

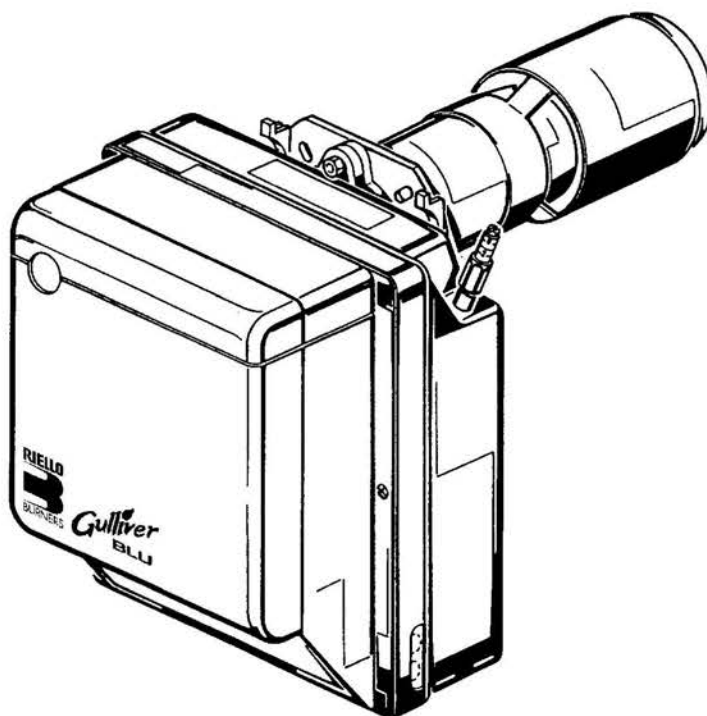


- I** Bruciatori di gasolio
- D** Öl-Gebläsebrenner
- F** Brûleurs fioul
- GB** Oil burners

Funzionamento monostadio
Einstufiger Betrieb
Fonctionnement à 1 allure
One stage operation



Gulliver
BLU



CODICE CODE	MODELLO - MODELL MODELE - MODEL	TIPO - TYP TYPE
3737050	BGK1	370 T1
3737055	BGK1	370 T1
3737056	BGK1	370 T1
3737450	BGK2	374 T1
3737455	BGK2	374 T1

INDEX

1. BURNER DESCRIPTION	1	4. WORKING	6
1.1 Burner equipment	1	4.1 Combustion adjustment	6
2. TECHNICAL DATA	2	4.2 Electrodes adjustment	8
2.1 Technical data	2	4.3 Flame detector adjustment	8
2.2 Overall dimensions	2	4.4 Fuel heating	8
2.3 Working fields	2	4.5 Burner start-up cycle	9
3. INSTALLATION	3	5. MAINTENANCE	9
3.1 Boiler fixing	3	6. FAULTS / SOLUTIONS	10
3.2 Fuel supply	3		
3.3 Hydraulic systems	4		
3.4 Electrical wiring	5		

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 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

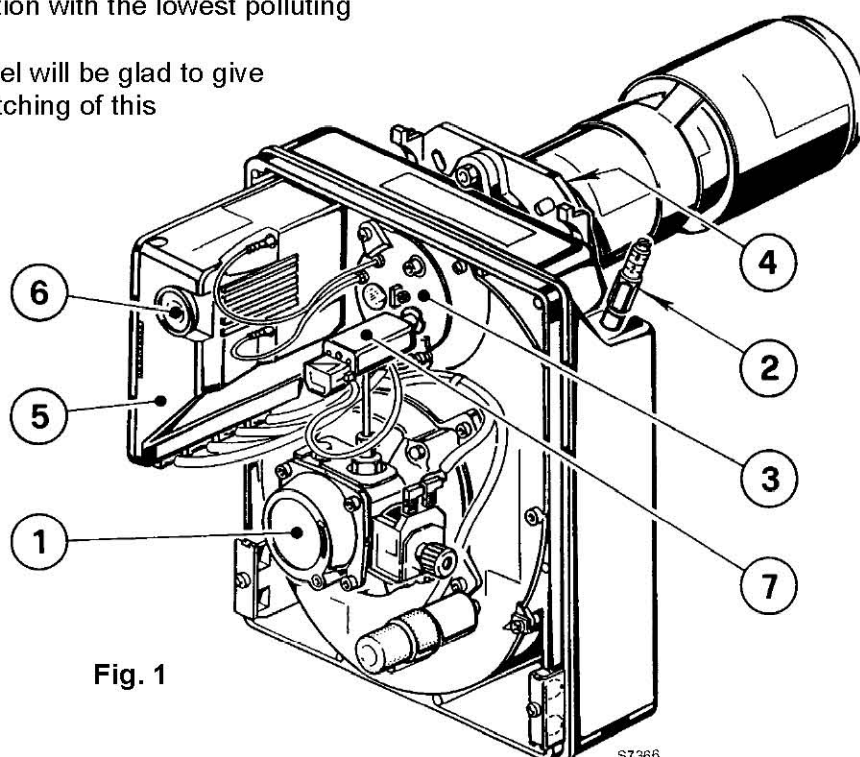


Fig. 1

S7366

- BUWAL approval No. 198014.
- CE Certification No. : **0036 0232/98** (370T1) – **0036 0233/98** (374T1), as 92/42/EEC.
- 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.

1.1 BURNER EQUIPMENT

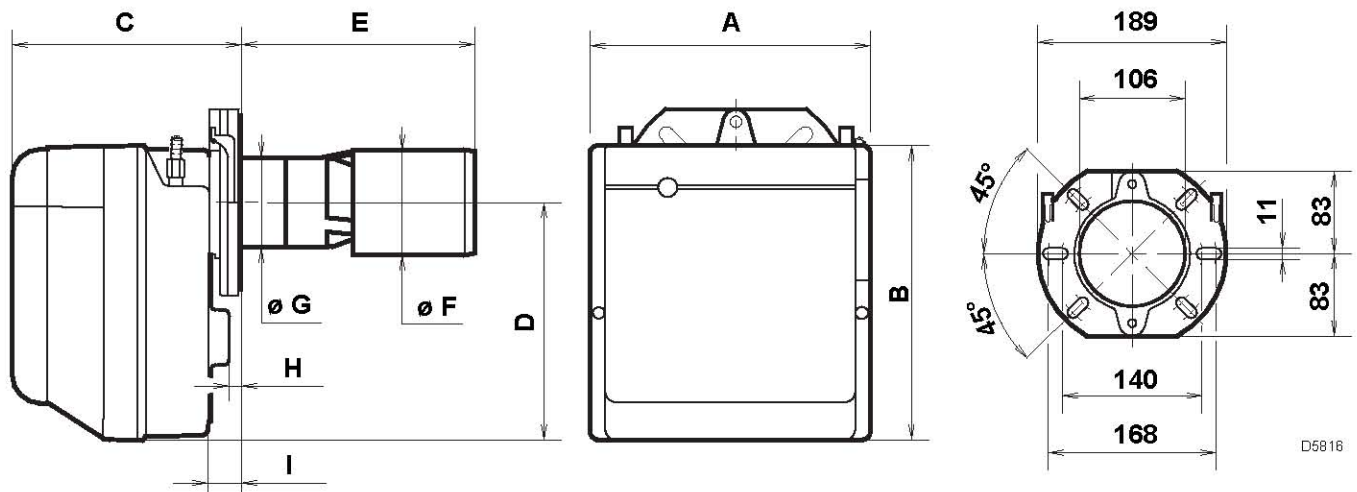
Flange with insulating gasket . . . No. 1	Screw and nuts for flange to be fixed to boiler . . . No. 4
Screw and nuts for flange No. 1	Flexible oil pipes with nipples No. 2
7 pin plug (only for code 3737055 - 3737056 - 3737455)	No. 1

2. TECHNICAL DATA

2.1 TECHNICAL DATA

TYPE			370 T1	374 T1
Output	As	kg/h	1.5 - 3	2.7 - 5
Thermal power	EN 267	kW	17.8 - 35.6	32 - 59.3
Output	As	kg/h	1.5 - 2.9	2.7 - 3.8
Thermal power	LRV 92	kW	17.8 - 34.4	32 - 45
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			0.25 kW	

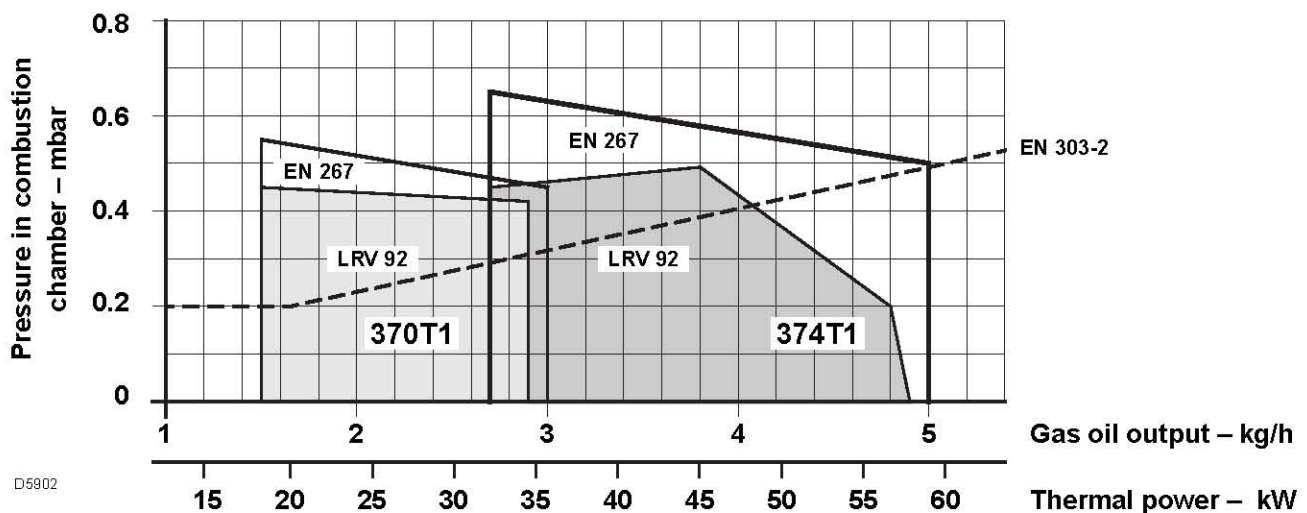
2.2 OVERALL DIMENSIONS



TYPE	A	B	C	D	E ●	Ø F	Ø G	H	I
370T1	255	280	202	230	172 – 207	104	89	10	28
374T1	255	280	202	230	197 – 229	105	89	10	28

● See page 7

2.3 WORKING FIELDS



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3. INSTALLATION

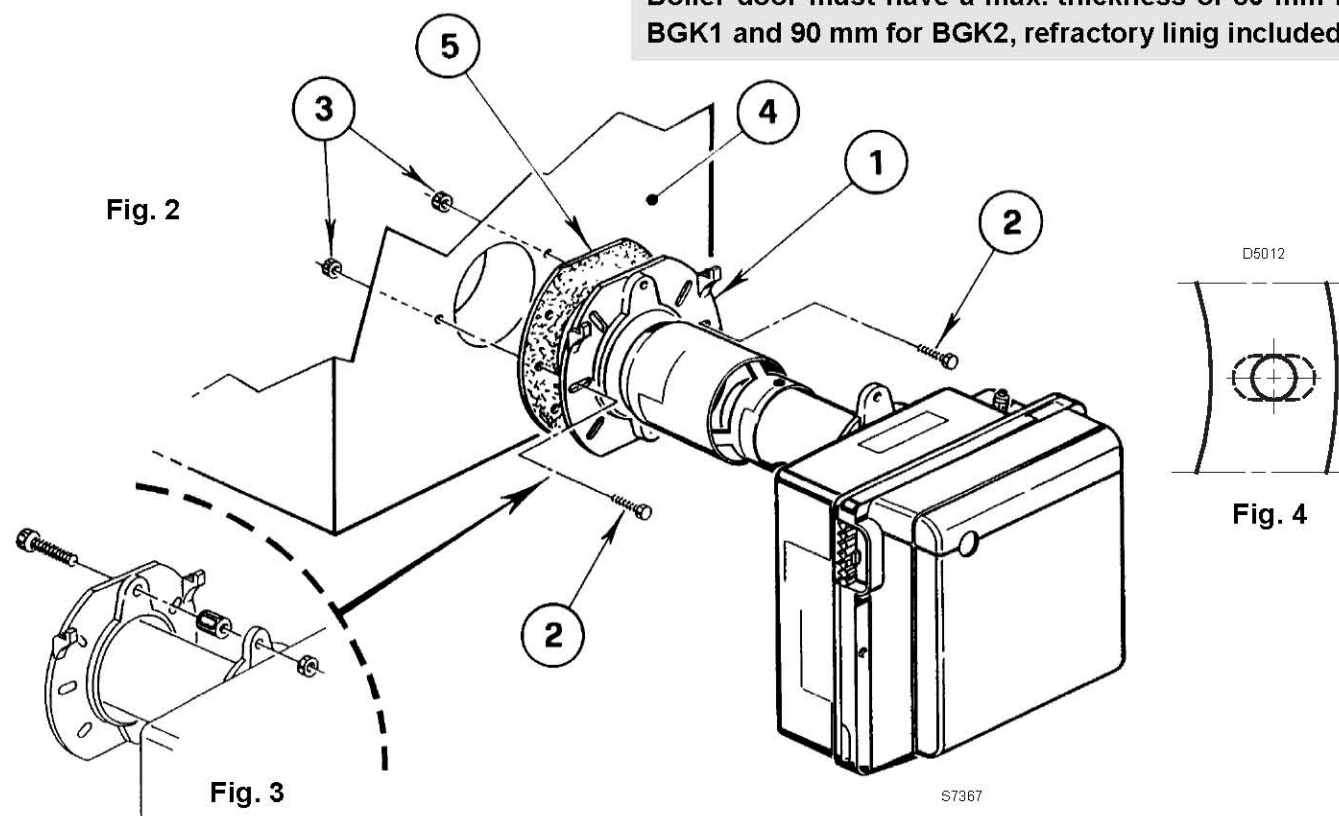
THE BURNER MUST BE INSTALLED IN CONFORMITY WITH LEGISLATION AND LOCAL STANDARDS.

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).

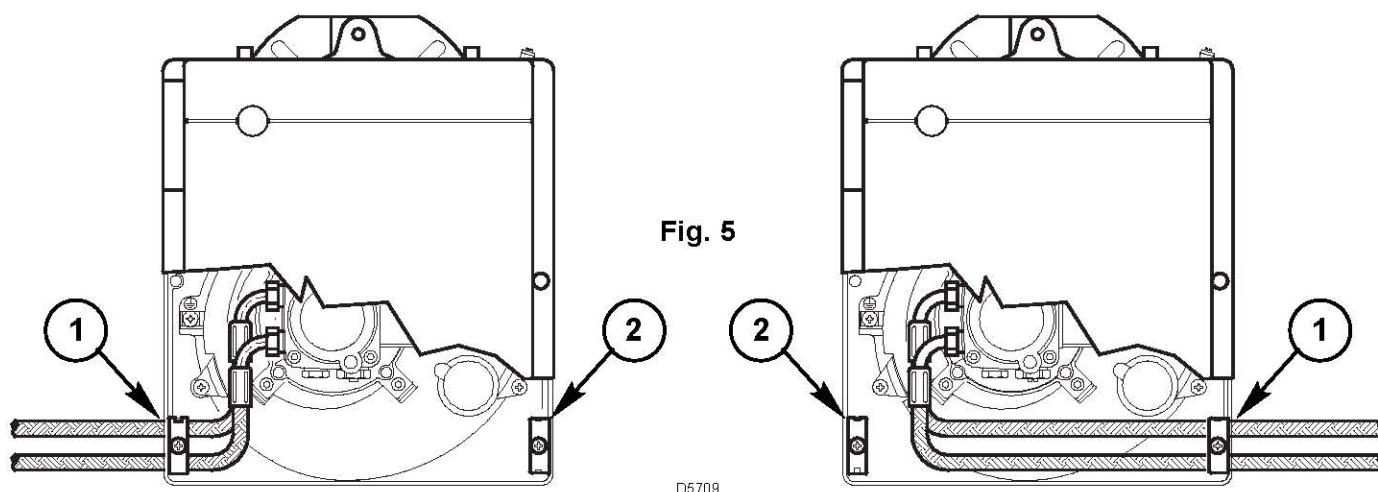
IMPORTANT

Boiler door must have a max. thickness of 80 mm for BGK1 and 90 mm for BGK2, 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:

- 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).
- 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.

**SYSTEM NOT PERMITTED
IN GERMANY**

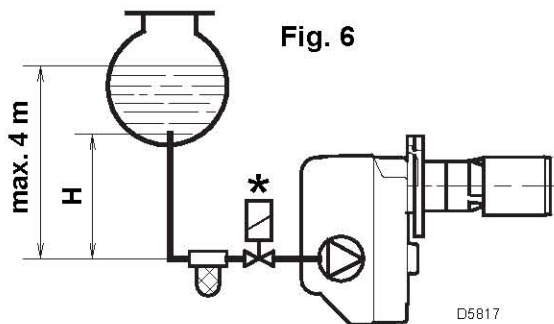


Fig. 6

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

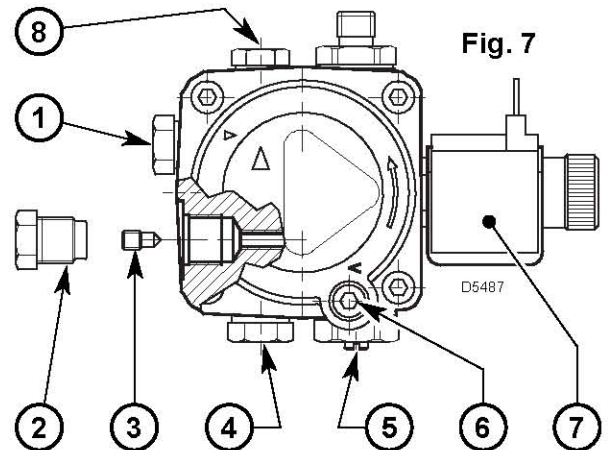


Fig. 7

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

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

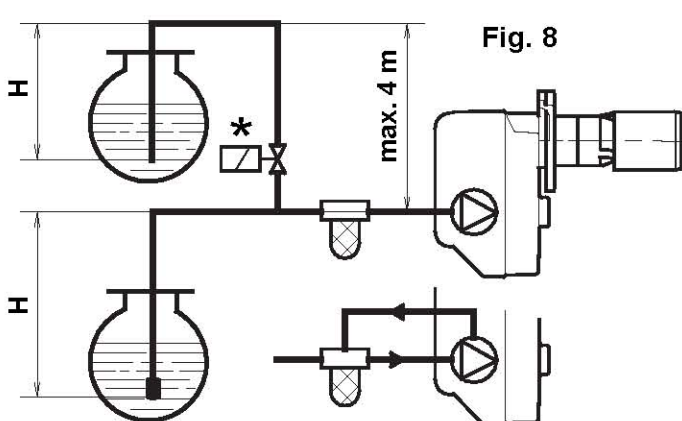


Fig. 8

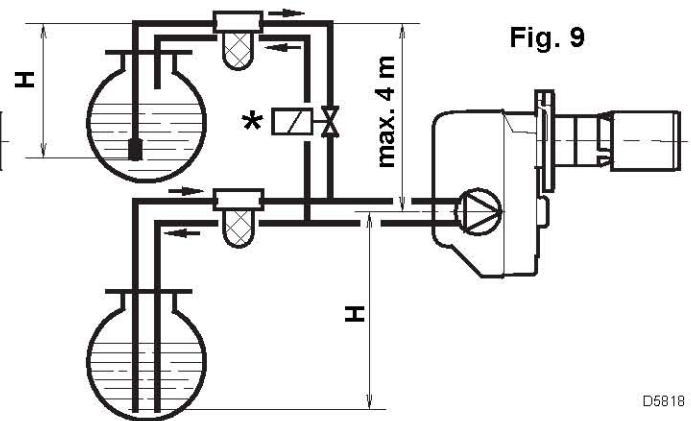


Fig. 9

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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.

3.4 ELECTRICAL WIRING

WARNING

DO NOT EXCHANGE NEUTRAL WITH PHASE

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.

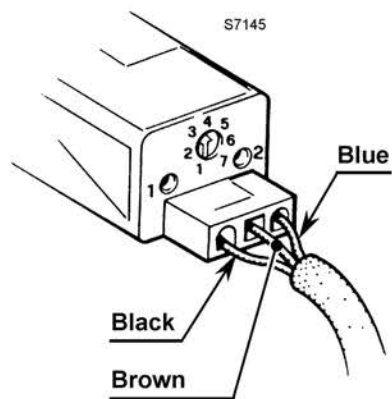
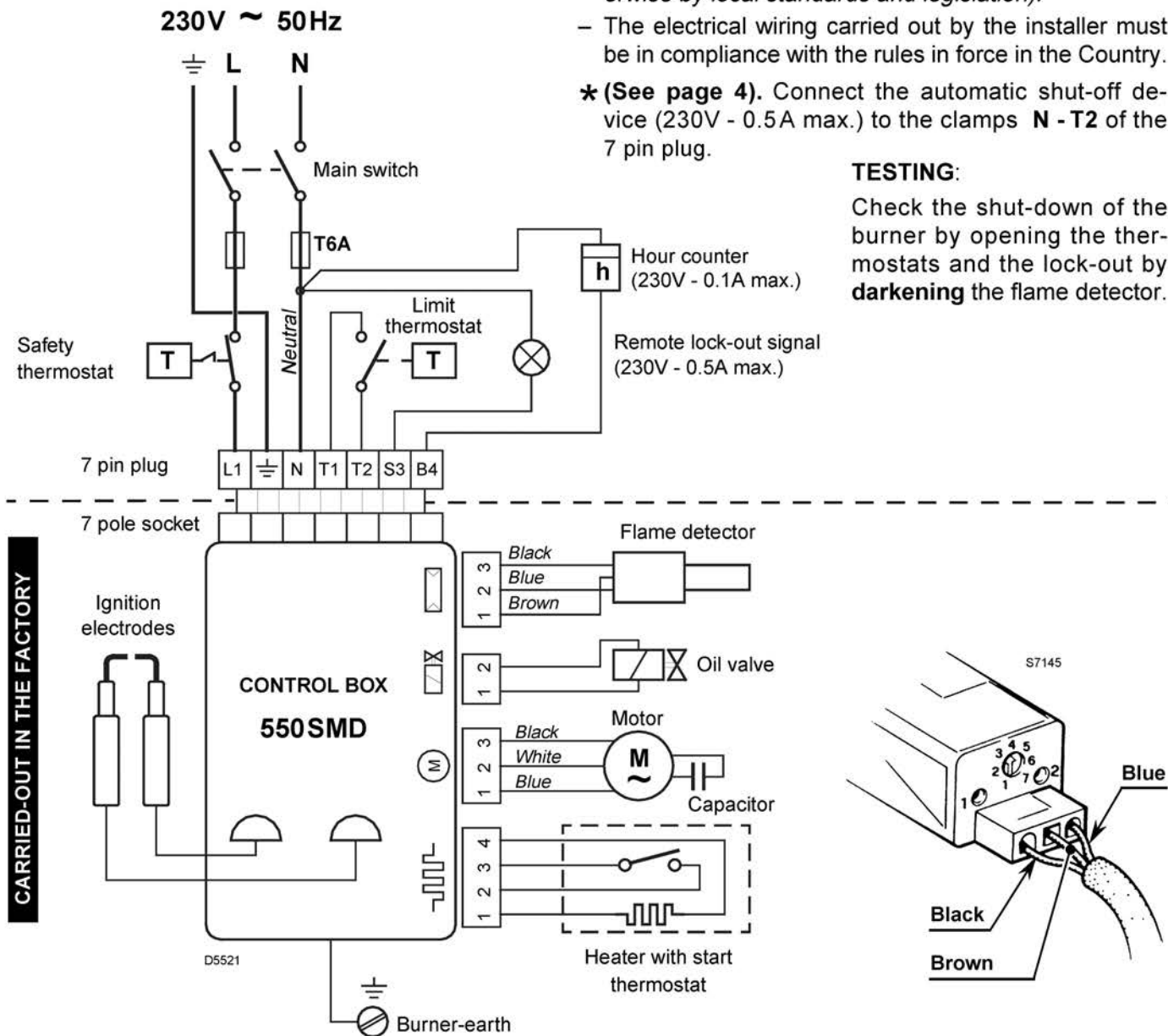
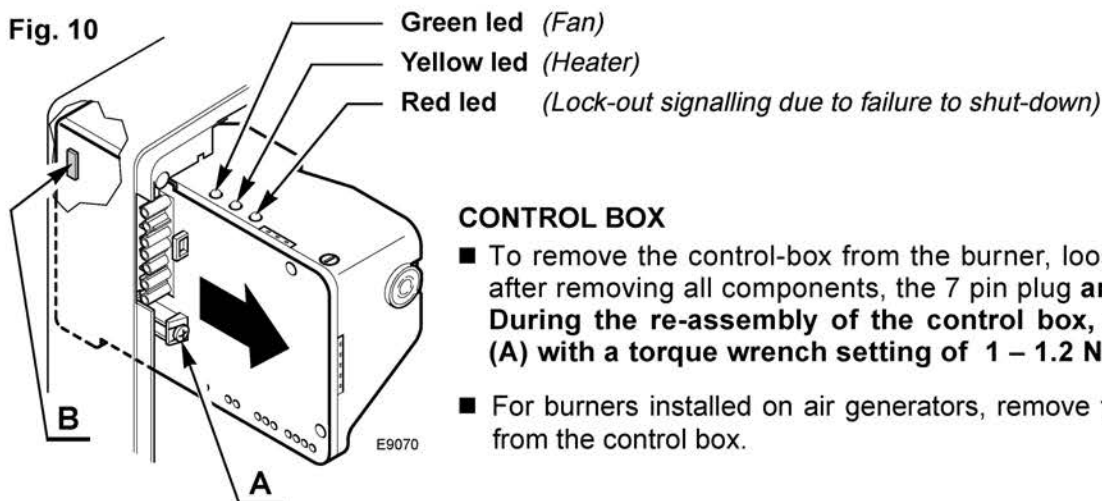


Fig. 10



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. Values in the table refer to 13% CO₂ and to sea level.

TYPE	Nozzle 1		Pump pressure 2	Burner output	Comb. head adjustment 3	Air damper adjustment 4
	GPH	Angle	bar	kg/h $\pm$ 4%	Set-point	Set-point
370T1	0.40	60°	12	1.5	0.5	0.4
	0.50	60°	12	1.8	1	1.1
	0.60	60°	12	2.3	1.5	2.5
	0.65	60°	12	2.5	2	2.9
	0.75	60°	13	3.0	2.5	3.5
374T1	0.75	60°	12	2.8	1.5	1.8
	0.85	60°	12	3.3	1.5	2.1
	1.00	60°	12	3.6	2	2.4
	1.10	60°	12	4.2	2.5	3
	1.25	60°	12	5.0	4	3.5

With the u. m. nozzles, it has been reached the combustion values according to:

RAL-UZ 9, Edition February 2001 (environmental mark - Germany):

370T1: Steinen 0,40 GPH - 60° H
Delavan 0,75 GPH - 60° W

374T1: Delavan 0,75 GPH - 60° W
Delavan 1,25 GPH - 60° W

LRV 92

370T1: Hago 0,40 GPH - 80° H
Danfoss 0,75 GPH - 80° H
Danfoss 0,75 GPH - 60° H

374T1: Hago 0,75 GPH - 60° H
Steinen 1,25 GPH - 80° H
Hago 1,25 GPH - 60° H

1 RECOMMENDED NOZZLES: Steinen type 60° H; Danfoss type 60° H; Delavan type 60° W.

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 loosing 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 loosing its fixing screw (3, fig. 15, page 8).
- Screw the nozzle (6) correctly and tighten it as shown in the figure.

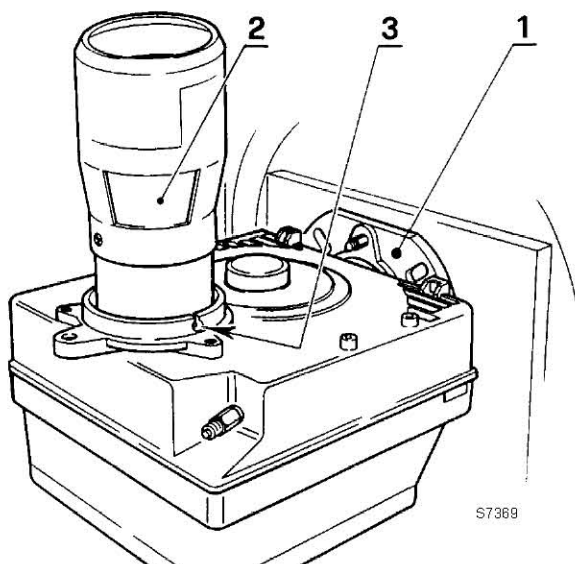
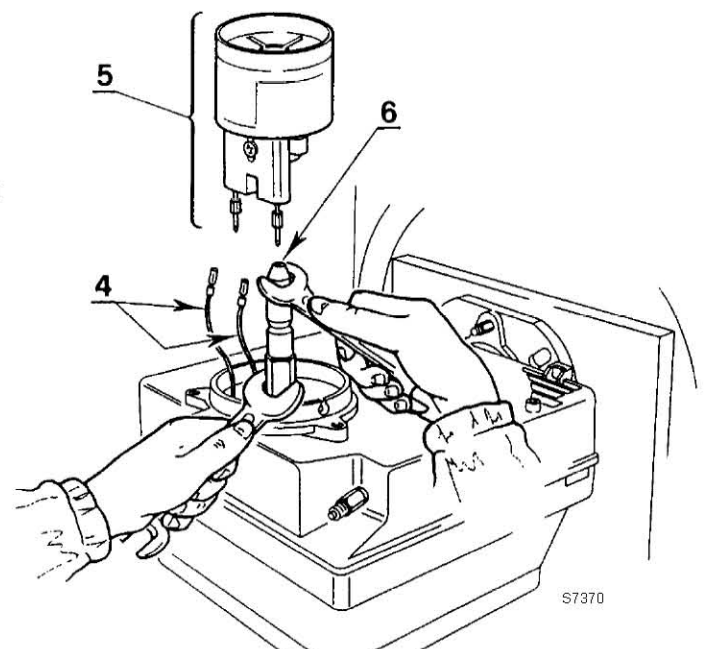


Fig. 11



A Fig. 12

- Remove nozzle-holder assembly (1) after loosening screws (2) and nut (3), remove the small cables (4) from the control box, the socket (5) and the flame detector (6).
- Withdraw the small cables (4) from the electrodes, remove the diffuser disc-holder assembly (7) from the nozzle-holder assembly (1) after loosening screw (3, fig. 15, page 8).
- Screw the nozzle (8) 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.

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 COMBUSTION HEAD SETTING

(see fig. 12)

It depends on the output of the burner and is carried out by rotating clockwise or counter-clockwise the setting screw (9) until the set-point marked on the regulating rod (10) is level with the outside plane of the nozzle-holder assembly (1).

- In the sketch the combustion head is set for an output of 0.75 GPH at 13 bar with reference to the BGK1 burner type 370T1.

The set-point **3** of the regulating rod is at the same level with the outside plane of the nozzle-holder assembly as shown in the schedule.

E RECIRCULATING PIPE ADJUSTMENT

(see fig. 14)

The burner leaves the factory with the recirculating pipe in the **position 1**.

If necessary, in order to optimise the combustion, place the flame tube according to the combustion head as indicated in the table. It is important that the combustion chamber is enough large for the flue gases recirculation. (Pay attention to the thickness of the boiler door).

By generally reducing the smoke recirculating section (**RF**), the combustion stability is increased, but emissions of NOx are also increased.

4 AIR DAMPER ADJUSTMENT

(see fig. 12)

- To vary the setting adjust the screw (11) after loosening the nut (12).
- When burner shuts down the air damper automatically close still a **max. chimney depression of 0.5 mbar**.

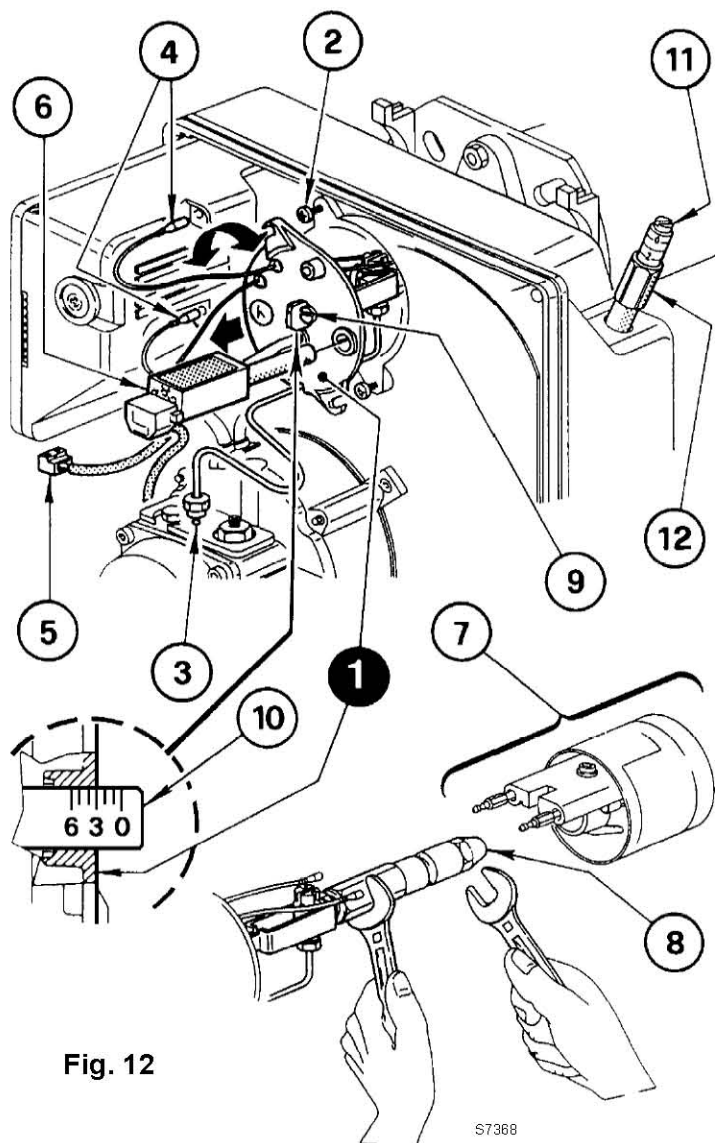


Fig. 12

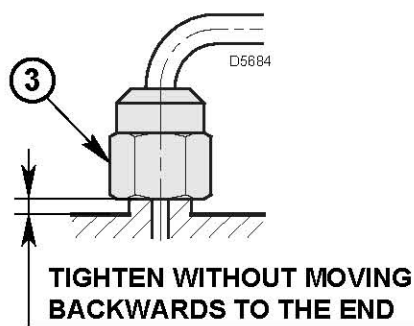
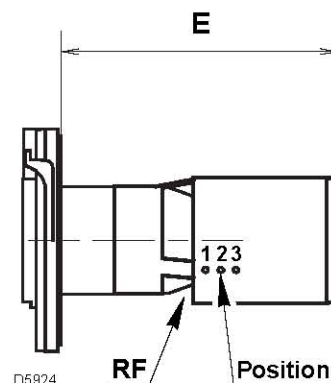


Fig. 13

Fig. 14

	E		
Pos.	1	2	3
370T1	207	189.5	172
374T1	229	213	197



4.2 ELECTRODES ADJUSTMENT (see fig. 15)

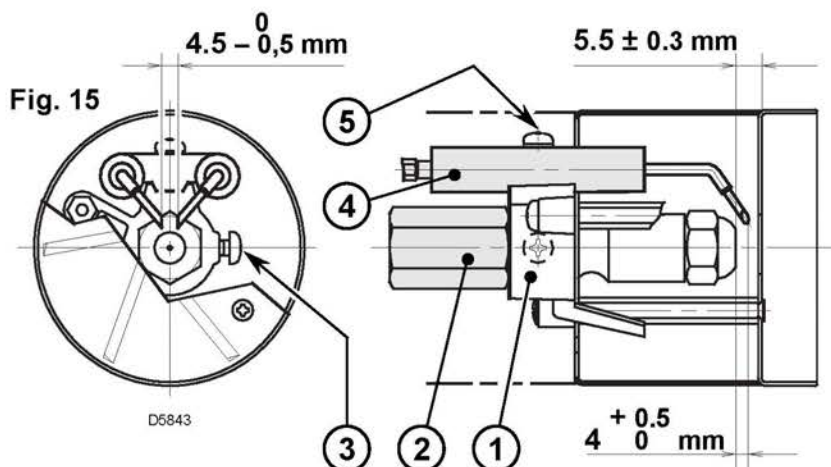
WARNING

MEASURES MUST BE RESPECTED.

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 4.1** (page 6) "RECOMMENDED NOZZLES".



4.3 FLAME DETECTOR ADJUSTMENT

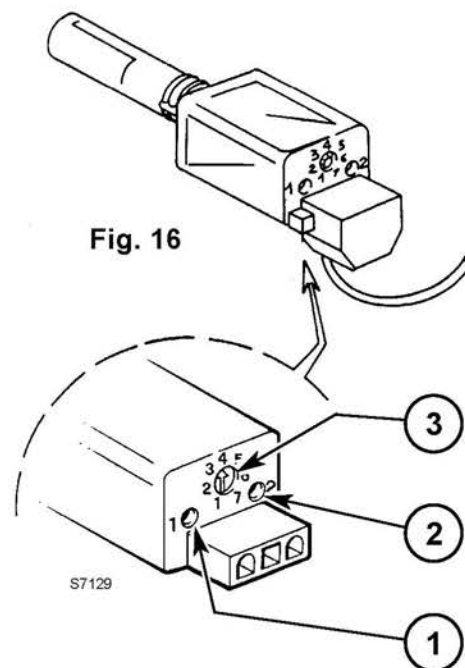
(See fig. 16)

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.**

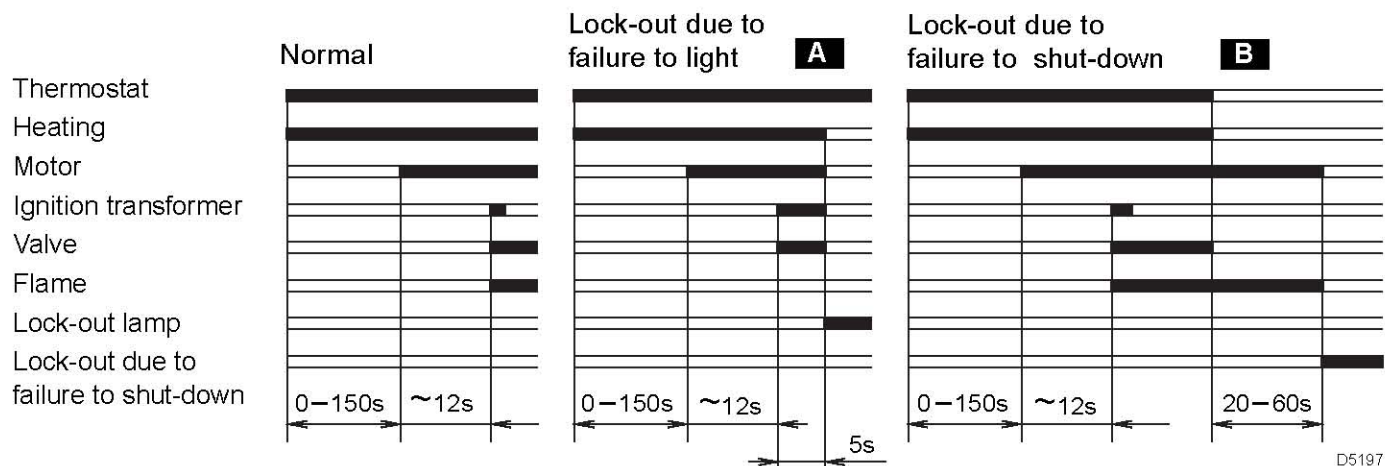


4.4 FUEL HEATING

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:

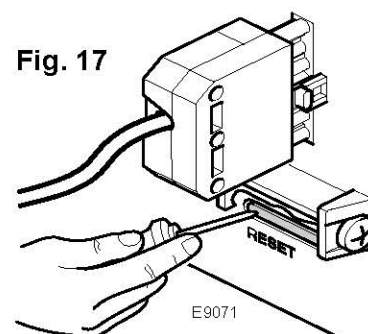
■ Restore the working by moving backward the control box, **keeping it supplied** and acting on the reset tongue (see fig. 17).

■ 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.

Fig. 17



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 filter in the oil suction line and in the pump.
- Clean the flame detector, (7, fig. 1, page 1).
- 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 mixing unit.
- 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. 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.
	Heating and start thermostats 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 strange 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.