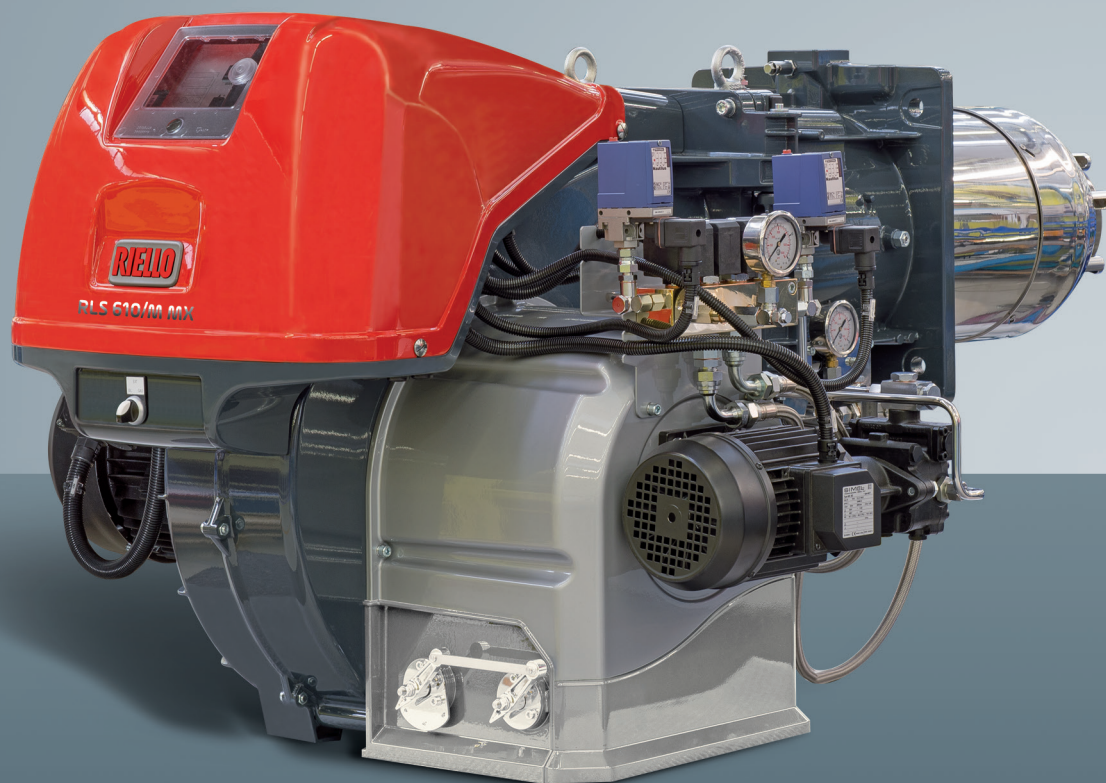
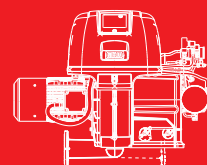
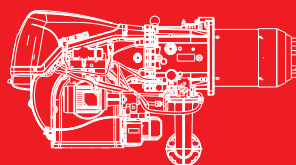




RLS 310÷610/M MX Series

Low NOx Modulating Dual Fuel Burners

RLS 310/M MX	600/1200	÷	3600	kW
RLS 410/M MX	640/1500	÷	4200	kW
RLS 510/M MX	680/1800	÷	5170	kW
RLS 610/M MX	1000/2200	÷	6155	kW



The high power monoblock Dual Fuel Burners Series, are the result of intensive activities of technical research and considerable investment, 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, RLS 310-410-510-610/M, able to summarize and concentrate the best technological expertise of Riello.

The new RLS 310-410-510-610/M models are characterized by technology, power and design and are growing in reputation and market share in the burners sector; a user friendly layout allows a full accessibility to all the components and a simple setup and adjustment.

On /M type models the air/fuel ratio control is managed by a MECHANICAL CAM, with Modulating operation, for simple commissioning and high performance.

The new models RLS 310-410-510-610/M are excellently covering the 3-6 MW output range and represent the ideal solution for heating boilers, steam generators and industrial process plants.

Technical Data

MODEL			RLS 310/M MX	RLS 410/M MX	RLS 510/M MX	RLS 610/M MX
Burner operation mode			Two Stage Progressive - Modulating			
Modulation ratio at max. output			5 ÷ 1			
Servomotor		type	SQM 40			
Heat output		kW	600/1200÷3600	640/1500 ÷4200	660/1800÷5170	1000/2200÷6155
		Kg/h	50/100÷305	55/126÷352	56/195÷435	110/185÷516
Working temperature		°C min./ max.	0/50			
FUEL/AIR DATA						
Light oil	net calorific value	kWh/kg	11.86			
	viscosity at 20°C	mm2/s (cSt)	4 ÷ 6			
Pump	type		TA3	TA4	TA5	
	output at 16.5 bar	kg/h	700	930	1270	
Pressure range		bar	7 ÷ 40		7 ÷ 30	
Fuel temperature		max. °C	140			
Nozzle	Number		1			
G20 gas	net calorific value	kWh/Nm3	10			
	gas density	kg/Nm3	0.71			
G25 gas	net calorific value	kWh/Nm3	8.6			
	gas density	kg/Nm3	0.78			
Fan		type	Forward curve blades			
Combustion air temperature		max °C	60			
ELECTRICAL DATA						
Start up		type	Direct			
Electrical supply		Ph/ V/Hz	3N ~ 230V ±10% 50 Hz			
Total electrical power		kW Max	9.1 (gas)/ 10.9 (oil)	10.6 (gas)/ 12.4 (oli)	9.1 (gas)/ 10.9 (oil)	10.6 (gas)/ 12.4 (oli)
Fan motor	electrical power	kW	7.5	9.2	7.5	9.2
	rated current	A	24 - 14	28.6 - 16.5	24 - 14	28.6 - 16.5
	protection level	IP	54			
Start up Type			Star - Delta			
Electrical supply		Ph/ V/Hz	3N ~ 400V ±10% 50 Hz			
Total electrical power		kW Max	8.8 (gas)/ 10.6 (oil)	10.6 (gas)/ 12.4 (oli)	13.9 (gas)/ 15.7 (oil)	16.9 (gas)/ 18.7 (oil)
Fan motor	electrical power	kW	7.5	9.2	12	15
	rated current	A	14 - 8.1	16.8 - 9.7	21.8 - 12.6	27 - 15.6
	protection level	IP	54			
Pump motor	electrical power	kW	1.5			
	rated current	A	5.9/3.4			
	start up current	A	7 x In			
	protection level	IP	54			
Ignition transformer		V1 - V2	230V - 2 x 5 kV			
		I1 - I2	1.9 A - 35 mA			
Control box		type	LFL 1.333			
Motor protection level		IP	54			
Operation			Intermittent (at least one stop every 24 hours)			

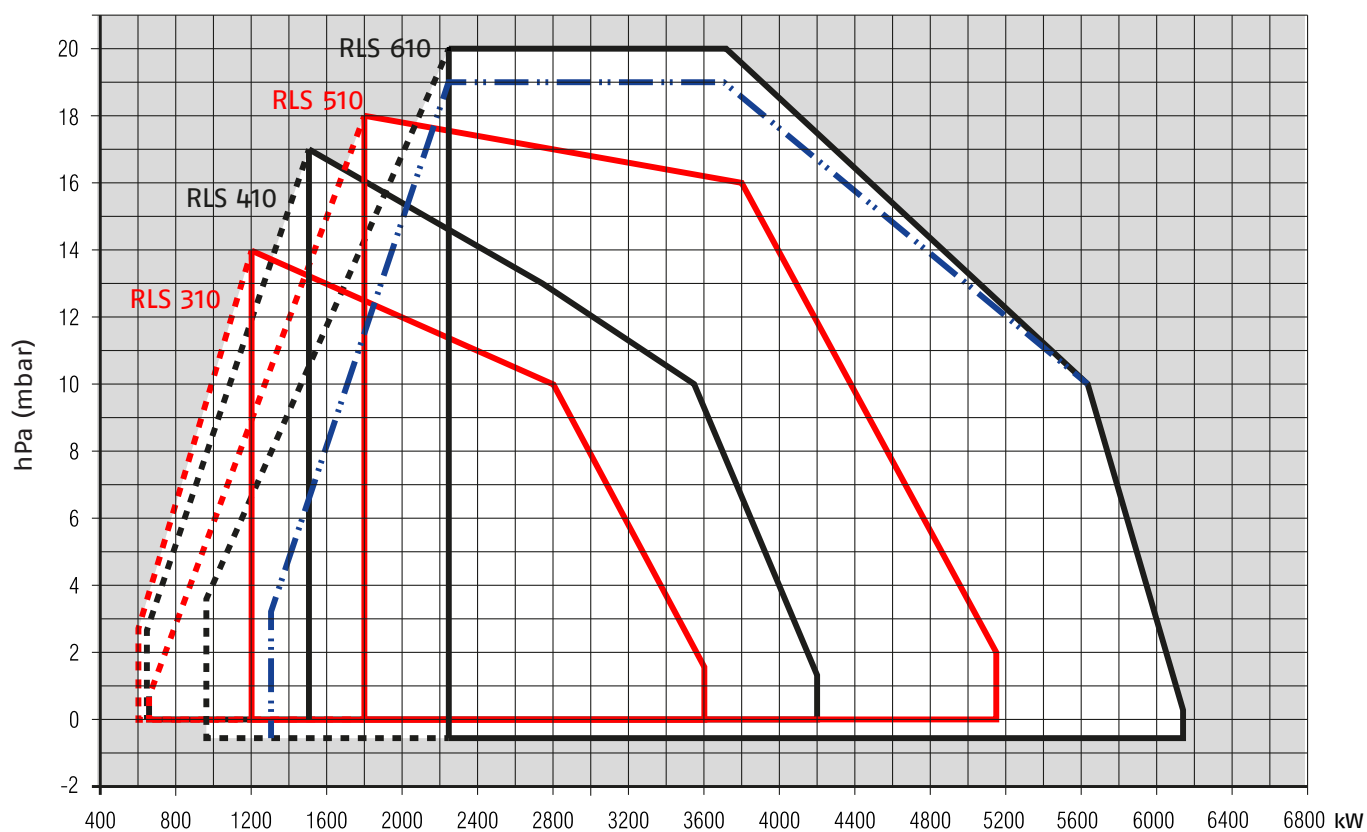
MODEL			RLS 310/M MX	RLS 410/M MX	RLS 510/M MX	RLS 610/M MX
EMISSIONS						
Noise levels	sound pressure	dB (A)	78	80	82.5	85
	sound power	dB (A)	89	91	93.5	96
Light oil	CO emission	mg/kWh	< 10			
	NOx emission	mg/kWh	< 185			
Gas G20	CO emission	mg/kWh	< 10			
	NOx emission	mg/kWh	< 80			
APPROVAL						
Directive			2006/42/EC - 2009/142/EC - 2014/30/UE - 2014/35 UE			
Conforming to			EN 267 - EN 676			
Certification			CE-0085C00196			

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

RLS 310-410-510-610/M MX



Useful working field
for choosing the
burner



Modulation range

Test conditions
conforming to EN267- EN676
Temperature: 20°C
Pressure: 1013,5 mbar
Altitude: 0 m a.s.l.



Light-oil
firing rate
for RLS 610 model
(min. output 1.300 kW)

Fuel Supply

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
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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.

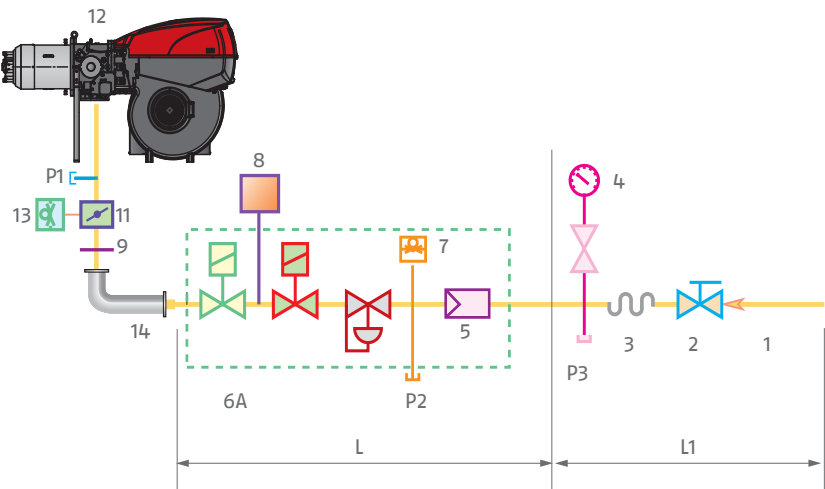
Fuel can be supplied either from the right or left sides, on the basis of the application requirements.

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.

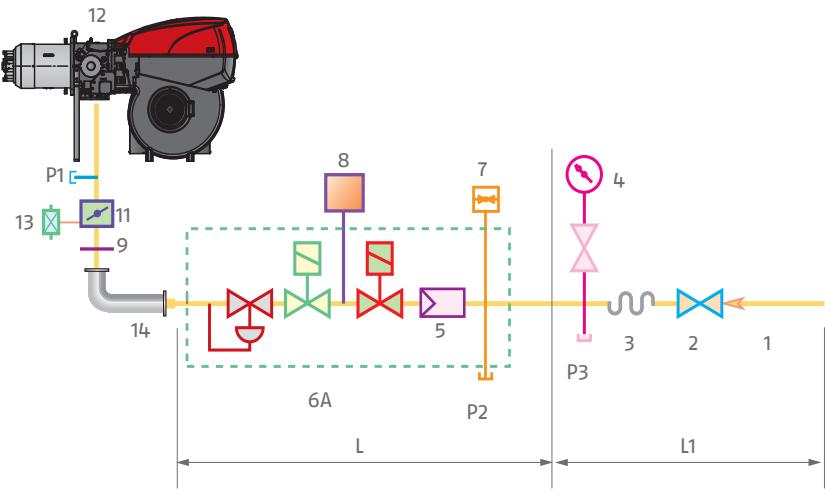
The gas trains are with or without seal control.

MB "THREADED"

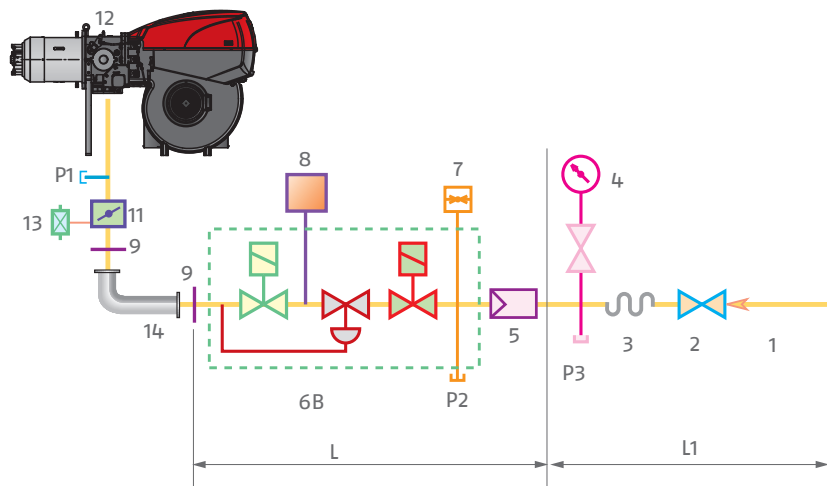


1	Gas input pipework
2	Manual valve
3	Anti-vibration joint
4	Pressure gauge with pushbutton cock
5	Filter
6A	Includes:
	- filter
	- operation valve
	- safety valve
	- pressure adjuster
7	Minimum gas pressure switch
8	Leak detection device, supplied as an accessory or incorporated, based on the gas train 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 "THREADED"

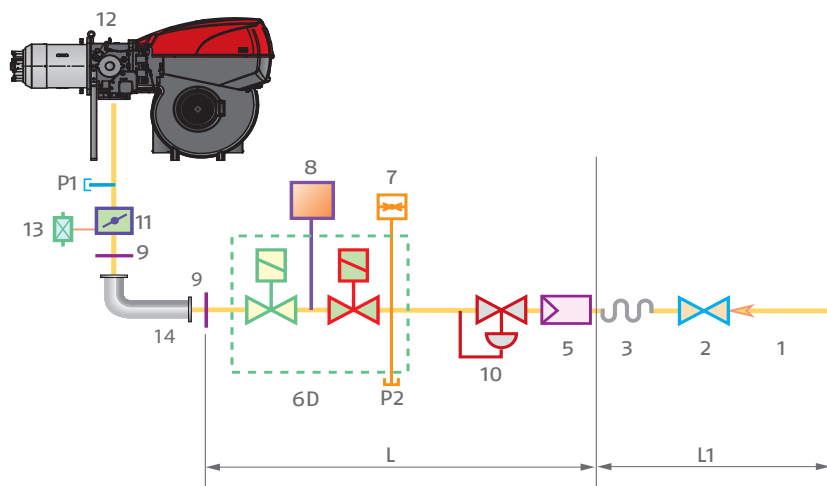


MBC "FLANGED"



- | | |
|----|---|
| 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. |

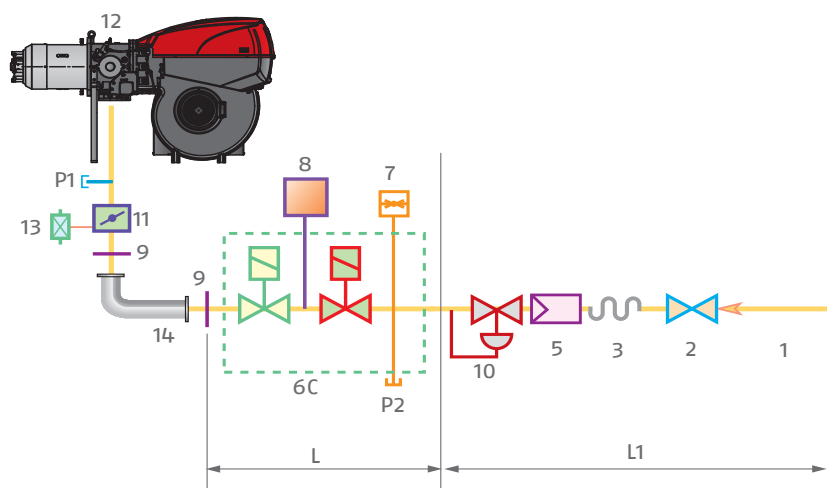
CB "FLANGED OR THREADED"



- | | |
|----|---|
| 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
----	----------------------------

DMV "FLANGED OR THREADED"



Gas trains are approved by standard EN 676 together with the burner.

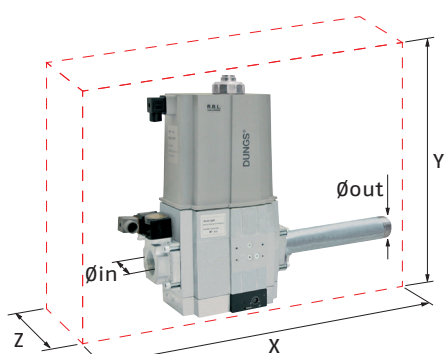
The overall dimensions of the gas train depends on how they are constructed. The following table shows the maximum dimensions of the gas trains that can be fitted to RS 650-800-1000-1200/M BLU burners, intake and outlet diameters and seal control if fitted.

The maximum gas pressure of gas train "MULTIBLOC" type is 360 mbar, and that one of gas train "COMPOSED" type is 500 mbar.

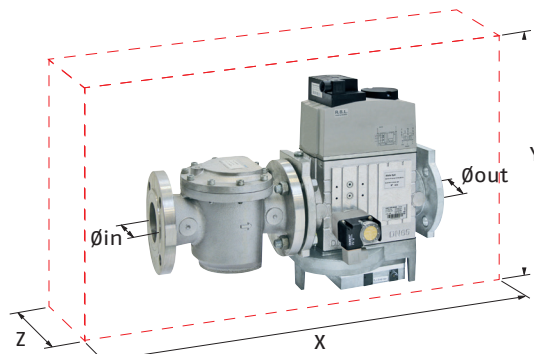
"MULTIBLOC" guarantees a range of pressure towards the burner from 4 to 60 mbar. For version DN 65 and DN 80 is from 20 to 40 mbar. For version DN 100 is from 40 to 80 mbar. The range of pressure in the "MULTIBLOC" with flange can be modified choosing the stabiliser spring (see gas train accessory).

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).

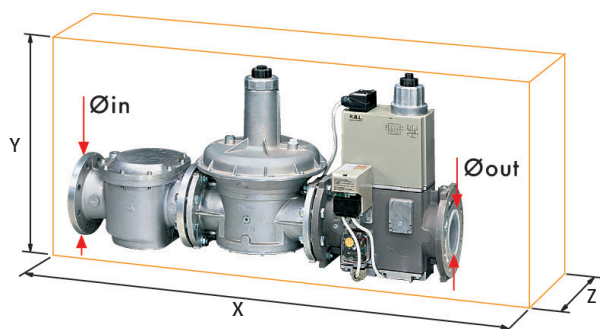
The maximum gas pressure of gas train "DMV" series is 500 mbar. "DMV" gas train is supplied without pressure governor.



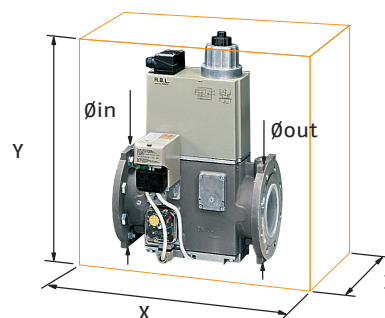
Example of gas train "MULTIBLOC" type
without seal control (i.e. MBC 1200)



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

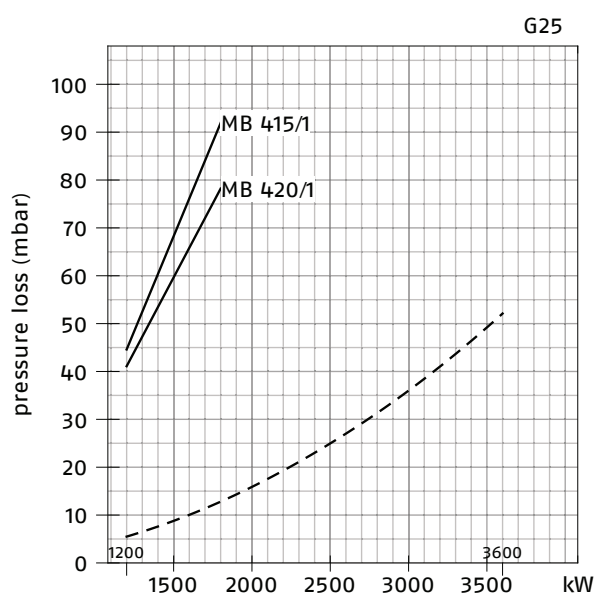
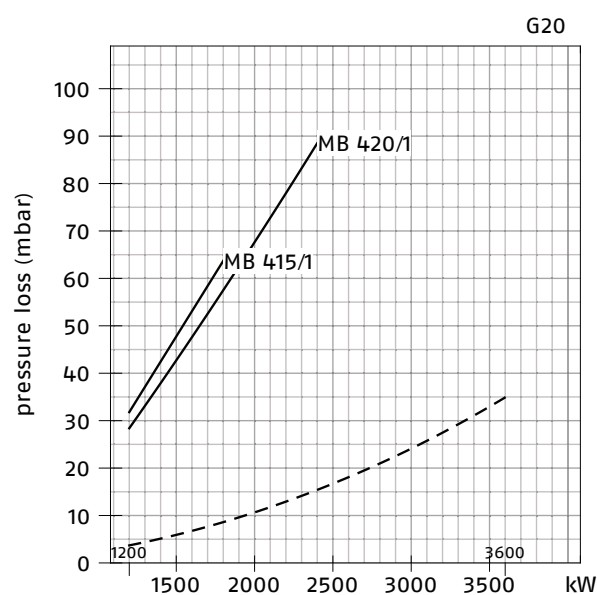
The diagrams indicate the minimum pressure drop of the burners with the various gas trains that can be matched with them; at the value of these pressure drop add the combustion chamber pressure.

The value thus calculated represents the minimum required input pressure to the gas train.

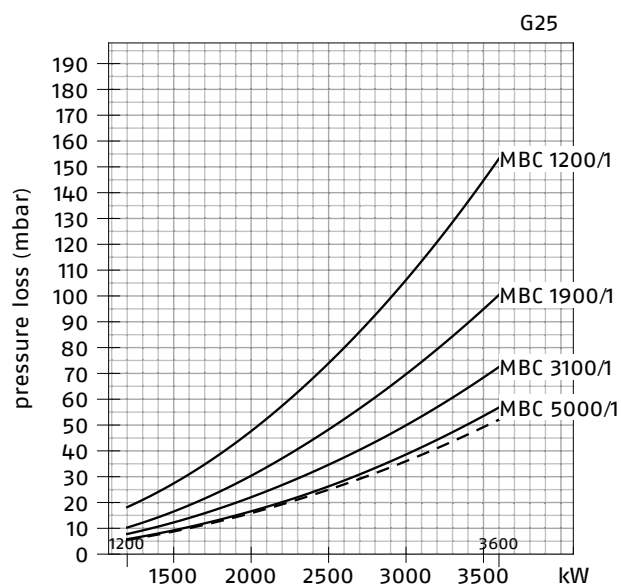
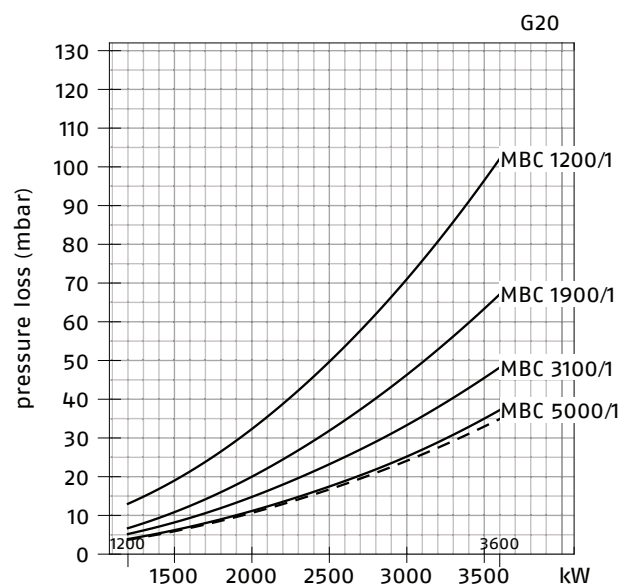
The minimum input gas pressure required is 15 mbar while burner operating.

In particular, the pressure difference between gas train upstream and downstream has to remain always over pressure drop values indicated below.

RLS 310/M MX – MB

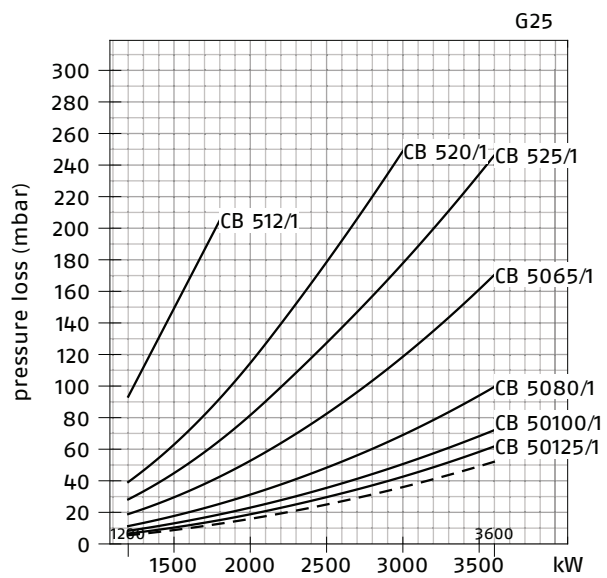
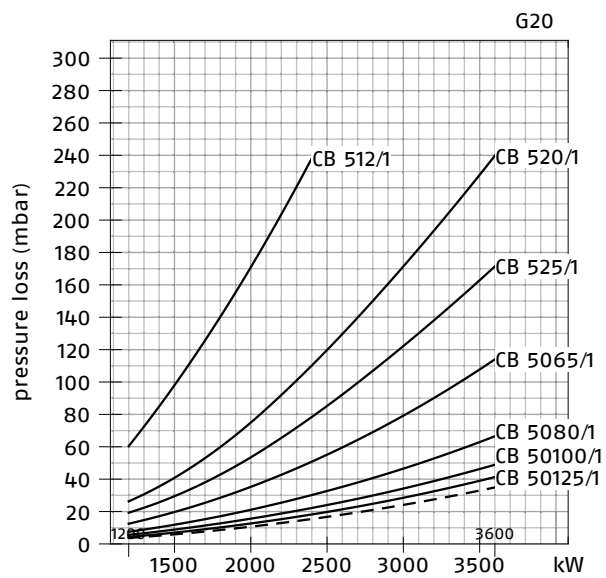


RLS 310/M MX – MBC

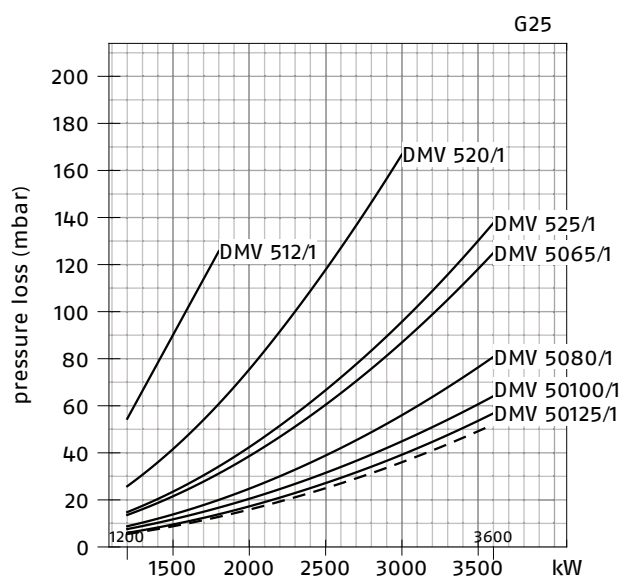
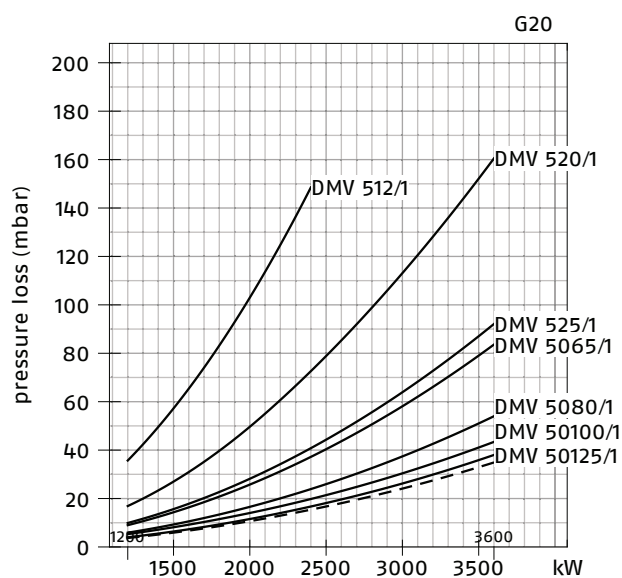


— Combustion head + gas butterfly valve + gas train
 - - - Combustion head + gas butterfly valve

RLS 310/M MX – CB

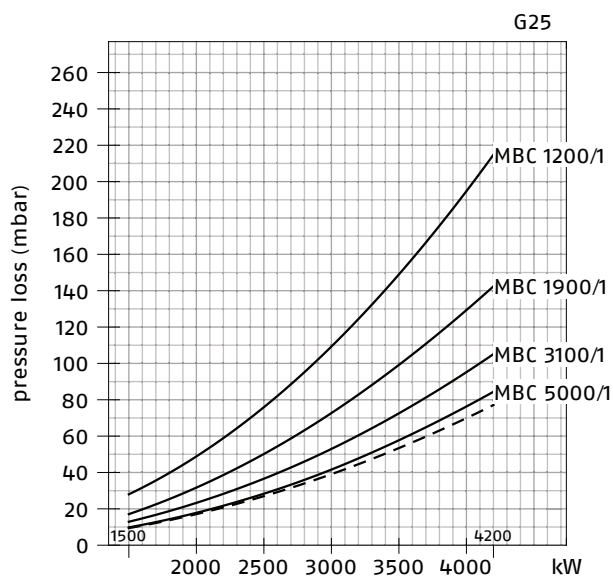
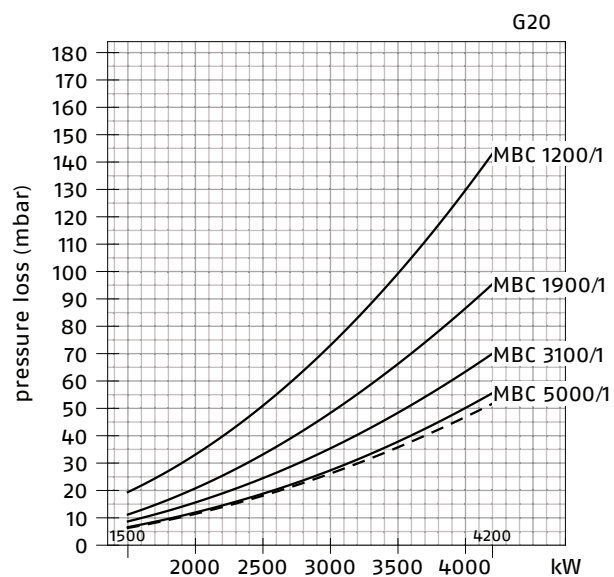


RLS 310/M MX – DMV

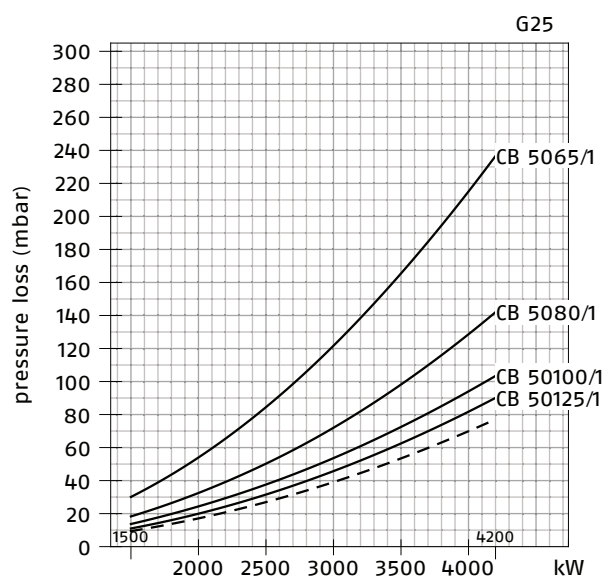
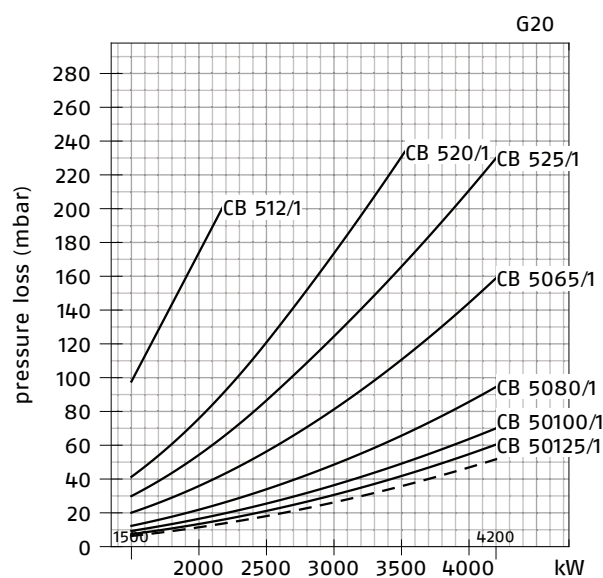


— Combustion head + gas butterfly valve + gas train
 - - - Combustion head + gas butterfly valve

RLS 410/M MX – MBC

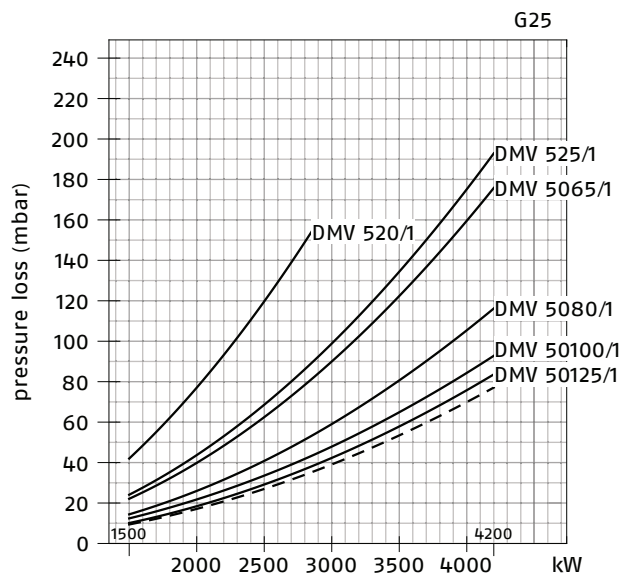
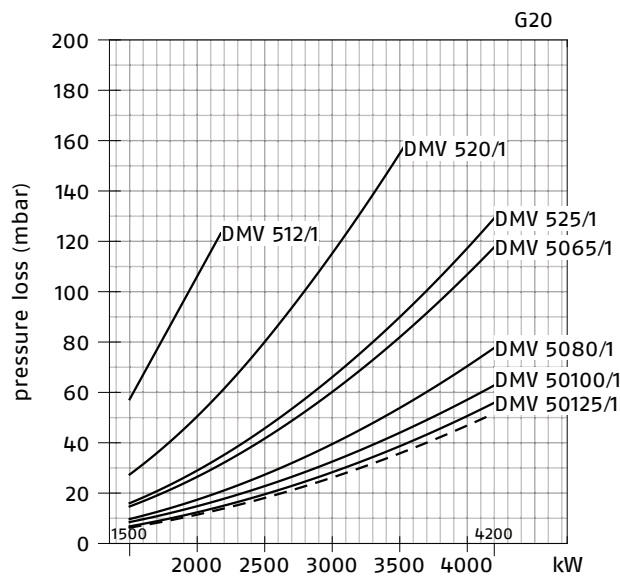


RLS 410/M MX – CB

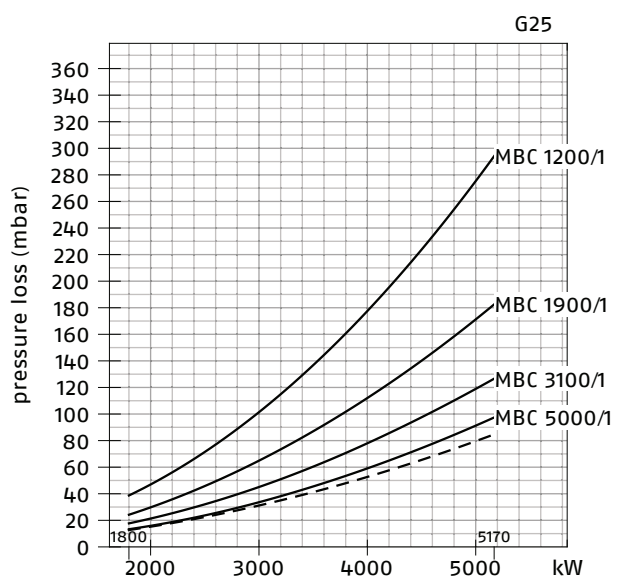
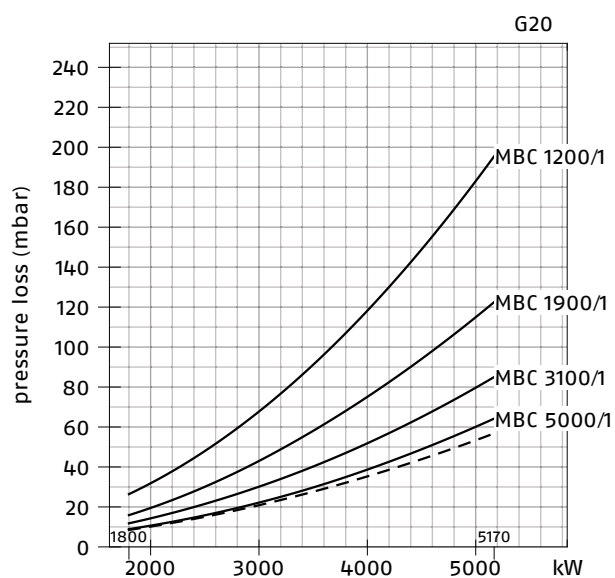


— Combustion head + gas butterfly valve + gas train
 - - - Combustion head + gas butterfly valve

RLS 410/M MX – DMV

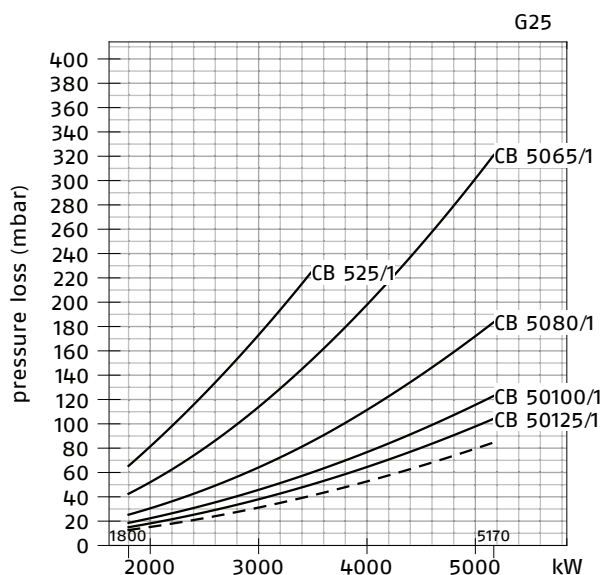
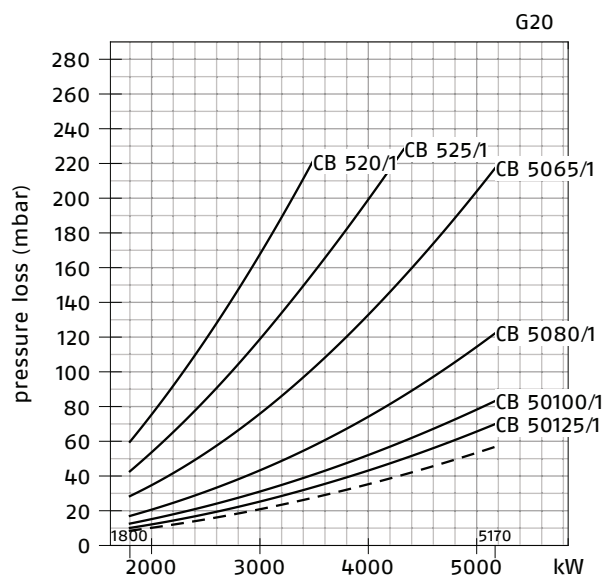


RLS 510/M MX – MBC

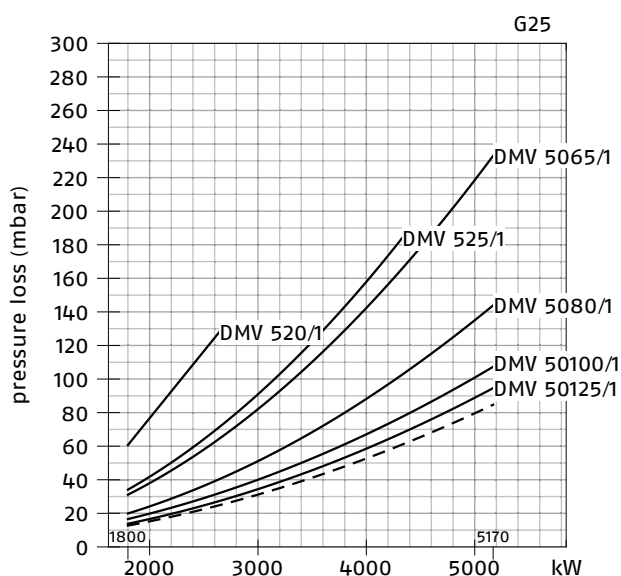
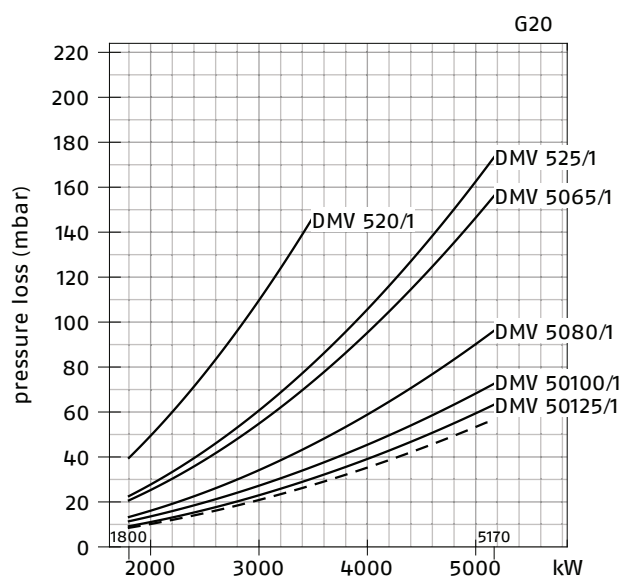


— Combustion head + gas butterfly valve + gas train
 - - - Combustion head + gas butterfly valve

RLS 510/M MX - CB

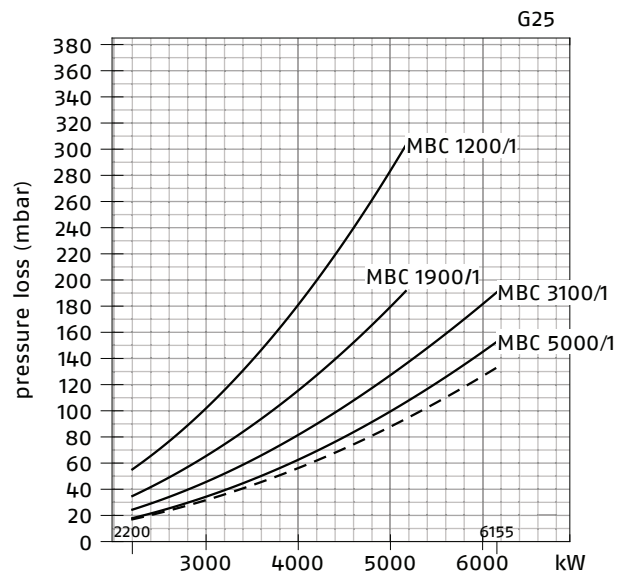
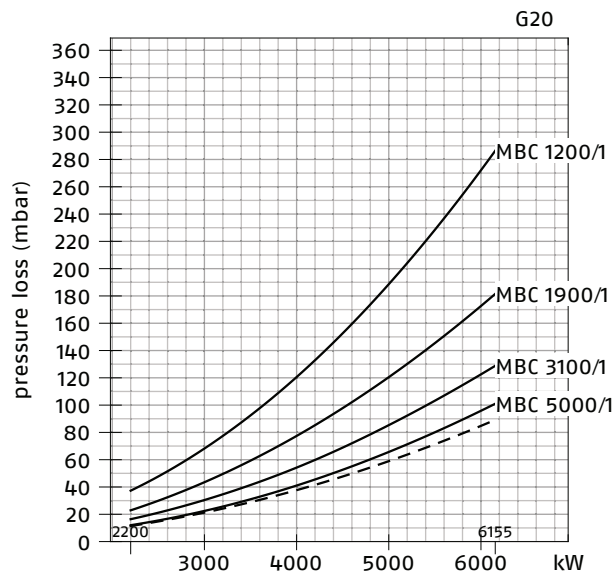


RLS 510/M MX - DMV

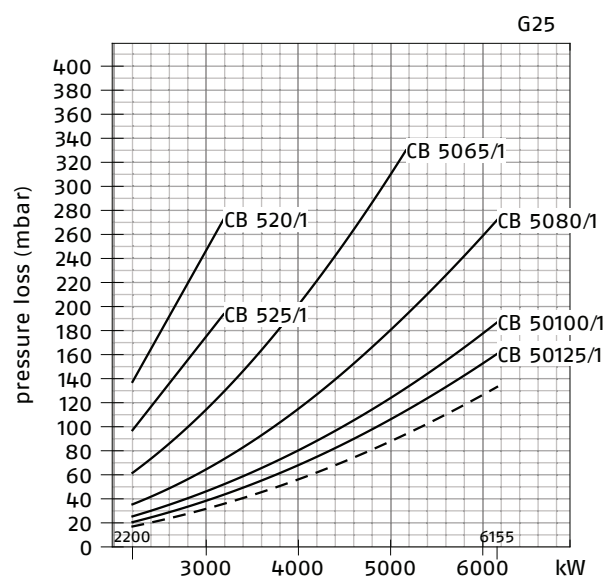
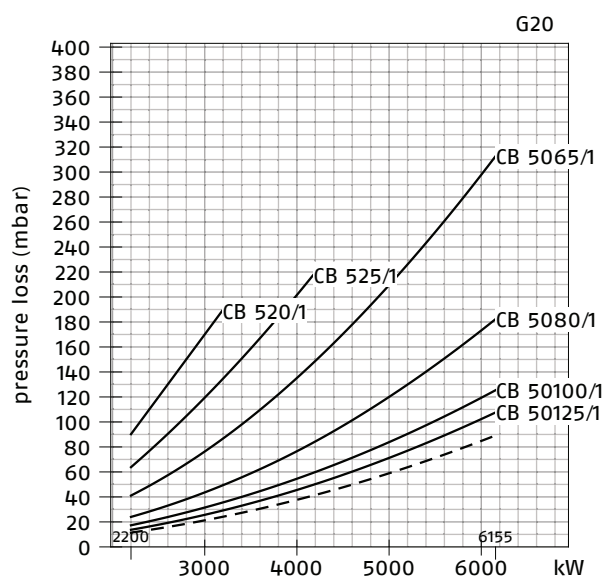


— Combustion head + gas butterfly valve + gas train
 - - - Combustion head + gas butterfly valve

RLS 610/M MX – MBC

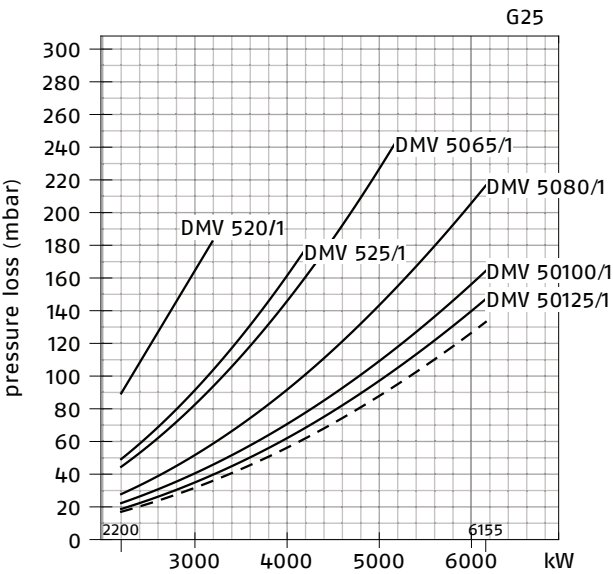
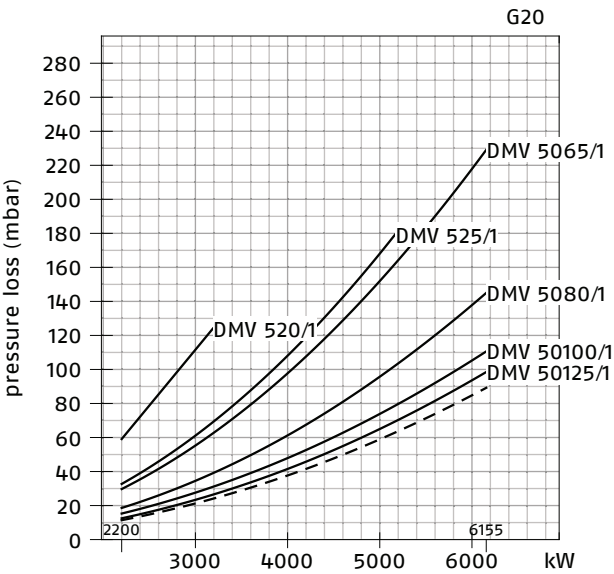


RLS 610/M MX – CB



— Combustion head + gas butterfly valve + gas train
 - - - Combustion head + gas butterfly valve

RLS 610/M MX - DMV



— Combustion head + gas butterfly valve + gas train
- - - Combustion head + gas butterfly valve

Gas Trains

GAS TRAIN			VPS KIT	CQ KIT	ADAPTER			
CODE	MODEL	◆	CODE	CODE	CODE			
					RLS 310	RLS 410	RLS 510	RLS 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	3010344	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	3010344	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	3010344	3000826 + 20042324			
3970225	MBC 1200/1 CT RSM 60	CT	-	-	3000826 + 20042324			
3970222	MBC 1900/1 - FSM 40	-	3010367	3010344	3010221			
3970226	MBC 1900/1 CT FSM 40	CT	-	-	3010221			
3970223	MBC 3100/1 - FSM 40	-	3010367	3010344	3010222			
3970227	MBC 3100/1 CT FSM 40	CT	-	-	3010222			
3970224	MBC 5000/1 - FSM 80	-	3010367	3010344	3010223 - 3010370			
3970228	MBC 5000/1 CT FSM 80	CT	-	-	3010223 - 3010370			
3970145	CB 512/1 - RSM 30	-	3010367	3010344	3000826 + 20064220	●	●	●
20045589	CB 512/1 CT RSM 30	CT	-	-	3000826 + 20064220	●	●	●
3970146	CB 520/1 - RSM 30	-	3010367	3010344	3000826 + 20042324			●
3970160	CB 520/1 CT RSM 30	CT	-	-	3000826 + 20042324			●
20044659	CB 525/1 - RSM 30	-	3010367	3010344	3000826 + 20042324			
20044660	CB 525/1 CT RSM 30	CT	-	-	3000826 + 20042324			
3970147	CB 5065/1 - FSM 30	-	3010367	3010344	3010221			
3970161	CB 5065/1 CT FSM 30	CT	-	-	3010221			

GAS TRAIN			VPS KIT	CQ KIT	ADAPTER			
CODE	MODEL	◆	CODE	CODE	CODE			
					RLS 310	RLS 410	RLS 510	RLS 610
3970148	CB 5080/1 - FSM 30	-	3010367	3010344	3010222			
3970162	CB 5080/1 CT FSM 30	CT	-	-	3010222			
3970149	CB 50100/1 - FSM 30	-	3010367	3010344	3010223 - 3010370			
3970163	CB 50100/1 CT FSM 30	CT	-	-	3010223 - 3010370			
20015871	CB 50125/1 - FSM 30	-	3010367	3010344	3010224			
3970196	CB 50125/1 CT FSM 30	CT	-	-	3010224			
20043035	DMV 512/1 - RSM -0	-	3010367		3000826 - 20064220		●	●
20043036	DMV 512/1 CT RSM -0	CT	-	-	3000826 - 20064220		●	●
20043037	DMV 512/1 CQ RSM -2	CQ	-	-	3000826 - 20064220		●	●
20043038	DMV 520/1 - RSM -0	-	3010367	3010344	3000826 - 20042324			●
20043039	DMV 520/1 CT RSM -0	CT	-	-	3000826 - 20042324			●
20043040	DMV 520/1 CQ RSM -2	CQ	-	-	3000826 - 20042324			●
20043053	DMV 525/1 - RSM -0	-	3010367	3010344	3000826 - 20042324			
20043054	DMV 525/1 CT RSM -0	CT	-	-	3000826 - 20042324			
20043055	DMV 525/1 CQ RSM -2	CQ	-	-	3000826 - 20042324			
20043041	DMV 5065/1 - FSM -0	-	3010367	3010344	3010221			
20043042	DMV 5065/1 CT FSM -0	CT	-	-	3010221			
20043043	DMV 5065/1 CQ FSM -2	CQ	-	-	3010221			
20043044	DMV 5080/1 - FSM -0	-	3010367	3010344	3010222			
20043045	DMV 5080/1 CT FSM -0	CT	-	-	3010222			
20043046	DMV 5080/1 CQ FSM -2	CQ	-	-	3010222			
20043047	DMV 50100/1 - FSM -0	-	3010367	3010344	3010223 - 3010370			
20043048	DMV 50100/1 CT FSM -0	CT	-	-	3010223 - 3010370			
20043049	DMV 50100/1 CQ FSM -2	CQ	-	-	3010223 - 3010370			
20043050	DMV 50125/1 - FSM -0	-	3010367	3010344	3010224			
20043051	DMV 50125/1 CT FSM -0	CT	-	-	3010224			
20043052	DMV 50125/1 CQ FSM -2	CQ	-	-	3010224			

- ◆ Gas valve leak detection control device:
 - 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 for burners /M.
CQ gas train with pressure switch for leak detection control of burners /E.
- VPS KIT** Valve leak detection control device. Supplied separately from the gas train, on demand.
- CQ KIT** Additional pressure switch for leak detection control in combination with burners /E.
- Gas train not available or not suitable for the matching to the burner.

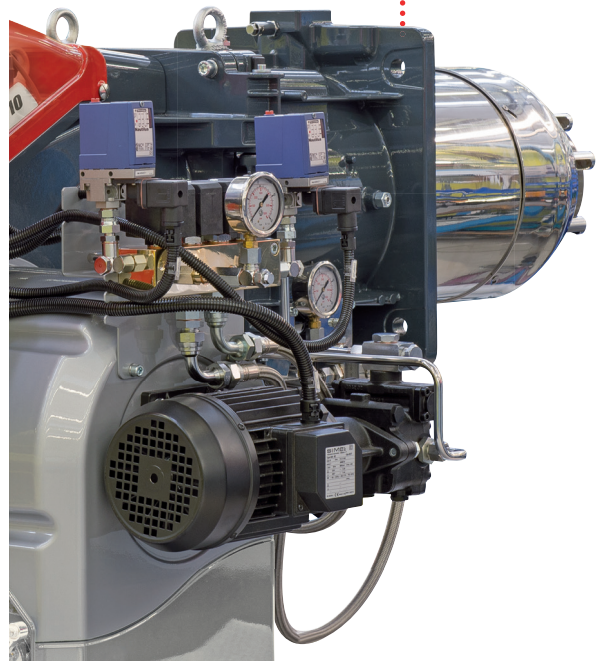
Hydraulic circuits

The hydraulic circuit of the RLS 310-410-510-610 series of burners is characterised by a fuel pump with an independent motor.

The burners are fitted with two valves (a safety valve and an operation valve) and an oil filter along the oil line from the pump to the nozzle.

A pressure regulator on the return circuit from the nozzle enables the quantity of fuel burnt to be varied. Two safety valves on the return circuit avoid oil leakage from the nozzle when the burner is in stand-by and prepurge phase.

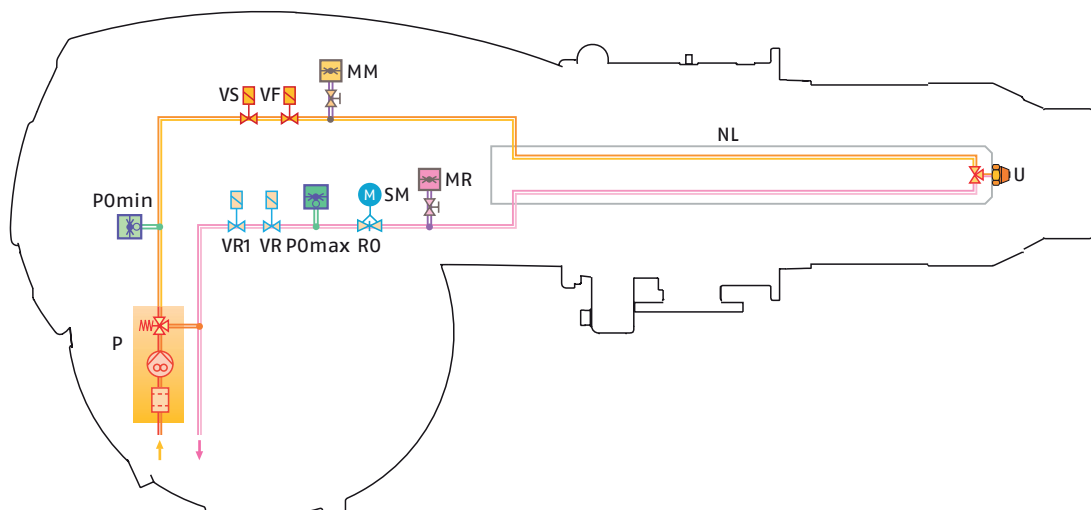
The models are fitted with a maximum pressure switch on the oil return circuit, and a minimum oil pressure switch on the oil line from the pump to the nozzle.



Example of the RLS 310-610 burner hydraulic circuit

P	Pump with filter and pressure regulator
P0 min	Min. oil pressure switch on the delivery circuit
VF	Operating valve
VS	Safety valve on the delivery circuit
MM	Pressure gauge on the delivery circuit
NL	Nozzle pipe
U	Nozzle
MR	Pressure gauge on the return circuit
SM	Servomotor
R0	Pressure regulator on the return circuit
P0 max	Max. oil pressure switch on the return circuit
VR	Safety valve on the return circuit
VR1	Safety valve on the return circuit

EN 267 > 100 Kg/h RLS 310-410-510-610



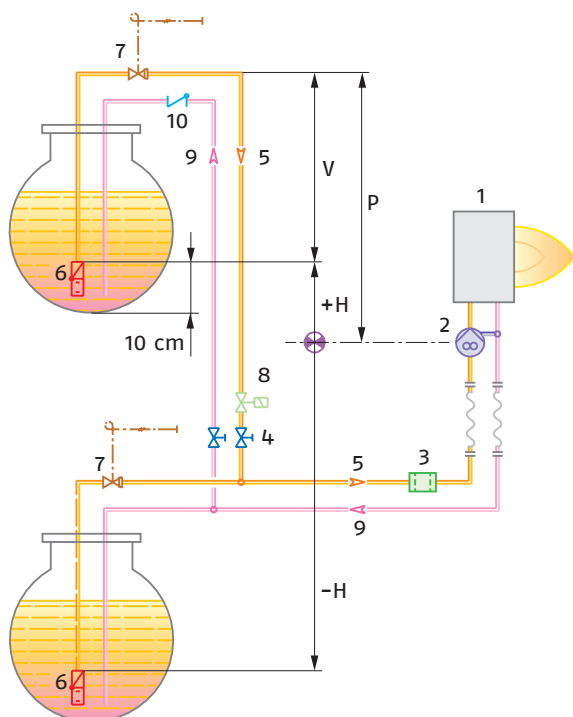
Selecting the fuel supply lines

The fuel feed must be completed with the safety devices required by the local norms.

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

MAXIMUM EQUIVALENT LENGTH FOR THE PIPING L [m]

MODEL	RLS 310-410-510-610			
DIAMETER PIPING	Ø 10 mm	Ø 12 mm	Ø 14 mm	Ø 16 mm
+/- H [m]	L max (m)			
4.0	14	30	55	95
3.5	13	28	52	89
3.0	12	26	48	82
2.5	11	24	44	76
2.0	10	22	41	70
1.5	9	20	37	63
1.0	8	18	33	57
0.5	7	16	29	51
0	6	14	26	44
-0.5	5	12	22	38
-1.0	4	10	18	32
-1.5	3	8	15	25
-2.0	-	6	11	19
-2.5	-	4	7	13
-3.0	-	-	4	7



H	Pump/Foot valve height difference
L	Piping length
Ø	Inside pipe diameter
1	Burner
2	Pump
3	Filter
4	Manual on/off valve
5	Suction line
6	Foot valve
7	Quick closing manual valve with remote control (Italy only)
8	On/off solenoid valve (Italy only). See electrical layout. Connections to be carried out by the installer (SV).
9	Return line
10	Check valve (only Italy)

With ring distribution oil systems, the feasible drawings and dimensioning are the responsibility of specialised engineering studios, who must check compatibility with the requirements and features of each single installation.

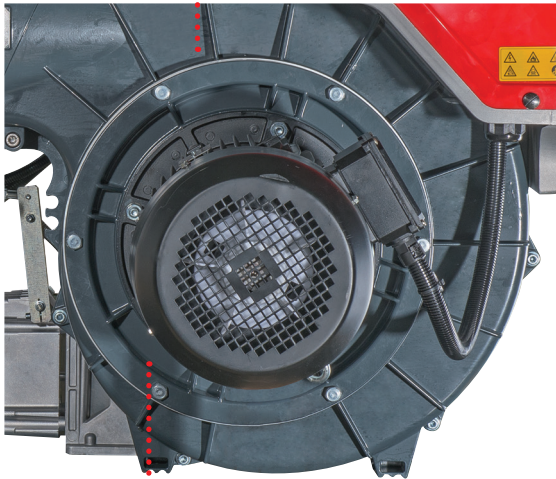
Ventilation

The ventilation unit comes with a sound proofing system.

All the 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.

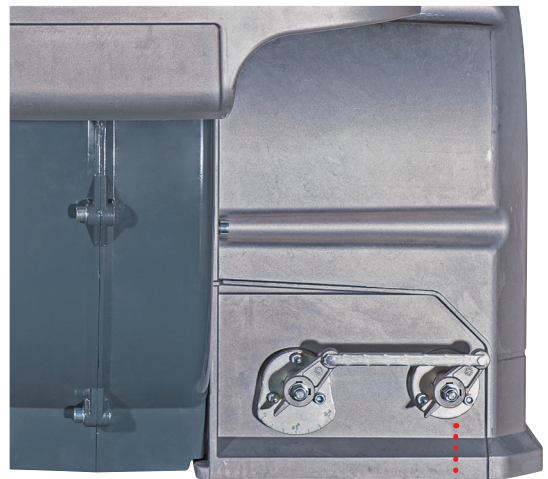
New ventilation structure

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 innovative combustion head adjustment system ensures perfect movement during modulation as well as reducing noise and pollutants. Simple adjustment of the combustion head allows to adapt internal geometry of the head to the output of the burner.

The same adjustment servomotor for the air damper also varies, depending on the required output, the setting of the combustion head, through a simple lever.

This system guarantees excellent mix on all firing rates range.



Example of a RLS 510 burner combustion head

Safe and Green

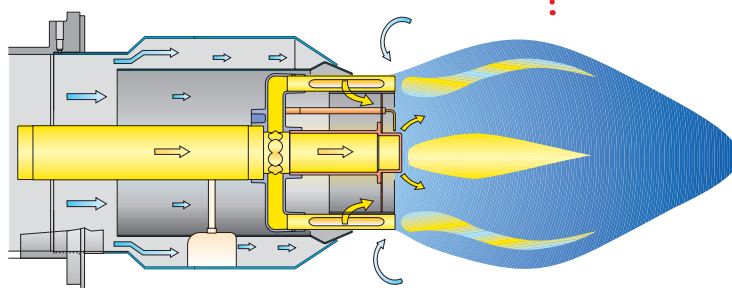
The RLS MX series reduces polluting emissions with its exclusive design which optimises air/fuel mixture.

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.

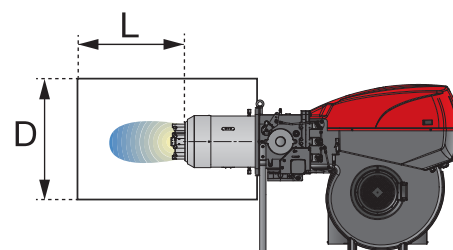
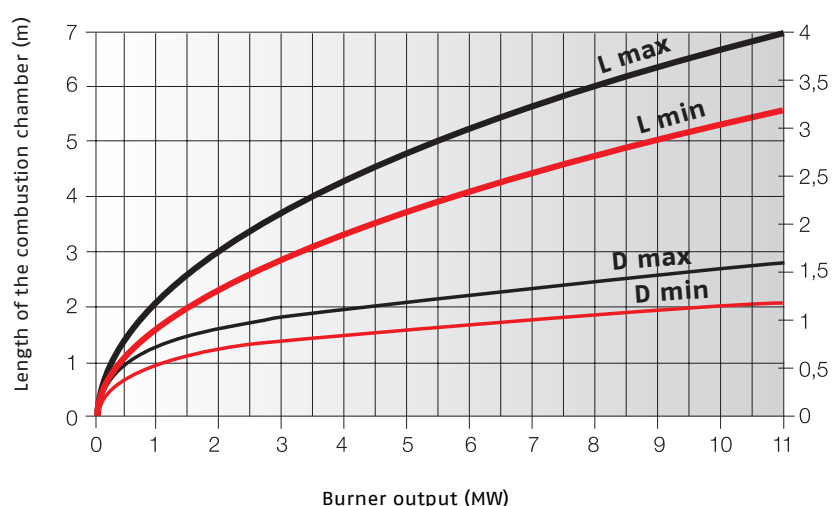
This results in low flame temperature combustion to prevent the formation of NO. Gradual and progressive combustion throughout the flame prevents areas of high oxidation inside the flame.

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.



SUGGESTED COMBUSTION CHAMBER DIMENSIONS



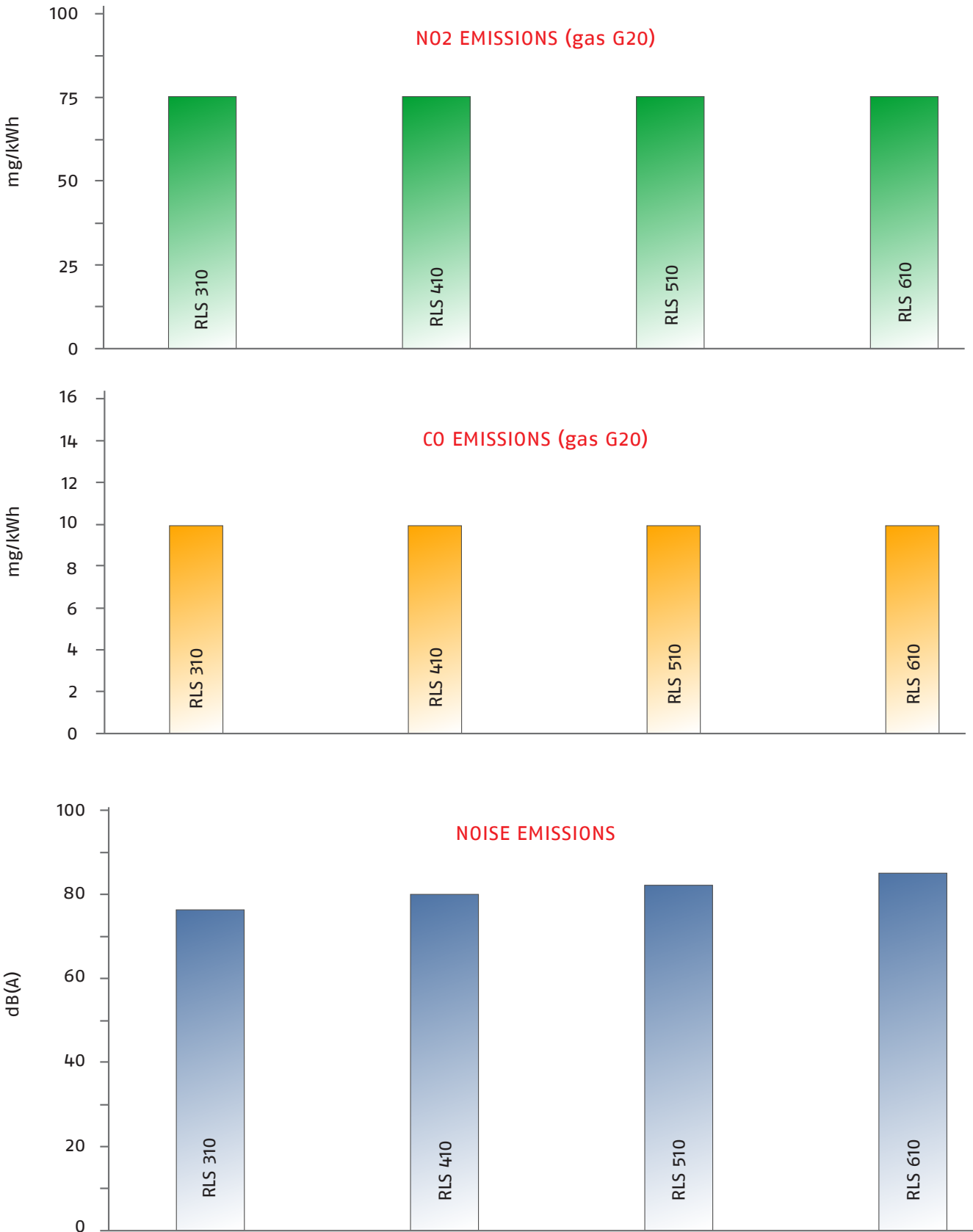
Example:

Burner thermal output = 6000 kW;

L Combustion Chamber (m) = 4,7 m (medium value);

D Combustion Chamber (m) = 1,2 m (medium value)

Emissions



The noise emissions have been measured at the maximum output.

Operation

BURNER OPERATION MODE

The RLS 310-410-510-610/M MX series of burners can have "two-stage progressive" or "modulating" operation, based on an air/fuel ratio control managed by a Mechanical cam.



Output regulator

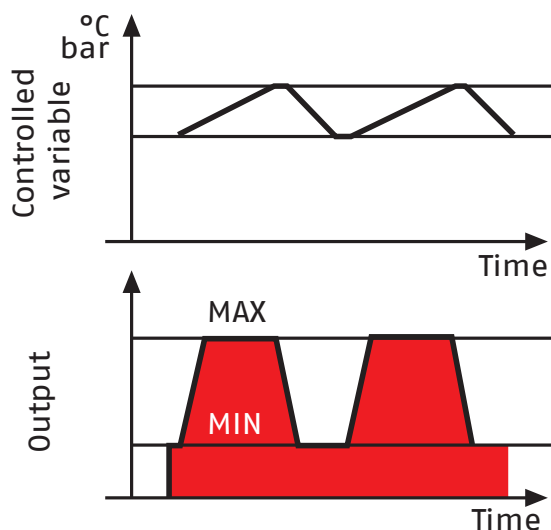


Analog 4-20 mA or 0 - 10V
converter for remote modulation

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).

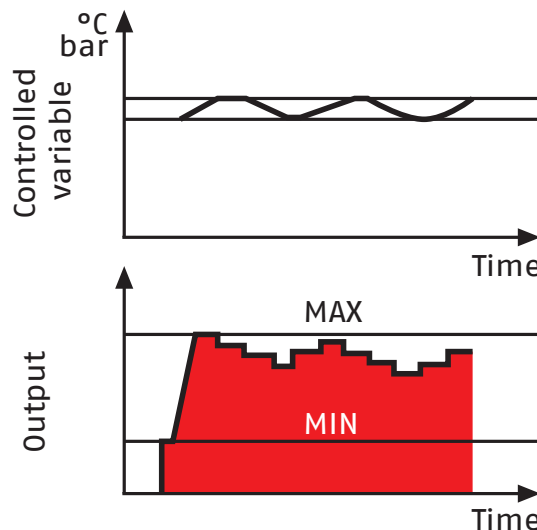
On "modulating" operation, normally required in steam generators, in superheater boilers or diathermic oil burners, a specific regulator and probes are required. These are supplied as accessories that must be ordered separately. The burner can work for long periods at intermediate output levels (see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

"TWO-STAGE PROGRESSIVE" OPERATION



Picture A

"MODULATING" OPERATION



Picture B

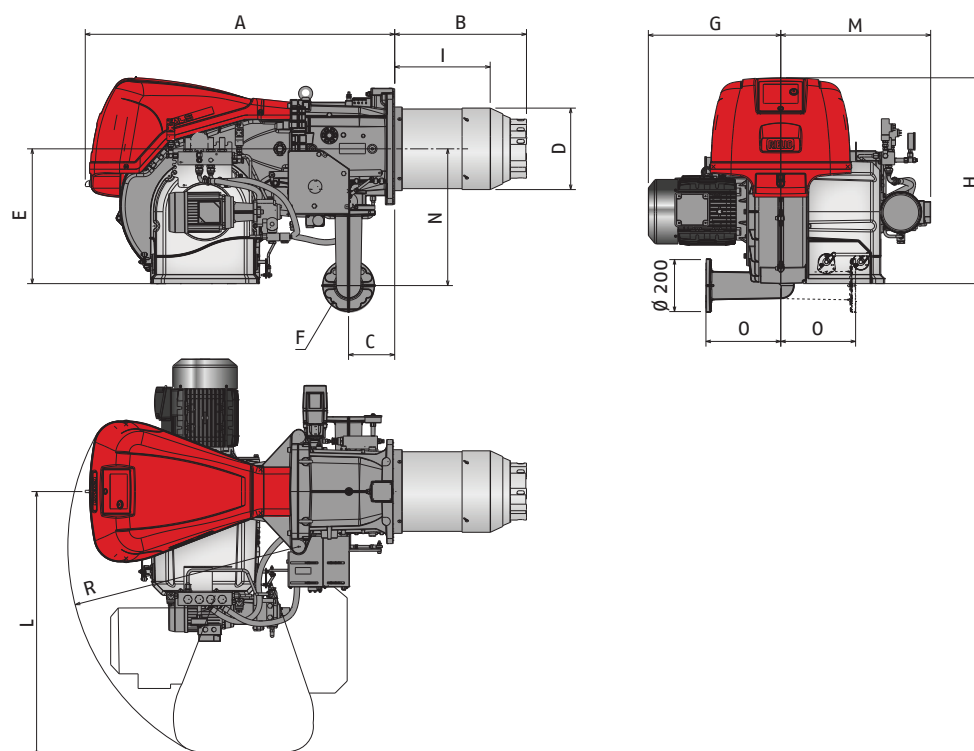
The RLS /M MX series burners are fitted with the LFL1...control panel.

LFL ... CONTROL BOX



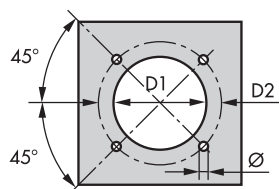
Overall Dimensions (mm)

BURNERS RLS 310-410-510-610/M MX



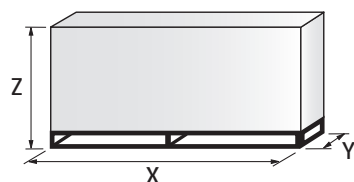
MODEL	A	B	C	D	E	F	G	H	I	L	M	N	O	R
RLS 310/M MX	1190	507	178	313	520	DN65	490	790	340	1015	576	528	290	890
RLS 410/M MX	1190	507	178	313	520	DN65	508	790	340	1015	576	528	290	890
RLS 510/M MX	1190	507	178	313	520	DN65	508	790	340	1015	576	528	290	890
RLS 610/M MX	1190	510	178	334	520	DN65	580	790	360	1015	576	528	290	890

BURNER - BOILER MOUNTING FLANGE



MODEL	D1	D2	Ø
RLS 310/M MX	335	452	M18
RLS 410/M MX	335	452	M18
RLS 510/M MX	335	452	M18
RLS 610/M MX	350	452	M18

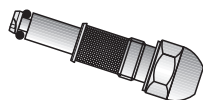
PACKAGING



MODEL	X	Y	Z	kg
RLS 310/M MX	2040	1180	1125	300
RLS 410/M MX	2040	1180	1125	300
RLS 510/M MX	2040	1180	1125	300
RLS 610/M MX	2400	1400	1595	320

Burner accessories

NOZZLES



Return nozzles without needle are used on RLS MX burners. The nozzle must be ordered as accessory. The following table shows the features and codes on the basis of the maximum required fuel output.

BURNER	RATED DELIVERY (kg/h)	NOZZLE CODE ⁽¹⁾	NOZZLE CODE ⁽²⁾
RLS 310-410	150	3009314	3045479
RLS 310-410	175	3009316	3045481
RLS 310-410	200	3009318	3045483
RLS 310-410	225	3009320	3045485
RLS 310-410-510	250	3009322	3045487
RLS 310-410-510	275	3009324	3045489
RLS 310-410-510-610	300	3009326	3045491
RLS 310-410-510-610	325	3009328	3045493
RLS 310-410-510-610	350	3009330	3045495
RLS 310-410-510-610	375	3009332	3045497
RLS 310-410-510-610	400	3009334	3045499
RLS 310-410-510-610	425	3009336	3045500
RLS 510-610	450	3009338	3045501
RLS 610	475	3009340	-
RLS 610	500	3009342	3045503
RLS 610	525	3009344	-
RLS 610	550	3009346	3045505
RLS 610	575	3009348	-
RLS 610	600	3009350	3045507

⁽¹⁾ Nozzle Bergonzo type B5 45° SA

⁽²⁾ Nozzle Fluidics type N2 45°

For more information please contact Riello Burners Commercial and Technical Department, our Application Engineers will be pleased to help you.

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
RLS 310-410-510-610/M MX	RWF 50.2 - Basic version with 3 position output	20073595
RLS 310-410-510-610/M MX	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
RLS 310-410-510-610/M MX	Temperature PT 100	-100 ÷ 500°C	3010110
	Pressure 4 ÷ 20 mA	0 ÷ 2,5 bar	3010213
	Pressure 4 ÷ 20 mA	0 ÷ 16 bar	3010214

ANALOG CONTROL SIGNAL CONVERTER



BURNER	TYPE (INPUT SIGNAL)	CODE
RLS 310-410-510-610/M MX	0/2 - 10 V (impedance 200 KΩ) 0/4 - 20 mA (impedance 250 Ω)	20074479

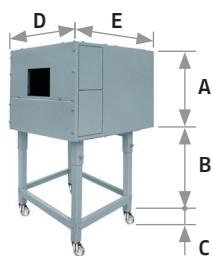
POTENTIOMETER



BURNER	CODE
RLS 310-410-510-610/M MX	20096322

It is necessary for analogic control signal converter operation.

SOUND PROOFING BOX



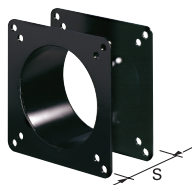
If noise emission needs reducing even further, sound-proofing boxes are available. In case of generator heights, where a lower dimension "B" is required, ask for the Box Support Kit code 20065135.

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
RLS 310/M MX RLS 410/M MX	C7	1255	160 - 980	110	1140	1345	10	3010376
RLS 510/M MX RLS 610/M MX	C7 plus	1255	160 - 980	110	1240	1345	10	20085111

(*) 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
RLS 310-410-510-610/M MX	180	20008903

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
RLS 310-410-510-610/M MX	20074542

Gas train accessories

STABILISER SPRING



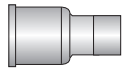
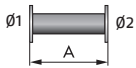
To vary the pressure range of the gas train stabilisers, accessory springs are available. The following table shows these accessories with their application range. Please refer to the technical manual for the correct choice of spring.

GAS TRAIN	SPRING COLOUR	SPRING Pressure range mbar	SPRING CODE
MBC 1900/1 MBC 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	100 - 150	3090487
CB 5065/1 CB 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

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

SEAL CONTROL KIT RLS 310-410-510-610/M MX



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 maximum 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 RIS/M MX series. Below 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	LS	510	/M	MX	TC	FS1	3/230-400/50	230/50-60	
BASIC DESIGNATION									
EXTENDED DESIGNATION									

AVAILABLE BURNER MODELS

MODEL	HEAT OUTPUT			TOTAL ELECTRICAL POWER (kW)	CERTIFICATION
	(kW)	LIGHT OIL (kg/h)	NATURAL GAS (Nm ³ /h)		
RLS 310/M MX TC 3/230/50	600/1200-3600	50/100-305	60/120-360	10,9 (oil) 9,1 (gas)	CE 0085CQ0196
RLS 310/M MX TC 3/400/50	600/1200-3600	50/100-305	60/120-360	10,9 (oil) 9,1 (gas)	CE 0085CQ0196
RLS 310/M MX TC 3/400/50	600/1200-3600	50/100-305	60/120-360	10,9 (oil) 9,1 (gas)	CE 0085CQ0196
RLS 410/M MX TC 3/230/50	640/1500-4200	55/126-352	64/150-420	12,6 (oil) 10,8 (gas)	CE 0085CQ0196
RLS 410/M MX TC 3/400/50	640/1500-4200	55/126-352	64/150-420	12,6 (oil) 10,8 (gas)	CE 0085CQ0196
RLS 410/M MX TC 3/400/50	640/1500-4200	55/126-352	64/150-420	12,6 (oil) 10,8 (gas)	CE 0085CQ0196
RLS 510/M MX TC 3/400/50	660/1800-5170	55/195-435	66/180-517	15,8 (oil) 14 (gas)	CE 0085CQ0196
RLS 610/M MX TC 3/400/50	1000/2200-6155	86/185-516	100/220-615,5	18,8 (oil) 17 (gas)	CE 0085CQ0196

STATE OF SUPPLY

Monoblock forced draught dual fuel burners with modulating operation, fully automatic, made up of:

- High performance fan
- 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 2800 rpm, three-phase, 400V, 50Hz
- Low emission 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
 - flame stability disk
- Mechanical cam with gas and oil modulator
- Maximum gas pressure switch, with pressure test point, to stop the burner in the case of over pressure on the fuel supply line
- Flame control panel for controlling the system safety
- UV flame sensor
- Star/delta starter or direct starter (RLS 310-410) for the fan motor
- Main electrical supply terminal board
- Burner on/off switch
- Burner working led signal
- Contacts motor and thermal relay with release button
- Motor internal thermal protection
- Burner failure led signal and lighted release button
- Volt free contact to remote burner's operation and lock-out signals
- Burner opening hinge
- Lifting rings
- IP 54 electric protection level
- Light oil gears pump for high pressure fuel supply
- Dedicated pump starting motor
- Valve unit with double oil safety valve on the output circuit and double safety valve on the return circuit
- Maximum an minimum oil pressure switches
- Oil pressure gauges on supply and return oil lines
- Oil/Gas selector
- Flame inspection window.

Standard equipment:

- 1 flange gasket for gas train adaptor
- 1 adaptor for gas train
- 4 screws for fixing the flange
- 1 thermal screen
- 4 screws for fixing the burner flange to the boiler
- 2 flexible pipes for connection to the oil supply network
- 2 nipples for connection to the pump with gaskets
- 8 gas nozzles (only for RLS 310/M)
- Instruction handbook for installation, use and maintenance
- Spare parts catalogue.

Gas train

Fuel supply line, in the MULTIBLOC configuration (for a diameter of 1-1/2" and 2") or COMPOSED configuration (from a diameter of DN 65 until a diameter of DN 125), fitted with:

- Filter
- Stabiliser
- Minimum gas pressure switch
- Safety valve
- One stage working valve with ignition gas output regulator.

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)
- EN 267 (oil burners).

Available accessories to be ordered separately:

- Power controller
- Probe
- Analog control signal converter
- Potentiometer
- Continuous ventilation kit
- Sound proofing box
- Spacer kit
- Adapters
- Seal Control kit
- Stabiliser spring.

NOTES

[illegible]

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

07/2016

TS0106UK00



[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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