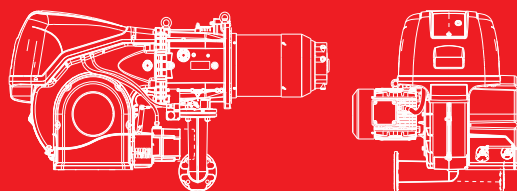


RS 280–510/E–/EV Series

Low NOx Modulating Gas Burners

RS 280/E–/EV	1050	–	10500 (9450*)	MBtu/hr
RS 310/E–/EV	1375	–	13600 (12240*)	MBtu/hr
RS 410/E–/EV	1635	–	16100 (14490*)	MBtu/hr
RS 510/E–/EV	2000	–	19200 (17280*)	MBtu/hr

* Firing rate for C-ETL Canadian Listing



The high power Burners Series RS, are the result of intensive activities of technical research and considerable investment, carried out in recent years, which 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 company's commitment to deliver performance, quality and reliability is once again demonstrated by the introduction of the new 280-310-410 and 510 high power R series burner models, in the 1050 – 20000 MBtu/hr capacity range, able to summarize and concentrate the best technological expertise of Riello.

The new models RS 280-310-410-510 characterized by Technology, Power and Design, are authentic 'little giants' in the burners scenario; little in size and weight, giants in performance.

This new addition to the R series family of burners is geared to meet the needs of our customer worldwide and specifically in the North American market. Parallel positioning fuel-air ratio control is at heart of the burner and can be enhanced by variable speed drive technology for maximum energy savings. These new models also maintain the Riello product line standards of low excess air operation throughout the firing range and minimal noise emission.

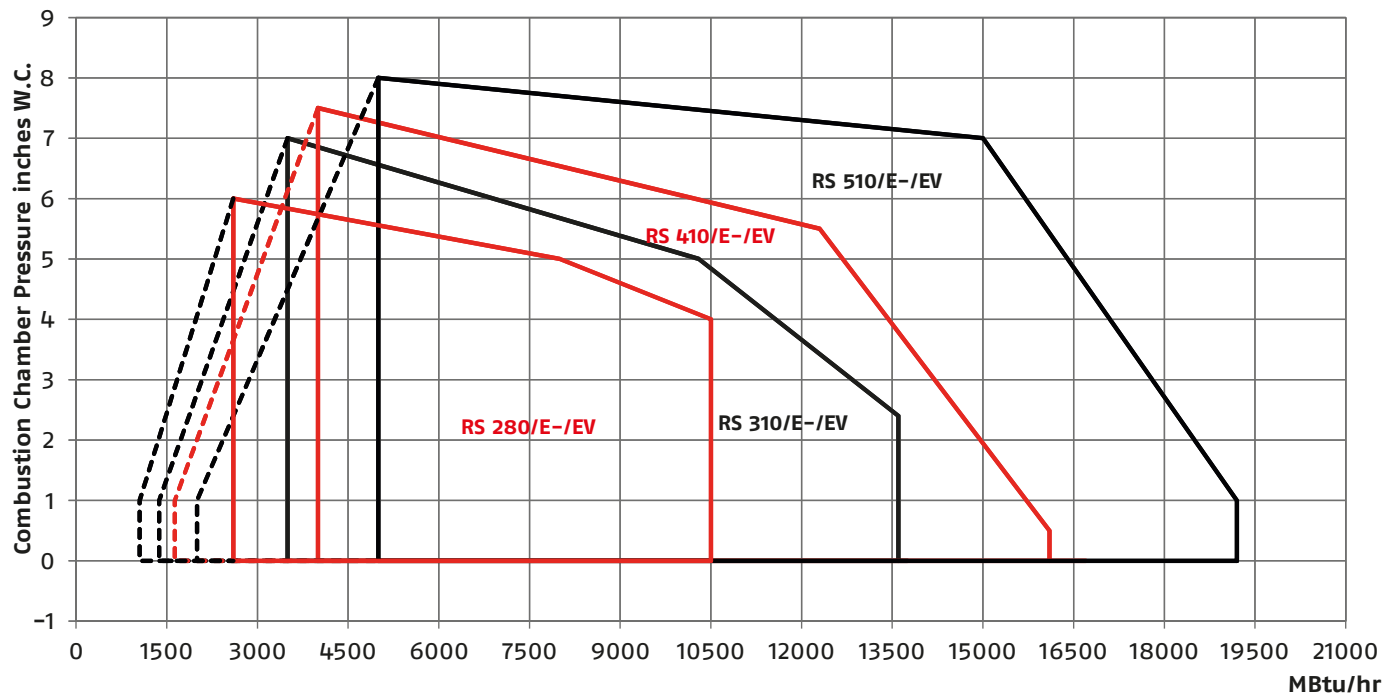
Technical Data

MODEL		RS 280/E-EV	RS 310/E-EV	RS 410/E-EV	RS 510/E-EV
Fuel		Natural gas			
Modes of operation		Modulating			
Firing Rate	MBtu/hr	1050-10500 (9450*)	1375-13600 (12240*)	1635-16100 (14490*)	2000-19200 (17280*)
Pressure at max. delivery (Natural Gas)	"WC	19,1	19,5	26,0	32,6
Primary Control		LMV 37			
Ignition transformer		120V-1.6A / 1x8kV-20mA			
Power Supply (+/- 10%)	V/Ph/Hz	208-230/460/575/3/60			
Fan Motor	rpm	3510	3540	3545	3535
	HP	5.5	10,2	12,4	14,8
	V	208-230/460/575			
	A	12,4/6,2/5	24/12/9,6	29/14,5/11,6	35,4/17,7/14,2
Power Consumption	kW max	5,3	9	10,9	12,9
Electrical protection level		NEMA 3			
Noise levels	dBA	82,7	78,7	82,9	83,6
CO Emission	ppm at 3% O ₂	less than 50			
NOx Emission**	ppm at 3% O ₂	less than 30			
Approvals		ETL			

* Firing rate for C-ETL Canadian Listing

** NOx emissions are verified in our Research Center; not all field applications allow similar performance.
If guaranteed emissions are required please contact Riello Burners Commercial and Technical Department.

Firing Rates



The max. firing rates are based on zero furnace backpressure, ambient temperature of 68 °F, barometric pressure 394 inches w.c. an elevation of 329 ft a.s.l.
For more details and final burner selection refer to applicable installation manual.

Gas train

GAS TRAINS – SELECTION/DESCRIPTION

Siemens gas train are supplied with (2) SSOV, (1) manual ball valve, (1) SKP 25 regulating actuator, (1) lubricated plug valve, low gas pressure switch, 3/8" pilot train including (1) pilot regulator, (1) manual ball valve and (1) SSOV and NO vent valve.

OPERATING PRESSURE (MIN./MAX.)	CODE	SAFETY SHUT-OFF VALVE DESCRIPTION	SIZE	INPUT (MBtu/hr)			
				RS 280/E-EV	RS 310/E-EV	RS 410/E-EV	RS 510/E-EV
3 PSI / 5 PSI	C8317005	Siemens (1) SKP15 (1) SKP25 (2) VGD20.503U	2"	10.500	13.600	16.100	19.200
	C8316817	Siemens (1) SKP15 (1) SKP25 (2) VGG10.504U					
2 PSI / 5 PSI	C8317002	Siemens (1) SKP15 (1) SKP25 (2) VGD40.065U	2 1/2"				
	C8316820	Siemens (1) SKP15 (1) SKP25 (2) VGG10.654U					
1 PSI / 5 PSI	C8317003	Siemens (1) SKP15 (1) SKP25 (2) VGD40.080U	3"				
	C8316822	Siemens (1) SKP15 (1) SKP25 (2) VGG10.804U					

Major components shipped loose for assembly and wiring by others
For lower or higher gas pressure, please contact factory for correct sizing

Ventilation

The ventilation unit comes with a sound proofing system.

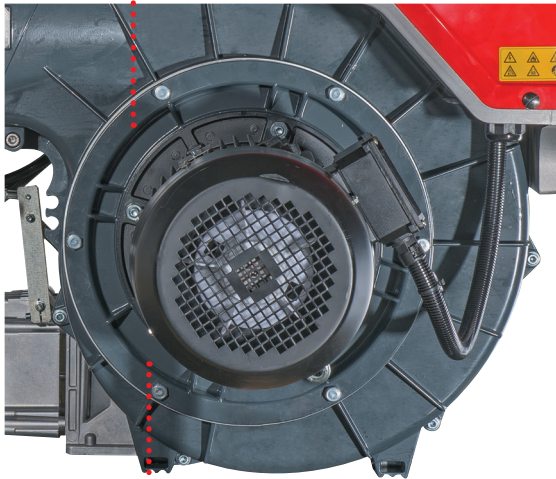
All the burners are fitted with fans, which give excellent performance and are fitted in line with the combustion head. The air flow and sound-deadening materials used in the construction are designed to reduce sound emissions to the minimum and guarantee high levels of performance in terms of output and air pressure.

A high precision servomotor through the main management module installed on each burner, controls the air dampers position constantly.

The RS/EV burners are supplied with the “inverter” technology, which means they are fitted with a device for varying the amount of combustion air through a variable speed action of the fan motor. The burner works at reduced speed, with further benefits in terms of sound emissions, especially during the night when the perception threshold is lower as well decreased power consumption.

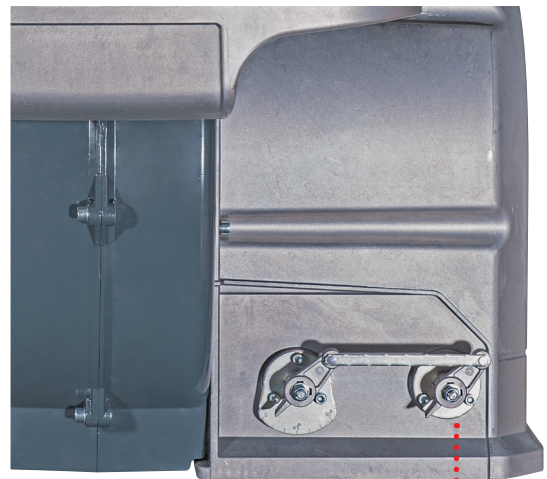
New ventilation structure

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 bearings

Combustion Head

The combustion head adjustment system allows to adapt internal geometry of the head to the output of the burner.

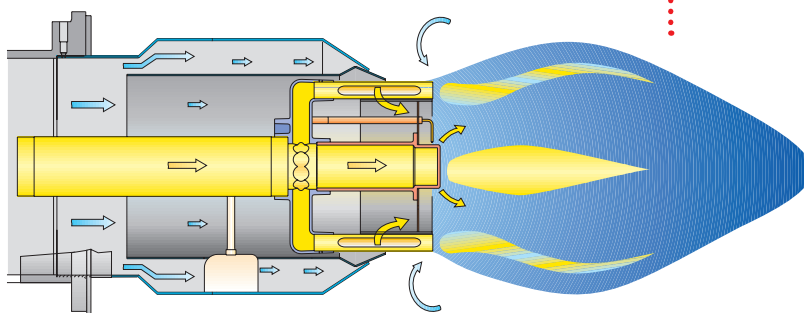
This system guarantees excellent mix on all firing rates range as well as reducing noise and pollutants.



Example of a RS/E-/EV burner combustion head

Safe and Green

Riello Burners experience in combustion technology is very well demonstrated in the combustion head of New RS burner models and assures smooth ignition, safe operation, and environmentally friendly emissions. Riello burners excels in producing burners which perform well with minimal excess air, this enhances system efficiency and reduces greenhouse gas emissions such as CO₂. With oxygen levels of only 3% (*) typical in the products of combustion and turndown ratios of up to 10-1 (*) on natural gas, system efficiencies are truly maximised. In addition to our standard product we also have available Low NO_x models which use an Advanced Combustion Technology in order to reach NO_x values of less than 30ppm (*) during the combustion of natural gas without the requirement of Flue Gas Recirculation; this enhances system efficiency in comparison with traditional FGR systems and reduces system/ installation costs.



(*) NO_x emissions and Modulation ratios are verified in our Research Center; not all field applications allow similar performance. If guaranteed emissions and/or turndown are required please contact Riello Burners Commercial and Technical Department.

Operation

BURNER OPERATION MODE

The RS 280-310-410-510/E-/EV series of burners can have “two-stage progressive” or “modulating” operation, based on an air/fuel ratio control managed by an Electronic cam.



LMV37 Digital Burner Management System

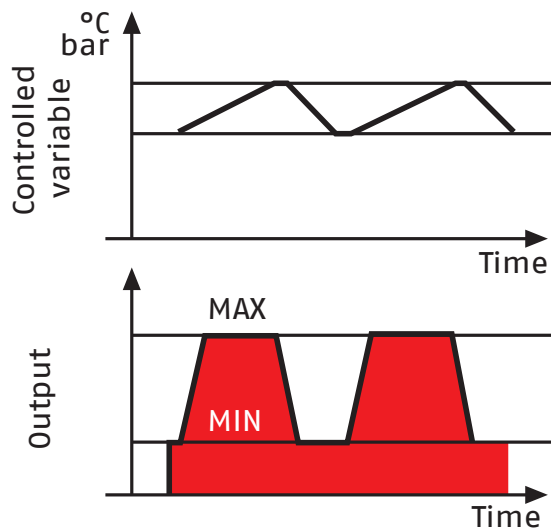


RWF PID Power Controller for modulation control, based on temperature or pressure of the heat generator

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).

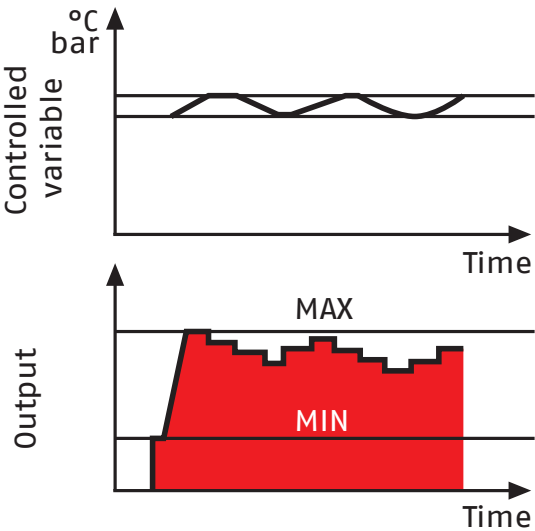
On “modulating” operation, normally required in steam generators, in superheater boilers or diathermic oil burners, a specific regulator and probes are required. These are supplied as accessories that must be ordered separately. The burner can work for long periods at intermediate output levels (see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

“TWO-STAGE PROGRESSIVE” OPERATION



Picture A

“MODULATING” OPERATION



Picture B

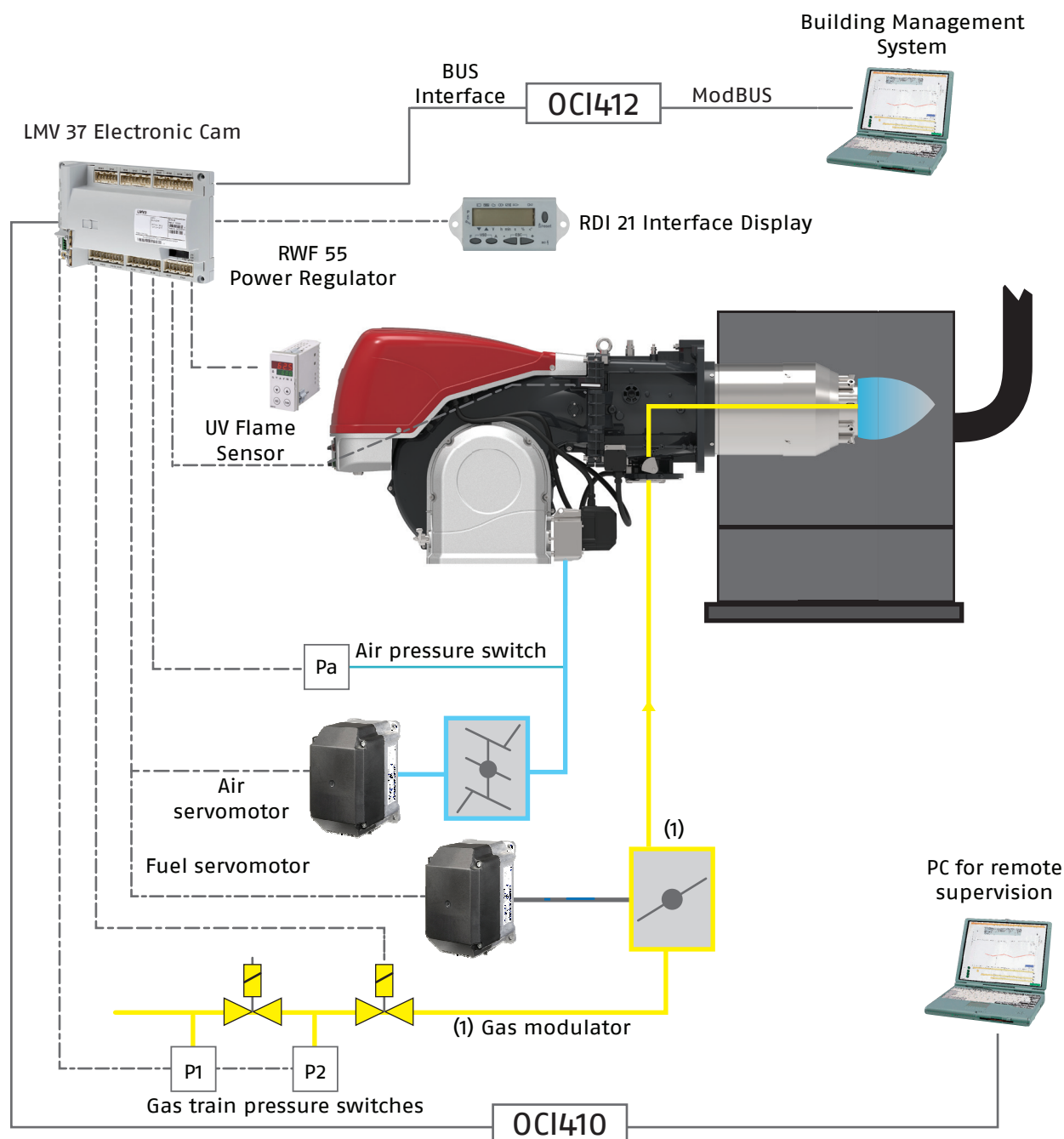
LMV 37 – DIGITAL BURNER MANAGEMENT SYSTEM

Combustion systems are in continuous evolution and high tech solutions related to electronic systems are today utilized to obtain better performances and efficiencies.

The Burner is one of the most important components of the combustion system and its evolution is oriented towards the perfect control of operation.

Riello RS 280-310-410-510/E and /EV burners utilize the LMV37 digital burner management systems providing precise fuel-air ratio control with independent servomotors for modulating fuel valve(s) and air damper.

The LMV37 controls are user friendly and provide maximum safety and reliability.



LMV 37 ELECTRONIC CAM SYSTEM

Function

Intermittent
Two stage progressive operation
Modulating operation with the installation of a PID electronic regulator
Variable speed drive operation
Valve proofing system
Air fuel mixing control
Independent Ignition Point Position
Closed air damper during burner stand-by
Password protection levels
Burner status display
Error message
Error history
Remote lockout reset
Continuous Ventilation
Start without pre-purging
Remote Connections by external OCI410-412 modules
4/20 mA Remote Analogue Control signal
Indication of current burner output DC 0 ... 10 V (alternative to VSD control)

FAN SPEED CONTROL

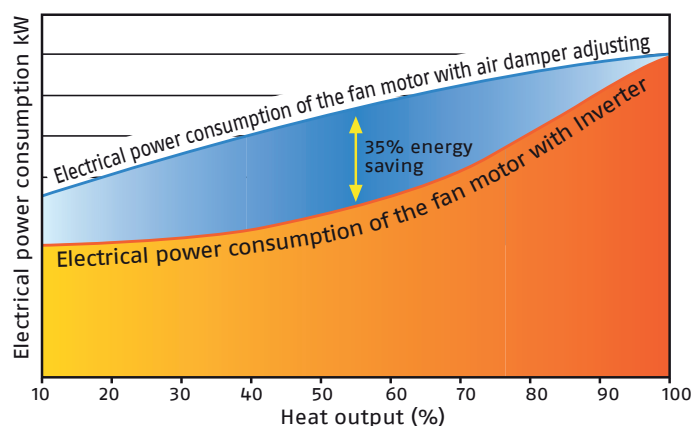
The inverter device fitted to the RS/EV series burner acts on the electrical supply frequency of the fan motor to adjust the air flow through the motor speed variation.

The main advantages of speed control:

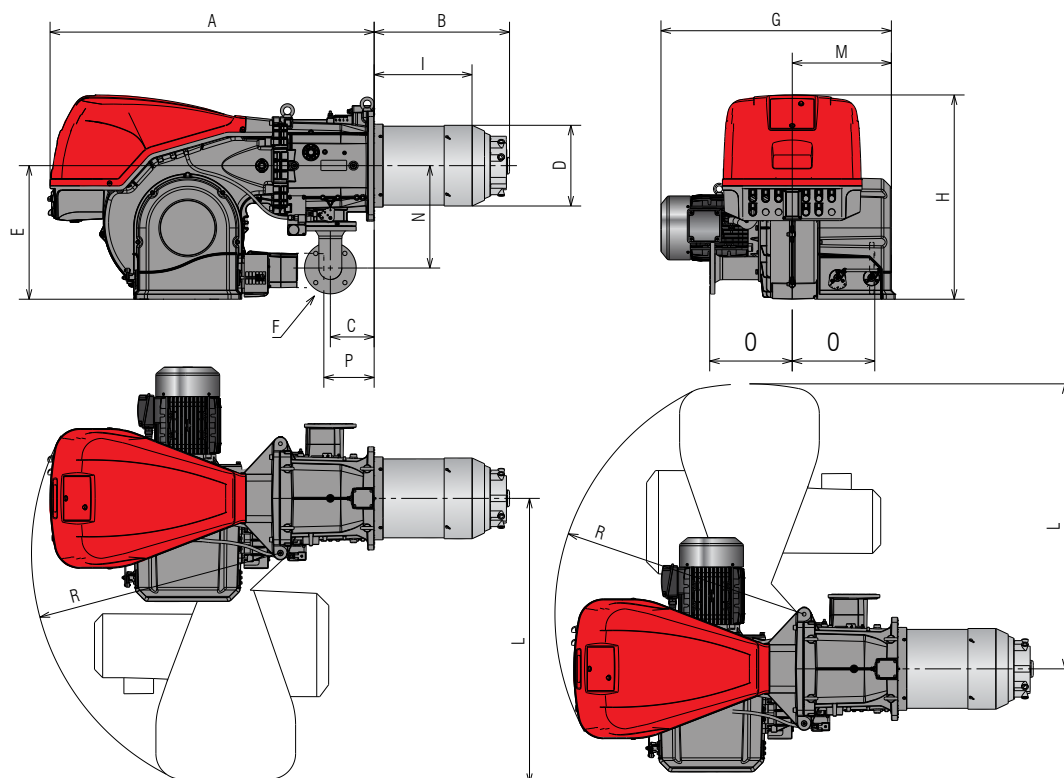
- lower sound emissions
- electric power saving.

The fan motor supplies just the necessary air flow, thus reducing sound emissions and avoiding energy loss due to the air damper regulation mechanism. The inverter technology can save up to 35% of the energy costs.

A safety device to verify the correct speed of the motor is mounted on the air suction circuit of the burner.



Overall Dimensions (inch)

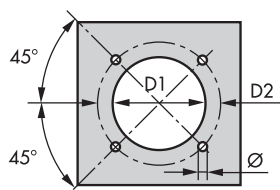


MODEL	A	B	C	D	E	F	G
RS 280/E-/EV	49 ³ / ₄ "	19 ⁹ / ₃₂ "	6 ¹¹ / ₁₆ "	10 ⁵ / ₈ "	20 ¹³ / ₃₂ "	ANSI 3"	33 ¹ / ₄ "
RS 310/E-/EV	49 ³ / ₄ "	20 ²³ / ₆₄ "	6 ¹¹ / ₁₆ "	12 ²¹ / ₆₄ "	20 ¹³ / ₃₂ "	ANSI 3"	36"
RS 410/E-/EV	49 ³ / ₄ "	20 ²³ / ₆₄ "	6 ¹¹ / ₁₆ "	12 ²¹ / ₆₄ "	20 ¹³ / ₃₂ "	ANSI 3"	37 ⁷ / ₈ "
RS 510/E-/EV	49 ³ / ₄ "	20 ²³ / ₆₄ "	6 ¹¹ / ₁₆ "	12 ²¹ / ₆₄ "	20 ¹³ / ₃₂ "	ANSI 3"	38"

MODEL	H	I	L	M	N	O	P	R
RS 280/E-/EV	31"	14"	43 ²⁵ / ₃₂ "	13 ¹³ / ₃₂ "	15 ⁵ / ₈ "	12 ¹⁹ / ₃₂ "	7"	38"
RS 310/E-/EV	31"	14 ¹¹ / ₁₆ "	43 ²⁵ / ₃₂ "	15 ³ / ₄ "	15 ⁵ / ₈ "	12 ¹⁹ / ₃₂ "	7"	38"
RS 410/E-/EV	31"	14 ¹¹ / ₁₆ "	43 ²⁵ / ₃₂ "	5 ³ / ₄ "	15 ⁵ / ₈ "	12 ¹⁹ / ₃₂ "	7"	38"
RS 510/E-/EV	31"	14 ¹¹ / ₁₆ "	43 ²⁵ / ₃₂ "	5 ³ / ₄ "	15 ⁵ / ₈ "	12 ¹⁹ / ₃₂ "	7"	38"

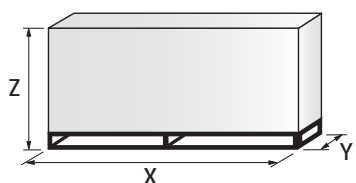
* Maximum depth of the boiler door including the depth of the burner head thermal gasket.

BURNER - BOILER MOUNTING FLANGE



MODEL	D1	D2	Ø
RS 280/E-EV	13 ³ / ₁₆ "	17 ¹³ / ₁₆ "	³ / ₄ " coarse
RS 310/E-EV	13 ³ / ₁₆ "	17 ¹³ / ₁₆ "	³ / ₄ " coarse
RS 410/E-EV	13 ³ / ₁₆ "	17 ¹³ / ₁₆ "	³ / ₄ " coarse
RS 510/E-EV	13 ³ / ₁₆ "	17 ¹³ / ₁₆ "	³ / ₄ " coarse

PACKAGING



MODEL	X	Y	Z	lbs
RS 280/E-EV	71"	43 ⁵ / ₁₆ "	42	550
RS 310/E-EV	80"	47 ¹ / ₄ "	45	575
RS 410/E-EV	80"	47 ¹ / ₄ "	45	575
RS 510/E-EV	80"	47 ¹ / ₄ "	45	575

Burner accessories

TEMPERATURE/PRESSURE SENSORS

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

PROBE



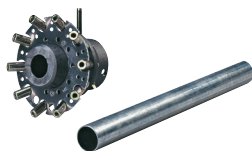
BURNER	PROBE TYPE	RANGE	PROBE CODE	
All models	Temperature sensor	Water NI 1000 RTD	C5332020	
		Air NI 1000 RTD	C5332021	
		Water QAE 2020 RTD	C5332027	
	Pressure sensor		4-20 mA	0-10 V
		0 - 15 PSI	C5332040	C5332050
		0 - 60 PSI	C5332041	C5332051
		0 - 150 PSI	C5332042	C5332052
		0 - 200 PSI	C5332043	C5332053
		0 - 300 PSI	C5332044	C5332054

STEP-DOWN TRANSFORMERS

BURNER	DESCRIPTION	CODE	NOTE
All models	Stepdown Transformer 208V – 120V	C7000510	(1)
	Stepdown Transformer 230V – 120V	C7000511	(1)
	Stepdown Transformer 460V – 120V	C7000512	(1)
	Stepdown Transformer 575V – 120V	C7000513	(1)

(1) Including fuses, mounted to burner

LPG KIT



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

MODEL	CODE
RS 280/E-EV	20121154
RS 310/E-EV	In progress
RS 410/E-EV	In progress
RS 510/E-EV	20124020

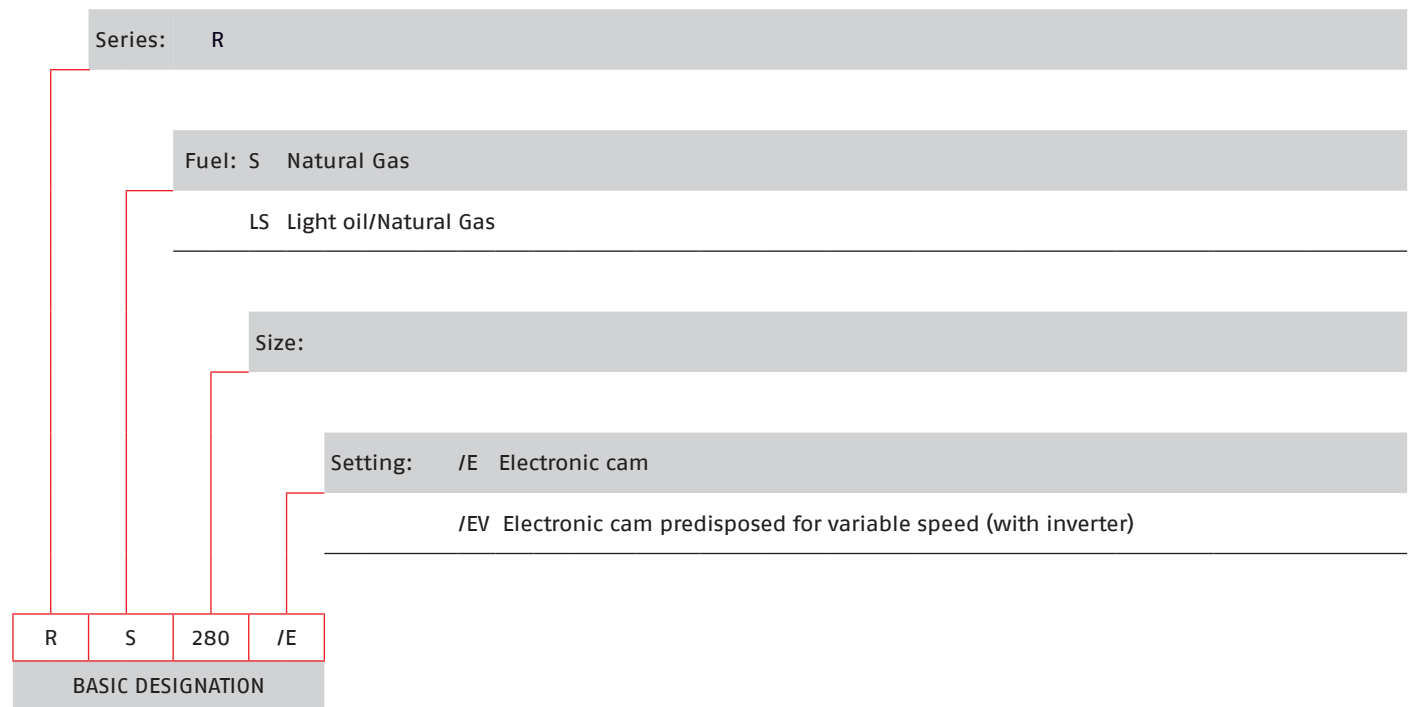
VARIABLE SPEED DRIVES FOR EV CHASSIS

VSD 208-230-460-575/3/60 are available. Please consult factory.

Specification

DESIGNATION OF SERIES

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



Available models

BURNERS – RS 280-310-410-510/E-/EV

BURNER MODEL	POWER SUPPLY	HEAT OUTPUT NATURAL GAS
	V/Ph/Hz	MBtu/hr
RS 280/E	230/3/60	1050-10500 (9450*)
RS 280/E	460/3/60	1050-10500 (9450*)
RS 280/E	575/3/60	1050-10500 (9450*)
RS 280/EV	230-460/3/60	1050-10500 (9450*)
RS 280/EV	575/3/60	1050-10500 (9450*)
RS 310/E	230/3/60	1375-13600 (12240*)
RS 310/E	460/3/60	1375-13600 (12240*)
RS 310/E	575/3/60	1375-13600 (12240*)
RS 310/EV	230-460/3/60	1375-13600 (12240*)
RS 310/EV	575/3/60	1375-13600 (12240*)
RS 410/E	230/3/60	1635-16100 (14490*)
RS 410/E	460/3/60	1635-16100 (14490*)
RS 410/E	575/3/60	1635-16100 (14490*)
RS 410/EV	230-460/3/60	1635-16100 (14490*)
RS 410/EV	575/3/60	1635-16100 (14490*)
RS 510/E	230/3/60	2000-19200 (17280*)
RS 510/E	460/3/60	2000-19200 (17280*)
RS 510/E	575/3/60	2000-19200 (17280*)
RS 510/EV	230-460/3/60	2000-19200 (17280*)
RS 510/EV	575/3/60	2000-19200 (17280*)

* Firing rate for C-ETL Canadian Listing

Specifications

STATE OF SUPPLY – RS 280-310-410-510/E-/EV

Monoblock forced draught gas burner with modulating operation, fully automatic, made up of:

- High performance fan with low sound emissions,
- reverse curve blades for RS 280/E-EV,
- forward curve blades for RS 310-410-510/E-EV
- Air suction circuit lined with sound-proofing material
- Air damper for air setting controlled by a high precision servomotor
- Fan driving motor at 3500 rpm, three-phase 230/460 or 575V, 60Hz
- 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 ignition pilot
 - flame stability disk
- Automatic regulator for gas delivery, controlled by a high precision servomotor
- High gas pressure switch to stop the burner in the case of excess pressure on the fuel supply line
- Low air pressure switch, stops the burner in case of insufficient air quantity at the combustion head
- LMV37 Electronic cam for air/fuel setting
- Burner safety control included on Electronic Cam device
- Display Interface module, for burner commissioning and monitoring
- Modulation by PID load controller with temperature or pressure (sensor available as accessories)
- Flame detection by UV sensor
- Fan motor starting by Star/Delta device or electronic Soft Start (Direct start for RS 280/E)
- Main electrical supply terminal strip
- "OFF-LOCAL-REMOTE" switch
- "POWER ON" signal
- "CALL FOR HEAT" signal
- "IGNITION ON" signal
- "FUEL ON" signal
- "ALARM SILENCE" button
- "BURNER LOCK-OUT and RESET" push-button
- Burner opening hinge
- Lifting rings
- Gas supply port ANSI 3" for gas train connection

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
- Instruction handbook for installation, use and maintenance and spare parts catalogue.

Notes

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Notes

[illegible]

Notes

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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

11/2016

TS0108NA00



[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 17 thousand to 163 million Btu/hr, 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 years. 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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