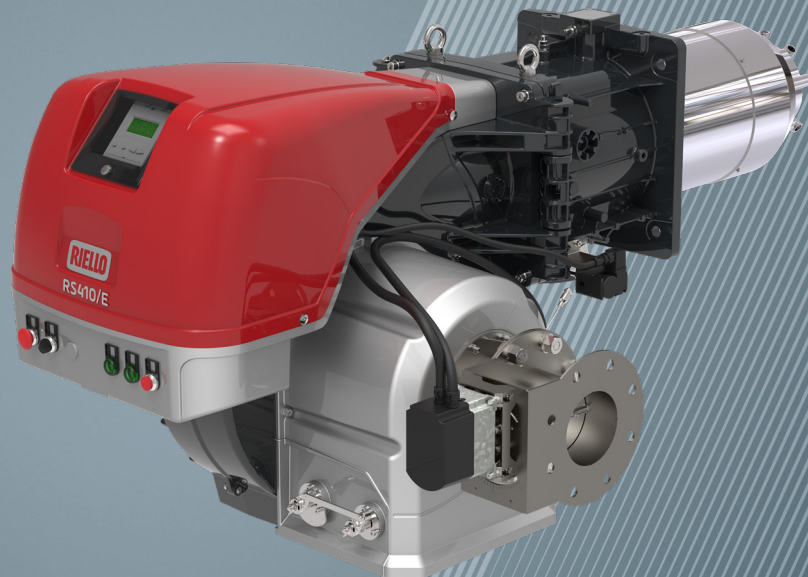


NEW



RS/E – /EV FGR SERIES

Monoblock FGR Burners
Ultra Low NOx Gas Burners – NOx < 30 mg/Nm³

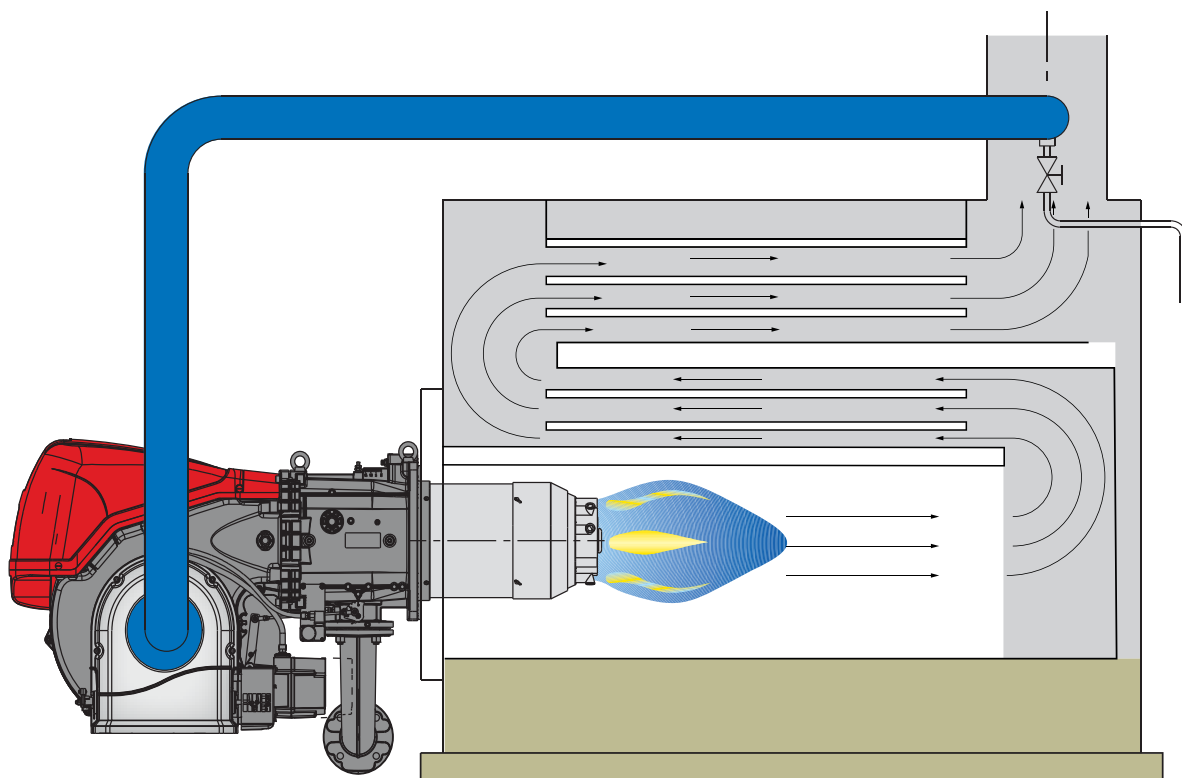
Product Overview

FGR TECHNOLOGY

DUE TO THE SIGNIFICANT INCREASE OF POLLUTANTS IN THESE LAST YEARS, ATTENTION TO PERFORMANCE, ENERGY EFFICIENCY AND EMISSION REDUCTION ARE BECOMING MORE IMPORTANT ALL AROUND THE WORLD, IN PARTICULAR IN ALL THE HIGHLY INDUSTRIALIZED COUNTRIES.

In order to comply WITH the increasing demand of very low NO_x emissions, RIELLO has developed a new range of Monoblock and Dual Block burners, equipped with advanced Low NO_x combustion heads and with the FGR (Flue gas Recirculation) low emission technology, which are suitable to achieve the most restrictive emission limits.

FGR TECHNOLOGY IS BASED ON THE RECIRCULATION OF A PART OF THE EXHAUST GAS, WHICH IS INTRODUCED IN THE AIR INLET SIDE OF THE BURNER; AN INTEGRATED DIGITAL BURNER MANAGEMENT SYSTEM, THROUGH THE ACTION OF INDEPENDENT SERVOMOTORS, ALLOWS THE CONTROL OF AIR, FUEL AND EXHAUST GAS PROPORTION IN EVERY WORKING POINT, IN ORDER TO REACH VERY LOW NO_x EMISSIONS, WHILE MAINTAINING HIGH RELIABILITY AND SAFETY OF OPERATION.



ULTRA LOW NOX GAS FGR MONOBLOCK BURNERS RS 410÷2000/E - /EV FGR SERIES

With many years of experience in the design and manufacture of Burners, Riello has developed a new range of Commercial and Industrial products, the New RS/E-/EV FGR Series, based on FGR (Flue gas Recirculation) low emission technology, suitable to achieve extremely Low NOx emission performance, lower than 30 mg/Nm³ @ 3.5% O₂.

The RS/E-/EV FGR burners series operation is based on a Digital Burner Management

System, which is able to manage the air-fuel ratio by independent servomotors in order to obtain a perfect output control and to assure a correct low polluting combustion and a safe operation on all modulation range.

The monoblock configuration allows having all the components integrated in a compact size, in order to facilitate and make extremely easy the installation and maintenance.



BURNER MODEL

RS 410/E-EV FGR	595 ÷ 1210/3820	kW
RS 510/E-EV FGR	660 ÷ 1800/4800	kW
RS 610/E-EV FGR	912 ÷ 2200/5850	kW
RS 810/E-EV FGR	1100 ÷ 3500/6990	kW
RS 1000/E-EV FGR	1100 ÷ 4000/10100	kW
RS 1200/E-EV FGR	1500 ÷ 5500/11100	kW
RS 1300/E-EV FGR	2500 ÷ 7500/13000	kW
RS 1600/E-EV FGR	3065 ÷ 9503/15560	kW
RS 2000/E-EV FGR	4000 ÷ 12000/19500	kW

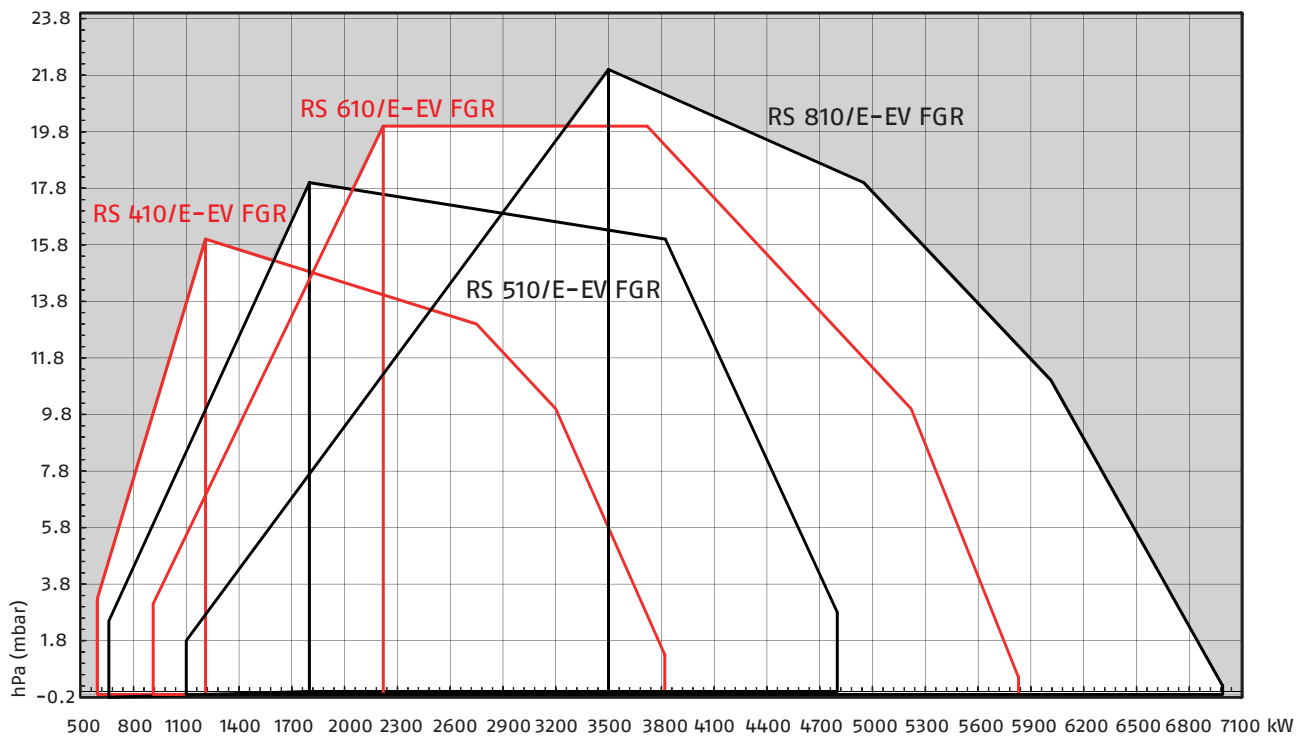
FIRING RATES

Please note: it is important to be aware that the use of the Flue Gas Recirculation (FGR) function, in order to achieve an ULTRA Low NO_x emission performance, might lower the burner's maximum output, because the maximum amount of combustion air that can be introduced will be reduced, and so the oxygen concentration.

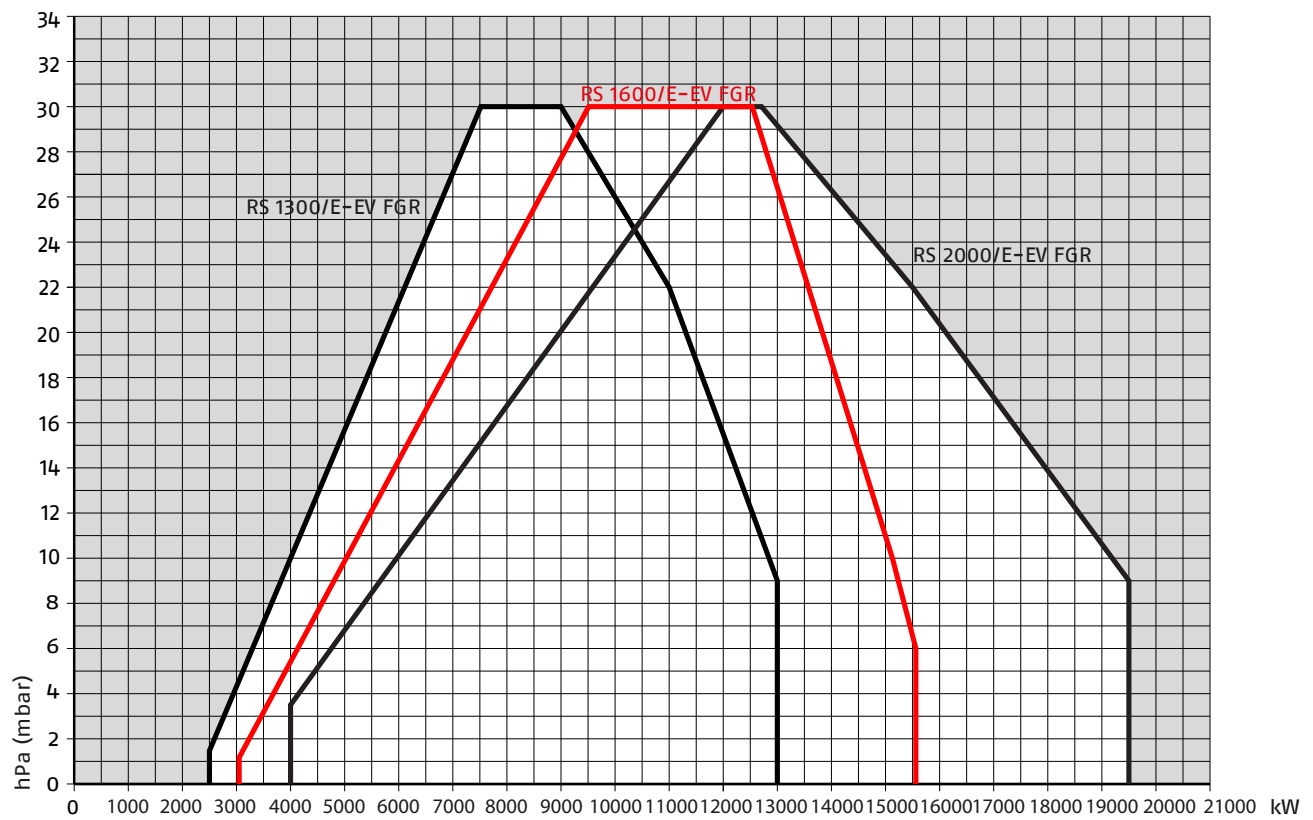
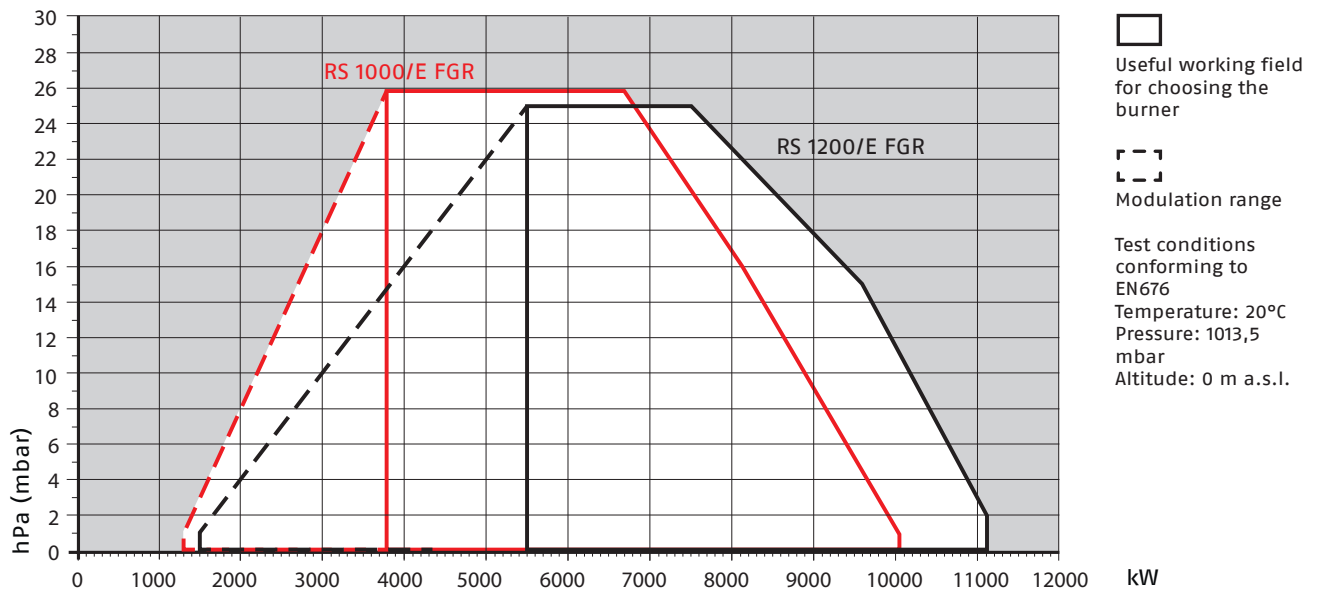
The shown firing rates are obtained in special test boilers, according to EN 676

regulation and referred to a Low NO_x performance conforming to the Class 3 of EN676, with 0% of Flue Gas Recirculation; by increasing the recirculation % in order to achieve an ULTRA Low NO_x emission the burner's maximum output will be reduced.

A Flue Gas Recirculation % needed to obtain an Ultra Low NO_x performance of 30 mg/Nm³ will involve a maximum output reduction of at list 20%.



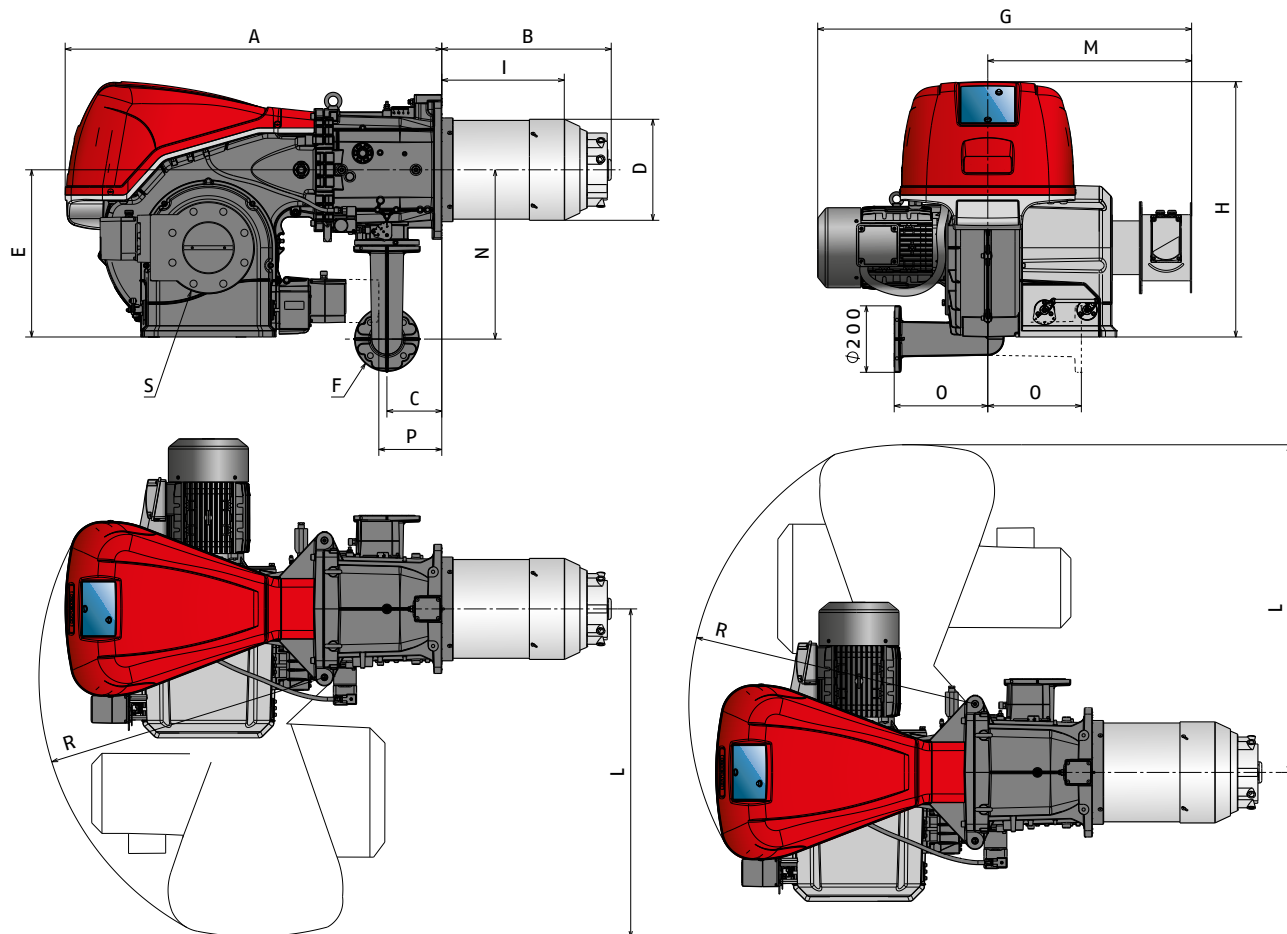
Test conditions
conforming to EN676
Temperature: 20°C
Pressure: 1013,5 mbar
Altitude: 0 m a.s.l.



OVERALL DIMENSIONS (mm)

BURNER

RS 410-610/E-EV FGR



MODEL	A	B	C	D	E	F*	G	H	I	L	M	N	O	P**	R	S
RS 410/E-EV FGR	1178	517	178	313	520	DN65	1140	790	340	1015	615	528	290	177	890	DN100
RS 510/E-EV FGR	1260	517	178	313	520	DN65	1140	790	360	1015	620	528	290	177	890	DN125
RS 610/E-EV FGR	1260	517	178	336	520	DN65	1215	790	365	1015	632	528	290	177	890	DN150

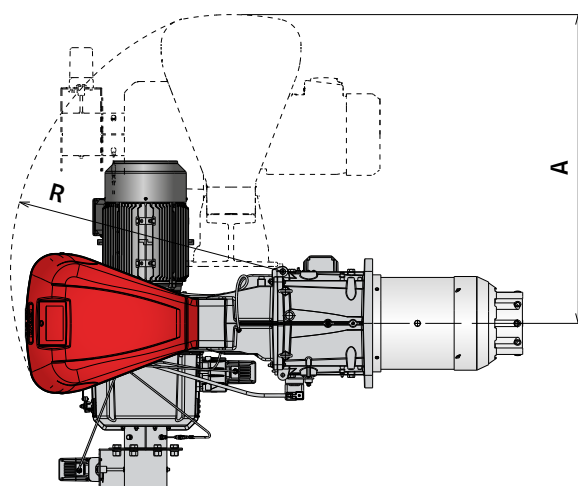
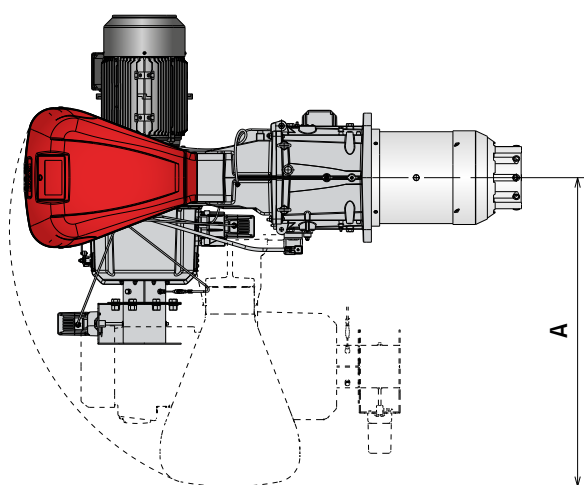
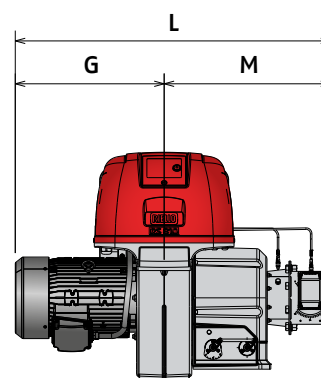
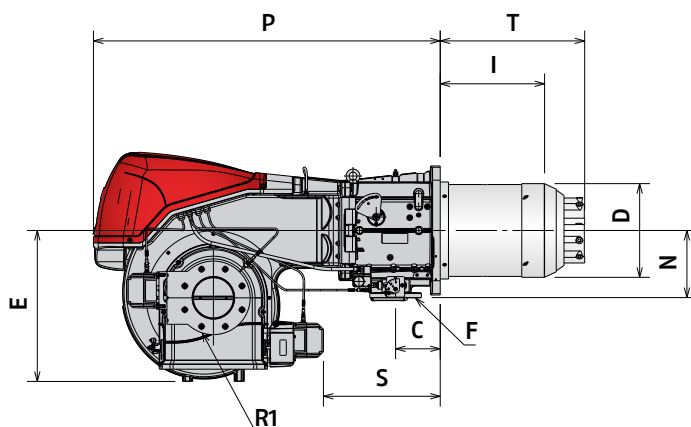
* The gas adaptor is set also for DN 80 bore.

** Maximum position for the extraction of the servomotor cover.

OVERALL DIMENSIONS (mm)

BURNER

RS 810/E-EV FGR

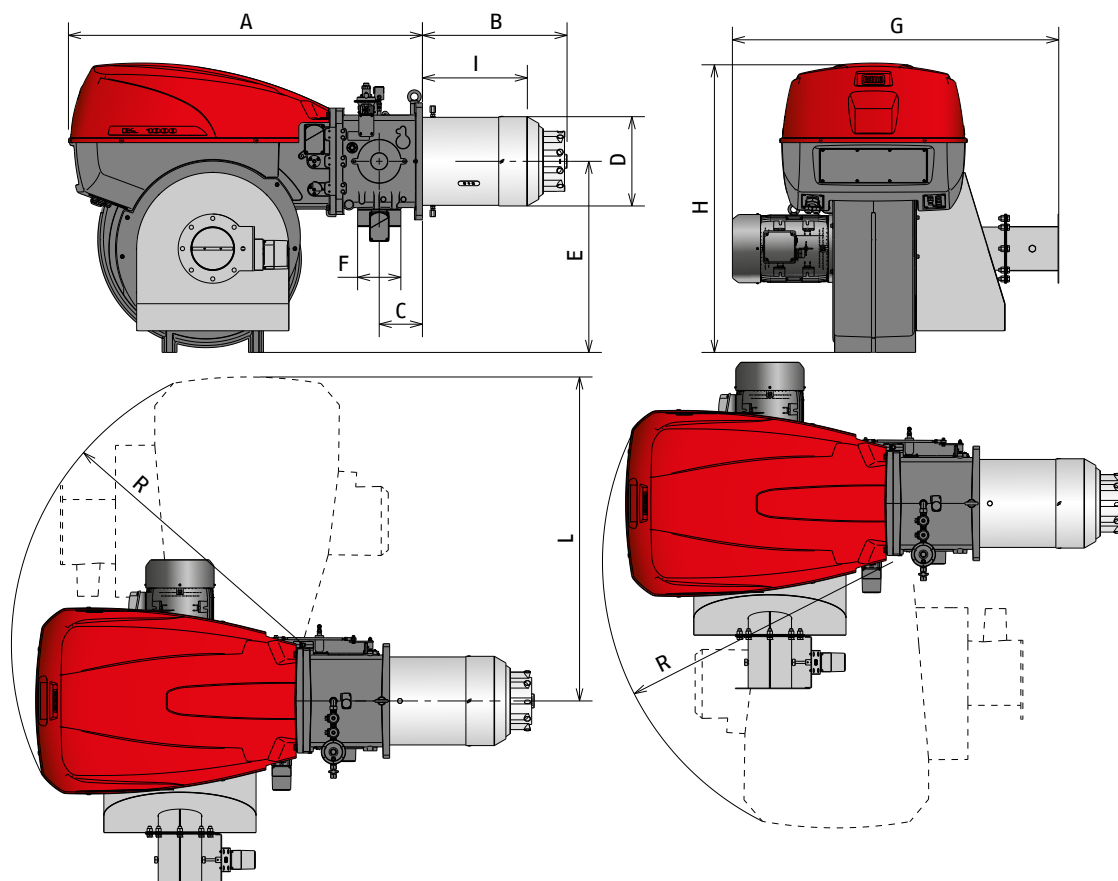


MODEL	A	C	D	E	F	G	I	L	M	N	P	R	R1	S	T
RS 810/E-EV FGR	1197	173	363	585	DN80	577	405	1222	645	260	1345	1055	6" - DN 150	450	558

OVERALL DIMENSIONS (mm)

BURNER

RS 1000-1200/E-EV FGR

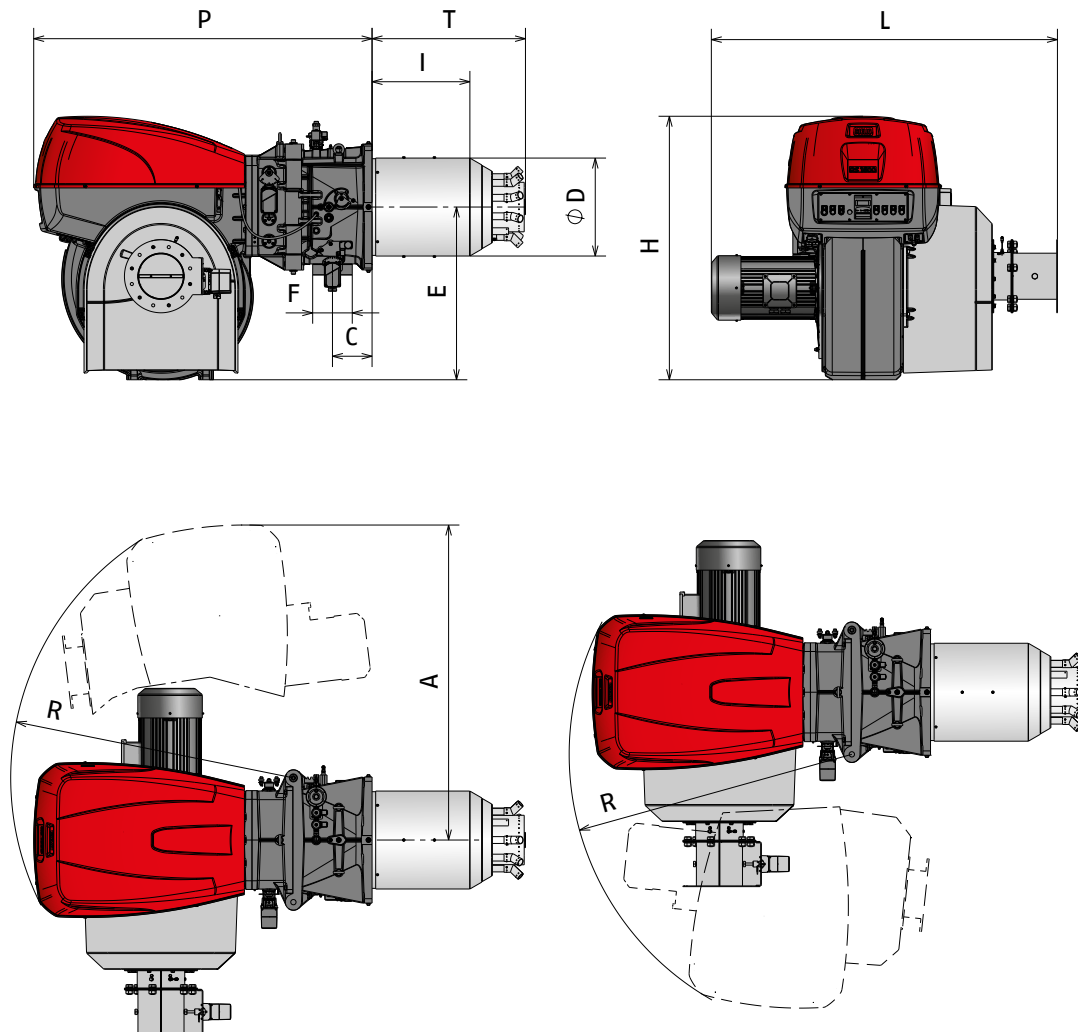


MODEL	A	B	C	D	E	F	G	H	I	L	R
RS 1000/E-EV FGR	1637	669	200	413	885	DN80	1510	1338	485	1493	1350
RS 1200/E-EV FGR	1637	670	200	456	885	DN80	1630	1338	463	1493	1350

OVERALL DIMENSIONS (mm)

BURNER

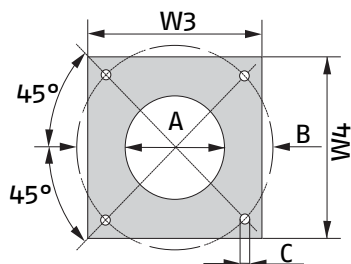
RS 1300-1600-2000/E-EV FGR



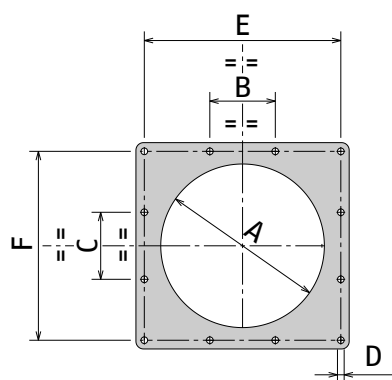
MODEL	A	C	D	E	F	H	I	L	P	R	T
RS 1300/E-EV FGR	1782	220	544	960	DN80	1463	383	1928	1880	1565	613
RS 1600/E-EV FGR	1785	220	544	960	DN100	1463	544	1922	1880	1565	852
RS 2000/E-EV FGR	1782	220	590	960	DN100	1463	562	1922	1880	1565	852

OVERALL DIMENSIONS (mm)

BURNER - BOILER MOUNTING FLANGE

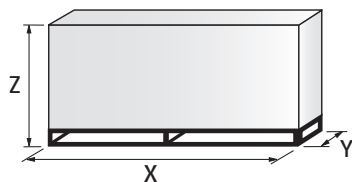


MODEL	A	B	C	W3	W4
RS 410/E-EV FGR	335	452	M18	400	430.5
RS 510/E-EV FGR	335	452	M18	400	430.5
RS 610/E-EV FGR	350	452	M18	400	430.5
RS 810/E-EV FGR	400	495	M18	530	530
RS 1000/E-EV FGR	460	608	M20	530	530
RS 1200/E-EV FGR	500	608	M20	530	530



MODEL	A	B	C	D	E	F
RS 1300/E-EV FGR	580	215	220	M20	645	620
RS 1600/E-EV FGR	580	215	220	M20	645	620
RS 2000/E-EV FGR	580	215	220	M20	645	620

PACKAGING



MODEL	X	Y	Z	kg
RS 410/E-EV FGR	2040	1280	1125	265
RS 510/E-EV FGR	2040	1280	1125	265
RS 610/E-EV FGR	2040	1280	1125	295
RS 810/E-EV FGR	2150	1070	1425	320
RS 1000/E-EV FGR	2640	1700	1750	450
RS 1200/E-EV FGR	2640	1700	1750	470
RS 1300/E-EV FGR	2960	1750	1800	1180
RS 1600/E-EV FGR	2960	1750	1800	1180
RS 2000/E-EV FGR	2960	1750	1800	1220

SPECIFICATION

DESIGNATION OF SERIES

Series:	R
Fuel:	S Natural Gas
	L Light oil
	LS Light oil/Natural Gas
	N Heavy oil
Size:	
Setting:	/1 Single stage
	/B Two stage
	/M Modulating-Mechanical cam
	/E Electronic cam
	/P Proportioning air/gas valve
	/EV Electronic cam predisposed for variable speed (with inverter)
	/EVi Electronic cam with integrated inverter
Emission:	... or C01 Class 1 EN676
	MZ Class 2 EN676
	BLU Class 3 EN676
	MX Class 3 EN676
	FGR Ultra Low NOx
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	410	/E	FGR	TC	FS1	3/400/50	230/50-60
BASIC DESIGNATION				EXTENDED DESIGNATION				

SPECIFICATION

STATE OF SUPPLY

Monoblock forced draught, Ultra Low NOx gas burner with Flue Gas Recirculation (FGR) system, with modulating operation, fully automatic, made up of:

- High performance fan with low sound emissions
- Air suction circuit
- Air damper for air setting controlled by a high precision servomotor
- Air pressure switch
- Three-phase Fan starting motor
- 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
 - flame stability disk
- Automatic regulator for gas delivery, controlled by a high precision servomotor
- Burner Pilot Ignition system, with dedicated gas train (on RS 1000-2000/E-EV FGR models), to assure a high ignition reliability
- Flue gas recirculation butterfly valve controlled by a high precision servomotor
- Flue gas recirculation temperature probe to prevent condensation in burner intake
- Maximum gas pressure switch, with pressure test point, to stop the burner in the case of excess pressure on the fuel supply line
- LMV51.300 Digital Burner Management System,
 - for control of air, fuel and exhaust gas proportion in every working point
 - for output modulation with incorporated PID control of temperature or pressure of the heat generator
 - with indication of operating status and parameters, error messages and diagnosis of fault causes
- Operator panel with LCD Display Interface, for combustion system commissioning and monitoring
- Burner safety control included on Electronic Cam device
- UV sensor for flame detection
- Main electrical supply terminal board
- Burner on/off switch
- Manual or automatic output increase/decrease switch
- Contacts motor and thermal relay with release button
- Motor internal thermal protection
- Clean contacts relay
- Burner failure led signal and lighted release button
- Hinge for opening the burner and inspecting the combustion head
- Lifting rings

Standard equipment:

Thermal insulation screen

- Screws to fix the burner flange to the boiler
- Screws to fix the gas train flange
- Gasket for gas train flange
- Pressure switch for leak detection control of gas train
- Spare parts catalogue
- Instruction handbook for installation, use and maintenance

AVAILABLE MODELS

BURNERS

CODE	MODEL			HEAT OUTPUT NATURAL GAS		TOTAL ELECTRICAL POWER (kW)	CERTIFICATION	NOTE
				(kW)	(Nm ³ /h)			
On demand	RS 410/E FGR	TC FS1	3/400/50	595/1210 - 3820	50/150 - 445	10,6	CE-0123CU1034	(1)(2)(4)
On demand	RS 510/E FGR	TC FS1	3/400/50	660/1800 - 4800	68/180 - 525	13,9	CE-0123CU1034	(1)(3)(4)
On demand	RS 610/E FGR	TC FS1	3/400/50	912/2200 - 5850	100/220 - 625	16,9	CE-0123CU1034	(1)(3)(4)
On demand	RS 810/E FGR	TC FS1	3/400/50	1100/3500 - 6990	120/350 - 700	24	CE-0123CU1078	(1)(3)(4)
On demand	RS 1000/E FGR	TC FS1	3/400/50	1100/4000 - 10100	110/400 - 1010	25,7		(1)(3)(4)
On demand	RS 1200/E FGR	TC FS1	3/400/50	1500/5500 - 11100	150/550 - 1110	28,7		(1)(3)(4)
On demand	RS 1300/E FGR	TC FS1	3/400/50	2500/7500 - 13000	250/750 - 1300	34,7		(1)(3)(4)
On demand	RS 1600/E FGR	TC FS1	3/400/50	3065/9503 - 15560	307/950 - 1556	41,5		(1)(3)(4)
On demand	RS 2000/E FGR	TC FS1	3/400/50	4000/12000 - 19500	400/1200 - 1950	49,3		(1)(3)(4)
On demand	RS 410/EV FGR	TC FS1	3/400/50	595/1210 - 3820	50/150 - 445	10,6	CE-0123CU1034	(1)(4)
On demand	RS 510/EV FGR	TC FS1	3/400/50	660/1800 - 4800	68/180 - 525	13,9	CE-0123CU1034	(1)(4)
On demand	RS 610/EV FGR	TC FS1	3/400/50	912/2200 - 5850	100/220 - 625	16,9	CE-0123CU1034	(1)(4)
On demand	RS 810/EV FGR	TC FS1	3/400/50	1100/3500 - 6990	120/350 - 700	24		(1)(4)
On demand	RS 1000/EV FGR	TC FS1	3/400/50	1100/4000 - 10100	110/400 - 1010	25,7		(1)(4)
On demand	RS 1200/EV FGR	TC FS1	3/400/50	1500/5500 - 11100	150/550 - 1110	28,7		(1)(4)
On demand	RS 1300/EV FGR	TC FS1	3/400/50	2500/7500 - 13000	250/750 - 1300	34,7		(1)(4)
On demand	RS 1600/EV FGR	TC FS1	3/400/50	3065/9503 - 15560	307/950 - 1556	41,5		(1)(4)
On demand	RS 2000/EV FGR	TC FS1	3/400/50	4000/12000 - 19500	400/1200 - 1950	49,3		(1)(4)

(1) Power range referred to a Low NO_x performance conforming to the Class 3 of EN676 European Standard, with 0% of Flue Gas Recirculation; by increasing the recirculation % in order to achieve an ULTRA Low NO_x emission the burner's maximum output will be reduced

(2) Direct starter fan motor

(3) Star delta fan motor starter

(4) According to 2016/426/EU - 2014/35/EU - 2014/30/EU - 2014/68/EU - 2006/42 EC Directive.

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

AVAILABLE MODELS

GAS TRAINS

CODE	GAS TRAIN		ADAPTER CODE		
	MODEL	Ø	RS 410	RS 510	RS 610
3970250*	MB 415/1 - RT 52	Rp 1" 1/2	●	●	●
3970257*	MB 420/1 - RT 52	Rp 2"	●	●	●
20137718*	VGD 50/1 - RT 122 (1)	Rp 2"	3000826 + 20042324		●
20140762*	VGD 65/1 - FT 122	DN 65 (2)		□	
20140763*	VGD 80/1 - FT 122	DN 80		□	
20169193*	VGD 100/1 - FT 122	DN 100		3010370	
20169195*	VGD 125/1 - FT 122	DN 125		3010224	

* 230V/50Hz - 220V/60Hz electrical supply.

** 230V/50Hz electrical supply.

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

The seal control function is managed by REC control box, by installation on gas train of a pressure switch (please see Gas train accessories paragraph).

To select the gas train please refer to the instruction manual.

(1) Additional flange kit code 20185515 needed for seal control function

(2) Øin = DN 65, Øout = DN 80.

● Not available.

□ Additional adapter not necessary, the gas train may be connected directly to the burner.

CODE	GAS TRAIN		ADAPTER CODE		
	MODEL	Ø	RS 810	RS 1000	RS 1200
20137718*	VGD 50/1 - RT 122 (1)	Rp 2"	●	●	●
20140762*	VGD 65/1 - FT 122	DN 65 (2)	20059331 / (3010222+20059331) (3)	●	●
20140763*	VGD 80/1 - FT 122	DN 80	20059331 / (3010222+20059331) (3)	20066268 / (3010222 + 20066268) (3)	
20169193*	VGD 100/1 - FT 122	DN 100	20059332 / (3010223+20059331) (3)	20066278 / (3010223 + 20066268) (3)	
20169195*	VGD 125/1 - FT 122	DN 125	20059333 / (3010224+20059331) (3)	20066284 / (3010224 + 20066268) (3)	

* 230V/50Hz - 220V/60Hz electrical supply.

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

The seal control function is managed by LMV control box, by installation on gas train of a pressure switch supplied, as standard equipment with the burner.

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

(1) Additional flange kit code 20185515 needed for seal control function

(2) Øin = DN 65, Øout = DN 80.

(3) To be used with gas train and burner opening on the left (fan motor side).

CODE	GAS TRAIN		ADAPTER CODE		
	MODEL	Ø	RS 1300	RS 1600	RS 2000
20137718*	VGD 50/1 - RT 122 (1)	Rp 2"	●	●	●
20140762*	VGD 65/1 - FT 122	DN 65 (2)	●	●	●
20140763*	VGD 80/1 - FT 122	DN 80	●	●	●
20169193*	VGD 100/1 - FT 122	DN 100	20130602	20130616	
20169195*	VGD 125/1 - FT 122	DN 125	20130606	20130617	

(1) Additional flange kit code 20185515 needed for seal control function

(2) Øin = DN 65, Øout = DN 80.

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

BURNER ACCESSORIES

ACCESSORIES FOR MODULATING OPERATION

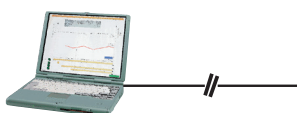


The control box of RS /E-EV FGR Burners includes the three point PID regulator to obtain the modulating operation.

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

BURNER	PROBE TYPE	RANGE (°C) (bar)	PROBE 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 ÷ 25 bar	3090873

PC INTERFACE SOFTWARE



PC tool for convenient programming and burner settings, process visualization, data recording, selection of AZL language, software update AZL.

BURNER	KIT CODE
RS 410 - 510 - 610 - 810/E-EV FGR	On demand
RS 1000 - 1200/E-EV FGR	
RS 1300 - 1600 - 2000/E-EV FGR	

STABILISER SPRING

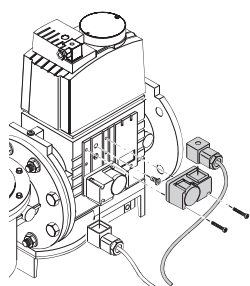


Accessory springs are available to vary the pressure range of the gas train stabilisers. The following table shows these accessories with their application range.

Please refer to the technical manual for the correct choice of spring.

GAS TRAIN	SPRING COLOUR	SPRING PRESSURE RANGE mbar	SPRING CODE
VGD/1 series	Neutral	0 - 22	20181839
	Yellow	15 - 120	20141900
	Red	100 - 250	20141901

PVP (PRESSURE VALVE PROVING) KIT*



The seal control function is included on Burner Digital Management System, it is only necessary to add the PVP kit on the gas train.

The PVP is included as standard equipment on RS 810-1000-1200-1300-1600-2000/E-EV FGR models.

GAS TRAIN	KIT CODE
All MB models, VGD 65/1 - 80/1 - 100/1 - 125/1	3010344 (*)
VGD 50/1	3010344 + 20185515 (**)

(*) Code 3010344 not necessary for RS 810-1000-1200-1300-1600-2000/E-EV FGR, where it is included as a standard.

(**)Code 20185515 always needed in case of seal control needed for VGD 50/1 gas train. Code 3010344 not necessary for RS 810-1000-1200-1300-1600-2000/E-EV FGR, where it is included as a standard.

RIELLO S.p.A. – 37045 Legnago (VR)
tel. +39 0442 630111
www.riello.com

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