RIELLO BURNERS

CE

TWO STAGE GAS BURNERS

RIELLO 40 GSD SERIES

GS10D	29/41 ÷ 106 kW
GS20D	58/81 ÷ 220 kW

The Riello 40 GSD series of two stage gas burners, is a complete range of products developed to respond to any request for home heating. The Riello 40 GSD series is available in two different models, with an output ranging from 29 to 220 kW, divided in two different structures.
All the models use the same components designed by Riello for the Riello 40 GSD series. The high quality level guarantees safe working.
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.
All the models are approved by the EN 676 European Standard and conform to European Directives for EMC, Low Voltage, Machinery and Boiler Efficiency.
All the Riello 40 GSD burners are tested before leaving the factory.

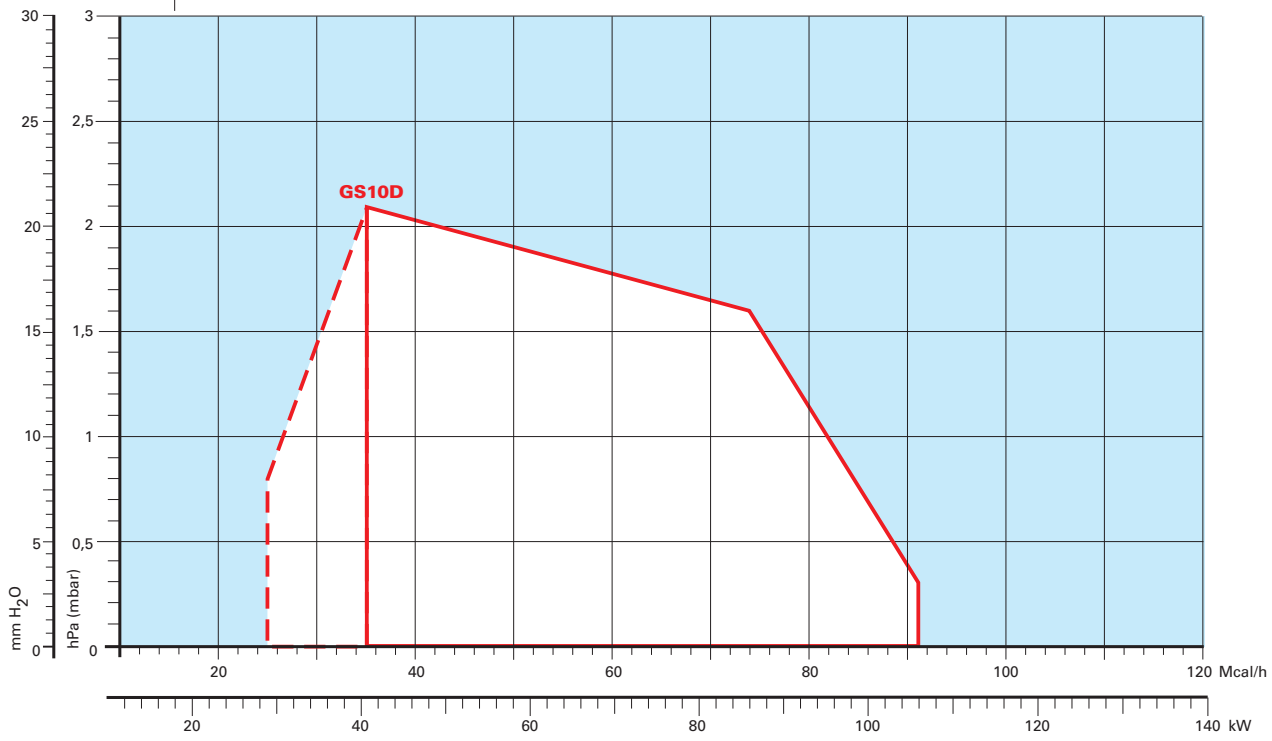
TECHNICAL DATA

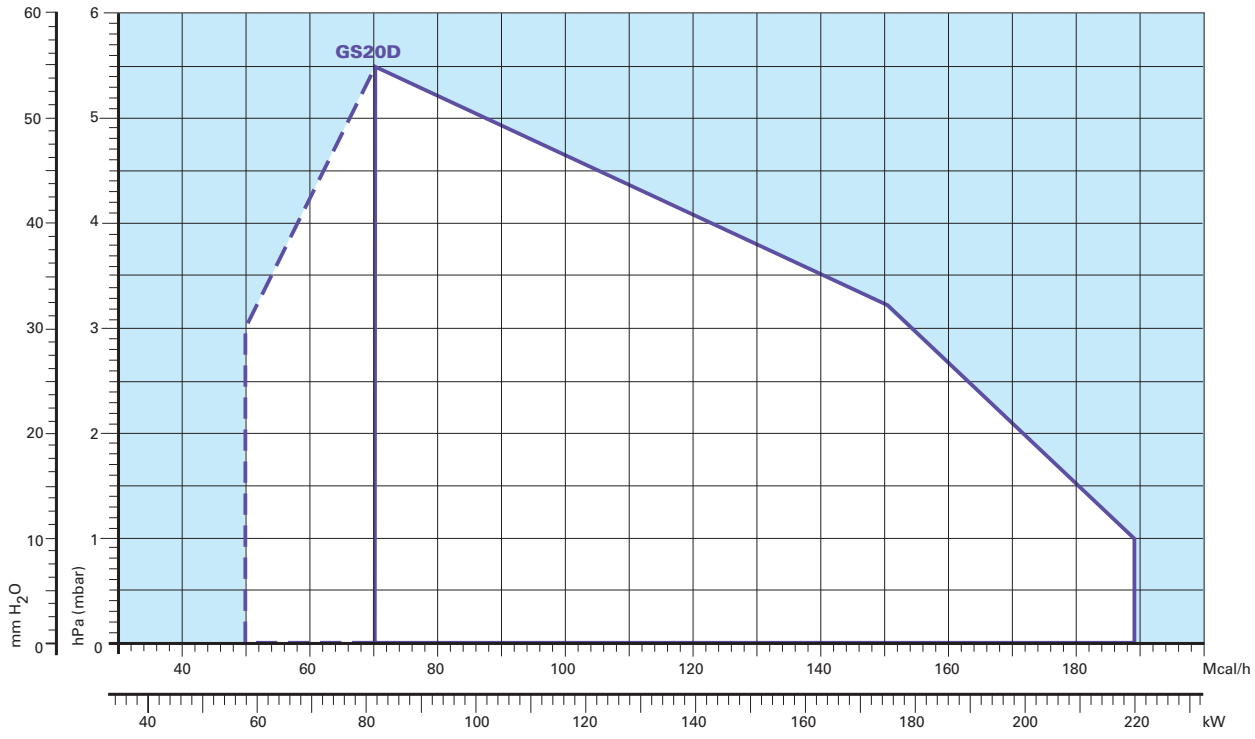
	Model		GS10D	GS20D
	Burner operation mode		Two stage	
	Modulation ratio at max. output		--	
	Servomotor	type	BERGER	
	Servomotor run time	s	13	
	Heat output	kW	29/41 - 106	58/81 - 220
	Heat output	Mcal/h	25/35 - 91	50/70 - 189
	Working temperature	°C min./max.	0 /40	
Fuel / air data	Net calorific value G20 gas	kWh/Nm³	10	
Fuel / air data	G20 gas density	kg/Nm³	0,71	
Fuel / air data	G20 gas delivery	Nm³/h	2,9/4,1 - 10,6	5,8/8,1 - 22
Fuel / air data	Net calorific value G25 gas	kWh/Nm³	8,6	
Fuel / air data	G25 gas density	kg/Nm³	0,78	
Fuel / air data	G25 gas delivery	Nm³/h	3,4/4,8 - 12,3	6,7-9,4 - 25,6
Fuel / air data	Net calorific value LPG gas	kWh/Nm³	25,8	
Fuel / air data	LPG gas density	kg/Nm³	2,02	
Fuel / air data	LPG gas delivery	Nm³/h	1,1/1,6 - 4,1	2,2/3,1 - 8,5
Fuel / air data	Fan	type	Centrifugal with forward curve blades	
Fuel / air data	Air temperature	Max. °C	40	
Electrical data	Electrical supply	Ph/Hz/V	1/50/230 ±10%	
Electrical data	Auxiliary electrical supply	Ph/Hz/V	--	
Electrical data	Control box	type	RMG 88.620A2	
Electrical data	Total electrical power	kW	0,130	0,250
Electrical data	Auxiliary electrical power	kW	--	
Electrical data	Protection level	IP	40	
Electrical data	Motor electrical power	kW	0,09	0,15
Electrical data	Rated motor current	A	0,7	1,4
Electrical data	Motor start up current	A	2,8	5,6
Electrical data	Motor protection level	IP	20	
Electrical data	Ignition transformer	type	Separated from the control box	
Electrical data	Ignition transformer	V1 - V2	230 V - 8 kV	
Electrical data	Ignition transformer	I1 - I2	1,8 A - 30 mA	
Electrical data	Operation		Intermittent (at least one stop every 24 h)	
Emissions	Sound pressure	dB(A)	65	72
Emissions	Sound power	W	--	
Emissions	CO emission	mg/kWh	<40	
Emissions	NOx emission	mg/kWh	≤120	
Approval	Directive		90/396/EEC, 89/336/EEC, 73/23/EEC, 98/37/EEC, 92/42/EEC	
Approval	Conforming to		EN 676	
Approval	Certification		CE - 0063 AP6680	

Reference conditions:
Temperature: 20 °C
Pressure: 1013,5 mbar
Altitude: 100 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.

FIRING RATES





Useful working field for choosing the burner

1st stage operating rate

Test conditions conforming to EN 676 standards:
Temperature: 20 °C
Pressure: 1013.5 mbar
Altitude: 100 m a.s.l.

FUEL SUPPLY

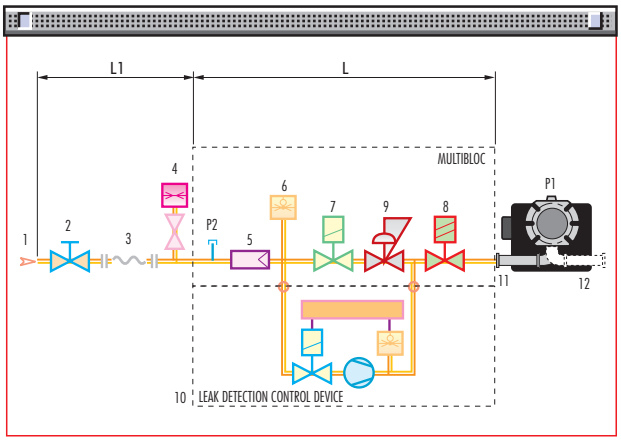
GAS TRAIN

The burners are set for fuel supply from either the right or left hand sides.

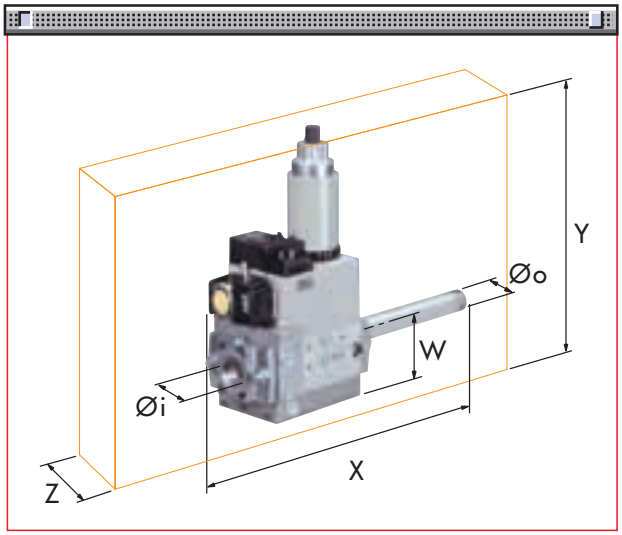
Depending on the gas output and the available pressure in the supply line, you should check the correct gas train to be adapted to the system requirements.

The gas train is Multibloc type, containing the main components in a single unit and it can be fitted with the valves seal control (as accessory).

MBZRDLE 405 - 407 - 410



1	Gas delivery pipe
2	Manual valve
3	Vibration damping joint
4	Gas pressure gauge
5	Filter
6	Gas pressure switch
7	Safety solenoid
8	Adjustment solenoid 1st and 2nd stage: firing delivery adjustment (rapid opening) maximum delivery adjustment (slow opening)
9	Pressure regulator
10	Leak detection control device for valves 7 and 8 (accessory)
11	Gas train-burner adapter
12	Burner
P1	Combustion head pressure
P2	Upstream pressure from the filter
L	Gas train supplied separately
L1	To be performed by the installer



The dimensions of the gas trains vary depending on their construction features.
The following table shows the dimensions of the gas trains that can be fitted to Riello 40 GSD burners, intake and outlet diameters.

	Name	Code	Ø i	Øo	X mm	Y mm	W mm	Z mm
MULTIBLOC	**MBZRDLE 405**	3970084	Rp 1/2"	Rp 1/2"(*)	321	257	46	120
	MBZRDLE 407	3970537	Rp 3/4"	Rp 3/4"	371	257	46	120
	MBZRDLE 410	3970534	1"	Rp 3/4"	405	315	55	145

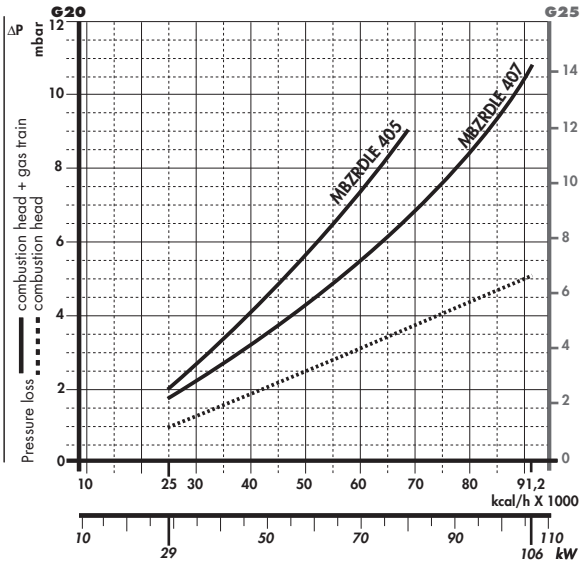
(*) With 1/2" - 3/4" reduction nipple supplied.

PRESSURE DROP DIAGRAM

The diagrams indicate the minimum pressure drop of the burners with the various gas trains that can be combined with them; the value thus calculated represents the minimum required input pressure to the gas train.

NATURAL GAS

GS10D

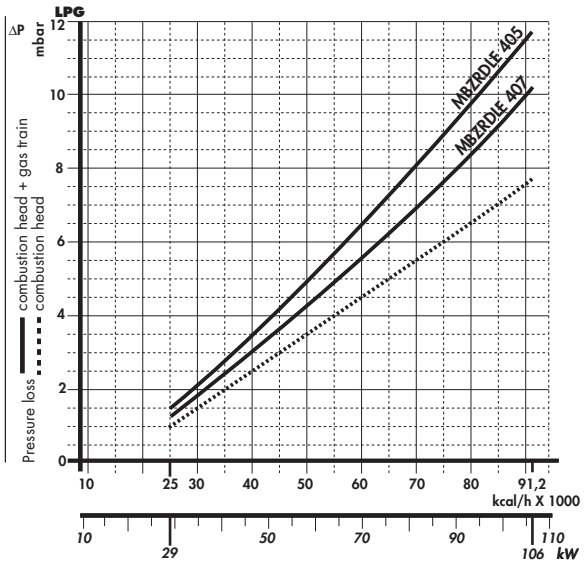


Gas train	Code	Output kW	Plug and socket
MBZRDLE 405	3970084	≤ 80 (*)	•
MBZRDLE 407	3970537	-	•

(*) With natural gas.

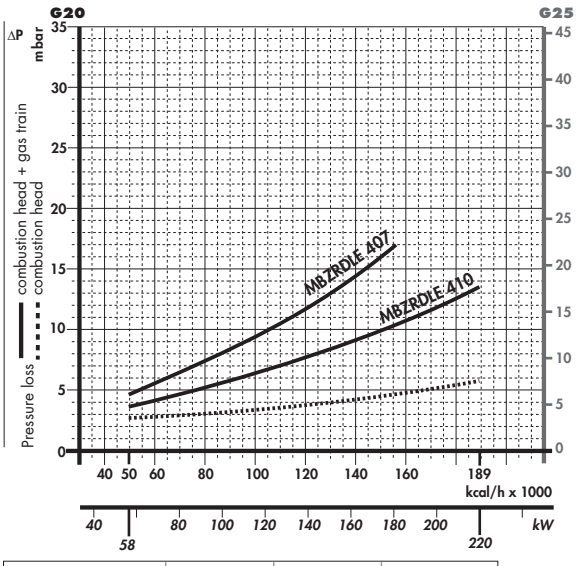
LPG

GS10D



NATURAL GAS

GS20D

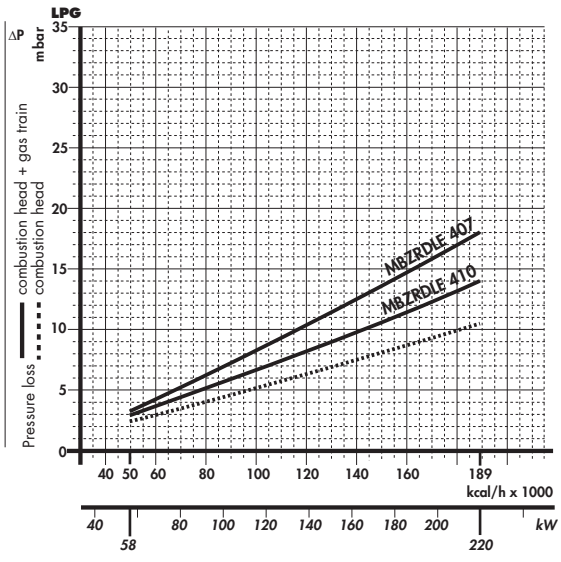


Gas train	Code	Output kW	Plug and socket
MBZRDLE 407	3970537	≤ 180 (*)	•
MBZRDLE 410	3970534		•

(*) With natural gas.

LPG

GS20D



note *For pressure levels different from those indicated above, please contact Riello Burners Technical Office.*
In LPG plants, Multibloc gas trains do not operate below 0°C.
They are only suitable for gaseous LPG (liquid hydrocarbons destroy the seal materials).

SELECTING THE FUEL SUPPLY LINES

The following diagram enables pressure drop in a pre-existing gas line to be calculated and to select the correct gas train.
The diagram can also be used to select a new gas line when fuel output and pipe length are known. The pipe diameter is selected on the basis of the desired pressure drop. The diagram uses methane gas as reference; if another gas is used, conversion coefficient and a simple formula (on the diagram) transform the gas output to a methane equivalent (refer to figure A). Please note that the gas train dimensions must take into account the back pressure of the combustion chamber during operations.

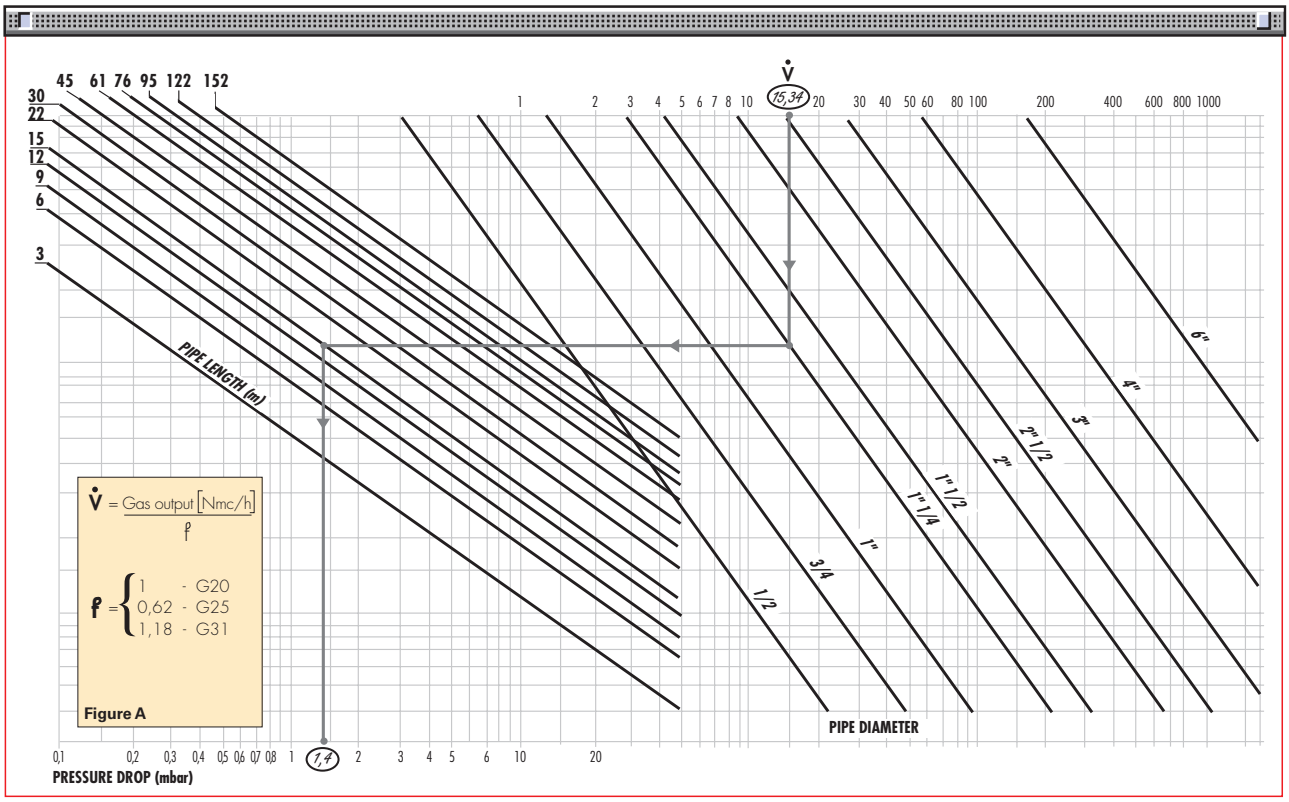
Control of the pressure drop in an existing gas line or selecting a new gas supply line.
The methane output equivalent is determined by the formula fig. A on the diagram and the conversion coefficient.

Once the equivalent output has been determined on the delivery scale ($\dot{V}$), shown at the top of the diagram, move vertically downwards until you cross the line that represents the pipe diameter; at this point, move horizontally to the left until you meet the line that represents the pipe length.
Once this point is established you can verify, by moving vertically downwards, the pipe pressure drop of on the botton scale below (mbar).
By subtracting this value from the pressure measured on the gas meter, the correct pressure value will be found for the choice of gas train.

Example:

- gas used	G25
- gas output	9.51 mc/h
- pressure at the gas meter	20 mbar
- gas line length	15 m
- conversion coefficient	0.62 (see figure A)

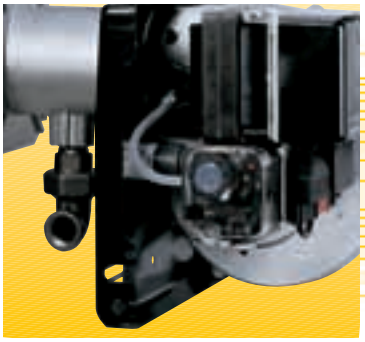
- equivalent methane output $\dot{V} = \left[\frac{9.51}{0.62} \right] = 15.34$ mc/h
- once the value of 15.34 has been identified on the output scale ($\dot{V}$), moving vertically downwards you cross the line that represents 1" 1/4 (the chosen diameter for the piping);
- from this point, move horizontally to the left until you meet the line that represents the length of 15 m of the piping;
- move vertically downwards to determine a value of 1.4 mbar in the pressure drop botton scale;
- subtract the determined pressure drop from the meter pressure, the correct pressure level will be found for the choice of gas train;
- correct pressure = (20-1.4) = 18.6 mbar



VENTILATION

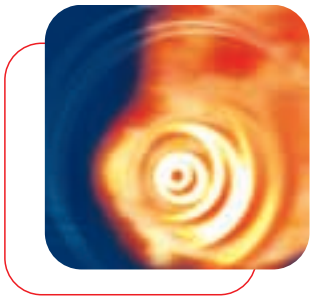
The different ventilation circuits always ensure low noise levels with high performance of pressure and air delivery, inspite of their compact size.
The burners are fitted with an adjustable air pressure switch, conforming to EN 676 standards.

Air suction



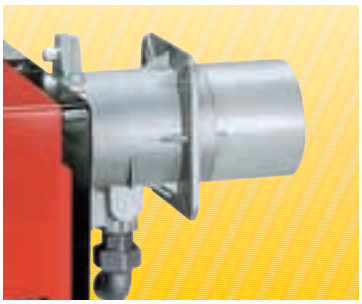
Air pressure switch

COMBUSTION HEAD



The combustion head in Riello 40 GSD burners is the result of an innovative design, which allows combustion with low polluting emissions, while being easy to adapt to all the various types of boilers and combustion chambers.

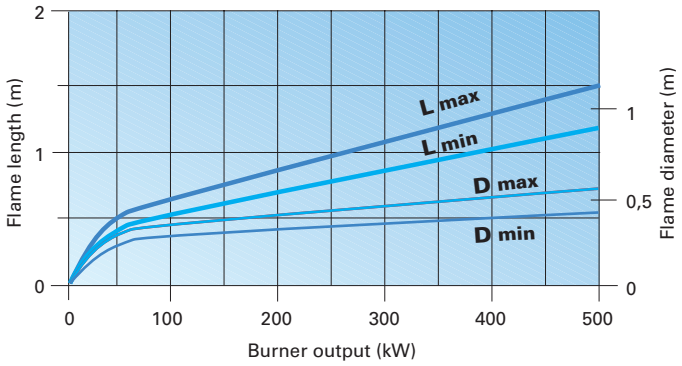
Combustion head

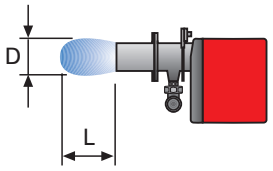


Flange

Simple adjustment allows the internal geometry of the combustion head to be adapted to the burner output.

Dimensions of the flame





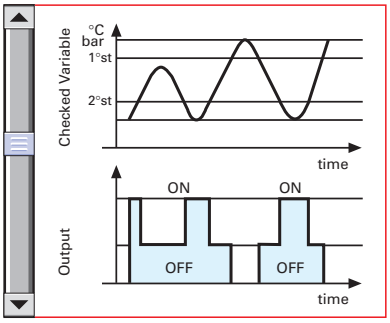
Example:
Burner thermal output = 350 kW;
L flame (m) = 1,2 m (medium value);
D flame (m) = 0,6 m (medium value)

ADJUSTMENT

BURNER OPERATION MODE

All these models are two stage operation. The Riello 40 GSD series of two stage burners allows operating at both full and reduced output, with consequent reduction in turning the burner on and off, their giving better performance to the boiler.
During stand-by, the air damper is completely closed (controlled by an electric servomotor) and prevents heat loss due to the flue draught.

Two stage operation



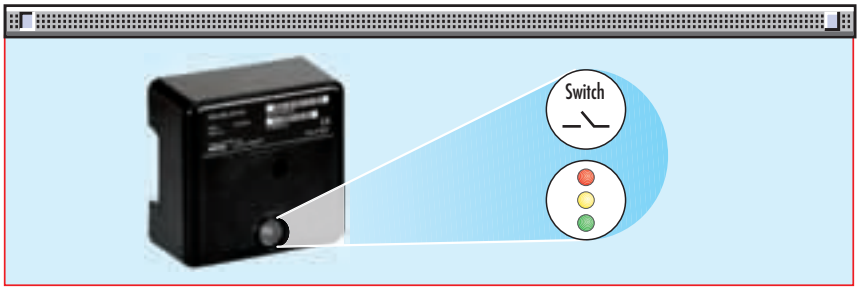
Air damper adjustment

This series burners 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.

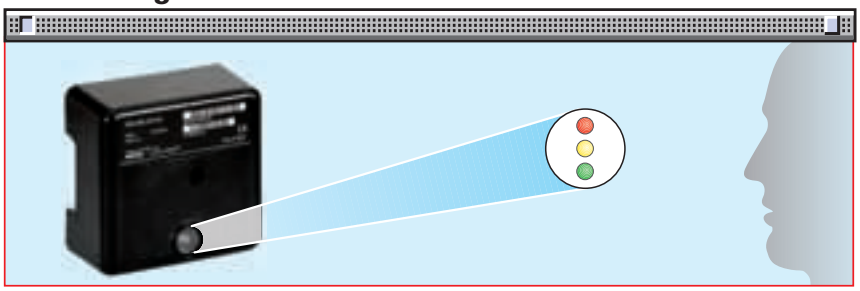
The multi-color LED is the central **indication element** for visual diagnosis and interface diagnosis.

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

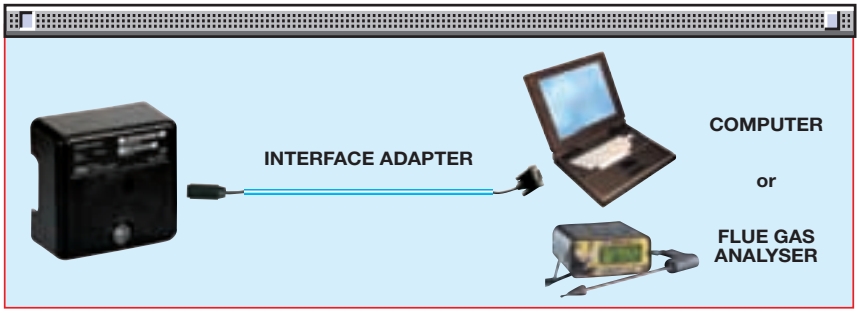


There are two diagnostic choices, for indication of operation and diagnosis of fault cause:

- **visual diagnosis** :



- **interface diagnosis** :



by the interface adapter and a PC with dedicated software or by a predisposed flue gas analyzer (see paragraph accessories).

Indication of operation :
In normal operation, the various statues are indicated in the form of colour codes according to the table below.
The interface diagnosis (with adapter) can be activated by pressing the lock-out button for > 3 seconds.

Color code table	
Operation statues	**Color code table**
Stand-by	○ ○ ○ ○ ○ ○ ○ ○
Pre-purging	☼ ☼ ☼ ☼ ☼ ☼ ☼ ☼
Ignition phase	☼ ○ ☼ ○ ☼ ○ ☼ ○
Flame OK	● ● ● ● ● ● ● ●
Poor flame	● ○ ● ○ ● ○ ● ○
Undervoltage, built-in fuse	☼ ● ☼ ● ☼ ● ☼ ●
Fault, alarm	● ● ● ● ● ● ● ●
Extraneous light	● ● ● ● ● ● ● ●

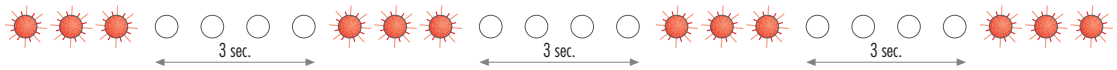
○ **LED off**

Diagnosis of fault causes :
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 interface diagnosis (with adapter) can be activated by pressing again the lock-out button for > 3 seconds.

The blinkers of red LED are a signal with this sequence :

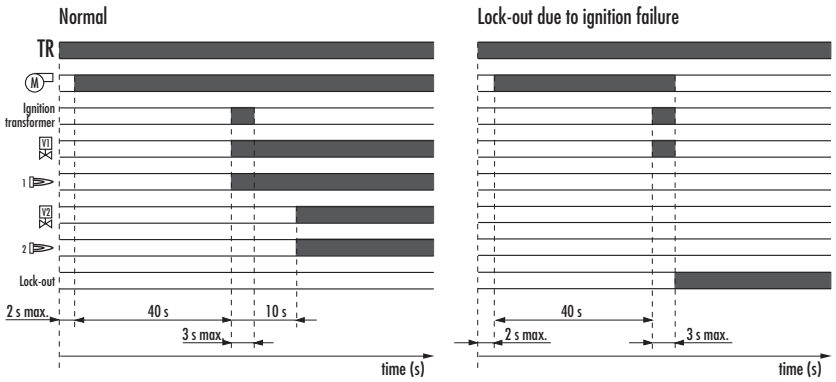
(e.g. signal with n° 3 blinks – faulty air pressure monitor)

○ **LED off**



Error code table	
Possible cause of fault	**Blink code**
No establishment of 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 equipment	● ●
Faulty air pressure monitor	● ● ●
Simulation of flame on burner start up	● ● ● ●
Loss of flame during operation : - faulty or soiled fuel valves - faulty or soiled flame detector - poor adjustment of burner	● ● ● ● ● ● ●
Wiring error or internal fault	● ● ● ● ● ● ● ● ● ●

START UP CYCLE



Correct operation

0s	The burner begins the ignition cycle
0s-2s	Safety time
2s-42s	Pre-purge with opened air damper
42s-45s	Ignition 1st stage
52s	Ignition 2nd stage.

Lock-out
If the 1st stage flame does not light within the safety limit (3s max.) the burner locks-out.
When flame-failure occurs during working, shut down takes place within one second.

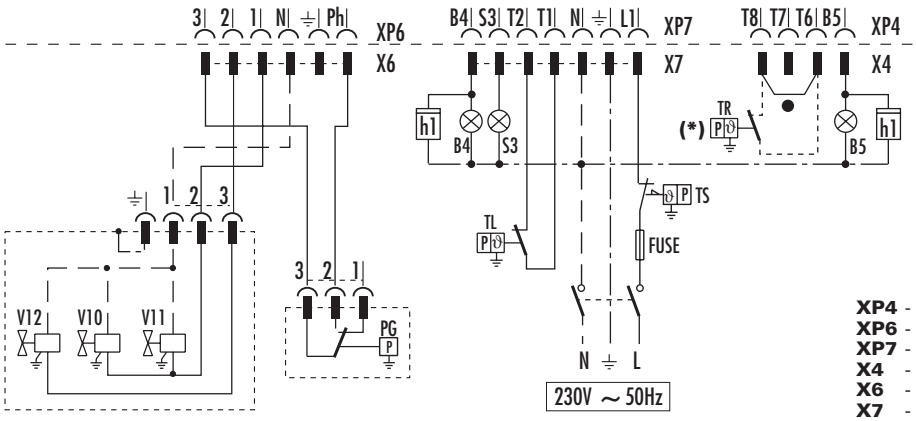
WIRING DIAGRAMS

Electrical connections must be made by qualified and skilled personnel in conformity with the local regulations in force.
The 7-pole socket, the 4-pole socket (for connecting the 2nd stage thermostat and the hour meter) and the 6-pole socket (for connection to the gas train) are connected to the equipement and fixed into the burner. The 7 and 4-pin plugs are supplied for connection to the boiler.

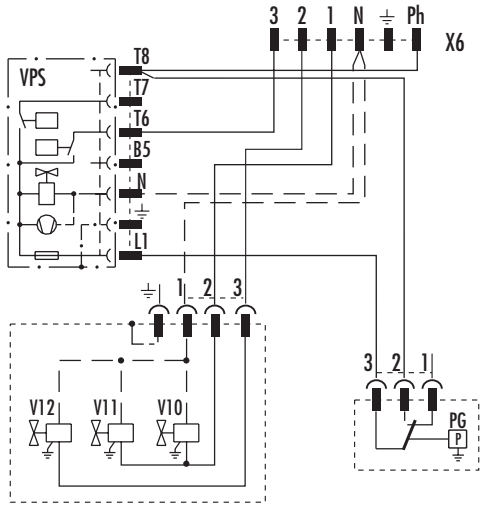
Appliance fitted with 7-pole, 6-pole and 4-pole sockets

TWO STAGE OPERATION

GS10D - GS20D



Electrical wiring with gas leak control device (DUNGS VPS 504)



XP4 - 4 pole socket
XP6 - 6 pole socket
XP7 - 7 pole socket
X4 - 4 pin plug
X6 - 6 pin plug
X7 - 7 pin plug
B4 - 1st stage working signal
B5 - 2nd stage working signal
h1 - 1st stage hour counter
h2 - 2nd stage hour counter
PG - Minimum gas pressure switch
S3 - Remote lock-out signal (230V - 0,5A max.)
TL - Limit thermostat
TR - 2nd stage thermostat
TS - Safety thermostat
V10 - Safety valve
V11 - 1st stage valve
V12 - 2nd stage valve

(*) Connect 2nd stage thermostat between clamps T6 and T8 removing the bridge.

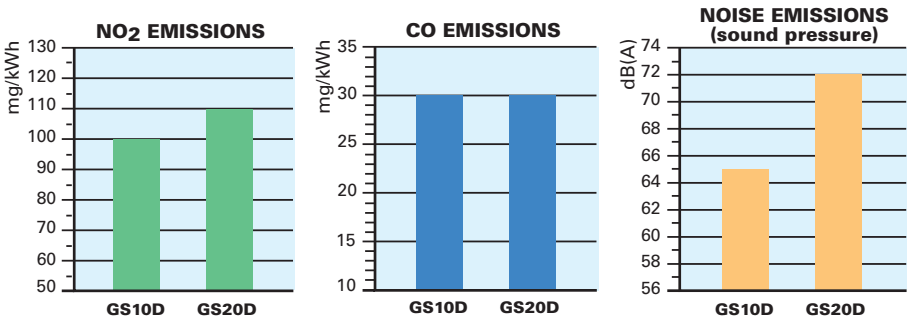
The following table shows the supply lead sections and types of fuse to be used.

Model	GS10D	GS20D
	230V	230V
F A	T6	T6
L mm²	1	1

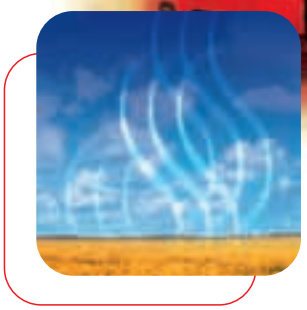
F = Fuse L = Lead section

EMISSIONS

The emission data have been measured in the various models at maximum output, in conformity with EN 676 standard.



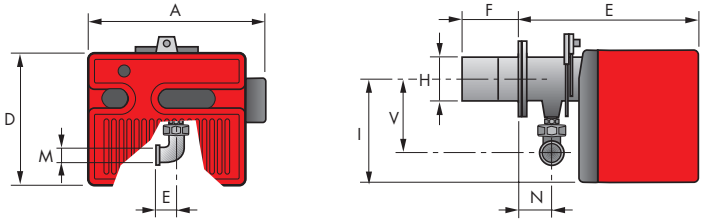
Special attention has been paid to noise reduction. All models are fitted with sound-proofing material inside the cover.



OVERALL DIMENSIONS (mm)

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

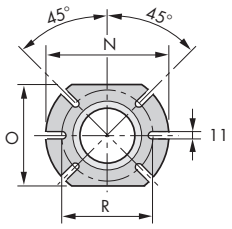
BURNER



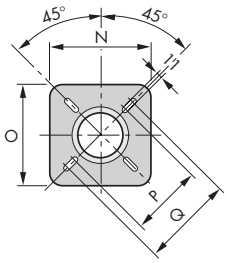
Model	A	D	E	F	H	I	M	N	V	Z
GS10D	368	262	346	110	105	204	Rp 3/4"	61	142	33
GS20D	413	298	389	120	125	230	Rp 3/4"	67	152	33

BURNER-BOILER MOUNTING FLANGE

GS10D

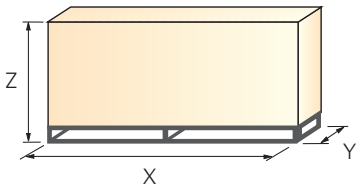


GS20D



Model	N	O	P	Q	R
GS10D	185	160	-	-	130
GS20D	170	170	155	200	-

PACKAGING



Model	X	Y	Z	kg
GS10D	485	473	320	17
GS20D	525	525	365	22

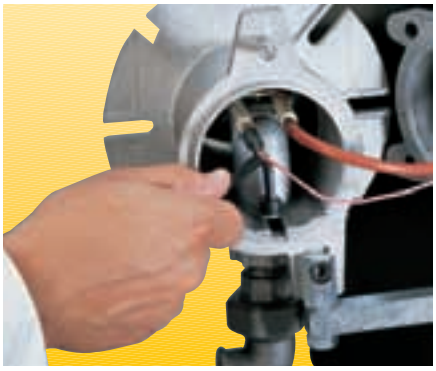
INSTALLATION DESCRIPTION

Installation, start up and maintenance must be carried out by qualified and skilled personnel.
All operations must be performed as described in the technical handbook supplied with the burner. The burner is set in the factory on standard calibration (minimum output). If necessary adjustments can be made on the basis of the maximum output of the boiler.

BURNER SETTING

- The air damper position can be adjusted without removing the burner cover.

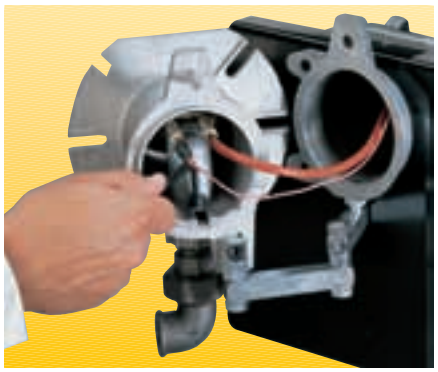
- Head setting is easy and aided by a graduated scale; a test point allows reading the air pressure in the combustion head.



- Riello 40 GSD burners are fitted with an air pressure switch which, in accordance with EN 676 standards, can be adjusted by the installer using a graduated selector, on the basis of the effective working conditions.

MAINTENANCE

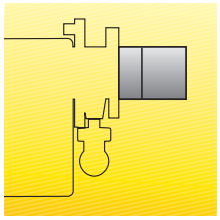
- The maintenance position is easily carried out by hinge that joins the body of burner to the flange.



BURNER ACCESSORIES

Extended head kit

"Standard head" burners can be transformed into "extended head" versions by using the special kit.
Below the KITS available for the various burners are listed, showing the original and the extended lengths.

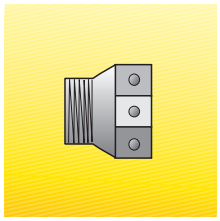


Extended head kit			
Burner	**Standard head length (mm)**	**Extended head length (mm)**	**Kit code**
GS10D	110	170	**3000864**
GS20D	120	280	**3000873**

End cone with turbulator disk

End cone with turbulator disk		
Burner	**Projection (mm)**	**Code**
GS10D	+18	**3000918**
GS20D	+23	**3000919**

Town gas kit



Town gas transformation kit	
Burner	**Kit code**
GS10D	**3000891**
GS20D	**3000893**

LPG kit

For burning LPG gas, a special kit is available to be fitted to the combustion head on the burner, as shown in the following table:

LPG kit		
Burner	**Kit code for standard head**	**Kit code for extended head**
GS10D	**3000884**	**3000884**
GS20D	**3000886**	**3000886**

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	
Burner	**Kit code**
GS10D - GS20D	**3002719**

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**
GS10D - GS20D	**3000945**

Ground fault interrupter kit
A "Ground fault interrupter kit" is available as a safety device in case of electrical system fault. It is supplied with burners with pin plug.

Ground fault interrupter kit	
Burner	**Kit code**
GS10D - GS20D	**3001180**

Continuous ventilation kit for RMG control box
If the burner requires continuous ventilation in the stages without flame, a special kit is available as given in the following table.

Continuous ventilation kit for RMG control box	
Burner	**Kit code**
GS10D - GS20D	**3010094**

GAS TRAIN ACCESSORIES

Seal control kit
To test the valve seals on the gas train, a special "seal control kit" is available.

Seal control kit	
Burner	**Kit code**
GS10D - GS20D	**3010123**

SPECIFICATION

A special index guides your choice of boiler from the various models available in the Riello 40 GSD series.
Below is a clear and detailed specification description of the product.

DESIGNATION OF SERIES

Series: G
Fuel : S Natural gas
Size
Optional variation: D Two stage output adjustment
Electrical supply to the system : 1/230/50 1/230V/50Hz

G	S	10	D	1/230/50

AVAILABLE BURNER MODELS

GS10D 1/230/50
GS20D 1/230/50

PRODUCT SPECIFICATION

Burner

Monoblock, gas burners, completely automatic, with two stage settings fitted with:
- Fan with forward curve blades
- Cover lined with sound-proofing material
- Air damper, completely closed in stand by, driven by an electric servomotor
- Air damper with 1st and 2nd stage adjustement
- Single phase electric motor 230 V, 50 Hz
- Combustion head fitted with:
    - stainless steel head cone, resistant to high temperatures
    - ignition electrodes
    - ionisation probe
    - gas distributor
    - flame stability disk
- Adjustable air pressure switch, with graduated selector, to guarantee burner lock out in the case of insufficient combustible air
- Protection filter against radio interference
- IP 40 electric protection level.

Gas train

Fuel supply line in the Multibloc configuration, fitted with:
- Filter
- Pressure stabiliser
- Minimum gas pressure switch
- Safety valve
- Two stage working valve with ignition gas output regulator.

Approval:
- EN 676 standard.

Conforming to:
- 90/396/EEC (gas)
- 73/23/EEC (low voltage)
- 89/336/EEC (electromagnetic compatibility)
- 92/42/EEC (efficiency)
- 98/37/EEC (machines).

Standard equipment:
- Insulating gasket
- Screws and nuts for fixing the flange to the boiler
- 7-pin plug
- 4-pin plug
- Hinge
- Cable grommet
- Instruction handbook for installation, use and maintenance
- Spare parts catalogue.

Available accessories to be ordered separately:
- Extended head kit
- End cone with turbolator disk
- Town gas kit
- LPG kit
- Interface adapter kit
- 7-pin plug kit
- Ground fault interrupter kit
- Continuous ventilation kit for RMG control box
- Seal control kit.

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