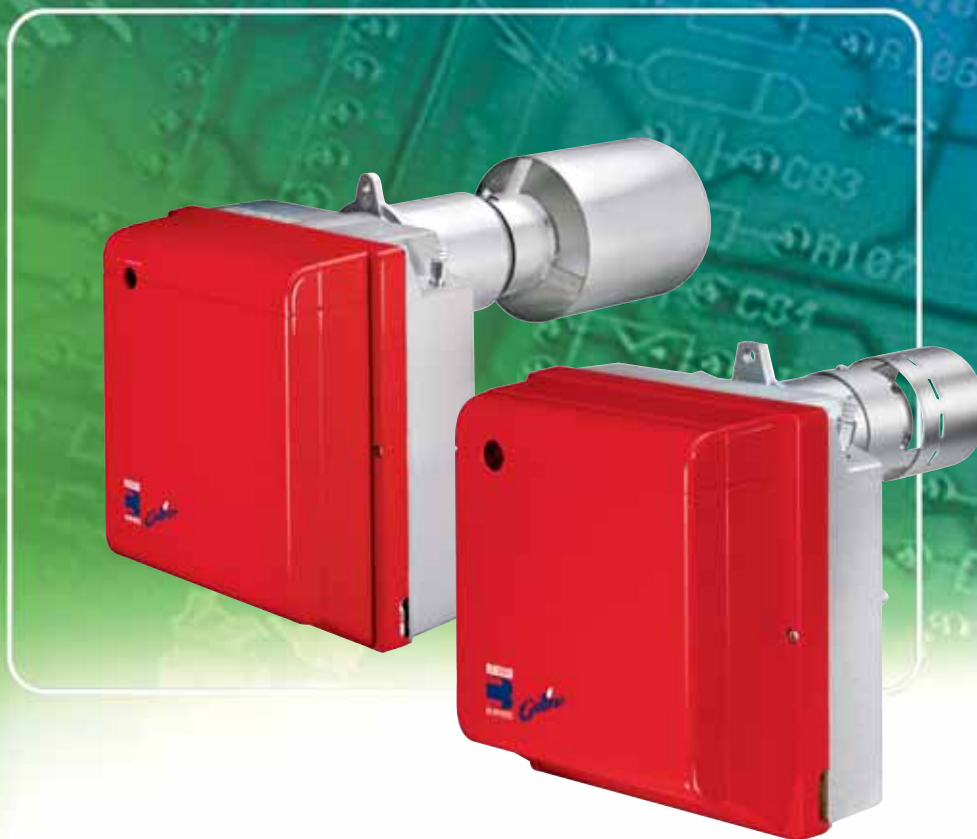


CE

RIELLO

BURNERS
LOW NO_x TWO STAGE LIGHT OIL BURNERS
► GULLIVER BGD SERIES
► BG6D 56,3/65,2 ÷ 106,7 kW

► BG7D 77,0/92,0 ÷ 160,0 kW


The Riello Gulliver BGD series of two stage light oil burners is a complete range of Low NO_x products, developed to respond to any request for home heating, conforming to the strictest standards governing the reduction of polluting emissions. The Gulliver BGD series is available in two different models, with an output ranging from 56,3 to 160 kW, divided in two different structures.

All the models use the same components designed by Riello for the Gulliver series. The high quality level guarantees safe working. The Gulliver BGD burners are fitted with a microprocessor - based flame control panel, with diagnostic functions.

In developing these burners, special attention was paid to reducing noise, to the ease of installation and adjustment, to obtaining the smallest size possible to fit into any sort of boiler available on the market.

The two-stage working guarantees high level of thermal unit efficiency.

All the models are approved by the EN 267 European Standard, the Swiss standard BUWAL-LRV 92 and conform to European Directives for EMC, Low Voltage, Machinery and Boiler Efficiency.

All the Gulliver BGD burners are fired before leaving the factory.



TECHNICAL DATA

			Model	▼ BG6D	▼ BG7D	
Fuel / air data	Burner operation mode			Two stage		
	Modulation ratio at max. output			--		
	Servomotor	run time	type	--		
			s	--		
	Heat output		kW	56,3/65,2 ÷ 106,7	77/92 ÷ 160	
			Mcal/h	49/56 ÷ 91,2	67/78,3 ÷ 137,6	
			kg/h	4,75/5,5 ÷ 9	6,5/7,75 ÷ 13,5	
	Working temperature		°C min./max.	0/40		
	Net calorific value		kWh/kg	11,8		
			kcal/kg	10200		
	Viscosity		mm²/s (cSt)	4 ÷ 6 (at 20°C)		
	Pump	delivery	type	R.B.L.		
			kg/h	30 (at 12 bar)		
	Atomised pressure			bar 8 ÷ 15		
	Fuel temperature			max. °C 50		
	Fuel pre-heater			NO		
	Fan			type centrifugal with forward curve blades		
Air temperature			max. °C 40			
Electrical data	Electrical supply		Ph/Hz/V	1/50/230 ±10%		
	Auxiliary electrical supply		Ph/Hz/V	--		
	Control box		type	MO550		
	Total electrical power		kW	0,375	0,470	
	Auxiliary electrical power		kW	--		
	Heaters electrical power		kW	--		
	Protection level		IP	X0D (40)		
	Pump motor electrical power		kW	--		
	Rated pump motor current		A	--		
	Pump motor start up current		A	--		
	Pump motor protection level		IP	--		
	Fan motor electrical power		kW	0,15	0,25	
	Rated fan motor current		A	2	2	
	Fan motor start up current		A	8	8	
	Fan motor protection level		IP	20		
	Emissions	Ignition transformer		type	incorporated in the control box	
				V1 - V2	(--) - 8 kV	
I1 - I2				(--) - 16 mA		
Operation		intermittent (at least one stop every 24 h)				
Sound pressure		dB (A)	64	71		
Sound power		W	--	--		
CO emission		mg/kWh	12	6		
Grade of smoke indicator		N° Bacharach	<1			
CxHy emission		mg/kWh	<10 (after the first 20 s)			
NOx emission		mg/kWh	102	110		
Approval	Directive		89/336/EEC, 73/23/EEC, 98/37/EEC			
	Conforming to		EN 267 - LRV 92 - BImSchV 1996			
	Certification		CE - 0036 0270/99 BUWAL - Nr.197012			
			CE - 0036 0269/99 BUWAL - Nr. 197012			

Reference conditions:

Temperature: 20°C

Pressure: 1013 mbar

Altitude: 0 m a.s.l.

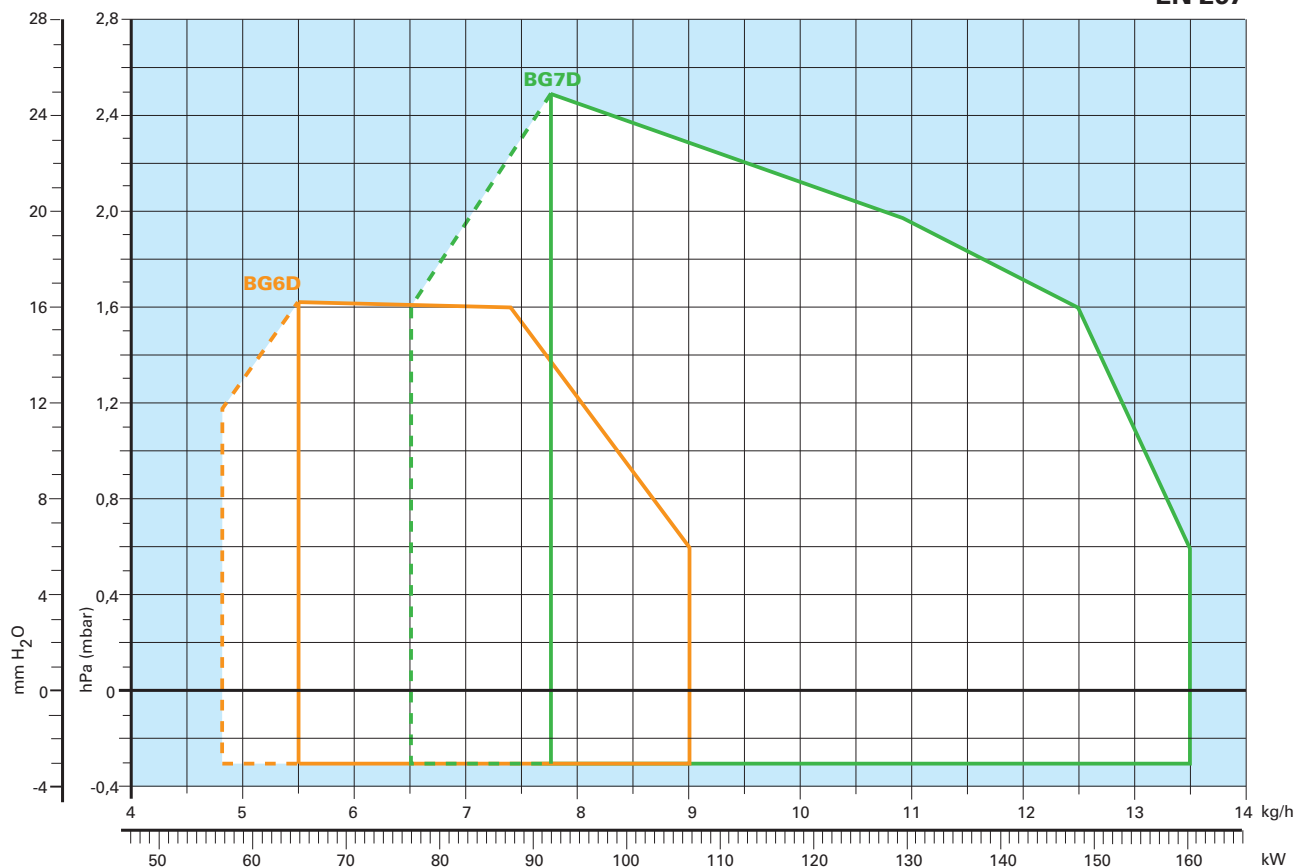
Noise measured at a distance of 1 meter.

Since the Company is constantly engaged in the production improvement, the aesthetic and dimensional features, the technical data, the equipment and the accessories can be changed.

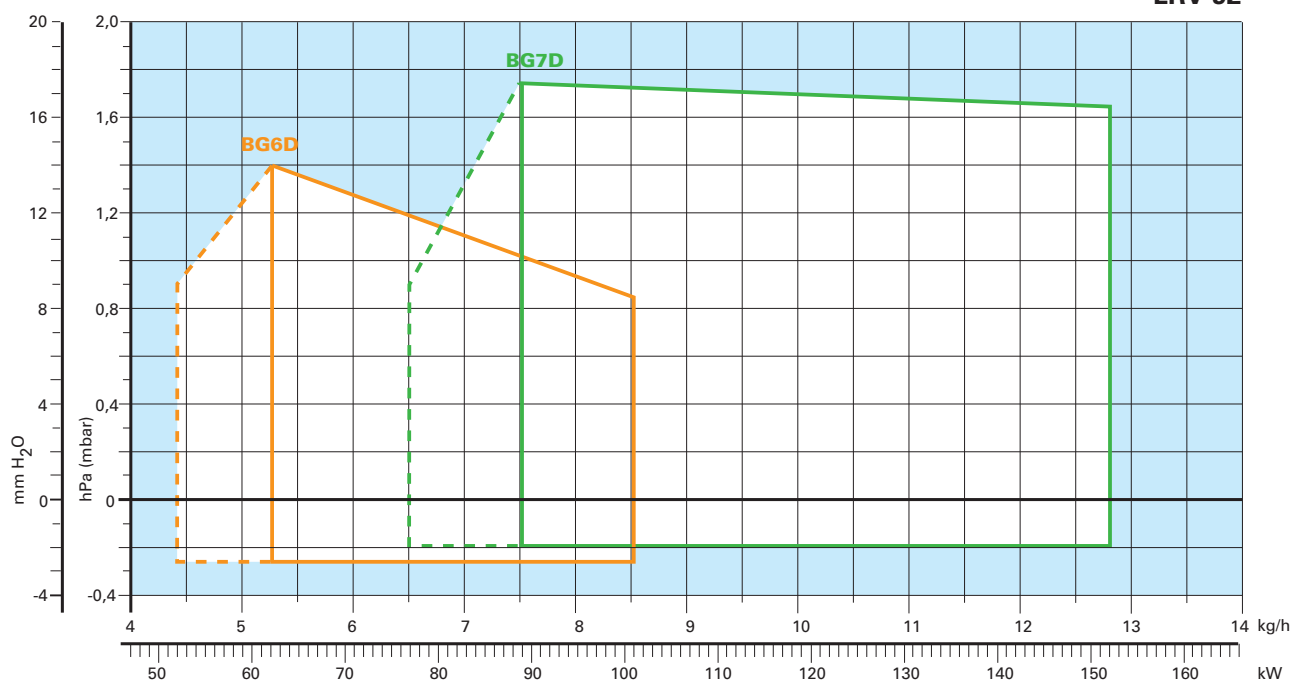
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FIRING RATES

EN 267



LRV 92



Useful working field for choosing the burner

1st stage operation range

Test conditions conforming to EN 267 and LRV 92:

Temperature: 20 °C

Pressure: 1013 mbar

Altitude: 0 m a.s.l.



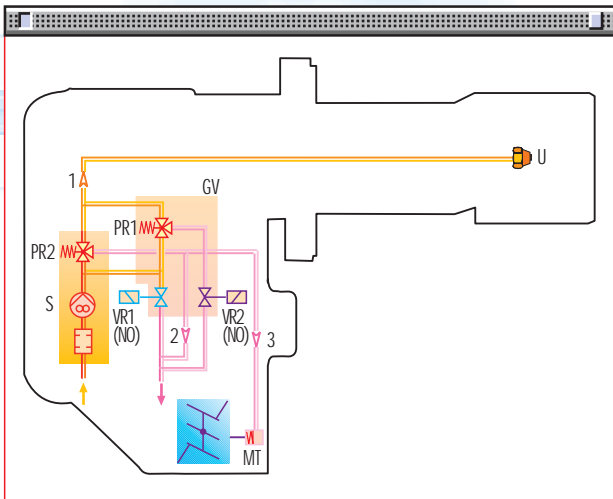
FUEL SUPPLY

HYDRAULIC CIRCUIT

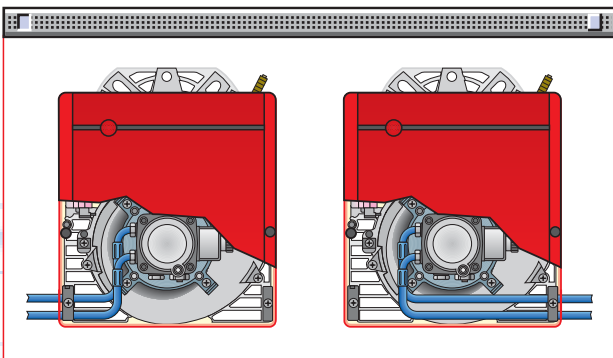
All the burners have a geared pump Riello with double safety valve on the return circuit.



Fuel pump



S	Pump with filter and pressure regulator on the delivery pipework
VR1(NO)	1 st stage oil return valve normally open
VR2(NO)	2 nd stage oil return valve normally open
1	Oil delivery pipe to the nozzle/s
2	Oil return pipe from the 2 nd stage regulator
3	Oil delivery pipe to the air damper hydraulic jack
MT	Air damper hydraulic jack for the 2 nd stage
PR1	1 st stage oil regulator
PR2	2 nd stage oil regulator
GV	Valve unit
U	Nozzle



Fuel feed to the burner can be from the right or the left side on all models.

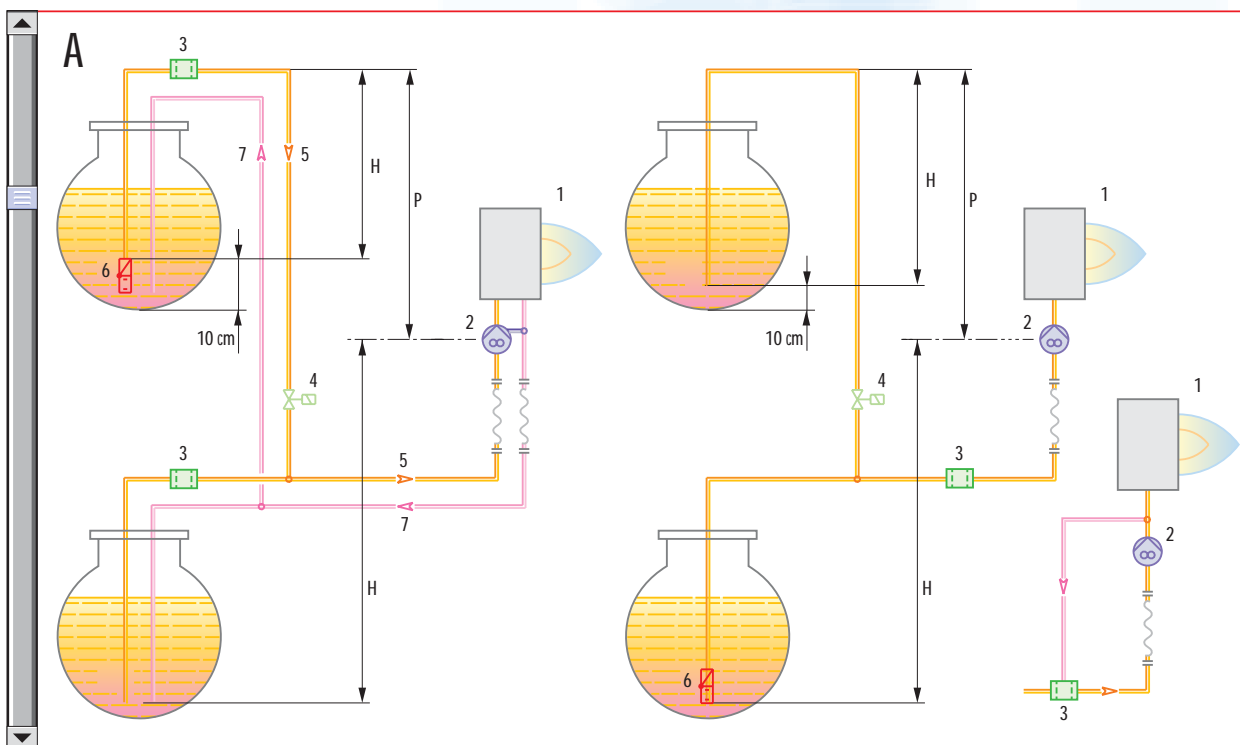


SELECTING THE FUEL SUPPLY LINES

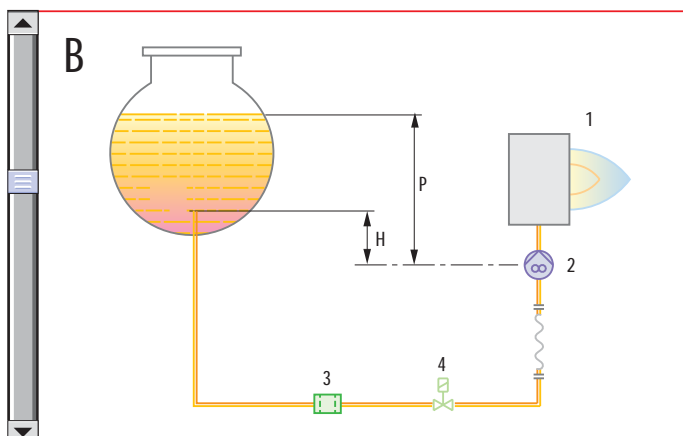
The fuel feed must be completed with the safety devices required by the local regulations in force.

The table shows the choice of piping diameter for the various burners, depending on the difference in the height between the burner and the tank and the distance between them.

MAXIMUM EQUIVALENT LENGTH OF THE PIPEWORK L[m]				
	Type A system		Type B system	
Pipe size	Ø8mm	Ø10mm	Ø8mm	Ø10mm
H (m)	L _{max} (m)	L _{max} (m)	L _{max} (m)	L _{max} (m)
0	35	100	-	-
0,5	30	100	10	20
1,0	25	100	20	40
1,5	20	90	40	80
2,0	15	70	60	100
3,0	8	30	-	-
3,5	6	20	-	-



Type of system that can be installed



H	Difference in height
Ø	Internal pipe diameter
P	Difference in height ≤ 4 m
1	Burner
2	Pump
3	Filter
4	Shut-off solenoid valve
5	Suction pipework
6	Bottom valve
7	Return pipework



VENTILATION

The different ventilation circuits always ensure low noise levels with high performance of pressure and air delivery, inspite of their compact size.



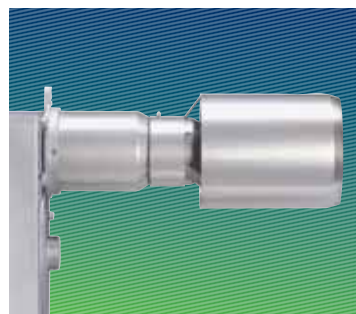
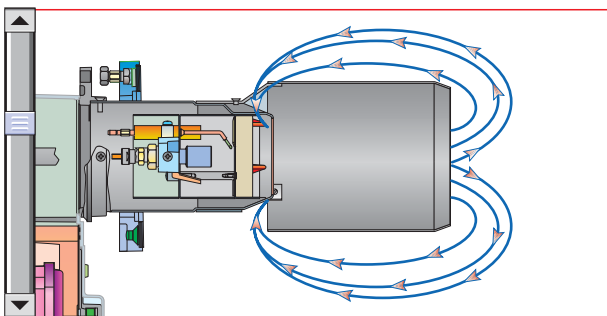
Air suction



COMBUSTION HEAD

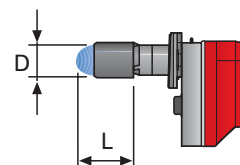
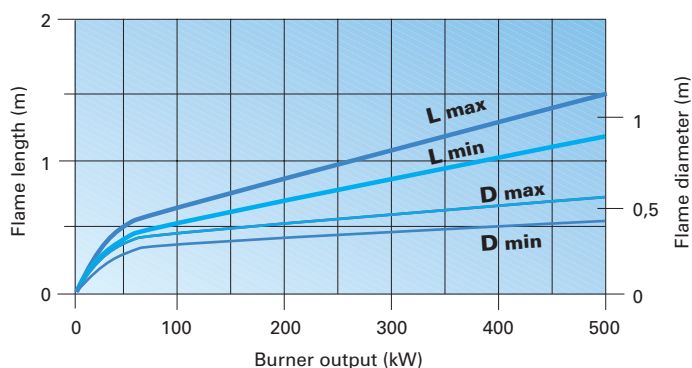
REDUCING FLAME TEMPERATURE

The configuration of the combustion head provokes internal re-circulation of the combustion substances. This re-circulation reduces the flame temperature and therefore the NO_x emissions. Furthermore, re-circulation of the combustion substances speeds up evaporation of combustible droplets creating gassy type combustion, similar to gas burner blue flame.



Combustion head

Dimensions of the flame



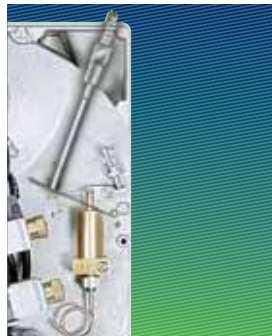
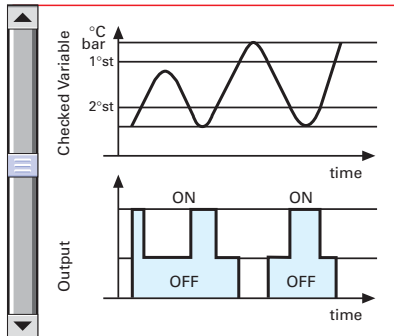
Example:
 Burner thermal output = 350 kW;
 L_{flame} (m) = 1,2 m (medium value);
 D_{flame} (m) = 0,6 m (medium value)

ADJUSTMENT

BURNER OPERATION MODE

All these models have two stage output operation.

"Two stage" operation



Reduced output ignition device



Air damper adjustment

The Gulliver BGD burner models are fitted with a new microprocessor control panel for the supervision during intermittent operation.

For helping the commissioning and maintenance work, there are two main elements:

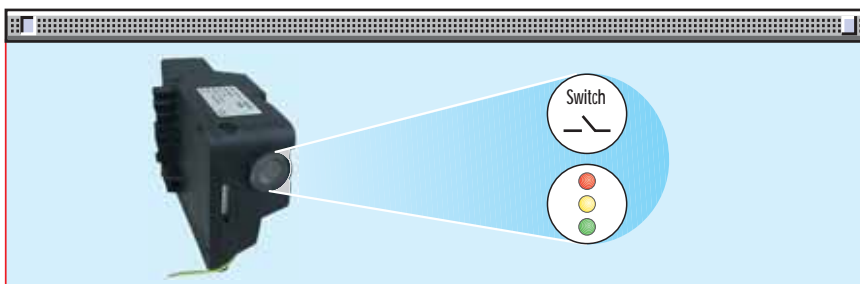


The lock-out reset button is the central **operating element** for resetting the burner control and for activating / deactivating the diagnostic functions.



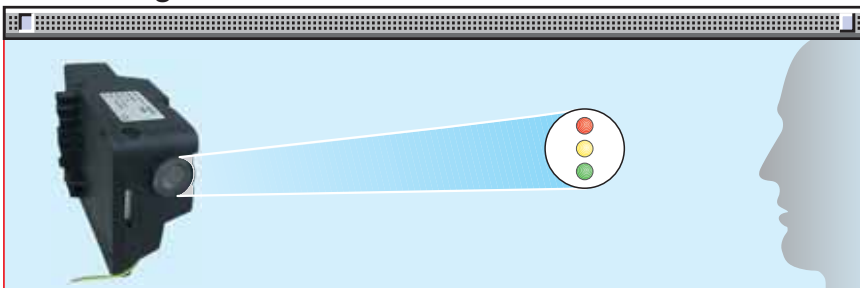
The multi-color LED is the central **indication element** for visual diagnosis and interface diagnosis.

Both elements are located under the transparent cover of lock-out reset button, as showed below.

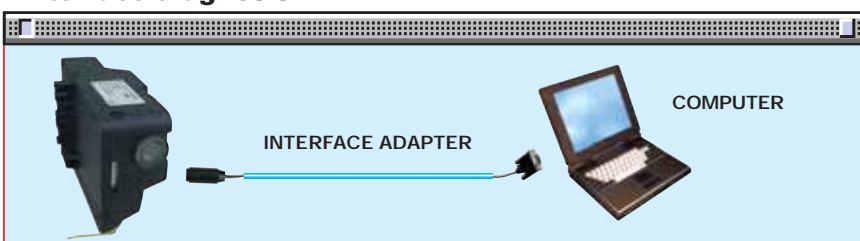


There are two diagnostic choices, for indication of operation and diagnosis of fault cause:

- visual diagnosis :



- interface diagnosis :







by the interface adapter and a PC with dedicated software.

In normal operation, the various statuses are indicated in the form of colour codes according to the table below.

Color code table		
Operation status	Color code	Blink type
Stand-by	○ Led off	
Pre-heating	● Yellow continue	
Pre-purging	● Green continue	
Ignition	● ☀ Green continue + Yellow blinking	Fast
Flame OK	● ☀ Green continue + Yellow blinking	Slow
Post-purge	● ● Green continue + Yellow continue	
Re-cycle	● ☀ Green continue + Yellow blinking	Medium
Lock out	● Red continue	Fast
Flame during pre-heating or stand-by	☀ Yellow blinking	Fast
Flame during post-purge	● ☀ Green continue + Yellow blinking	Fast
Flame during lock out	● ☀ Red continue + Yellow blinking	

After lock-out has occurred, the red signal lamp is steady on. In this status, the visual fault diagnosis according to the error code table can be activated by pressing the lock-out reset button for > 3 seconds. The control box sends a sequence of pulses that are repeated at 2-second intervals. The interface diagnosis (with adapter) can be activated by pressing again the lock-out button for > 3 seconds.

○ LED off      

Error code table	
Blink code	Possible cause of fault
2 blinks 	No flame at the end of safety time : - faulty or soiled fuel valves - faulty or soiled flame detector - poor adjustment of burner, no fuel - faulty ignition
4 blinks 	Extraneous light or presence of flame : - in stand-by position - with thermostat of heat demand in idle or working position - during oil-preheater - during pre-purge - during post-purge
7 blinks 	Flame failure during running position after n° 3 attempts of re-cycle : - faulty or soiled fuel valves - faulty or soiled flame detector - soiled ignition electrodes - poor adjustment of burner, no fuel
8 blinks 	Monitoring of oil-preheater : - faulty heater or oil-thermostat

Post ignition

Adjustable post purge

This function can be activated and set in a very easy way by pressing repeatedly the reset button; after 5 seconds the control box automatically shows the minutes set by the red LED flashing (1 pulse = post-ventilation for 1 minute).

Remote lock-out reset

max 20 m

Switch

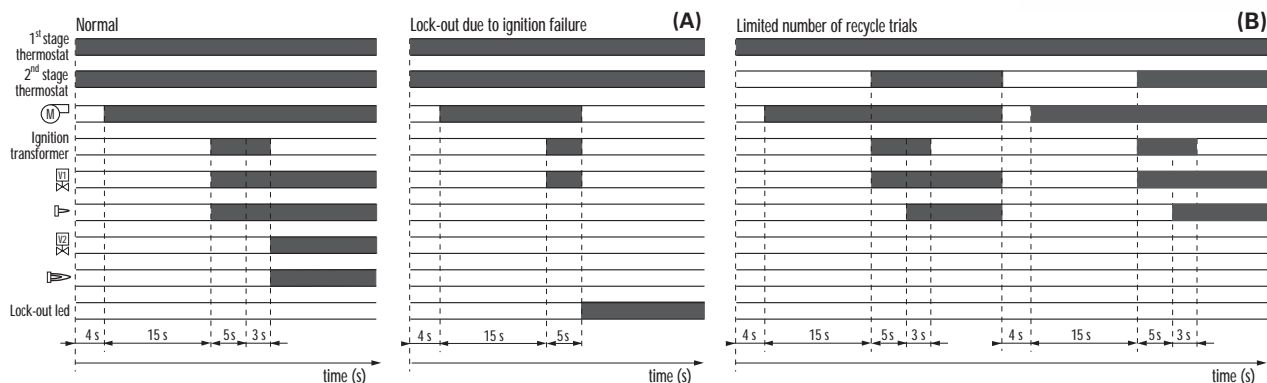
Connection cable

CONNECTOR

position. In the burner packages will be included a particular connector to remote the reset signal. The maximum length of connection must be 20 m.



START UP CYCLE



(A) Lock-out is shown by a led on the appliance.

(B) Total number of recycle trials is 3.

Correct operation

0s Start of heat demand the burner begins the ignition cycle

0s-4s The burner is in stand-by

4s-19s Pre-purge with air damper open

19s 1st stage ignition

19s-24s Safety time

24s-27s Post-ignition transformer time

27s Second stage ignition

Lock-out due to ignition failure

If the flame does not light within the safety limit (~5s) the burner locks-out.

Re-cycle

The burner permits maximum three repetitions of complete ignition cycle if there is flame failure during operation. The burner goes in safety shut-down within one second. The final action at the last trial following at last flame failure is a lock-out.



WIRING DIAGRAMS

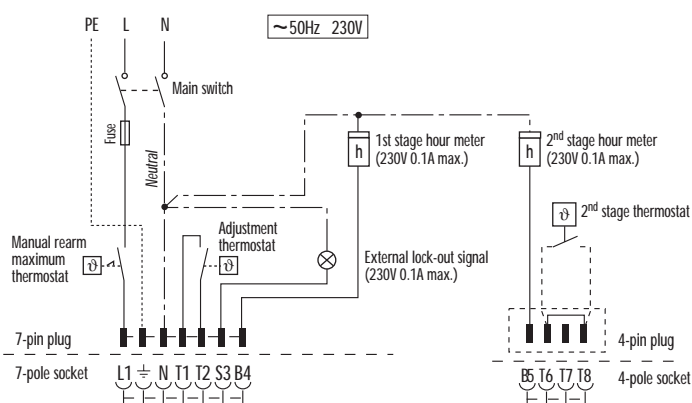


Control box fitted with ignition transformer

Electrical connections must be made by qualified and skilled personnel in conformity with the local regulations in force.



"TWO STAGE" OPERATION



The following table shows the supply lead sections and types of fuse to be used.

Model	▼BG6D	▼BG7D
	230V	230V
F A	T6	T6
L mm ²	1	1

F = Fuse

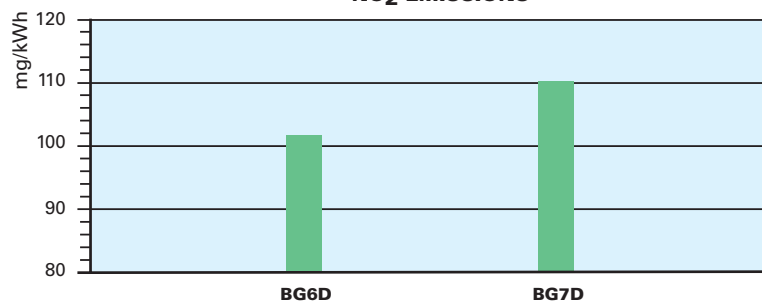
L = Lead section



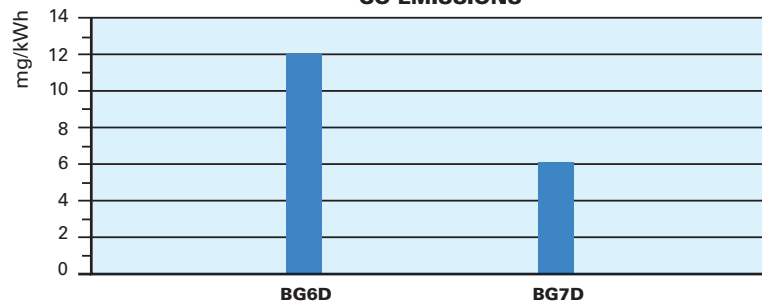


EMISSIONS

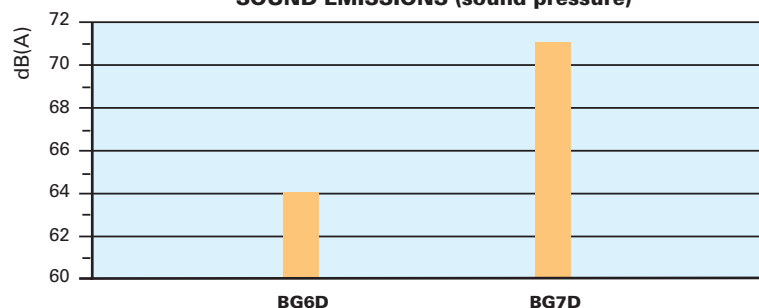
NO₂ EMISSIONS



CO EMISSIONS



SOUND EMISSIONS (sound pressure)



The emission data have been measured in the various models at maximum output, in conformity with EN 267 standard.

Special attention has been paid to noise reduction. All models are fitted with sound-proofing material inside the cover.

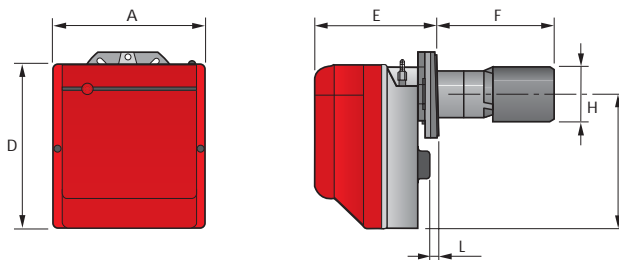


OVERALL DIMENSIONS (mm)

These models are distinguished by their reduced size, in relation to their outputs, which means they can be fitted to any boiler on the market.



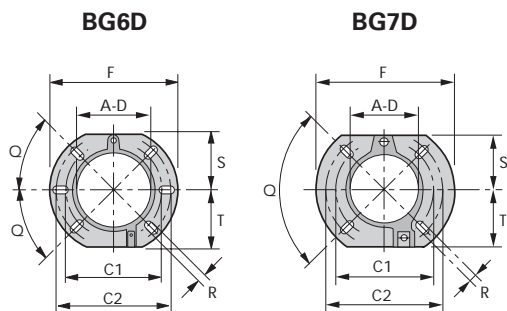
BURNER



Model	A	D	E	F	H	I	L
► BG6D	300	345	228	284	131	285	12
► BG7D	300	345	247	394	165	285	12

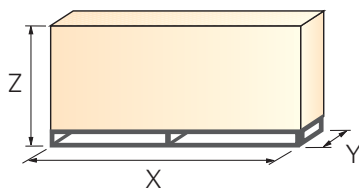
IMPORTANT: Boiler door must have a max. thickness of 120 mm for BG6D and 180 mm for BG7D, refractory lining included.

BURNER-BOILER MOUNTING FLANGE



Model	A	C1	C2	D	F	Q	R	S	T
► BG6D	106	140	170	106	189	45	11	83	83
► BG7D	127	160	190	127	213	90	11	99	99

PACKAGING



Model	X	Y	Z	kg
► BG6D	590	335	420	20
► BG7D	590	335	420	20



INSTALLATION DESCRIPTION

Skilled and qualified personnel must perform installation, start up and maintenance. A nozzle is fitted to the burner and used for fire tests in the factory. If necessary, change the nozzle on the basis of the maximum output of the boiler. All operations must be carried out as described in the technical handbook supplied with the burner.

BURNER SETTING

- ▶ 2nd stage air damper position adjustment can be made without removing the burner casing.
- ▶ 1st stage air damper position adjustment.
- ▶ Head setting area is easily accessible and the operation is simple thanks to a graduated scale.



MAINTENANCE AND ELECTRICAL CONNECTIONS

- ▶ The nozzle holder can be serviced through the rear cover, without detaching the burner from the boiler.
- ▶ The 7-pole socket is incorporated in the control box, the 4-pole socket is already connected.
- ▶ The 4 and 7-pin plugs are also supplied for connection to the boiler.



BURNER ACCESSORIES

Tester

The tester controls the correct working of the burner components in the GULLIVER series. It can be fitted to all the light oil models, with or without pre-heater.

It is made up of two parts: a control instrument and a "control box" which replaces and simulates the one on the burner.







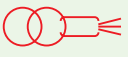

This tester is very simple to use: just replace the burner control box with the tester to check correct working of the motor, valve, pre-heater and flame probe (only photo-resistance).

This device has a display showing the levels that have been measured, a selection switch for selecting the component to be tested and four switches to be used in the various working stages of the burner.



Tester	
Burner	Kit code
BG6D - BG7D	3087211



Direct testing	Measurements
 MOTOR The switch feeds the motor.	 L1-N Main voltage (230 V)
 VALVE The switch feeds electromagnetic winding of the coil. A red led signals excitation stage, and a green led signals retainer stage.	 A Pre-heater current consumption
 PRE-HEATER The switch feeds the light oil pre-heater; a green led signals the thermostat cut-in.	 V M Secondary voltage (low voltage)
 TRANSFORMER The switch feeds the firing transformer inside the control box and excites the oil valve.	 A Photo-resistance current consumption

7-pin plug kit

If necessary a 7-pin plug kit is available (in packaging of n. 5 pieces).

7-pin plug kit	
Burner	Kit code
All models	3000945

Interface adapter kit

To connect the flame control panel to a personal computer for the transmission of operation, fault signals and detailed service information, an interface adapter with PC software are available.



Interface adapter kit	
Burner	Kit code
BG6D - BG7D	3002731



Light oil filter

For cleaning light oil from dirty particles and impurities filters with the following features are available:



Light oil filter		
Burner	Filtering degree (µm)	Code
All models	60	3006561

Filter made up of aluminium body and stainless steel filtering cartridge; available singularly.

Light oil filter		
Burner	Filtering degree (µm)	Code
All models	60	3075011

Filter made up of aluminium cover, plastic tank and nylon filtering cartridge; available in packaging of 50 pieces.

Light oil filter/degassing unit

To solve problems of air or water in the oil circuit a special filter/degassing unit is available, made up of aluminium cover, plastic tank, stainless steel filtering cartridge, air release cap and water purge valve. It is available singularly.



Light oil filter/degassing unit		
Burner	Filtering degree (µm)	Code
All models	100	3000926

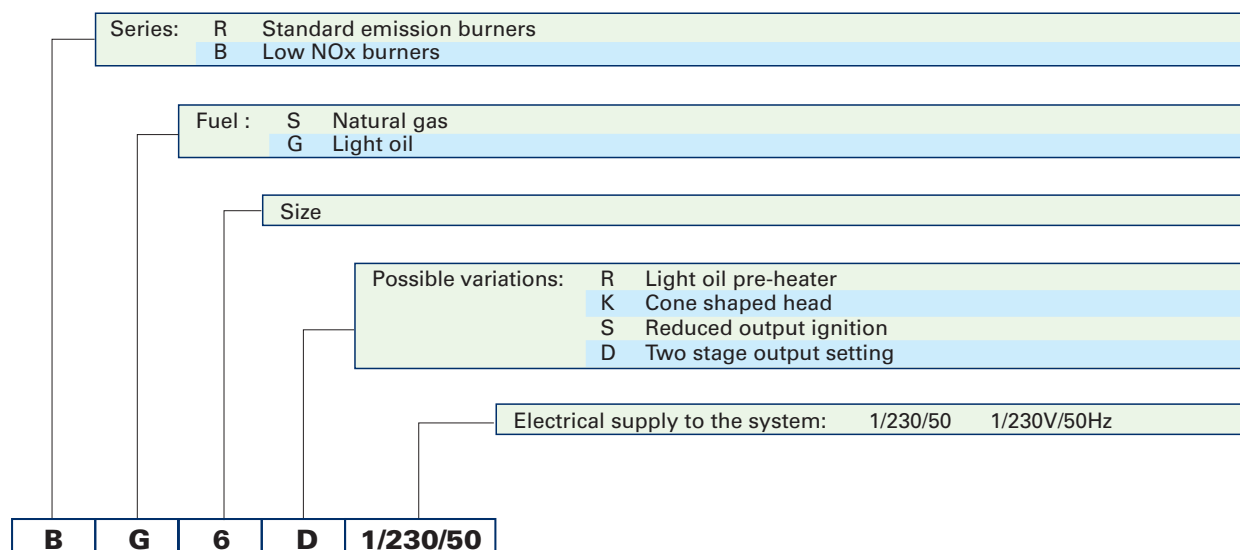


SPECIFICATION



A special index will help you choose the right burner from the BGD models available.
There is also a clear and detailed product specification and description.

DESIGNATION OF SERIES





▶ AVAILABLE BURNER MODELS

BG6D	1/230/50
BG7D	1/230/50

▶ PRODUCT SPECIFICATION

Burner:

Completely automatic monobloc light oil burners, with two stage operation fitted with:

- Fan with forward inclined blades
- Cover lined with sound-deadening material
- Air damper completely closed in stand by
- Air damper, with 1st and 2nd stage adjustment (2nd stage adjustment without removing the casing)
- Single phase electric motor 230 V, 50 Hz
- Combustion head fitted with:
 - stainless steel head cone, resistant to high temperatures
 - ignition electrodes
 - flame stability disk
- Geared pump for fuel supply, fitted with:
 - filter
 - pressure regulator
 - attachments for fitting a pressure gauge and vacuum meter
 - internal by-pass for preparing for single-pipe installations
- Post-ignition of 3 seconds after safety time
- Fuel feed solenoid incorporated in the pump
- Microprocessor-based flame control panel, with diagnostic and remote control release functions
- Protection filter against radio interference (included into flame control panel)
- Light oil nozzle
- IP X0D (IP 40) electric protection level
- IRD for flame detection
- 2nd stage delay integrated into control box.

Approval:

- EN 267 standard
- LRV 92.

Conforming to European directives:

- 89/336/EEC (electromagnetic compatibility)
- 73/23/EEC (low voltage)
- 98/37/EEC (machinery)
- 92/42/EEC (efficiency).

Conforming to:

- BImSchV 1996.

Standard equipment:

- Two flexible pipes for connection to the light oil supply line
- Two nipples for connection to the pump
- Flange, screws and nuts for fixing
- Thermal screen
- 7-pin plug
- 4-pin plug
- Remote control release kit
- Instruction handbook for installation, use and maintenance
- Spare parts catalogue.

Available accessories to be ordered separately:

- Tester for checking the various components
- 7-pin plug kit
- Interface adapter kit
- Light oil filter
- Light oil filter/degassing unit.





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