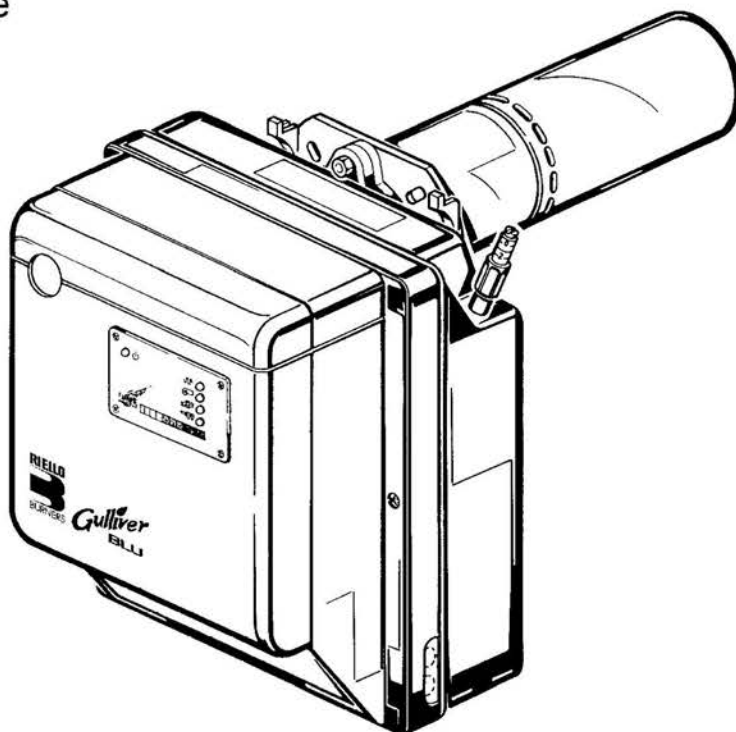




- I Bruciatori di gasolio**
- D Öl-Gebläsebrenner**
- F Brûleurs fioul**
- GB Oil burners**

Funzionamento monostadio
 Einstufiger Betrieb
 Fonctionnement à 1 allure
 One stage operation



Gulliver
BLU

CODICE CODE	MODELLO - MODELL MODELE - MODEL	TIPO - TYP TYPE
3737150	BG1	371 T1
3737151	BG1E Con /mit /avec/with FLAME MONITOR	371 T1
3737250	BG2	372 T1
3737251	BG2E Con /mit /avec/with FLAME MONITOR	372 T1
3737350	BG3	373 T1
3737351	BG3E Con /mit /avec/with FLAME MONITOR	373 T1

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1. BURNER DESCRIPTION

One stage gas oil burner with low pollutant emissions (Nitric Oxide NO_x, Carbon monoxide CO and unburnt Hydrocarbons), in conformity with the environmental mark "Blauer Engel" RAL-UZ9, Edition February 2001.

The burner has a device (compensator) which is integral with the air damper that sets the air output. This device keeps the oxygen level as necessary for the combustion despite any changing of the room temperature.

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.

The RIELLO Technical Service Personnel will be glad to give you all the information for a correct matching of this burner to the boiler.

- 1 – Oil pump
- 2 – Air damper adjustment assembly
- 3 – Nozzle holder assembly
- 4 – Flange with insulating gasket
- 5 – Control-box
- 6 – Reset button with lock-out lamp
- 7 – Flame detector
- 8 – Temperature probe of the compensator

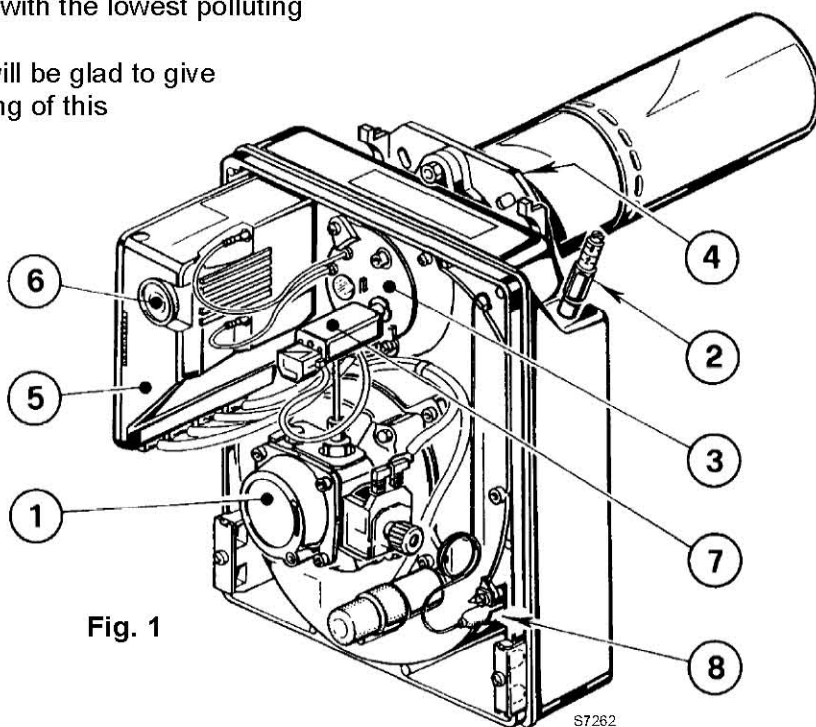


Fig. 1

- The burner meets protection level of IP 40, EN 60529.
- Burner with CE marking in conformity with EEC directives: EMC 89/336/EEC, Low Voltage 73/23/EEC, Machines 98/37/EEC and Efficiency 92/42/EEC.
- CE Certification No.: 0036 0264/99 (371T1) – 0036 0265/99 (372T1) – 0036 0266/99 (373T1), as 92/42/EEC.
- BUWAL approval No. 192016 (371T1- 372T2).

1.1 BURNER EQUIPMENT

Flange with insulating gasket . . . No. 1
Screw and nuts for flange No. 1

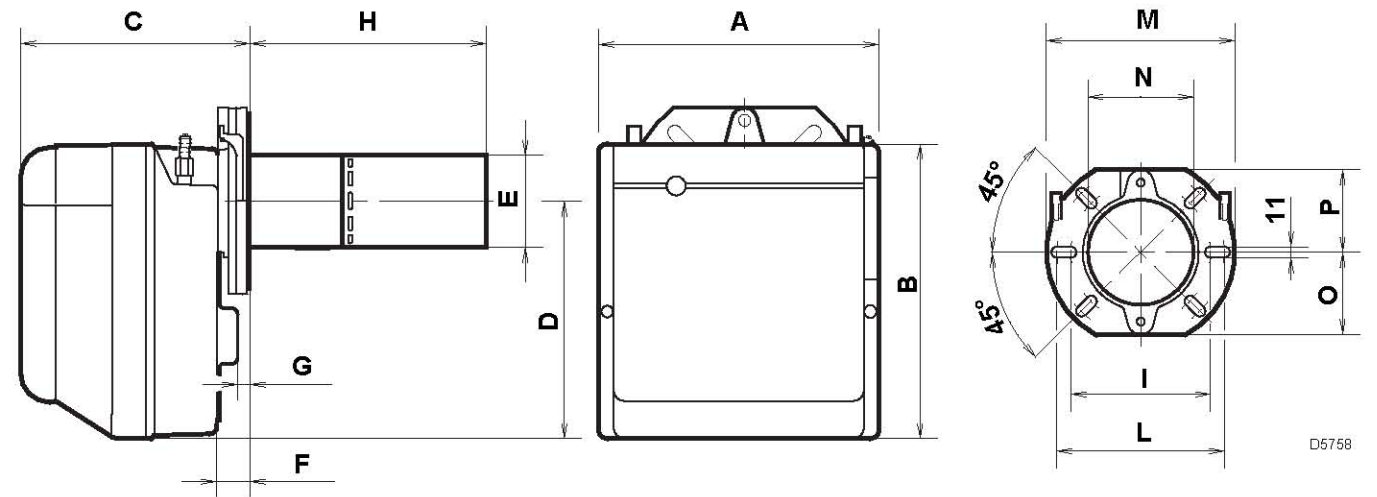
Screw and nuts for flange to be fixed to boiler . . . No. 4
Flexible oil pipes with nipples No. 2

2. TECHNICAL DATA

2.1 TECHNICAL DATA

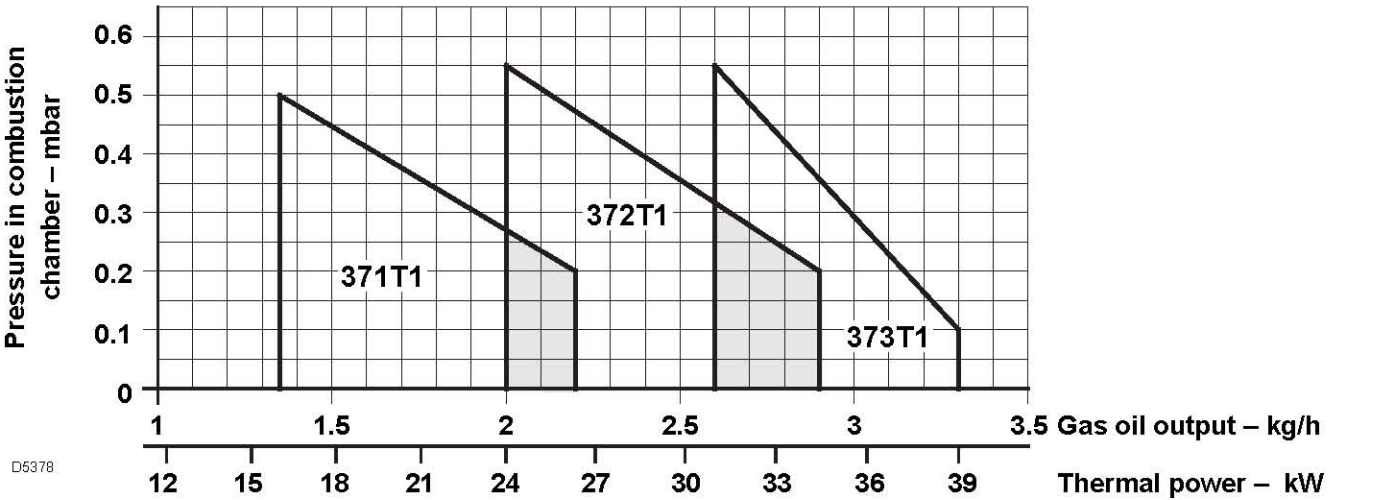
TYPE		371 T1	372 T1	373 T1
Output	kg/h	1.35 – 2.2	2 – 2.9	2.6 – 3.3
Thermal power	kW	16 – 26	24 – 34.5	31 – 39
Fuel	Gas oil, viscosity 4 – 6 mm ² /s at 20 °C			
Electrical supply	Single phase, 230V ± 10% ~ 50Hz			
Motor	Run current 0.85A – 2750 rpm – 289 rad/s			
Capacitor	4 µF			
Ignition transformer	Secondary 8 kV – 16 mA			
Pump	Pressure 8 – 15 bar			
Absorbed electrical power	kW	0.27	0.27	0.28

2.2 OVERALL DIMENSIONS



TYPE	A	B	C	D	E	F	G	H	I	L	M	N	O	P
371 T1	255	280	199	230	80	25	7	280.5	130	150	180	91	72	72
372 T1	255	280	202	230	89	28	10	287.5	140	168	189	106	83	83
373 T1	255	280	202	230	89	28	10	287.5	140	168	189	106	83	83

2.3 WORKING FIELD (as EN 267)



3. INSTALLATION

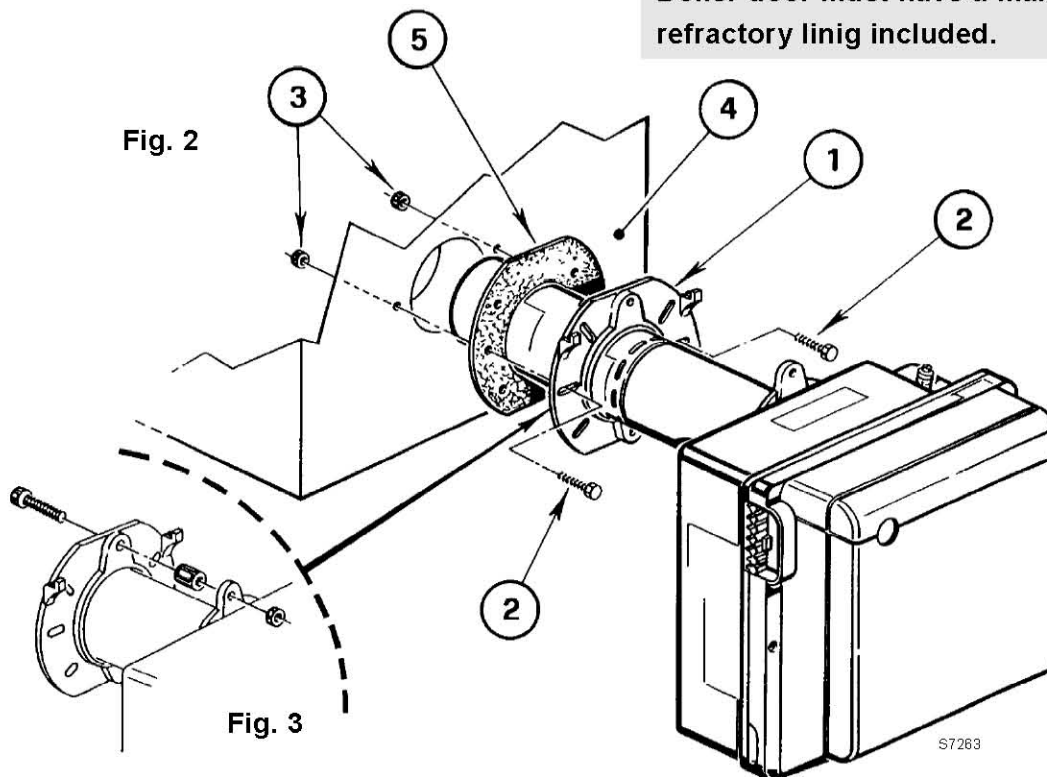
THE BURNER MUST BE INSTALLED IN CONFORMITY WITH LEGISLATION AND LOCAL STANDARDS.

3.1 BOILER FIXING

- Put on the flange (1) the screw and two nuts (see fig. 3).
- Widen, if necessary, the insulating gasket holes (5) (see fig. 4).
- 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).

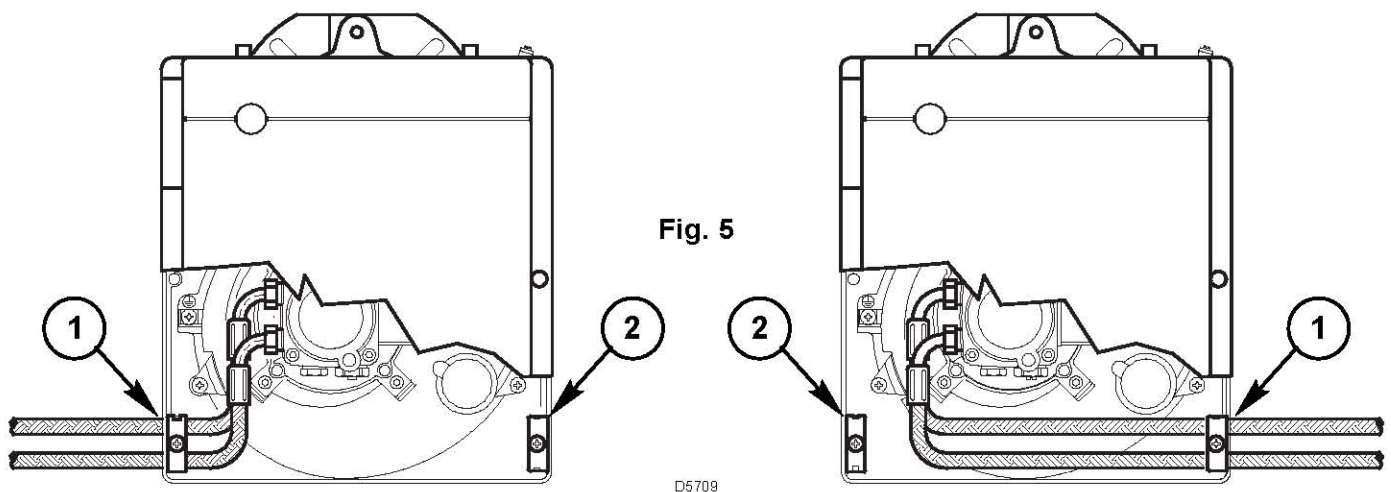
IMPORTANT

Boiler door must have a max. thickness of 100 mm, refractory lining included.



3.2 FUEL SUPPLY

The burner is designed to allow entry of the oil supply pipes on either side. Depending on the oil supply pipes position (to the right or to the left hand side of the burner) the fixing plate (1) and closing plate (2) should be reversed (see fig. 5).



3.3 HYDRAULIC SYSTEMS

WARNING:

- Before starting the burner make sure that the return pipe-line is not clogged. An excessive back pressure would cause the damage of the pump seal.
- The pump is designed to allow working with two pipes. 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 again the plug (2). (See fig. 7).

**SYSTEM NOT PERMITTED
IN GERMANY**

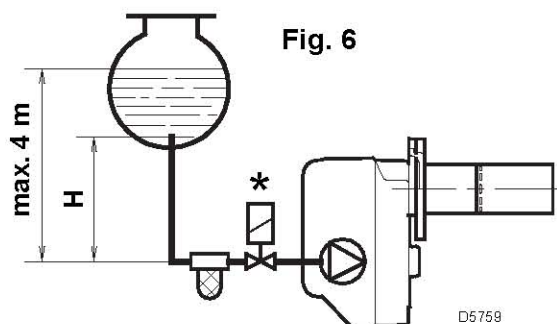


Fig. 6

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

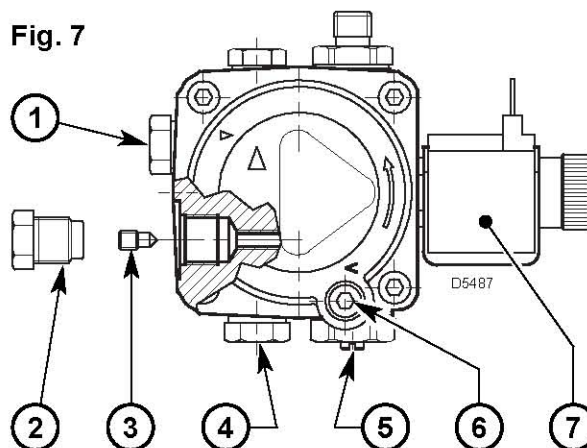


Fig. 7

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

PRIMING PUMP:

On the system in fig. 6 it is sufficient to loosen the suction gauge connection (6, fig. 7) and wait until oil flows out.

On the systems in fig. 8 and 9 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. 9) 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

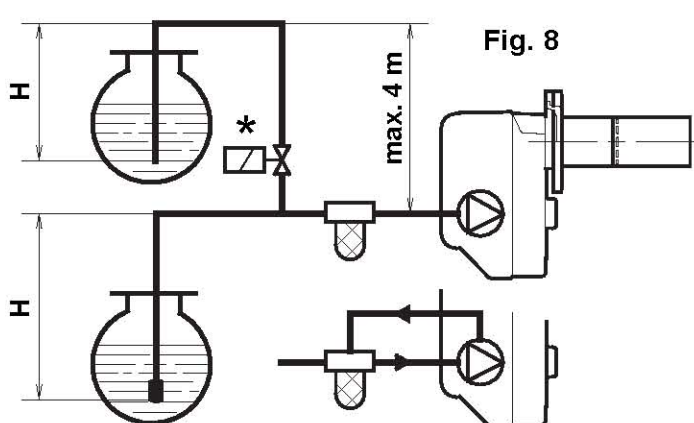


Fig. 8

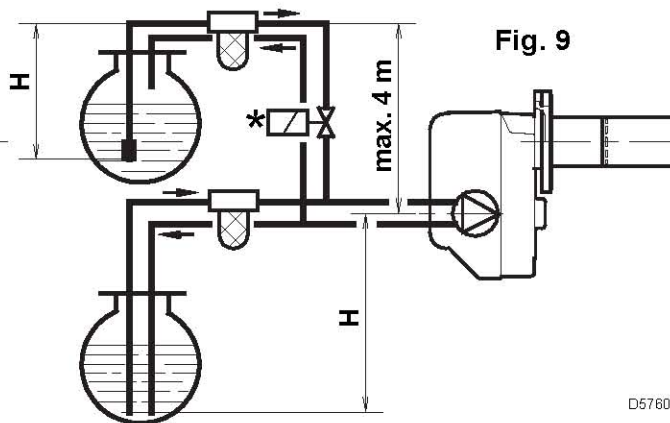


Fig. 9

It is necessary to install a filter on the fuel supply line.

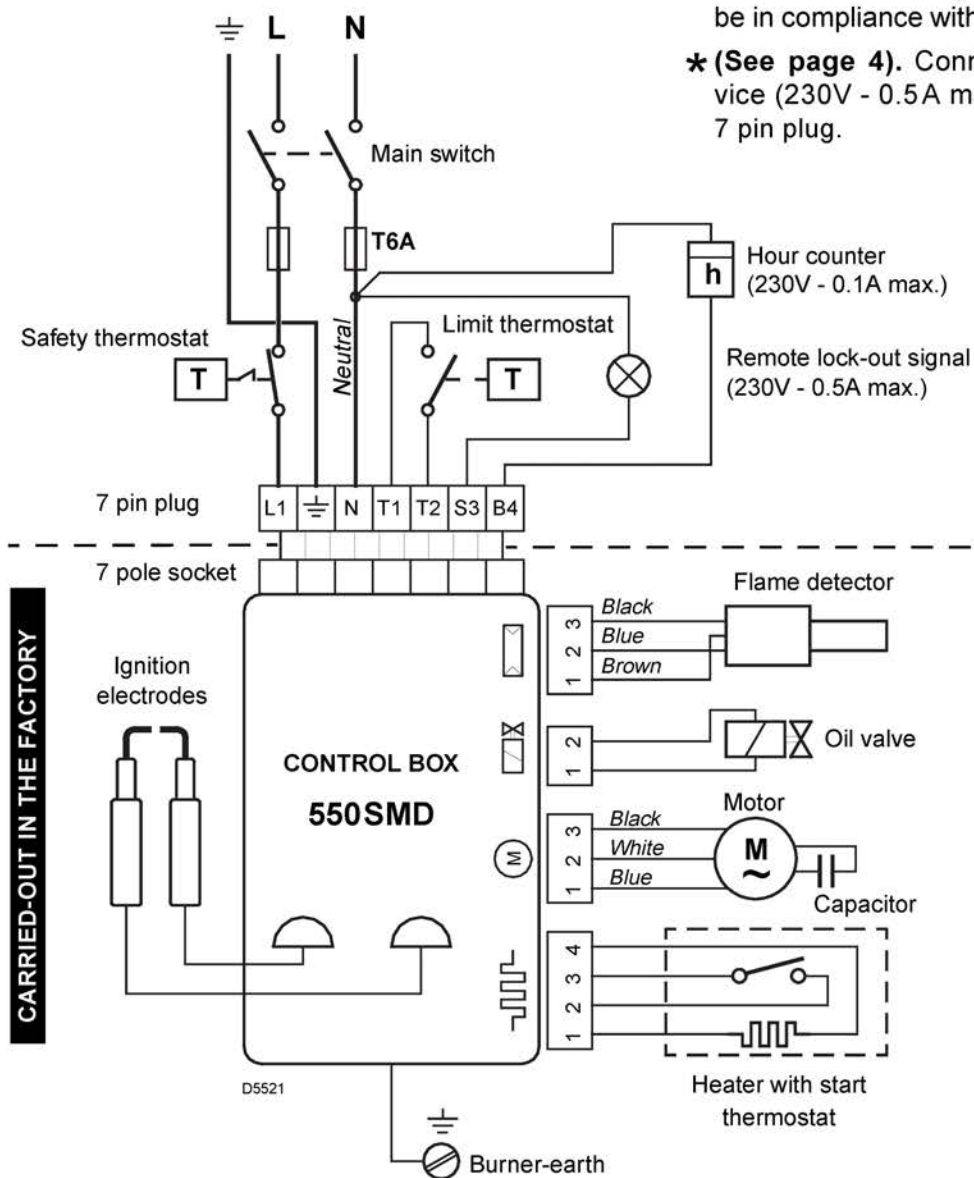
* **ONLY FOR ITALY:** Automatic shut-off device as per Ministry of Internal Affairs' regulation no. 73 dated 7/29/71.
H = difference of level; L = max. length of the suction line; I. D. = internal diameter of the oil pipes.

3.4 ELECTRICAL WIRING

WARNING

DO NOT EXCHANGE NEUTRAL WITH PHASE

230V ~ 50Hz



NOTES:

- Wires of min. 1 mm² section. (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.
- ★ (See page 4). Connect the automatic shut-off device (230V - 0.5A max.) to the clamps **N - T2** of the 7 pin plug.

TESTING:

Check the shut-down of the burner by opening the thermostats and the lock-out by **darkening** the flame detector.

CARRIED-OUT IN THE FACTORY

FLAME DETECTOR

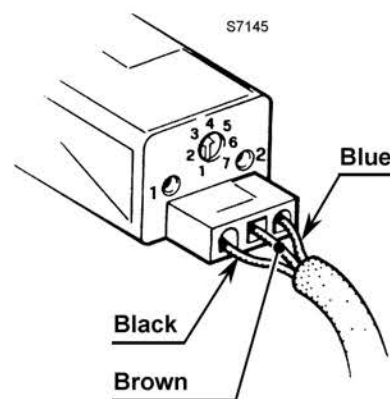
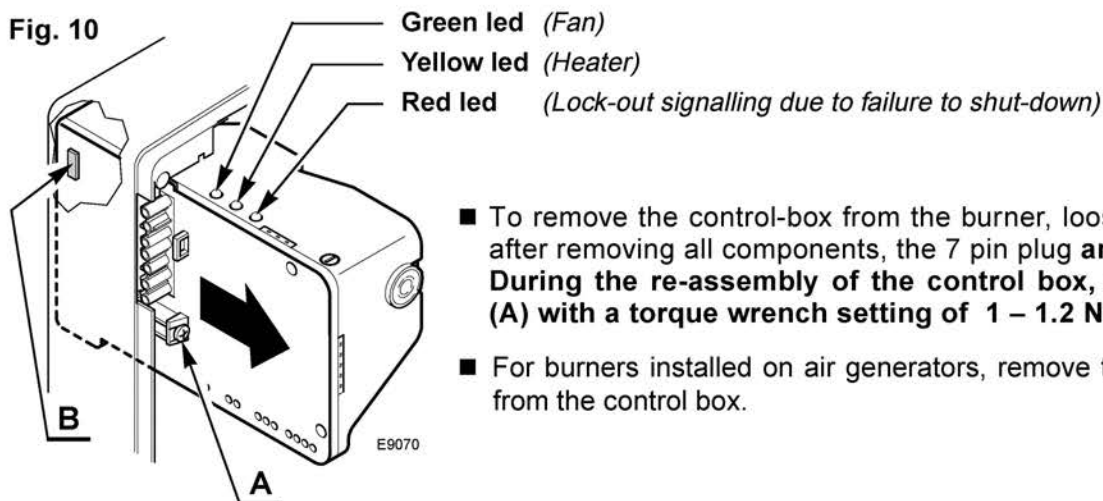


Fig. 10



- To remove the control-box from the burner, loosen screw (A, fig. 10) after removing all components, the 7 pin plug and earth wire. During the re-assembly of the control box, retighten the screw (A) with a torque wrench setting of 1 – 1.2 Nm.
- For burners installed on air generators, remove the bridge (B, fig. 10) from the control box.

4. WORKING

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 CO₂ 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 air damper opening in accordance with the following schedule:

TYPE	Nozzle 1		Pump pressure 2	Burner output	Air damper adjustment 3
	GPH	Angle	bar	kg/h $\pm$ 4%	Set-point
371T1	0.40	80°	12	1.35	0.25
	0.50	80°	12	1.7	1.1
	0.60	80°	12 / 14	2.0 / 2.2	2.0
372T1	0.60	80°	12	2.0	1.1
	0.65	80°	12	2.3	2.0
	0.75	80°	12	2.9	2.5
373T1	0.75	80°	11	2.6	2.2
	0.85	80°	12	3.0	2.9
	0.85	80°	14	3.3	4.0

In the output range from 1.35 to 3.3 kg/h and using the u. m. nozzles (with filter Delavan DROPSTOP type 60030), it has been reached the combustion values as per RAL-UZ 9, Edition February 2001 (environmental mark - GERMANY):

Type 371T1: Delavan 0,40 GPH - 80° W
Delavan 0,50 GPH - 80° W
Delavan 0,60 GPH - 80° W

Type 372T1: Delavan 0,60 GPH - 80° W
Delavan 0,65 GPH - 80° W
Delavan 0,75 GPH - 80° W

Type 373T1: Delavan 0,75 GPH - 80° W
Delavan 0,85 GPH - 80° W

1 NOZZLES TO BE USED: Delavan 80° W with filter DROPSTOP type 60030.

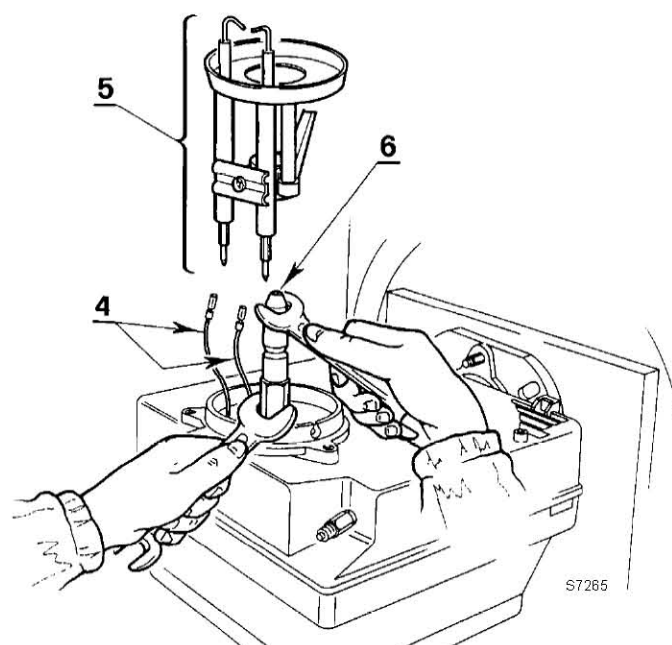
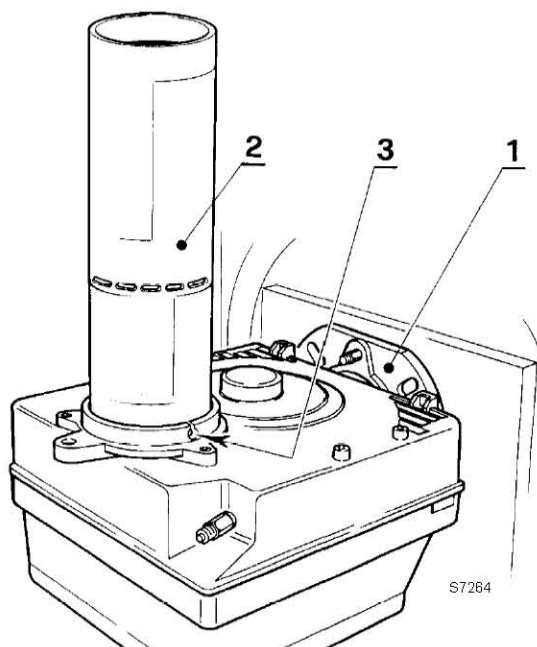
MAINTENANCE POSITION

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

A Fig. 11 –Remove the burner out of the boiler, after loosing the fixing nut to the flange.

- Hook the burner to the flange (1), by removing the flame tube (2) after loosening the fixing screws (3).
- Remove the small cables (4) from the electrodes and the diffuser disc-holder assembly (5) from the nozzle-holder assembly after loosening its fixing screw (3, fig. 15, page 8).
- Screw the nozzle (6) correctly and tighten it as shown in the figure.

Fig. 11



A Fig. 12 –Remove nozzle-holder assembly (1) after loosening screws (2) and nut (3), remove the small cables (6) from the control box, the socket (4) and the flame detector (5).

- Withdraw the small cables (6) from the electrodes, remove the diffuser disc-holder assembly (9) from the nozzle-holder assembly (1) after loosening screw (3, fig. 15, page 8).
- Screw the nozzle (10) correctly and tighten it as shown in figure.

ATTENTION

- During the reassembly of the nozzle-holder assembly screw the nut (3) as shown in the fig. 13.
- In order to guarantee the sealing of the fan in its seat, make sure that there is at least 1 mm of spring tension between nozzle-holder assembly and casing.
Therefore the fixing split pin (11) will have to be extended at least of 1 mm beyond the flange of the nozzle-holder assembly.

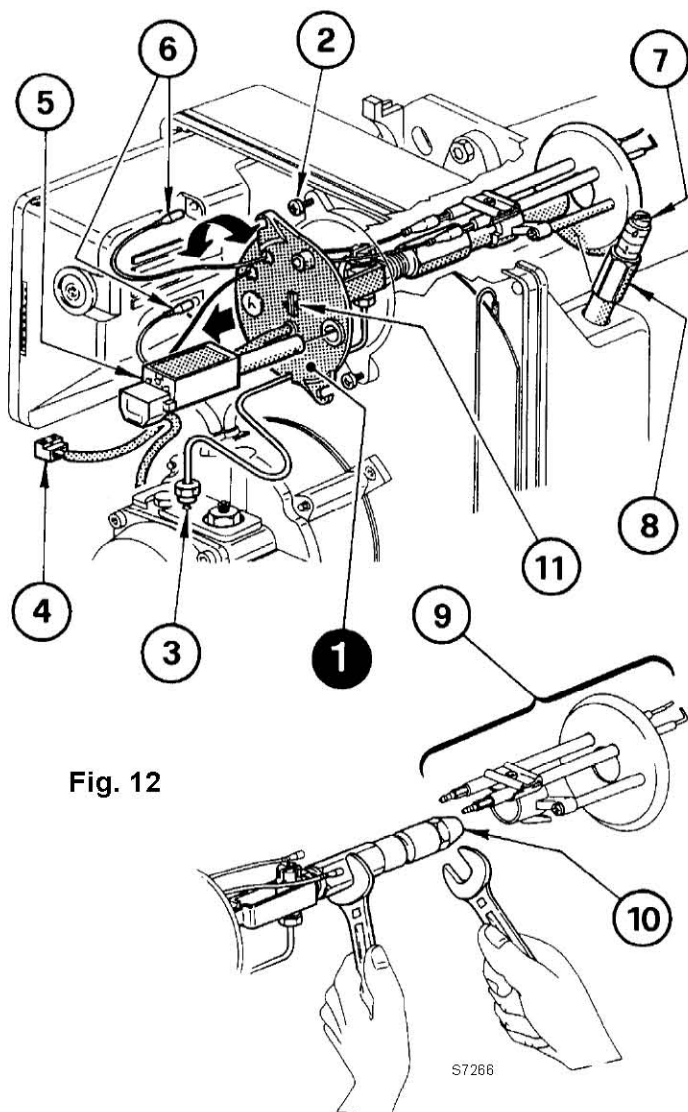


Fig. 12

2 PUMP PRESSURE

- 12 bar: the pump leaves the factory set at this value.
To change it act on pump pressure adjust screw (5, fig. 7, page 4).

3 AIR DAMPER ADJUSTMENT

(See fig. 12)

- To vary the setting adjust the screw (7) after loosening the nut (8).
- Values in the table refer to 12% CO₂ and to sea level.
- When burner shuts down the air damper automatically close still a **max. chimney depression of 0.5 mbar**.

SLOTS SETTING FOR THE FLUE GASES RECIRCULATING (see fig. 14)

The flame tube is equipped with a device for the slots setting for the flue gases recirculating; this recirculating system allows to reduce the pulsations of the burner during the start.

The burner leaves the factory with the slots completely opened.

This setting requires the following operations:

- Loosen the screw (1).
- Turn the ring (2) closing the slots in part until to eliminate the pulsations verifying that the combustion values meet the limits stated by the standards in force.
- Tighten the screw (1).

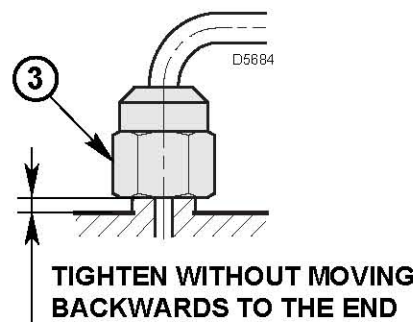


Fig. 13

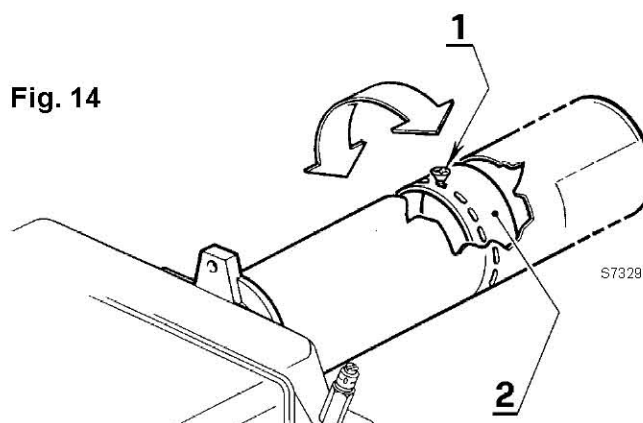


Fig. 14

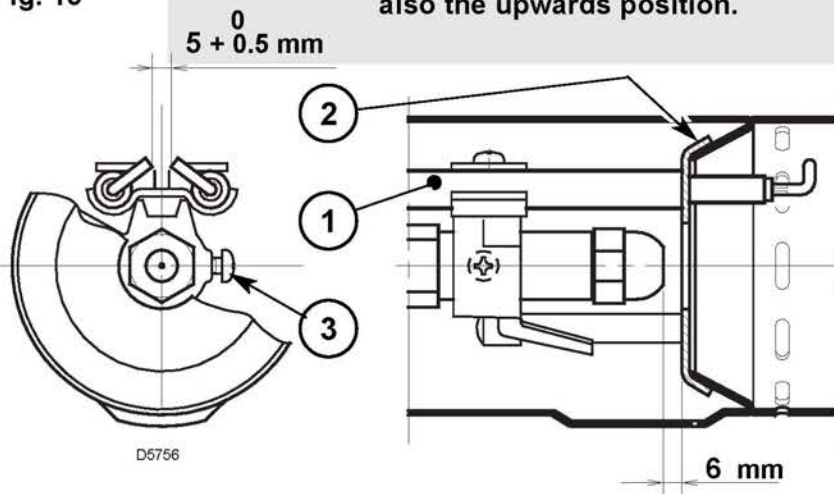
4.2 ELECTRODES ADJUSTMENT

ATTENTION

Lean insulators (1) to disc (2),
(see fig. 15).

To have access to the electrodes carry out operation as described in chapter 4.1 (page 6) "NOZZLES TO BE USED".

Fig. 15



ATTENTION

Measures must be respected and also the upwards position.

4.3 FLAME DETECTOR ADJUSTMENT, (see fig. 16)

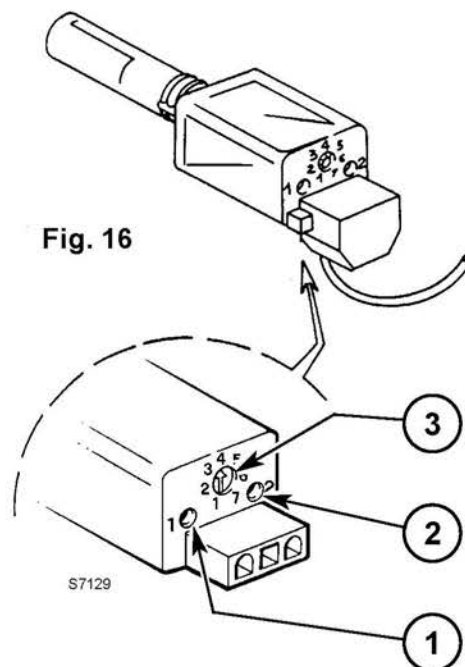
The sensitivity of the flame detector can be adjusted with a potentiometer (3). It is factory-set in position 4.

Led (1) indicates the sensitivity.

Led (2) indicates the operation.

- During pre-ventilation both leds are switched off.
- Optimal sensitivity during stable operation is shown when both leds are switched on.
- If led (1) pulsates, turn the potentiometer until it switches on in a steady manner. Then, first turn the pointer counterclockwise until the led pulsates. Next, increase the sensitivity by turning the pointer clockwise one or two notches.
- Wait at least 5 minutes, then make sure that the adjustment done as above allows a correct starting program of the burner.

Fig. 16

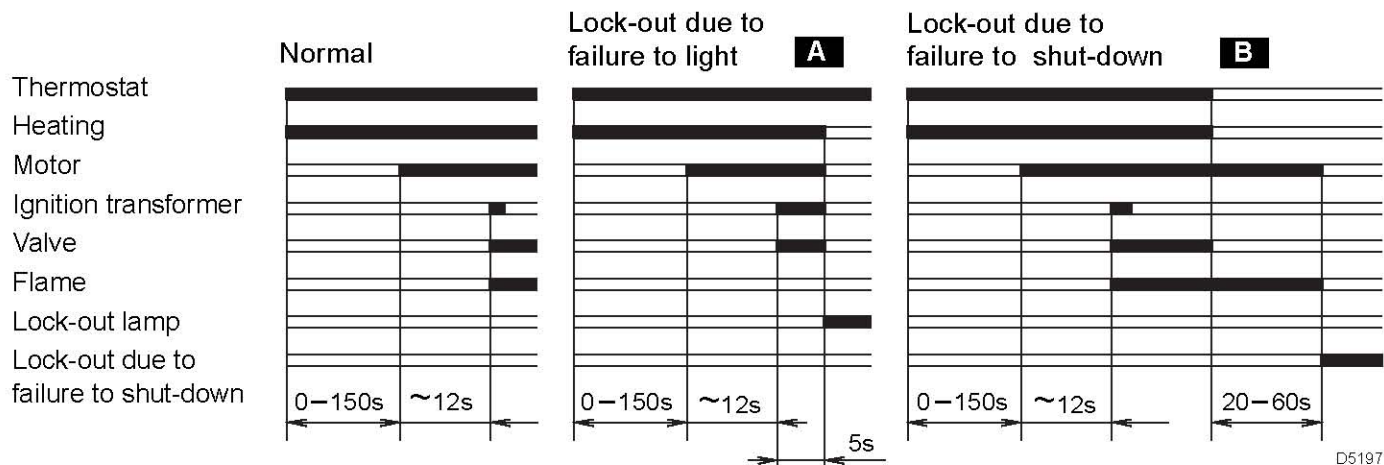


4.4 FUEL HEATING

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.

4.5 BURNER START-UP CYCLE



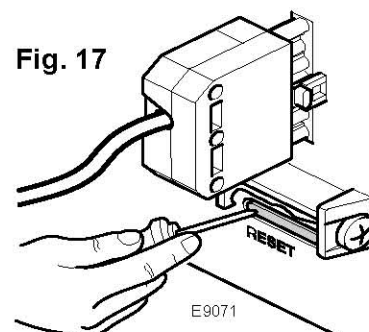
A Lock out is indicated by a lamp on the control box (6, fig. 1, page 1).

B In this case the burner will not reset because there is a serious fault.

CALL THE SERVICE AGENT

The authorized service agent must:

- Restore the working by moving backward the control box, **keeping it supplied** and acting on the reset tongue (see fig. 17).
- Check the efficiency of:
 - Flame detector (7, fig. 1, page 1).
 - Pump: interception valve (7), or pressure adjuster piston (5), see fig. 7, page 4.



5. MAINTENANCE

The burner requires periodic maintenance carried out by a qualified and authorised technician **in conformity with legislation and local standards**.

Maintenance is essential for the reliability of the burner, avoiding the excessive consumption of fuel and consequent pollution.

Before carrying out any cleaning or control always first switch off the electrical supply to the burner acting on the main switch of the system.

THE BASIC CHECKS ARE:

- Check that there are not obstructions or dents in the supply or return oil pipes.
- Clean the flame detector (7, fig. 1, page 1).
- Clean the filter in the oil suction line and in the pump.
- Check for correct fuel consumption.
- Replace the nozzle, (see fig. 11, page 6) and check the correct position of electrodes (fig. 15, page 8).
- Clean the combustion head in the fuel exit area, on the turbulating disc.
- Leave the burner working without interruptions for 10 min. and set rightly all the components stated in this manual. **Then carry out a combustion check verifying:**
 - Smoke temperature at the chimney;
 - Content of CO₂ (%);
 - Content of CO (ppm);
 - Smoke value according to opacity smokes index according to Bacharach scale.

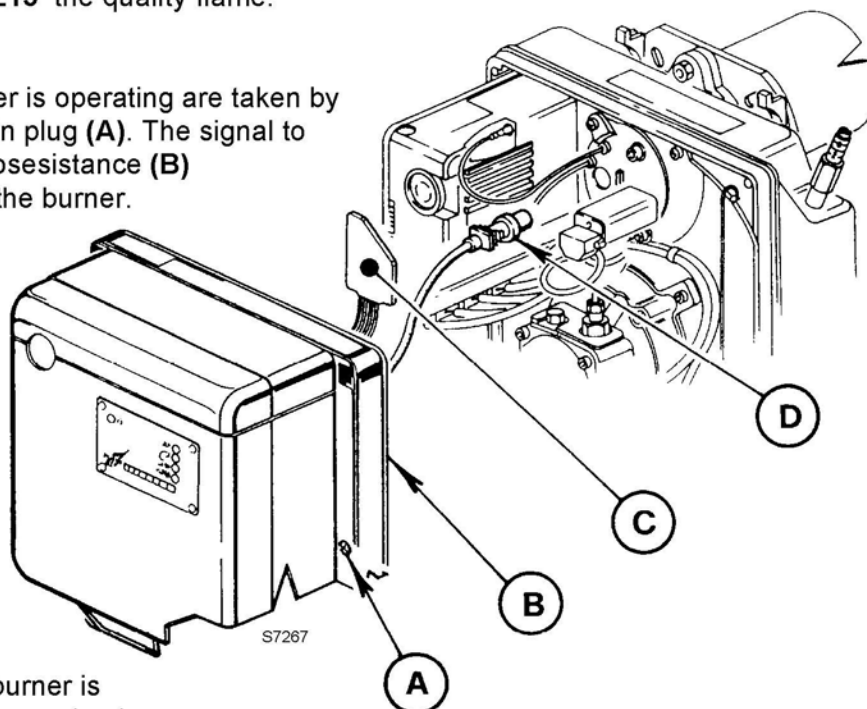
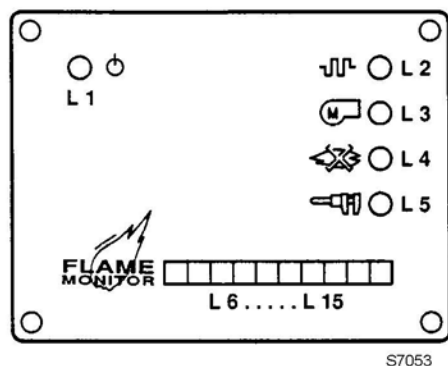
6. MODEL WITH "FLAME MONITOR"

THIS DEVICE ENABLES TO:

- Supervise through the leds "L1 – L5" how the burner is working.
- Supervise through the leds "L6 – L15" the quality flame.

OPERATION

The signals to supervise how the burner is operating are taken by the control box 550SMD through a 9 pin plug (A). The signal to supervise the flame is taken by a photoresistance (B) added to the normal flame detector of the burner.



L1 SIGNALING OF WAIT

When the led is on it means that the burner is connected to the electric power but it has not yet started the working programm (setting thermostat open).

L2 SIGNALING OF PRE HEATING

When the led is on it means that the gasoil has been pre-heated and this occurs when the thermostat closes. This led is off when the best spraying temperature has been reached.

L3 SIGNALING OF PRE-VENTILATION

When the led is on it means that in the combustion chamber there is the ventilation phase.

L4 SIGNALING OF LOCK OUT DUE TO IGNITION FAILURE

When the led is on it means that there is lock out that can be resetted by the user.

L5 SIGNALING OF LOCK OUT DUE TO SHUTTING OFF FAILURE

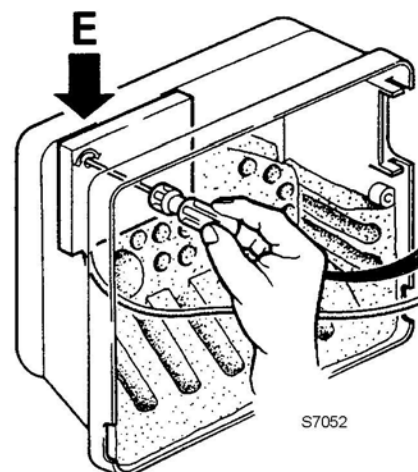
When the led is on it means that a remarkable trouble has been detected. This kind of lock out comes into action if at the opening of the setting thermostat there is still a flame presence. It can be resetted only the technical service (see paragraph 4.5 and 7).

L6...L15 SIGNALING OF THE FLAME CONDITION

A blue flame means a good combustion with low polluting emissions. This happens when 1 or 2 green leds are on but this has to be checked with special instruments.

As a rule you have to set the probe sensitivity (*this has to be done after 5 minutes of continuous working of the burner*) acting with a screwdriver in the hole (E) until one green led is on.

If then the flame colour verges on yellow the combustion is not good and therefore the colour of the bar first verges on the yellow area and then to the red one.



NOTE: To remove the cover (B) from the burner, loosen the screws (A) and take back the cover of some centimeters, then take away the pin plug (C) and the photoresistance (D) from their locations.

7. FAULTS / SOLUTIONS

Here below you can find some causes and the possible solutions for problems that could cause a failure to start or a bad working of the burner.

A fault usually makes the lock-out lamp light which is situated inside the reset button of the control box (6, fig. 1, page 1).

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.

If however the lock out continues the cause must be determined and the solution found.

FAULTS	POSSIBLE CAUSES	SOLUTION
The burner doesn't start when the limit thermostat closes.	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.
	Heater or start thermostat are faulty.	Replace them.
	The connections in the control box are wrongly inserted.	Check and connect completely all the plugs.
	Lock-out because of a failure to turn off (event B page 9).	Call technical assistance.
The burner remains in the pre-purge phase.	The flame detector sees false light (Led 1 is switched on).	Eliminate the light.
Burner runs normally in the prepurge and ignition cycle and locks out after 5 seconds ca.	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.
Yellow flame.	Nozzle dirty or worn.	Replace it.
	Defect in the air output.	Adjust the air output.
	Pump pressure is not correctly set.	Verify the pressure and the output of the fuel and adjust them according to the instructions of this manual.
	Air suction inlet is clogged.	Clear it.
	Obstruction in the exhaust circuit.	Clear it.
Burner starts with an ignition delay.	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.

WARNING:

The manufacturer cannot accept responsibility for any damage to persons, animals or property due to error in installation or in the burner adjustment, or due to improper or unreasonable use or non observance of the technical instruction enclosed with the burner, or due to the intervention of unqualified personnel.