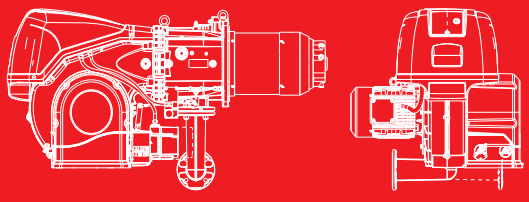
TECHNICAL DATA LEAFLET

LOW NOx GAS

RS 310-610/M BLU Series

Low NOx Modulating Gas Burners

RS 310/M BLU	400/1200	-	3630	kW
RS 410/M BLU	500/1500	-	4450	kW
RS 510/M BLU	680/1800	-	5250	kW
RS 610/M BLU	1000/2200	-	6250	kW



RIELLO
Energy For Life

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The high power monoblock Burners Series RS, are the result of intensive activities of technical research and considerable investments, carried out in recent years, that allowed the highest levels of technological development to be achieved in the Industrial Burners context, confirming the historical leadership of Riello in this important area of energy management.
The remarkable results of performance, quality and reliability, are now consolidated by the creation of new models in the 3-6 MW range, RS 310-410-510-610, able to summarize and concentrate the best technological expertise of Riello.
The RS 310-410-510-610/M BLU burners series covers a firing range from 1200 to 6250 kW, and it has been designed for use in low or medium temperature hot water boilers, hot air or steam boilers, diathermic oil boilers. 0peration can be "two stage progressive" or, alternatively, "modulating" with the installation of a PID logic regulation.
The exclusive design ensures reduced dimensions, simple use and maintenance.
A wide range of accessories guarantees elevated working flexibility.

Technical Data

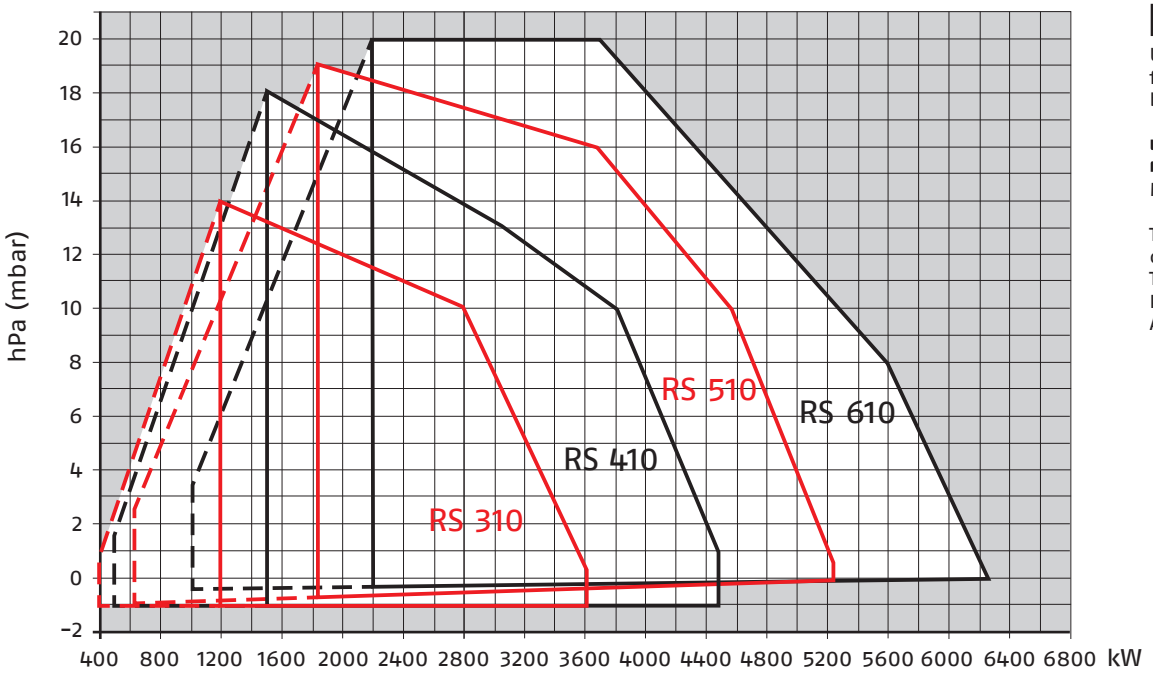
MODEL		RS 310/M BLU	RS 410/M BLU	RS 510/M BLU	RS 610/M BLU
Burner operation mode		Modulating			
Modulation ratio at max. output		5 - 1			
Servomotor	type	SQM 40			
	run time s	30 at 90°			
Heat output	kW	400/1200-3630	500/1500 -4450	680/1800-5250	1000/2200-6250
	Mcal/h	344/1032-3122	430/1290-3827	585/1548-4515	860/1892-5375
Working temperature	°C min./max.	0/50			
FUEL/AIR DATA					
Net calorific value G20 gas	kWh/Nm³	10			
G20 gas density	kg/Nm³	0.71			
G20 gas delivery	Nm³/h	40/120-360	50/150-440	68/180-520	100/220-620
Net calorific value G25 gas	kWh/Nm³	8.6			
G25 gas density	kg/Nm³	0.78			
G25 gas delivery	Nm³/h	46/140-422	58/174-517	79/209-610	116/255-727
Fan	type	Forward curve blades			
Air temperature	max °C	60			
ELECTRICAL DATA					
Start-up	type	Direct		--	
Electrical supply	Ph/V/Hz	3/230/50 3N/400/50	3/230/50 3N/400/50	--	
Auxiliary electrical supply	Ph/V/Hz	1/230/50		--	
Total electrical power	kW	9.1	10.8	--	
Motor electrical power	kW	7.5	9.2	--	
Rated motor current	A	24/14	28.6/16.5	--	
Motor protection level	IP	54		--	
Start-up	type	Star/Triangle			
Electrical supply	Ph/V/Hz	3N/400/50			
Auxiliary electrical supply	Ph/V/Hz	1/230/50			
Total electrical power	kW	8.8	10.6	14	16.9
Motor electrical power	kW	7.5	9.2	12	15
Rated motor current	A	14/8.1	16.8/9.7	21.8/12.6	27/15.6
Motor protection level	IP	54			
Control box	type	RMG 88.62 - LFL 1.333 - LGK 16.333 **(*)**			
Protection level		IP 54			
Ignition transformer	type	--			
	V1 - V2	230V - 1 X 8 kV			
	I1 - I2	1 A - 20 mA			
Operation		FS1 - Intermittent (at least one stop every 24 h) FS2 - or Continuous (at least one stop in 72 h)			

(*) according to the operation and the installation.

MODEL		RS 310/M BLU	RS 410/M BLU	RS 510/M BLU	RS 610/M BLU
EMISSIONS					
Sound pressure	dB(A)	78	80	82,5	85
Sound power	dB(A)	89	91	93,5	96
CO emission	mg/kWh	< 10			
NOx emission	mg/kWh	60	57	57	51
APPROVAL					
Directive	EC	2006/42/EC - 2009/142/EC - 2014/30/UE - 2014/35/UE			
Conforming to		EN 676			
Certification		CE-0085CP0166			

Reference conditions:
Temperature: 20°C - Pressure: 1013,5 mbar - Altitude: 0 m a.s.l. - Noise measured at a distance of 1 meter. 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.

Firing Rates



Useful working field for choosing the burner

Modulation 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												
	DMV												
	DMV12												
	VGD												
	CB												
	CBH												
	MV												
	CG												

Size:	405	407	410	412	415	420							
		65	120	300	700	1200	–	1900	3100	5000			
	505	507	510	512	–	520	525	5065	5080	50100	50125	50150	
10	15	20	32	40	–	50	–	65	80	100	125	150	
		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

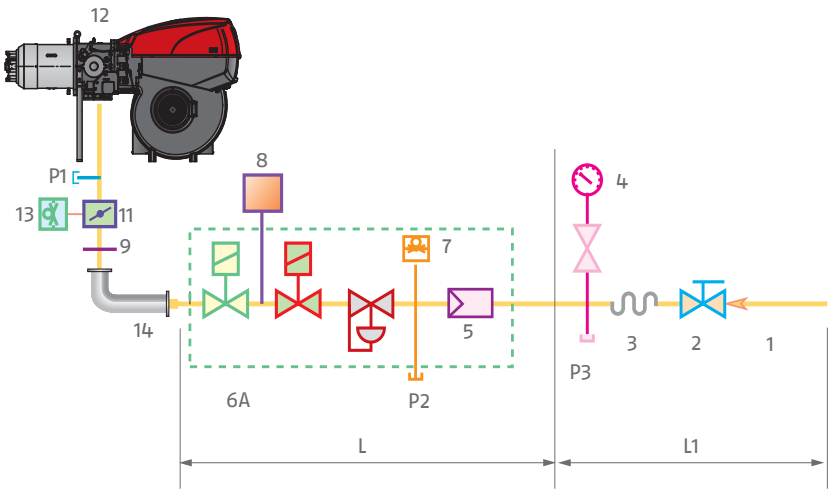
BASIC DESIGNATION

EXTENDED DESIGNATION

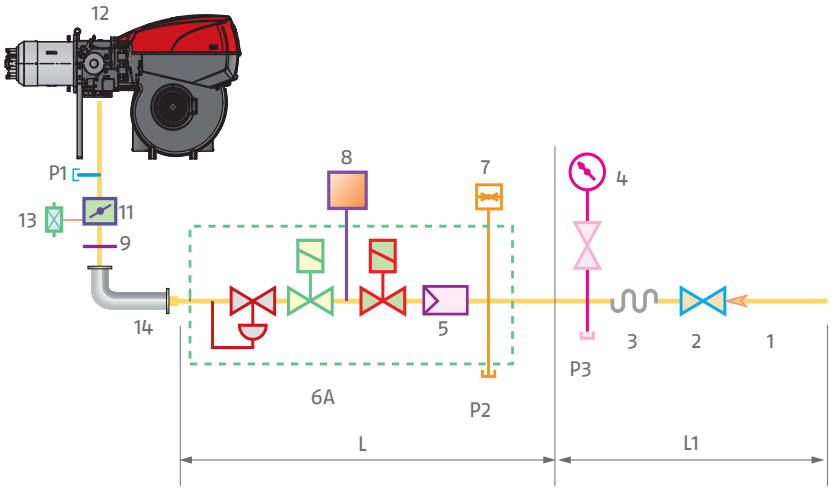
GAS TRAINS

The burners are fitted with a butterfly valve to regulate the fuel, controlled by the main management module of burner through a high precision servomotor.
Fuel can be supplied either from the right or left sides, on the basis of the application requirements.
A maximum gas pressure switch stops the burner in case of excess pressure in the fuel line.
The gas train can be selected to best fit system requirements depending on the fuel output and pressure in the supply line.
The gas trains are with or without seal control.

MB "THREADED"

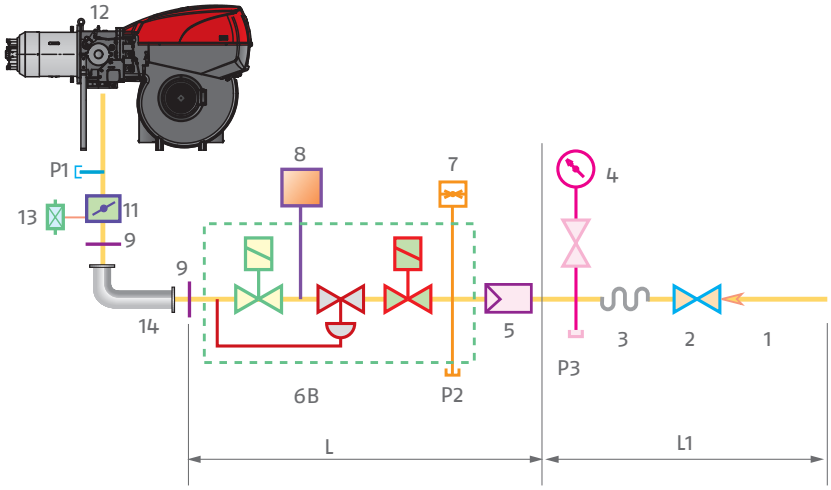


MBC "THREADED"

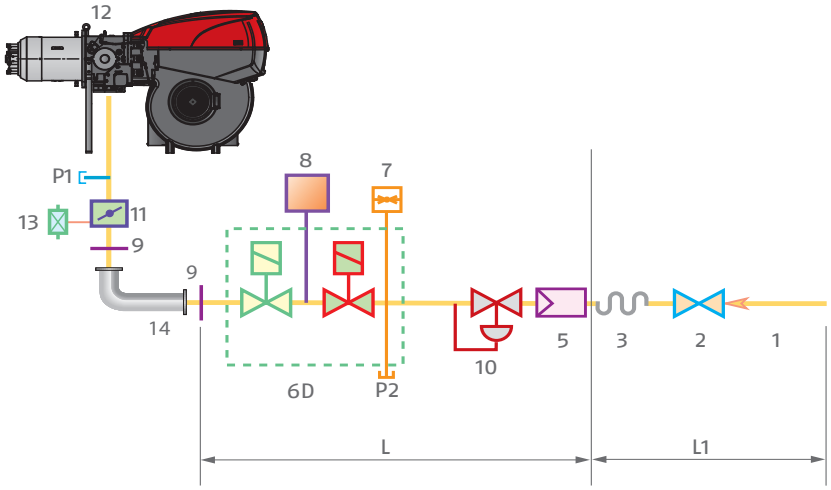


1	Gas input pipework
2	Manual valve
3	Anti-vibration joint
4	Pressure gauge with pushbutton cock
5	Filter
6A	Includes:
	- filter
	- operation valve
	- safety valve
	- pressure adjuster
7	Minimum gas pressure switch
8	Leak detection device, supplied as an accessory or incorporated, based on the gas train code.
9	Gasket, for "flanged" versions only
10	Pressure adjuster
11	Gas adjuster butterfly valve
12	Burner
13	Maximum gas pressure switch
14	Gas train-burner adaptor, supplied separately
P1	Combustion head pressure
P2	Upstream pressure of valves
P3	Upstream pressure of the filter
L	Gas train supplied separately, with the code given in the table.
L1	Installer's responsibility

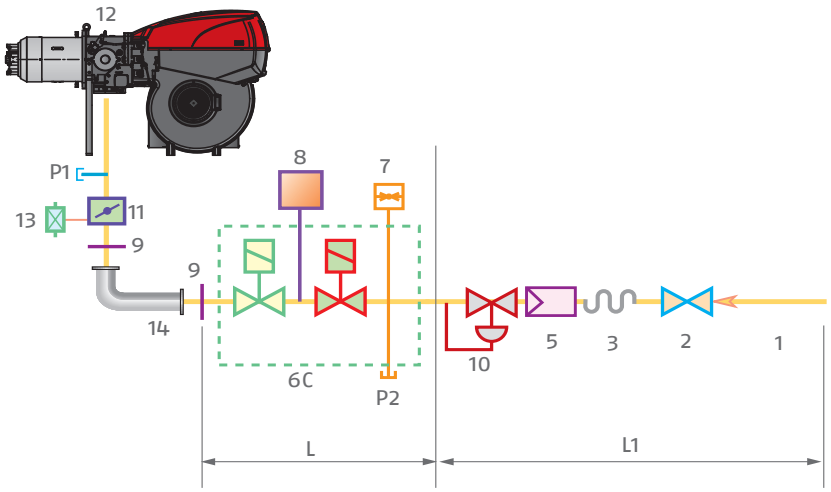
MBC "FLANGED"



CB "FLANGED OR THREADED"

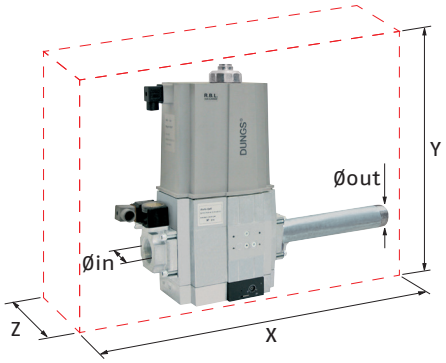


DMV "FLANGED OR THREADED"

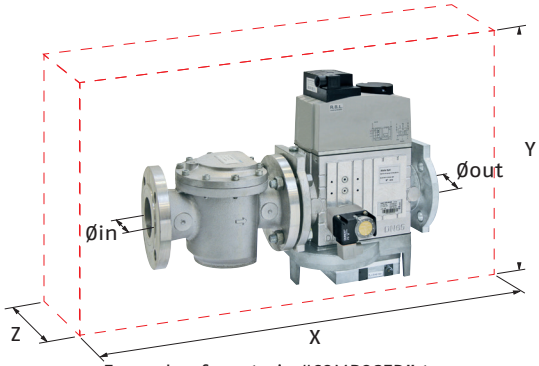


1	Gas input pipework
2	Manual valve
3	Anti-vibration joint
4	Pressure gauge with pushbutton cock
5	Filter
6B	Includes:
	- operation valve
	- safety valve
	- pressure adjuster
6C	Includes:
	- operation valve
	- safety valve
6D	Includes:
	- operation valve
	- safety valve
7	Minimum gas pressure switch
8	Leak detection device, supplied as an accessory or incorporated, based on the gas train code.
9	Gasket, for "flanged" versions only
10	Pressure adjuster
11	Gas adjuster butterfly valve
12	Burner
13	Maximum gas pressure switch
14	Gas train-burner adaptor, supplied separately
P1	Combustion head pressure
P2	Upstream pressure of valves
P3	Upstream pressure of the filter
L	Gas train supplied separately, with the code given in the table
L1	Installer's responsibility

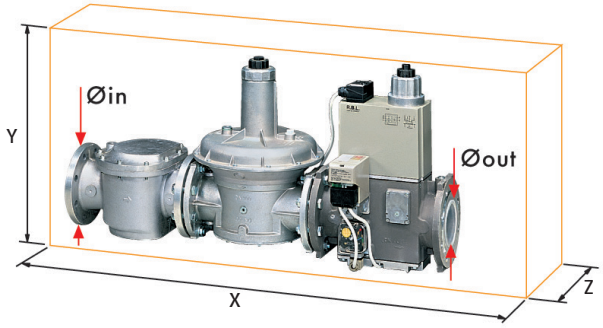
Gas trains are approved by standard EN 676 together with the burner.
The overall dimensions of the gas train depends on how they are constructed. The following table shows the maximum dimensions of the gas trains that can be fitted to RS 650-800-1000-1200/M BLU burners, intake and outlet diameters and seal control if fitted.
The maximum gas pressure of gas train "MULTIBLOC" type is 360 mbar, and that one of gas train "COMPOSED" type is 500 mbar.
"MULTIBLOC" guarantees a range of pressure towards the burner from 4 to 60 mbar. For version DN 65 and DN 80 is from 20 to 40 mbar. For version DN 100 is from 40 to 80 mbar. The range of pressure in the "MULTIBLOC" with flange can be modified choosing the stabiliser spring (see gas train accessory).
The maximum gas pressure of gas train "CB" series is 500 mbar. "CB" gas train guarantees a range of pressure towards the burner from 10 to 30 mbar. The range of pressure can be modified choosing the stabilizer spring (see accessories).
The maximum gas pressure of gas train "DMV" series is 500 mbar. "DMV" gas train is supplied without pressure governor.



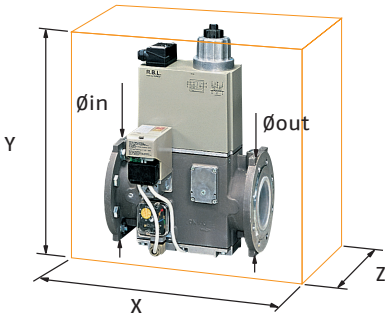
Example of gas train "MULTIBLOC" type without seal control (i.e. MBC 1200)



Example of gas train "COMPOSED" type without seal control (i.e. MBC 1900-3100-5000)



Example of gas train "CB" series with seal control



Example of gas train "DMV" series with seal control

GAS TRAIN MODEL	CODE	Ø in	Ø out	X mm	Y mm	Z mm
MB 415/1 - RT 30	3970180	Rp 1-1/2"	Rp 1-1/2"	523	250	100
MB 415/1 CT RT 30	3970198	Rp 1-1/2"	Rp 1-1/2"	523	250	229
MB 415/1 - RT 52	3970250	Rp 1-1/2"	Rp 1-1/2"	523	250	100
MB 415/1 CT RT 52	3970253	Rp 1-1/2"	Rp 1-1/2"	523	250	229
MB 415/1 RSM 30	3970232	Rp 1-1/2"	Rp 1-1/2"	523	250	100
MB 420/1 - RT 30	3970181	Rp 2"	Rp 2"	523	289	100
MB 420/1 CT RT 30	3970182	Rp 2"	Rp 2"	523	289	229
MB 420/1 - RT 52	3970257	Rp 2"	Rp 2"	523	289	100
MB 420/1 CT RT 52	3970252	Rp 2"	Rp 2"	523	289	229
MB 420/1 RSM 30	3970233	Rp 2"	Rp 2"	523	289	100
MB 420/1 CT RSM 30	3970234	Rp 2"	Rp 2"	523	289	229

GAS TRAIN						
MODEL	CODE	Ø in	Ø out	X mm	Y mm	Z mm
MBC 1200/1 - RSM 60	3970221	Rp 2"	Rp 2"	528	424	161
MBC 1200/1 CT RSM 60	3970225	Rp 2"	Rp 2"	528	424	290
MBC 1900/1 - FSM 40	3970222	DN 65	DN 65	613	430	237
MBC 1900/1 CT FSM 40	3970226	DN 65	DN 65	613	430	298
MBC 3100/1 - FSM 40	3970223	DN 80	DN 80	633	500	240
MBC 3100/1 CT FSM 40	3970227	DN 80	DN 80	633	500	319
MBC 5000/1 - FSM 80	3970224	DN 100	DN 100	733	576	280
MBC 5000/1 CT FSM 80	3970228	DN 100	DN 100	733	576	348

GAS TRAIN						
MODEL	CODE	Ø in	Ø out	X mm	Y mm	Z mm
CB 512/1 - RSM 30	3970145	Rp 1-1/2"	Rp 1-1/2"	891	261	245
CB 512/1 CT RSM 30	20045589	Rp 1-1/2"	Rp 1-1/2"	891	261	245
CB 520/1 - RSM 30	3970146	Rp 2"	Rp 2"	986	328	255
CB 520/1 CT RSM 30	3970160	Rp 2"	Rp 2"	986	328	255
CB 525/1 - RSM 30	20044659	Rp 2"	Rp 2"	1025	356	285
CB 525/1 CT RSM 30	20044660	Rp 2"	Rp 2"	1025	356	285
CB 5065/1 - FSM 30	3970147	DN 65	DN 65	906	356	285
CB 5065/1 CT FSM 30	3970161	DN 65	DN 65	906	356	285
CB 5080/1 - FSM 30	3970148	DN 80	DN 80	934	416	285
CB 5080/1 CT FSM 30	3970162	DN 80	DN 80	934	416	285
CB 50100/1 - FSM 30	3970149	DN 100	DN 100	1054	501	350
CB 50100/1 CT FSM 30	3970163	DN 100	DN 100	1054	501	350
CB 50125/1 - FSM 30	20015871	DN 125	DN 125	1164	780	400
CB 50125/1 CT FSM 30	3970196	DN 125	DN 125	1164	780	400

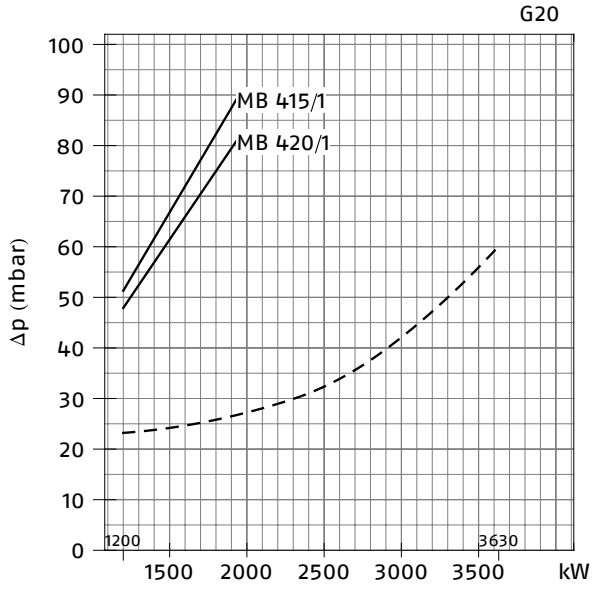
GAS TRAIN						
MODEL	CODE	Ø in	Ø out	X mm	Y mm	Z mm
DMV 512/1 - RSM -0	20043035	Rp 1-1/2"	Rp 1-1/2"	490	292	245
DMV 512/1 CT RSM -0	20043036	Rp 1-1/2"	Rp 1-1/2"	490	292	245
DMV 512/1 CQ RSM -2	20043037	Rp 1-1/2"	Rp 1-1/2"	490	292	245
DMV 520/1 - RSM -0	20043038	Rp 2"	Rp 2"	490	292	255
DMV 520/1 CT RSM -0	20043039	Rp 2"	Rp 2"	490	292	255
DMV 520/1 CQ RSM -2	20043040	Rp 2"	Rp 2"	490	292	255
DMV 525/1 - RSM -0	20043053	Rp 2"	Rp 2"	530	338	270
DMV 525/1 CT RSM -0	20043054	Rp 2"	Rp 2"	530	338	270
DMV 525/1 CQ RSM -2	20043055	Rp 2"	Rp 2"	530	338	270
DMV 5065/1 - FSM -0	20043041	DN 65	DN 65	290	338	270
DMV 5065/1 CT FSM -0	20043042	DN 65	DN 65	290	338	270
DMV 5065/1 CQ FSM -2	20043043	DN 65	DN 65	290	338	270
DMV 5080/1 - FSM -0	20043044	DN 80	DN 80	310	397	290
DMV 5080/1 CT FSM -0	20043045	DN 80	DN 80	310	397	290
DMV 5080/1 CQ FSM -2	20043046	DN 80	DN 80	310	397	290
DMV 50100/1 - FSM -0	20043047	DN 100	DN 100	350	449	307
DMV 50100/1 CT FSM -0	20043048	DN 100	DN 100	350	449	307
DMV 50100/1 CQ FSM -2	20043049	DN 100	DN 100	350	449	307
DMV 50125/1 - FSM -0	20043050	DN 125	DN 125	400	554	333
DMV 50125/1 CT FSM -0	20043051	DN 125	DN 125	400	554	333
DMV 50125/1 CQ FSM -2	20043052	DN 125	DN 125	400	554	333

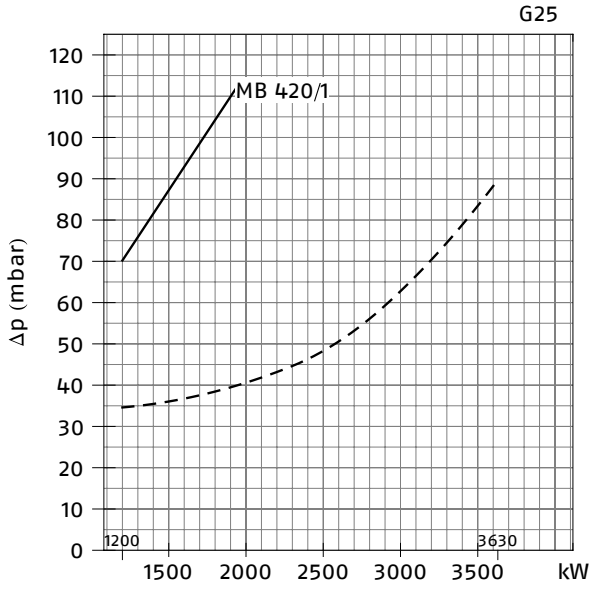
Pressure Drop Diagram

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.

The minimum input gas pressure required is 15 mbar while burner operating.
In particular, the pressure difference between gas train upstream and downstream has to remain always over pressure drop values indicated below.

RS 310/M BLU (NATURAL GAS)





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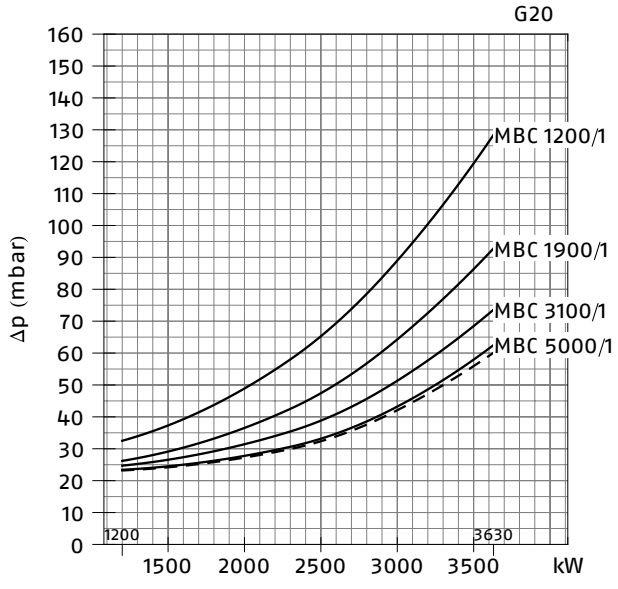
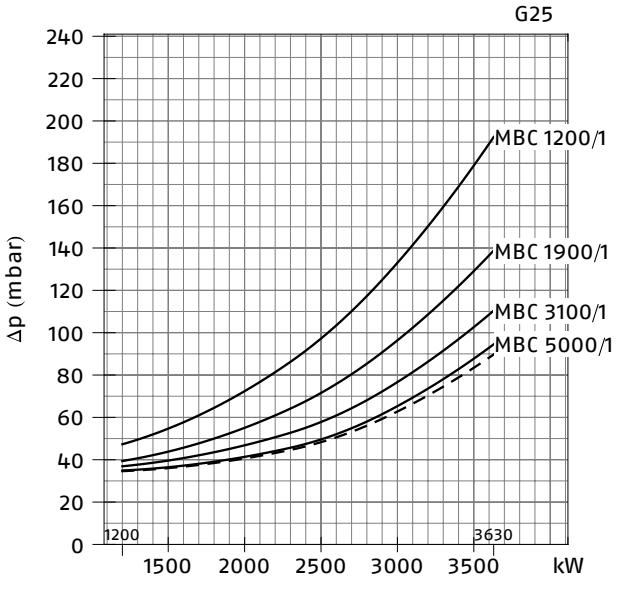
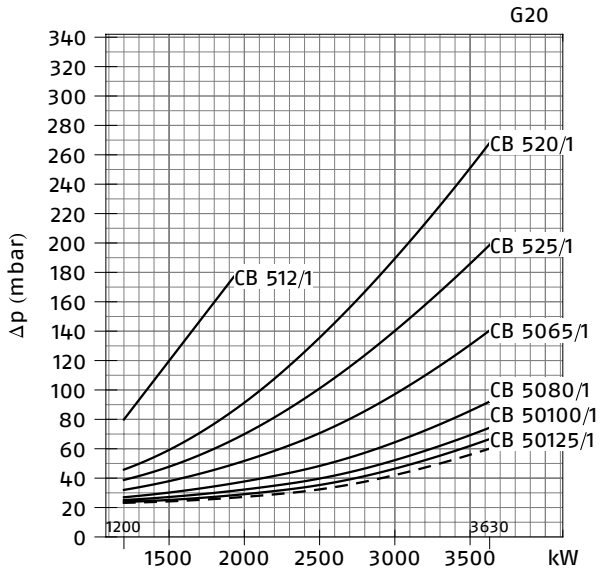
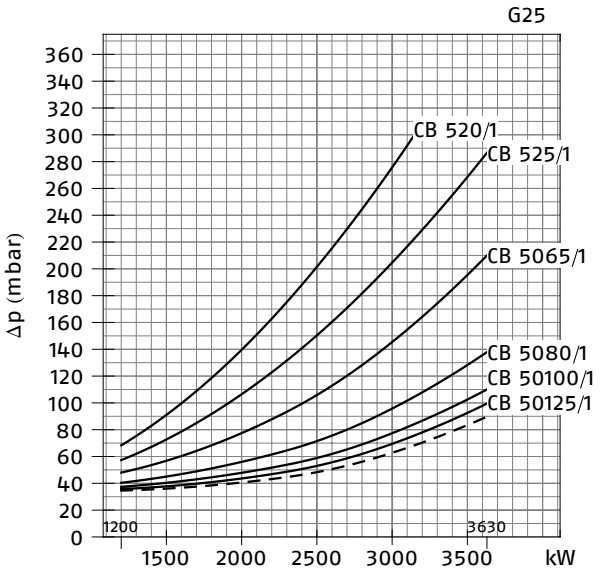




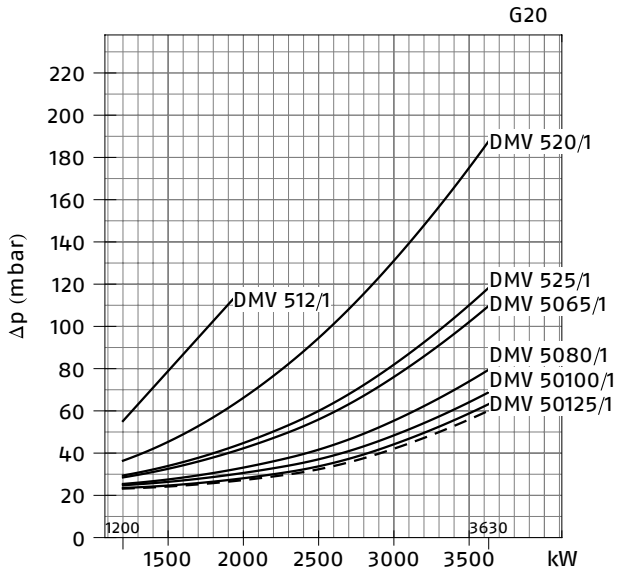
Combustion head + gas butterfly valve + gas train
Combustion head + gas butterfly valve

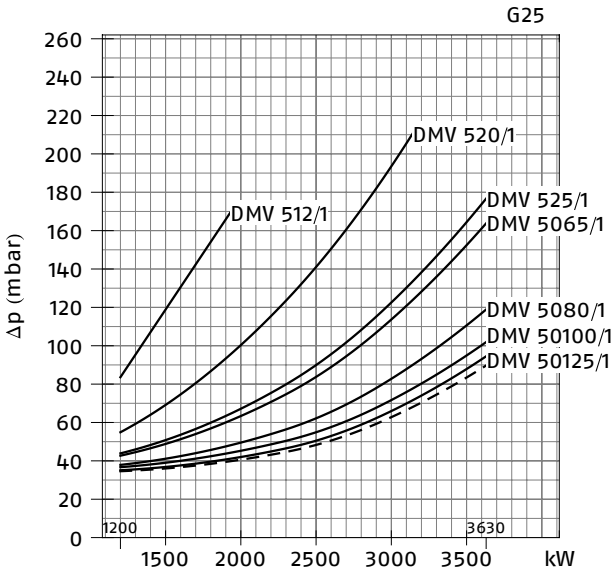
RS 310/M BLU (NATURAL GAS)





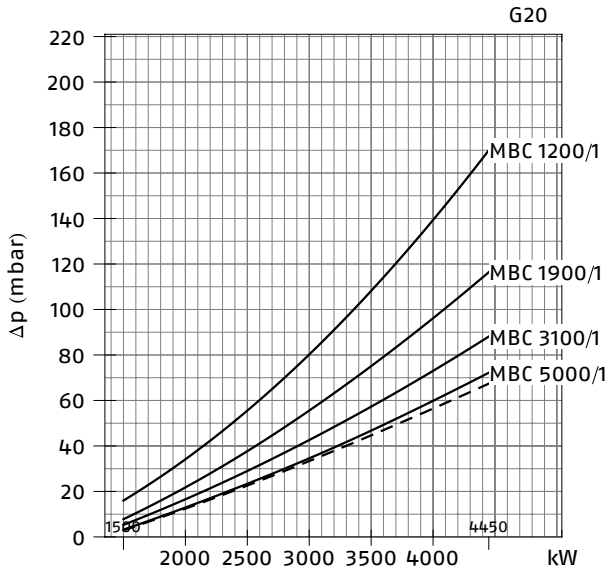
RS 310/M BLU (NATURAL GAS)

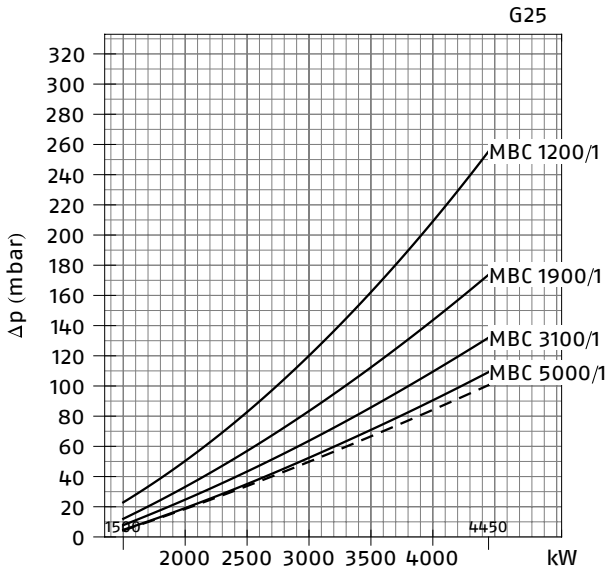




Combustion head + gas butterfly valve + gas train
Combustion head + gas butterfly valve

RS 410/M BLU (NATURAL GAS)





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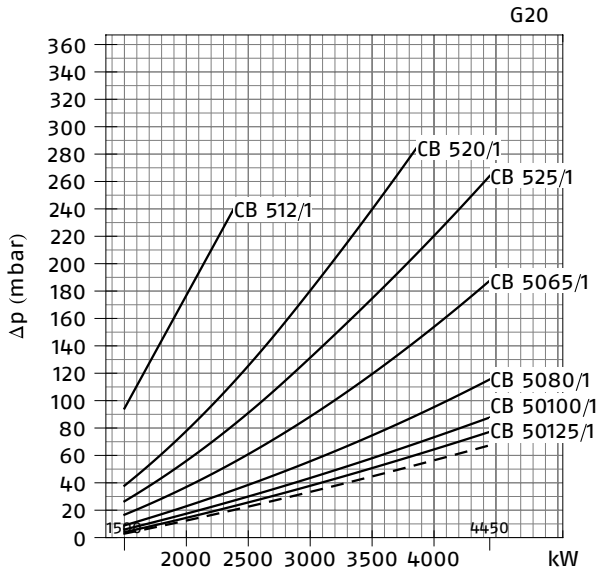
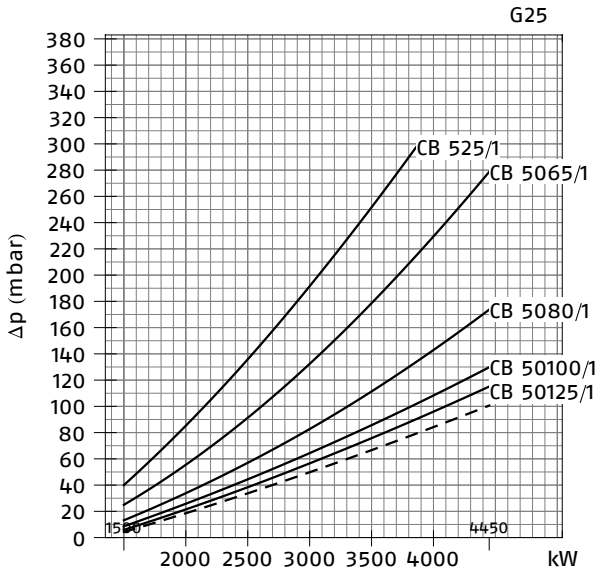
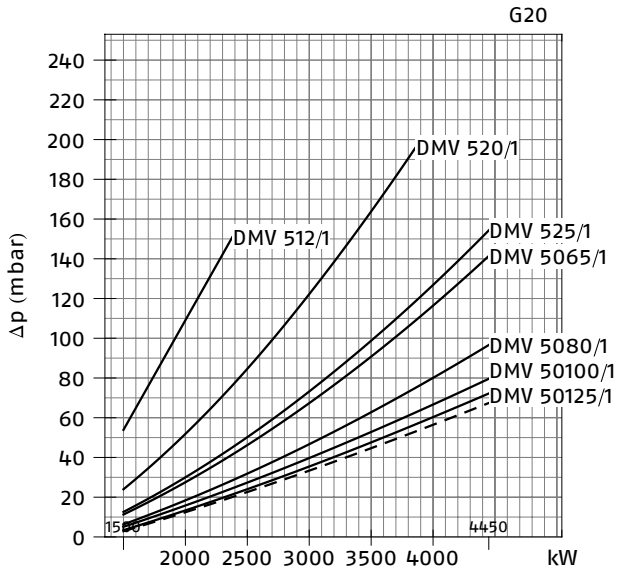
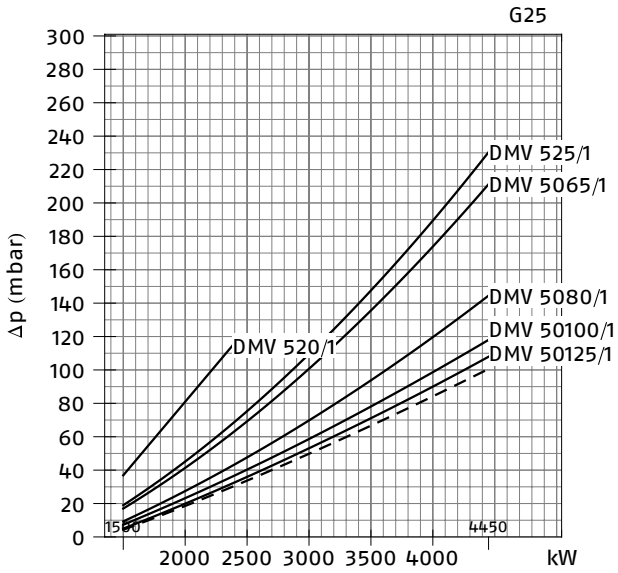




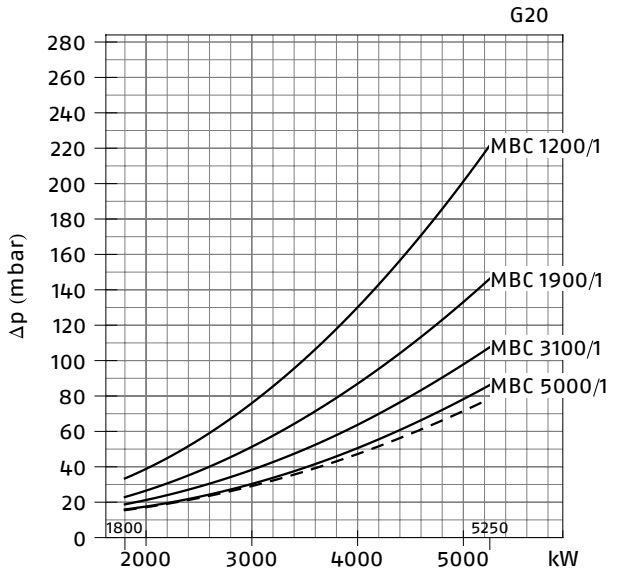
Combustion head + gas butterfly valve + gas train
Combustion head + gas butterfly valve

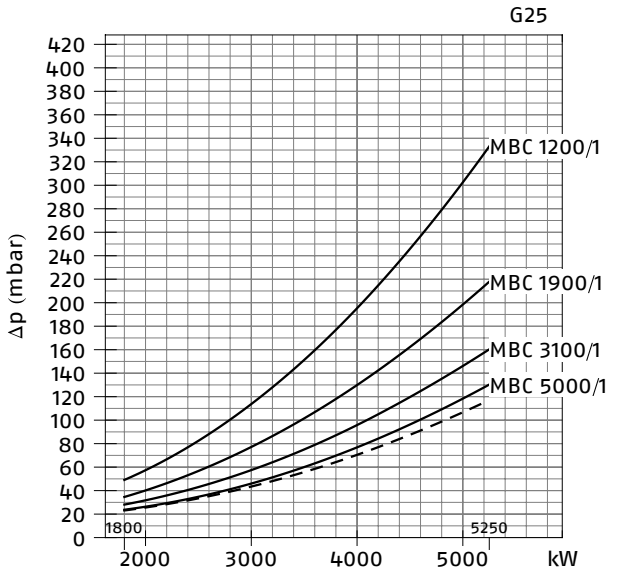
RS 410/M BLU (NATURAL GAS)





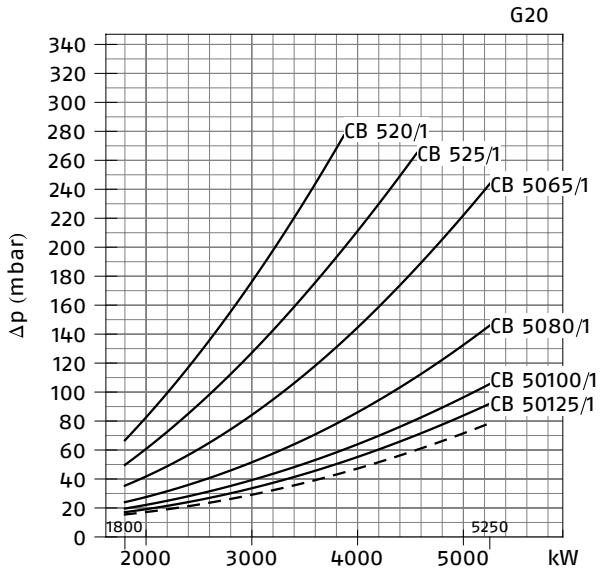
RS 510/M BLU (NATURAL GAS)

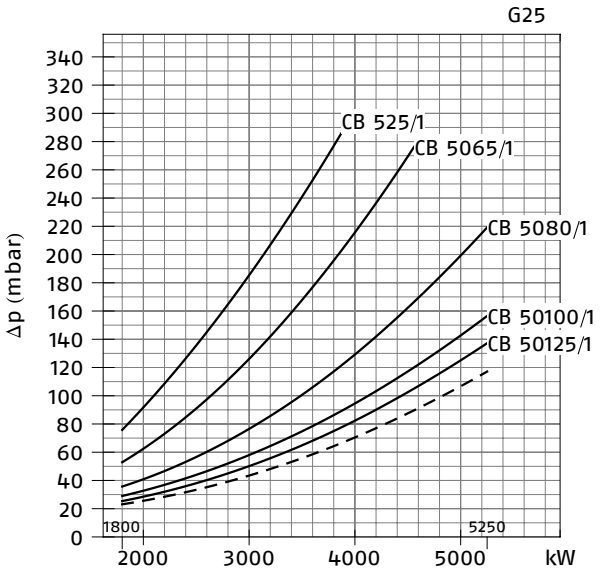




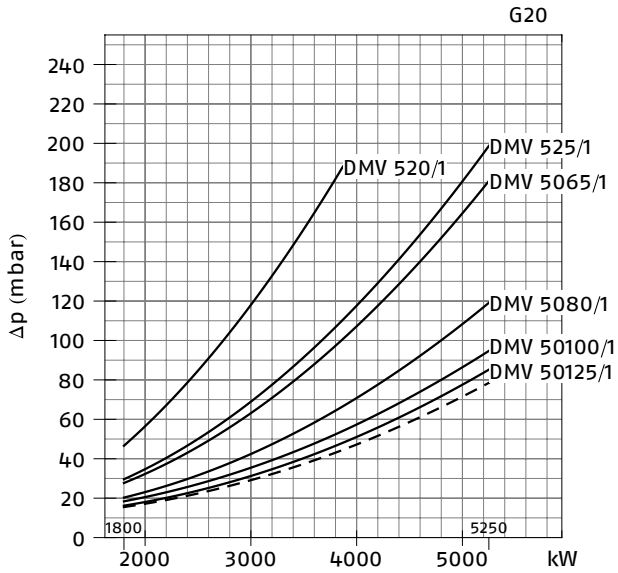
Combustion head + gas butterfly valve + gas train
Combustion head + gas butterfly valve

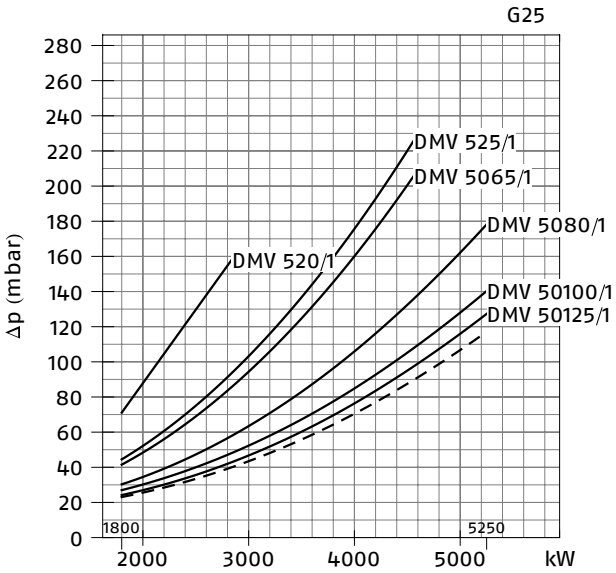
RS 510/M BLU (NATURAL GAS)





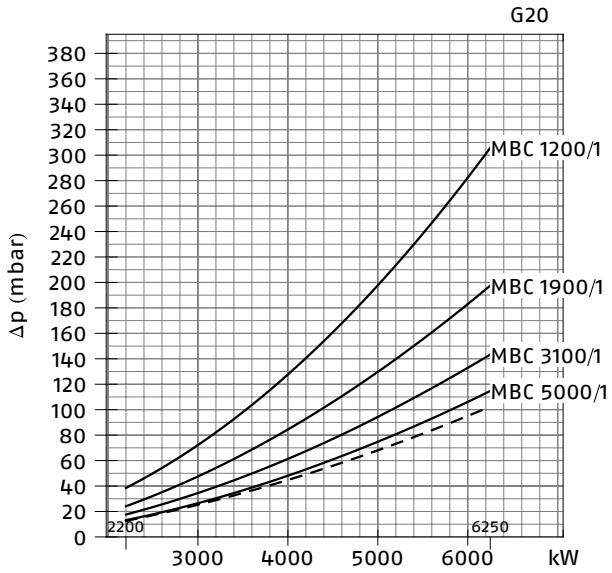
RS 510/M BLU (NATURAL GAS)

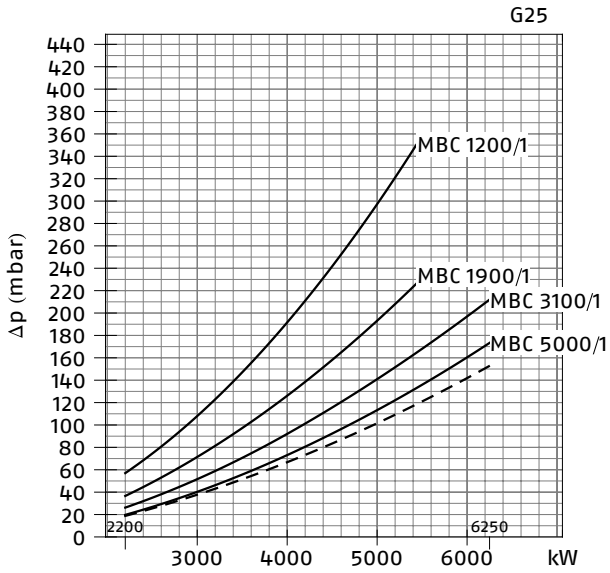




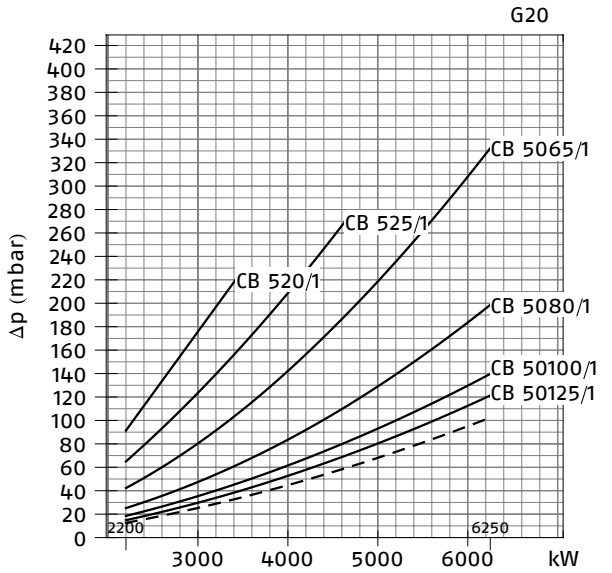
Combustion head + gas butterfly valve + gas train
Combustion head + gas butterfly valve

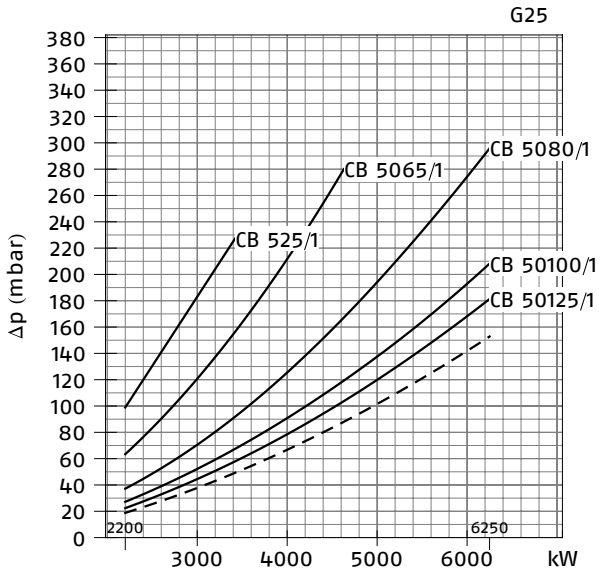
RS 610/M BLU (NATURAL GAS)





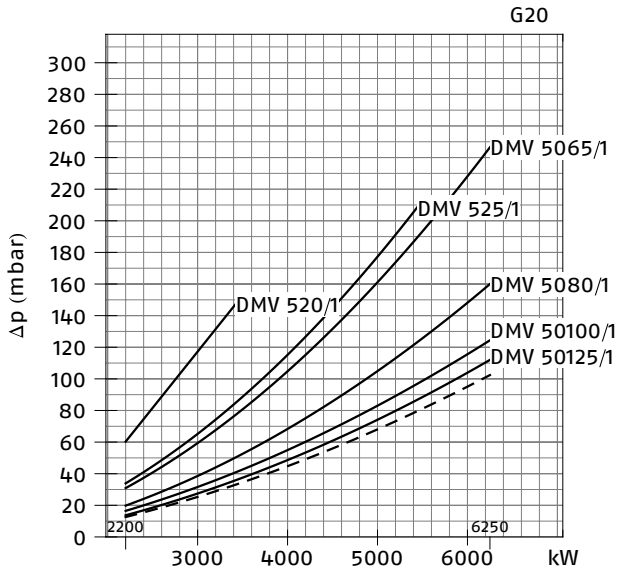
RS 610/M BLU (NATURAL GAS)

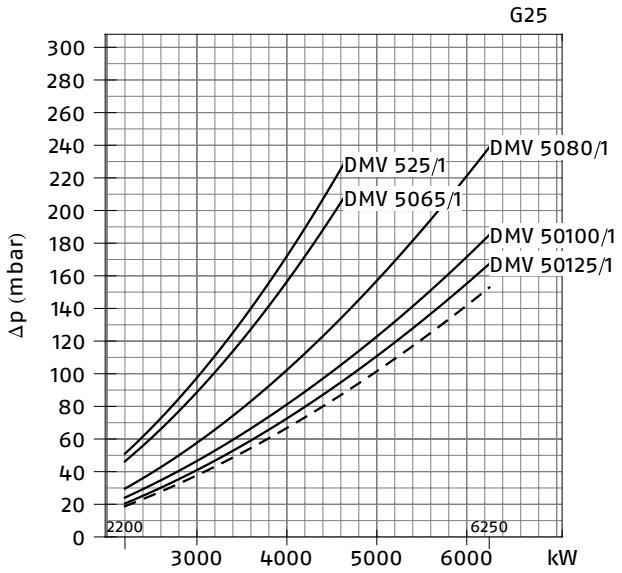




Combustion head + gas butterfly valve + gas train
Combustion head + gas butterfly valve

RS 610/M BLU (NATURAL GAS)





Combustion head + gas butterfly valve + gas train
Combustion head + gas butterfly valve

GAS TRAIN			VPS KIT	ADAPTER			
CODE	MODEL	◆	CODE	CODE			
				RS 310	RS 410	RS 510	RS 610
3970180	MB 415/1 – RT 30	–	3010123	3000826 + 20064220	●	●	●
3970198	MB 415/1 CT RT 30	CT	–	3000826 + 20064220	●	●	●
3970250	MB 415/1 – RT 52	–	3010123	3000826 + 20064220	●	●	●
3970253	MB 415/1 CT RT 52	CT	–	3000826 + 20064220	●	●	●
3970232	MB 415/1 – RSM 30	–	3010123	3000826 + 20064220	●	●	●
3970181	MB 420/1 – RT 30	–	3010123	3000826 + 20042324	●	●	●
3970182	MB 420/1 CT RT 30	CT	–	3000826 + 20042324	●	●	●
3970257	MB 420/1 – RT 52	–	3010123	3000826 + 20042324	●	●	●
3970252	MB 420/1 CT RT 52	CT	–	3000826 + 20042324	●	●	●
3970233	MB 420/1 – RSM 30	–	3010123	3000826 + 20042324	●	●	●
3970234	MB 420/1 CT RSM 30	CT	–	3000826 + 20042324	●	●	●
3970221	MBC 1200/1 – RSM 60	–	3010367	3000826 + 20042324			
3970225	MBC 1200/1 CT RSM 60	CT	–	3000826 + 20042324			
3970222	MBC 1900/1 – FSM 40	–	3010367	3010221			
3970226	MBC 1900/1 CT FSM 40	CT	–	3010221			
3970223	MBC 3100/1 – FSM 40	–	3010367	3010222			
3970227	MBC 3100/1 CT FSM 40	CT	–	3010222			
3970224	MBC 5000/1 – FSM 80	–	3010367	3010223 – 3010370			
3970228	MBC 5000/1 CT FSM 80	CT	–	3010223 – 3010370			
3970145	CB 512/1 – RSM 30	–	3010367	3000826 + 20064220		●	●
20045589	CB 512/1 CT RSM 30	CT	–	3000826 + 20064220		●	●
3970146	CB 520/1 – RSM 30	–	3010367	3000826 + 20042324			●
3970160	CB 520/1 CT RSM 30	CT	–	3000826 + 20042324			●
20044659	CB 525/1 – RSM 30	–	3010367	3000826 + 20042324			
20044660	CB 525/1 CT RSM 30	CT	–	3000826 + 20042324			
3970147	CB 5065/1 – FSM 30	–	3010367	3010221			
3970161	CB 5065/1 CT FSM 30	CT	–	3010221			
3970148	CB 5080/1 – FSM 30	–	3010367	3010222			
3970162	CB 5080/1 CT FSM 30	CT	–	3010222			
3970149	CB 50100/1 – FSM 30	–	3010367	3010223 or 3010370			
3970163	CB 50100/1 CT FSM 30	CT	–	3010223 or 3010370			
20015871	CB 50125/1 – FSM 30	–	3010367	3010224			
3970196	CB 50125/1 CT FSM 30	CT	–	3010224			

GAS TRAIN			VPS KIT	ADAPTER			
CODE	MODEL	◆	CODE	CODE			
				RS 310	RS 410	RS 510	RS 610
20043035	DMV 512/1 - RSM -0	-	3010367	3000826 + 20064220		●	●
20043036	DMV 512/1 CT RSM -0	CT	-	3000826 + 20064220		●	●
20043038	DMV 520/1 - RSM -0	-	3010367	3000826 + 20042324			●
20043039	DMV 520/1 CT RSM -0	CT	-	3000826 + 20042324			●
20043053	DMV 525/1 - RSM -0	-	3010367	3000826 + 20042324			
20043054	DMV 525/1 CT RSM -0	CT	-	3000826 + 20042324			
20043041	DMV 5065/1 - FSM -0	-	3010367	3010221			
20043042	DMV 5065/1 CT FSM -0	CT	-	3010221			
20043044	DMV 5080/1 - FSM -0	-	3010367	3010222			
20043045	DMV 5080/1 CT FSM -0	CT	-	3010222			
20043047	DMV 50100/1 - FSM -0	-	3010367	3010223 or 3010370			
20043048	DMV 50100/1 CT FSM -0	CT	-	3010223 or 3010370			
20043050	DMV 50125/1 - FSM -0	-	3010367	3010224			
20043051	DMV 50125/1 CT FSM -0	CT	-	3010224			

◆ Gas valve leak detection control device:
- gas train not equipped gas train not equipped with leak detection control device; this device can be ordered separately - see VPS column - and installed later.

CT gas train equipped with VPS leak detection control device.

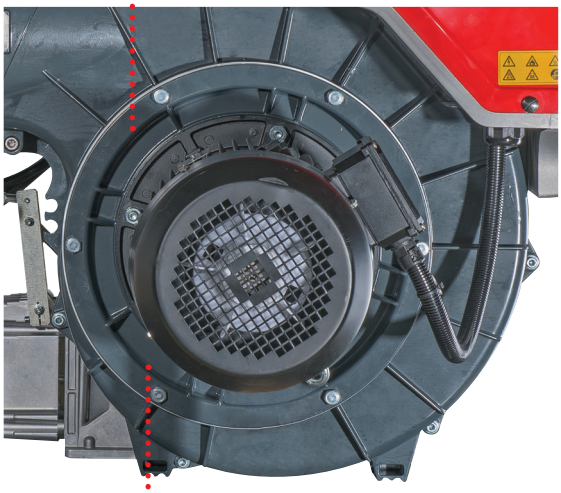
VPS KIT Valve leak detection control device. Supplied separately from the gas train, on demand.

● Gas train not available or not suitable for the matching to the burner.

Ventilation

The RS 310 - 610/M BLU burners are fitted with fans, which give excellent performance and are fitted in line with the combustion head. The air flow and sound-deadening materials used in the construction are designed to reduce sound emissions to the minimum and guarantee high levels of performance in terms of output and air pressure.
A high precision servomotor through the main management module installed on each burner, controls the air dampers position constantly.

New ventilation structure
A new ventilation structure has been developed in order to reduce the overall dimensions and weight



Simplified Maintenance
for motor and fan by direct extraction through opening flange

Air adjusting dampers
at air inlet side with ball bearings

Combustion Head

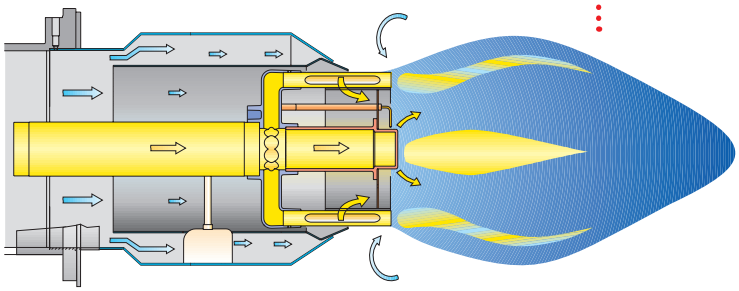
The design and development of the combustion heads are based on long-standing Riello experience and competence in combustion technology, the result is an extraordinary performance with high reliability and durability. The combustion head allows to keep an excellent air and fuel mix on all firing rates range as well as reducing noise and pollutants.
The access to the combustion head for commissioning and maintenance is made easy by the hinge (the hinge can be opened on the left or right side of the burner).

Example of RS BLU combustion head

Example of hinged burner opening on the left side of the burner

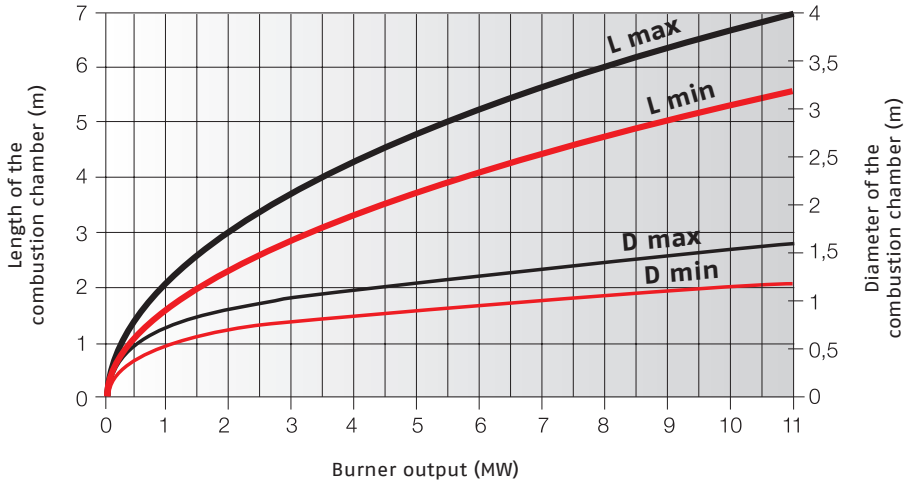
Safe and Green

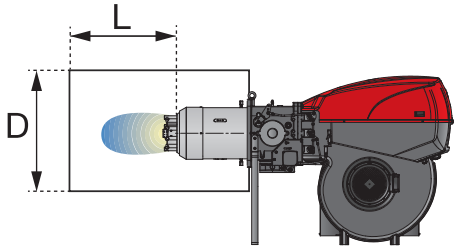
The RS BLU series reduces polluting emissions with its exclusive design which optimises air/fuel mixture.
The gas in the combustion head is distributed through openings which are perpendicular to the air flow; part of the fuel is injected directly into the centre of the flame.
This results in low flame temperature combustion to prevent the formation of NO. Gradual and progressive combustion throughout the flame prevents areas of high oxidation inside the flame.
Emissions are further reduced by the re-circulation of combustion gases due to the high velocity of air leaving the combustion head.
Pollution levels are below even the most severe standard requirements (NOx <60 mg/kWh) **(*)**.



(*) Performance realized on test boiler at the Riello Combustion Research Centre

SUGGESTED COMBUSTION CHAMBER DIMENSIONS





Example:
Burner thermal output = 6000 kW;
L Combustion Chamber (m) = 4,7 m (medium value);
D Combustion Chamber (m) = 1,2 m (medium value)

Operation

BURNER OPERATION MODE

The RS 310-410-510-610/M series of burners can have "two-stage progressive" or "modulating" operation.

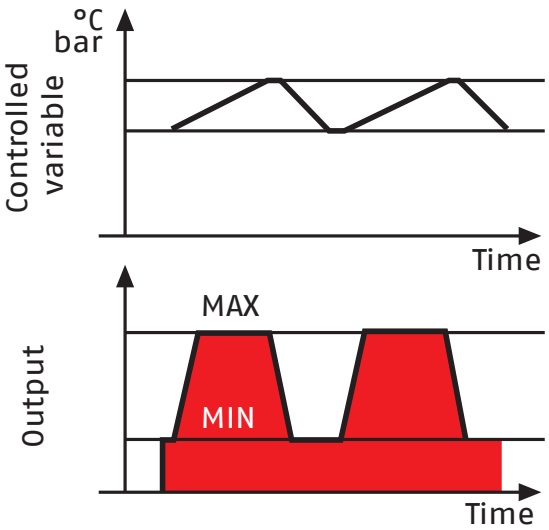
Output regulator

Analog 4-20 mA or 0 - 10V converter for remote modulation

On "two-stage progressive" operation, the burner gradually adapts the output to the requested level, by varying between two pre-set levels (see picture A).

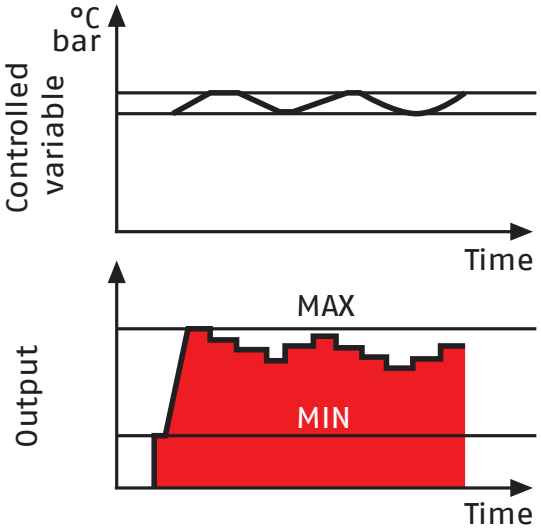
On "modulating" operation, normally required in steam generators, in superheater boilers or diathermic oil burners, a specific regulator and probes are required. These are supplied as accessories that must be ordered separately. The burner can work for long periods at intermediate output levels (see picture B).

"TWO-STAGE PROGRESSIVE" OPERATION



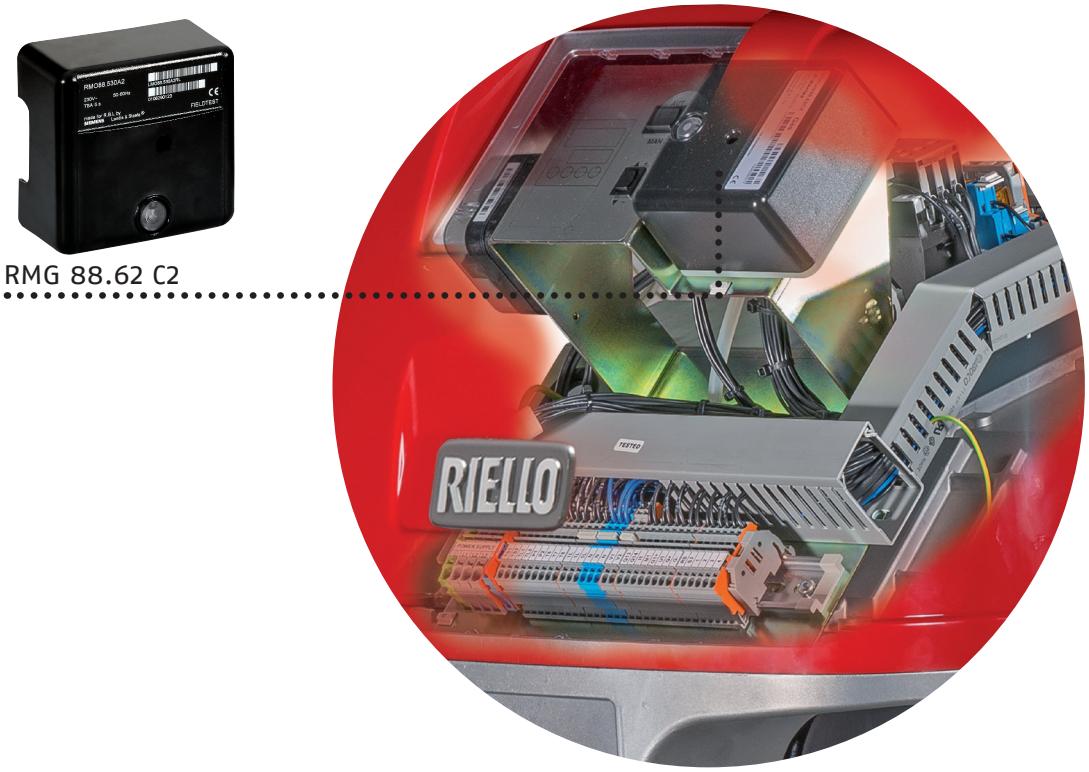
Picture A

"MODULATING" OPERATION



Picture B

The RS 310-410-510-610/M BLU series burners are fitted with the LFL 1.333 or RMG88.62 C2 microprocessor control panel for the supervision during intermittent operation. The FS2 burners are fitted with the LGK16.333A27 control panel.
For helping the commissioning and maintenance work, on the RMG/M control box, there are two main elements:



RMG 88 DIGITAL CONTROL BOX

Two main elements of the RMG/M control box make easy the commissioning and the maintenance:

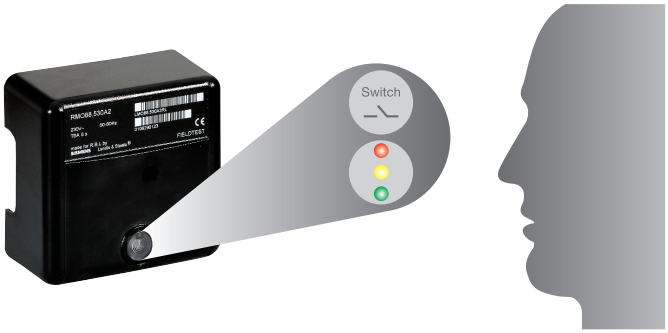
The lock-out reset button is the central operating element for resetting the burner control and for activating / deactivating the diagnostic functions.

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 shown in the picture above.

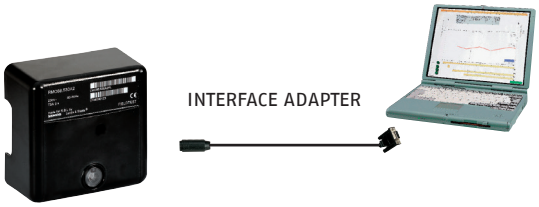
There are two diagnostic choices, for indication of operation and diagnosis of fault cause:

VISUAL DIAGNOSIS

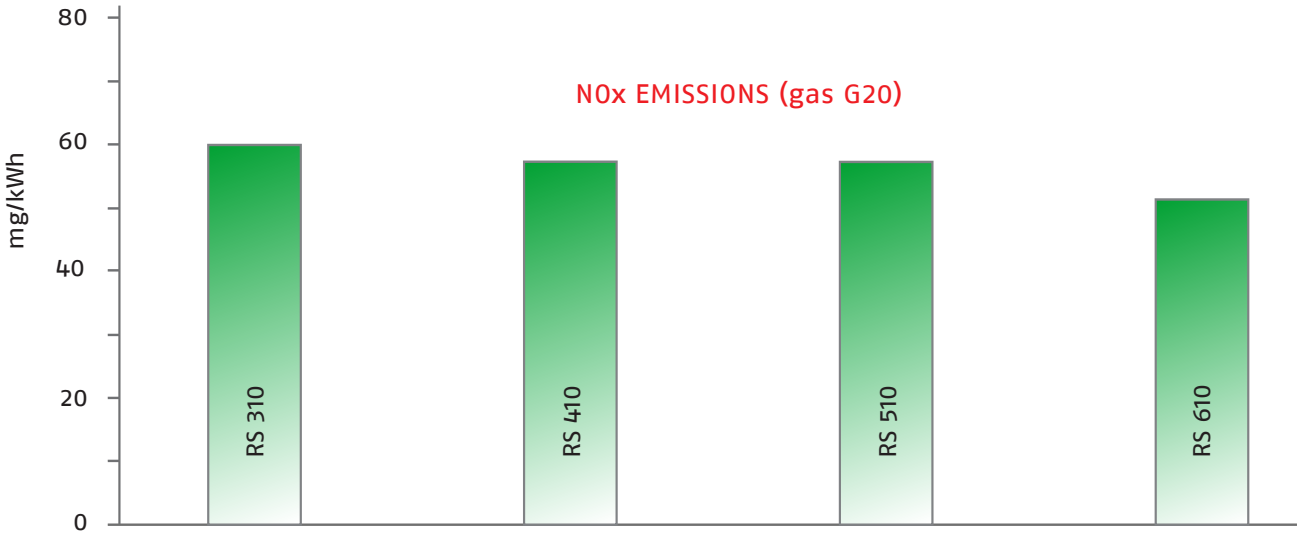


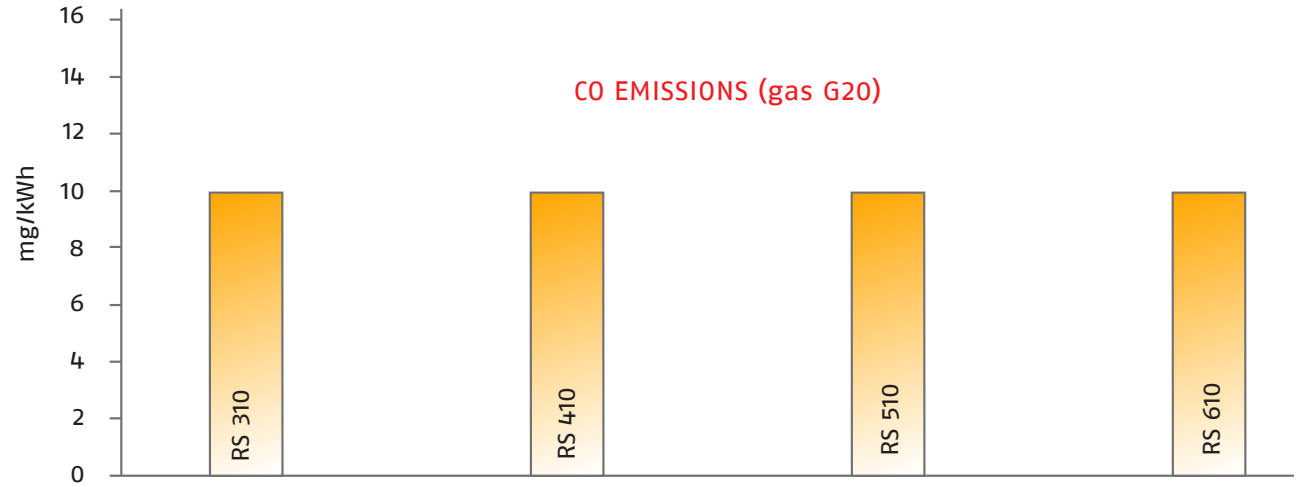
INTERFACE DIAGNOSIS

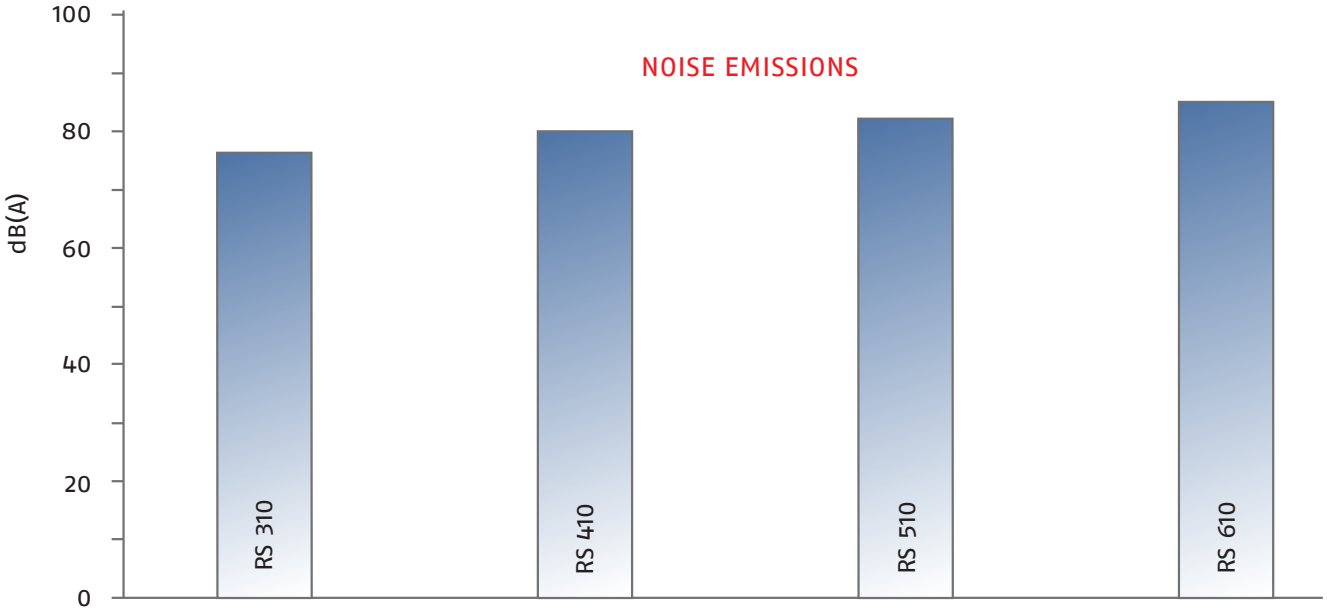
By the interface adapter and a PC with dedicated software or by a predisposed flue gas analyzer (see paragraph accessories).



Emissions

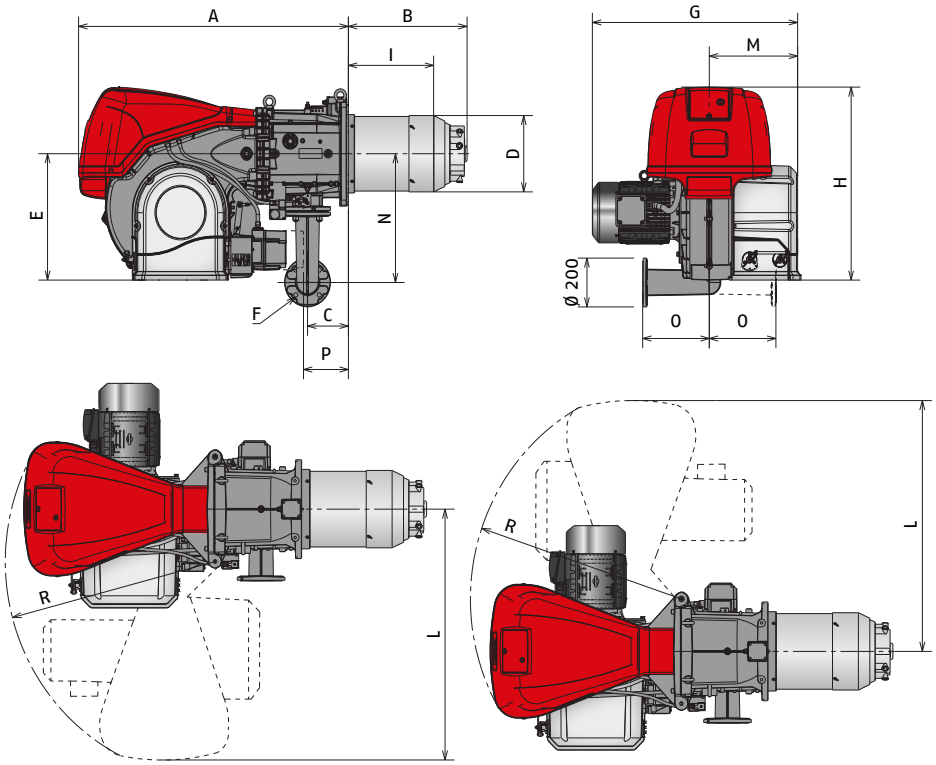






The noise emissions have been measured at the maximum output.

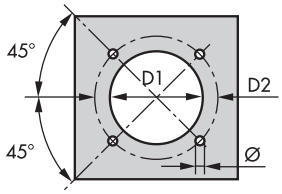
Overall Dimensions (mm)



MODEL	A	B	C	D	E	F**	G	H	I	L	M	N	O	P*	R
RS 310/M BLU	1178	465	178	306	520	DN65	890	790	346	1015	400	528	290	177	890
RS 410/M BLU	1178	517	178	313	520	DN65	908	790	340	1015	400	528	290	177	890
RS 510/M BLU	1178	517	178	313	520	DN65	908	790	340	1015	400	528	290	177	890
RS 610/M BLU	1178	517	178	334	520	DN65	980	790	365	1015	400	528	290	177	890

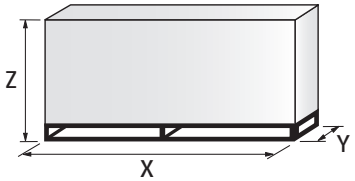
* Maximum position for the extraction of the servomotor cover in mechanical cam models.
** The gas adaptor is set also for DN 80 bore.

BURNER – BOILER MOUNTING FLANGE



MODEL	D1	D2	Ø
RS 310/M BLU	335	452	M18
RS 410/M BLU	335	452	M18
RS 510/M BLU	335	452	M18
RS 610/M BLU	350	452	M18

PACKAGING



MODEL	X	Y	Z	kg
RS 310/M BLU	2040	1180	1125	250
RS 410/M BLU	2040	1180	1125	250
RS 510/M BLU	2040	1180	1125	250
RS 610/M BLU	2040	1180	1125	280

Burner accessories

Accessories for modulating operation

POWER CONTROLLER

To obtain modulating operation, the RS/M BLU series of burners requires a regulator with three point outlet controls.
The following table lists the accessories for modulating operation with their application range.

BURNER	TYPE	CODE
All models	RWF 50.2 - Basic version with 3 position output	20073595
	RWF 55.5 - Complete with RS-485 interface	20074441
	RWF 55.6 - Complete with RS-485/ PROFIBUS interface	20074442

PROBE

The relative temperature or pressure probes fitted to the power controller must be chosen on the basis of the application.

BURNER	TYPE	RANGE (°C) (bar)	CODE
All models	Temperature PT 100	-100 - 500°C	3010110
	Pressure 4 - 20 mA	0 - 2,5 bar	3010213
	Pressure 4 - 20 mA	0 - 16 bar	3010214
	Pressure 4 - 20 mA	0 - 16 bar	3090873

ANALOG CONTROL SIGNAL CONVERTER

BURNER	TYPE (INPUT SIGNAL)	CODE
All models	0/2 - 10 V (impedance 200 KΩ) 0/4 - 20 mA (impedance 250 Ω)	20074479

POTENTIOMETER

BURNER	CODE
All models	20074487

CONTINUOUS VENTILATION KIT

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

BURNER	CODE
All models	20074542

UV CELL KIT

A UV cell is available for the supervision of the flame alternatively to ionisation probe for special applications.

BURNER	CODE
All models	20074548

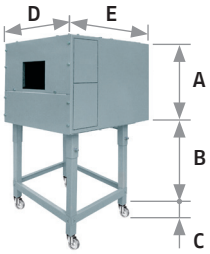
PC INTERFACE KIT

To connect the 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.

BURNER	CODE
All models **(*)**	3002719

(*) Equipped with RMG/M control box

SOUND PROOFING BOX

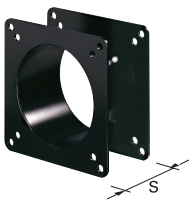


If noise emission needs reducing even further, sound-proofing boxes are available. In case of generator heights, where a lower dimension "B" is required, ask for the Box Support Kit code 20065135.
The useful dimensions are 40 mm less than the total dimensions indicated in the table (A, D, E). Not suitable for outdoor use.

BURNER	BOX TYPE	A (mm)	B (mm) min. - max.	C (mm)	D (mm)	E (mm)	[dB(A)] **(*)**	CODE
All models	C7	1255	160 - 980	110	1140	1345	10	3010376

(*) Average noise reduction according to EN 15036-1 standard

SPACER KIT



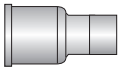
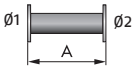
If burner head penetration into the combustion chamber needs reducing, varying thickness spacers are available, as given in the following table.

BURNER	SPACER THICKNESS S (mm)	CODE
All models	180	20008903

Gas train accessories

ADAPTERS

In certain cases, an adapter must be fitted between the gas train and the burner, when the diameter of the gas train is different from the set diameter of the burner.
Below are given the available adapters; please see on the Gas Train list the correct adapter codes to select.

ADAPTER	DIMENSIONS				ADAPTER CODE
	Ø1 DN	Ø2 DN	A mm	B mm	
1" 1/2  2"	-	-	65	-	20064220
2"  2"	-	-	65	-	20042324
DN 80  2" 1/2  2"	-	-	300	-	3000826
	65	80	400	-	3010221
	80	80	400	-	3010222
	100	80	400	-	3010223
	125	80	320	-	3010224

STABILISER SPRING

To vary the pressure range of the gas train stabilisers, accessory springs are available. The following table shows these accessories with their application range. Please refer to the technical manual for the correct choice of spring.

GAS TRAIN	SPRING COLOUR	SPRING PRESSURE RANGE mbar	SPRING CODE
MBC 1900/1 - 3100/1 MBC 5000/1	White	4 - 20	3010381
	Red	20 - 40	3010382
	Black	40 - 80	3010383
	Green	80 - 150	3010384
CB 512/1	Red	25 - 55	3010131
	Black	60 - 110	3010157
	Pink	90 - 150	3090486
CB 520/1 - 525/1	Red	25 - 55	3010132
	Black	60 - 110	3010158
	Pink	90 - 150	3090487
CB 5065/1 - 5080/1	Red	25 - 55	3010133
	Black	60 - 110	3010135
	Pink	100 - 150	3090456
	Grey	140 - 200	3090992
CB 50100/1	Red	25 - 55	3010134
	Black	60 - 110	3010136
	Pink	100 - 150	3090489
	Grey	140 - 200	3092174
CB 50125/1	Red	25 - 55	3010315
	Yellow	30 - 70	3010316
	Black	60 - 110	3010317
	Pink	100 - 150	3010318

SEAL CONTROL KIT

To test the valve seals on the gas train, a special "seal control kit" is available. The valve seal control device is compulsory (EN 676) on gas trains to burners with a nominal output over 1200 kW.
The seal control is type VPS 504.

GAS TRAIN	KIT CODE for 50 Hz operation
MB type	3010123
MCB - CB - DMV type	3010367

Specification

DESIGNATION OF SERIES

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

Series:	R			
Fuel:	S	Natural Gas		
	L	Light oil		
	LS	Light oil/Natural Gas		
	N	Heavy oil		
Size:				
Setting:	/1	Single stage	/E	Electronic cam
	/B	Two stage	/P	Proportioning air/gas valve
	/M	Modulating-Mechanical cam	/EV	Electronic cam predisposed for variable speed (with inverter)
Emission:	... or C01		Class 1 EN267 - EN676	
	MZ		Class 2 EN267 - EN676	
	BLU		Class 3 EN267 - EN676	
	MX		Class 2 EN267 Class 3 EN676	
Head length:	TC	standard head		
	TL	extended head		
Flame control system:	FS1	Standard/Intermittent (at least 1 stop every 24 h)		
	FS2	Continuous (1 stop every 72 h)		
Electrical supply to the system:				
	1/230/50	1/230V/50Hz		
	3/230/50	3/230V/50Hz		
	3/400/50	3N/400V/50Hz		
	3/230-400/50	3/230V/50Hz - 3N/400V/50Hz		
	3/220/60	3/220V/60Hz		
	3/380/60	3N/380V/60Hz		
	3/220-380/60	3/220/60Hz - 3N/380V/60Hz		
Auxiliary voltage:	230/50-60	230V/50-60H		
	110/50-60	110V/50-60Hz		

R	S	510	/M	BLU	TC	FS1	3/230-400/50	230/50-60

BASIC DESIGNATION

EXTENDED DESIGNATION

AVAILABLE BURNER MODELS

MODEL				HEAT OUTPUT NATURAL GAS (KW)	HEAT OUTPUT NATURAL GAS (Nm³/h)	TOTAL ELECTRICAL POWER (KW)	CERTIFICATION	NOTE
RS 310/M BLU	TC	FS1	3/400/50	400/1200-3630	40/120-363	8,8	CE-0085C90166	(1) (4)
RS 310/M BLU	TC	FS1	3/230/50	400/1200-3630	40/120-363	9,1	CE-0085C90166	(1)
RS 310/M BLU	TC	FS1	3/400/50	400/1200-3630	40/120-363	9,1	CE-0085C90166	(1)
RS 310/M BLU	TC	FS1	3/400/50	400/1200-3630	40/120-363	9,1	CE-0085C90166	(2) (4)
RS 310/M BLU	TC	FS1	3/230/50	400/1200-3630	40/120-363	9,1	CE-0085C90166	(2)
RS 310/M BLU	TC	FS1	3/400/50	400/1200-3630	40/120-363	9,1	CE-0085C90166	(2)
RS 310/M BLU	TC	FS2	3/400/50	400/1200-3630	40/120-363	9,1	CE-0085C90166	(3) (4)
RS 310/M BLU	TC	FS2	3/230/50	400/1200-3630	40/120-363	9,1	CE-0085C90166	(3)
RS 310/M BLU	TC	FS2	3/400/50	400/1200-3630	40/120-363	9,1	CE-0085C90166	(3)
RS 410/M BLU	TC	FS1	3/400/50	500/1500-4450	50/150-445	10,6	CE-0085C90166	(1) (4)
RS 410/M BLU	TC	FS1	3/230/50	500/1500-4450	50/150-445	10,8	CE-0085C90166	(1)
RS 410/M BLU	TC	FS1	3/400/50	500/1500-4450	50/150-445	10,8	CE-0085C90166	(1)
RS 410/M BLU	TC	FS1	3/400/50	500/1500-4450	50/150-445	10,8	CE-0085C90166	(2) (4)
RS 410/M BLU	TC	FS1	3/230/50	500/1500-4450	50/150-445	10,8	CE-0085C90166	(2)
RS 410/M BLU	TC	FS1	3/400/50	500/1500-4450	50/150-445	10,8	CE-0085C90166	(2)
RS 410/M BLU	TC	FS2	3/400/50	500/1500-4450	50/150-445	10,8	CE-0085C90166	(3) (4)
RS 410/M BLU	TC	FS2	3/230/50	500/1500-4450	50/150-445	10,8	CE-0085C90166	(3)
RS 410/M BLU	TC	FS2	3/400/50	500/1500-4450	50/150-445	10,8	CE-0085C90166	(3)
RS 510/M BLU	TC	FS1	3/400/50	680/1800-5250	68/180-525	14	CE-0085C90166	(1) (4)
RS 510/M BLU	TC	FS1	3/400/50	680/1800-5250	68/180-525	14	CE-0085C90166	(2) (4)
RS 510/M BLU	TC	FS2	3/400/50	680/1800-5250	68/180-525	14	CE-0085C90166	(3) (4)
RS 610/M BLU	TC	FS1	3/400/50	1000/2200-6250	100/220-625	16,9	CE-0085C90166	(1) (4)
RS 610/M BLU	TC	FS1	3/400/50	1000/2200-6250	100/220-625	16,9	CE-0085C90166	(2) (4)
RS 610/M BLU	TC	FS2	3/400/50	1000/2200-6250	100/220-625	16,9	CE-0085C90166	(3) (4)

Natural gas, net calorific value: 10 kWh/Nm³ - Density: 0,71 kg/Nm³
The burners of RS/M BLU series are in according to 2009/142 - 2014/30/UE - 2014/35/UE - 2006/42 EC Directives.
(1) with RMG/M control box
(2) with LFL control box
(3) with LGK control box
(4) Star delta starter

SPECIFICATION

STATE OF SUPPLY

Burner
Monoblock forced draught gas burner with modulating operation, fully automatic, made up of:
- High performance fan with low sound emissions, forward curve blades.
- Air suction circuit lined with sound-proofing material
- Air damper for air setting controlled by a high precision servomotor
- Air pressure switch
- Fan starting motor at 2900 rpm, three-phase 230/400 - 400/690 V with neutral, 50 Hz
- Combustion head, that can be set on the basis of required output, fitted with:
    - stainless steel end cone, resistant to corrosion and high temperatures
    - ignition electrodes; ionisation sensor for flame detection (or UV sensor on demand)
    - flame stability disk
- Maximum gas pressure switch, with pressure test point, for halting the burner in the case of over pressure on the fuel supply line
- Burner safety control box for controlling the system safety: RMG/M and LFL for FS1 intermittent operation and LGK for FS2 continuous operation
- Star/Delta starter for the fan motor (Direct starter fan motor for RS 310-410 models)
- Main electrical supply terminal board
- Burner on/off switch
- Manual or automatic output increase/decrease switch
- Contacts motor and thermal relay with release button
- Burner failure led signal and lighted release button
- Burner opening hinge
- Lifting rings
- IP 54 electric protection level

Standard equipment
- Gasket for gas train adaptor
- Adaptor for gas train
- M16x70 screws for fixing the gas train adaptor
- Thermal insulation screen
- M18x60 screws to secure the burner flange to the boiler
- Cable grommets kit for optional electrical wiring input
- M16x6 studs for fixing the gas elbow to the pipe coupling
- M16 nuts to fix the gas elbow to the pipe coupling
- Instruction handbook for installation, use and maintenance
- Spare parts catalogue

Conforming to:
- 2014/30/UE directive (electromagnetic compatibility)
- 2014/35/UE directive (low voltage)
- 2009/142/EC directive (gas)
- 2006/42/EC directive (machine)
- EN 676 (gas burners).

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

11/2016
TS0099UK01

[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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