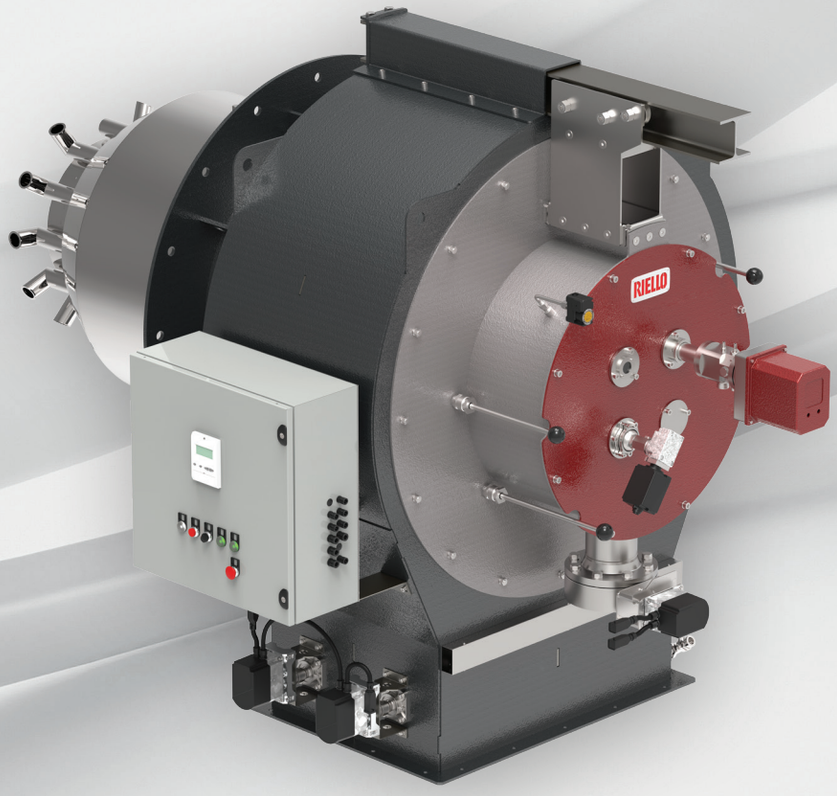
DR SE FGR SERIES

TECHNICAL DATA LEAFLET

Industrial Dual Block Gas Burners FGR Ready



RIELLO
Energy For Life

A Carrier Company

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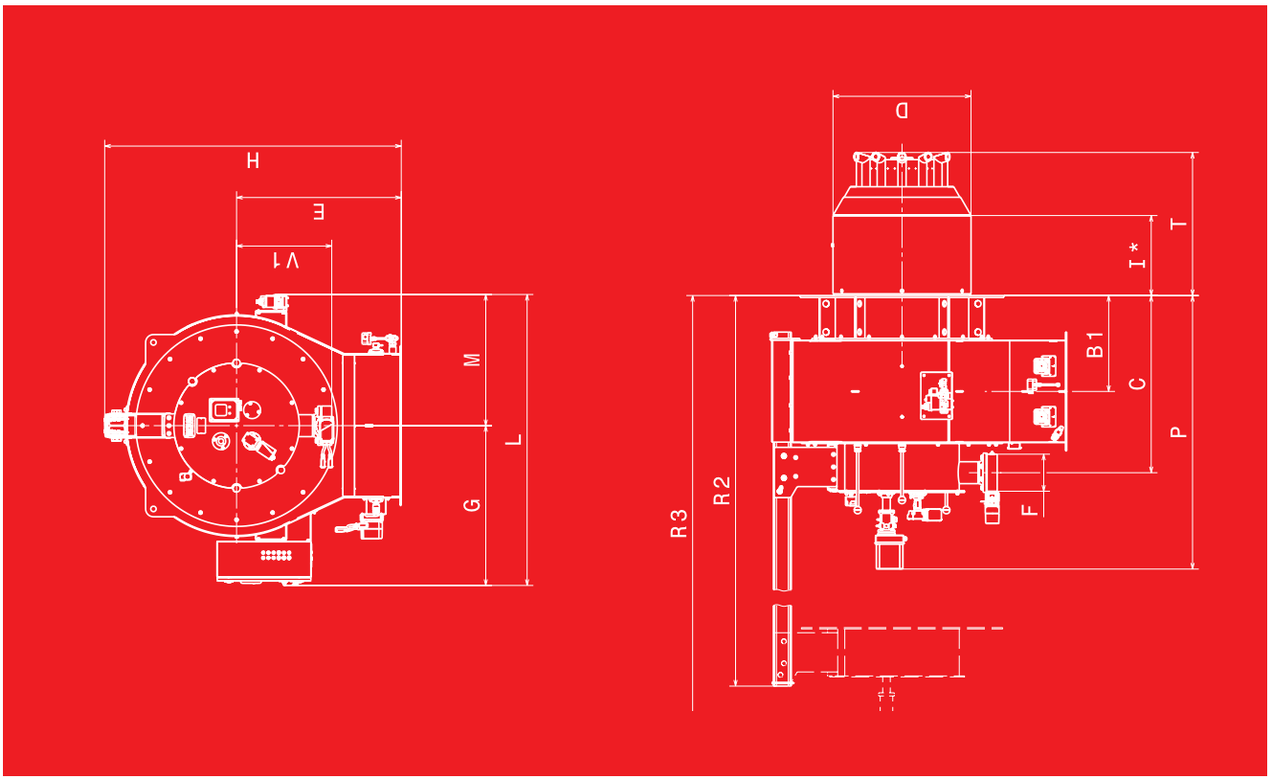
OVERVIEW

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 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 create 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	Min Head output	Max Head Output	UoM
DR 20 SE FGR	276,38	68,24	Mbtu/h
DR 25 SE FGR	68,24	85,30	Mbtu/h
DR 32 SE FGR	85,30	109,19	Mbtu/h
DR 40 SE FGR	109,19	136,49	Mbtu/h
DR 50 SE FGR	136,49	170,61	Mbtu/h
DR 65 SE FGR	170,61	221,79	Mbtu/h
DR 80 SE FGR	221,79	272,97	Mbtu/h



TECHNICAL DATA

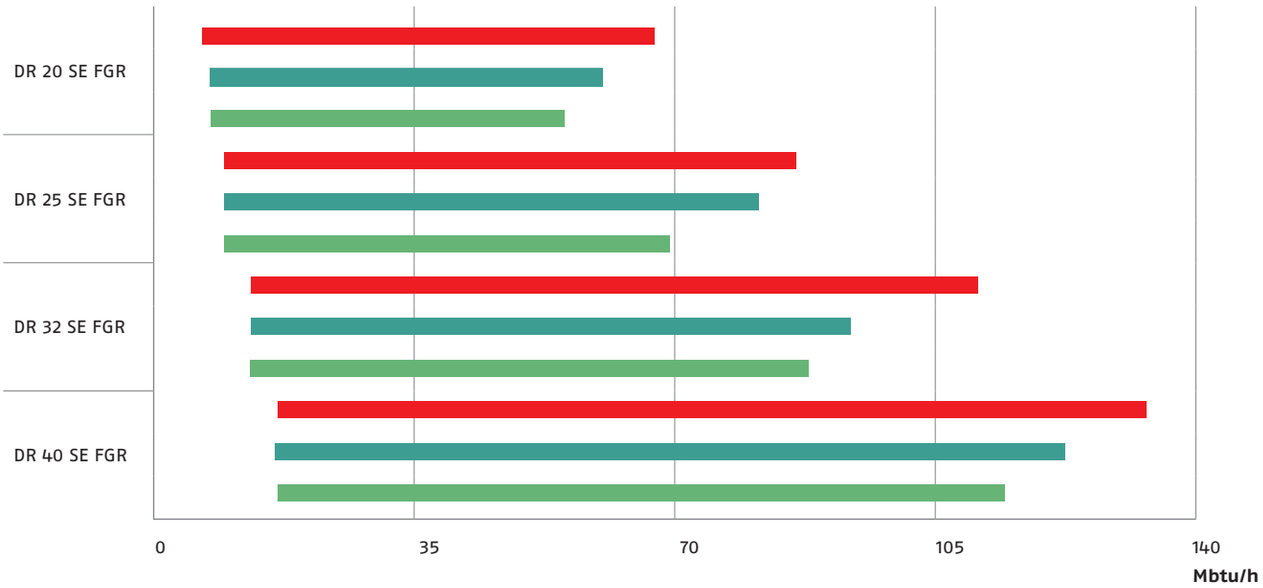
	UoM	DR 20	DR 25	DR 32	DR 40
Burner operation mode	–	Modulating (other fuels on request)			
Modulation ratio at maximum output	–	Up to 8:1			
Servomotor	–	SQM 45 / SQM 48			
Heat output – Natural Gas	Mbtu/h	54,59 ÷ 68,24	68,24 ÷ 85,30	85,30 ÷ 109,18	109,18 ÷ 136,48
Working temperature – min/max	°F	5 – 122			
FUEL/AIR DATA	**UoM**	**DR 20**	**DR 25**	**DR 32**	**DR 40**
Combustion air maximum temperature	°F	Up to 302			
Net calorific value	BTU/SCF	966,21			
Density kg/Nm3 0.71	lb/SCF	0,443			
Gas delivery	SCFH	5650–7062	7062–8828	8828–11299	11299–14124
ELECTRICAL DATA	**Type**	**DR 20**	**DR 25**	**DR 32**	**DR 40**
Electrical supply Ph/Hz/V 1/50/230 (*)	Ph/Hz/V	Available in different versions			
Control box Type	On board	LMV 52			
Protection level	IP	IP 54			
Ignition	–	Natural gas fired igniter			
Operation	–	Intermittent (at least 1 stop every 24 h)			
		Continuous (at least 1 stop every 72 h)			
EMISSIONS	**UoM**	**DR 20**	**DR 25**	**DR 32**	**DR 40**
G20 CO emission	ppm	mg/kWh < 100			
NOx emission	ppm	mg/kWh≤ 80 without FGR, ≤ 50 with 10% FGR (**)			
APPROVAL	–	Conforming to 2006/42/EC – 2014/35/EU – EN 676 (***) – EN 746-2 (***)			

	UoM	DR 50	DR 55	DR 80
Burner operation mode	–	Modulating (other fuels on request)		
Modulation ratio at maximum output	–	Up to 8:1		
Servomotor	–	SQM 45 / SQM 48		
Heat output – Natural Gas	Mbtu/h	136,48 ÷ 170,60	170,60 ÷ 221,78	221,78 ÷ 272,97
Working temperature – min/max	°F	5 – 122		
FUEL/AIR DATA	**UoM**	**DR 50**	**DR 55**	**DR 80**
Combustion air maximum temperature	°F	Up to 302		
Net calorific value	BTU/SCF	966,21		
Density kg/Nm3 0.71	lb/SCF	0,443		
Gas delivery	SCFH	14124–17655	17655–22951	22951–28248
ELECTRICAL DATA	**UoM**	**DR 50**	**DR 55**	**DR 80**
Electrical supply Ph/Hz/V 1/50/230 (*)	Ph/Hz/V	Available in different versions		
Control box Type	On board	LMV 52		
Protection level	IP	IP 54		
Ignition	–	Natural gas fired igniter		
Operation	–	Intermittent (at least 1 stop every 24 h)		
		Continuous (at least 1 stop every 72 h)		
EMISSIONS	**UoM**	**DR 50**	**DR 55**	**DR 80**
G20 CO emission	ppm	mg/kWh < 100		
NOx emission	ppm	mg/kWh≤ 80 without FGR, ≤ 50 with 10% FGR (**)		
APPROVAL	–	Conforming to 2006/42/EC – 2014/35/EU – EN 676 (***) – EN 746-2 (***)		

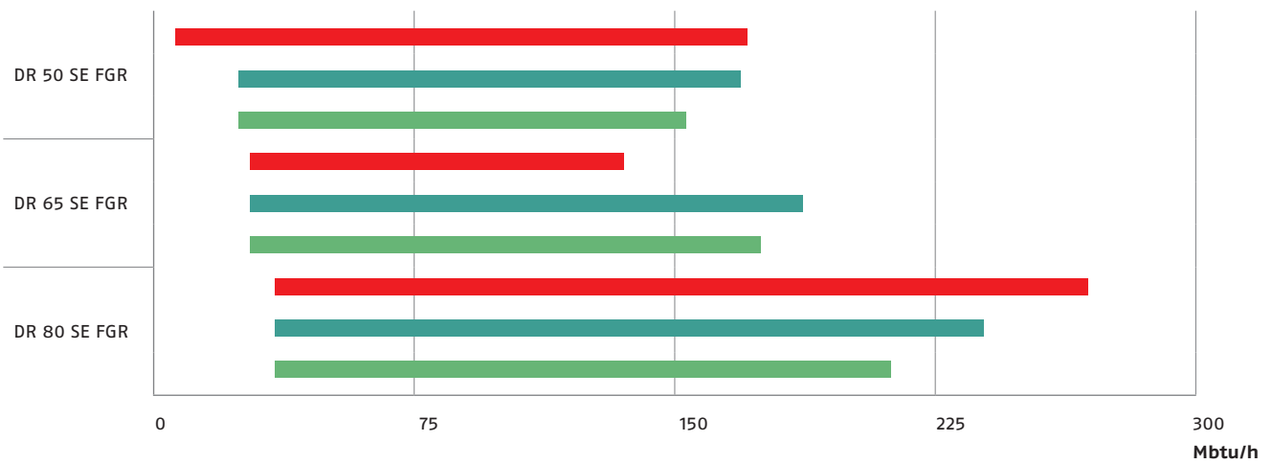
Reference conditions: Ambient temperature 20°C – Gas temperature 15°C – Barometric pressure 1013 mbar – Altitude 0 m a.s.l.
(*) Other electrical supply standards available on request
(**) Average value measured in test rig according to EN 676
(***) Limited to the applicable parts
For performance estimation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

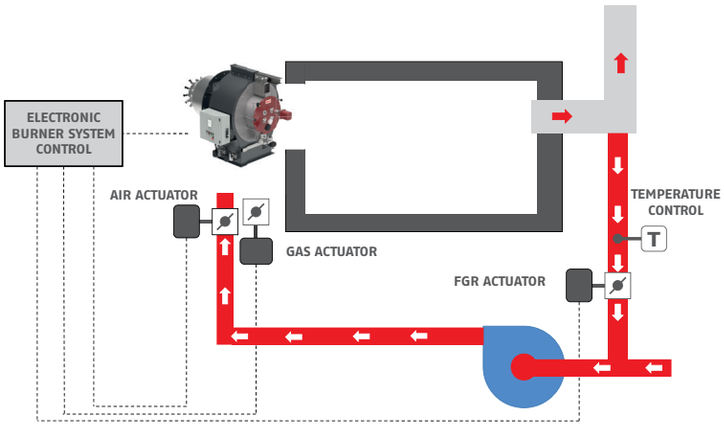
10 % FGR – Combustion air temperature 50°C

10 % FGR – Combustion air temperature 150°C

Test conditions conforming EN 676:
Temperature: 122 °F
Pressure: 147 psi
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 meet 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.

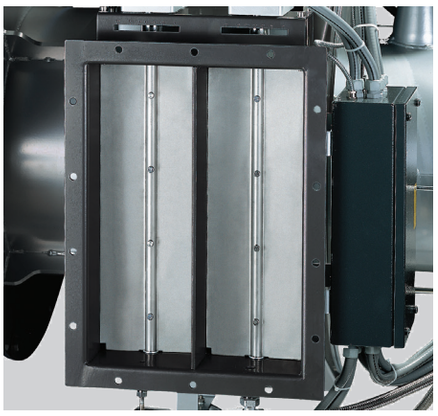


EXAMPLE OF AXIAL SWIRL REGISTER DEVICE (ON DEMAND)

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).

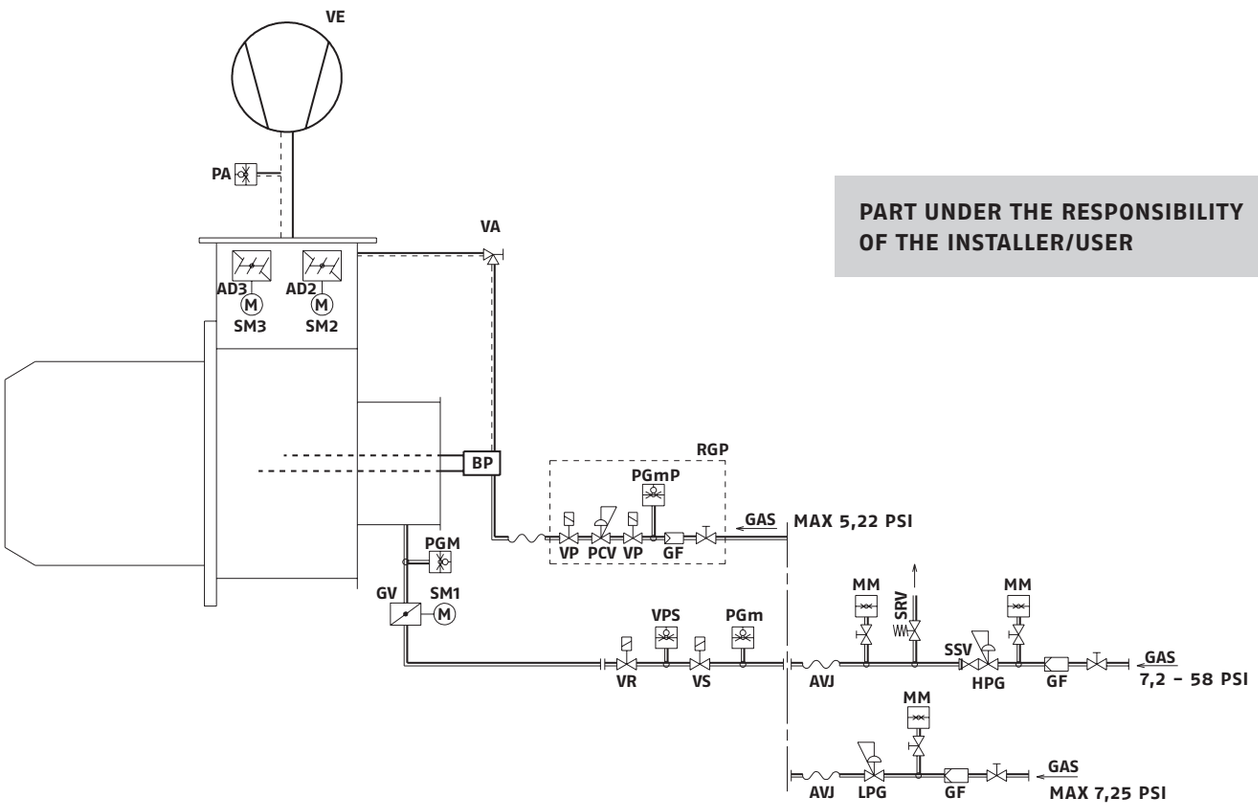
EXAMPLE OF AIR DAMPERS



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.



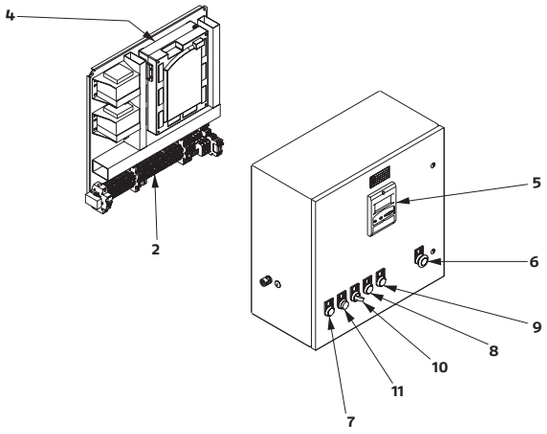
PART UNDER THE RESPONSIBILITY OF THE INSTALLER/USER

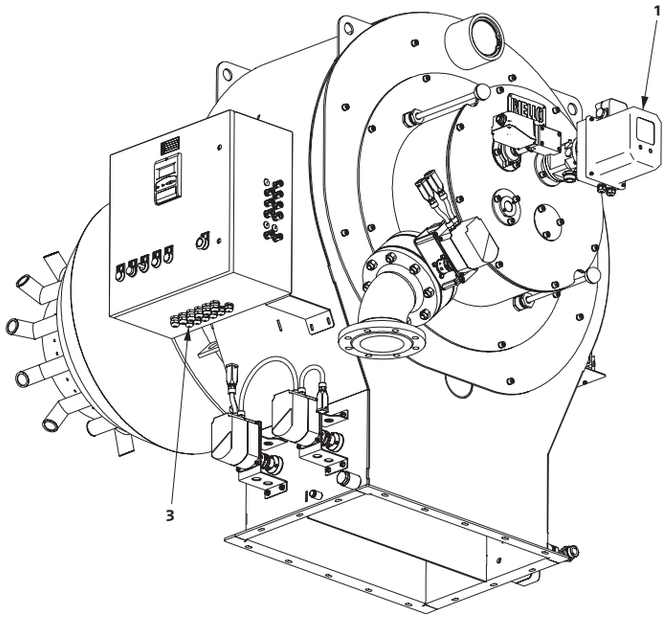
AD2	Primary air damper
AD3	Secondary air damper
BP	Pilot burner
AVJ	Vibration damping joint
GF	Gas butterfly valve
GV	High gas pressure regulator
HPG	Low gas pressure regulator
LPG	Pressure gauge
MM	Minimum air pressure switch
PA	Gas pressure sensor
VPS	Minimum gas pressure switch
PGm	Maximum gas pressure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

COMMISSIONING AND MAINTENANCE

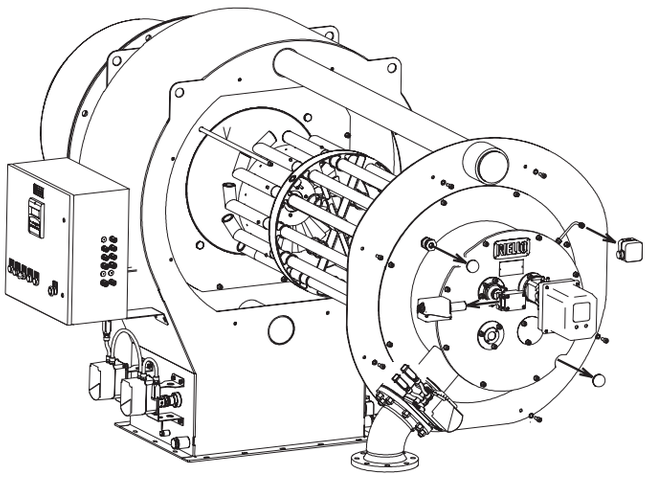
Optimized configuration for easy commissioning and manteinance.
Control panel with LMV52 and AZL 52 supplied on board as standard equipment. Signal lamps are installed on the control panel making easy to check burner operation. Ignition transfomer is installed directly on burner ignition pilot in order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

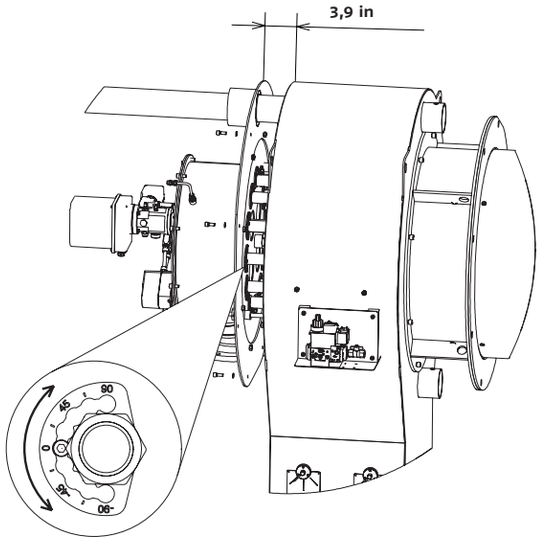




1 Ignition transformer integrated in the ignition pilot
2 Terminal board
3 Cable glands for external inlets
4 Electronic cam
5 Display
6 Stop push-button
7 Auxiliary lamp "ON"
8 Burner lamp "ON"
9 Fan lamp "ON"
10 "ON/OFF" selector
11 Push-button/Lock-out lamp/ Burner reset

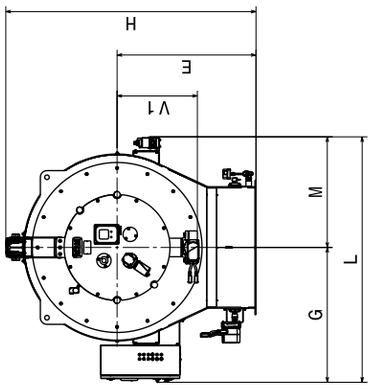
Extraction tube supplied as standard equipment for an easy manteinance operation and regulation of inner part of burner head.

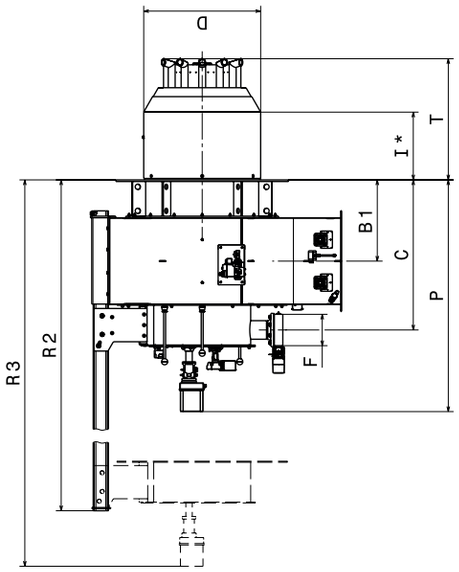




OVERALL DIMENSIONS (in)

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

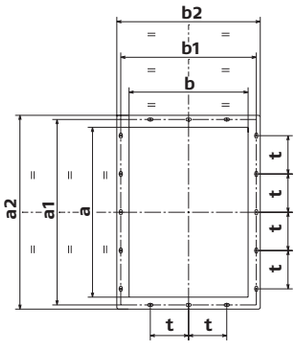




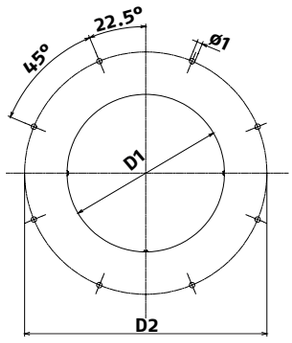
MODEL	B1	C	D	E	F	G	H	I	L	M	P	T	V1	R2	R3
DR 20	19,7	35,6	27,4	38,2	DN 125	35,8	61,8	17,8	64,6	28,7	56,6	30,7	20,2	103,2	119,2
DR 25	19,7	35,6	30,5	38,2	DN 125	35,8	61,8	17,8	64,6	28,7	56,7	31,7	20,2	103,2	119,2
DR 32	24,0	44,5	34,6	41,3	DN 125	40,1	74,4	20,1	73,2	33,1	68,9	35,8	24,1	134,8	152,7
DR 40	24,0	44,5	38,6	41,3	DN 125	40,1	74,4	20,1	73,2	33,1	68,9	37,8	24,1	134,8	152,7
DR 50	32,1	57,5	43,8	44,2	DN 150	42,1	79,1	23,8	77,2	35,0	81,9	44,5	26,3	163,4	182,8
DR 65	32,1	57,5	49,6	44,2	DN 150	42,1	79,1	23,8	77,2	35,0	81,9	46,2	26,3	163,4	182,3
DR 80	35,2	61,6	55,7	55,1	DN 200	42,3	95,9	32,1	82,9	40,5	89,1	58,0	32,9	182,7	202,7

BURNER – BOILER MOUNTING FLANGE

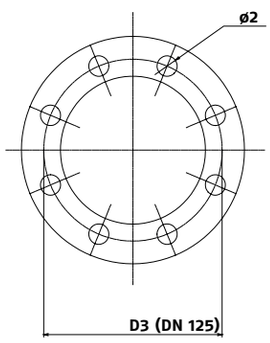
Air Duct Connection



Oiler Fixing



Gas Feeding



MODEL	B1	C	D	E	F	G	H	I	L	M	P	T	V1	R2	R3
DR 20	0,8	1,4	1,1	1,5	DN 125	1,4	2,4	0,7	2,5	1,1	2,3	1,2	0,8	4,1	4,7
DR 25	0,8	1,4	1,2	1,5	DN 125	1,4	2,4	0,7	2,5	1.132	2,2	1,2	0,8	4,1	4,7
DR 32	0,9	1,7	1,7	1,6	DN 125	1,6	2,9	0,8	2,9	1,3	2,7	1,4	0,9	5,3	6,0
DR 40	0,9	1,7	1,5	1,6	DN 125	1,6	2,9	0,8	2,9	1,3	2,7	1,5	0,9	5,3	6,0
DR 50	1,3	2,3	1,7	1,7	DN 150	1,6	3,1	0,9	3,0	1,4	3,2	1,7	1,0	6,4	7,2
DR 65	1,3	2,3	1,9	1,7	DN 150	1,6	3,1	0,9	3,0	1,4	3,2	1,8	1,0	6,4	7,2
DR 80	1,4	2,4	2,2	2,2	DN 200	1,7	3,8	1,3	3,3	1,6	3,5	2,3	1,3	7,2	7,9

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** = 302 F
	T200 = 392 F
	T250 = 482 F

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/m3 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.

Required components to be ordered separately:

- Gas train equipped with 2 safety shut off valves and gas pressure regulator
- High pressure gas regulator train
- Instruction handbook for installation, use and maintenance
- Spare parts catalogue
- Holder for burner opening (tube)

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)

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
- Holder for burner opening (tube)

MORE THAN 100 YEARS EXPERIENCE

Each RIELLO burner is the result of a long experience in design and manufacture, coupled with leading technology and flexible burner design. RIELLO has always believed and invested in the search for new materials and in the development of more advanced combustion technology.

OUR PRESENCE

RIELLO, World Leader in the production of gas, oil, dual fuel and Low NOx burners deliver outstanding performance across the full range of residential and commercial heating applications, as well as in industrial processes.
The RIELLO Combustion Research Centre represents one of the most modern facilities 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-structured and efficient sales network, alongside many important Training Centres located in various countries to meet its customers' needs.

With headquarters in Legnago (Northern Italy), RIELLO has been manufacturing premium quality burners for more than 100 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.

RIELLO

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Since the Company is constantly engaged in the production improvement,
the aesthetic and dimensional features, the technical data, the equipment and the accessories can be changed.