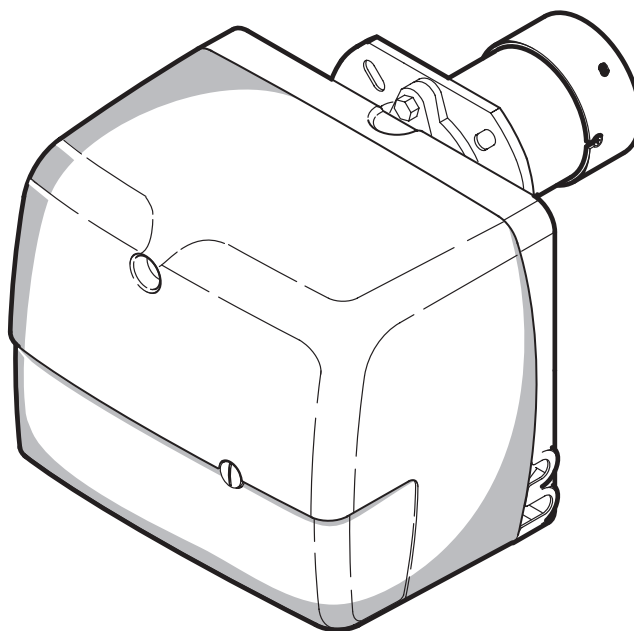


GB Oil burner

One stage operation



CODE	MODEL - MODELE	TYPE
8099060	SIME MACK 7	440 T

INDEX

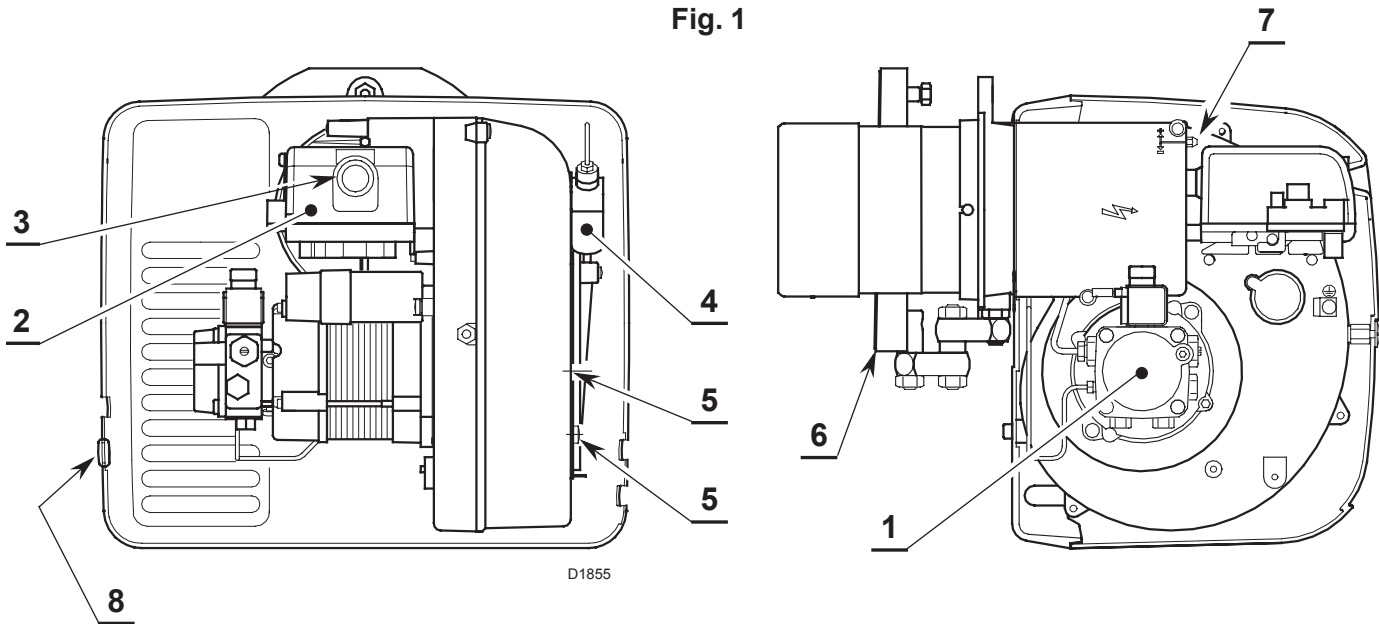
1. BURNER DESCRIPTION	1	4.2 Nozzles recommended.....	6
1.1 Burner equipment	1	4.3 Electrode setting	7
2. TECHNICAL DATA	2	4.4 Combustion head setting.....	7
2.1 Technical data	2	4.5 Air damper adjustment	7
2.2 Overall dimensions.....	2	4.6 Pump pressure	8
2.3 Working field	2	4.7 Burner start-up cycle.....	8
3. INSTALLATION	3	4.8 Adjustments, to avoid flame - detachment, at burner - ignition.....	8
3.1 Boiler fixing	3	5. MAINTENANCE	9
3.2 Hydraulic systems	4	6. FAULTS / SOLUTIONS	10
3.3 Electrical wiring	5		
4. WORKING	6		
4.1 Combustion adjustment	6		

1. BURNER DESCRIPTION

One stage light oil burner.

- 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.

Fig. 1



- | | |
|-------------------------------------|--------------------------------------|
| 1 – Oil pump | 5 – Screws fixing air-damper |
| 2 – Control-box | 6 – Flange with insulating gasket |
| 3 – Reset button with lock-out lamp | 7 – Combustion head adjustment screw |
| 4 – Hydraulic jack with air-damper | 8 – Grommet |

1.1 BURNER EQUIPMENT

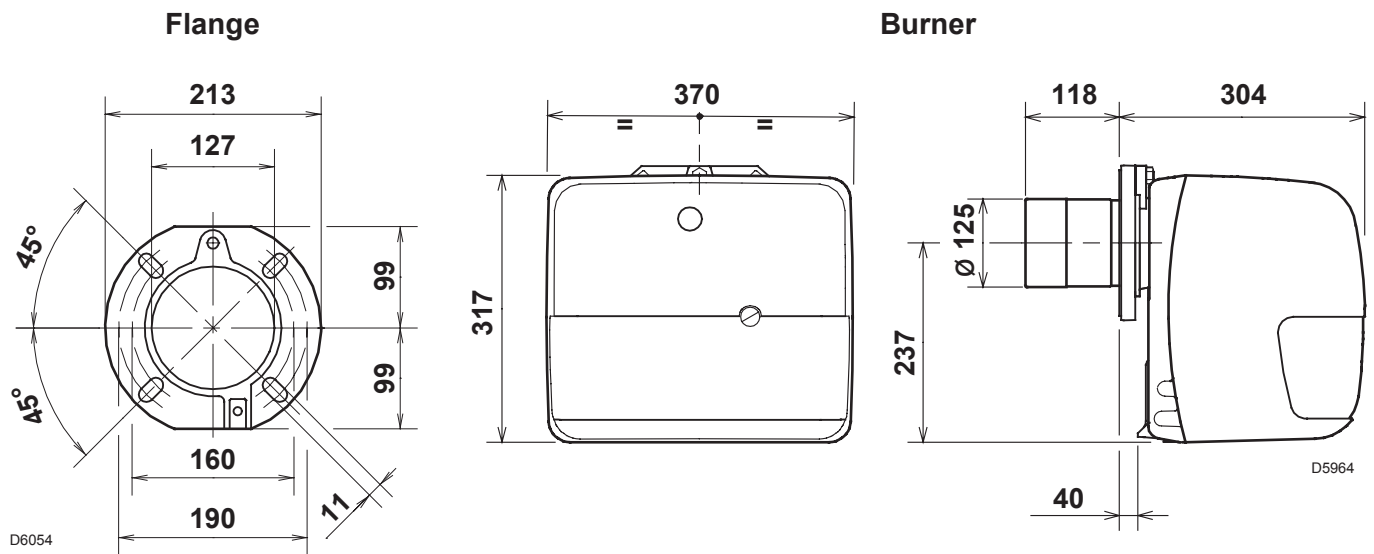
Flange with insulating gasket . . .	No. 1	Screw and nuts for flange to be fixed to boiler . .	No. 4
Screw and nuts for flange	No. 1	Flexible oil pipes with nipples	No. 2
Grommet.....	No. 1	7 pin plug.....	No. 1
Hinge.....	No. 1		

2. TECHNICAL DATA

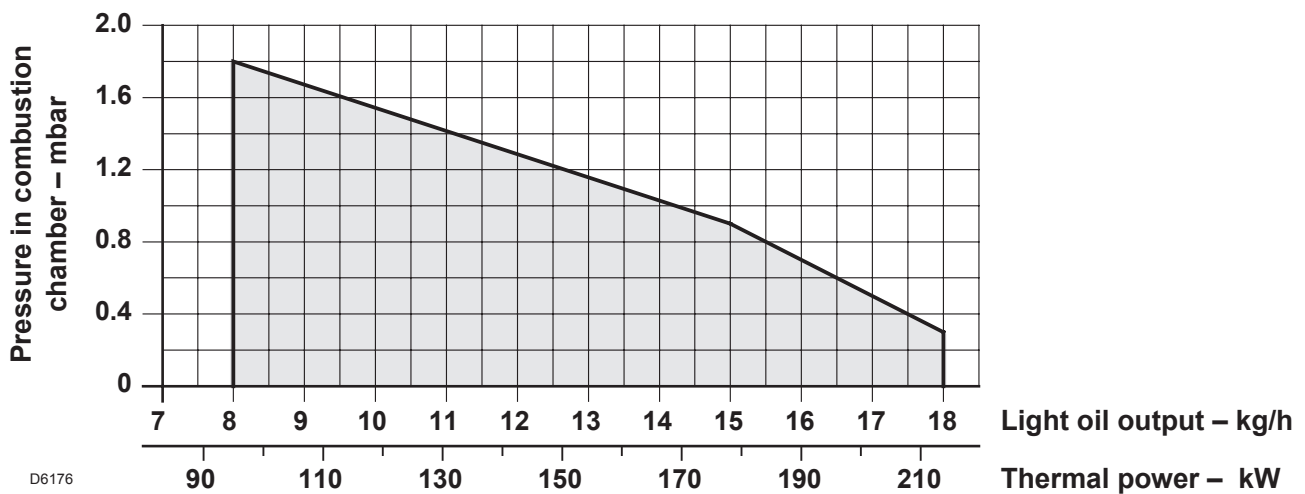
2.1 TECHNICAL DATA

Model	MACK 7
Output - Thermal power	8 – 18 kg/h - 95 – 213.5 kW
Fuel	Light oil, max. viscosity at 20°C: 6 mm ² /s
Electrical supply	Single phase, ~ 50Hz 230V ± 10%
Motor	Run current 1.4A - 2750 rpm - 288 rad/s
Capacitor	6.3 μF
Ignition transformer	Secondary 8 kV - 16 mA
Pump	Pressure: 7 – 15 bar
Absorbed electrical power	0.30 kW

2.2 OVERALL DIMENSIONS



2.3 WORKING FIELD (as EN 267)



3. INSTALLATION

3.1 BOILER FIXING

- ▶ Assemble the hinge and put on the flange (1) the screw and two nuts, (see fig. 2).
- ▶ 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. 3).
- ▶ Verify that the installed burner is lightly leaned towards the button, (see figure 4).

Fig. 2

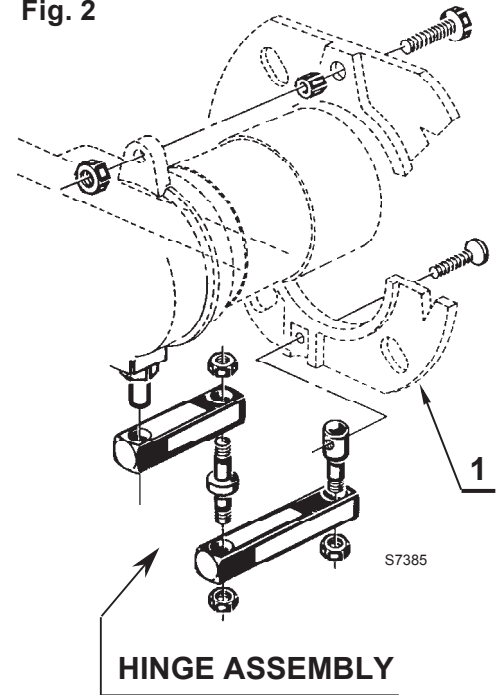


Fig. 3

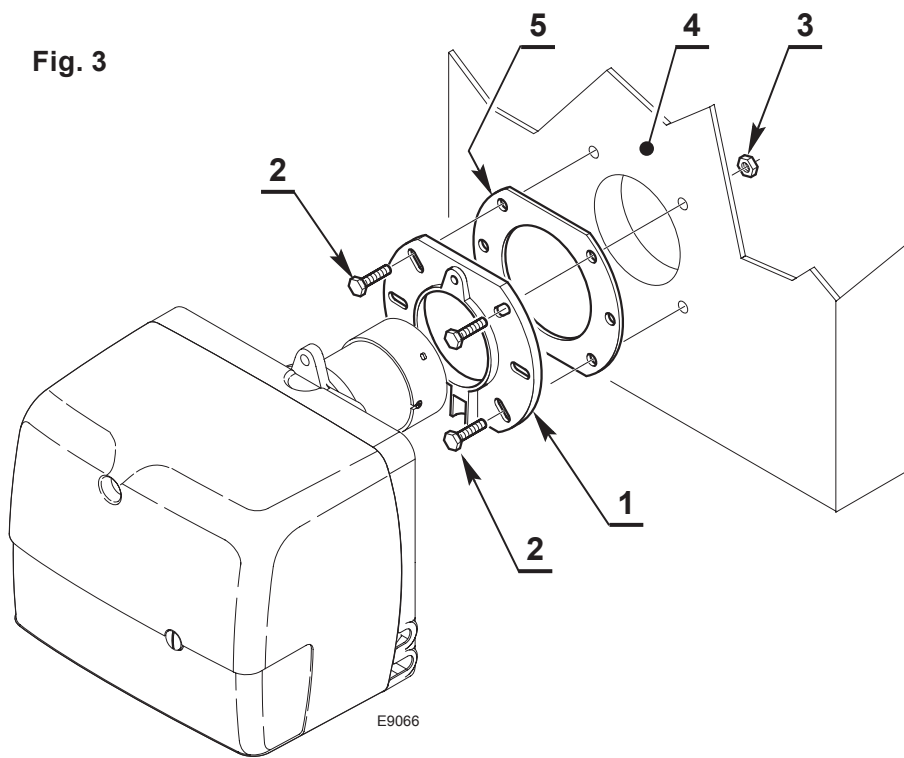
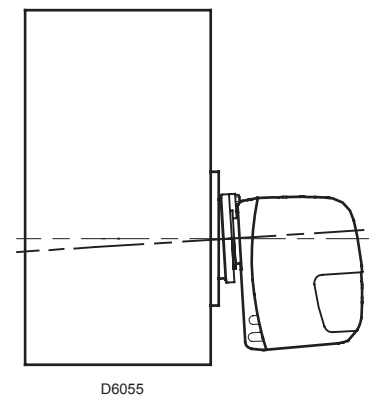


Fig. 4

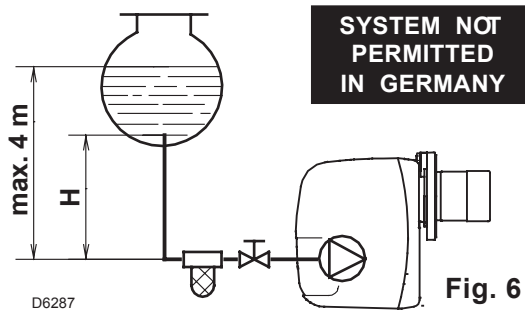


3.2 HYDRAULIC SYSTEMS

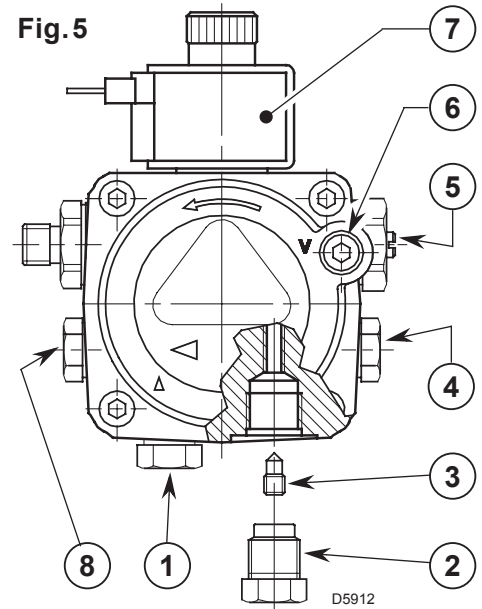
The burner is designed to allow entry of the flexible oil-lines on either side of the burner.

WARNING:

- It is necessary to install a filter on the fuel supply line. The standard filter code 6276200 and that one with recirculation code 6276201 are available on request.
- 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.



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 - Oil valve
- 8 - Auxiliary pressure test point

PRIMING PUMP:

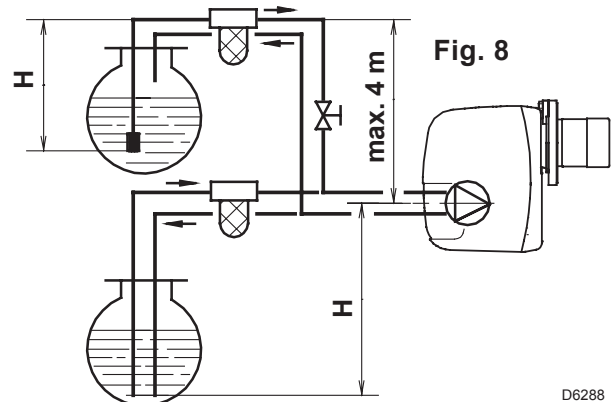
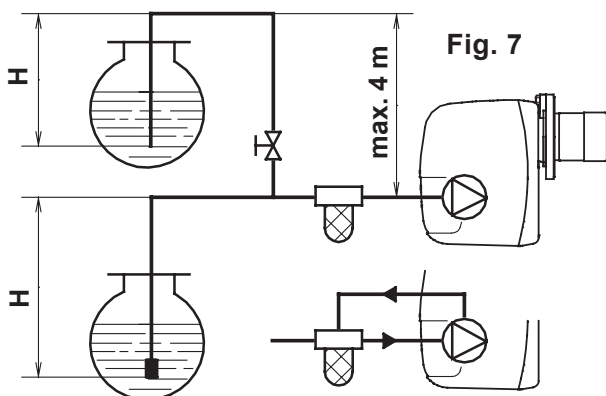
On the system in fig. 6 it is sufficient to loosen the suction gauge connection (6, fig. 5) and wait until oil flows out.

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



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

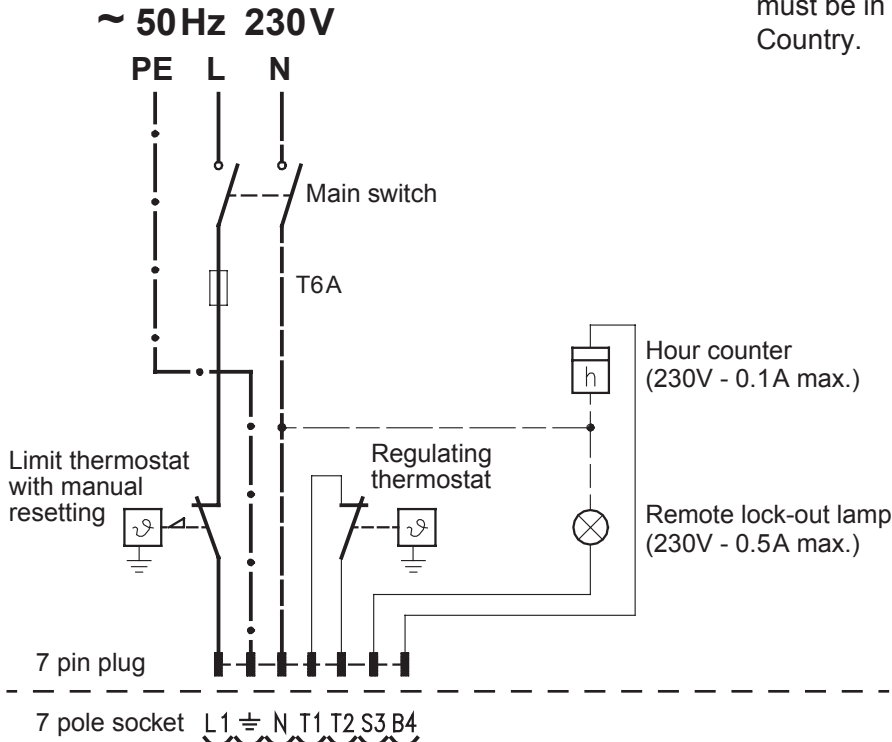
3.3 ELECTRICAL WIRING

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.



TESTING

Check the shut-down of the burner by opening the thermostats.

CONTROL BOX

To remove the control-box from the burner, loosen screw (A, fig. 9) and pull to the arrow direction, after removing all components, the 7 pin plug and earth wire.

CARRIED-OUT IN THE FACTORY

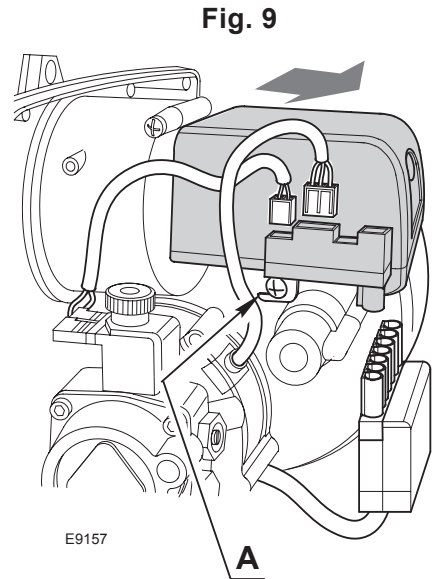
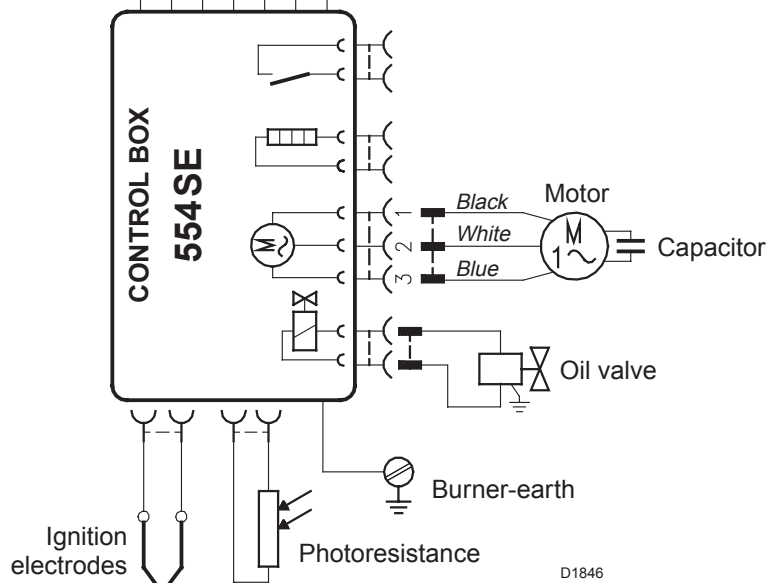


Fig. 9

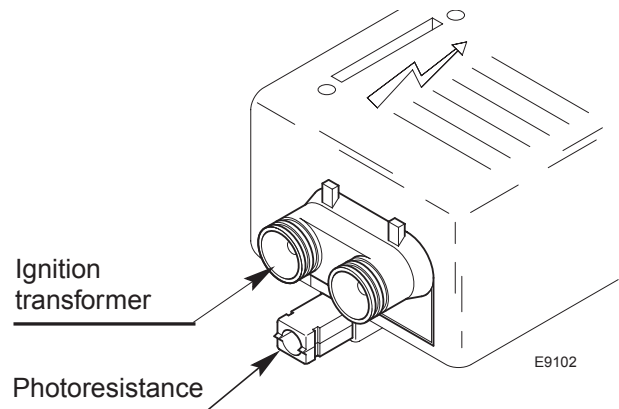
E9157

Fig. 10

ACCESS TO THE PHOTORESISTANCE

(See fig. 10)

The photoresistance is fitted directly into the control-box (underneath the ignition-transformer) on a plug-in support.



E9102

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 table.

■ ADJUSTMENTS FOR SIME BOILERS

The values shown in the table are measured on a SIME boiler (as per EN 267).
They refer to 12.5% CO₂ at sea level and with light oil and room temperature of 20 °C.

BOILER	BURNER - Code 8099060 - Model MACK 7					
	Nozzle		Pump pressure	Burner output	Combustion head adjustment	Air damper adjustment
	GPH	Angle	bar	kg/h ± 4%	Set-point	Set-point
1R 9	2.00	60° B	13	8.4	1.0	3.0
2R 6	▲ 2.50	60° B	11	9.6	2.0	3.5
2R 7	2.75	60° B	13	11.5	2.5	4.5

▲ Burner adjustments carried out in factory.

In case of matching with a boiler different from the “2R 6” model, for the adjustments follow what indicated in the table.

■ APPROXIMATE ADJUSTMENTS FOR INSTALLATION ON OTHER BOILERS

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 ± 4%	Set-point	Set-point
2.00	60°	12	8.0	0.5	2.6
2.25	60°	12	9.0	1.5	3
2.50	60°	12	10.0	2	3.5
2.75	60°	12	11.0	2	4
3.00	60°	12	12.0	2.5	5
3.25	60°	12	13.0	3	5.5
3.50	60°	12	14.0	3.5	6
4.00	60°/45°	12	16.1	5	7
4.00	60°/45°	15	18.0	6	8

4.2 NOZZLES RECOMMENDED:

Monarch type R - PLP ; Delavan type B - W ; Hago type P
Steinen type S - SS ; Danfoss type S - B.

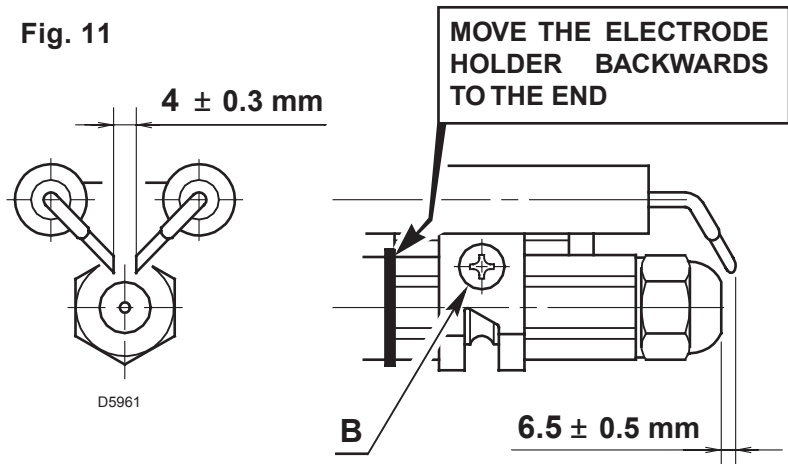
Angle: 60° - In most cases. Particularly suited to avoid flame-detachment during ignition.

45° - For narrow and long combustion-chambers.

4.3 ELECTRODE SETTING

ATTENTION

Before removing or assembling the nozzle, loosen the screw (**B**, fig. 11) and move the electrodes ahead.



4.4 COMBUSTION HEAD SETTING

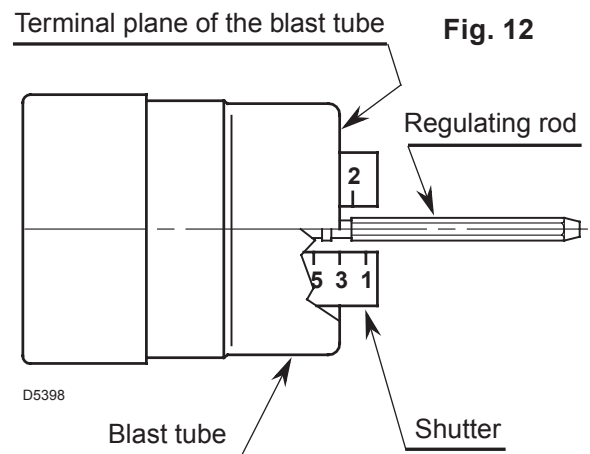
(See fig. 12 and 13)

This is done when fitting the nozzle, with the blast tube removed. It depends on the output of the burner and is carried out by rotating the regulating rod, till the terminal plane of the blast tube is level with the set-point, as indicated in the schedule.

In the sketch on fig. 12, the combustion head is set for an output of 3.25 GPH at 12 bar, while the shutter is level with set-point **3**, as required by the above schedule.

Combustion head settings indicated in the schedule are valid for most cases.

The setting of the fan output according to the installation should normally be done only through the air damper. Should one subsequently want to retouch also the setting of the combustion head, with the burner running, operate on the rod (**1**) with a 6 mm spanner (**2**), (see fig. 13).



TURN TO THE RIGHT: (sign +)

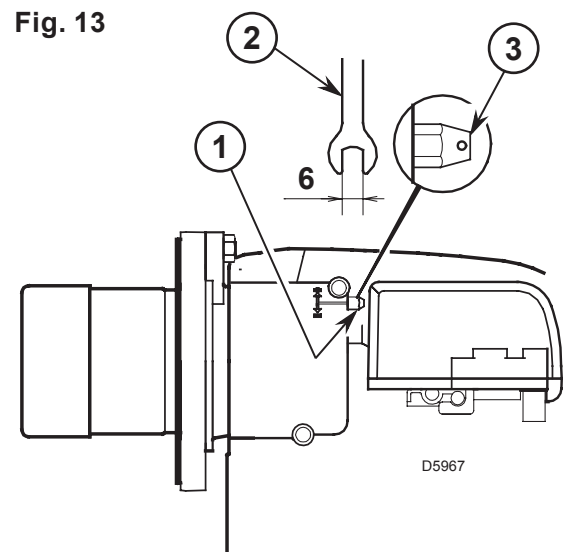
In order to increase the volume of air entering the combustion chamber and thus diminishing its pressure.

There is a reduction of CO₂ and the adhesion of the flame to the air diffuser disc improves.

(Setting advisable for ignitions at low temperatures).

TURN TO THE LEFT: (sign -)

In order to reduce the volume of air entering the combustion chamber and thus increasing its pressure. The CO₂ improves and the adhesion of the flame to the diffuser tends to reduce. (This setting is not advisable for ignitions at low temperatures). In any case do not bring the combustion head setting more than one point away from that indicated in the schedule. One set-point corresponds to 3 turns of the rod; a hole (**3**) at its end facilitates counting the number of turns.



4.5 AIR DAMPER ADJUSTMENT, (see fig. 14, page 8)

The mobile air damper (**1**) operated by the jack (**2**) assures the complete opening of the air intake. The regulation of the air-rate is made by adjusting the fixed air damper (**3**), after loosening the screws (**4**). When the optimal regulation is reached, **screw tight the screws (4)** to assure a free movement of the mobile air damper (**1**).

The settings, indicated in the table at page 6, refer to the burner with its cover fitted and combustion chamber with depression zero.

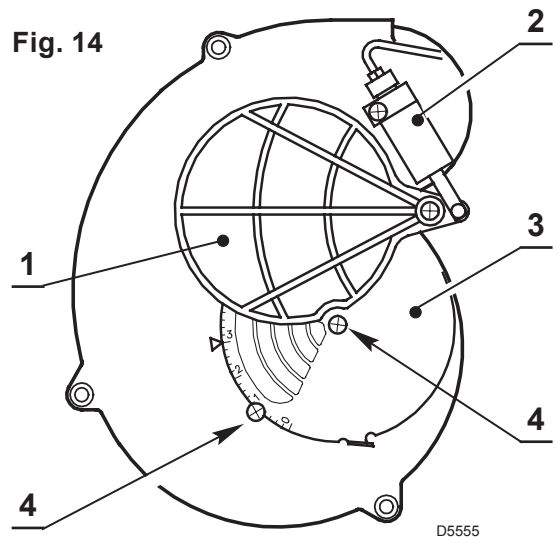
These regulations are purely indicative. Each installation however, has its own unpredictable working conditions: actual nozzle output; positive or negative pressure in the combustion-chamber, the need of excess air, etc.

All these conditions may require a different air-damper setting.

It is important to take account of the fact that the air output of the fan differs according to whether the burner has its cover fitted or not.

Therefore we recommended to proceed as follows:

- ▶ Adjust the air damper as indicated in the table at page 6.
- ▶ Mount the cover.
- ▶ Check smoke number and CO₂.
- ▶ Should it become necessary to modify the air output, remove the cover by loosening the screw, adjust the air damper, remount the cover and finally recheck the smoke number.



4.6 PUMP PRESSURE

11 bar: The pump leaves the factory set at this value.

14 bar: Improves flame retention; it is therefore suitable for ignitions at low temperatures.

4.7 BURNER START-UP CYCLE



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

4.8 ADJUSTMENTS, TO AVOID FLAME - DETACHMENT, AT BURNER - IGNITION

This inconvenience can occur, when the temperature of the gas-oil decreases below +5 °C.

1) **CORRECT POSITIONING OF THE ELECTRODES,** (see fig. 11, page 7).

2) PUMP - SETTING

The pump is factory set, at a pressure of 11 bar.

When the temperature of the gas-oil decreases below +5 °C, increase the pressure to 14 bar.

3) COMBUSTION-HEAD SETTING

Regulate the combustion-head one set-point further ahead than indicated in the instructions.

Example: the instructions require to set the combustion-head on set-point 3.

Instead, the setting is made on set-point 4.

4) FAN - AIR DAMPER ADJUSTMENT

Adjust the air damper of the fan, such as to obtain a smoke-number not inferior to 1. (i.e. a combustion with the lowest possible excess-air).

5. MAINTENANCE

Burner requires a periodic maintenance carried out by a qualified and authorized technicians.

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, (see fig. 10, page 5).
- ▶ Check for correct fuel consumption.
- ▶ Replace the nozzle and check the correct position of electrodes (fig. 11, 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.

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 green led on the control box is off and the burner does not start.	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 thermostat limit is not lock out.	
	The connections in the control box are wrongly inserted.	Check and connect completely all the plugs.
The green led on the control box is on and the burner remains in the pre-purge phase.	The photoresistance sees false light.	Eliminate the light.
Burner runs normally in the pre-purge 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.



Fonderie Sime S.p.A. - via Garbo, 27 - 37045 Legnago (Vr) - Italy

Tel. +39/0442 631111 - Export Division fax number +39/0442 631293 - Sime Service fax number +39/0442 631292