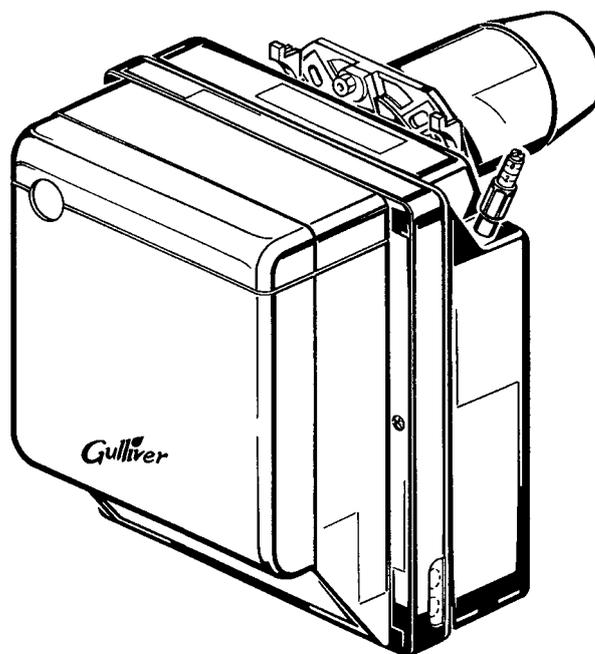


## **GB** Light oil burner

One stage operation



*Gulliver*



CODE	MODEL	TYPE
3736254	RG1RK	362 T1

## Declaration

### Declaration of conformity in accordance with ISO / IEC 17050-1

Manufacturer: RIELLO S.p.A.  
Address: Via Pilade Riello, 7  
37045 Legnago (VR)  
Product: Light oil burner  
Model: RG1RK

These products are in compliance with the following Technical Standards:

EN 267

EN 12100

and according to the European Directives:

BED	92/42/EC	Efficiency Directive
MD	2006/42/EC	Machine Directive
LVD	2006/95/EC	Low Voltage Directive
EMC	2004/108/EC	Electromagnetic Compatibility

Such products are marked as follows:



**CE-0036 0341/03**

The quality is guaranteed by a quality and management system certified in accordance with UNI EN ISO 9001.

Legnago, 30.03.2010

Mr. G. Conticini  
Burners Division Department  
RIELLO S.p.A.

# INDEX

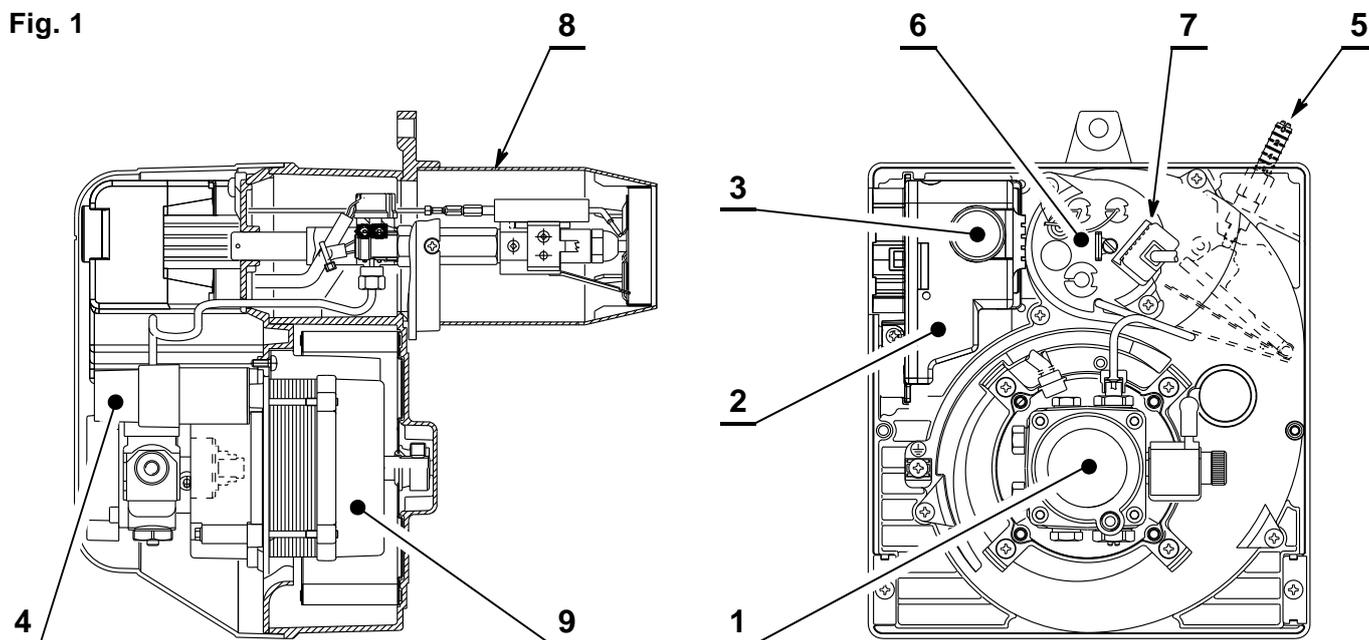
<b>1.</b>	<b>BURNER DESCRIPTION</b>	<b>2</b>
1.1	Burner equipment	2
1.2	Accessories	2
<b>2.</b>	<b>TECHNICAL DATA</b>	<b>3</b>
2.1	Technical data	3
2.2	Overall dimensions	3
2.3	Firing rates	3
<b>3.</b>	<b>INSTALLATION</b>	<b>4</b>
3.1	Working position	4
3.2	Boiler fixing	4
3.3	Hydraulic systems	5
3.4	Electrical wiring	6
<b>4.</b>	<b>BURNER OPERATION</b>	<b>7</b>
4.1	Combustion adjustment	7
4.2	Recommended nozzles	7
4.3	Pump pressure	7
4.4	Maintenance position	8
4.5	Combustion head adjustment	9
4.6	Air damper adjustment	9
4.7	Electrodes adjustment	9
4.8	Fuel heating	9
4.9	Operating programme	10
4.9.1	Normal operation with preheating	10
4.9.2	Lockout due to firing failure	11
4.9.3	Lockout due to extraneous light during pre-purging	11
4.9.4	Lockout types and triggering times in case of burner malfunction	12
4.9.5	Control box reset	12
4.9.6	Recycle function	12
4.9.7	Logging of burner operation parameters	12
4.10	Additional, programmable control box functions	13
4.10.1	Post-purging function (t6)	13
4.10.2	Continuous purging function	13
4.10.3	Long pre-purging function (t7)	13
4.10.4	Function setting procedure using reset button	13
<b>5.</b>	<b>MAINTENANCE</b>	<b>14</b>
5.1	Control box visual diagnostic	14
<b>6.</b>	<b>FAULTS / SOLUTIONS</b>	<b>15</b>
6.1	Start-up problems	15
6.2	Operating irregularities	16
<b>7.</b>	<b>WARNINGS AND SAFETY</b>	<b>17</b>
7.1	Burner identification	17
7.2	Basic safety measures	17

# 1. BURNER DESCRIPTION

One stage light oil burner.

- The burner meets protection level of IP X0D (IP 40), EN 60529.
- The burner is approved for intermittent operation.

Fig. 1



D7367

- |                                     |                            |
|-------------------------------------|----------------------------|
| 1 – Oil pump                        | 6 – Nozzle holder assembly |
| 2 – Control box                     | 7 – Flame detector         |
| 3 – Reset button with lock-out lamp | 8 – Combustion head        |
| 4 – Capacitor                       | 9 – Motor                  |
| 5 – Air damper adjustment assembly  |                            |

## 1.1 BURNER EQUIPMENT

- |   |   |
|---|---|
| Flange with insulating gasket . . . . . No. 1 | Screw and nuts for flange to be fixed to boiler. . . . .No. 4 |
| Screw and nuts for flange . . . . . No. 1     | Flexible oil pipes with nipples . . . . .No. 2                |
| Remote reset connection . . . . . No. 1       |   |

## 1.2 ACCESSORIES

### DIAGNOSTIC SOFTWARE KIT

A special kit is available that detects the life of the burner through optical connections with a PC showing the duty hours, number and types of lockout, control box serial number etc...

Do the following to display the diagnostic:

- Connect the kit supplied separately to the appropriate socket on the control box.  
The information is read after the software program in the kit is booted.

### REMOTE RESET KIT

The burner is fitted with a remote reset kit (**RS**) consisting of a connection to which a button can be connected up to a distance of 20 meters.

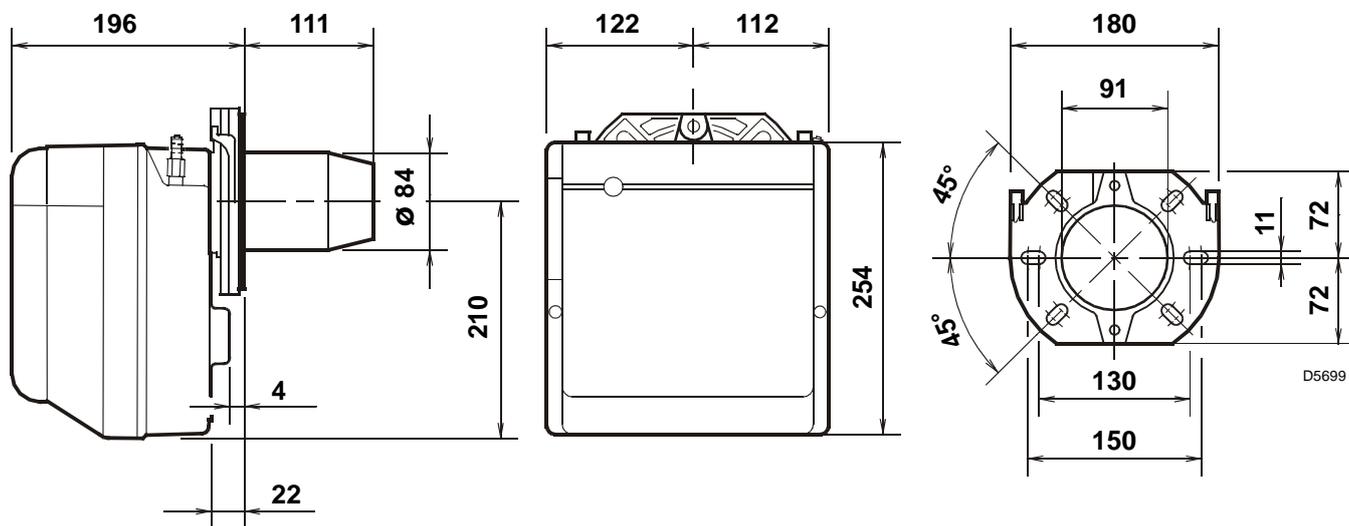
For the installation, remove the protection block installed in the factory and install the block that is supplied with the burner (see wiring diagram on page 6).

## 2. TECHNICAL DATA

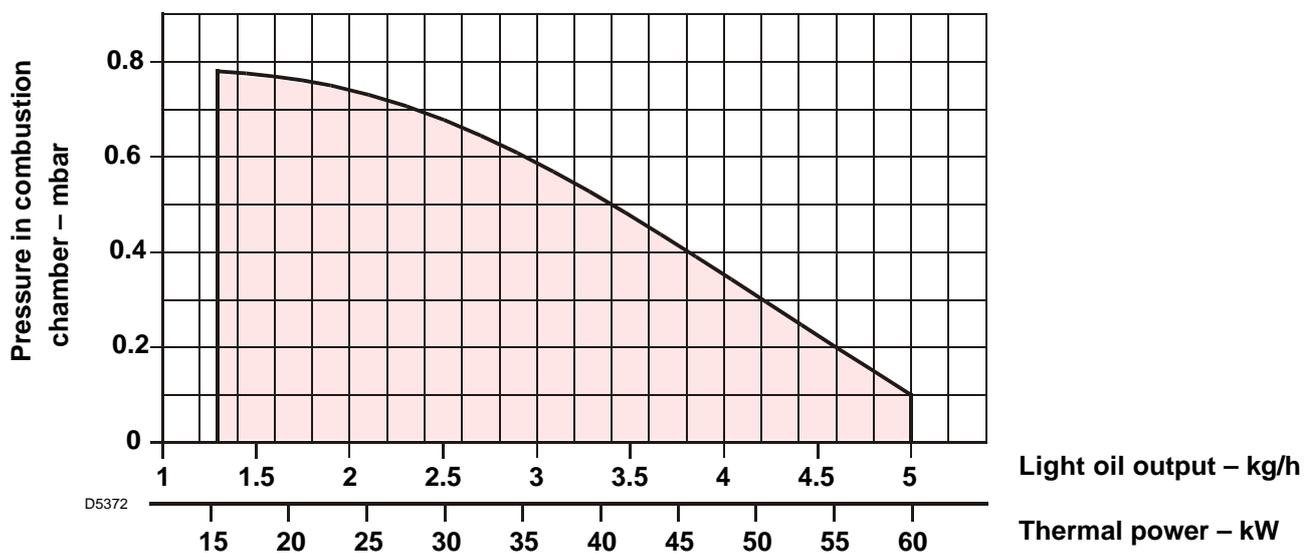
### 2.1 TECHNICAL DATA

TYPE	362T1
Output - Thermal power	1.3 - 5 kg/h - 15 - 60 kW
Fuel	Light oil, viscosity 4 - 6 mm <sup>2</sup> /s at 20 °C
Electrical supply	Single phase, ~ 50Hz 230V ± 10%
Motor	Run current 0.85A - 2750 rpm - 289 rad/s
Capacitor	4 μF
Ignition transformer	Secondary 8 kV - 16 mA
Pump	Pressure: 8 - 15 bar
Absorbed electrical power	0.29 kW

### 2.2 OVERALL DIMENSIONS



### 2.3 FIRING RATES, (as EN 267)



### 3. INSTALLATION

THE BURNER MUST BE INSTALLED IN CONFORMITY WITH LEGISLATION AND LOCAL STANDARDS.

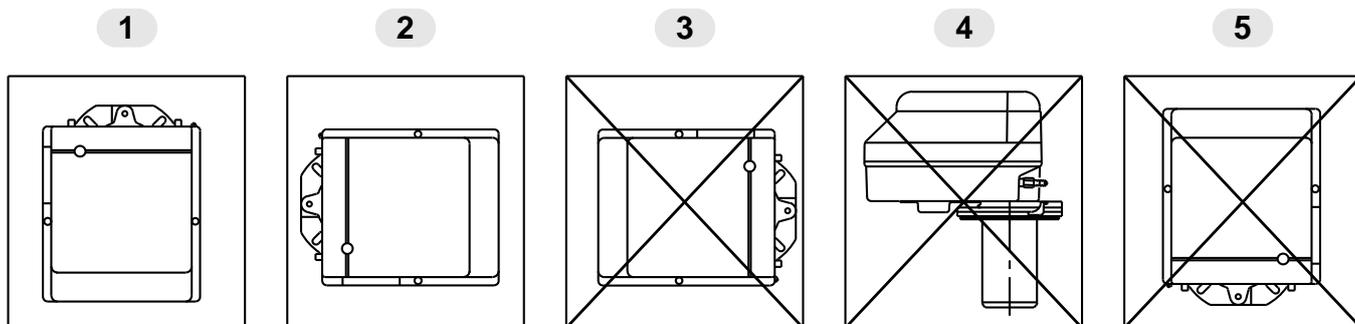
#### 3.1 WORKING POSITION

The burner is designed to work only in the positions, 1 and 2. Installation 1 is preferable, as it is the only one that allows performing maintenance operations as described in this manual.

Installations 2 allow working operations but not maintenance with hooking to the boiler.

Any other position could compromise the correct working of the appliance.

Installations 3, 4 and 5 are forbidden for safety reasons.

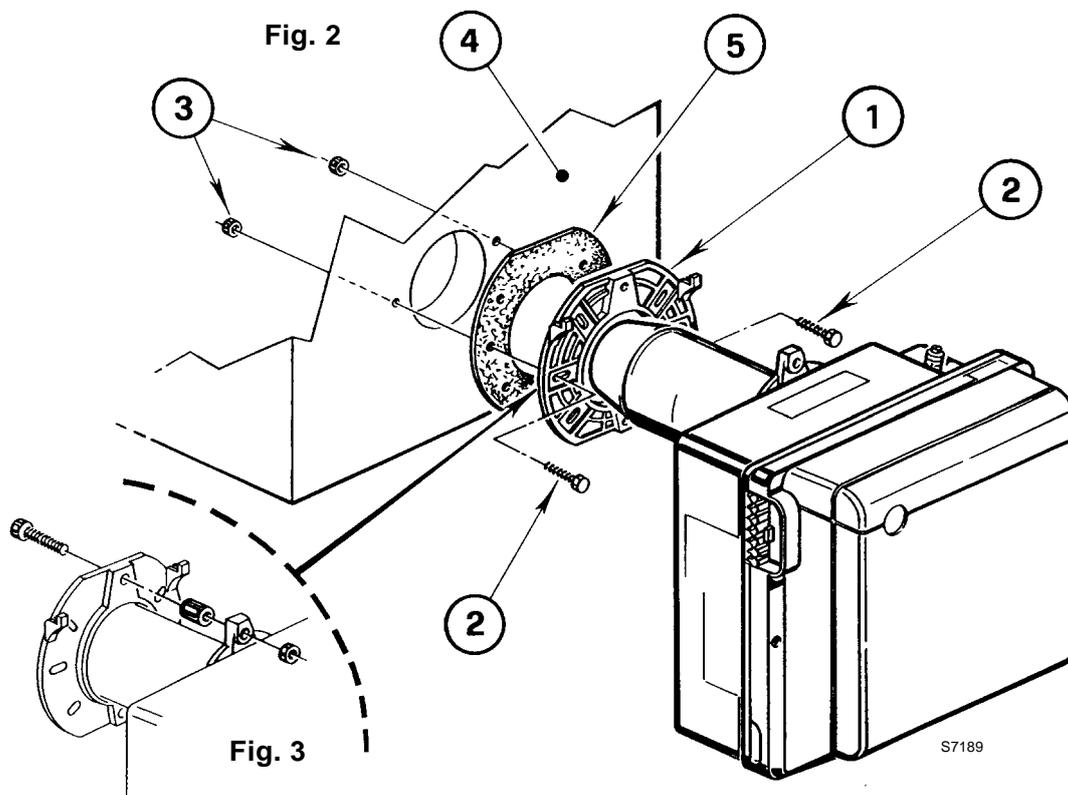


D7088

#### 3.2 BOILER FIXING

To install the burner on the boiler, do the following:

- ▶ Put on the flange (1) the screw and two nuts, (see fig. 3).
- ▶ Widen, if necessary, the insulating gasket holes (5).
- ▶ Fix the flange (1) to the boiler door (4) using screws (2) and (if necessary) the nuts (3) interposing the insulating gasket (5), (see fig. 2).



S7189

### 3.3 HYDRAULIC SYSTEMS

#### WARNING:

- The burner is designed to accommodate the installation of light oil supply pipes on either side of the burner.
- It is necessary to install a filter on the fuel supply line.
- The pump is designed for use with a two-pipe system. In order to obtain one-pipe working, it is necessary to unscrew the return plug (2), remove the by-pass screw (3) and then screw the plug (2) up again, (see fig. 4).
- Before starting the burner make sure that the return pipeline is not clogged. An excessive back pressure would cause the damage of the pump seal.

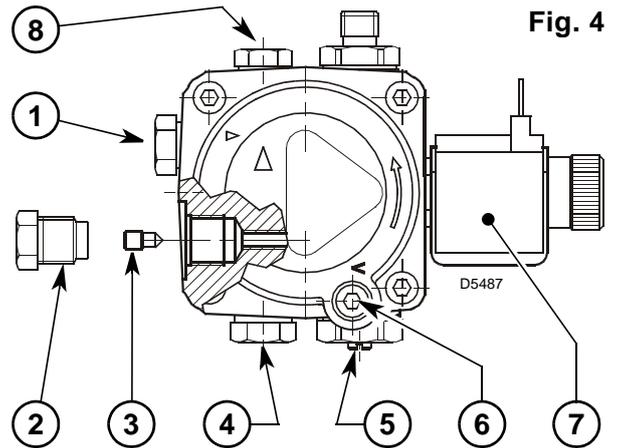
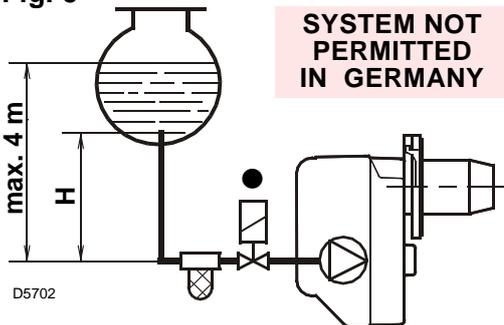


Fig. 4

Fig. 5



H meters	L meters	
	I. D. 8 mm	I. D. 10 mm
0.5	10	20
1	20	40
1.5	40	80
2	60	100

- 1 - Suction line
- 2 - Return line
- 3 - By-pass screw
- 4 - Gauge connection
- 5 - Pressure adjuster
- 6 - Suction gauge connection
- 7 - Valve
- 8 - Auxiliary pressure test point

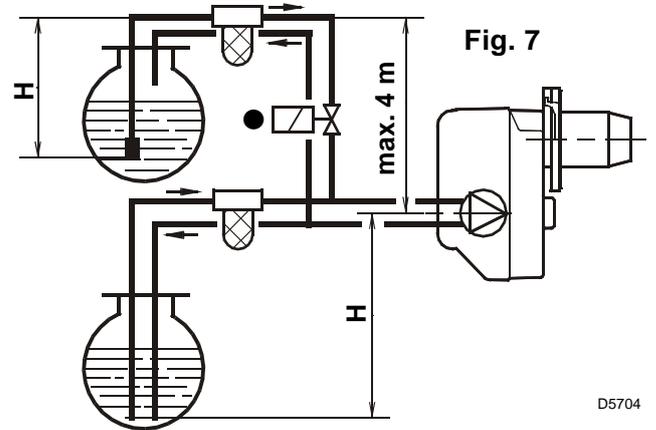
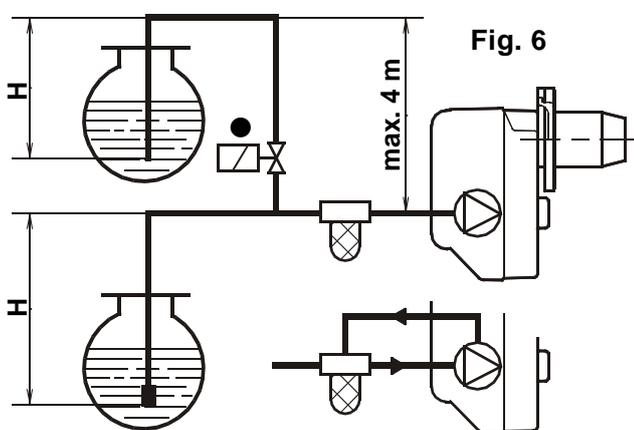
#### PRIMING PUMP

On the system in fig. 5 it is sufficient to loosen the suction gauge connection (6, fig. 4) and wait until oil flows out.

On the systems in fig.6 and 7 start the burner and wait for the priming. Should lock-out occur prior to the arrival of the fuel, await at least 20 seconds before repeating the operation.

The pump suction should not exceed a maximum of 0.4 bar (30 cm Hg). Beyond this limit gas is released from the oil. Oil pipes must be completely tight. In the vacuum systems (fig. 7) the return line should terminate within the oil tank at the same level as the suction line. In this case a non-return valve is not required. Should however the return line arrive over the fuel level, a non-return valve is required. This solution however is less safe than previous one, due to the possibility of leakage of the valve.

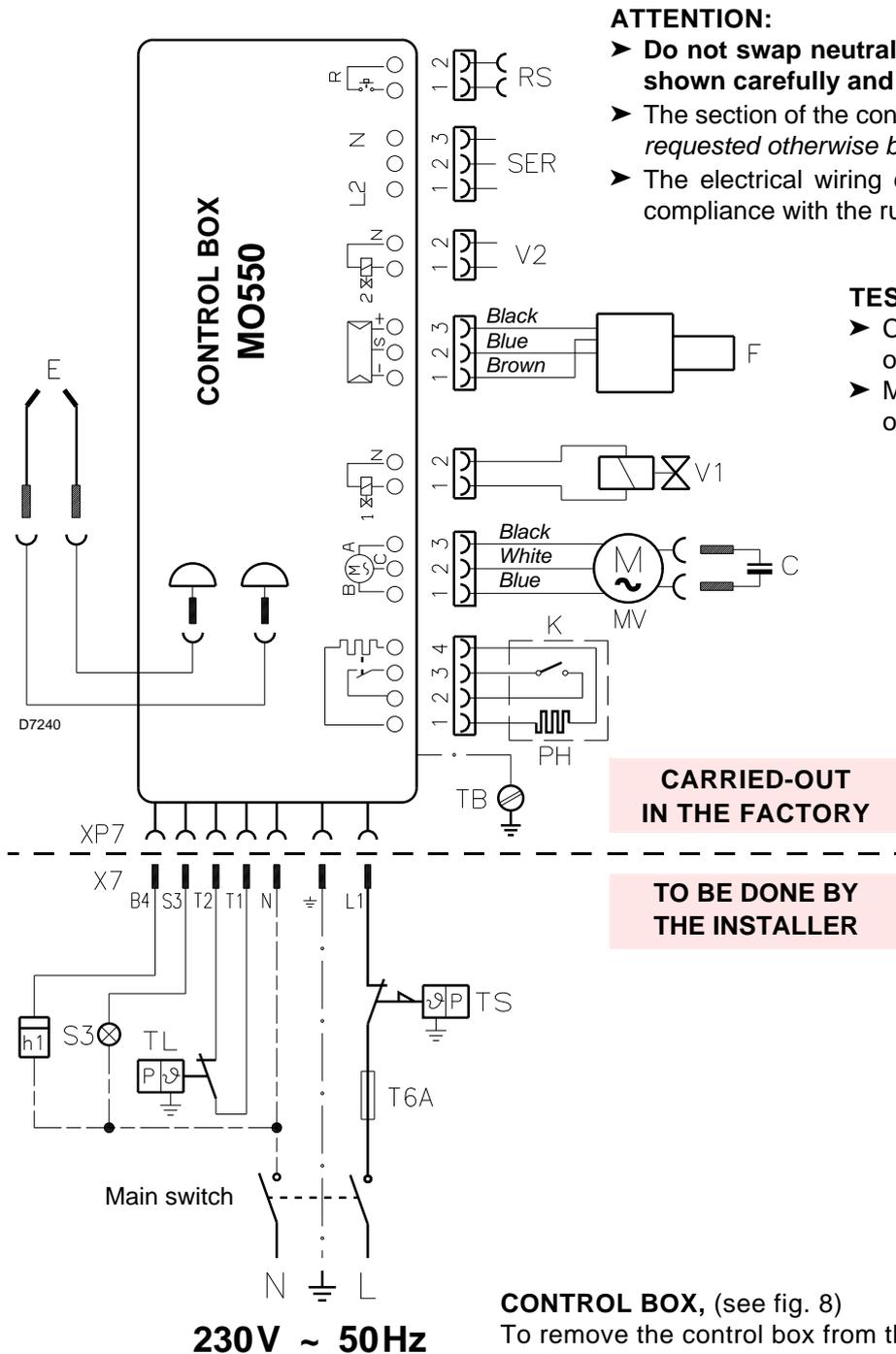
H meters	L meters	
	I. D. 8 mm	I. D. 10 mm
0	35	100
0.5	30	100
1	25	100
1.5	20	90
2	15	70
3	8	30
3.5	6	20



● **ONLY FOR ITALY:** Automatic shut-off device as per Ministry of Internal Affairs' regulation no. 73 dated 7/29/71.

H = difference of level; L = max. length of the suction line; I. D. = internal diameter of the oil pipes.

### 3.4 ELECTRICAL WIRING



**ATTENTION:**

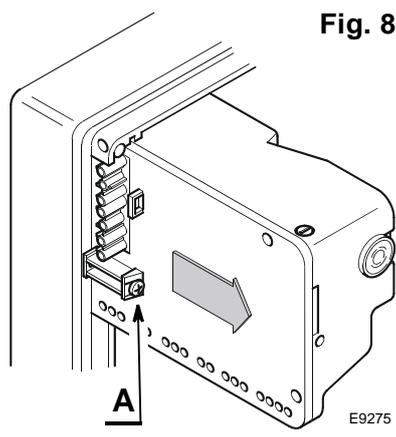
- Do not swap neutral and phase over, follow the diagram shown carefully and carry out a good earth connection.
- The section of the conductors must be at least 1mm<sup>2</sup>. (Unless requested otherwise by local standards and legislation).
- The electrical wiring carried out by the installer must be in compliance with the rules in force in the country.

**TESTING**

- Check the burner has stopped by opening the thermostats.
- Make sure the operating burner locks out by covering the flame detector.

- LAY-OUT**
- C** – Capacitor
  - E** – Electrode
  - F** – Flame detector
  - h1** – Hour counter
  - K** – Thermostat enabling start-up after preheating
  - MV** – Motor
  - PH** – Oil heater
  - RS** – Remote reset
  - SER** – Safety lockout device
  - S3** – Lock-out signal
  - T6A** – Fuse
  - TB** – Burner-earth
  - TL** – Limit thermostat
  - TS** – Safety thermostat
  - V1** – Oil valve
  - V2** – Safety lockout device
  - X7** – 7 pin plug
  - XP7** – 7 pole socket

**Fig. 8**



**CONTROL BOX**, (see fig. 8)

To remove the control box from the burner it is necessary to:

- Disconnect all the connectors, the 7-pin plug, the high voltage cables and the earth wire (**TB**);
- Unscrew the bolt (**A**) and pull the control box in the direction of the arrow.

To install the control box it is necessary to:

- Screw the bolt (**A**) in at a torque of 1 - 1.2 Nm;
- Reconnect all the connectors previously disconnected.

**NOTES:**

The burners have been type-approved for intermittent operation. This means they must stop at least once every 24 hours in order to allow the electrical control box to check its efficiency on start-up. The boiler limit thermostat (**TL**) normally ensures the burner halts. If this does not happen a time switch halting the burner at least once every 24 hours must be applied in series to (**TL**).

## 4. BURNER OPERATION

### **WARNING**

**QUALIFIED PERSONNEL WITH THE RIGHT INSTRUMENTS MUST HANDLE THE BURNER'S FIRST START-UP**

### 4.1 COMBUSTION ADJUSTMENT

In conformity with Efficiency Directive 92/42/EEC the application of the burner on the boiler, adjustment and testing must be carried out observing the instruction manual of the boiler, including verification of the CO and CO<sub>2</sub> concentration in the flue gases, their temperatures and the average temperature of the water in the boiler.

To suit the required appliance output, choose the proper nozzle and adjust the pump pressure, the setting of the combustion head, and the air damper opening in accordance with the following schedule.

The values shown in the table are measured on a CEN boiler (as per EN 267).

They refer to 12.5% CO<sub>2</sub> at sea level and with light oil and room temperature of 20 °C.

Nozzle		Pump pressure	Burner output	Combustion head adjustment	Air damper adjustment
GPH	Angle	bar	kg/h ± 4%	Set-point	Set-point
0.40	80°/60°	9	1.3	0	0.5
0.50	60°	12	1.9	0.5	1.0
0.60	60°	12	2.3	1	1.5
0.65	60°	12	2.5	1.5	2.4
0.75	60°	12	2.9	2.5	3.2
0.85	60°	12	3.3	3	4.2
1.00	60°	12	3.8	3.5	4.9
1.10	60°/45°	12	4.2	4.5	5.4
1.25	60°/45°	12	4.8	5	6.3
1.25	60°/45°	13	5.0	6	6.7

### 4.2 RECOMMENDED NOZZLES

Delavan W - B type;

Danfoss S - B type;

Monarch R type;

Steinen S - Q type.

### 4.3 PUMP PRESSURE

It leaves the factory set at 12 bar.

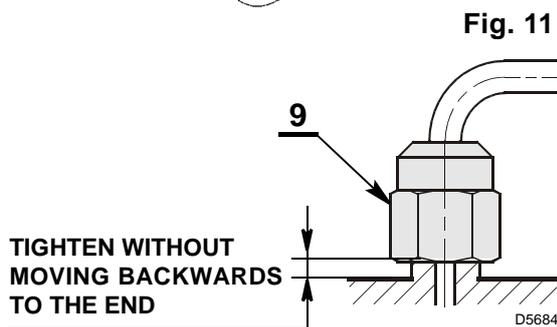
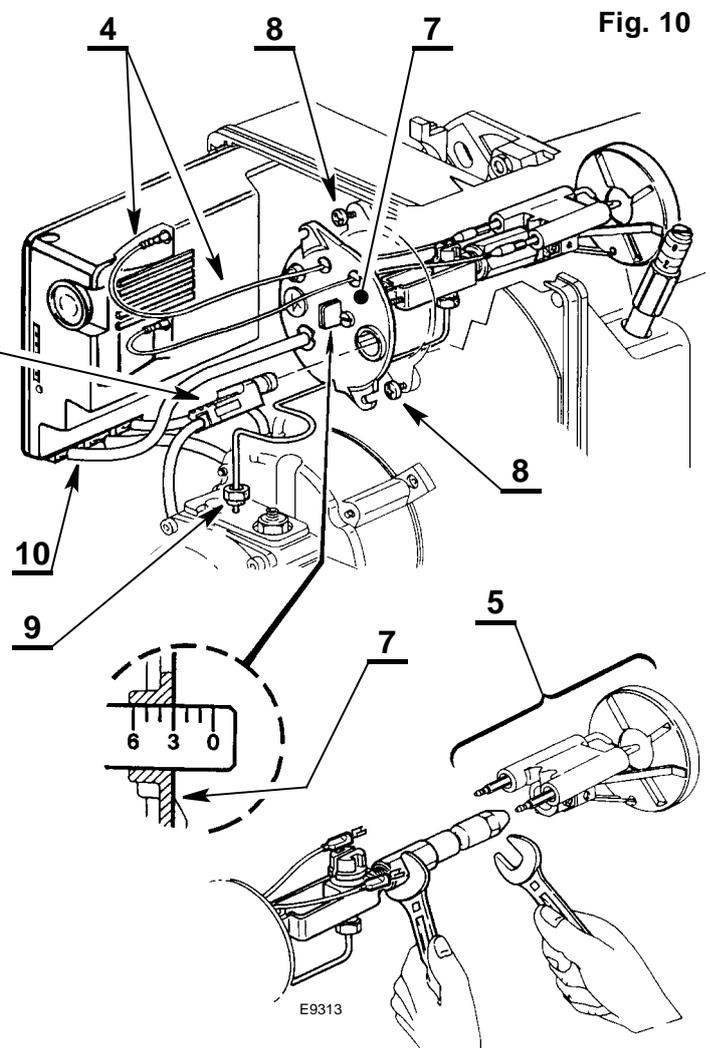
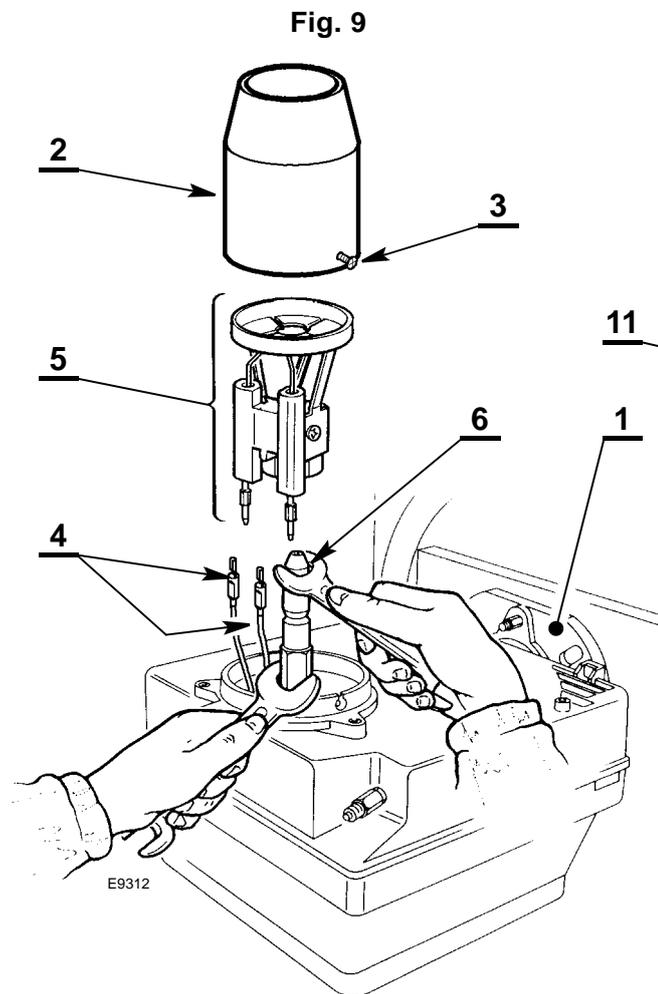
To change it act on pump pressure screw (5, fig. 4, page 5).

## 4.4 MAINTENANCE POSITION

Before performing maintenance on the burner, it is best to disconnect the system's power supply.

### ACCESSIBILITY TO THE NOZZLE, THE DIFFUSER DISC AND THE ELECTRODES IS MADE EASY IN 2 WAYS:

- Remove the burner from the boiler after having removed the fixing nuts to the flange.
  - Hook the burner onto flange (1), loosen the screws (3) and remove the nozzle (2).
  - Remove the small cables (4) from the electrodes, loosen the screw (3 fig. 13 page 9) and remove the diffuser disc-holder assembly (5) from the nozzle-holder assembly (7).
  - Screw up the nozzle (6) as shown in the figure.
  - Refit following the operations in the reverse order to the one described above.
- Remove the nozzle-holder assembly (7) after loosening the screw (8), unscrewing the nut (9), removing the small cables (4) from the control box, the flame detector (11) and the socket (10).
  - Remove the small cables (4) from the electrodes, loosen the screw (3 fig. 13 page 9) and remove the diffuser disc-holder assembly (5) from the nozzle-holder assembly (7).
  - Screw up the nozzle (6) holding the nozzle support with a spanner.
  - Refit following the operations in the reverse order to the one described above.



### ATTENTION

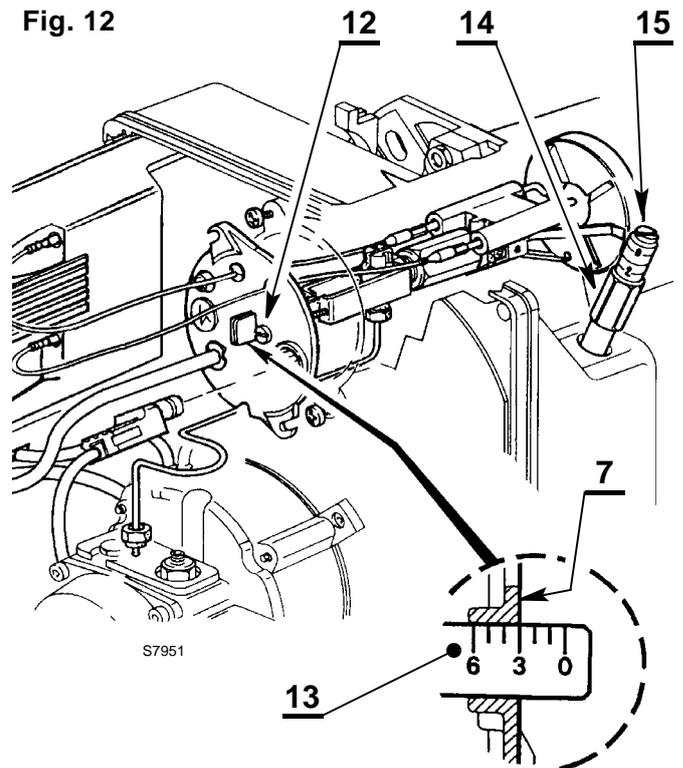
During the reassembly of the nozzle-holder assembly screw the nut (9) as shown in fig. 11.

#### 4.5 COMBUSTION HEAD ADJUSTMENT, (fig. 12)

The adjustment of the combustion head varies depending on the burner output. Do the following to adjust it:

- Rotate the setting screw (12) clockwise or counterclockwise until the set-point marked on the regulating rod (13) is level with the outside plane of the nozzle-holder assembly (7).
- In the example the regulating rod (13) is set at notch 3; this means that the burner is regulated for an output of 3,3 Kg/h with pump pressure at 12 bar and with the use of a nozzle of 0.85 GPH, as indicated in the reference table.

Fig. 12



#### 4.6 AIR DAMPER ADJUSTMENT, (fig. 12)

To regulate the air damper, do the following:

- Loosen the nut (14) and set the air damper by turning the screw (15).
- When the adjustment is completed do the nut (14) up again.

When burner shuts down the air damper automatically close still a max. chimney depressure of 0.5 mbar.

#### 4.7 ELECTRODES ADJUSTMENT, (see fig. 13)

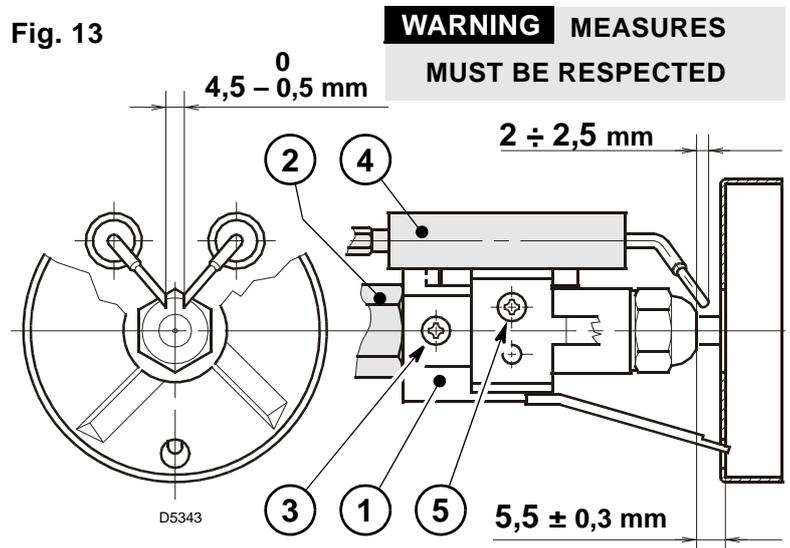
##### WARNING

Lean the diffuser disc-holder assembly (1) on the nozzle-holder (2) and lock it by screw (3).

For prospective adjustments of the electrodes assembly (4), loosen screw (5).

To have access to the electrodes carry out operation as described in **chapter "4.4 MAINTENANCE POSITION"** (page 8).

Fig. 13



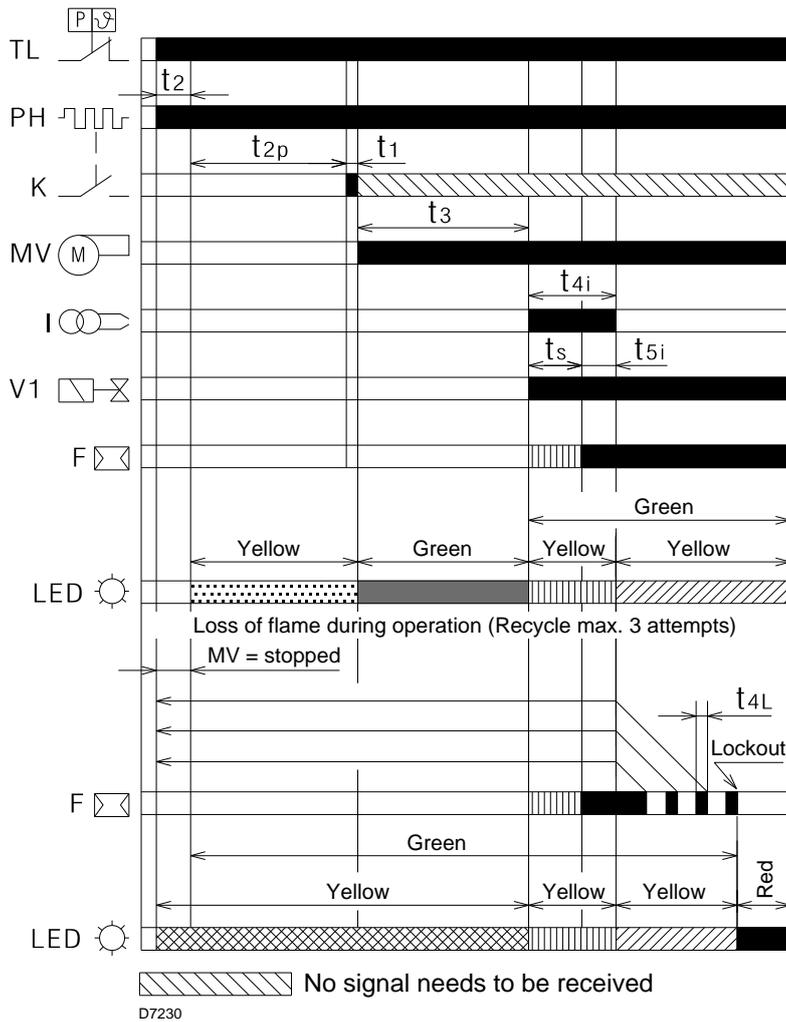
#### 4.8 FUEL HEATING

In order to assure regular ignition and working also at low temperature the burner has an oil pre-heater fitted in combustion head. The pre-heater starts when thermostats close.

When the required temperature for ignition is reached the thermostat fitted on the nozzle holder starts the burner. The pre heater remains energised during working and cuts out when burner shuts-down.

## 4.9 OPERATING PROGRAMME

### 4.9.1 NORMAL OPERATION WITH PREHEATING



#### KEY TO LAY-OUT

- F** – Flame detector
- I** – Ignition transformer
- K** – Thermostat enabling start-up after preheating
- LED** – Reset button LED indicating operating status
- MV** – Fan motor
- PH** – Oil heater
- TL** – Limit thermostat
- V1** – Oil valve

- Red
- Green + Yellow slow flashing
- Green + Yellow fast flashing
- Yellow
- Green
- Green + Yellow medium flashing
- Red + yellow fast flashing
- Yellow fast flashing

#### OPERATING TIMES

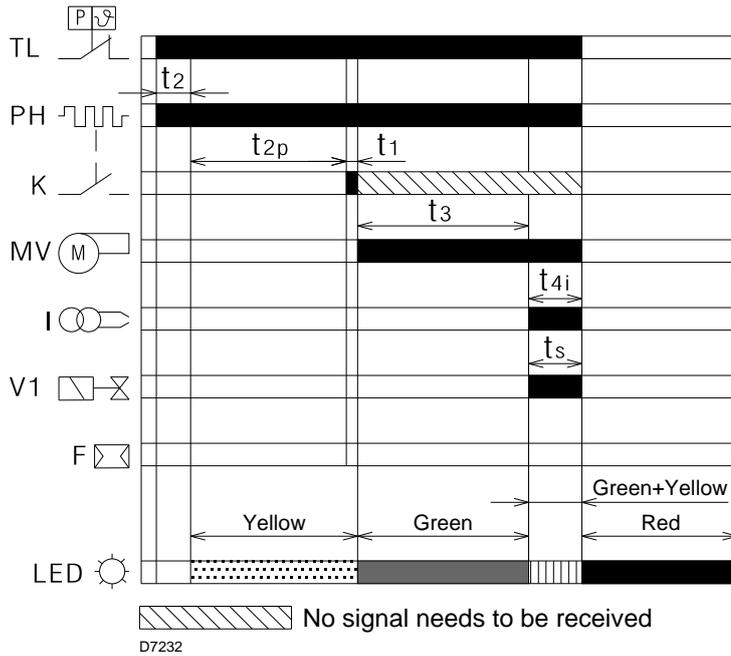
<b>t1</b>	ma x	1
<b>t1l</b>	ma x	30
<b>t2</b>	-	3
<b>t2l</b>	ma x	30
<b>t2p</b>	ma x	60 0
<b>t3</b>	-	15

<b>ts</b>	-	5
<b>t4i</b>	-	8
<b>t5i</b>	-	3
<b>t4l</b>	ma x	1
<b>t6</b>	ma x	36 0
<b>t6l</b>	ma x	30

<b>t1</b>	Standby time pending an input signal to control box: reaction time, control box takes no action for time <b>t1</b> .
<b>t1l</b>	Extraneous light detected before demand for heat: lockout occurs if light persists for time <b>t1l</b> .
<b>t2</b>	Standby time following a demand for heat: control box takes no action for time <b>t2</b> .
<b>t2l</b>	Extraneous light detected during oil preheating: lockout occurs if light persists for time <b>t2l</b> .
<b>t2p</b>	Max. preheating time: lockout occurs if thermostat <b>K</b> does not switch within time <b>t2p</b> , control box takes no action for time <b>t2p</b> .
<b>t3</b>	Pre-purging time: fan motor starts.
<b>t3l</b>	Extraneous light detected during pre-purging: immediate lockout.

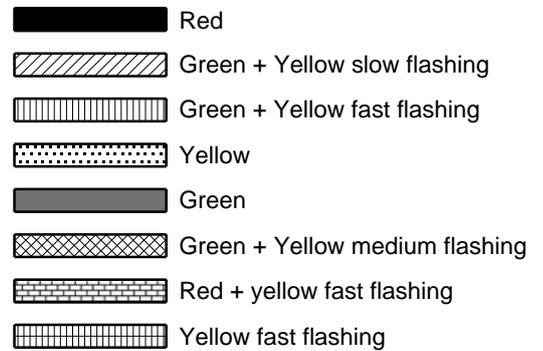
<b>ts</b>	Safety time: lockout occurs if no flame is detected by the end of time <b>ts</b> .
<b>t4i</b>	Transformer ignition time: total ignition time: <b>ts + t5i</b> .
<b>t5i</b>	Transformer post-ignition time: additional ignition time following <b>ts</b> .
<b>t4l</b>	Flame loss during operation: oil valve drop maximum reaction time, lockout occurs after 3 recycle attempts.
<b>t6</b>	Post-purging time: additional purging time when heat demand limit thermostat ( <b>TL</b> ) opens.
<b>t6l</b>	Extraneous light detected during post-purging: lockout occurs if light persists for time <b>t6l</b> .
<b>t7</b>	Long pre-purging time: pre-purging time longer than <b>t3</b> .

## 4.9.2 LOCKOUT DUE TO FIRING FAILURE

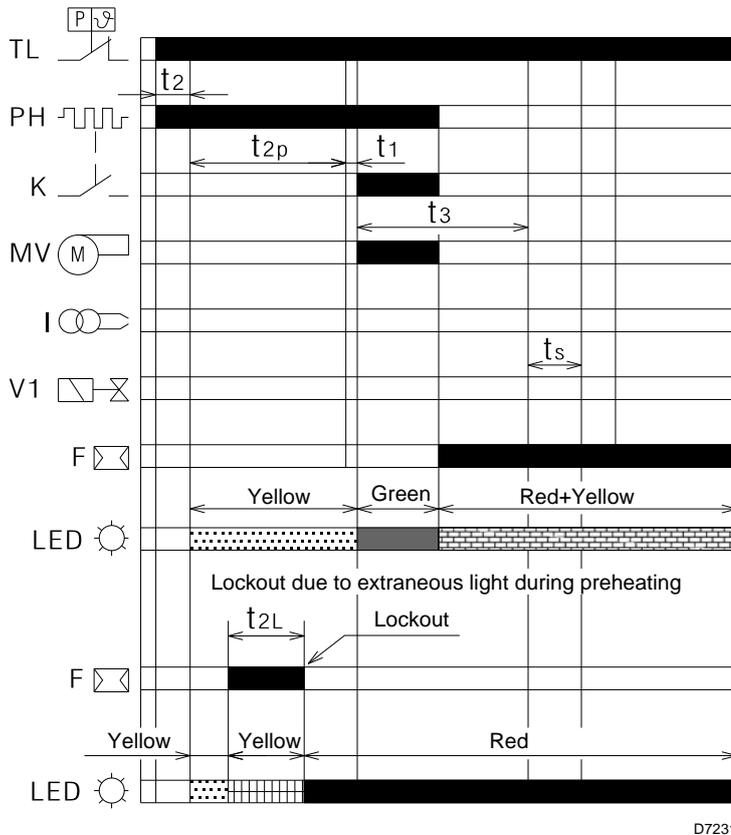


### KEY TO LAY-OUT

- F** – Flame detector
- I** – Ignition transformer
- K** – Thermostat enabling start-up after pre-heating
- LED** – Reset button LED indicating operating status
- MV** – Fan motor
- PH** – Oil heater
- TL** – Limit thermostat
- V1** – Oil valve



## 4.9.3 LOCKOUT DUE TO EXTRANEIOUS LIGHT DURING PRE-PURGING



### OPERATING TIMES

<b>t1</b>	ma x	1
<b>t1l</b>	ma x	30
<b>t2</b>	-	3
<b>t2l</b>	ma x	30
<b>t2p</b>	ma x	60 0
<b>t3</b>	-	15

<b>ts</b>	-	5
<b>t4i</b>	-	8
<b>t5i</b>	-	3
<b>t4l</b>	ma x	1
<b>t6</b>	ma x	36 0
<b>t6l</b>	ma x	30

## COLOUR CODE OF CONTROL BOX RESET BUTTON LED

Operating status	LED colour codes	Flashing speed	ON Seconds	OFF Seconds
Standby	○	LED unlit		
Preheating	●	Yellow		
Pre-purging	●	Green		
Long pre-purging	●	Green		
Transformer ignition	●	Green + Yellow flashing	Fast	0.3 0.3
Regular flame	● ●	Green + Yellow flashing	Slow	0.3 2
Post-purging	● ●	Green + Yellow		
Recycle	● ●	Green + Yellow flashing	Medium	2 1
Continuous purging (*)	●	Green		
Extraneous light during preheating or standby	●	Yellow flashing	Fast	0.3 0.3
Extraneous light during post- or continuous purging (*)	● ●	Green + Yellow flashing	Fast	0.3 0.3
Extraneous light during lockout	● ●	Red + Yellow flashing	Fast	0.3 0.3
Lockout	●	Red		
Lockout with continuous purging (*)	● ●	Red + Green		

(\*) only for applications where this is an option.

### 4.9.4 LOCKOUT TYPES AND TRIGGERING TIMES IN CASE OF BURNER MALFUNCTION

DESCRIPTION OF FAULT TYPES	LOCKOUT
Oil heater fault: starting thermostat (K) contact fails to switch	After max. 10 minutes
Extraneous light when the burner is turned on and off	After max. 30 seconds
Extraneous light detected during oil preheating	After max. 30 seconds
Extraneous light detected during pre-purging	Within 1 second
Extraneous light detected during post-purging or continuous purging (*)	After max. 30 seconds
Flame goes out during operation	After 3 recycles
No flame is detected after safety time	Immediate

(\*) only for applications where this is an option.

### 4.9.5 CONTROL BOX RESET

To carry out the control box reset, proceed as follows:

- Hold the reset button down for between 1 and 2 seconds. If the burner does not restart, you must make sure the limit point thermostat (TL) is closed.
- **If the control box reset button keeps flashing, reporting the cause of the malfunction (RED LED), you must press the button again, holding it down for no more than 2 seconds.**

### 4.9.6 RE-CYCLE FUNCTION

The control box allows re-cycling, i.e. the complete repetition of the starting programme, for 3 attempts maximum, in the event the flame goes out during operation.

If the flame goes out again, this will cause the burner to lock out. If there is a new demand for heat during the recycle, the 3 attempts are reset when the limit thermostat (TL) switches.

### 4.9.7 LOGGING OF BURNER OPERATION PARAMETERS

With this control box, data - i.e. the number of lockouts that have occurred, the type of lockout that has occurred (just the last one) and the oil valve opening operating time - can be logged even when there is no power supply. That way, you can determine how much fuel has been consumed during operation.

To view these parameters, you will need to connect the software diagnostics kit, as described in section (1.2) on page 2.

## 4.10 ADDITIONAL PROGRAMMABLE CONTROL BOX FUNCTIONS

### 4.10.1 POST-PURGING FUNCTION (t6)

Post-ventilation is a function that maintains air ventilation even after the burner is switched off. The burner switches off when the limit thermostat (TL) opens, cutting off the fuel supply to the valves.

To use this function the reset button must be pressed when the limit thermostat is not switched over (burner switched off). Post-ventilation time can be set to a maximum of **6 minutes**. Proceed as follows:

- Press and hold the reset button for at least 5 seconds till the LED indicator changes to red.
- Set the desired time pressing the button repeatedly: **once = post-ventilation for 1 minute**.
- After 5 seconds the control box automatically shows the minutes set by the red LED flashing:  
**1 pulse = post-ventilation for 1 minute**.

**To reset** this function, press and hold the button for at least 5 seconds, till the LED indicator changes to red then release it without carrying out any operation, then wait for 20 seconds for the burner to start.

If during post-purging there is a new request for heat, post-purging time is halted and a new operating cycle starts when the limit thermostat (TL) switches over.

If there is extraneous light during post-purging, the burner locks out after 30 seconds.

The control box leaves the factory with the following setting: **0 minutes = no post-purging**.

### 4.10.2 CONTINUOUS PURGING FUNCTION, (only for applications where this is an option)

Continuous purging is a function that keeps air purging on regardless of whether burner ignition is being requested. As soon as this mode is set, the motor keeps running both when the limit thermostat (TL) is not switched (burner off) and when the burner is locked out.

Only when the limit thermostat (TL) switches will the motor stop for the standby time of 4 seconds (standby position =  $t_2 + t_1$ ).

The function can be set with the reset button, when the limit thermostat (TL) is not switched (burner off), following the procedure in section 4.10.1 post-purging function, by pressing the button **7 times = continuous purging**. **To reset** this function, simply hold the button down for 5 seconds until the indicator LED goes red and release it without performing any operation, then wait at least 20 seconds to allow the burner to restart. If there is extraneous light when the limit thermostat (TL) switches, the motor stops for as long as the extraneous light persists, after which there is a lockout.

The control box's factory setting is as follows: **0 minutes = no continuous purging**.

### 4.10.3 LONG PRE-PURGING FUNCTION (t7)

Long pre-purging is a feature that can be used to lengthen the air purging period to 2 minutes from when the limit thermostat (TL) switches to when the flame ignites. The function can be set with the reset button, when the limit thermostat (TL) is not switched (burner off), following the procedure in section 4.10.1 post-purging function, by pressing the button **8 times = long pre-purging**.

**To reset** this function, simply hold the button down for 5 seconds until the indicator LED goes red and release it without performing any operation, then wait at least 20 seconds to allow the burner to restart.

The control box's factory setting is as follows: **0 minutes = no long pre-purging**.

### 4.10.4 FUNCTION SETTING PROCEDURE USING RESET BUTTON

Control box function	Action with reset button	Reset button in enabled status
Reset	1 to 2 seconds	After control box lockout
Visual diagnostics of lockout causes (5.1)	3 seconds	After control box lockout
Post-purging (4.10.1)	5 seconds then press once = 1 minute	With limit thermostat (TL) not switched (burner off)
Continuous purging (4.10.2) (only for applications where this is an option)	5 seconds then press 7 times = continuous purging	With limit thermostat (TL) not switched (burner off)
Long pre-purging (4.10.3)	5 seconds then press 8 times = long pre-purging	With limit thermostat (TL) not switched (burner off)
Resetting set functions	5 seconds	With limit thermostat (TL) not switched (burner off)
Resetting operation parameters	5 seconds	With limit thermostat (TL) switched during pre-purging

## 5. MAINTENANCE

**Disconnect the electric supply to the burner by switching off the main power switch and close the light oil shut-off valve before maintaining or checking the system.**

The burner requires scheduled maintenance that must be carried out by qualified personnel and in compliance with local legislation.

Scheduled maintenance is vital for the smooth operation of the burner; it avoids waste of fuel and reduces harmful emissions into the atmosphere.

### THE FUNDAMENTAL OPERATIONS TO CARRY OUT ARE AS FOLLOWS:

- Check there are no occlusions or obstructions in the inlet or return pipes, in the air suction areas and in the combustion product waste pipe.
- Check that the positioning of the combustion head is correct and that it is properly fixed to the boiler.
- Clean the combustion head at the fuel outlet.
- Clean the fuel suction line filter and the pump filter.
- Check that the burner electrical connections are correct.
- Clean the flame detector.
- Check for correct fuel consumption.
- Check the combustion head (fig. 12, page 9) and the air damper are set correctly (fig. 12, page 9).
- Replace the nozzle if necessary (fig. 9 and 10, page 8) and check the correct position of electrodes (fig. 13, page 9).
- Clean the fan.

Leave the burner working without interruptions for 10 min. and check the right settings at 1<sup>st</sup> and 2<sup>nd</sup> stage of all components stated in this manual. **Then carry out the analysis of the combustion by checking:**

- Smoke index as per the Bacharach scale;
- CO<sub>2</sub> percentage (%);
- CO content (ppm);
- NO<sub>x</sub> content (ppm);
- Smoke temperature at the chimney.

### 5.1 CONTROL BOX VISUAL DIAGNOSTIC

The control box has a diagnostic function that can identify the likely causes of any malfunctions (indicator: **RED LED**).

In order to be able to use this function, press and hold the reset button for at least 3 seconds from when the appliance is made safe (**lock-out**).

The control box sends a sequence of pulses that are repeated at 2-second intervals.



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

SIGNAL	PROBABLE CAUSE
2 pulses ● ●	The flame does not stabilise at the end of the safety time: <ul style="list-style-type: none"> <li>– flame detector faulty or dirty;</li> <li>– oil valve faulty or dirty;</li> <li>– faulty ignition transformer;</li> <li>– poor burner regulation.</li> </ul>
4 pulses ● ● ● ●	Light present in the chamber before the burner's switching on or off: <ul style="list-style-type: none"> <li>– presence of a strange light before or after the limit thermostat switching over;</li> <li>– presence of a strange light during pre-purging;</li> <li>– presence of a strange light during post-ventilation.</li> </ul>

SIGNAL	PROBABLE CAUSE
7 pulses ● ● ● ● ● ● ●	Loss of flame during operations: – poor burner regulation (insufficient gas); – oil valve faulty or dirty; – flame detector faulty or dirty.
8 pulses ● ● ● ● ● ● ● ●	Check and monitor oil heater (if fitted): – heater or control thermostat faulty.

**ATTENTION** To reset the control box after the diagnostics display, press the lockout-reset button.

## 6. FAULTS / SOLUTIONS

Below is a list of some of the causes and possible solutions to a series of problems that might be encountered and could cause a failure to start or irregular burner operation.

A fault usually makes the lock-out lamp light which is situated inside the reset button of the control box (3, fig. 1, page 2).

When lock out lamp lights the burner will attempt to light only after pushing the reset button. After this if the burner functions correctly, the lock-out can be attributed to a temporary fault.

However, if lockout continues, you must determine the cause of the problem and take the action illustrated in the solution column in the tables below.

### 6.1 START-UP PROBLEMS

FAULT	POSSIBLE CAUSES	SOLUTION
<b>The burner doesn't start when the limit thermostat closes.</b>	Lack of electrical supply.	Check presence of voltage in the L1 - N clamps of the 7 pin plug.
		Check the conditions of the fuses.
		Check that safety thermostat is not lock out.
	Heating and start thermostats are faulty.	Replace them.
	The connections in the control box are wrongly inserted.	Check and connect completely all the plugs.
<b>The burner goes in safety lock-out before or during the pre-purge phase.</b>	The flame detector sees strange light.	Eliminate the light.
<b>Burner runs normally in the prepurge and ignition cycle and locks out after 5 seconds ca.</b>	The flame detector is dirty.	Clear it.
	The flame detector is defective	Change it.
	Flame moves away or fails.	Check pressure and output of the fuel.
		Check air output.
	Change nozzle.	
	Check the coil of solenoid valve.	

FAULT	POSSIBLE CAUSES	SOLUTION
<b>Burner starts with an ignition delay.</b>	The ignition electrodes are wrongly positioned.	Adjust them according to the instructions of this manual.
	Air output is too high.	Set the air output according to the instructions of this manual.
	Nozzle dirty or worn.	Replace it.

## 6.2 OPERATING IRREGULARITIES

FAULT	POSSIBLE CAUSES	SOLUTION
<b>Burner locks out during operation.</b>	Flame disappears 4 times.	Clean or replace flame detector.
		Replace dirty or deteriorated nozzle.
	Does not shut down.	Check efficiency of flame detector.
		Check efficiency of pressure regulator's piston.
		Check efficiency of pump's on-off valve.

## 7. WARNINGS AND SAFETY

The dimension of the boiler's combustion chamber must respond to specific values, in order to guarantee a combustion with the lowest polluting emissions rate.

You are therefore advised to consult the Technical Assistance Department before choosing this type of burner for the combination with a boiler. Qualified personnel are those with the professional and technical requirements indicated by law no. 46 dated March 5, 1990 n° 46.

The commercial organisation has a widespread network of agencies and technical offices whose personnel participates periodically in instructional and refresher courses at the company training centre.

This burner must only be used for the purposes it has specifically been designed for.

All contractual and other liability on the part of the manufacturer is excluded for injury caused to people, animals or damage caused to property due to faulty installation, calibration, adjustment, maintenance or improper use.

### 7.1 BURNER IDENTIFICATION

The Identification Plate on the product gives the serial number, model and main technical and performance data. If the Identification Plate is tampered with, removed or missing, the product cannot be clearly identified thus making any installation or maintenance work potentially dangerous.

### 7.2 BASIC SAFETY MEASURES

- Children or inexpert persons must not use the appliance.
- Under no circumstances must the intake grids, dissipation grids and ventilation vents in the installation room be covered up with cloths, paper or any other material.
- Unauthorised persons must not attempt to repair the appliance.
- It is dangerous to pull or twist the electric leads.
- Cleaning operations must not be performed if the appliance is not disconnected from the main power supply.
- Do not clean the burner or its parts with inflammable substances (e.g. petrol, alcohol, etc.). The cover must be cleaned with soapy water.
- Do not place anything on the burner.
- Do not block or reduce the size of the ventilation vents in the installation room.
- Do not leave containers and inflammable products in the installation room.

---

**RIELLO**

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