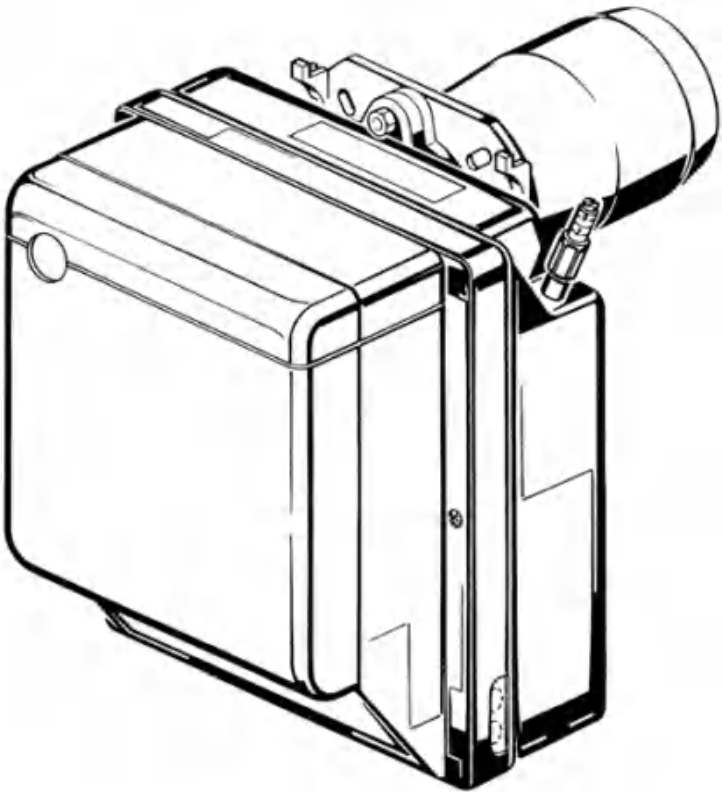


GB

Light oil burner



CODE	MODEL	TYPE
3737750	RG1	376 T1
3737751	RG2	377 T1
3737752	RG3	378 T1
3737761	RG4S	387 T1
3737762	RG5S	397 T1

INDEX

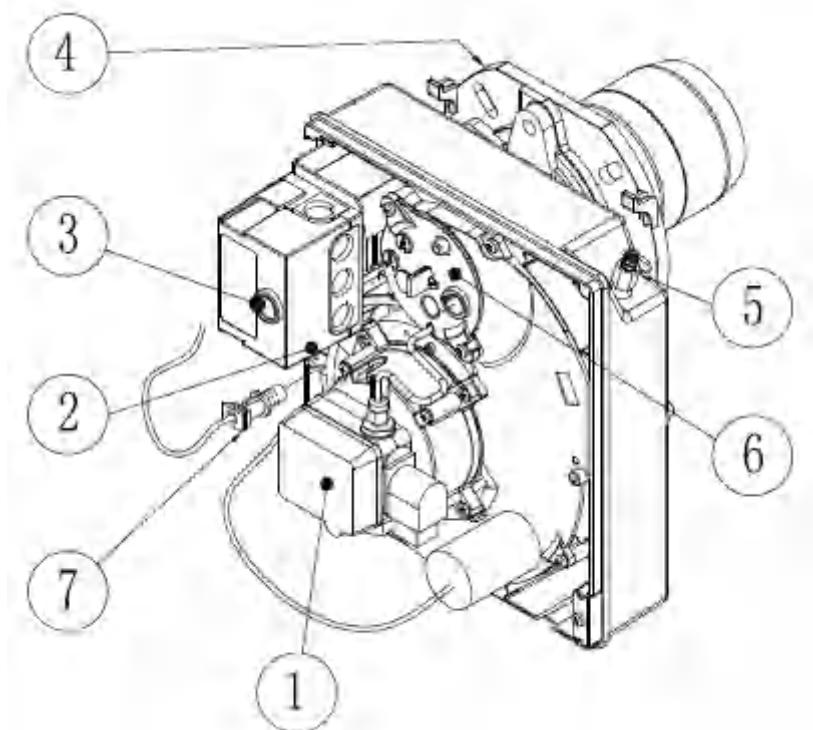
1. BURNER DESCRIPTION	1	4. WORKING	6
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1. BURNER DESCRIPTION

One stage light oil burner.

- CE Certification No.: **0036 0344/03** as 92/42/EEC.
- 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.
- The burner meets protection level of IP X0D (IP 40), EN 60529.

- 1 – Oil pump
- 2 – Control-box
- 3 – Reset button with lock-out lamp
- 4 – Flange with insulating gasket
- 5 – Air damper adjustment assembly
- 6 – Nozzle holder assembly
- 7 – Photoresistance



1.1 BURNER EQUIPMENT

Flange with insulating gasketNo. 1
 Screw and nuts for flangeNo. 1
 7 pin plugNo. 1

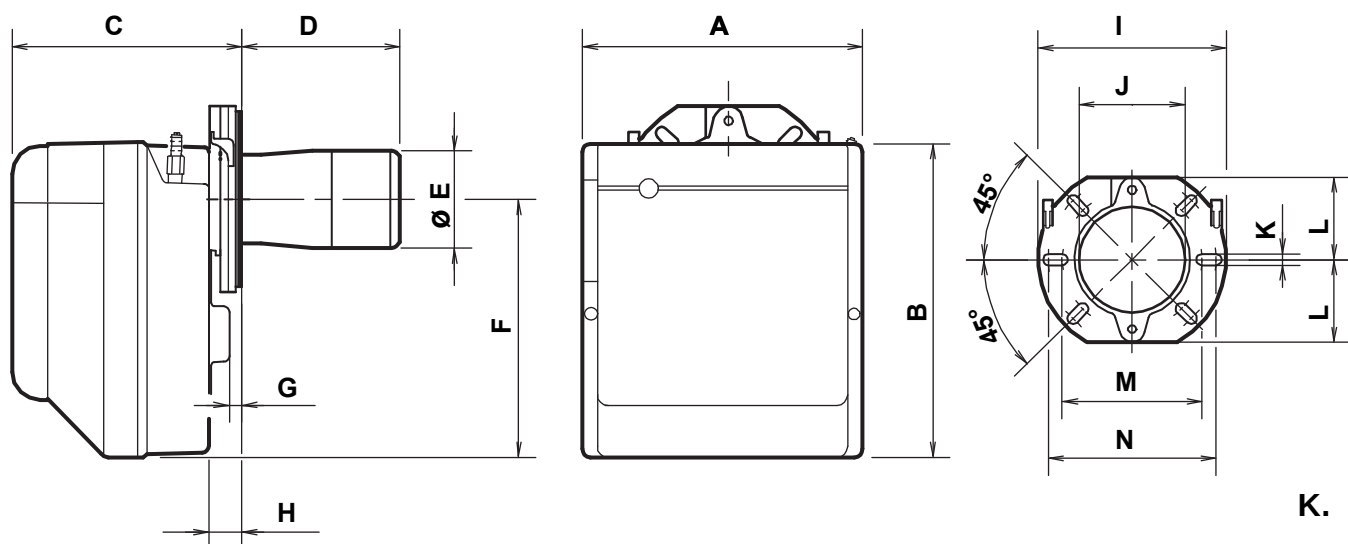
Screw and nuts for flange to be fixed to boilerNo. 4
 Flexible oil pipes with nipplesNo. 2

2. TECHNICAL DATA

2.1 TECHNICAL DATA

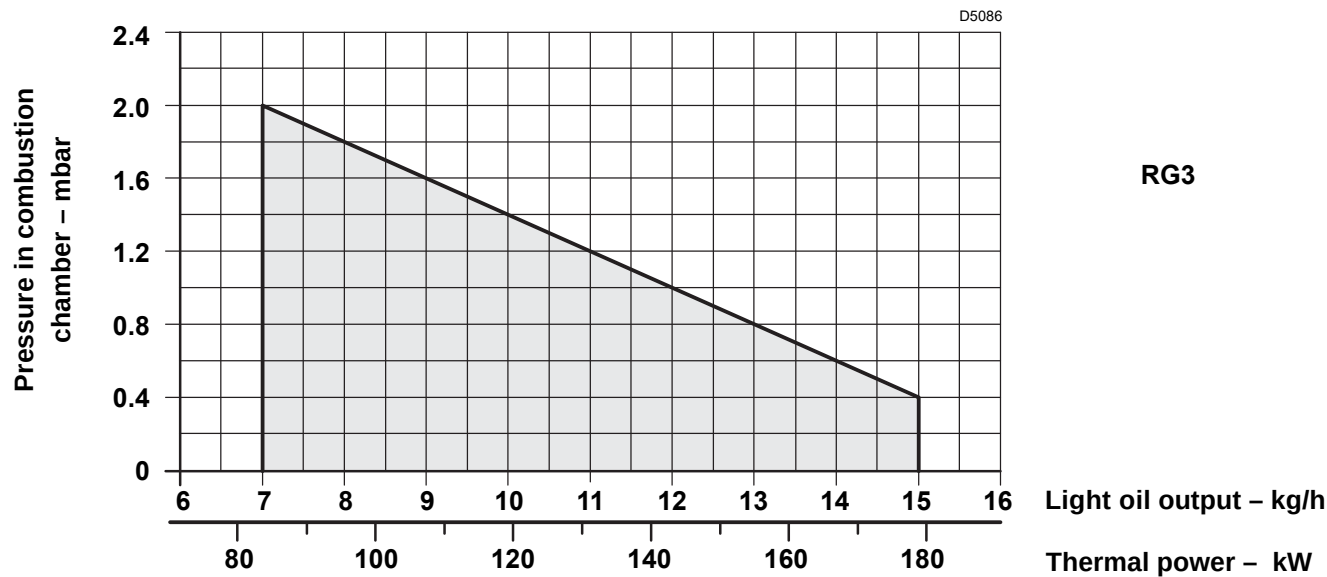
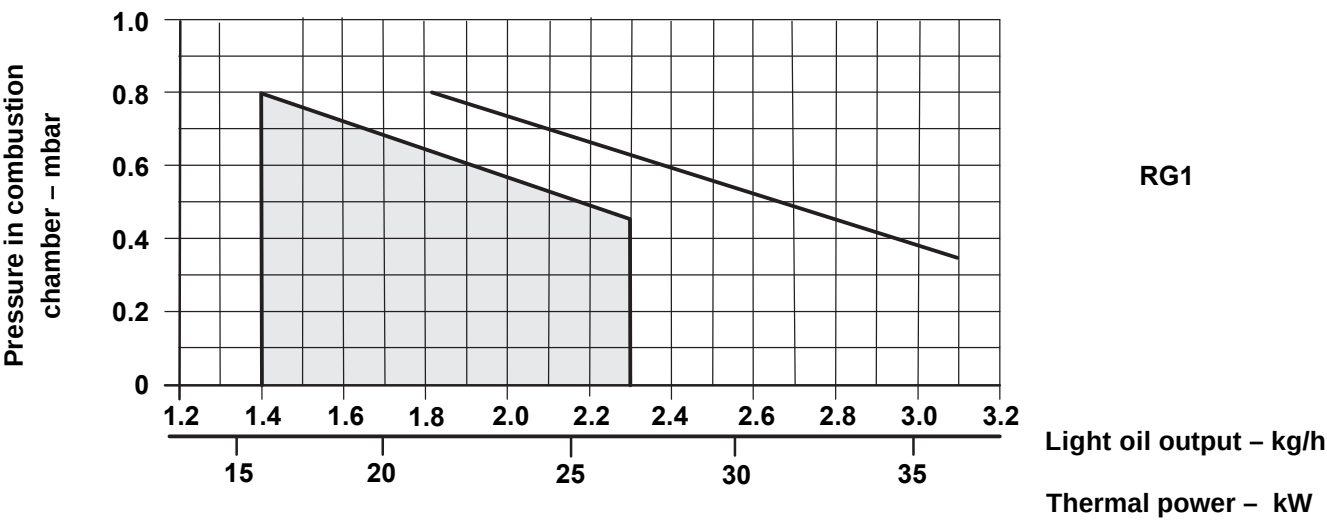
TYPE	RG1	RG2	RG3	RG4S	RG5S
Output - Thermal power	21.3-36.7 kW 1.8-3.1 kg/h	47-119 kW 4-10 kg/h	83-178 kW 7-15 kg/h	118.5-237 kW 10-20 kg/h	160-309.5 kW 13.5-26 kg/h
Fuel	Light oil, viscosity 4 – 6 mm2/s at 20 °C				
Electrical supply	Single phase , ~50Hz 230 V ± 10%				
Motor	Run current 0.85A	0.9A	1.9A	2A	
	2720 rpm – 285 rad/s				
Capacitor	4uF		6.3uF		8uF
Ignition transformer	Secondary 8 kV – 16 mA				
Pump	Pressure: 8 – 15 bar				
Absorbed electrical power	0.29 kW	0.18 kW	0.385 kW	0.39 kW	0.47 kW

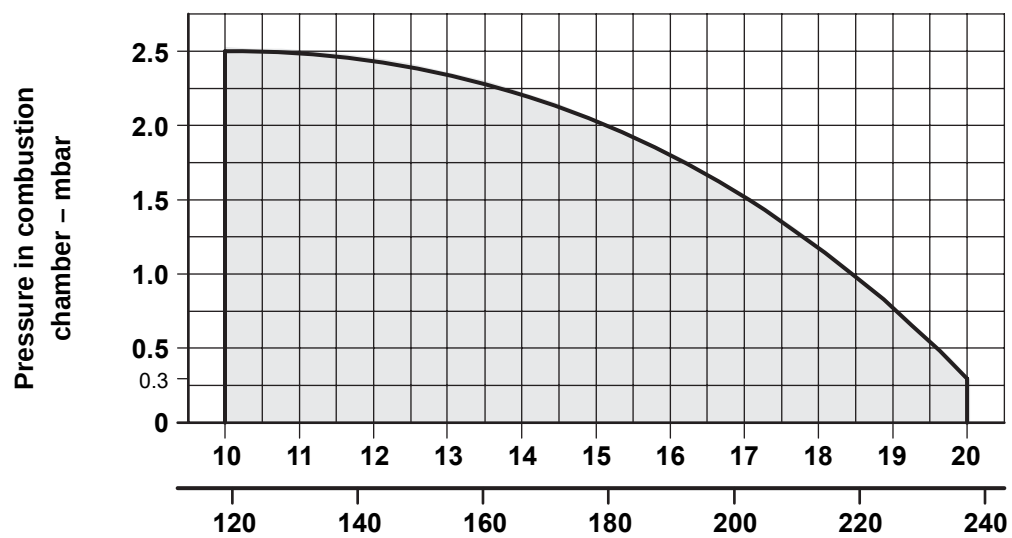
2.2 OVERALL DIMENSIONS



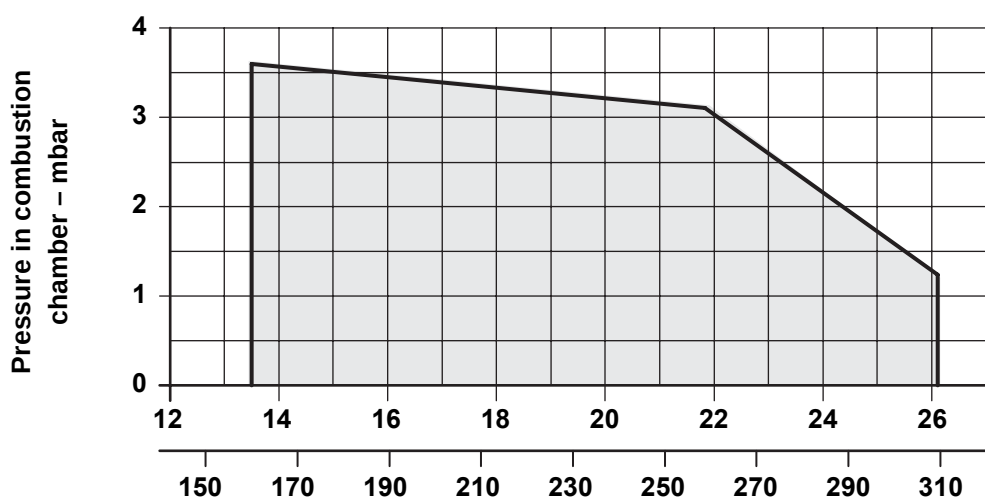
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
RG1	255	210	205	93	84	168	5	5	180	91	11	72	130	150
RG2	255	280	202	115	95	230	10	28	189	106	11	83	140	168
RG3	300	345	228	142	123	285	12	36	213	127	11	99	160	190
RG4S	300	345	228	142	123	285	12	36	213	127	11	99	160	190
RG5S	300	345	247	155	125	285	12.5	36	213	127	11	99	160	190

2.3 FIRING RATE, (as EN 267)





RG4S



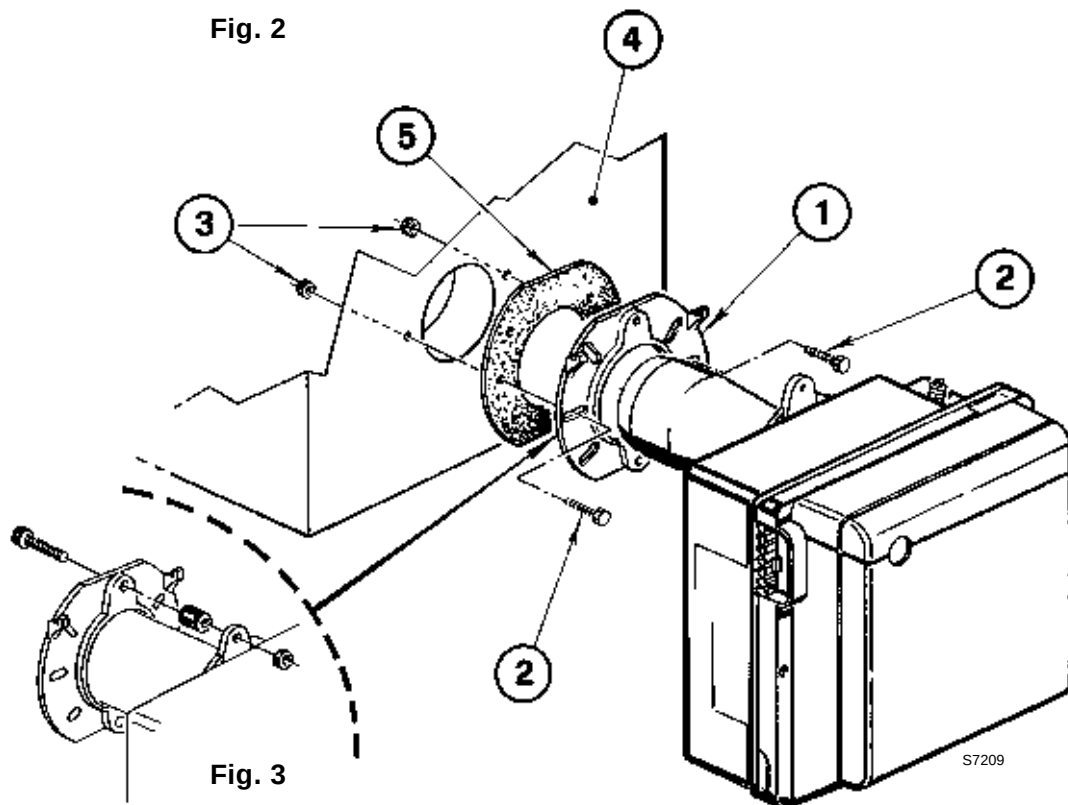
RG5S

3. INSTALLATION

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

3.1 BOILER FIXING

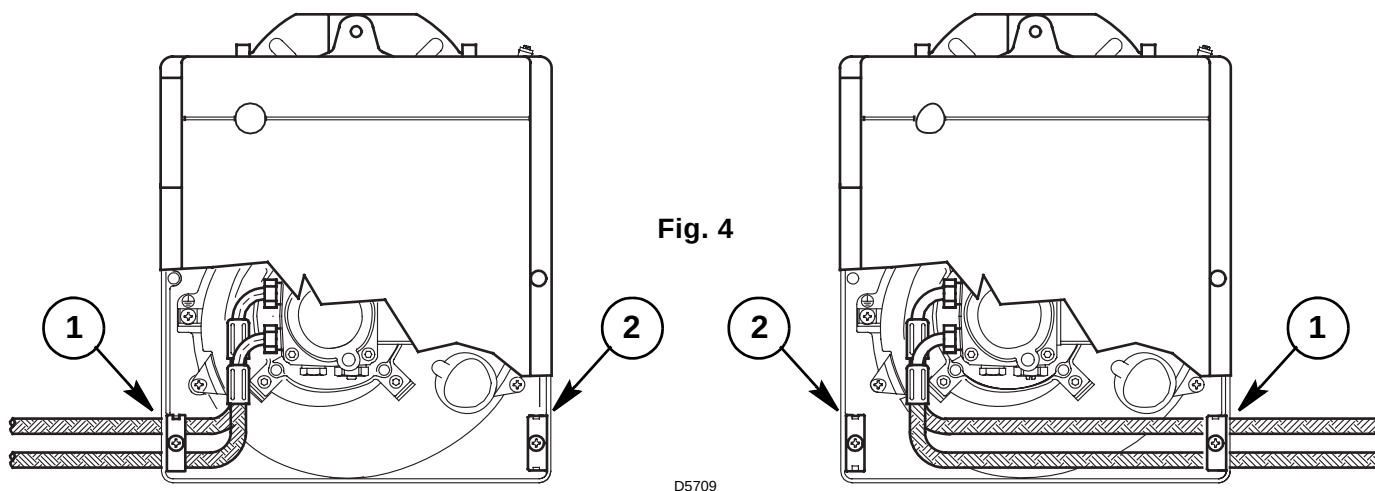
- Put on the flange (1) the screw and two nuts, (see fig. 3).
- Widen, if necessary, the insulating gasket holes (5).
- Fix the flange (1) to the boiler door (4) using screws (2) and (if necessary) the nuts (3) **interposing the insulating gasket (5)**, (see fig. 2).



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. 4).



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. 5).
- 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.

SYSTEM NOT PERMITTED IN GERMANY

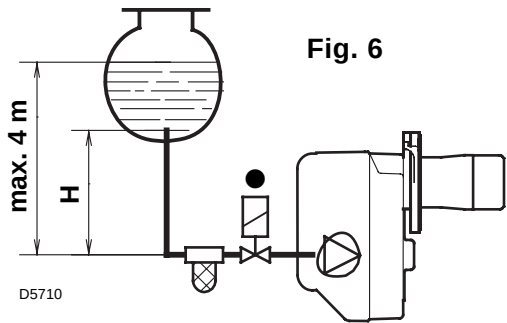


Fig. 6

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

- 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

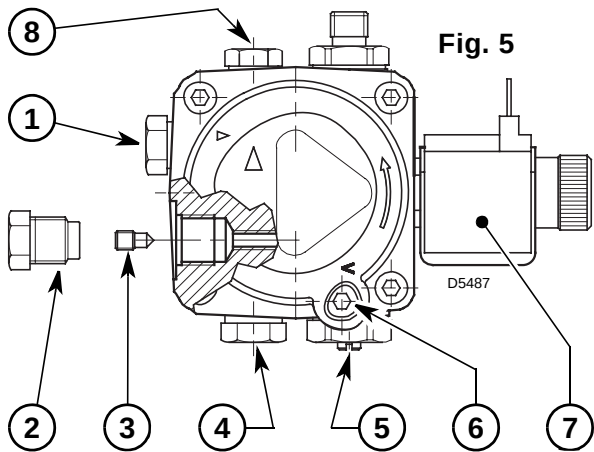


Fig. 5

PRIMING PUMP:

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

On the systems in fig. 7 and 8 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. 8) 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

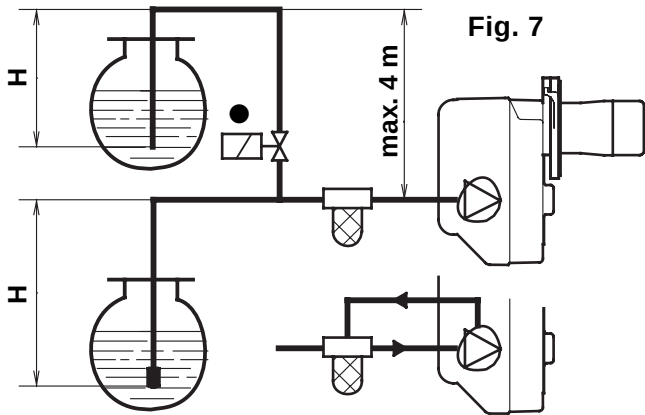


Fig. 7

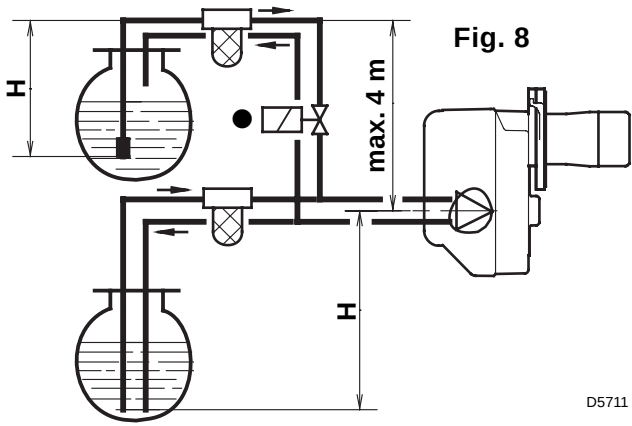


Fig. 8

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**

NOTES:

- Wires of 1 mm² section.
- The electrical wiring carried out by the installer must be in compliance with the rules in force in the Country.

■ **Connect 2nd stage thermostat between clamps T6 - T8 by removing the bridge.**

TESTING: Check the shut-down of the burner by opening the thermostats and the lock-out by **darkening** the photoresistance.

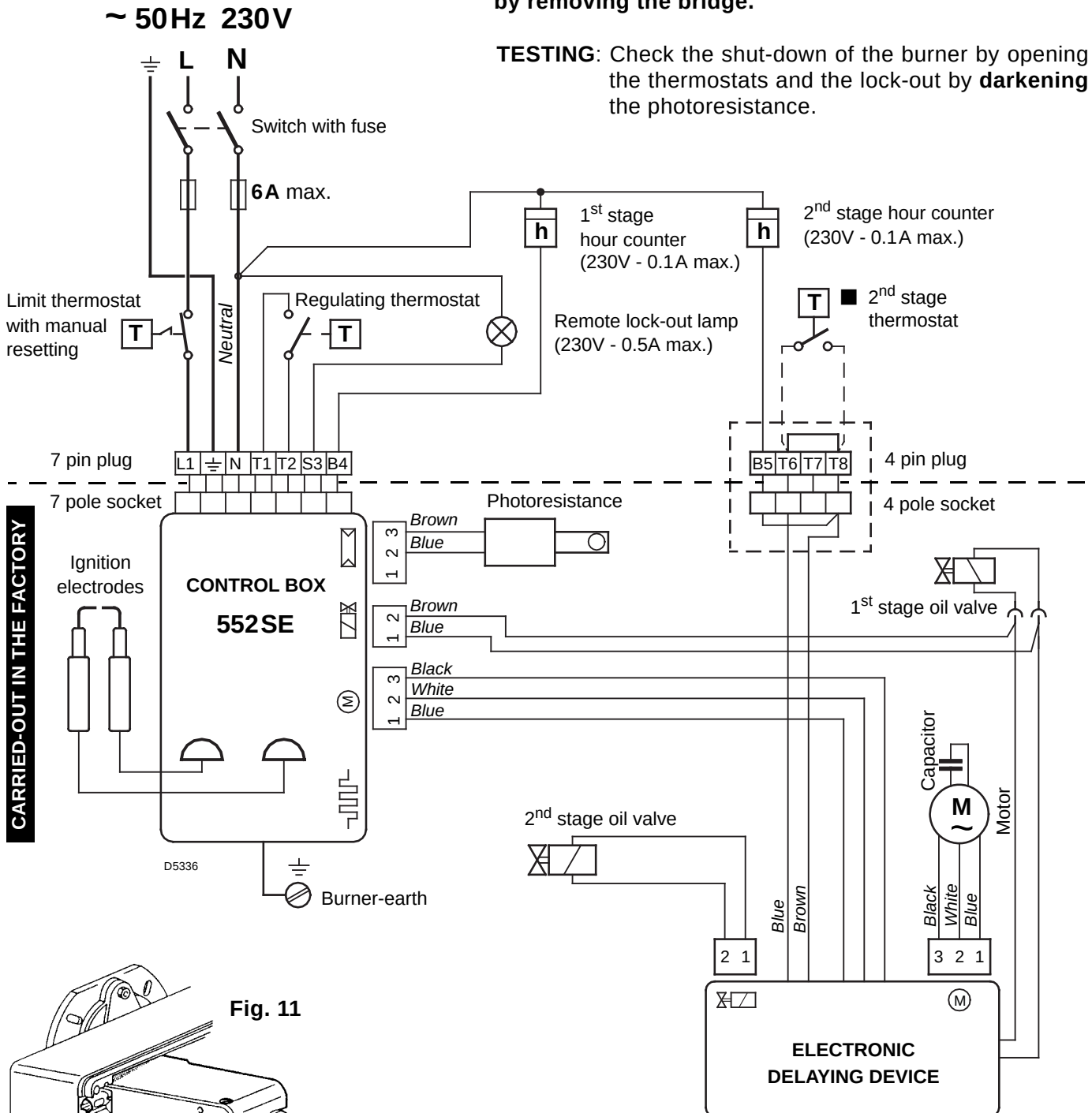
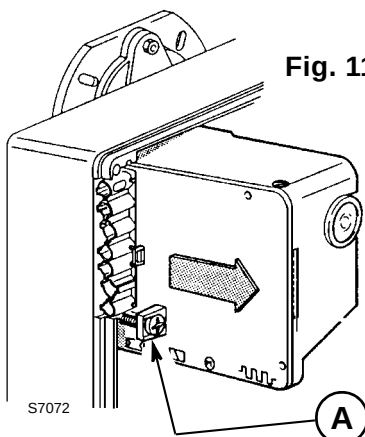


Fig. 11



To remove the control-box from the burner, loosen screw **(A, fig. 11)** after removing all components, the 7 pin plug **and earth wire**.

In case of disassembly of the control box, retighten the screw (A) with a torque wrench setting of 1 – 1.2 Nm.

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 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% CO₂ 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 $\pm$ 4%	Set-point	Set-point
1.00	60°	12	4.0	0	0.9
1.10	60°	12	4.4	1	3.1
1.25	60°	12	5.0	2	3.4
1.50	60°	12	6.0	3	3.8
1.75	60°	12	7.0	4	4.5
2.00	60°	12	8.0	5	4.9
2.25	60°	14	9.8	6	6.0

RG1-3

Nozzle		Pump pressure		Burner output	Combustion head adjustment	Air damper adjustment	
		one stage	two stage			one stage	two stage
GPH	Angle	bar	bar	kg/h $\pm$ 4%	Set-point	Set-point	Set-point
3.00	60°	9	15	13.5	0	0.4	1.3
3.50	60°	9	15	15.7	0	0.5	2.0
4.00	60°	9	15	18.0	2	0.7	2.5
4.50	60°	9	15	20.2	4	0.8	3.0
5.00	60°	9	15	22.4	6	0.9	3.7
5.50	60°	9	15	24.7	8	1.1	5.8
6.00	60°	9	14	26.0	10	1.3	6.0

RG4-5S

4.2 RECOMMENDED NOZZLES: Delavan type W - B ; Danfoss type S - B
Monarch type R ; Steinen type S - Q.

MAINTENANCE POSITION

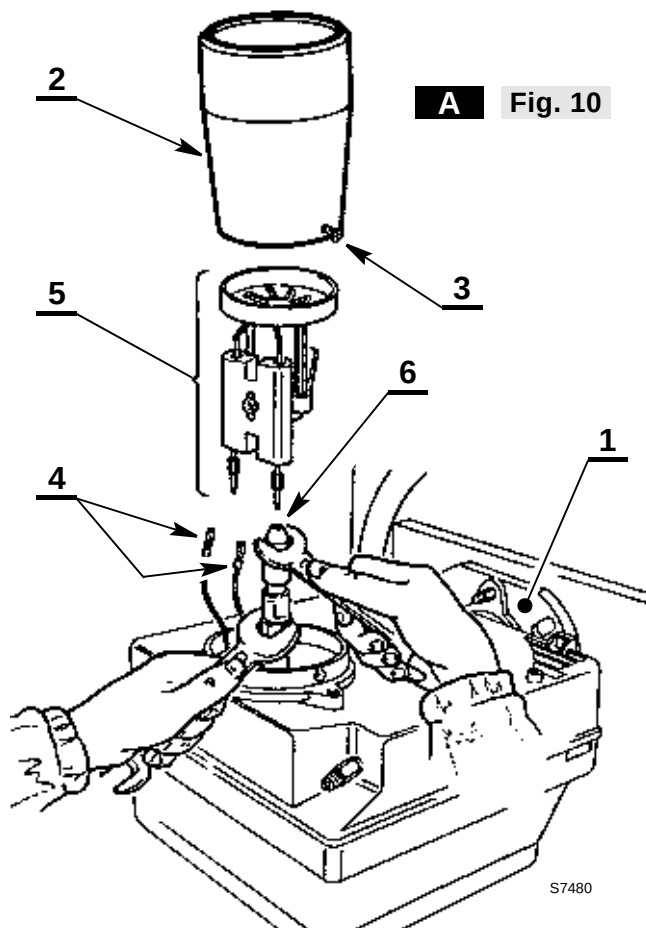
THE ACCESSIBILITY TO THE NOZZLE, THE DIFFUSER DISC AND THE ELECTRODES IS MADE EASY IN 2 WAYS:

A Fig. 10 – 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 blast 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. 12, page 7).
- **Screw the nozzle (6) correctly and tighten it as shown in the figure.**

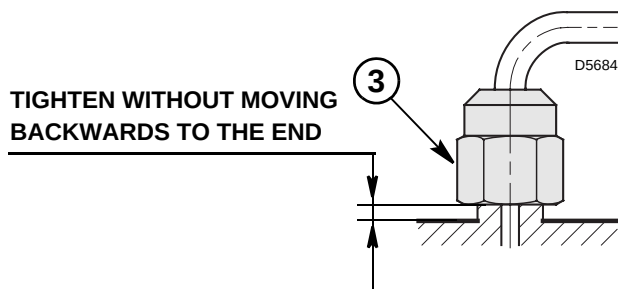
B Fig. 11, page 7 – Remove nozzle-holder assembly (1) after loosing screws (2) and nut (3), remove the small cables (4) from the control box and the photoresistance (6).

- Withdraw the small cables (4) from the electrodes, remove the diffuser disc-holder assembly (10) from the nozzle-holder assembly (1) after loosing screw (3, fig. 12, page 7).
- **Screw the nozzle (11) 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 figure below.



4.4 COMBUSTION HEAD SETTING

(See fig. 11)

It depends on the output of the burner and is carried out by rotating clockwise or counterclockwise the setting screw (5) until the set-point marked on the regulating rod (9) is level with the outside plane of the nozzle-holder assembly (1).

- In the sketch the combustion head is set for an output of 1.50 GPH at 12 bar.
The set-point **3** of the regulating rod (9) is at the same level with the outside plane of the nozzle-holder assembly (1) as shown in the schedule.

4.5 AIR DAMPER ADJUSTMENT

(See fig. 11)

- To vary the setting adjust the screw (7) after loosening the nut (8).
- When burner shuts down the air damper automatically closes till a **max. chimney depressure of 0.5 mbar.**

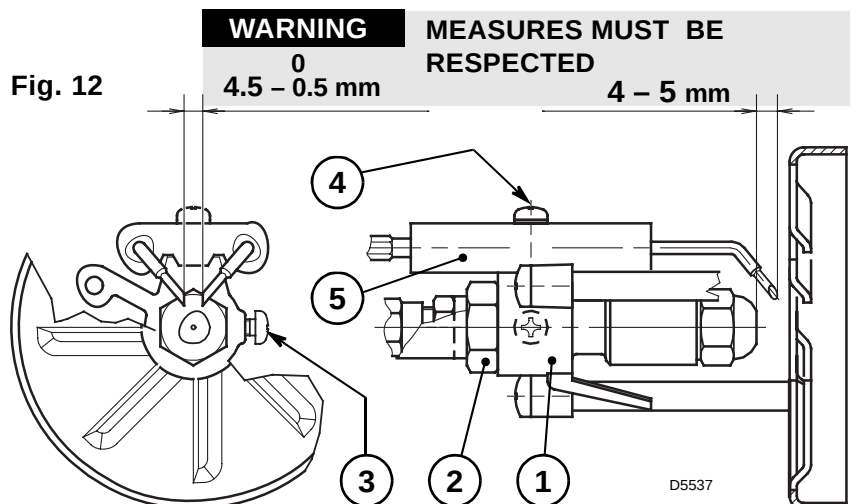
4.6 ELECTRODES ADJUSTMENTS (see fig. 12)

ATTENTION

Lean the diffuser disc-holder assembly (1) on the nozzle-holder (2) and lock it by screw (3). For prospective adjustments loosen screw (4) and move the electrodes assembly (5).

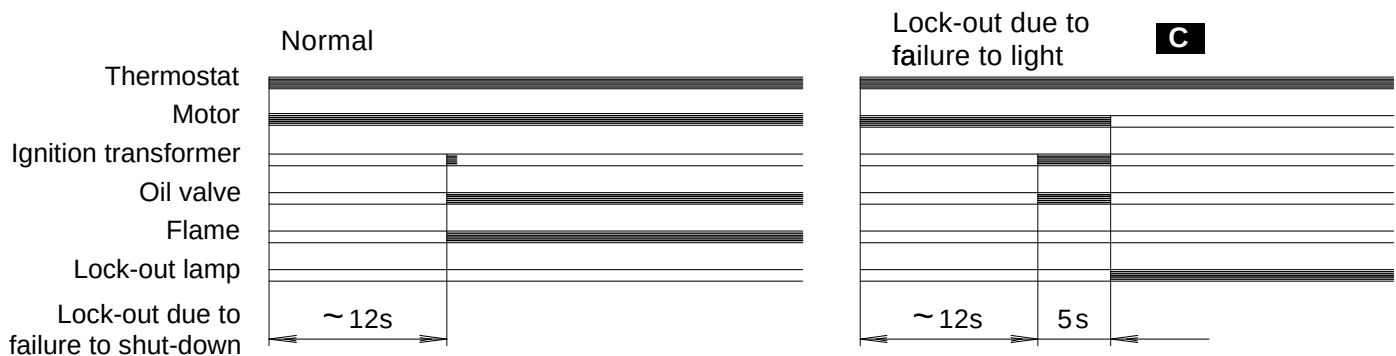
To have access to the electrodes carry out operation as described in **chapter "4.2 RECOMMENDED NOZZLES"** (page 6).

Fig. 12



B Fig. 11

4.7 BURNER START-UP CYCLE



C Lock out is indicated by a lamp on the control box (3, fig. 1, page 1).

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 photoresistance, (7, fig. 1, page 1).
- Check for correct fuel consumption.
- Replace the nozzle (see fig. 10, page 6) and check the correct position of electrodes (fig. 12, page 7).
- Clean the combustion head in the fuel exit area, on the diffuser 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.

Pump pressure and air output

Regardless of the boiler model, in order to ensure smooth start-up of the burner, a hydraulic device is installed, independent of the control box, to lower the fuel and air quantity .

At the time of ignition, the pressure at the nozzle is 9 bar.

After 3 - 9 seconds, it will automatically increase to 15 bar.

The air flow is initially adjusted to low flow, and will automatically switch to high flow when the oil pressure changes.

Settings for low ignition flow (see Fig. 13)

Adjustment of damper

Loosen the screw (8) about one turn; at this time the burner remains in the low flame position.

Loosen the nut (5) and turn the screw (4) until the pointer (6) reaches the specified position.

Then lock the nut (5) and tighten the screw (8).

Adjustment of start delay device

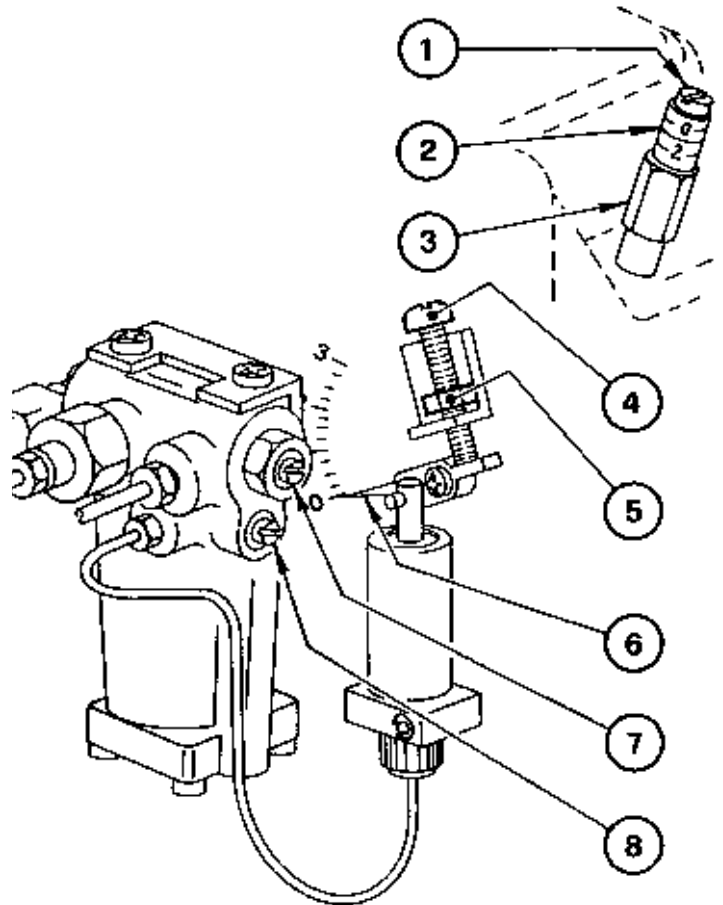
Factory setting is 9 bar.

The pressure gauge must be installed at the connection (4, Fig. 7, P 4).

If it is necessary to reset the pressure or adjust the pressure, this should usually be done after loosening the

Open the screw (8) and adjust the screw (7). Please refer to the table on P 6 for adjustment.

In short, it is recommended that the adjustment result should ensure that the CO₂ value is not less than 12%.



6. FAULTS / SOLUTIONS

Here below you can find some causes and the possible solutions for some 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 (3, 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.
	The photoresistance sees false light.	Eliminate the light.
	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 D, page 8) .	Call technical assistance.
Burner runs normally in the prepurge and ignition cycle and locks out after 5 seconds ca.	The photoresistance is dirty.	Clear it.
	The photoresistance 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.
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.