

GB **Forced draught gas burner**

One stage operation

CODE	MODEL	TYPE
3751682	GAS 4	516 T80

Declaration of conformity in accordance with ISO / IEC 17050-1

Manufacturer: RIELLO S.p.A.
Address: Via Pilade Riello, 7
37045 Legnago (VR)
Product: Forced draught gas burner
Model: GAS 4

These products are in compliance with the following Technical Standards:

EN 676

EN 12100

and according to the European Directives:

MD	2006/42/EC	Machine Directive
LVD	2006/95/EC	Low Voltage Directive
EMC	2004/108/EC	Electromagnetic Compatibility

The quality is guaranteed by a quality and management system certified in accordance with UNI EN ISO 9001.

Legnago, 21.05.2015

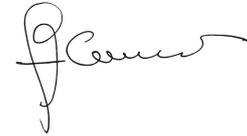
Executive General Manager
RIELLO S.p.A. - Burner Department

Mr. U. Ferretti



Research & Development Director
RIELLO S.p.A. - Burner Department

Mr. F. Comencini

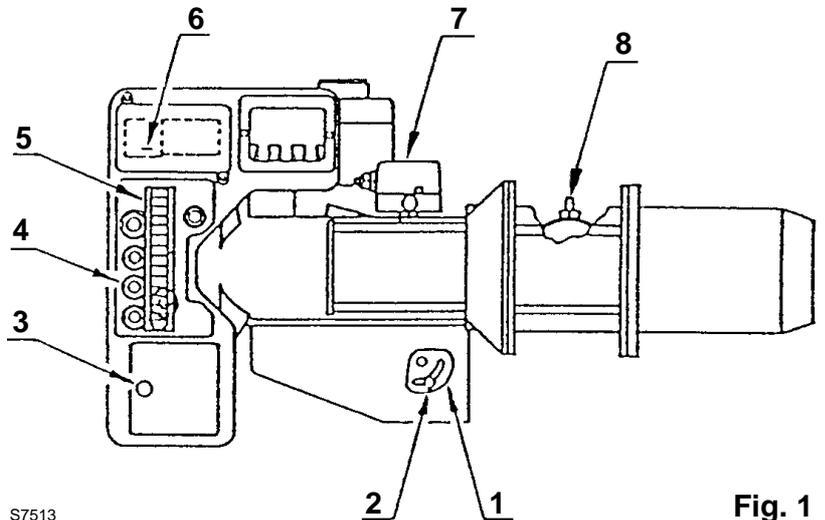


TECHNICAL DATA

Thermal output	180 - 470 kW 154.800 - 404.200 kcal/h
Fuel	Natural gas Pci 8 - 10 kWh/m ³ = 7000 - 8600 kcal/m ³
Minimum gas pressure	For maximum output 9.8 mbar are needed measured at the coupling with nil pressure in the combustion chamber and gas with calorific value of 8600 kcal/m ³
Maximum gas pressure	150 mbar
Electrical supply	Three phase 380 V + 10% - 10% ~ 60Hz with neutral
Motor	1.5 A / 380 V
Ignition transformer	Primary: 1.8A / 220V - Secondary: 1 x 8 kV - 30 mA
Absorbed electrical power	0.6 kW

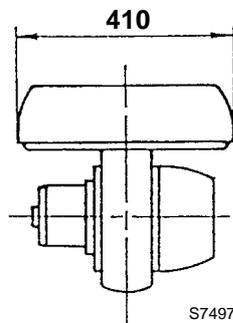
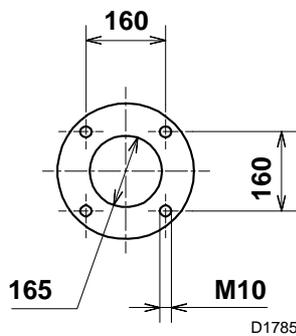
BURNER DESCRIPTION

- 1 – Air shutter control
- 2 – Air shutter lock-nut
- 3 – Control box re-set button
- 4 – Fair leads
- 5 – Wiring terminal block
- 6 – Re-set push-button of the motor overload relay
- 7 – Air pressure switch
- 8 – Gas pressure test-point

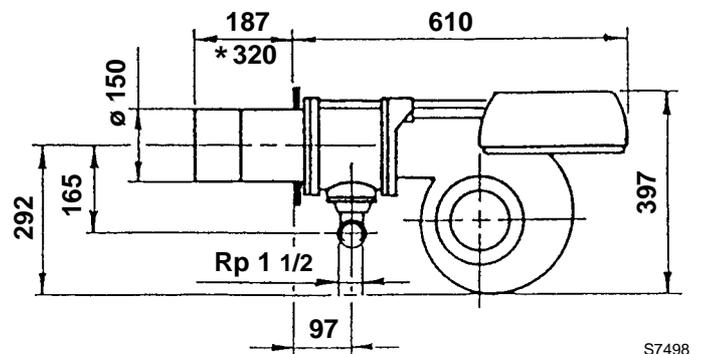


OVERALL DIMENSIONS

Boiler front-plate drilling



Burner



*Length available with special blast tube to be separately required.

STANDARD EQUIPMENT

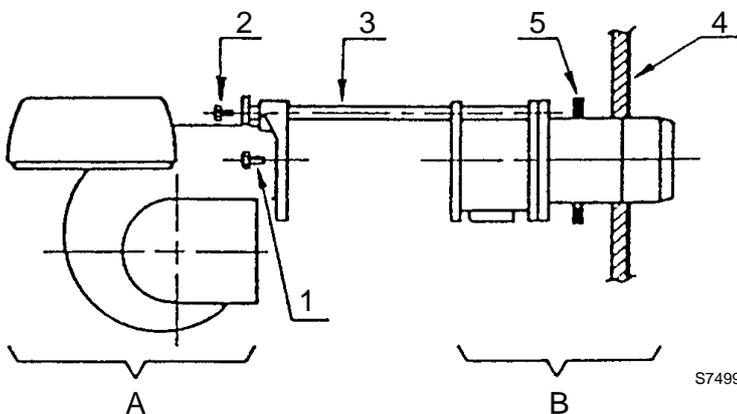
Quantity	Description
1	Flange
1	Gasket
8	Screws
1	Flange gasket

ACCESSORIES

• RADIO DISTURBANCE PROTECTION KIT code 3010386

If the burner is installed in places particularly subject to radio disturbance (emission of signals exceeding 10 V/m) owing to the presence of an INVERTER, or in applications where the length of the thermostat connections exceeds 20 metres, a protection kit is available as an interface between the control box and the burner.

FIXING TO THE BOILER

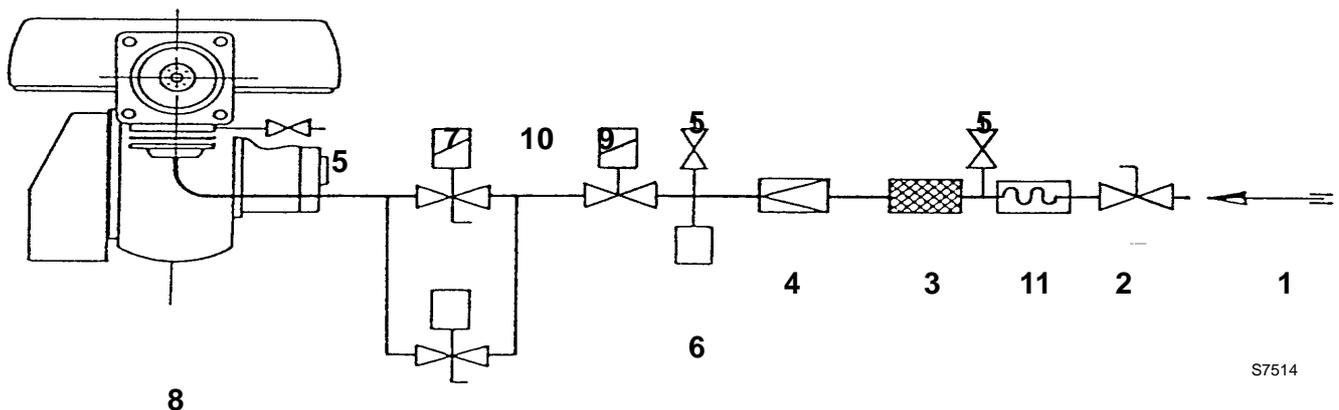


Separate the combustion head from the burner body by loosening the screws 1) and 2) and with drawing the group A) from the holding bars 3).

Fix the group B) to the boiler front plate 4) using the gasket 5) provided as accessory.

S7499

GAS SUPPLY

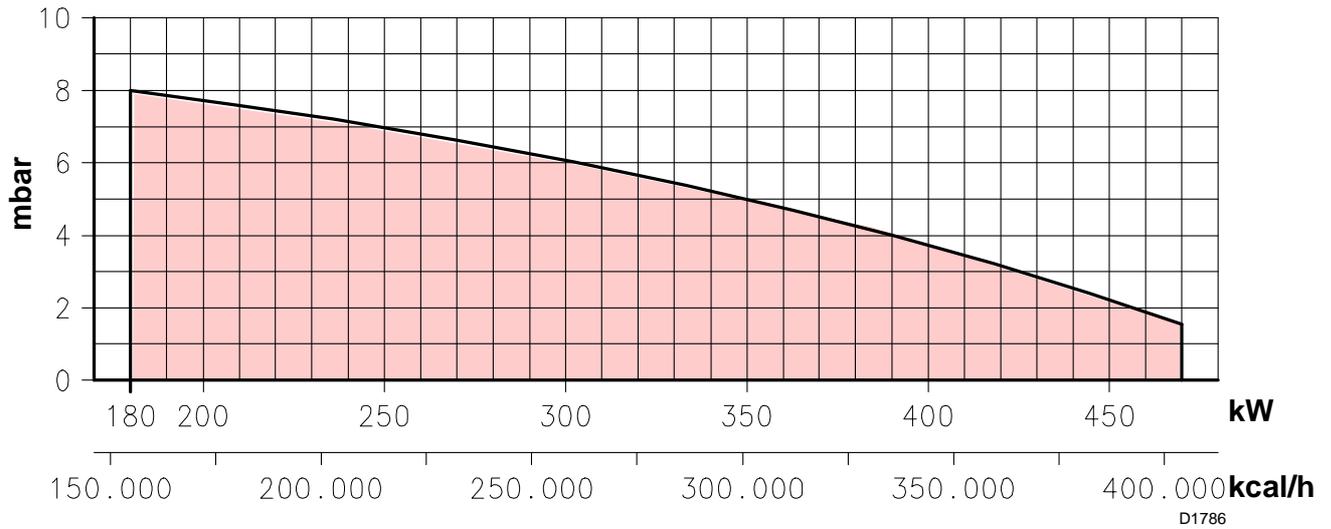


S7514

- | | |
|---------------------------------|-------------------------------|
| 1 - Gas pipe line | 7 - Gas shut off valve |
| 2 - Cock valve | 8 - Burner |
| 3 - Filter | 9 - Gas safety shut off valve |
| 4 - Pressure stabilizer | 10 - Gas leak control device |
| 5 - Pressure test-point | 11 - Isolator joint |
| 6 - Minimal gas pressure switch | |

WORKING RANGE

COMBUSTION CHAMBER PRESSURE - MAXIMUM OUTPUT (in compliance with DIN 4788)



MINIMUM GAS PRESSURE - OUTPUT

Pressure: detected at the pressure test-point 7) (fig. 1) with nil mbar into the combustion chamber. Should the combustion chamber be pressurized, the pressure necessary will be that of the graph plus the pressurization value.

Example: to obtain 350 kW it is necessary a gas pressure of 7 mbar and the combustion head set as indicated at page 7.

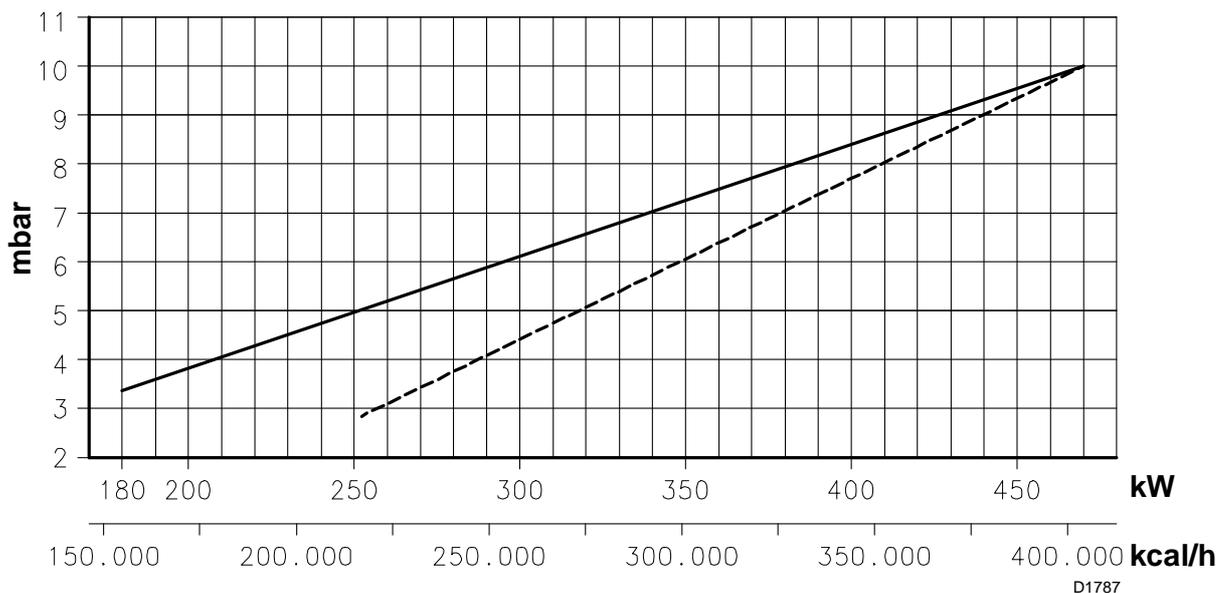
If the combustion chamber is pressurized at 2 mbar, the pressure detected at the test-point 7) is: $7 + 2 = 9$ mbar.

If this value is too high, for very low gas pipework pressures, the gas gear 6) (page 7) could be more open.

Do not decrease the pressure at the coupling under the values shown in the diagram.

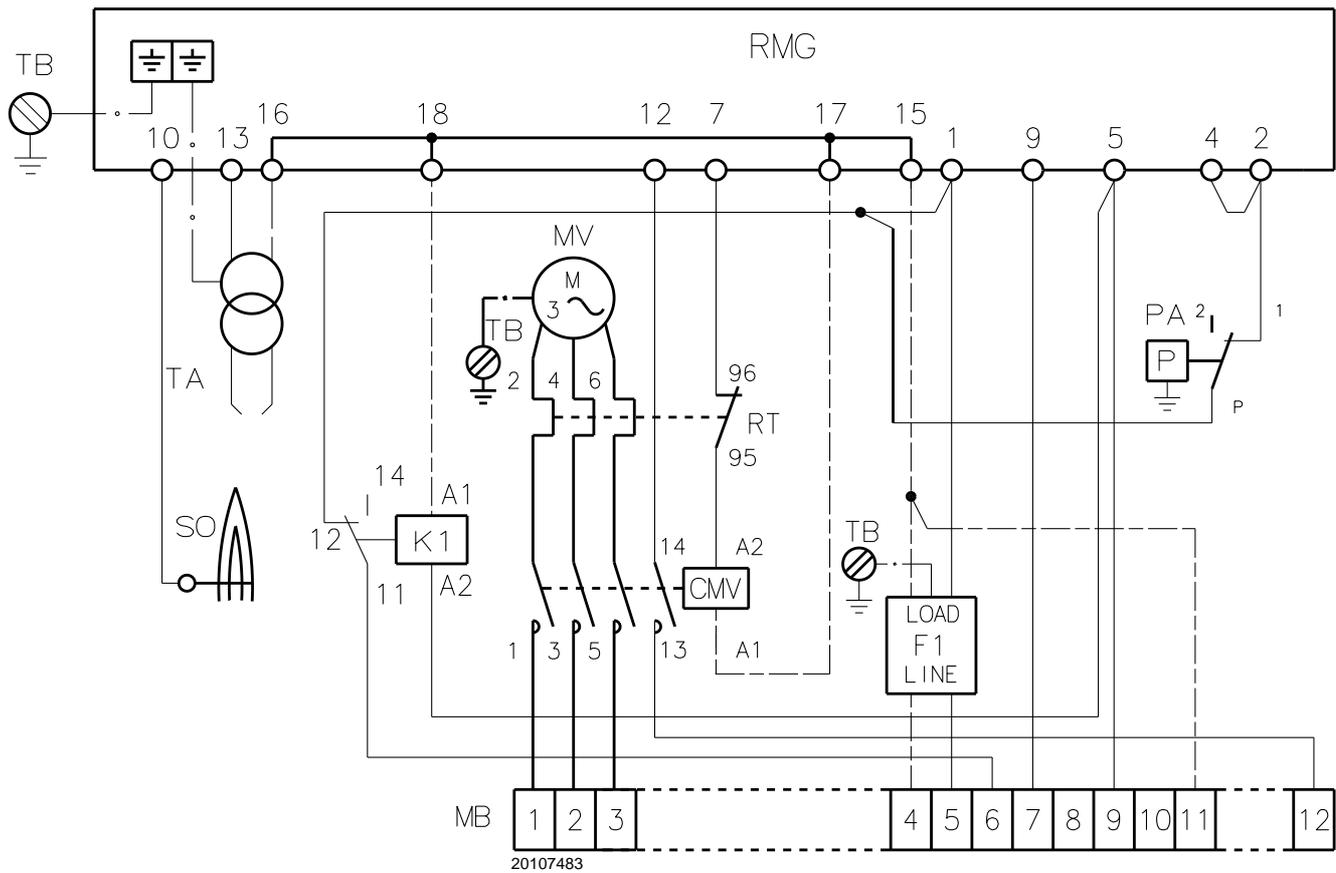
Output: the maximum value is obtainable with gas Pci 8600 kcal/m³.

CORRELATION BETWEEN GAS PRESSURE AND BURNER OUTPUT



BURNER ELECTRICAL WIRING

(carried out in the factory)

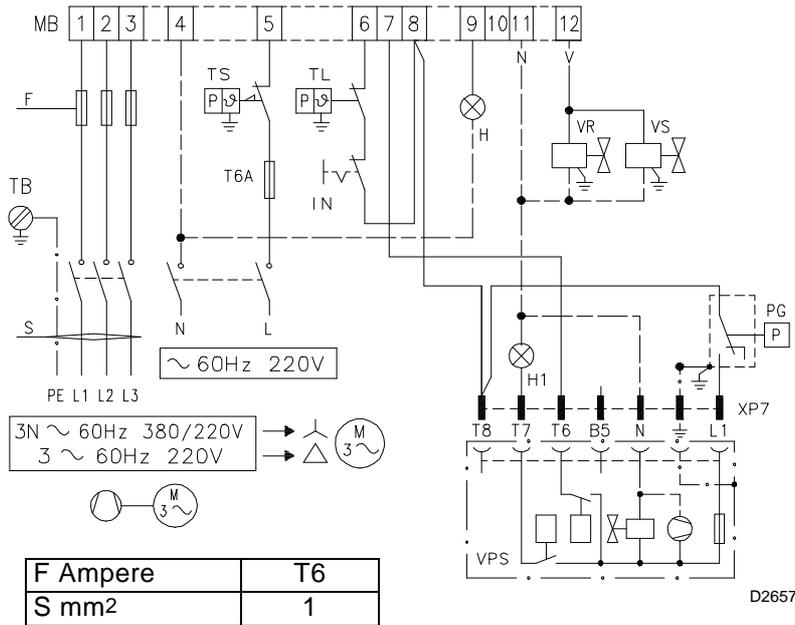


- CMV Fan motor contactor
- F1 Protection against radio interference
- K1 Relay
- MB Burner terminal strip
- MV Fan motor
- PA Air pressure switch
- RMG Control box
- RT Overload
- SO Ionisation probe
- TA Ignition transformer
- TB Burner earth

ATTENTION

In the case of phase-phase feed, a bridge must be fitted on the control box terminal board between terminal 6 and the earth terminal.

ELECTRICAL CONNECTIONS TO THE WIRING TERMINAL BLOCK (to be carried out by the installer)



- H** Remote lock-out signal
- H1** Remote lock-out signal of leak detection control device
- IN** Burner manual stop switch
- MB** Burner terminal strip
- PG** Min. gas pressure switch
- TL** Limit control device system
- TS** Safety control device system
- VPS** Leak detection control device
- VR** Gas adjustment valve
- VS** Gas safety valve
- XP7** Plug for leak detection control device

Notice

- Leads minimal section 1 mm².
- The electric wiring carried out by the installer must be in compliance with the rules in force in the Country.

FIXING OF THE ELECTRICAL WIRES

All the electrical wires, which are to be connected to the terminal block 5) (fig. 1) shall pass through the fair leads 4) (fig. 1) as for this scheme.

- 1** - Single phase supply : fair lead Pg 13.5
- 2** - Adjustment thermostat : fair lead Pg 13.5
- 3** - Safety thermostat : fair lead Pg 13.5
- 4** - Gas train : fair lead Pg 13.5, sheath \varnothing 13

5 / 6 / 7 / 8 - Pre-sheared holes

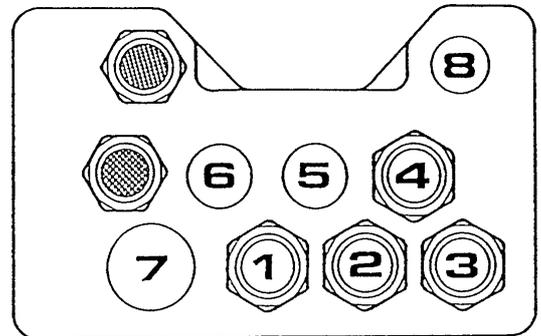
Further prospective signals or controls can be connected to the burner wiring terminal board by removing the metal weldnuts from the pre-sheared holes and inserting a common fair lead for the passage and the clamping of the leads.

NOTES

- Do not exchange the neutral wire with the phase (avoid the plug-pin connection).
- Carry out a safe earth connection.
- Check the stop of the burner, by opening the boiler thermostat and the burner lock-out, by disconnecting the lead from the flame probe.

WARNING

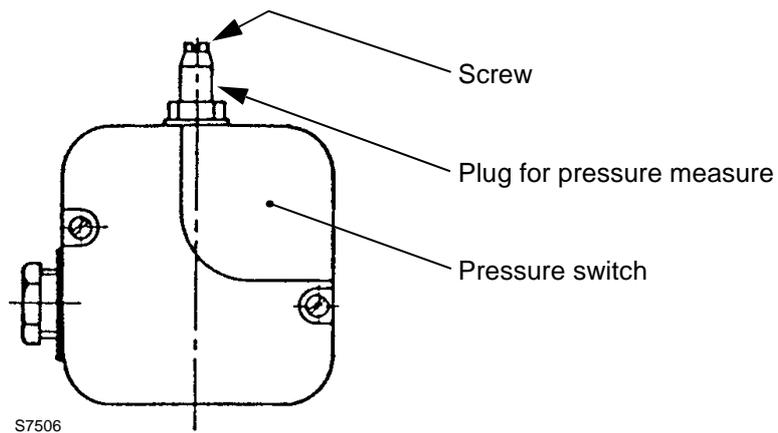
When closing the burner on its slide-bars, pull towards the outside the high voltage cable and the cable of the flame detection probe, till to little tension.



S7505

BURNER START-UP CYCLE

Air-purge: loosen the screw placed on the minimal gas pressure switch mounted on the gas train.



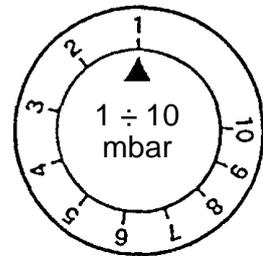
S7506

AIR PRESSURE SWITCH 7) (fig.1)

The air pressure switch setting shall be carried out after having set all other adjustment of the burner and the air pressure switch shall be at its lowest set-point.

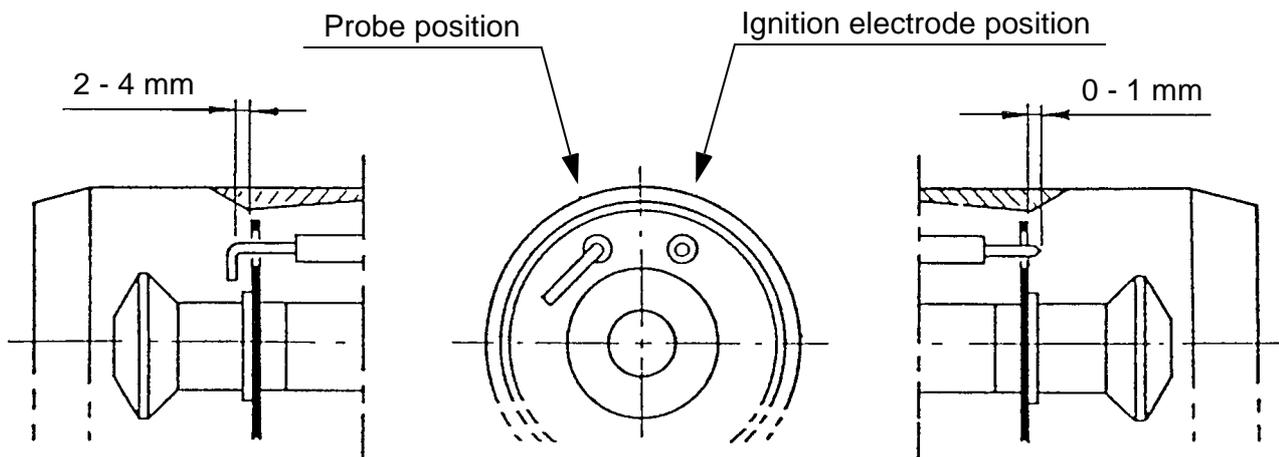
When the burner is operating, increase the adjustment pressure by turning - slowly - clockwise the knob till reaching the burner lock-out.

Thereafter, turn the knob anticlockwise for 1 mbar and repeat the burner start-up for checking the regularity: if lock-out intervenes turn the knob anticlockwise for 0.5 mbar.



S7507

Adjustment knob



S7508

CAUTION:

do not turn the ionization probe, maintain the drawing position; should it be close to the ignition electrode, damage may occur to the control box amplifier.

COMBUSTION HEAD ADJUSTMENT

Two separate adjustments have to be made: air and gas.

These adjustments can be carried out when the burner is still open, during the installation (see page 2 - Fixing to the boiler).

Air setting

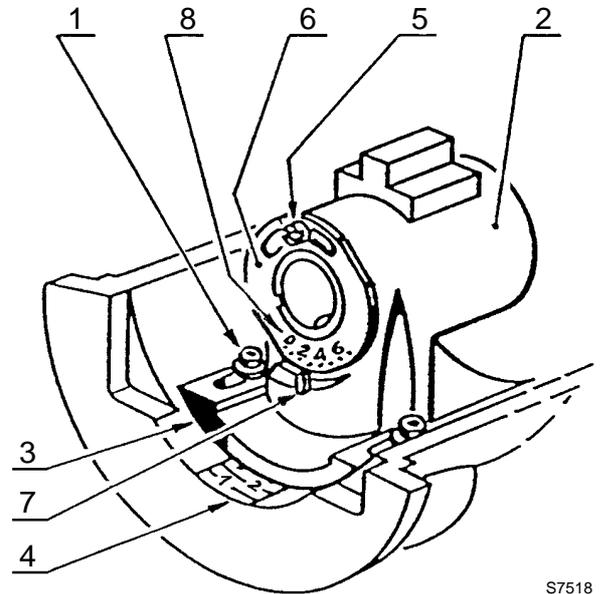
Loosen the two screws 1) and move the internal part of the combustion head 2) so that its rear edge 3) is coincident with the desired set-point on the plate 4). Tighten the screws 1).

Gas setting

Loosen the screw 5), move the ring 6) so that the pointer 7) is coincident with the desired set-point 8). Tighten the screw 5).

Attention:

the set-point number is the same for air and gas setting and is given by the following diagram.

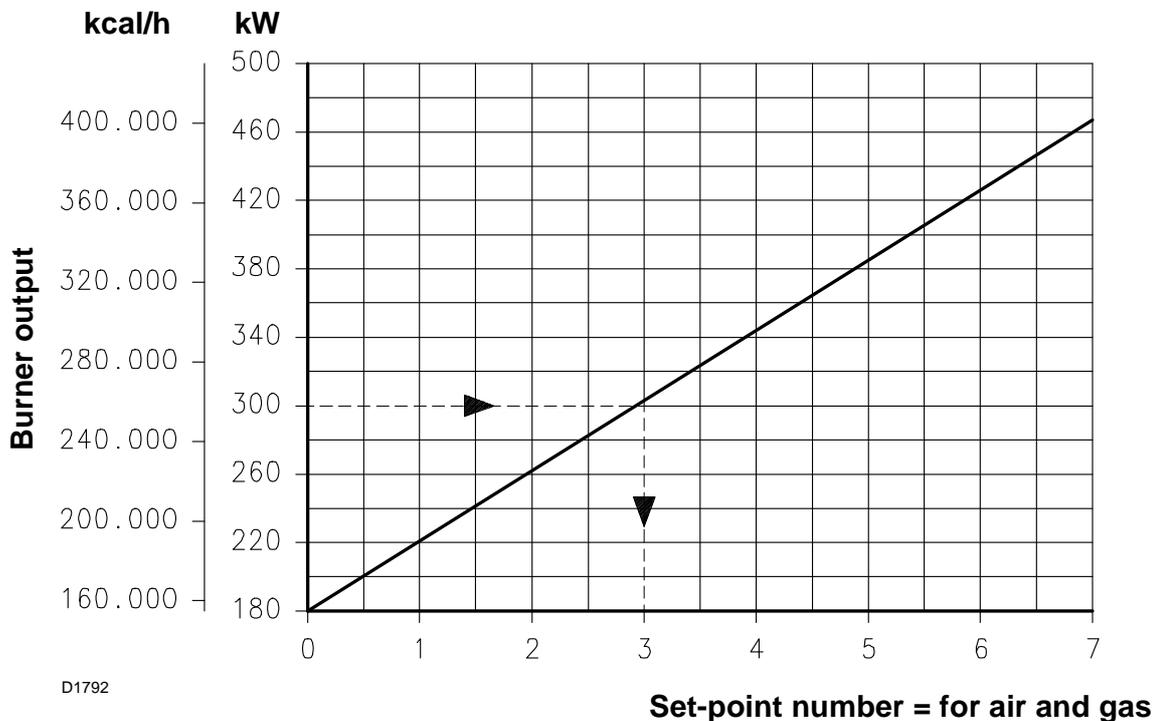


S7518

Example:

the burner is installed on a boiler of 270 kW, assuming an efficiency of 90% the burner output should be 300 kW.

From the diagram it can be seen that the air and gas settings for this rating should be no. 3.



COMBUSTION CHECKS

CO₂

It is advisable to not exceed 10% of CO₂ (gas with calorific value of 8600 kcal/m³), in order to avoid the risk that small changes of the adjustments due, for instance, at draught variation, may cause combustion with insufficient air and consequently formation of CO.

CO

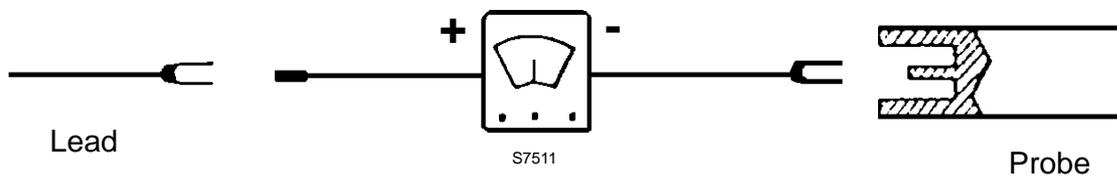
For safety reason the value of 0.1% (one thousand p.p.m.) must not be exceeded.

IONIZATION CURRENT

The minimum current necessary for the control box operation is 3 μA.

The burner normally supplies a higher current value, so that no check is needed.

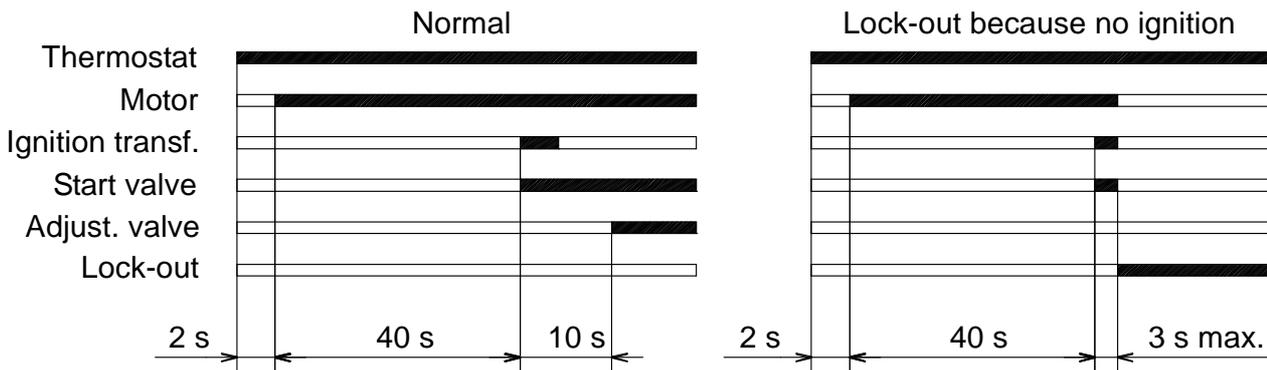
However, if a measurement of the ionization current is required, it is necessary to disconnect the probe lead and insert a d.c. microamperometer.



MOTOR LOCK-OUT

This is caused by the thermal protector relay, in case of overloading, or by the lacking of the phase. To clear, pushdown the appropriate knob, after having removed the protective cover

BURNER START-UP



D1798

If during operation the flame shuts off, lock-out occurs within 1 sec.

BURNER STARTING DIFFICULTIES AND THEIR CAUSES

Signal	Problem	Possible cause	Recommended remedy
2 blinks ● ●	Once the pre-purging phase and safety time have passed, the burner goes into lockout without the appearance of the flame	1 - The operation solenoid lets little gas through 2 - One of the two solenoid valves does not open. 3 - Gas pressure too low 4 - Ignition electrode incorrectly adjusted 5 - Electrode grounded due to broken . . insulation 6 - High voltage cable defective 7 - High voltage cable deformed by high temperature 8 - Ignition transformer defective 9 - Incorrect valve or transformer electrical wiring 10 - Defective control box. 11 - A closed valve upline the gas train . . 12 - Air in pipework. 13 - Gas valves unconnected or with . . . interrupted coil	Increase Replace Increase pressure at governor Adjust Replace Replace Replace and protect Replace Check Replace Open Bleed air Check connections or replace coil
3 blinks ● ● ●	The burner does not switch on, and the lockout appears	14 - Air pressure switch in operating position	Adjust or replace
	The burner switches on, but then stops in lockout	- Air pressure switch inoperative due to insufficient air pressure: 15 - Air pressure switch incorrectly adjusted. 16 - Pressure switch pressure test point . pipe blocked 17 - Poorly adjusted head. 18 - High pressure in the furnace	Adjust or replace Clean Adjust Connect air pressure switch to fan suction line
	Lockout during pre-purging phase	19 - Defective motor control contactor . . . (only three-phase version) 20 - Defective electrical motor 21 - Motor lockout (defective electrical motor)	Replace Replace Replace
4 pulses ● ● ● ●	The burner switches on, but then stops in lockout	22 - Flame simulation	Replace the control box
	Lockout when burner stops	23 - Permanent flame in the combustion . head or flame simulation	Eliminate persistence of flame or replace control box
7 blinks ● ● ● ● ● ● ●	The burner goes into lockout immediately following the appearance of the flame	24 - The operation solenoid lets little gas through 25 - Ionisation probe incorrectly adjusted. 26 - Insufficient ionisation (less than 5 A). 27 - Earth probe 28 - Burner poorly grounded. 29 - Phase and neutral connections inverted 30 - Defective flame detection circuit . . .	Increase Adjust Check probe position Withdraw or replace cable Check grounding Invert them Replace the control box
	Burner goes into lockout during operation	31 - Probe or ionisation cable grounded. .	Replace worn parts

Signal	Problem	Possible cause	Recommended remedy
10 blinks ●●●●● ●●●●●	The burner does not switch on, and the lockout appears	32 - Incorrect electrical wiring	Check
	The burner goes into lockout	33 - Defective control box 34 - Presence of electromagnetic disturbances in the thermostat lines 35 - Presence of electromagnetic disturbance	Replace Filter or eliminate Use the radio disturbance protection kit
No blink	The burner does not start	36 - No electrical power supply	Close all switches - Check connections
		37 - A limiter or safety control device is open	Adjust or replace
	38 - Line fuse blocked 39 - Defective control box 40 - No gas supply 41 - Mains gas pressure insufficient 42 - Minimum gas pressure switch fails to close	Replace Replace Open the manual valves between contactor and train Contact your GAS COMPANY Adjust or replace	
The burner continues to repeat the start-up cycle, without lockout	43 - The gas pressure in the gas mains lies very close to the value to which the minimum gas pressure switch has been set. The sudden drop in pressure after valve opening causes temporary opening of the pressure switch itself, the valve immediately closes and the burner comes to a halt. Pressure increases again, the pressure switch closes again and the ignition cycle is repeated. And so on	Reduce the minimum gas pressure switch intervention pressure. Replace the gas filter cartridge.	
Ignition with pulsations		44 - Poorly adjusted head	Adjust
		45 - Ignition electrode incorrectly adjusted	Adjust
		46 - Incorrectly adjusted fan air damper: too much air	Adjust
		47 - Output during ignition phase is too high	Reduce

OPERATING FAULT DIAGNOSTICS

The control box has a self-diagnostic system, which easily allows identifying the operating faults (**RED LED** signal).

To use this function, wait at least ten seconds from the safety lock out, and then press the reset button for a minimum of 3 seconds.

After releasing the button, the RED LED starts flashing as shown in the diagram below.



The pulses of the LED constitute a signal spaced by approximately 3 seconds.

The number of pulses will provide the information on the possible faults, according to the table below:

SIGNAL	PROBABLE CAUSE
2 flashes ● ●	The flame does not stabilise at the end of the safety time: – faulty ionisation probe; – faulty or soiled gas valves; – neutral/phase exchange; – faulty ignition transformer; – poor burner regulation (insufficient gas).
3 flashes ● ● ●	Min. air pressure switch does not close: – air pressure switch faulty; – air pressure switch incorrectly regulated; – max. air pressure switch triggered (if installed).
4 flashes ● ● ● ●	Min. air pressure switch does not open or light in the chamber before firing: – air pressure switch faulty; – air pressure switch incorrectly regulated.
7 flashes ● ● ● ● ● ● ●	Loss of flame during operations: – poor burner regulation (insufficient gas); – faulty or soiled gas valves; – short circuit between ionisation probe and earth.
8 flashes ● ● ● ● ● ● ● ●	– Not used.
10 flashes ● ● ● ● ● ● ● ● ● ●	– Wiring error or internal fault.

RIELLO

RIELLO S.p.A.
I-37045 Legnago (VR)
Tel.: +39.0442.630111
[http:// www.riello.it](http://www.riello.it)
[http:// www.riello.com](http://www.riello.com)