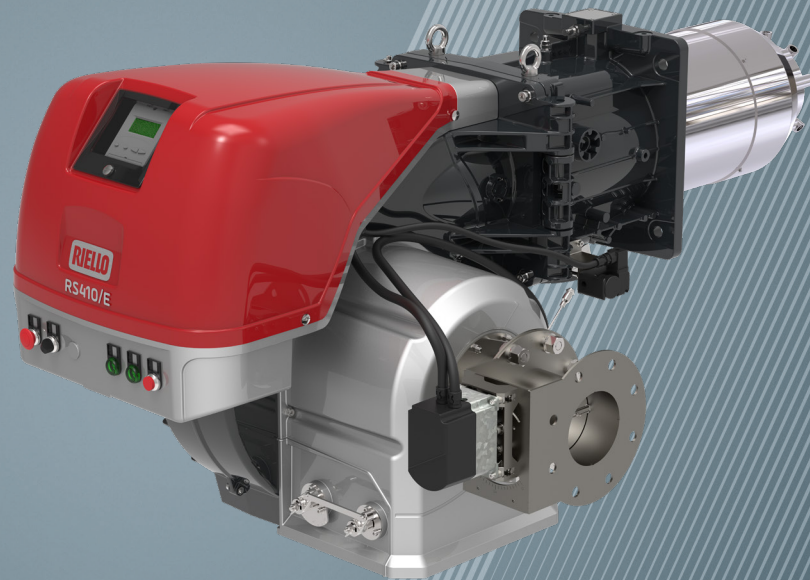


NEW



RS/E - /EV FGR SERIES

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

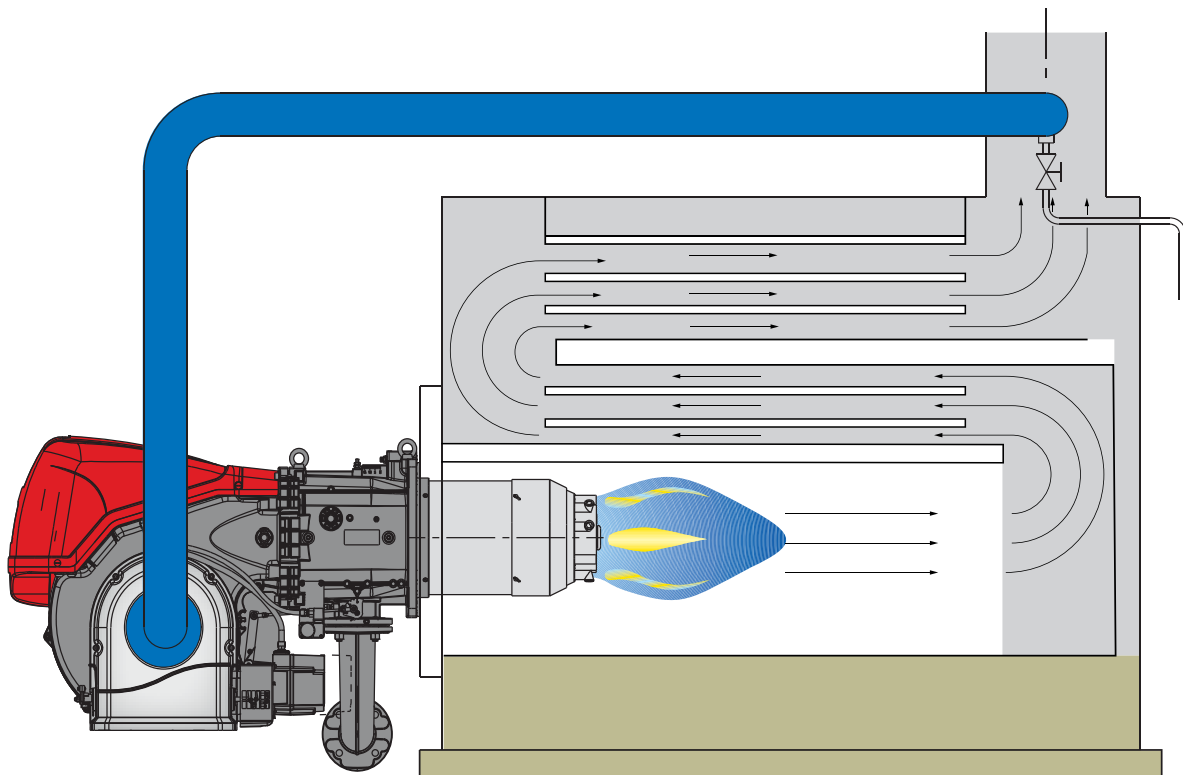
Product Overview

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.



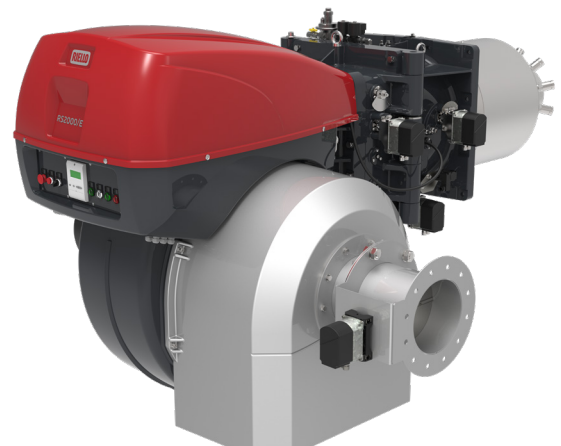
ULTRA LOW NOX GAS FGR MONOBLOCK BURNERS RS 410÷2000/E - /EV FGR SERIES

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 |

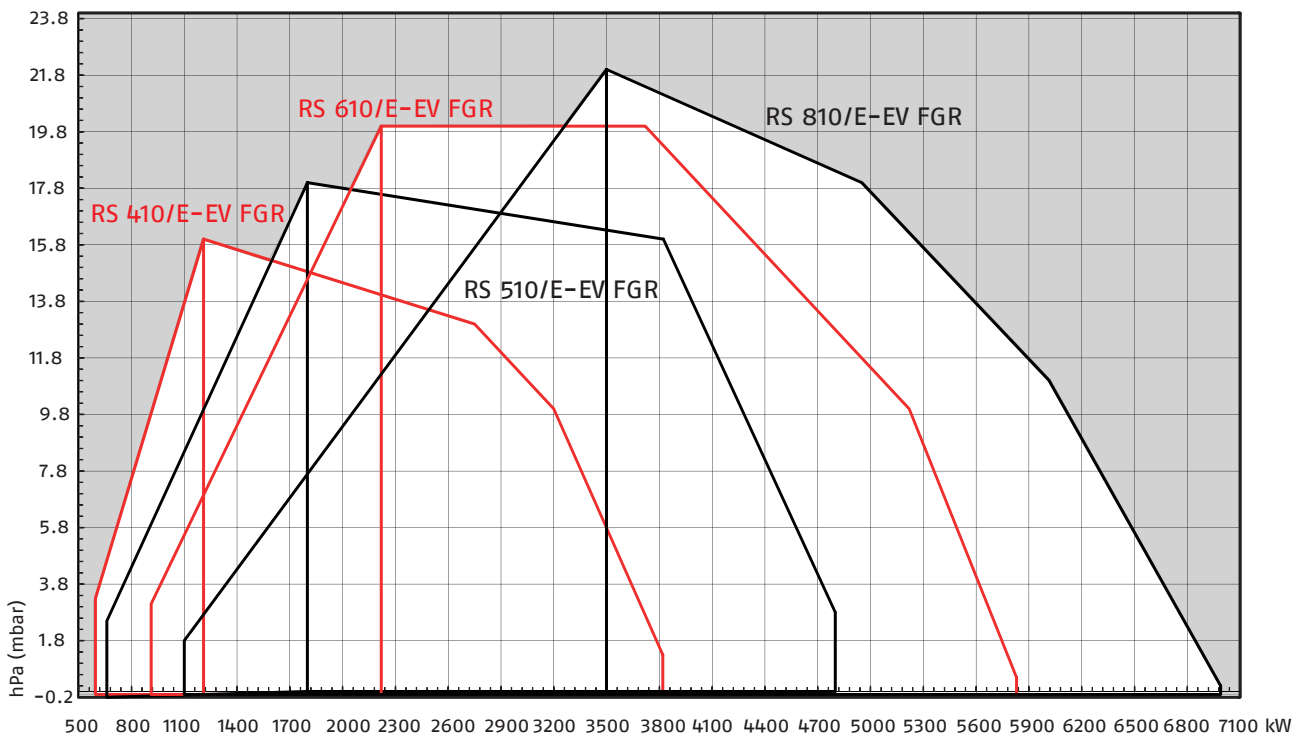
FIRING RATES

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.

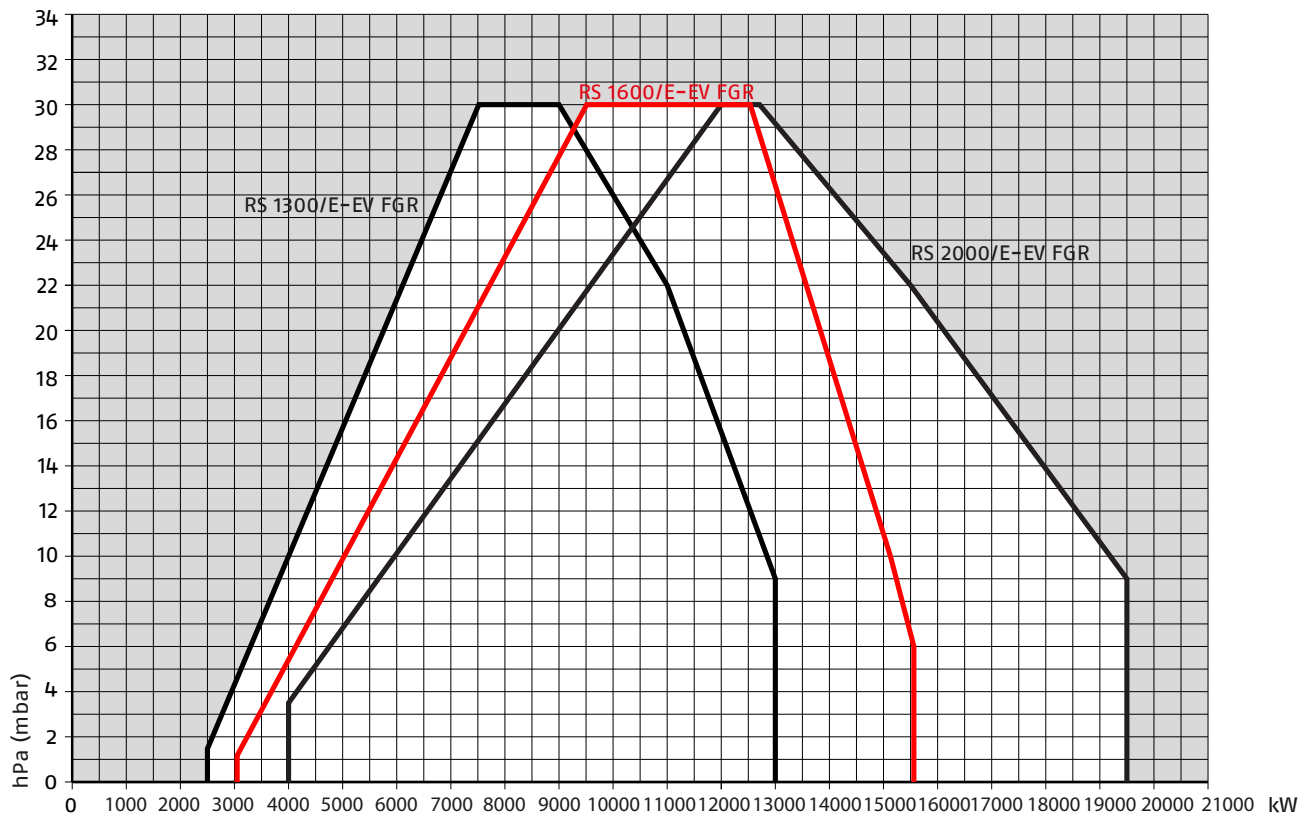
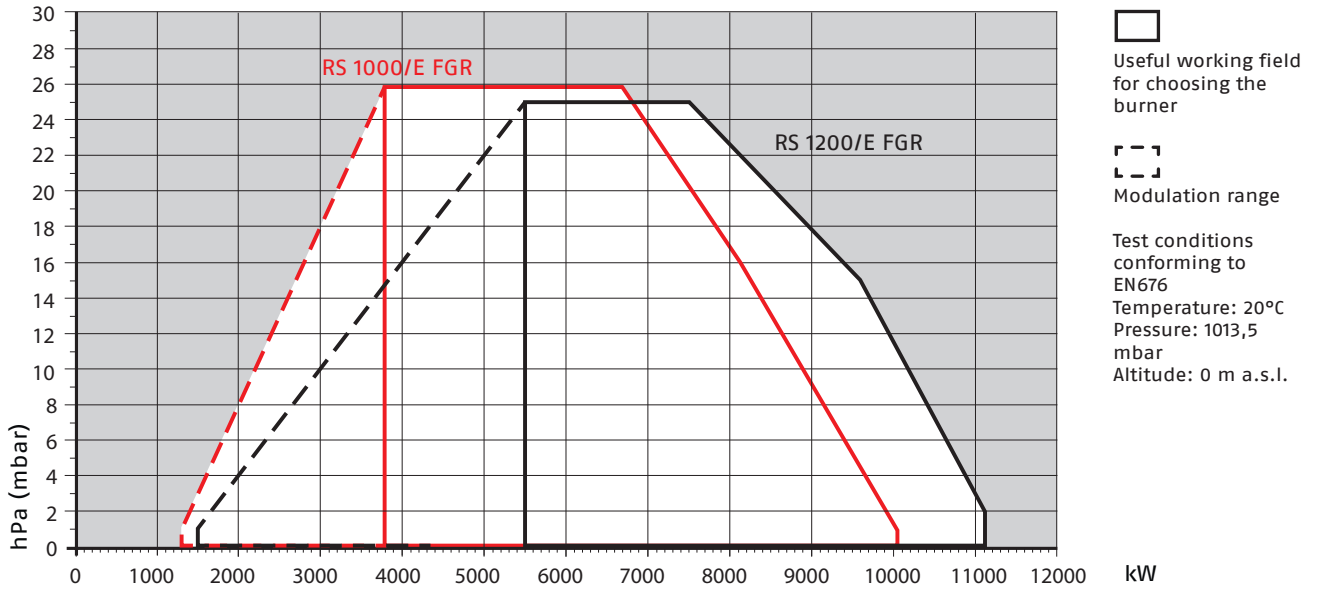
The shown firing rates are obtained in special test boilers, according to EN 676

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%.



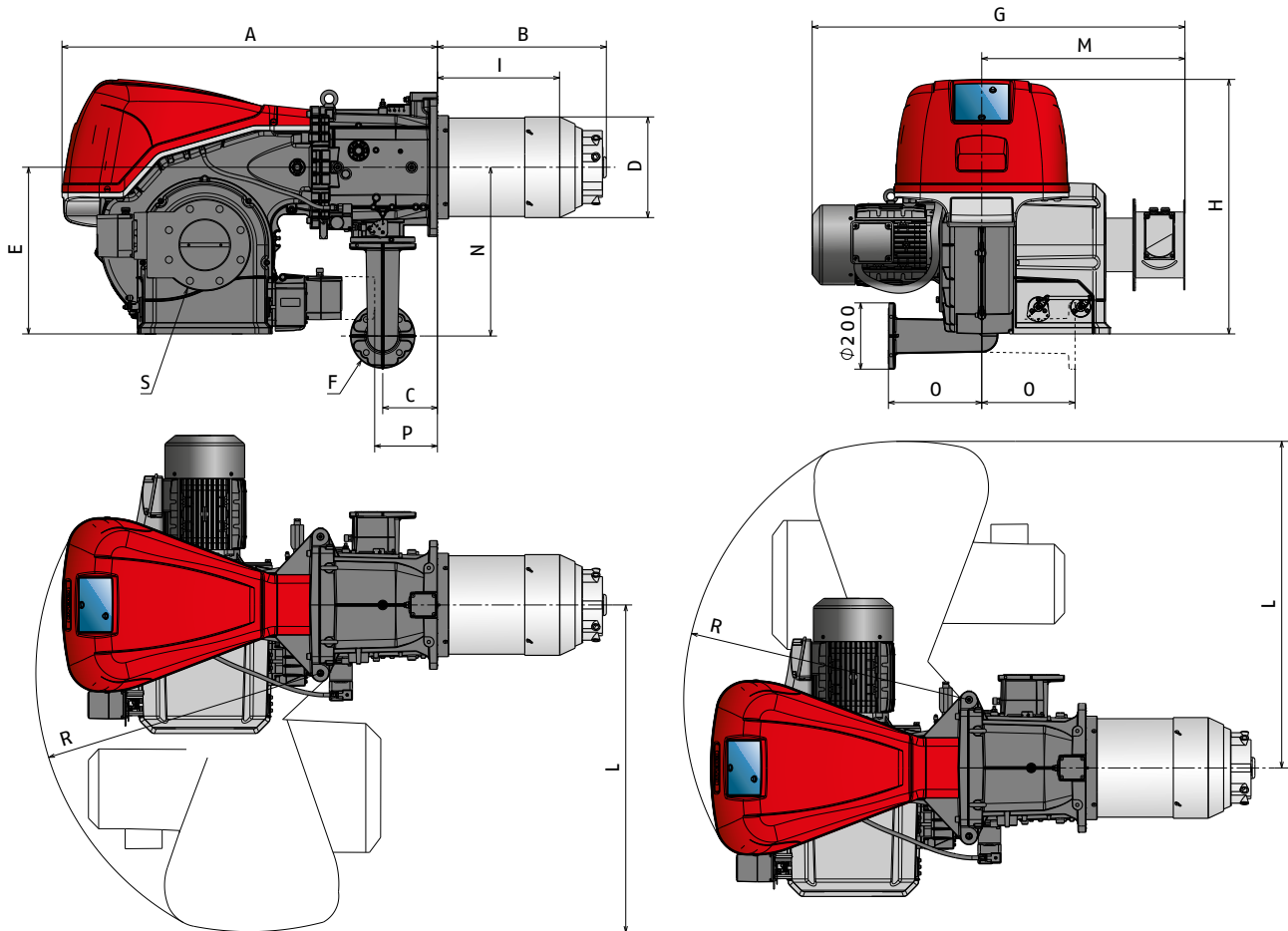
Test conditions
conforming to EN676
Temperature: 20°C
Pressure: 1013,5 mbar
Altitude: 0 m a.s.l.



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 |

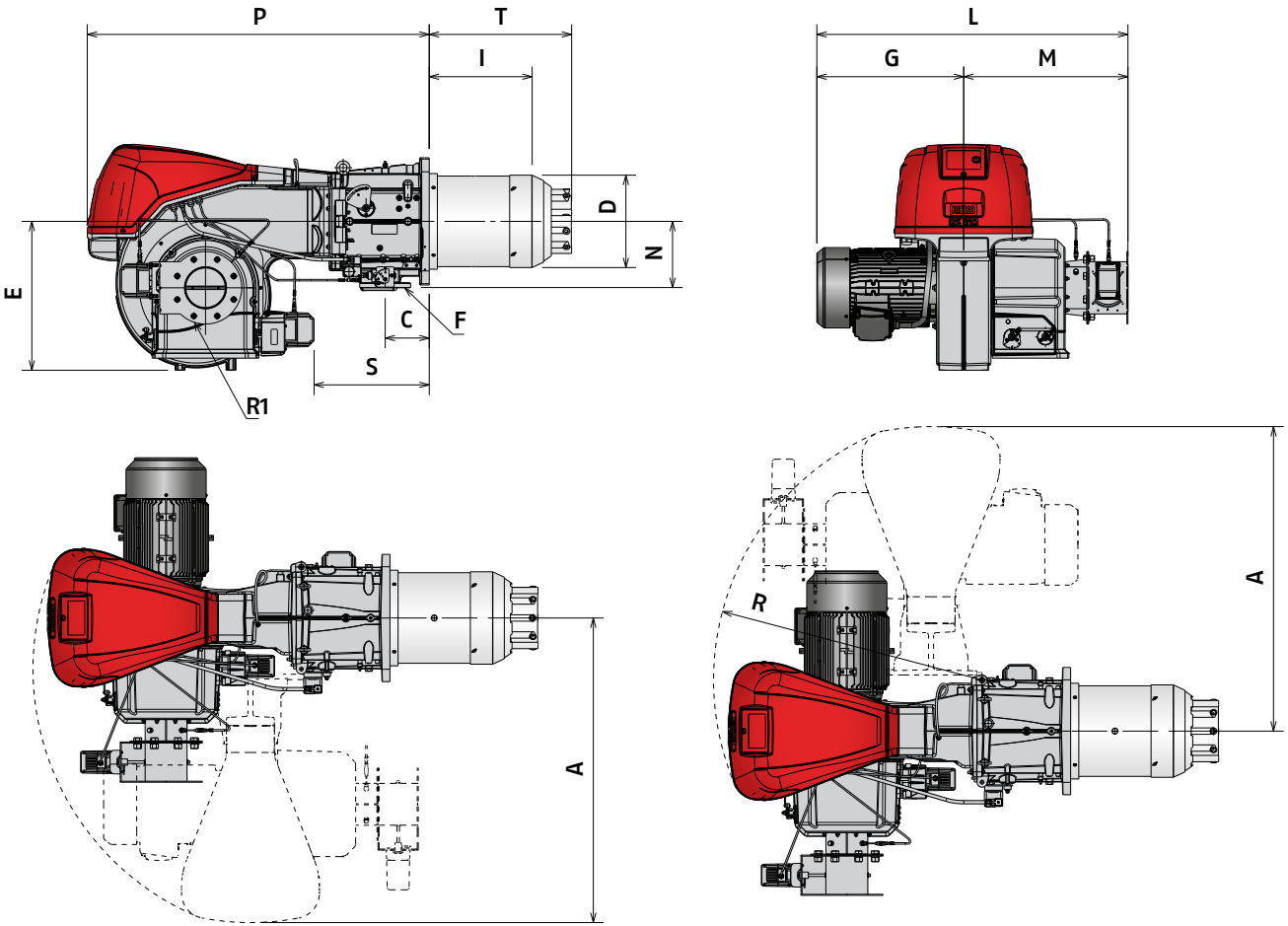
* The gas adaptor is set also for DN 80 bore.

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

OVERALL DIMENSIONS (mm)

BURNER

RS 810/E-EV FGR

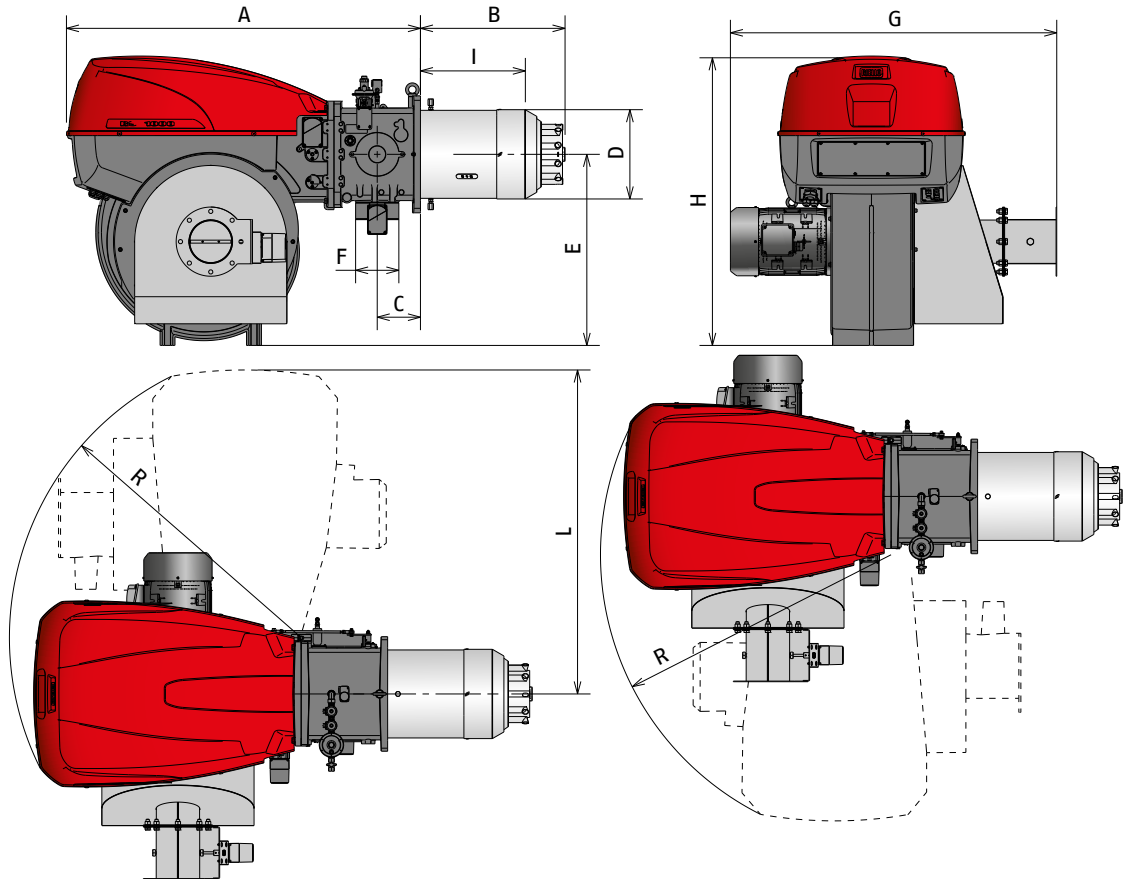


| MODEL | A | C | D | E | F | G | I | L | M | N | P | R | R1 | S | T |
|-----------------|------|-----|-----|-----|------|-----|-----|------|-----|-----|------|------|-------------|-----|-----|
| RS 810/E-EV FGR | 1197 | 173 | 363 | 585 | DN80 | 577 | 405 | 1222 | 645 | 260 | 1345 | 1055 | 6" - DN 150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

OVERALL DIMENSIONS (mm)

BURNER

RS 1000-1200/E-EV FGR

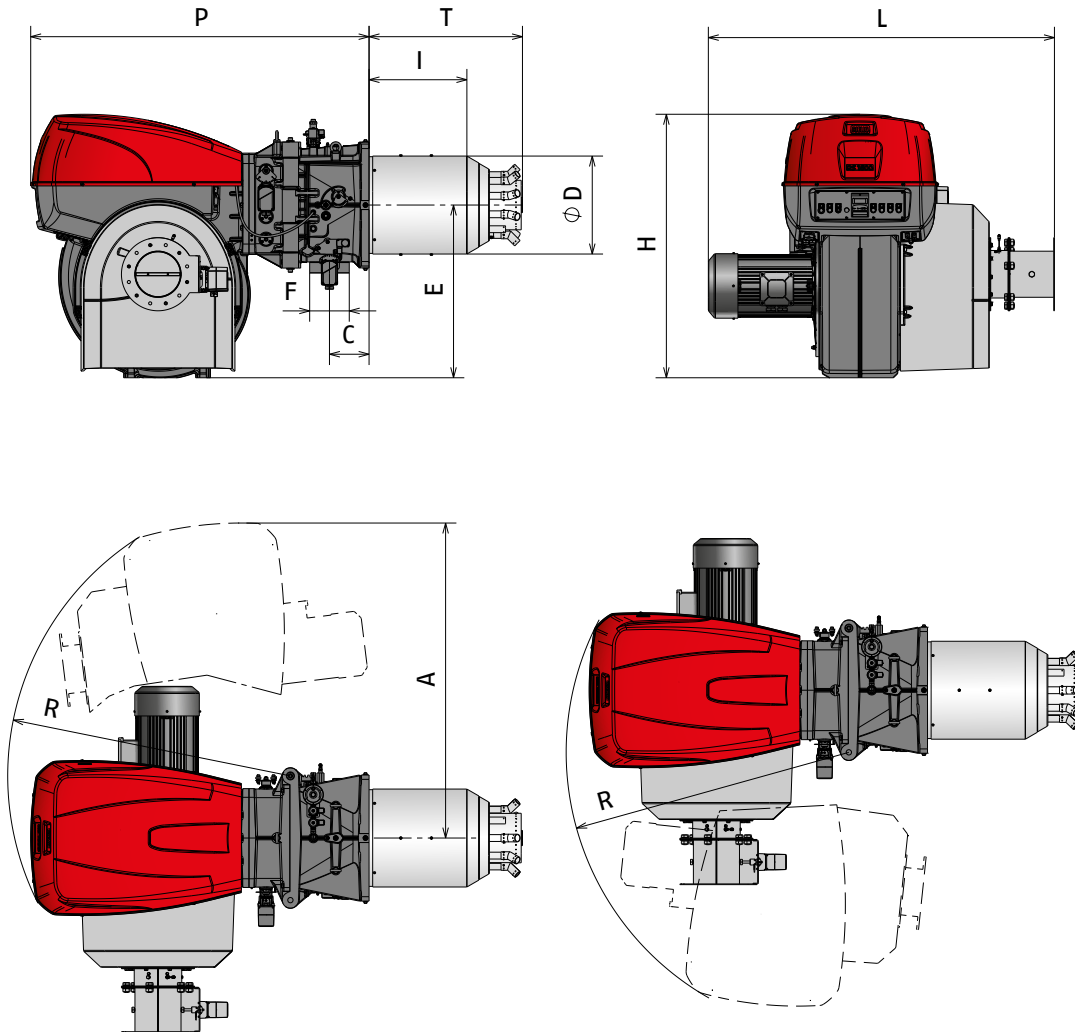


| MODEL | A | B | C | D | E | F | G | H | I | L | R |
|------------------|------|-----|-----|-----|-----|------|------|------|-----|------|------|
| RS 1000/E-EV FGR | 1637 | 669 | 200 | 413 | 885 | DN80 | 1510 | 1338 | 485 | 1493 | 1350 |
| RS 1200/E-EV FGR | 1637 | 670 | 200 | 456 | 885 | DN80 | 1630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

OVERALL DIMENSIONS (mm)

BURNER

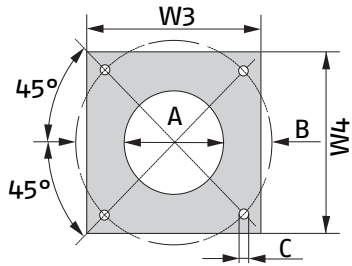
RS 1300-1600-2000/E-EV FGR



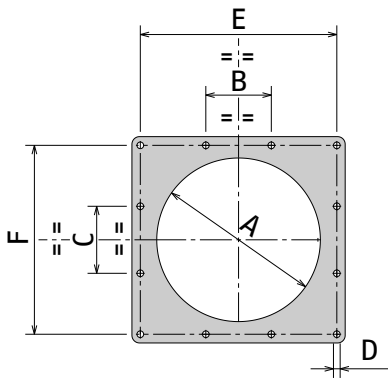
| MODEL | A | C | D | E | F | H | I | L | P | R | T |
|------------------|------|-----|-----|-----|-------|------|-----|------|------|------|-----|
| RS 1300/E-EV FGR | 1782 | 220 | 544 | 960 | DN80 | 1463 | 383 | 1928 | 1880 | 1565 | 613 |
| RS 1600/E-EV FGR | 1785 | 220 | 544 | 960 | DN100 | 1463 |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

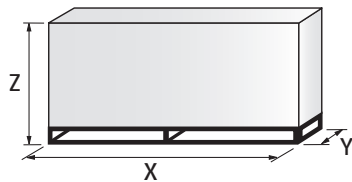


| MODEL | A | B | C | W3 | W4 |
|------------------|-----|-----|-----|-----|-------|
| RS 410/E-EV FGR | 335 | 452 | M18 | 400 | 430.5 |
| RS 510/E-EV FGR | 335 | 452 | M18 | 400 | 430.5 |
| RS 610/E-EV FGR | 350 | 452 | M18 | 400 | 430.5 |
| RS 810/E-EV FGR | 400 | 495 | M18 | 530 | 530 |
| RS 1000/E-EV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

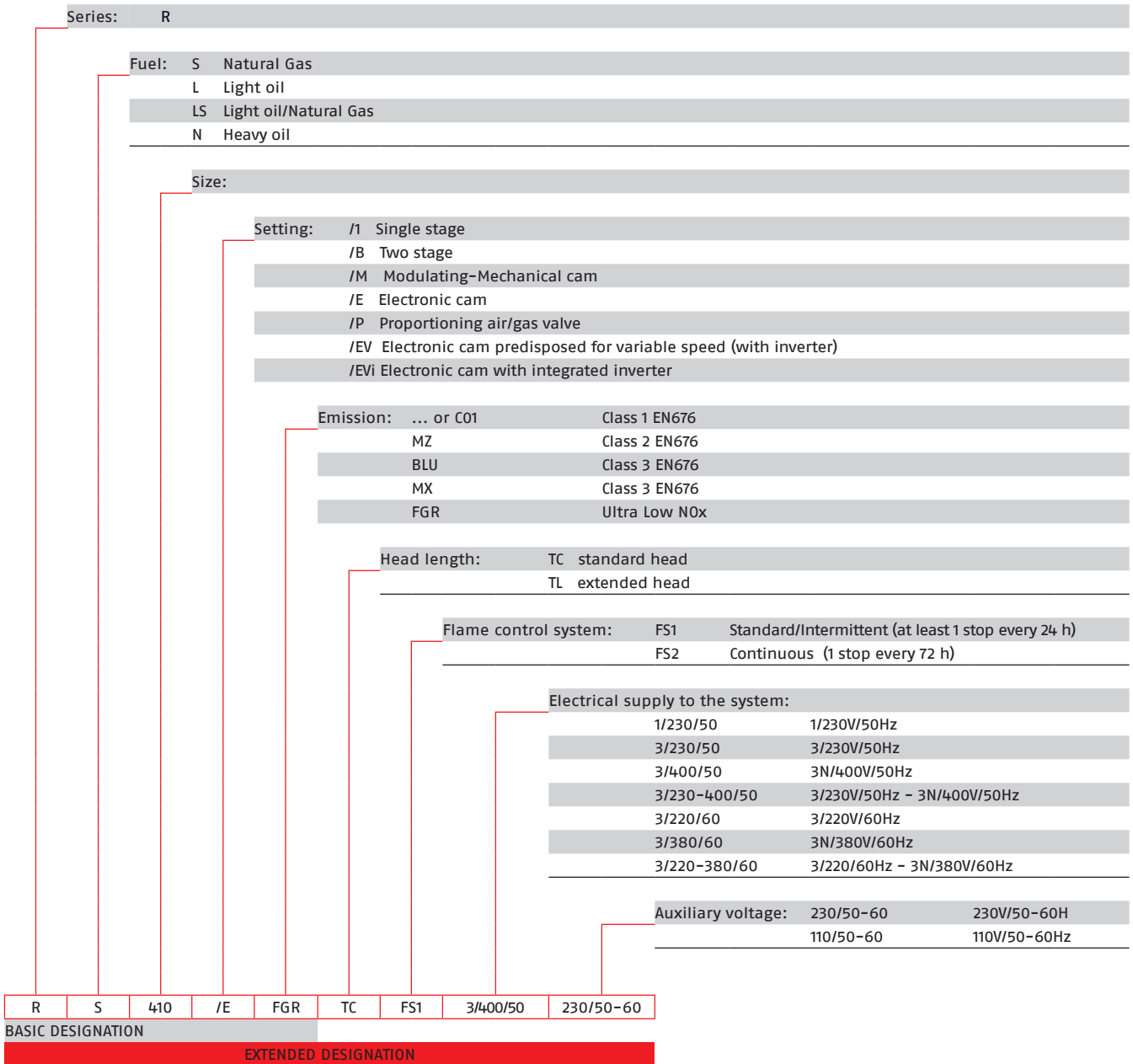
PACKAGING



| 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



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 NOx 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 NOx 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 | ∅ | 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) ∅in = DN 65, ∅out = DN 80.

● Not available.

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

| CODE | GAS TRAIN | | ADAPTER CODE | | |
|-----------|-----------------------|-----------|--------------------------------------|-------------------------------------|---------|
| | MODEL | ∅ | 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) ∅in = DN 65, ∅out = DN 80.

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

| CODE | GAS TRAIN | | ADAPTER CODE | | |
|-----------|-----------------------|-----------|--------------|----------|---------|
| | MODEL | ∅ | 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) ∅in = DN 65, ∅out = DN 80.

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

BURNER ACCESSORIES

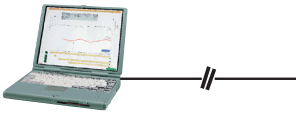
ACCESSORIES FOR MODULATING OPERATION



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 | |
| RS 1000 - 1200/E-EV FGR | On demand |
| RS 1300 - 1600 - 2000/E-EV FGR | |

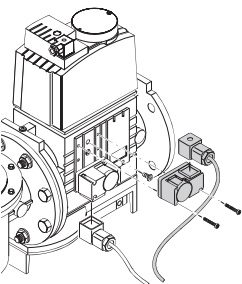
STABILISER SPRING



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.

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