周期结束。

稳态运行

装有控制装置 TR 的系统

启动周期结束后，控制装置 TR 传递指令给二段火电磁阀来控制锅炉温度及压力。

- 如果温度或压力升高至控制装置 TR 断开，则电磁阀 11) 关闭，燃烧器由二段火转为一段火运行。
- 如果温度或压力降低至控制装置 TR 闭合，则电磁阀 11) 开启，燃烧器由一段火转为二段火运行。以此类推。
- 一段火运行时，如热量需求小于燃烧器所输送的热量时，燃烧器停止运行。在此情况下，远程控制装置 TL 断开，电磁阀 8)-16) 关闭，火焰立刻熄灭。风机风门挡板完全关闭。

未装控制装置 TR 的系统 (装有短接线)

燃烧器会按以上所述被点燃。如果温度或压力升高至控制装置 TL 开启，则燃烧器停机 (如图 A-A 所示)。

当电磁阀 11) 断电，活塞 12) 关闭二段火喷嘴油路，液压缸 15) 及活塞 B 内燃油 流入回油管 7)。

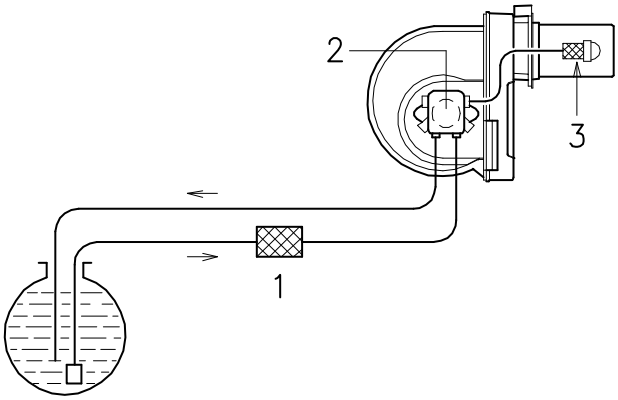
点火失败

如果燃烧器点火失败，会在 1 号喷嘴开启 5 秒之内进入锁定状态且在控制装置 TL 闭合 30 秒后。

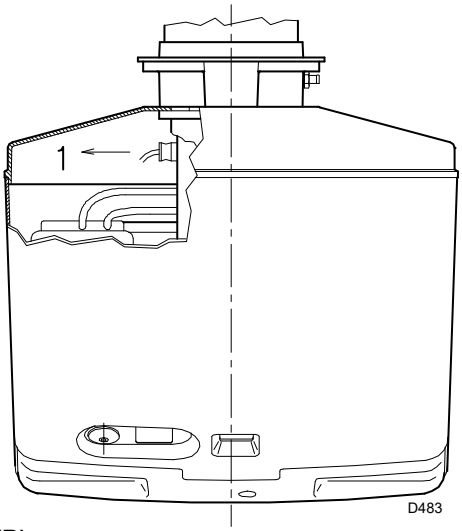
控制盒指示灯将会亮起。

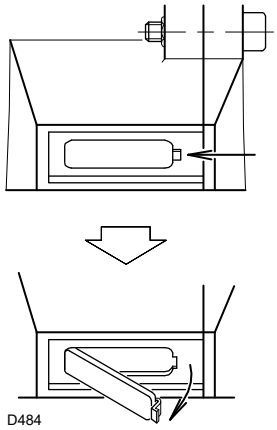
燃烧器运行中意外停机

如果运行过程中火焰熄灭，燃烧器将会在 1 秒内自动停机，并且会自动进入启动阶段启动。

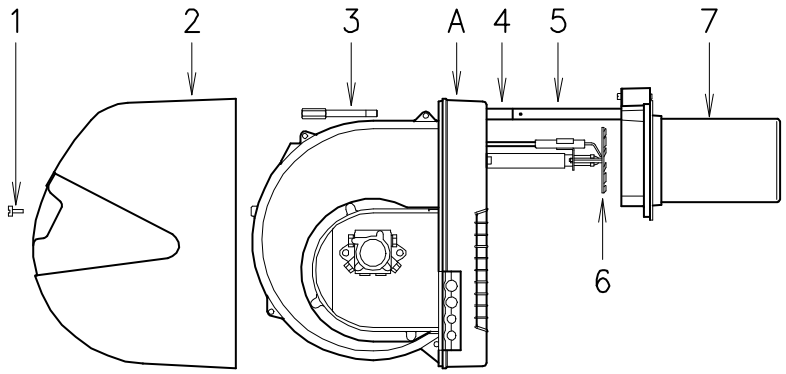


(A) D482

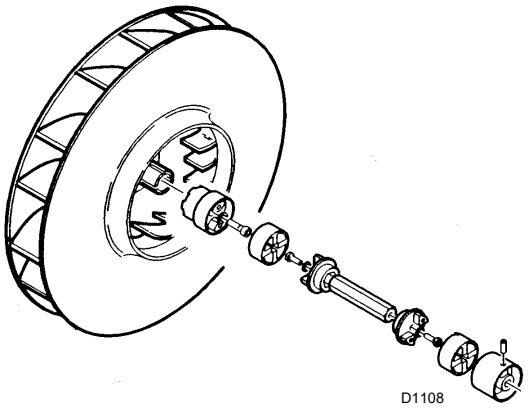




(B) **(C)**



(D) D486



(E)

最终检查

- 闭合控制装置及遮蔽光电管： 燃烧器将启动，并在开启 1 号喷嘴 5 秒后锁定。
- 闭合控制装置并让光电管感光：燃烧器将启动，并在大约 10 秒后锁定。
- 燃烧器处于二段火运行时，拔除光电管，会接连出现以下情况：火焰 1 秒内熄灭，预吹扫约 20 秒，点火约 5 秒，燃烧器进入锁定状态。
- 燃烧器运行时，顺序断开控制装置 TL 及 TS 燃烧器将停止运行。

维护

燃烧

燃烧器的优化校核需要烟气分析仪。维护时与原有数据存在较大差异的地方应多加注意。

油泵

油泵工作时压力必须稳定在 12 bar。

真空度 必须低于 0.45 bar。

油泵工作室必须保持噪音不能过大。

如果压力不稳或噪音过大，必须从过滤网上取下软管，并从附近的油箱中为油泵加油。这一措施可以追查进油管及油泵的工作异常情况。

如果油泵工作异常，检查并确保过滤网未被堵塞。真空计安装位置位于过滤网之前，因此不能提示过滤网是否被堵塞。 反之，如果进油管出问题，检查确保过滤网清洁以及进油管内没有空气进入。

过滤网 (A)

检查下列过滤网：

• 管路 1) • 油泵 2) • 喷嘴 3)，需要时清洁并更换过滤网。

如果油泵内生锈或有污物，请使用另一个独立的油泵将油箱底部的水或污物抽出。

然后清洁油泵内部以及端口的密封面。

风机

检查确保风机内部及扇叶上没有灰尘积聚，灰尘会减少空气流通量并增加燃烧污染物的排放。

燃烧头

检查确保燃烧头的所有部件性能完好、安装正确以及未被污染，这样就燃烧器就不会在高温运行时出现故障。

喷嘴

不要清洁喷嘴口。

建议在定期维护时每年更换喷嘴。

更换喷嘴时需要对燃烧进行控制。

光电管 (B)

清洁玻璃罩上可能积聚的任何灰尘。安装和取下光电管 1) 都需用力。

火焰检查窗 (C)

如需要，清洁检查窗玻璃。

软管

检查软管状态良好，未遭损坏或变形。

燃料箱

大概每 5 年、任何必要时刻、燃料箱底部进水或有污物时，需要启用另外一部独立的油泵。

锅炉

为了使保持最初的燃烧性能不被破坏，请按随附说明书上的要求清洁锅炉，特别要注意烟气温度及燃烧室压力。

打开燃烧器 (D)

- 断开所有电源
- 拆下螺栓 1，同时 取下保护盖 2)
- 拆下螺栓 3)
- 略抬起机体A，向后拉，注意不要碰坏在燃烧筒 7) 里的稳火盘 6)。

可能进行的油泵及 / 或管路接口更换 (E)

按照图 (E) 说明进行操作。

燃烧器启动阶段故障诊断
启动过程中的指示灯指示见下表：

颜色代码表	
启动过程	**颜色代码**
预吹扫	●○●○●○●○●
点火阶段	●○●○●○●○●
运行，火焰正常	□□□□□□□□□
运行，火焰较弱	□○□○□○□○□
低电压，低于 ~ 170V	●▲●▲●▲●▲●
锁定	▲▲▲▲▲▲▲▲▲
外部光源	▲□▲□▲□▲□▲
图例： ○ 灯灭 ● 黄色 □ 绿色 ▲ 红色	

复位控制盒及执行故障诊断
控制盒具有故障诊断功能，因此能很容易确定故障原因（指示器：**红色 LED 指示灯**）。
要使用这一功能，须等进入安全保护状态（锁定状态）至少 10 秒之后再按下复位按钮。控制盒发出一组脉冲信号 (相隔 1 秒)，该组信号会以 3 秒间隔不断重复出现。
可根据指示灯的闪烁次数来判断可能的故障原因，系统复位时必须按住按钮 1-3 秒。

红色 LED 指示灯亮 **等待至少 10 秒**	**锁定**	**按下复位按钮** **时间大于 3 秒**	**脉冲信号**	**间隔** **3 秒**	**脉冲信号**
			● ● ● ● ●		● ● ● ● ●

以下方法可用来复位控制盒及执行故障诊断。

复位控制盒
复位控制盒程序如下：
- 按住复位键 1-3 秒。
  松开复位键 2 秒后燃烧器重启。
  若温度限位开关处于断开状态，则燃烧器不能重启。

可视诊断
提示引起燃烧器锁定的故障类型。
查看故障诊断，并按以下步骤操作：
- 当红色 LED 持续亮起（燃烧器锁定）时，按住按钮超过 3 秒。
  黄灯闪烁说明操作成功。
  指示灯闪烁则松开按钮。指示灯闪烁次数提示故障原因，如第 15 页列表所示。

软件诊断
通过与 PC 电脑连接，报告燃烧器使用寿命，提示运行时间、 锁定次数及类型、控制盒序列号等 .....
查看故障诊断，并按以下步骤操作：
- 当红色 LED 持续亮起（燃烧器锁定）时，按住按钮超过 3 秒。
  黄灯闪烁说明操作成功。
  松开按钮 1 秒之后再次按下按钮超过 3 秒直至黄灯再次闪烁。
  松开按钮，红色 LED 高频闪烁：此时红外端口被激活。

一旦操作成功，必须按照上述控制盒复位程序将控制盒恢复初始状态。

按键时间	**控制盒状态**
1 – 3 秒	在可视诊断前复位控制盒。
大于 3 秒	在锁定状态进行可视诊断： (Led 指示灯以 1 秒间隔闪烁)。
开始可视诊断后超过 3 秒	通过红外线与 PC 电脑连接进行软件诊断 (可查看运行时间、故障等)

控制盒指示灯闪烁情况提示故障类型，如第 15 页列表所示。

指示灯	故障	可能的故障原因	排除故障建议
不闪烁	燃烧器未启动	1 - 电源没电 2 - 限位或安全控制装置断开 3 - 控制盒锁定 4 - 油泵堵塞 5 - 不正确的电气连接 6 - 控制盒损坏 7 - 电机损坏	关闭所有电源 - 检查保险丝 调节或更换 复位控制盒 (锁定 10 秒后) 更换 检查接线 更换 更换
闪烁 2 次 ● ●	预吹扫及安全时间过后，燃烧器进入锁定状态	8 - 油箱中没有油；油箱底部有水 9 - 燃烧头及风门调节不当 10 - 燃油电磁阀打开失败 (一段火阀或安全阀) 11 - 1 号喷嘴堵塞、脏或损坏 12 - 点火电极脏或调节不当 13 - 由于绝缘破损电极接地 14 - 高压电缆损坏或接地 15 - 高压电缆由于高温而损坏 16 - 点火变压器损坏 17 - 阀组或点火变压器电气连接错误 18 - 控制盒损坏 19 - 油泵不启动 20 - 油泵 / 电机耦合断开 21 - 油泵吸油管和回油管短路 22 - 油泵上游的阀关闭 23 - 过滤网脏：油路 - 油泵 - 喷嘴 24 - 光电管或控制盒损坏 25 - 光电管脏 26 - 一段火运行液压缸故障 27 - 电机锁定 28 - 电机启动远程控制装置失败 29 - 电源缺相 (RL 44 MZ 三相) 热熔断路器断开 30 - 电机转向失灵	增加油到相应水平或抽走油箱底部水 调节，见第 7 页及第 10 页 检查连接或更换线圈 更换 调节或清洁 更换 更换 更换或采取保护措施 更换 检查 更换 启动油泵，参见 “ 油泵不启动 ” 更换 正确连接 开启 清洁 更换光电管或控制盒 清洁 更换液压缸 复位热动继电器 替换 接通三相电源 复位热动继电器 更换电机电气连接
闪烁 4 次 ● ● ● ●	燃烧器启动之后进入锁定状态	31 - 光电管短路 32 - 有外部光源进入或虚假火焰	更换光电管 消除光源或更换控制盒
闪烁 7 次 ● ● ● ● ● ● ●	脱火	33 - 燃烧头调节不当 34 - 点火电极调节不当或脏 35 - 风门调节不当：风量过大 36 - 1 号喷嘴流量过大 (震动) 37 - 1 号喷嘴流量过小 (脱火) 38 - 1 号喷嘴脏或变形 39 - 油泵压力不当 40 - 一段火喷嘴与燃烧器或锅炉不匹配 41 - 一段火喷嘴损坏	调整，见第 6 页，图 (F) 调整，见第 6 页，图 (B) 调整 减小 1 号喷嘴流量 增大 1 号喷嘴流量 更换 调整至 10 - 14 bar 参见喷嘴列表，第 5 页，减小一段火喷嘴流量 更换
	燃烧器不能运行二段火	42 - 控制装置 TR 不能闭合 43 - 控制盒故障 44 - 二段火电磁阀线圈故障 45 - 活塞堵塞	调整或更换 更换 更换 更换整个部件
	燃油进入二段火运行但风量为一段火风量	46 - 油泵压力低 47 - 二段火运行液压缸故障	加压 更换液压缸
	一、二断火转换时燃烧器停机。燃烧器重复启动周期。	48 - 喷嘴脏 49 - 光电管脏 50 - 过量空气	更换喷嘴 清洁 减少
	燃油供应不稳定	51 - 查看原因是否出在油泵 或燃油供应系统	从就近的油箱为燃烧器供油
	油泵内部生锈	52 - 油箱内有水	用另一个泵将油箱内水抽干
	油泵噪音大，压泵不稳	53 - 进油管有空气 - 油泵进油压力过高 (高于 35 cm Hg)： 54 - 油箱 / 燃烧器高度差过大 55 - 管道直径太小 56 - 进油管过滤网堵塞 57 - 进油阀关闭 58 - 温度过低，煤油凝固	紧固接头 采用循环回路为燃烧器供油 增大 清洁 开启 向燃油中加入添加剂
	油泵长时间不启动	59 - 回油管没有燃油 60 - 进油管有空气	升高到与进油管同样高度 紧固接头
	油泵漏油	61 - 由密封圈处泄露	更换油泵
	烟气 - 黑度等级 - 黄度等级	62 - 空气不足 63 - 喷嘴磨损或脏 64 - 喷嘴过滤网堵塞 65 - 油泵压力不当 66 - 稳焰盘脏，松动或变形 67 - 炉膛通风不足 68 - 空气过量	调整燃烧头及风门，见第 6 页及第 11 页 更换 清洁或更换 调整至 10 - 14 bar 清洁，紧固或更换 增大 调整燃烧头及风门，见第 6 页及第 11 页
	燃烧头脏	69 - 喷嘴或过滤网脏 70 - 喷嘴流量或角度不当 71 - 喷嘴松动 72 - 稳焰盘上有杂物 73 - 燃烧头调节不当或空气不足 74 - 燃烧筒高度与锅炉不匹配	更换 参见推荐喷嘴，见第 5 页 固定 清洁 调整，见第 11 页；打开风门挡板 联系锅炉制造商
闪烁 10 次 ● ● ● ● ● ● ● ● ● ●	燃烧器锁定	75 - 接线错误或内部故障 76 - 存在电磁干扰	启动抗电磁干扰工具包

配件 (可选)：

- **抗电磁干扰组件**

如果由于附近有变频器，使得燃烧器受到电磁干扰 （电磁信号强度大于 10 V/m），或恒温器的连接线长度超过 20 米时，需要在电气控制与燃烧器之间安装电磁干扰防护装置。

燃烧器	**RL 50**
代码	3010386

- **油气分离器**

轻油中的一定量的空气可能被吸入油泵。这些空气可能由于负压或密封不良而存在轻油中。
在双管系统中，空气可经回油管回到油箱中；在单管系统中，空气仍存在于油路循环系统中，会引起油泵压力变化及燃烧器故障。
因此，我们建议在安装单管系统时，在燃烧器附近安装一个油气分离器。
油气分离器有以下两个型号：

代码 **3010054** 不带过滤器
代码 **3010055** 带过滤器

油气分离器特性
- 燃烧器出力 : 80 kg/h 最大
- 轻油压力 : 0,7 bar 最大
- 助燃空气温度 : 40 °C 最高
- 轻油温度 : 40 °C 最高
- 附件连接器 : 1/4 inch

Registered Office - 公司注册所在地 :
RIELLO S.p.A.
I-37045 Legnago (VR)
Tel.: +39.0442.630111
http:// www.riello.it
http:// www.riello.com

Manufacturing site:
Riello Heating Equipment (Shanghai) CO., LTD
No. 388, Jinbai Road - Jinshan Industrial Zone
201506 - Shanghai
CHINA

生产场所 :
Riello Heating Equipment (Shanghai) CO., LTD
利雅路热能设备（上海）有限公司
上海市金山工业区金百路 388 号