Dual fuel Gas-Oil/Gas burner

MODEL	TYPE
GI/EMME 600	497 T80

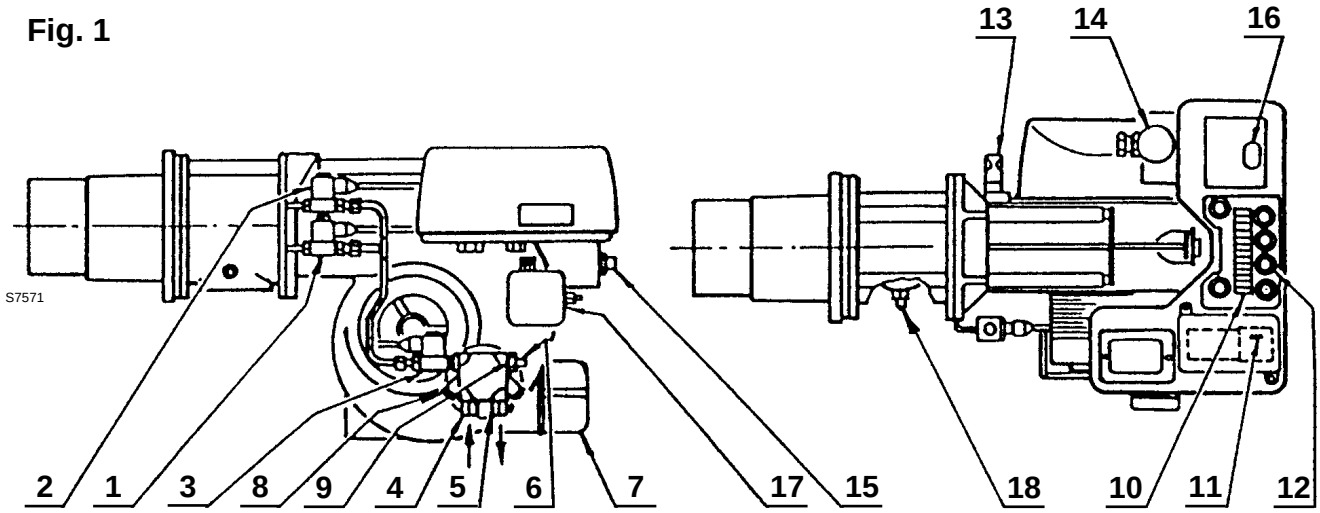
2915144 (6)

TECHNICAL FEATURES

Thermal power	174/348 ÷ 697 kW - 150.000/300.000 ÷ 600.000 kcal/h
Fuels	Oil, max. viscosity at 20°C: 6mm^2/s (1.5°E) natural gas with Pci 8600 kcal/m^3 Lpg with Pci 22.200 kcal/m^3
Minimum gas pressure (measured at the test-point)	Maximum capacity requires 13 mbar with natural gas, 15 mbar with LPG. Combustion chamber at 0 mbar.
Maximum gas pressure	150 mbar
Electrical supply	Three-phase 380 V +10% -15% ~ 60 Hz with neutral
Motor	1.9 A/380V
Pump-capacitor motor	1A / 220 V - 6.3 µF
Ignition transformer	Primary: 1.8A / 220 V - Secondary: 30 mA / 1x8 kV
Pump	Output 80 kg/h at 12 bar - max pressure 15 bar
Operation	Two stages gas

The burner conforms to IP 40 level of insulation as per CEI/70.1

Fig. 1



KEY TO LAY-OUT

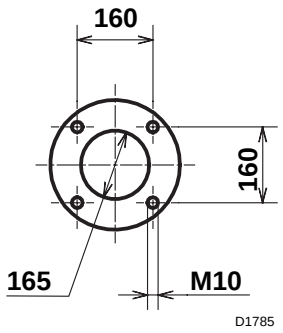
1 - Oil valve 1° stage
2 - Oil valve 2° stage
3 - Safety oil valve
4 - Oil supply port
5 - Oil return port
6 - Pressure regulator at the pump
7 - Air damper motor
8 - Pressure gauge port (G 1/8)
9 - Vacuum gauge port (G 1/8)
10 - Terminal board
11 - Reset push-button of the motor overload relay
12 - Cable gland
13 - UV photocell
14 - Oil motor capacitor
15 - Oil-gas selector switch
16 - Control-box reset button
17 - Air pressure-switch
18 - Gas pressure socket to sleeve

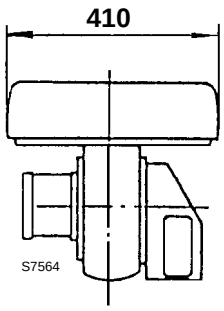
EQUIPMENT

Quantity	Burner accessories
1	Gas-train's gasket
8	Screws
1	Insulating screen
3	Seal
2	Oil hoses
4	Connectors
4	Gaskets
1	Lpg transf. kit
2	Oil nozzles
1	Flange
1	Pipe fitting for gas train

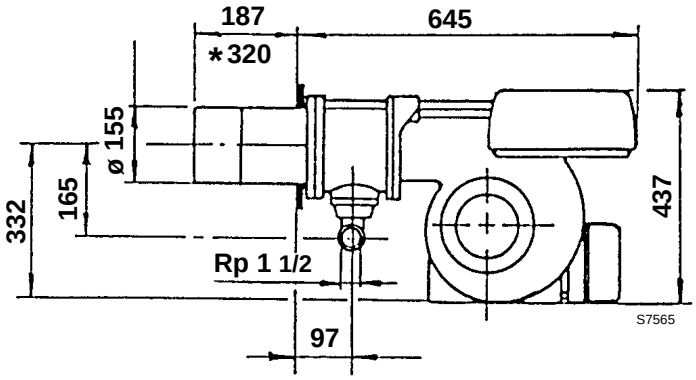
DIMENSIONS

Boiler front-plate drilling





Burner

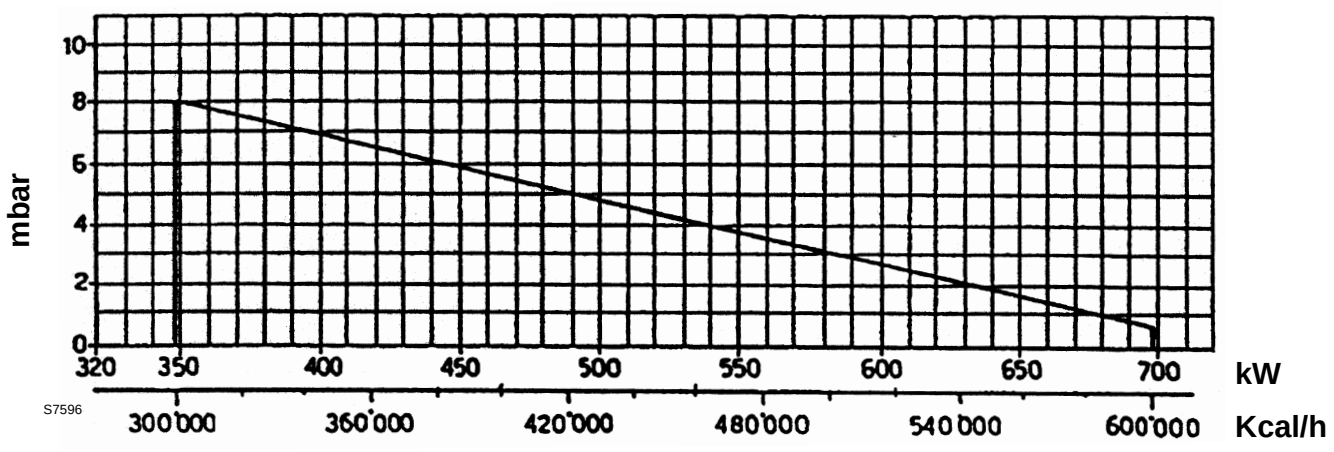


* Extension that you can obtain with special extended head (to be requested separately).

WORKING RANGE

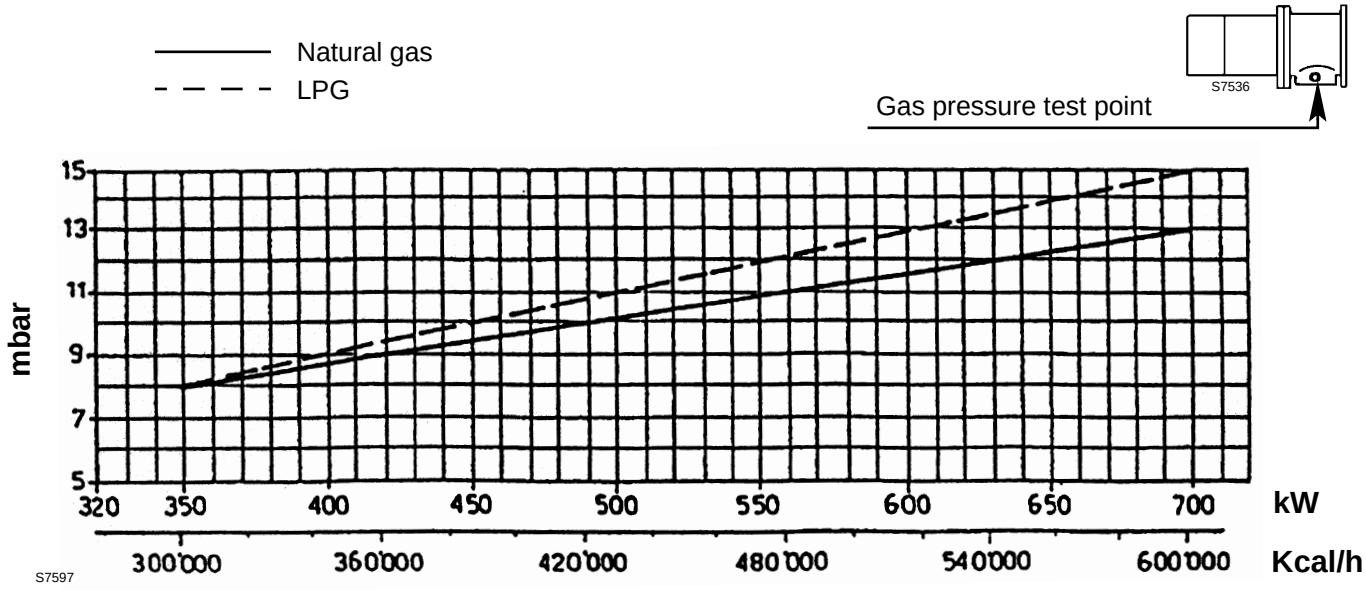
PRESSURE IN THE COMBUSTION CHAMBER - 2nd STAGE OUTPUT

Min output at 1st stage 174 kW - 15 Kg/h

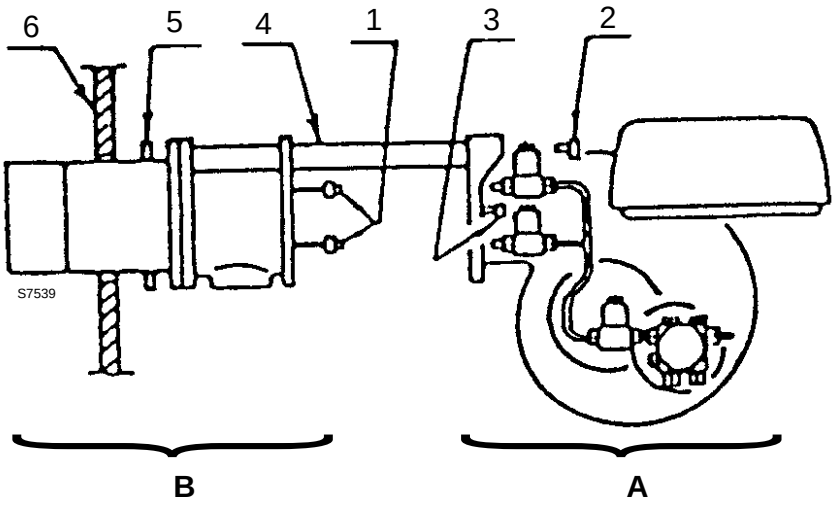


MINIMUM GAS PRESSURE - 2nd STAGE OUTPUT

Pressure: measured at the test point with combustion chamber at 0 mbar.



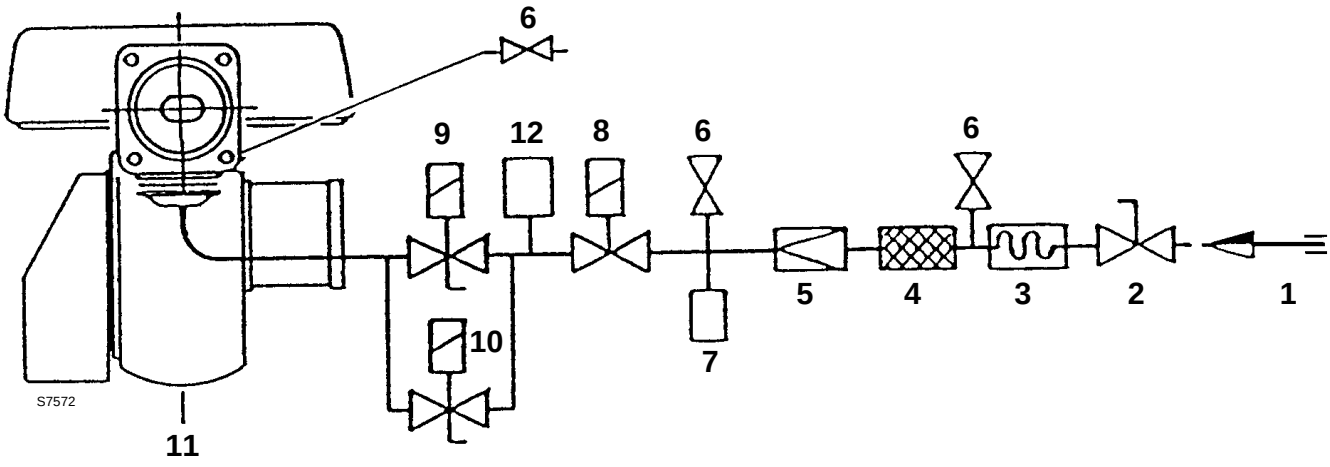
FIXING TO THE BOILER



In order to devide the combustion head from the rest of the burner, you have to:
- remove the connection (1) from the two valves;
- remove the 4 screws (2 - 3);
- slide the burner body (A) along the rails (4);
- mount the group (B) to the boiler's plate (6) interposing gasket (5).

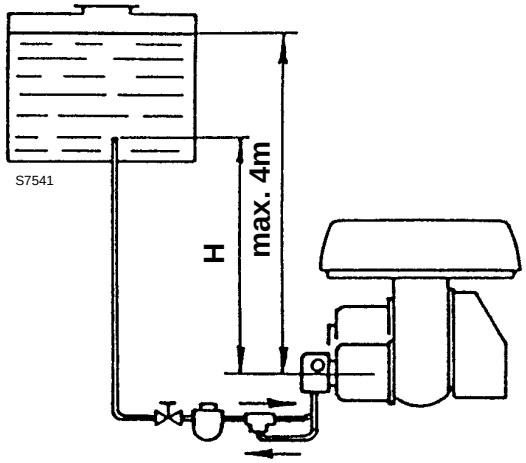
Mount the group (A) to the boiler front. Fit the nozzles and regulate the combustion head (as specified below).

GAS SUPPLY LINE

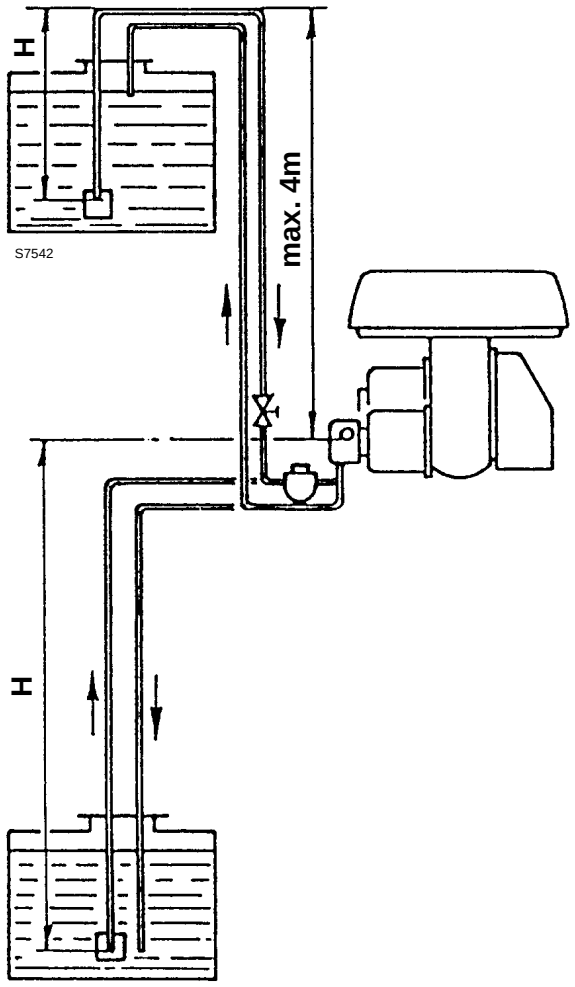


1 - Gas supply pipe
2 - Manual valve
3 - Isolator joint
4 - Filter
5 - Pressure governor
6 - Pressure test-point
7 - Min. gas pressure switch
8 - Gas safety shut off valve
9 - 1° stage gas shut off valve
10 - 2° stage gas shut off valve
11 - Burner
12 - Gas leak control device

OIL SUPPLY



H	L	m
m	Øi 8	Øi 10
0.5	4	10
1	8	20
1.5	12	30
2	16	40
2.5	20	50



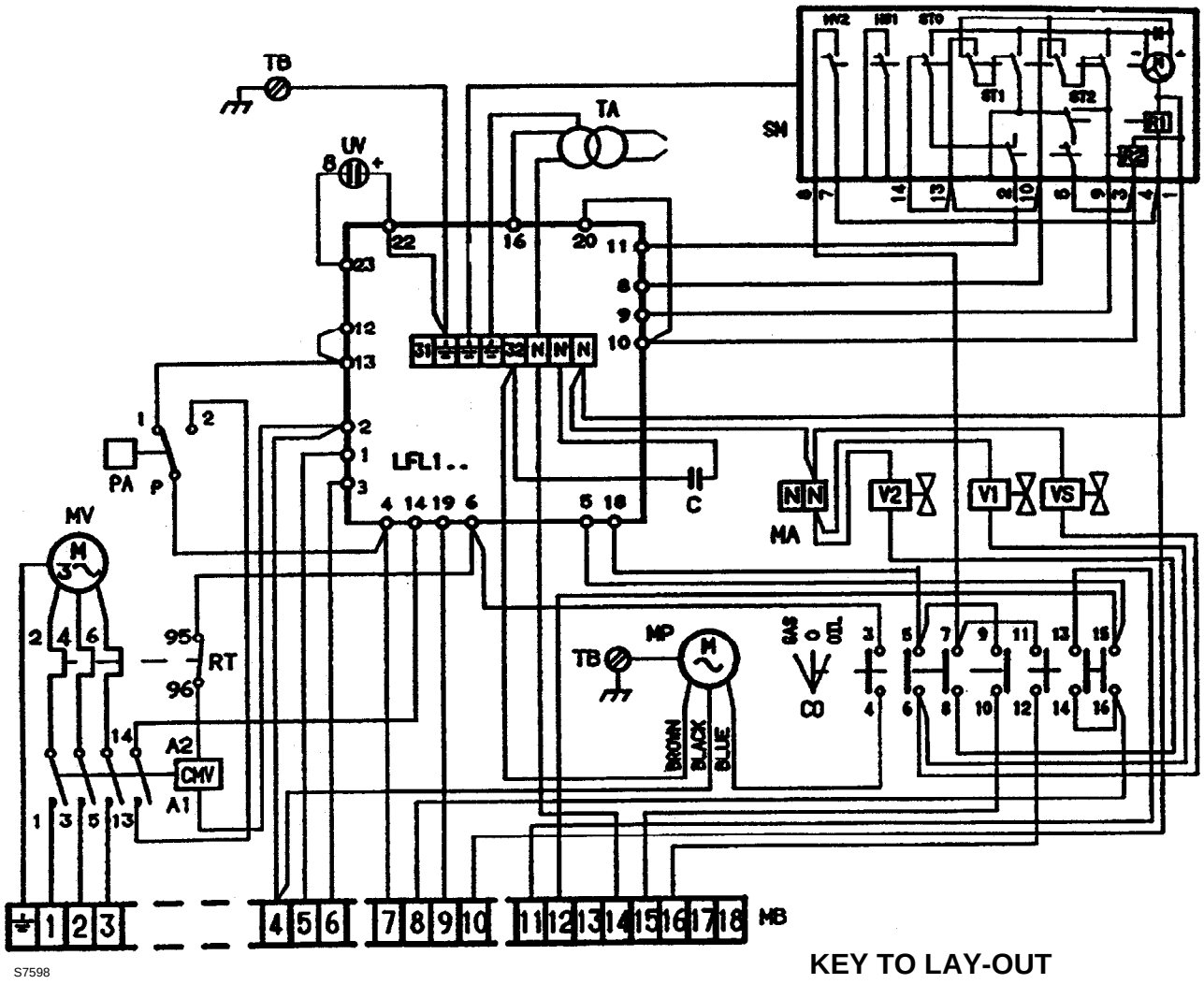
H	L	m
m	Øi 10	Øi 12
0	40	100
0.5	36	90
1	32	80
2	24	58
3	15	36
3.5	10	25

Please note:
all oil lines must be airtight.
We suggest copper-piping. Level as the suction pipe, then a none return valve is not required and the section-pipe can be disconnected without causing any problems.

H = Margin; **L** = Inlet-pipe's length, including the vertical line.
The copper pipes with diameter 10 and 12, shown in the schemes, can be replaced with 3/8 and 1/2 steel pipes, commercial gas without welding.

BURNER ELECTRICAL WIRING

(carried out in the factory)



KEY TO LAY-OUT

C: Pump motor capacitor
CMV: Contact-maker
CO: Selector switch
MB: Burner terminal strip
MP: Pump motor
MV: Fan motor
PA: Air pressure switch
RT: Thermal relay
SM: Servo-motor
TA: Ignition transformer
TB: Burner earth
UV: Probe U.V.
V1: 1° stage valve
V2: 2° stage valve
VS: Oil safety valve

SELECTOR SWITCH

	OIL	O	GAS
3 - 4	X		
5 - 6	X		
7 - 8	X		
9 - 10			X
11 - 12			X
13 - 14			X
15 - 16	X		

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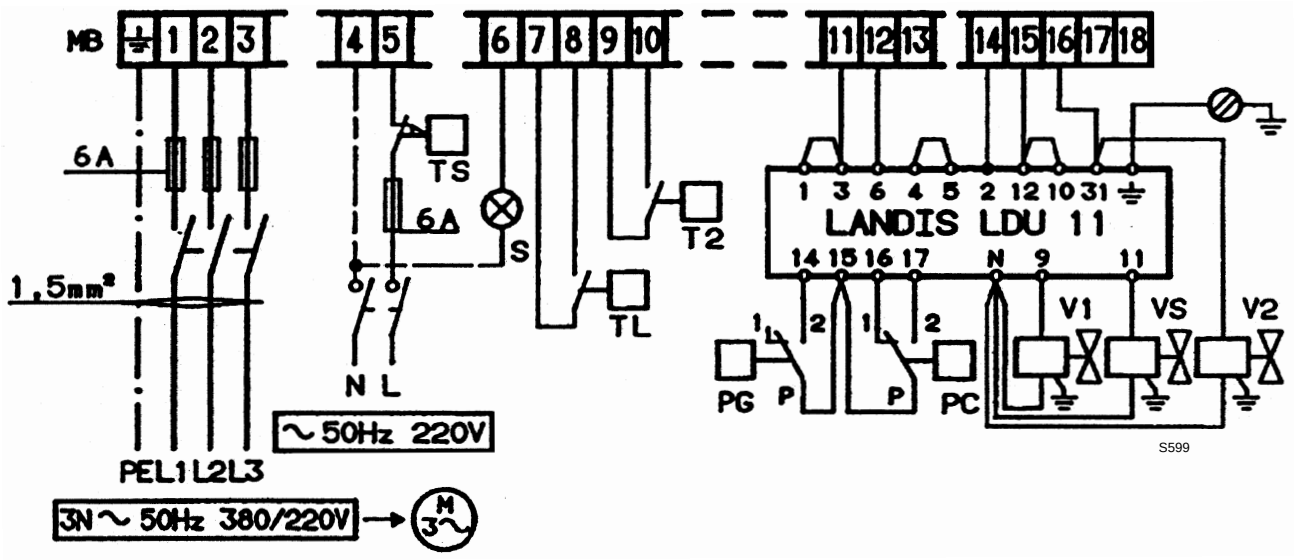
ELECTRICAL CONNECTIONS TO THE WIRING TERMINAL BLOCK

(to be carried out by the installer)



KEY TO LAYOUT

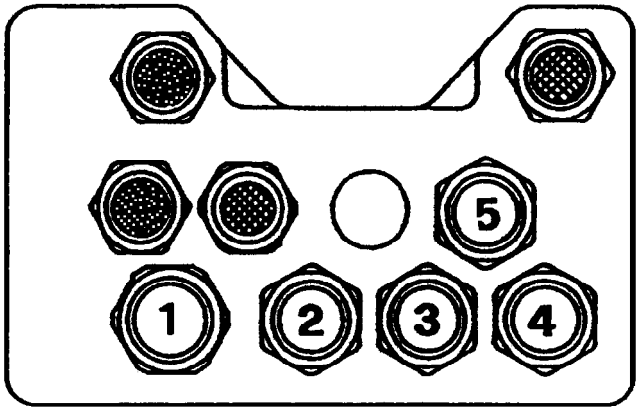
MB - Burner terminal strip
MR - Gas train terminal strip
TS - Safety remote control system
TL - Limit control system
T2 - 2° stage remote control system
PG - Min. gas pressure switch
V1 - 1° stage gas shut off valve
V2 - 2° stage gas shut off valve
VS - Gas safety shut off valve
S - Remote lock signal
PC - Check pressure switch
TB - Burner earth

NOTICE

- The electric wiring carried out by the installer must be in compliance with the rules in force in the country.
- Leads minimal section 1.5 mm^2.
- Burners with non-stop operation: for safety reasons, this type of burner must be stopped every 24 hours of operation, by means of an hours-counter to be connected in series with the adjustment devices.
- The flame modulation in obtainable trought the 2° stage remote control system (T2). Connected to the terminals 9-10.

FIXING OF THE ELECTRICAL WIRES

All the electrical wires, which are to be connected into the terminal rail 10 (fig. 1) should pass through the cable glands hubes 12 (fig. 1), accordingly the scheme below.



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1 - Supply : gland Pg 21
2 - Regulation thermostat : gland Pg 13.5
3 - Safety thermostat : gland Pg 13.5
4 - 2° stage thermostat : gland Pg 13.5
5 - GAS TRAIN : gland Pg 13.5 - for sheath ø 13

To guarantee the IP 40 protection level, in accordance to CEI 70.1, seal the glands that are not used.

NOTES

- Do not exchange “Neutral” with “Phase” (avoid a plug/socket connection).
- Make a good earth connection.

  Verify that the burner will lockout by firing the burner and obscuring the UV cell.

ATTENTION

When you close the burner on the two guide rail, all the slack should be pulled out the high voltage-cable.

This burner is in accordance to the CEE law n.76/889, D.M. 9/10/1980, for protection against radio-noises.

COMBUSTION HEAD ADJUSTMENT

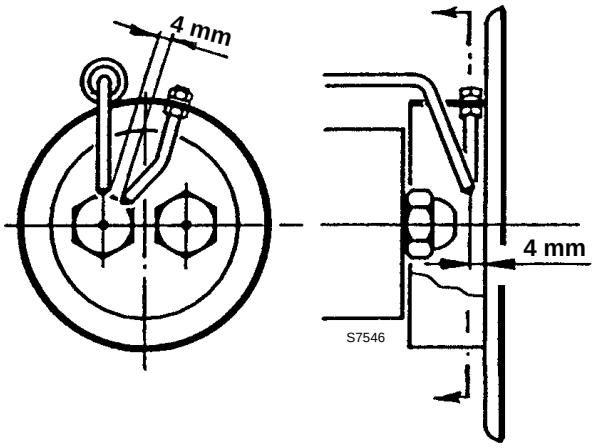
Adjustments can be made to the burner, when it is still open for installation (see page 3, fixing to the boiler).

NOZZLE'S CHOICE

Spray angle:
- usually, 60°
- for narrow combustion chambers: 45°

Pump pressure	Nozzle				
	1°		2°		1°+2° kg/h
bar	GPH	kg/h	GPH	kg/h	
11	4.00	15.0	4.00	15.0	30.0
10 12	4.50 4.50	16.4 18.0	4.50 4.50	16.4 18.0	32.8 36.0
10 12	5.00 5.00	18.2 20.4	5.00 5.00	18.2 20.4	36.4 40.8
10 12	5.50 5.50	19.7 22.0	5.50 5.50	19.7 22.0	39.4 44.0
10 12	6.00 6.00	22.0 24.0	6.00 6.00	22.0 24.0	44.0 48.0
10 12	6.50 6.50	24.0 27.0	6.50 6.50	24.0 27.0	48.0 54.0
10 12	7.00 7.00	25.5 28.4	7.00 7.00	25.5 28.4	51.0 56.8
11	7.50	30.0	7.50	30.0	60

Position of the ignition electrodes



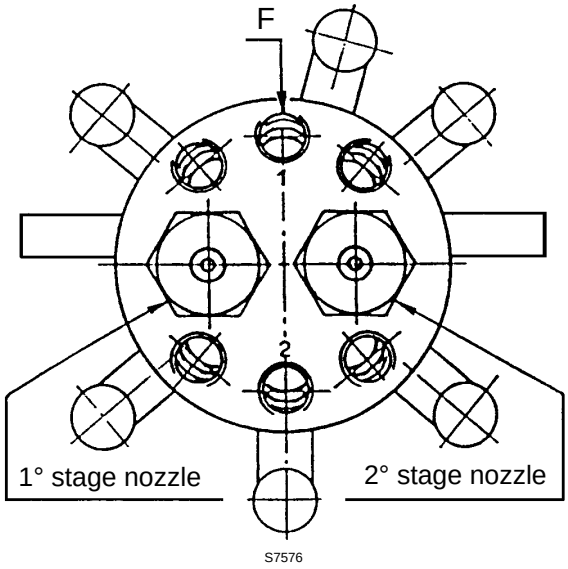
SETTING OF GAS DISTRIBUTOR

The burner leaves the factory setted for burning natural gas (see the drawing on the right):

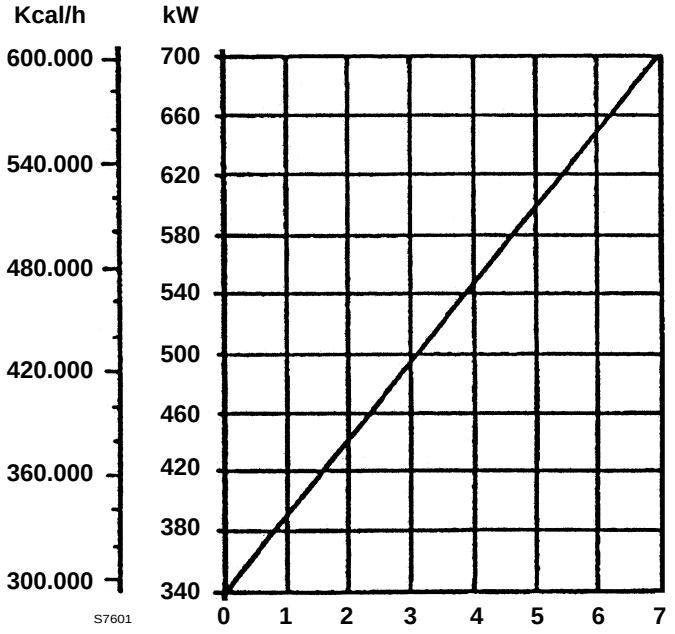
- Each hole (F) completely opened.
- For operation up to 400.000 kca/h, fit 2 nozzles with 4 mm diameter outlets to holes (F) (1 and 2). The fitting is suggested to get better combustion performance.

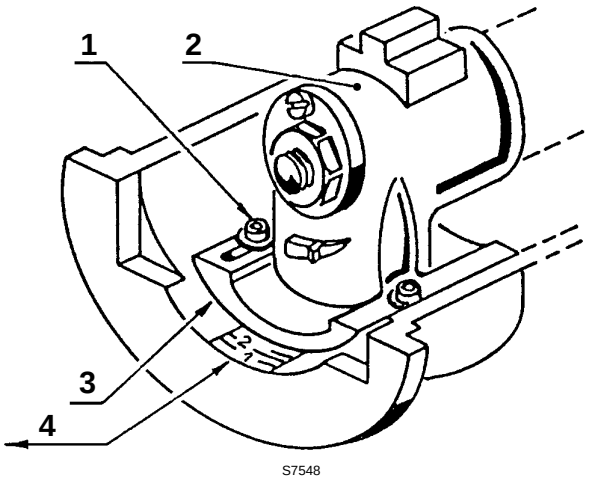
To burn LPG fit the kit as detailed below:

- Fit 6 nozzles with ø 4 mm diameter outlets to holes (F).



Loosen the two screws (1), move the elbow (2) so that the rear part (3) coincides to the desired set-point (4). Tighten the screws (1).

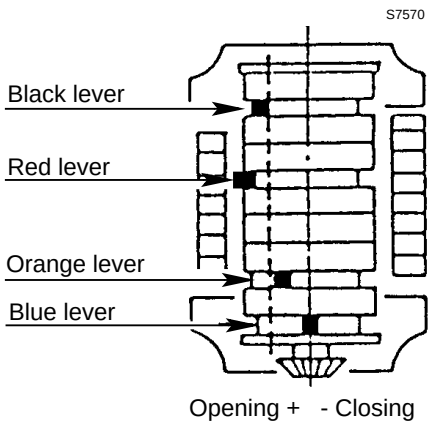




ADJUSTMENT OF THE AIR DAMPER MOTOR

STOP - Blue lever

This lever leaves the factory vertically positioned and corresponds to the complete closing of the air damper.
A partial opening of the air damper might be obtained by moving leftwards this lever (+ on the label).
The new position the air damper is detectable when the burner is off. Do not overcome the position of the orange lever for the 1st stage.



1st STAGE - Orange lever

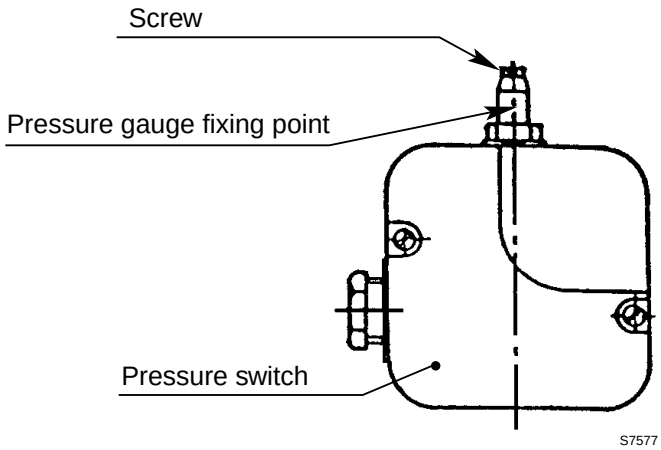
The orange lever controls the air damper position for the first flame, it is adjustable both for opening and closing.

2nd STAGE - Red and black levers

The red lever controls the air damper position for the second flame, it is adjustable both for closing and opening. The black lever controls the opening of the second oil valve and it must always - for a bit - the red lever, but never the orange one.

BURNER START-UP CYCLE

Venting the gas supply.
This is done by removing the screw from the gas pressure switch, or the pressure test point.

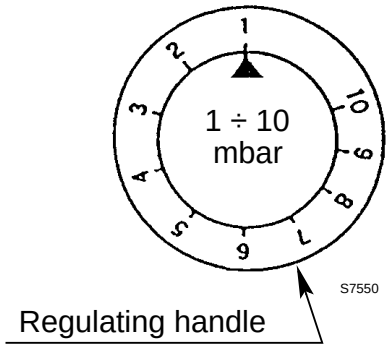


AIR PRESSURE SWITCH (17 Fig.1)

Adjust the air pressure switch after adjustment of all the other parts of the burner, with air pressure switch setted at beginning of the scale.

When the burner works (1st stage) increase the regulating pressure, turning the handle slowly in the clockwise till the burner is locked out.

Then turn back of 1 mbar and repeat the burner's starting, in order to verify the good work; if you have a lock out, turn back once again of 0.5 mbar.



PUMP'S FIRING

In case of drop-plant with supply from the tank's bottom, back off the plug at the vacuumeter-joint 9) (fig. 1), till the leaking of fuel.
In the other two situations, start up the burner, bleed the air of manometer-joint 8) P (fig. 1); if you have a lock-out, repeat the cycle.

ATTENTION
Before starting up the burner, check that the return pipe has no occlusions.
Any occlusions will cause the break of the pump-sealing organ.

WORK WITH OIL

At the first ignition, when there is the passage from the first to the second flame, there is a strong decrease of fuel-pressure owing to the filling of second nozzle's pipe. This decrease can cause the burn-out of the burner.

COMBUSTION CHECKS

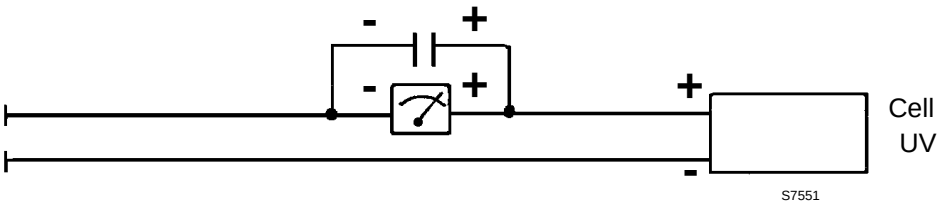
CO_2
It is better to set the burner with CO_2 not higher than 10% (gas with Pci 8600 kcal/m^3).
So you avoid that a little unsetting (for example draft variation) causes combustion with few air and with the production of CO.

CO
It must be not higher than 0.1% (thousand parts for million) in accordance to UNI-CIG 8042 norme.

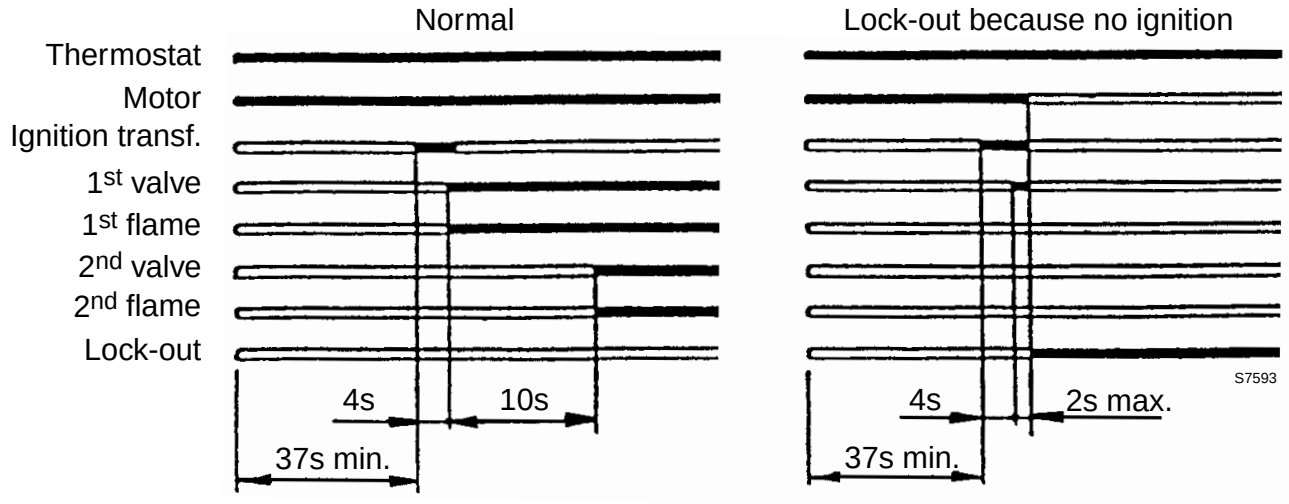
CURRENT TO THE UV PHOTOCELL

Min. value for a good work: 15 µA.
If the value is lower, it can depends on:
- worked out photocell.
- low current (lower than 187V)
- bad regulation of the burner.

In order to measure the current, use a microammeter of 100 µA c.c., connected to the photocell, as in the scheme, with a capacitor of 100 µF - 10V c.c. at the same level of the instrument.



BURNER STARTING UP PROGRAMME



If during the work the flame burns off, there is a lock out within 1 second.

BURNER STARTING DIFFICULTIES AND THEIR CAUSES (GAS)

The electrical equipment is fitted with a disk which rotates during the start-up program and can be seen through the release inspection window. When the burner does not start or stops because of a fault, the symbol which appears in the inspection window indicates the type of interruption fault.

◄ THE EQUIPMENT DOES NOT START WHEN THE THERMOSTATS CLOSE

- There is no gas.
- The min. gas pressure switch does not close the contact: it is incorrectly adjusted.
- The air pressure switch is set in operating position.
- The equipment fuse has blown.
- The cam pos. 1 selector switch does not close the circuit, equipment terminals 11 and 8.

▲ HALT AFTER START-UP

- The cam pos. 2 selector switch does not close the circuit, equipment terminals 9 and 8.

P LOCK HALT

The air pressure switch does not effect a selection because of:
- a fault contact;
- insufficient air pressure.

■ LOCK HALT

Malfunctions of the flame detection circuit:
- photo-sensitive cell exhausted;
- fault internal amplifier.

▼ PRE-VENTILATION HALT

- The cam pos. 3 selector switch does not close the circuit, equipment terminals 10 and 8.

1 LOCK HALT, no flame signal:

- ……
- photo-sensitive cell connection to the equipment is interrupted;
- insufficient electrical detection current (min. 70 µA).

❙ LOCK HALT IN OPERATION BECAUSE OF:

- no flame signal;
- no air pressure.

N.B.:

- If the lock halt takes place between start and pre-start-up without a fault symbol appearing, the fault is usually flame simulation.
- The burner continues repeating the start-up cycle without the lock taking place:
  a) there is oscillation of the min. gas pressure switch caused by adjustment very close to the mains pressure, so that the drop in pressure which occurs at burner start-up is sufficient to trigger action and this cause a new start-up cycle.

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