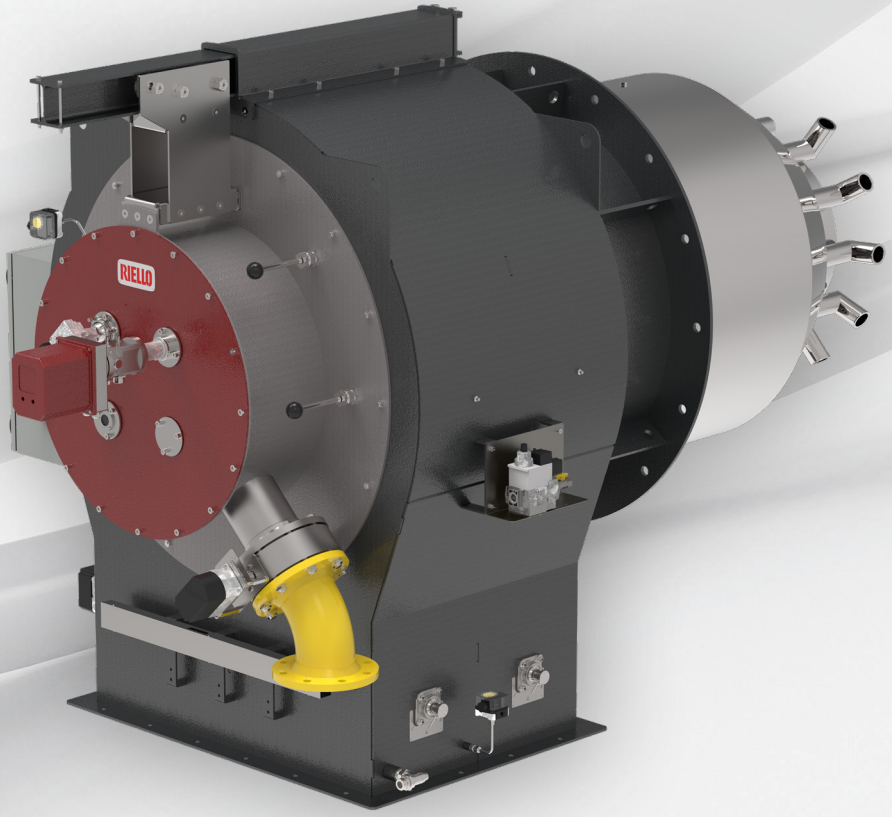
DR SE FGR SERIES

TECHNICAL DATA LEAFLET

Industrial Dual Block Gas Burners FGR Ready



RIELLO
Energy For Life

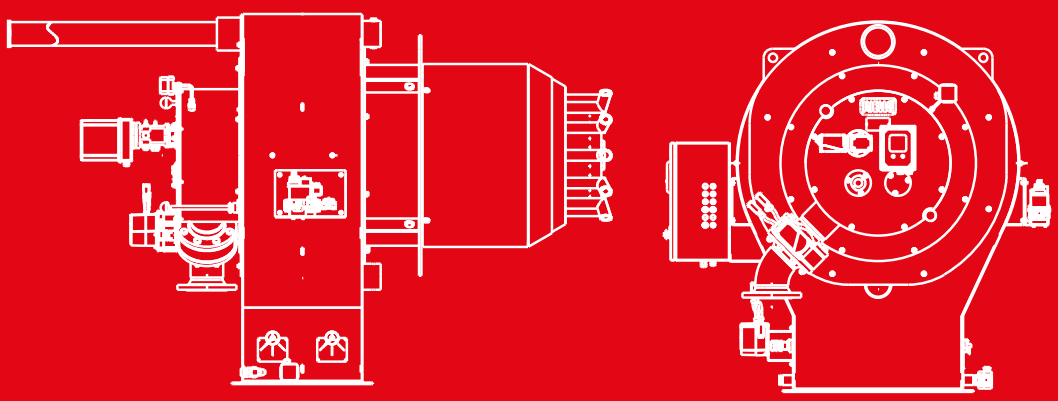
A Carrier Company

www.riello.com

Overview

The new DR SE FGR burner platform represents the evolution in Riello Burners industrial product range for high power applications.
They are dual block burners for applications in in big civil heating plants (i.e. hospitals, district heating) and industrial processes (i.e. food chemicals, textile industry) with a remarkable thermal demand. They can be matched with hot water boilers, steam and thermal oil generators.
These burners allow to realise a modular and flexible combustion system adding a preparation fuel unit, a gas train, a control panel and a fan. Control panel with high-end control box can be supplied installed on burner board.
These burners are supplied with electronic air-fuel ratio control in order to obtain a perfect output control and to assure a correct low polluting combustion and a safe operation on all modulation range.
Preheated air can also be used as in the oil diathermic generators and other heat recovery systems.
The modulating regulation always allows to reach a wide modulation ratio and optimal fluid-dynamics conditions for a good combustion.
The low-NOx combustion head allows to reach, on natural gas operations, NOx emissions ≤ 80 mg/kWh without FGR use (≤ 50 mg/kWh with 10% FGR).

Model	Heat output	
DR 20 SE FGR	16000 ÷ 20000	kW
DR 25 SE FGR	20000 ÷ 25000	kW
DR 32 SE FGR	25000 ÷ 32000	kW
DR 40 SE FGR	32000 ÷ 40000	kW
DR 50 SE FGR	40000 ÷ 50000	kW
DR 65 SE FGR	50000 ÷ 65000	kW
DR 80 SE FGR	65000 ÷ 80000	kW



Technical Data

DR 20-25-32-40 SE FGR

		MODEL	DR 20	DR 25	DR 32	DR 40
Burner operation mode			Modulating (0ther fuels on request)			
Modulation ratio at maximum output			up to 8:1			
Servomotor		Type	SQM 45 / SQM 48			
Heat output	Natural gas	kW	16000÷20000	20000÷25000	25000÷32000	32000÷40000
Working temperature	Min./Max.	°C	-15÷50			
FUEL/AIR DATA						
Combustion air maximum temperature		°C	up to 150°C			
Net calorific value		kWh/Nm³	10			
Density		kg/Nm³	0.71			
Gas delivery		Nm³/h	1600 - 2000	2000 - 2500	2500 - 3200	3200 - 4000
ELECTRICAL DATA						
Electrical supply		Ph/Hz/V	1/50/230 (*)			
Control box		Type	LMV 52 (Installed on board)			
Protection level		IP	54			
		Ignition	Natural Gas Fired Igniter			
		0peration	Intermittent (at least one stop every 24 h) Continuous (at least one stop every 72 h)			
EMISSIONS						
G20	C0 emission	mg/kWh	< 100			
	N0x emission	mg/kWh	≤ 80 without FGR, ≤ 50 with 10% FGR (**)			
APPROVAL						
Conforming to			2006/42/EC - 2014/35/EU - EN 676 (***) - EN 746-2 (***)			

DR 50-65-80 SE FGR

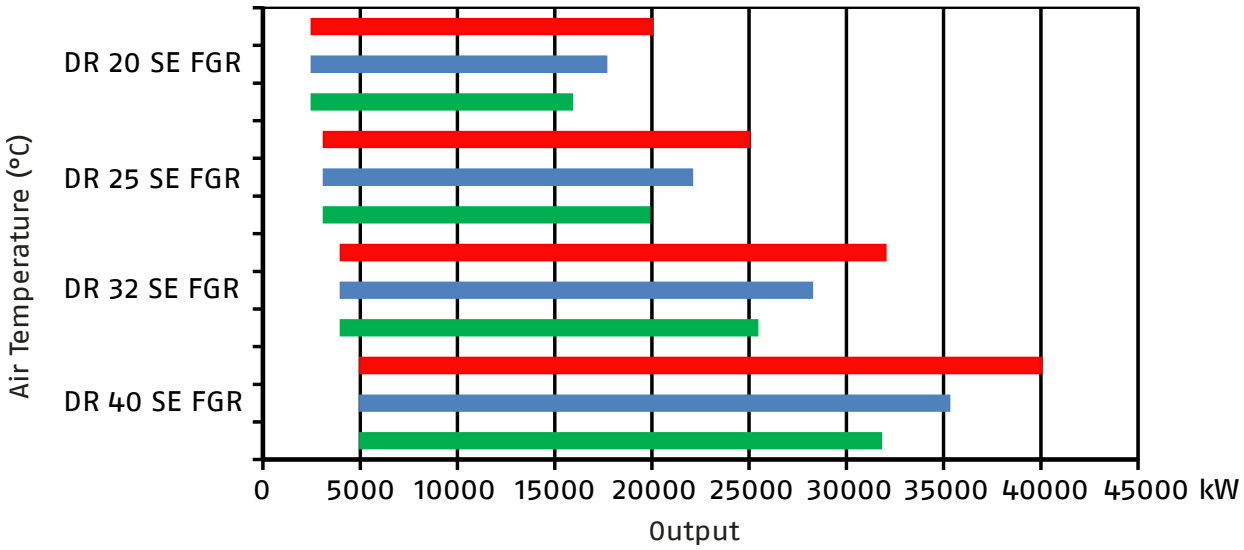
		MODEL	DR 50	DR 65	DR 80
Burner operation mode			Modulating (0ther fuels on request)		
Modulation ratio at maximum output			up to 8:1		
Servomotor		Type	SQM 45 / SQM 48		
Heat output	Natural gas	kW	40000÷50000	50000÷65000	65000÷80000
Working temperature	Min./Max.	°C	-15÷50		
FUEL/AIR DATA					
Combustion air maximum temperature		°C	up to 150°C		
Net calorific value		kWh/Nm³	10		
Density		kg/Nm³	0.71		
Gas delivery		Nm³/h	4000 - 5000	5000 - 6500	6500 - 8000
ELECTRICAL DATA					
Electrical supply		Ph/Hz/V	1/50/230 (*)		
Control box		Type	LMV 52 (Installed on board)		
Protection level		IP	54		
Ignition			Natural Gas Fired Igniter		
Operation			Intermittent (at least one stop every 24 h) Continuous (at least one stop every 72 h)		
EMISSIONS					
G20	C0 emission	mg/kWh	< 100		
	N0x emission	mg/kWh	≤ 80 without FGR, ≤ 50 with 10% FGR (**)		
APPROVAL					
Conforming to			2006/42/EC - 2014/35/EU - EN 676 (***) - EN 746-2 (***)		

Reference conditions: Ambient temperature 20°C - Gas temperature 15°C - Barometric pressure 1013 mbar - Altitude 0 m a.s.l.
(*) 0ther electrical supply standards available on request
(**) Average value measured in test rig according to EN 676
(***) Limited to the applicable parts

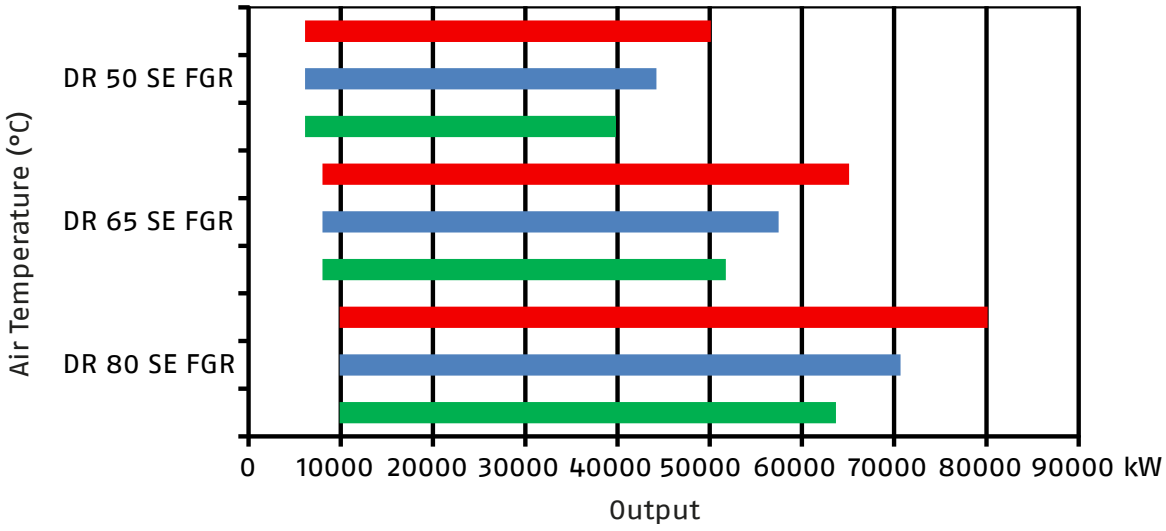
For performance estimation according to your plant specification, please contact Riello Application Engineering.

Firing Rates

DR 20-25-32-40 SE FGR



DR 50-65-80 SE FGR

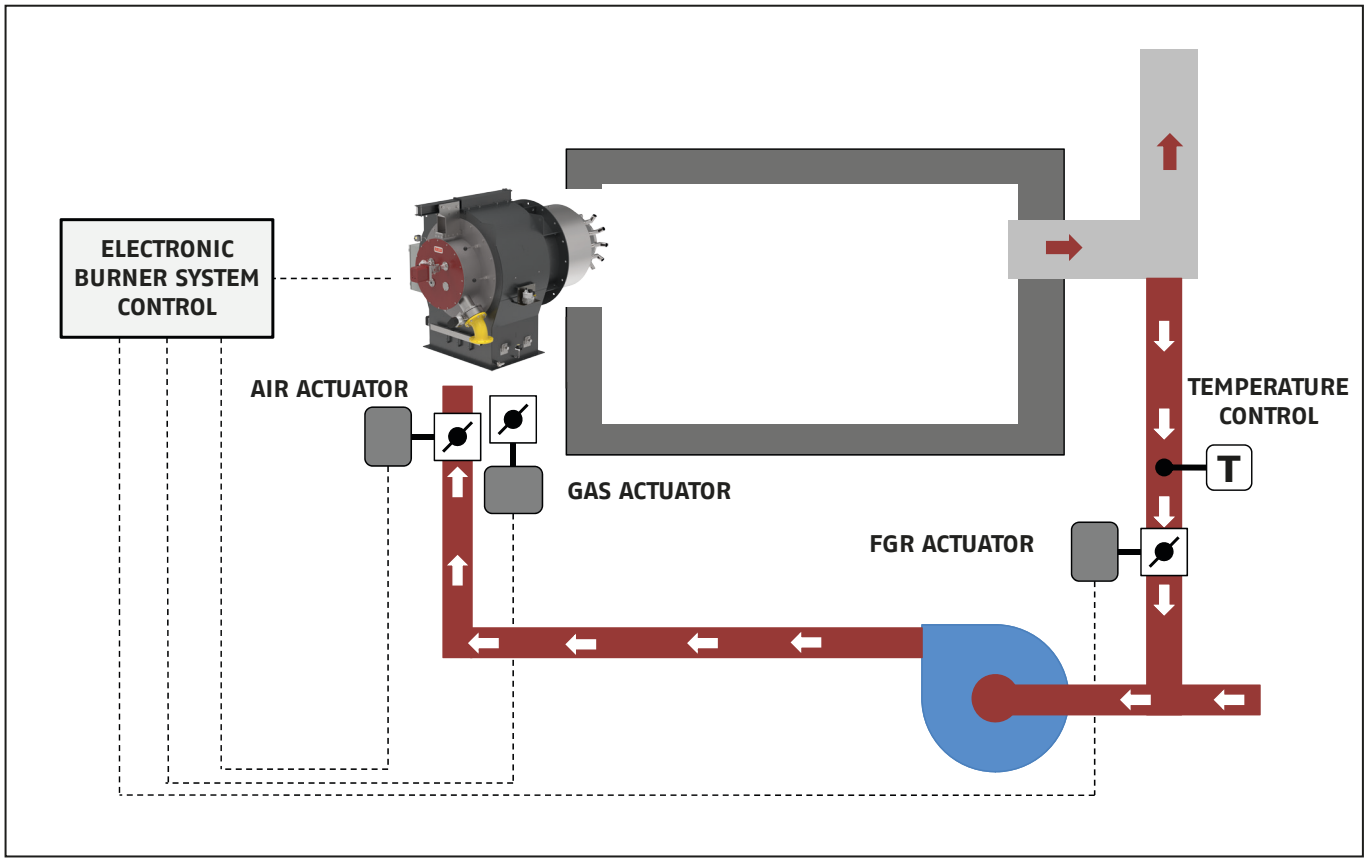


NO FGR – Combustion air temperature 50°C
10 % FGR – Combustion air temperature 50°C
10 % FGR – Combustion air temperature 150°C

Test conditions conforming EN 676:
Temperature: 50°C
Pressure: 1013.5 mbar
Altitude: 0 m a.s.l.

FGR Technology

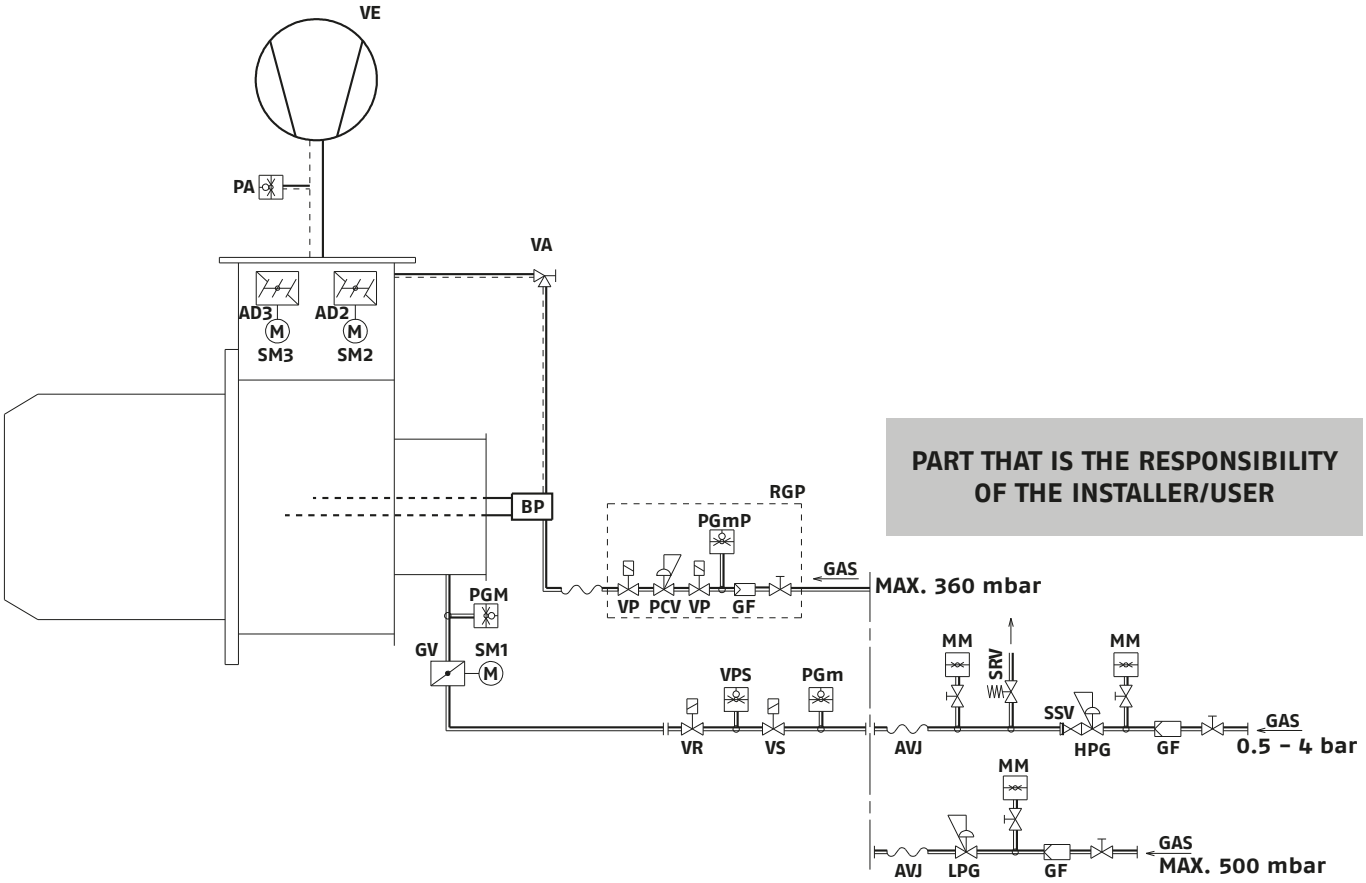
Due to the significant increase of pollutants in these last years, attention to performance, energy efficiency and emission reduction is becoming more important all around the world.
In order to comply the increasing demand of very low NOx emissions, RIELLO has developed a new range of Dual Block burners equipped with advanced Low NOx combustion heads and compatible, if needed, with the FGR (Flue gas Recirculation) low emission technology, in order to comply with the most restrictive emission limits.
FGR technology is based on the recirculation of a part of the exhaust gas, which are mixed with air upstream of the burner; the 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 NOx emissions, while maintaining high reliability and safety of operation.



Fuel Supply

EXAMPLE OF COMPLETE SUPPLY GAS LINE

The DR burners series are fitted with a butterfly valve to regulate the fuel, controlled by a variable profile cam servomotor which guarantees, through the association of the air and fuel regulation, high thermal efficency all over the firing rates.



Burner with A180 configuration (air supply from top)

AD2	Primary air damper
AD3	Secondary air damper
BP	Pilot burner
AVJ	Vibration damping joint
GF	Gas filter
GV	Gas butterfly valve
HPG	High gas pressure regulator
LPG	Low gas pressure regulator
MM	Pressure gauge
PA	Minimum air pressure switch
VPS	Gas pressure sensor
PGm	Minimum gas pressure switch
PGM	Maximum gas pressure switch

SM1	Fuel servomotor
SM2	Primary air servomotor
SM3	Secondary air servomotor
PCV	Pilot gas pressure regulator
SRV	Vent solenoid (Safety)
SSV	Manual reset stop valve
VA	Pilot air pressure regulation valve
VC	Continuous purging solenoid
VE	Fan
VR	Gas pressure regulator solenoid valve
VP	Gas safety solenoid
PGmP	Minimum gas pressure switch for pilot
RGP	Gas train for pilot burner

Air Suction Circuit

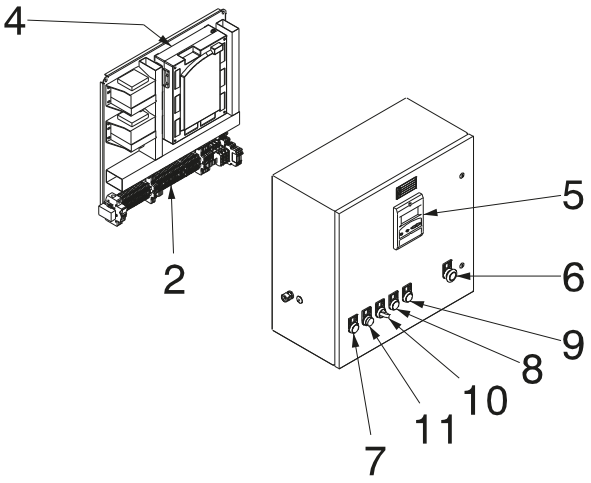
The air suction circuit of DR SE FGR burners is designed with two independent air ducts, each of them equipped with an independent high precision servomotor to control the air flow.
This particular design allows to obtain primary and secondary air flows to the combustion head in order to obtain staging combustion system (see “Combustion head” section).

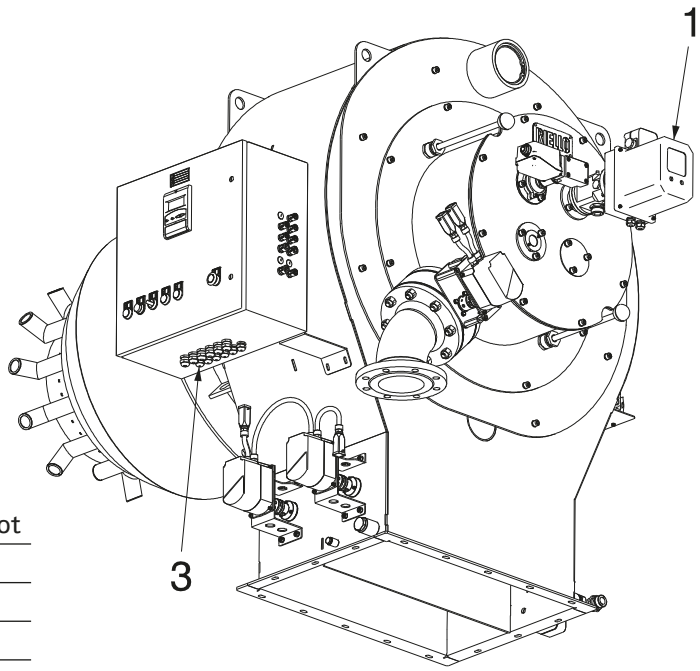
Example of axial swirl register device (on demand)

Example of air dampers

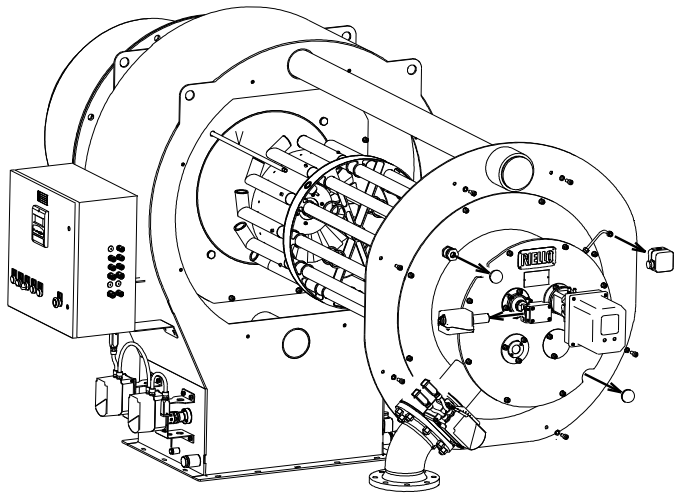
Commissioning and Maintenance

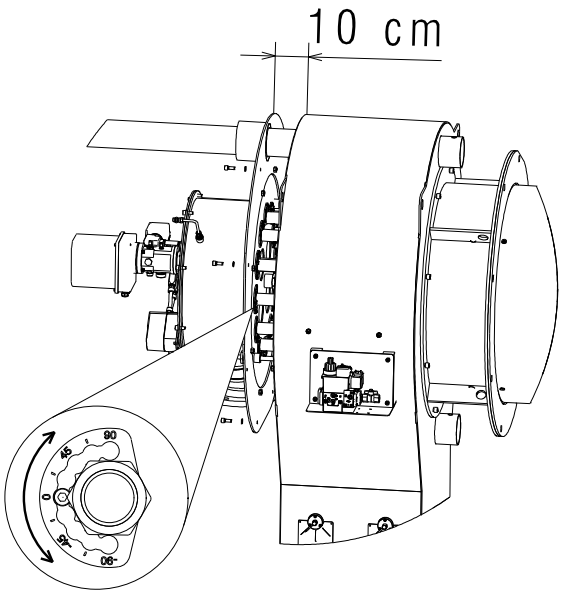
Optimized configuration for easy commissioning and manteinance.
Control panel with LMV52 and AZL 52 supplied on board as standard equipment. Signal lamps are installed on the control panel making easy to check burner operation. Ignition transfomer is installed directly on burner ignition pilot in order to avoid any electromagnetic interference.





1	Ignition transformer integrated in the ignition pilot
2	Terminal board
3	Cable glands for external inlets
4	Electronic cam
5	Display
6	Stop push-button
7	Auxiliary lamp “ON”
8	Burner lamp “ON”
9	Fan lamp “ON”
10	“ON/OFF” selector
11	Push-button/Lock-out lamp/ Burner reset

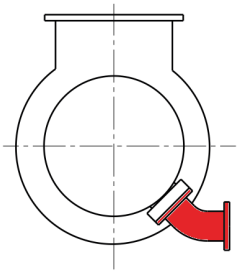




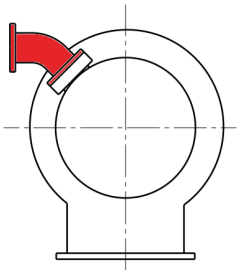
Extraction tube supplied as standard equipment for an easy manteinance operation and regulation of inner part of burner head.

Burner layout – Elbow

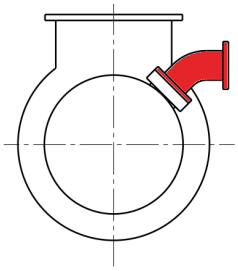
Highly customizable layout.
Burner layout can be easily adapted according to plant requirements, orientating air flange from bottom or from the top and with 8 different possibility of gas flange orientation (final elbow design can be modified according to the desired orientation).
Final gas elbow orientation to be defined before order.



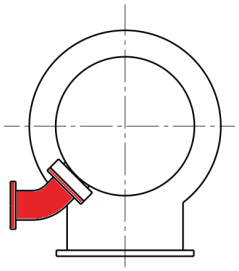
A180
G45



A0
G225



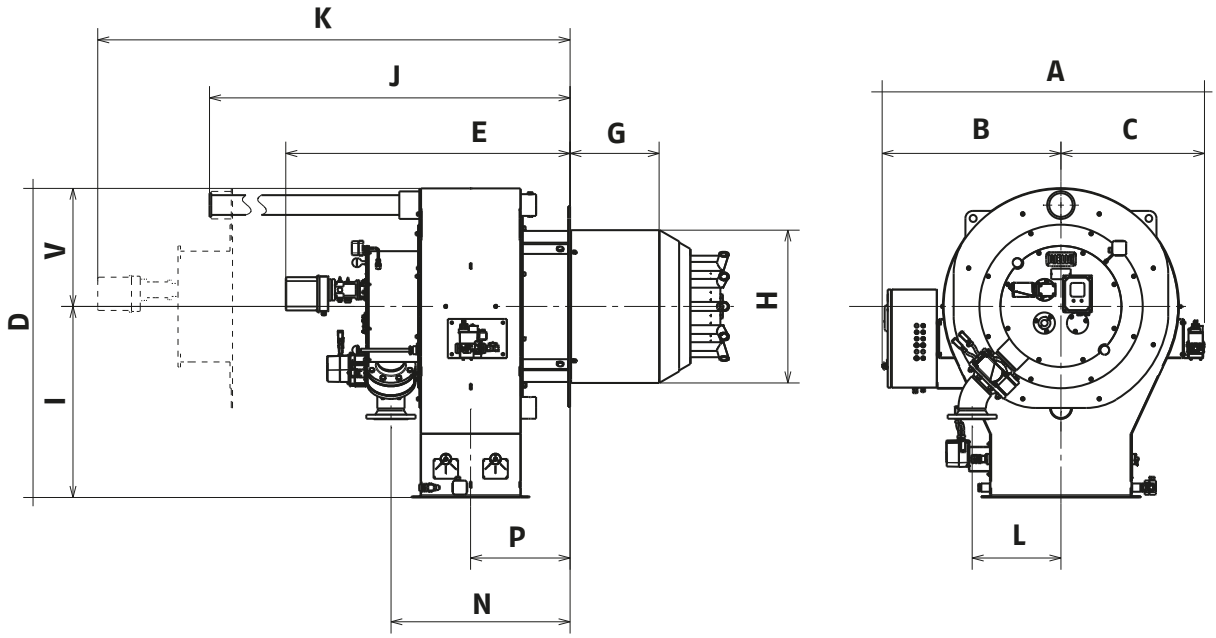
A180
G135



A0
G305

Overall Dimensions (mm)

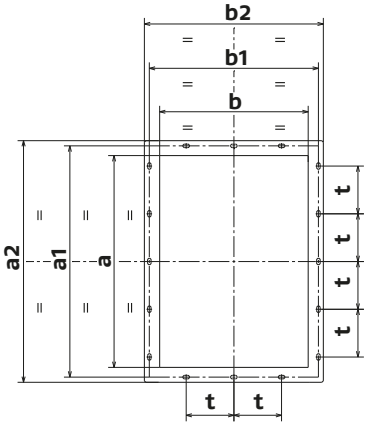
All dimensions are approximate and mentioned just as an indication. Please refer to Riello Burners Technical Department for further detailed information.



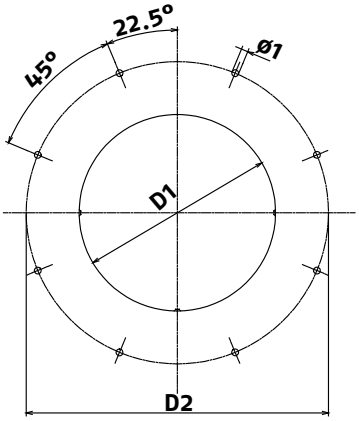
MODEL	A	B	C	D	E	G	H	I	J	K	L	N	P	V
DR 20 SE FGR	1639	909	730	1570	1444	453	696	970	2430	3000	451	910	505	600
DR 20 SE FGR	1639	909	730	1570	1444	453	776	970	2430	3000	451	910	505	600
DR 32 SE FGR	1851	1013	838	1758	1726	453	200	1050	-	-	451	1082	583	708
DR 40 SE FGR	1851	1013	838	1758	1726	453	200	1050	-	-	451	1082	583	708
DR 50 SE FGR							*to be defined*							
DR 65 SE FGR							*to be defined*							
DR 80 SE FGR							*to be defined*							

BURNER – BOILER MOUNTING FLANGE

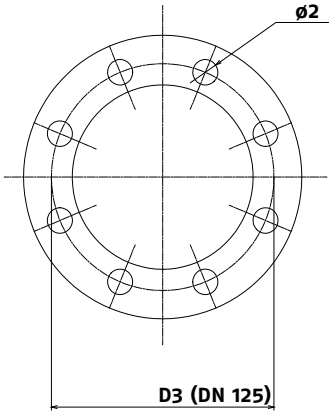
Air Duct Connection



Boiler Fixing



Gas Feeding



MODEL	a1	a2	a	b1	b2	b	t	D1	D2	D3	Ø1	Ø2
DR 20 SE FGR	775	810	710	567	600	500	160	800	970	180	M18	18
DR 20 SE FGR	775	810	710	567	600	500	160	800	970	210	M18	18
DR 32 SE FGR	968	1018	900	640	758	708	200	720	970	210	-	18
DR 40 SE FGR	968	1018	900	640	758	708	200	720	970	-	-	18
DR 50 SE FGR						*to be defined*						
DR 65 SE FGR						*to be defined*						
DR 80 SE FGR						*to be defined*						

Specification

DESIGNATION OF VERSIONS

A specific index guides your choice of burner from the various models available in the DR series.
Follow a clear and detailed specification description of the product.

Series:	DR			
Size:	20 - 25 - 32 - 40 - 50 - 65 - 80			
Fuel:	S	Natural Gas	NS	Heavy oil/natural gas
	L	Light oil	NAS	Heavy oil assisted atomizing/Natural gas
	N	Heavy oil	LS	Light oil/Natural gas
	NA	Heavy oil assisted atomizing	LP	Light oil/LPG
	P	LPG	NAP	Heavy oil assisted atomizing/LPG
Operation:	/E	electronic cam		
	/M	mechanic cam		
	/EV	Electronic cam and variable speed (with inverter)		
Emission:	C01	= Class 1 gas (EN 676)		
	C02	= Class 2 gas (EN 676)		
	C03	= Class 3 gas (EN 676)		
	FGR	= Ready for induced flue gas recirculation		
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)		
Fuel supply:	G45	= 45° angle, fuel from right or from bottom		
	G135	= 135° angle, fuel from left or from bottom		
	G225	= 225° angle, fuel from left or from top		
	G305	= 305° angle, fuel from right or from top		
Air supply:	A-0	= from bottom		
	A-180	= from top		
Air max temperature:	T150	= 150° C		
	T200	= 200° C		
	T250	= 250° C		
Auxiliary voltage:	230/50-60	230V/50-60 Hz		
	110/50-60	110V/50-60 Hz		

DR	25	S	E	FGR	TC	FS1/FS2	G45	A0	T150	230/50-60
BASIC DESIGNATION										
EXTENDED DESIGNATION										

* Estimated, emissions values, considering a hot water boiler with thermal load of 1,1 MW/m^3
Guaranteed values to be confirmed after the verification of the combustion chamber charachteristics

In order to identify the most suitable configuration for each specific application, please contact Riello Application Engineering.

STATE OF SUPPLY

Dual block forced draught burner, modulating operation, separate supply, fully automatic, made up of:
- Sheet-steel airlock painted with a front cover for access to the internal elements
- Air dampers for air setting controlled by two indipendent high precision servomotors managed by microprocessor
- Pilot burner with gas train and ignition electrodes
- Combustion head fitted with:
  - flame stability disk made up of axial swirler
  - stainless steel end cone, resistant to corrosion and high temperatures
  - gas distributor with multiple pipes
  - easy regulation system for gas pipes
- Variable geometry combustion head that can be set according to the required output
- Lifting rings.
- Flame inspection window
- Electrical interface box with ignition transformer inside
- IP54 protection level.
- UV photocell (other flame detector on request)
- Minimum air pressure switch
- Maximum gas pressure switch
- Butterfly gas valve with servomotor , controlled by a high precision servomotor managed by microprocessor
- Pressure test point to the combustion head for primary, secondary air channel and gas
- Complete control panel with LMV52 control box and AZL52 panel

Conforming to:
- 2014/35/EU directive (Electromagnetic Compatibility)
- 2006/42/EC directive (Machinery)
- EN 676 (Gas burners) - Limited to the applicable parts
- EN 746-2 (Industrial thermoprocessing equipment) - Limited to the applicable parts.

Standard equipment:
- Screws for fixing the burner flange to the boiler
- Thermal screen
- Screws for fixing the gas train flange to the burner
- Gas train gasket
- Instruction handbook for installation, use and maintenance
- Spare parts catalogue
- Holder for burner opening (tube)

Required components to be ordered separetaly:
- Gas train equipped with 2 safety shut off valves and gas pressure regulator
- High pressure gas regulator train

Available accessories to be ordered separately:
- Adapter for gas train
- Flue gas recirculation butterfly valve with servomotor managed by microprocessor
- Flue gas recirculation temperature probe to prevent condensation inside the burner
- Complete control panel for burner management and monitoring for stand-alone installation.

Notes

Notes

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

TS0120UK01 01/2022

[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 100 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.

RIELLO S.p.A. - 37045 Legnago (VR) - Italy
tel. +39 0442 630111 - fax: +39 0442 21980
www.riello.com

RIELLO