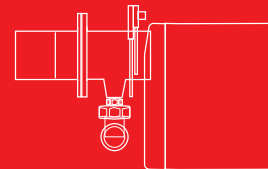
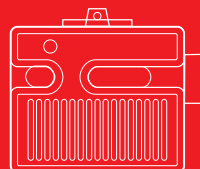




## Riello 40 GSD Series

Two Stage Gas Burners

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 41 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, Gas Appliance 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	
Heat output (Hi) (1)	min. - max.	kW kcal/h	29/41 ÷ 106 25.000/35.000 ÷ 91.000	58/81 ÷ 220 50.000/70.000 ÷ 189.000
FUEL/AIR DATA				
Fuel			NCV 8 ÷ 12 kWh/m³ – 7.000 ÷ 10.340 kcal/m³	
	Family 2 Pressure		min. 6.9 mbar max. 360 mbar	min. 6.6 mbar max. 360 mbar
	Family 3 Pressure		min. 9.7 mbar max. 360 mbar	min. 14.1 mbar max. 360 mbar
Operation			Intermittent (FS1)	
Use			Boilers: water and diathermic oil	
Ambient temperature		°C	0 – 50	
Combustion air temperature		°C max.	60	
ELECTRICAL DATA				
Electrical supply			1/230V/50Hz	
Fan motor		rpm – rad/s V – Hz W A	2800 – 294 230 – 50 90 0.75	2750 – 288 230 – 50 150 1.3
Ignition transformer			Primary 230 V / 1.8A Secondary 8 kV / 30 mA	
Capacitor		µF	2	5
Absorbed electrical power		kW	0.13	0.25
Protection level			IP40	
EMISSIONS				
Noise levels (2)	Soundpressure	dB (A)	63.1	66.8
	Sound power		74.7	77.8
APPROVAL				
Directive			2006/42/CE – 2016/426/EU – 2014/30/EU – 2014/30/EU	
Conforming to			EN 676 – EN 12100	
Certification			CE-0476CT2714	

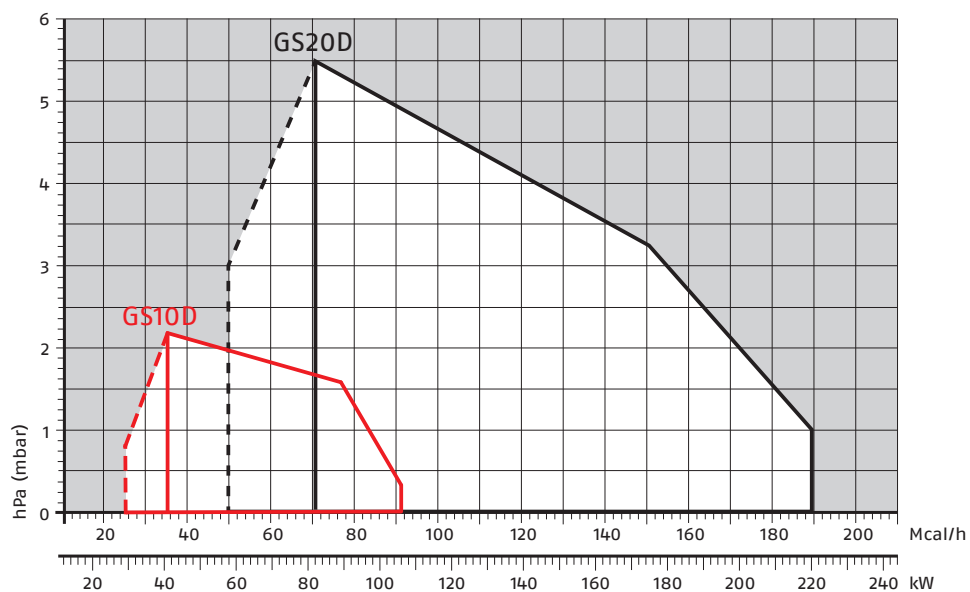
Reference conditions:

(1) Temperature: 20°C - Pressure: 1013.5 mbar - Altitude: 0 m a.s.l. - Noise measured at a distance of 1 meter.

(2) Sound pressure measured in manufacturer's combustion laboratory, with burner operating on test boiler and at maximum rated output. The sound power is measured with the "Free Field" method, as per EN 15036, and according to an "Accuracy: Category 3" measuring accuracy, as set out in EN ISO 3746.

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. This document contains confidential and proprietary information of RIELLO S.p.A. Unless authorised, this information shall not be divulged, nor duplicated in whole or in part.

## Firing Rates



Useful firing rate  
for choosing the  
burner



1<sup>st</sup> stage operation  
range

Test conditions  
conforming to  
EN676  
Temperature: 20°C  
Pressure: 1013,5  
mbar  
Altitude: 0 m a.s.l.

# Gas train

## GAS TRAIN DESIGNATION

Series:	MB						
	MBC						
	VGD						
	CB						
	DMV						
	CG						

Size:	405	407	410	412	415	420	-
	65	1200	1900	3100	5000		
	50	65	80	100	-	-	-
	512	520	525	5065	5080	50100	50125
	120	220	-	-	-	-	-

Operation:	/S	only ON-OFF function
	/1	stage mode opening
	/2	2nd stage mode opening
	/P	1st stage mode opening with air/gas proportional regulator

Leak detection control:	-	0
	CT	leak detection control device installed on the gas train
	CQ	equipped with pressure switch for leak detection control

Joint type:	R	threaded joint
	F	standard flange ISO
	F1	square flange BS1
	F2	square flange BS2
	F3	square flange BS3 – BS4

Electrical connection:	T	Terminals – Terminal strip
	SD	Domestic plug
	SM	Medium voltage plug

Standard output pressure range:	-	without pressure governor
	0	with governor and air/gas proportional pressure
	2	with governor and output pressure up to 20 mbar
	3	with governor and output pressure up to 30 mbar
	4	with governor and output pressure up to 40 mbar
	5	with governor and output pressure up to 50 mbar
	6	with governor and output pressure up to 60 mbar
	8	with governor and output pressure up to 80 mbar
	15	with governor and output pressure up to 150 mbar

Valve control:	0	shared
	2	separate

CB	5065	/1	CT	F	SM	3	0
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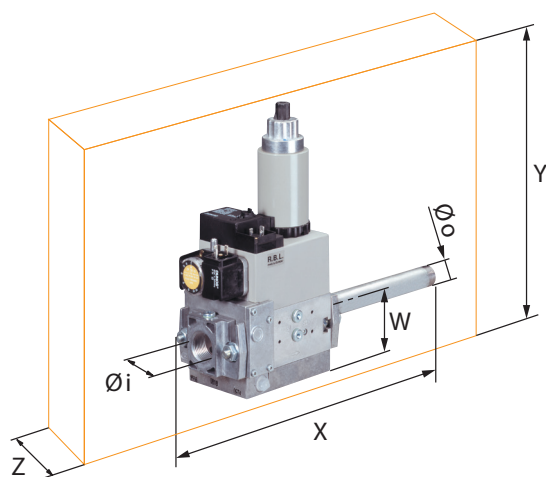
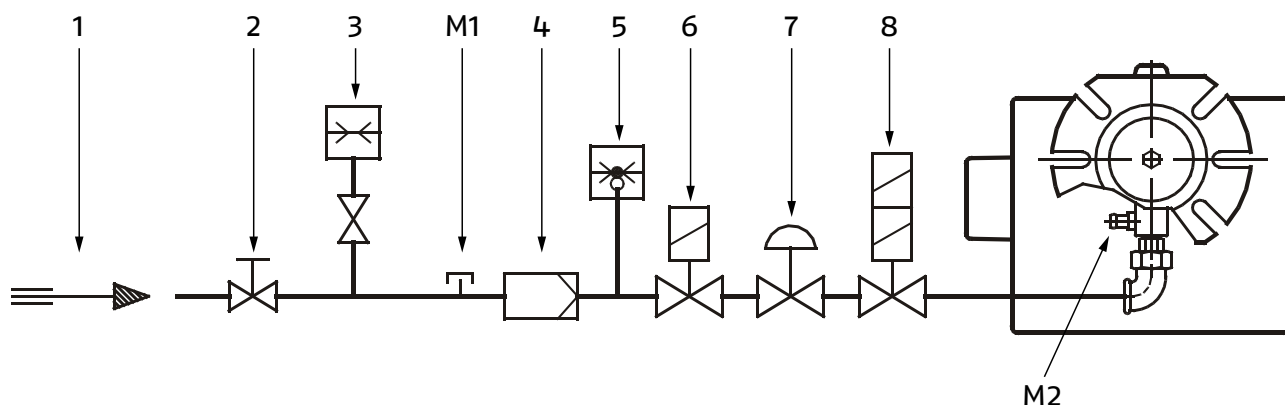
BASIC DESIGNATION

EXTENDED DESIGNATION

## GAS TRAINS

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

### MB 405-407-410/2



1	Gas input pipe
2	Manual gate (the responsibility of the installer)
3	Gas pressure gauge (the responsibility of the installer)
4	Filter
5	Gas pressure switch
6	Safety valve
7	Pressure stabiliser
8	1st and 2nd stage adjustment valve
M1	Gas-supply pressure test point on the pressure switch
M2	Pressure coupling test point

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.

GAS TRAIN								BURNER		NOTE
MODEL	CODE *	Ø in	Ø out	X mm	Y mm	W mm	Z mm	NATURAL GAS	LPG	
MB 405/2	3970084	Rp 1/2"	Rp 1/2"	321	257	46	120	GS10D	GS10D	(1) (2) (4)
MB 407/2	3970537	Rp 3/4"	Rp 3/4"	371	257	46	120	GS10D - GS20D	GS10D - GS20D	(1) (3)
MB 410/2	3970534	Rp 1"	Rp 3/4"	405	315	55	145	GS20D	GS20D	(1)

Please see Designation of Gas Train Series in the page before the Catalogue index.

\* Gas train are 230V/50Hz - 220V/60Hz electrical supply

(1) With installed plug (if the plug is not necessary, remove it in accordance with gas train instruction manual indication)

(2) GS10D ≤ 80 kW with natural gas

(3) GS20D ≤ 180 kW with natural gas

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

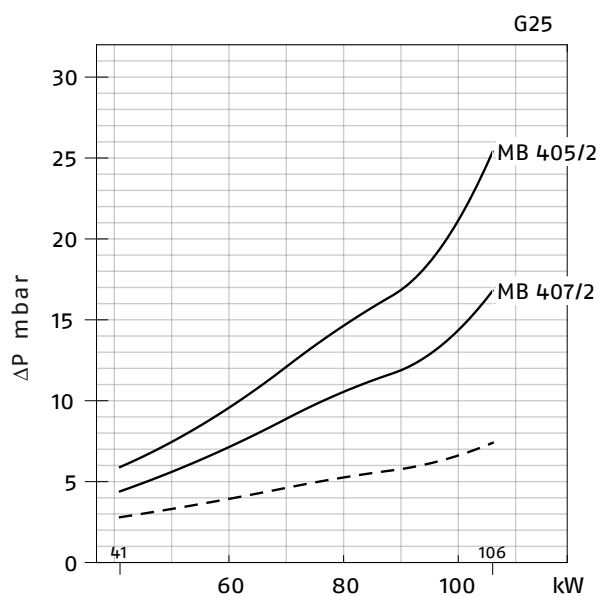
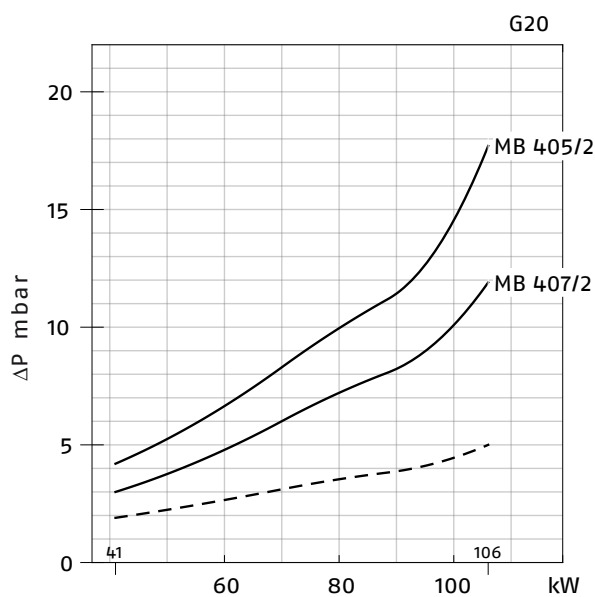
The valve seal control device is compulsory (conforming to EN 676) on gas trains to burners with a maximum output over 1200 kW.

To select the gas train please refer to the technical data leaflet and/or instruction manual.

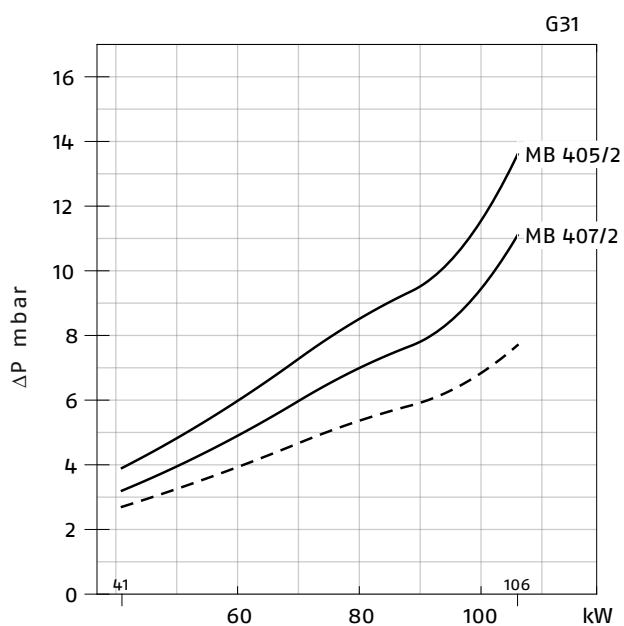
## Pressure Drop Diagram

The diagrams indicate the minimum pressure drop of the burners with the various gas trains that can be matched with them; at the value of these pressure drop add the combustion chamber pressure. The value thus calculated represents the minimum required input pressure to the gas train.

### GS10D (NATURAL GAS)



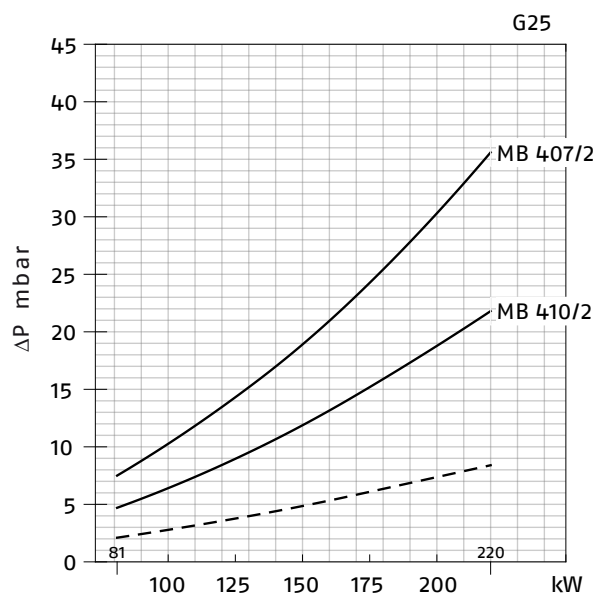
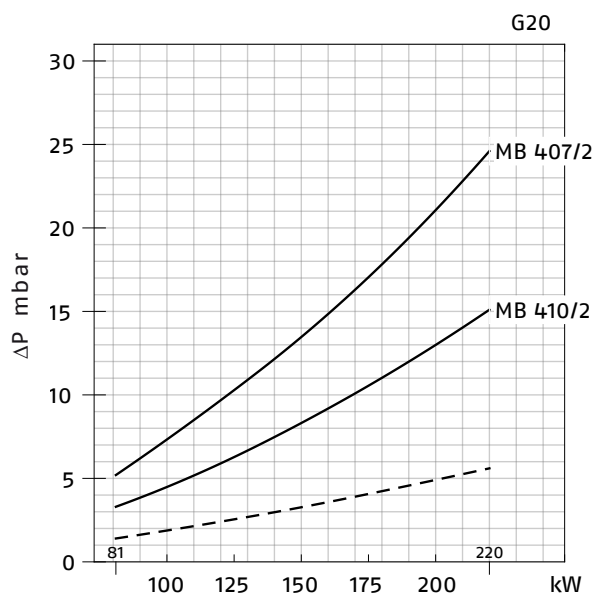
### GS10D (LPG)



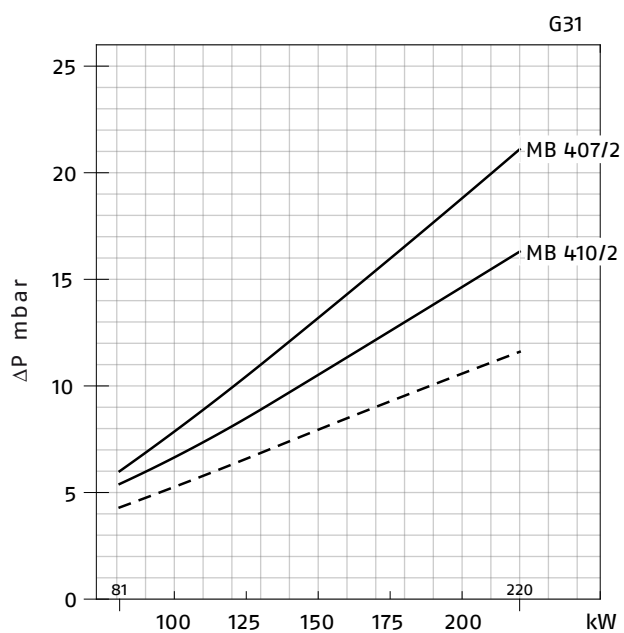
For pressure levels different from those indicated above, please contact Riello Burners Technical Office.  
In LPG plants, Multibloc gas trains do not operate below 0°C.  
They are only suitable for gaseous LPG (liquid hydrocarbons destroy the seal materials).

— Combustion head + gas train  
- - - Combustion head

## GS20D (NATURAL GAS)



## GS20D (LPG)



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).

— Combustion head + gas train  
 - - - Combustion head



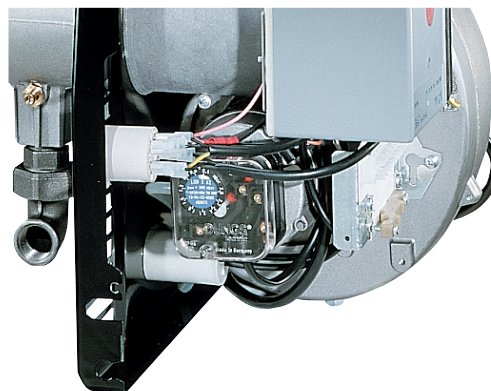
## Ventilation

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.



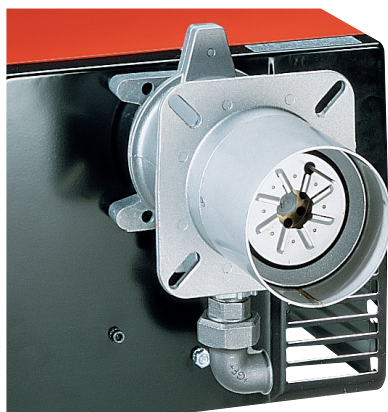
Air suction



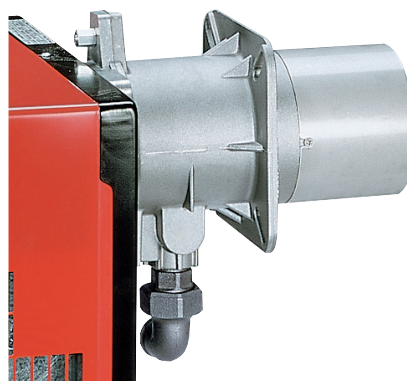
Air pressure switches

## 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.



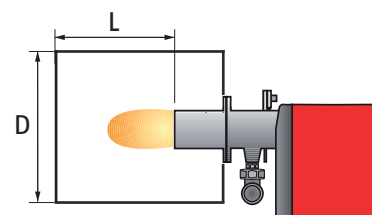
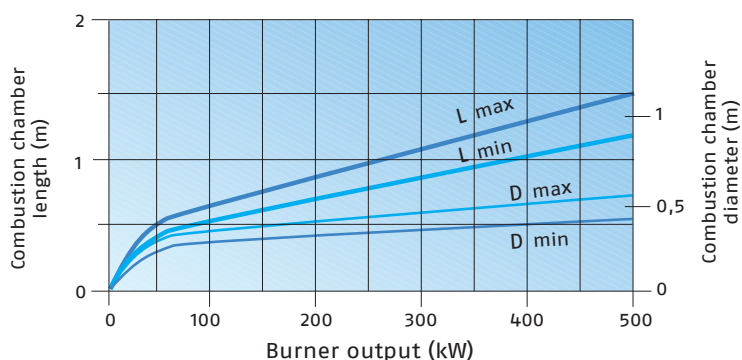
Combustion head



Mobile flange

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

### SUGGESTED COMBUSTION CHAMBER DIMENSIONS



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

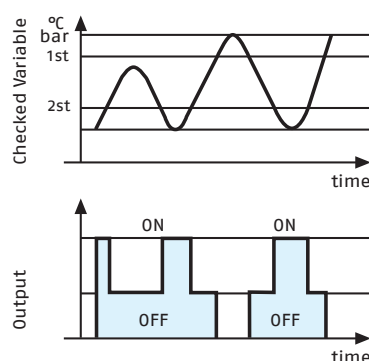
# Operation

## BURNER OPERATION MODE

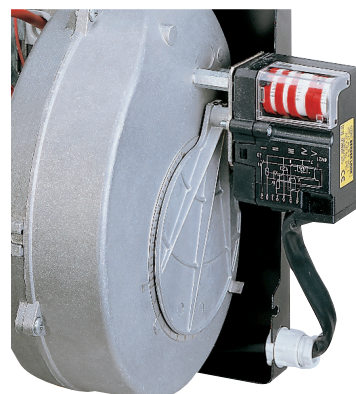
All these models are two stage operation.

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

The GS20D model is fitted with the new microprocessor control panel for the supervision during intermittent operation. For helping the commissioning and maintenance work, there are two main elements:

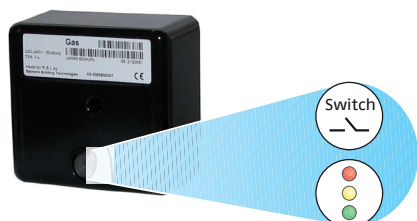


The lock-out reset button is the central operating element for resetting the burner control and for activating / deactivating the diagnostic functions.



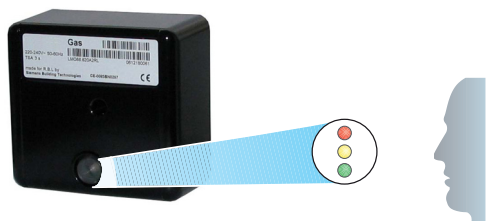
The multi-color LED is the central indication element for visual diagnosis and interface diagnosis.

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

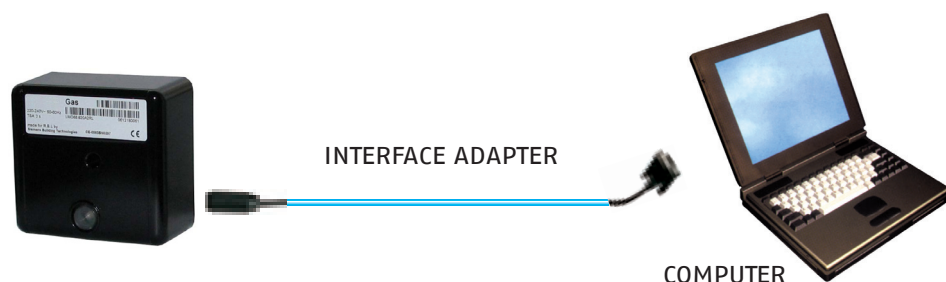


There are two diagnostic choices, for indication of operation and diagnosis of fault cause:

### - visual diagnosis:



### - interface diagnosis:



By the interface adapter and a PC with dedicated software.

### Indication of operation:

In normal operation, the various status 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 status	Color code	Color
Stand-by	○ ○ ○ ○ ○ ○ ○ ○	Off
Pre-purging	☀ ☀ ☀ ☀ ☀ ☀ ☀ ☀	Yellow
Ignition phase	☀ ○ ☀ ○ ☀ ○ ☀ ○	Flashing yellow
Flame OK	☘ ☘ ☘ ☘ ☘ ☘ ☘ ☘	Green
Poor flame	☘ ○ ☘ ○ ☘ ○ ☘ ○	Flashing green
Undervoltage/overvoltage	☀ ☘ ☀ ☘ ☀ ☘ ☀ ☘	Yellow red
Fault, alarm	☘ ☘ ☘ ☘ ☘ ☘ ☘ ☘	Red
Extraneous light	☘ ☘ ☘ ☘ ☘ ☘ ☘ ☘	Green - Red

### 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 flashes of red LED are a signal with this sequence :

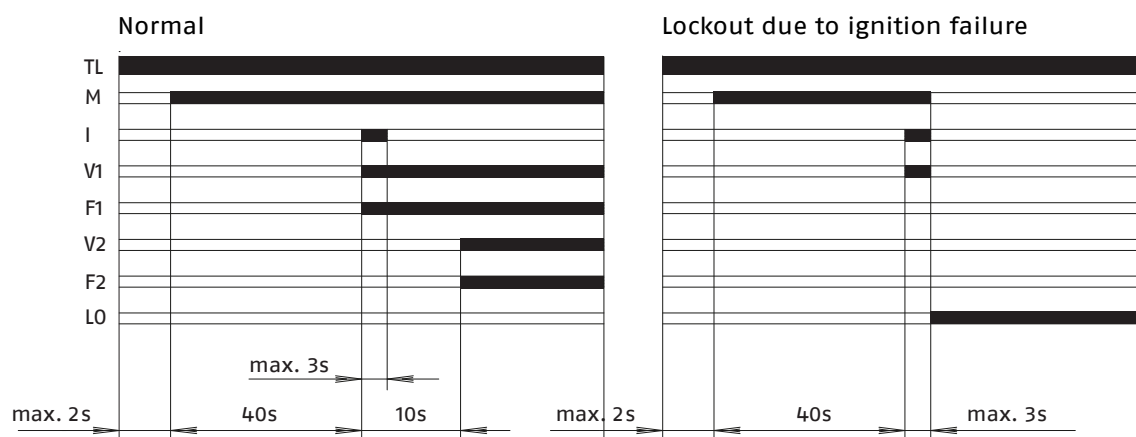
(e.g. signal with n° 3 flashes – faulty air pressure monitor)



Error code table	
Flash code	Possible cause of fault
2 flashes ☘ ☘	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
3 flashes ☘ ☘ ☘	Faulty air pressure switch
4 flashes ☘ ☘ ☘ ☘	Simulation of flame on burner start up
7 flashes ☘ ☘ ☘ ☘ ☘ ☘ ☘	Loss of flame during operation : - faulty or soiled fuel valves - faulty or soiled flame detector - poor adjustment of burner
10 flashes ☘ ☘ ☘ ☘ ☘ ☘ ☘ ☘ ☘ ☘	Wiring error or internal fault

## START UP CYCLE

Operation sequence of the burner



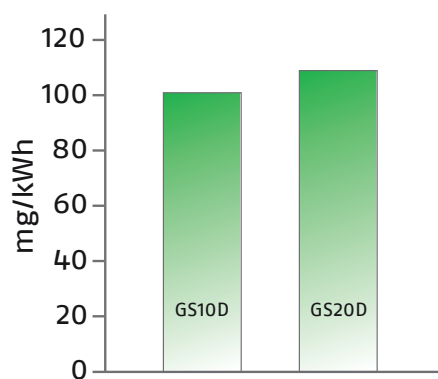
### KEY

I	Ignition transformer
F1	1st stage flame
F2	2nd stage flame
L0	Lockout
M	Fan motor
TL	Limit thermostat
V1	1st stage gas valve
V2	2nd stage gas valve

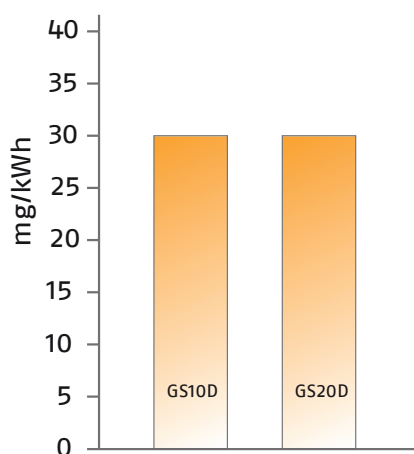
## Emissions

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

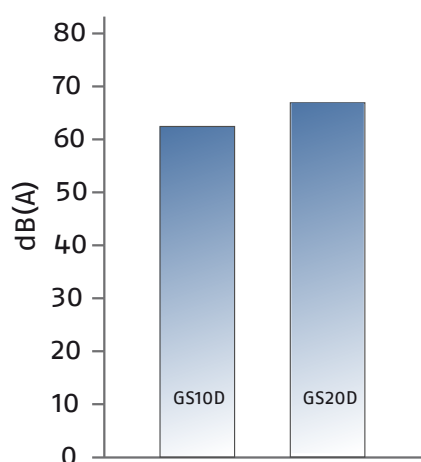
### NOx EMISSIONS



### CO EMISSIONS



### NOISE EMISSIONS



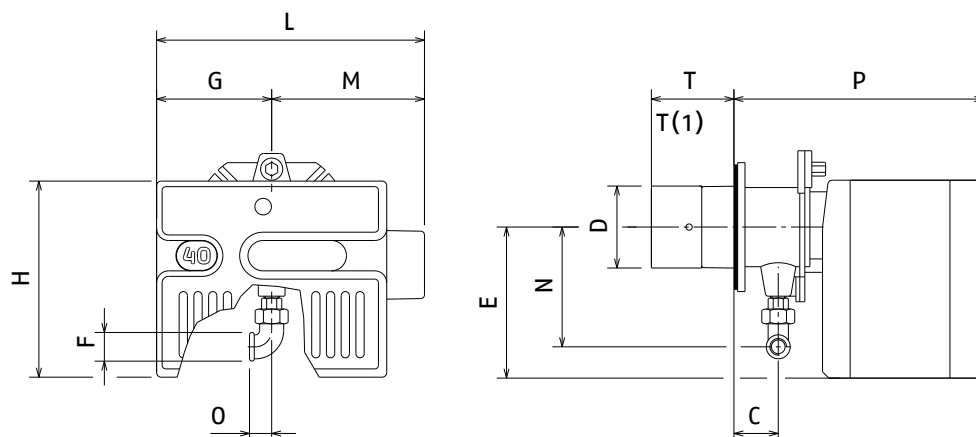
Special attention has been paid to noise reduction.  
All models are fitted with sound-proofing material inside the cover.



## Overall Dimensions (mm)

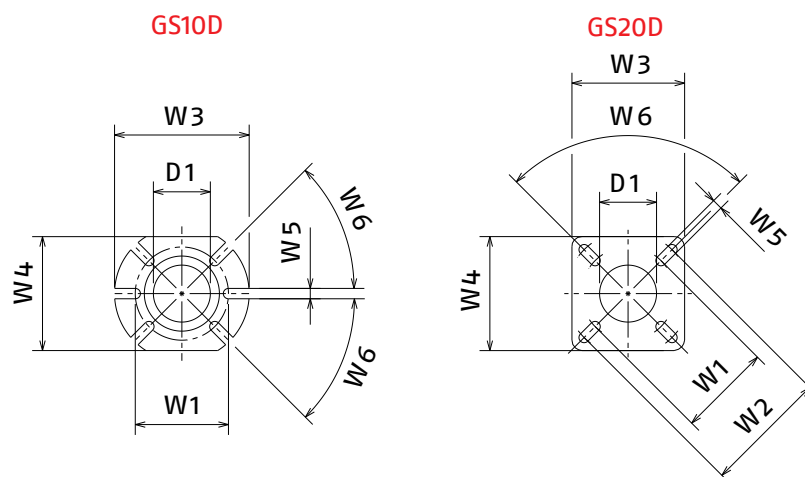
These models are distinguished by their reduced size, in relation to the outputs achieved, which means they can be fitted to any boiler on the market.

### BURNER



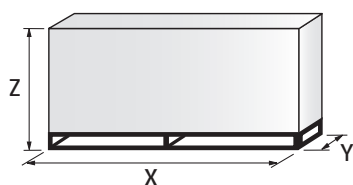
MODEL	C	D	E	G	H	L	M	N	O	P	T - T(1)
GS10D	61	105	204	153	262	368	215	142	33	346	110
GS20D	67	125	230	175	298	413	238	152	33	389	120 - 280

### BURNER - BOILER MOUNTING FLANGE



MODEL	D1	W1	W2	W3	W4	W5	W6
GS10D	114	130	-	185	160	11	45°
GS20D	125	155	200	170	170	11	90°

### PACKAGING



MODEL	X	Y	Z	kg
GS10D	495	483	330	16
GS20D	535	535	375	22



## Installation Description

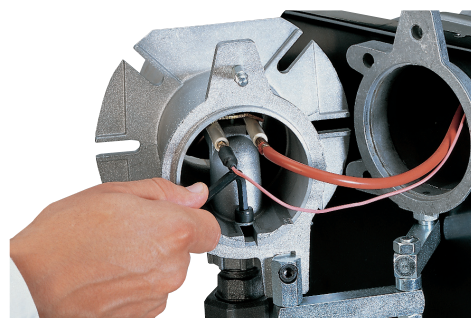
Installation, start up and maintenance must be carried out by qualified and skilled personnel. All operations must be performed as described in the technical handbook supplied with the burner. The burner is set in the factory on standard calibration (minimum output). If necessary adjustments can be made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

### BURNER SETTING

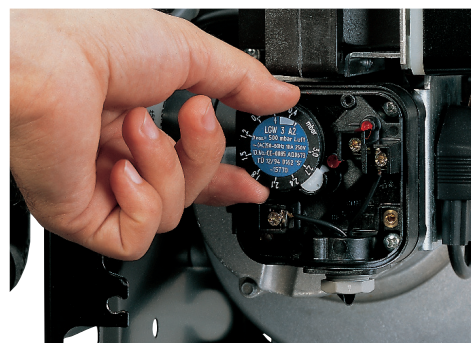
The air damper position can be adjusted without removing the burner cover.



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

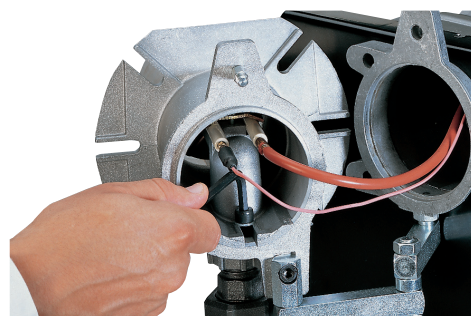


Riello 40 GSD burners are fitted with an air pressure switch which, in accordance with EN 676 standards, can be adjusted by the installer using a graduated selector, on the basis of the effective working conditions.



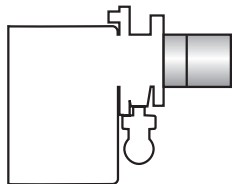
### MAINTENANCE

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



## Burner accessories

### EXTENDED HEAD KIT



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

BURNER	STANDARD HEAD LENGTH (mm)	EXTENDED HEAD LENGTH (mm)	CODE
GS10D	100	170	3001064
GS20D	120	280	3000873

### END CONE WITH TURBULATOR DISK



The end cone turbulator disk reduces the flame length. It is suitable for hoven application (CO emissions) and short boiler chamber.

BURNER	PROJECTION (mm)	CODE
GS10D	+ 18	3000918
GS20D	+ 23	3000919

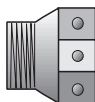
### LPG KIT



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.

BURNER	STANDARD HEAD CODE	EXTENDED HEAD CODE
GS10D	3000884	3000884
GS20D	3000886	3000886

### TOWN GAS KIT



BURNER	CODE
GS10D	3000891
GS20D	3000894

### 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.

BURNER	CODE
GS10D – GS20D	3001180



## 7-PIN PLUG KIT

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

BURNER	CODE
GS10D – GS20D	3000945

## CONTINUOUS VENTILATION KIT FOR CONTROL BOX

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

BURNER	CODE
GS10D – GS20D	3010094

## PC INTERFACE KIT



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

BURNER	CODE
GS10D – GS20D	3002719

# Gas train accessories

## SEAL CONTROL KIT



To test the valve seals on the gas train a special “seal control kit” is available.

GAS TRAIN	CODE for 50Hz operation	CODE for 60Hz operation
MB/1 type	3010123	20050030

# Specification

## DESIGNATION OF SERIES

A specific index guides your choice of burner from the various models available in the BS series. Below is a clear and detailed specification description of the product.

Series:	G	Standard emission burner
Fuel:	S	Natural Gas
Size:	10	
Optional variation:	D	Two stage output adjustment
Head:	...	Standard head
	TL	Extended head
Electrical supply to the system:	1/230/50	1/230V/50Hz

G	S	10	D		1/230/50
BASIC DESIGNATION					
EXTENDED DESIGNATION					

## AVAILABLE BURNER MODELS

BURNER MODELS	ELECTRICAL SUPPLY	HEAT OUTPUT		ABSORBED ELECTRICAL POWER (kW)	CERTIFICATION	NOTE
		(kW)	NATURAL GAS (Nm <sup>3</sup> /h)			
GS10D	1/230/50	29/41 – 106	2,9/4,1 – 10,6	0,13	CE-0476CT2714	(1)
GS20D	1/230/50	58/81 – 220	5,8/8,1 – 22	0,25	CE-0476CT2714	(1)

Net calorific value G20: 10 kWh/Nm<sup>3</sup> – Density: 0,71 kg/Nm<sup>3</sup>

The burners of GSD series are in according to EN 676

(1) With plug and socket

## SPECIFICATION

### STATE OF SUPPLY

#### **Burner**

Monoblock, gas burners, completely automatic, two stage operation, made up of:

- 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 adjustment
- 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
  - flame inspection window
- 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 X0D (IP 40) electric protection level.

#### **Standard equipment:**

- Flange insulation screen
- Screws and nuts for fixing the flange to the boiler
- 7-pole socket
- 4-pole socket
- Hinge
- Grommet
- Instruction handbook for installation, use and maintenance
- Spare parts catalogue.

#### **Conforming to:**

- 2014/30 EU Directive (electromagnetic compatibility)
- 2014/35 EU Directive (low voltage)
- 2016/426 EU Gas Appliances Regulation
- 2006/42 CE Directive (machine)
- EN 676 (gas burners)

#### **Available accessories to be ordered separately:**

- Extended head kit
- End cone with turbulator disk
- LPG kit
- Town gas kit
- Ground fault interrupter kit
- 7-pin plug kit
- Continuous ventilation kit for control box
- PC interface kit

# Riello Burners a world of experience in every burner we sell.

05/2019

TS0026UK04



[ 1 ]



[ 2 ]

[ 1 ] BURNERS PRODUCTION PLANT  
S. PIETRO, LEGNAGO (VERONA) - ITALIA

[ 2 ] HEADQUARTER BURNERS DIVISION  
S. PIETRO, LEGNAGO (VERONA) - ITALIA

Across the world, Riello sets the standard in reliable and high efficiency burner technology.

With burner capacity from 5 kW to 48 MW, Riello gas, oil, dual fuel and Low Nox burners deliver unbeatable performance across the full range of residential and commercial heating applications, as well as in industrial processes.

With headquarter in Legnago, Italy, Riello has been manufacturing premium quality burners for over 90 year. The manufacturing plant is equipped with the most innovative systems of assembling lines and modern manufacturing cells for a quick and flexible response to the market.

Besides, the Riello Combustion Research Centre, located in Angiari, Italy, represents one of the most modern facility in Europe and one of the most advanced in the world for the development of the combustion technology.

Today, the company's presence on worldwide markets is distinguished by a well-constructed and efficient sales network, alongside many important Training Centres located in various countries to meet its customers' needs. Riello has 13 operational branches abroad (in Europe, America and Asia), with customers in over 60 countries.

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