

## DB SERIES

The new DB burners platform represents the evolution in Riello Burners industrial product range.

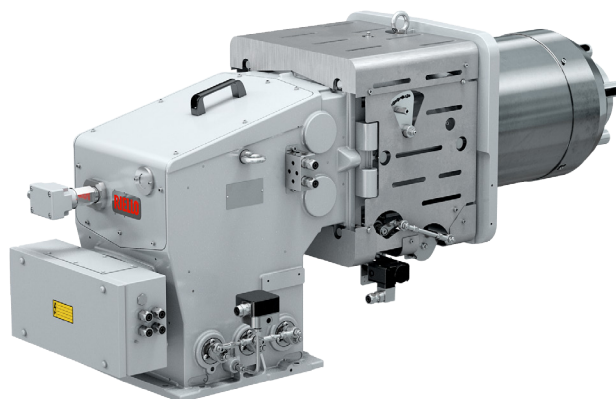
They are dual block burners for application in big plants (district heating, hospitals) as well as in food, chemicals, textile industry for matching with hot water boilers, steam and thermal oil generators.

DB series burners can be supplied with electronic or mechanical air-fuel ratio control according to customer specification.

DB 9-12-16-20 are equipped with pilot ignition, while for DB 4-6 models it can be supplied on demand. DB series can work with pre-heated air up to 150°C as standard, up to 250°C with special construction. New variable geometry combustion head allows to reach < 80 mg/kWh NOx emission on natural gas operations.

An hinge system for easier combustion head maintenance is available on all models.

As part of the offer, various accessories (air fan, control panels, high pressure gas train, etc) are available.

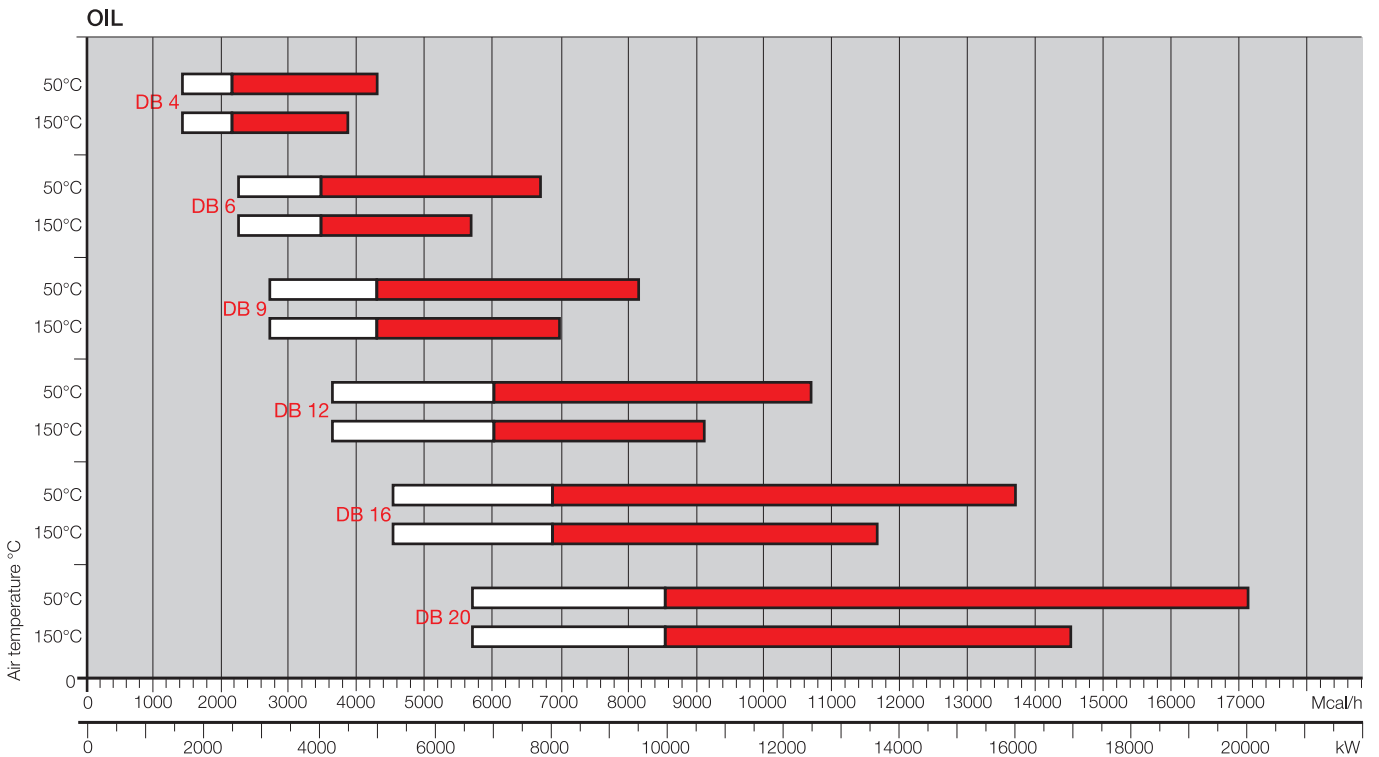
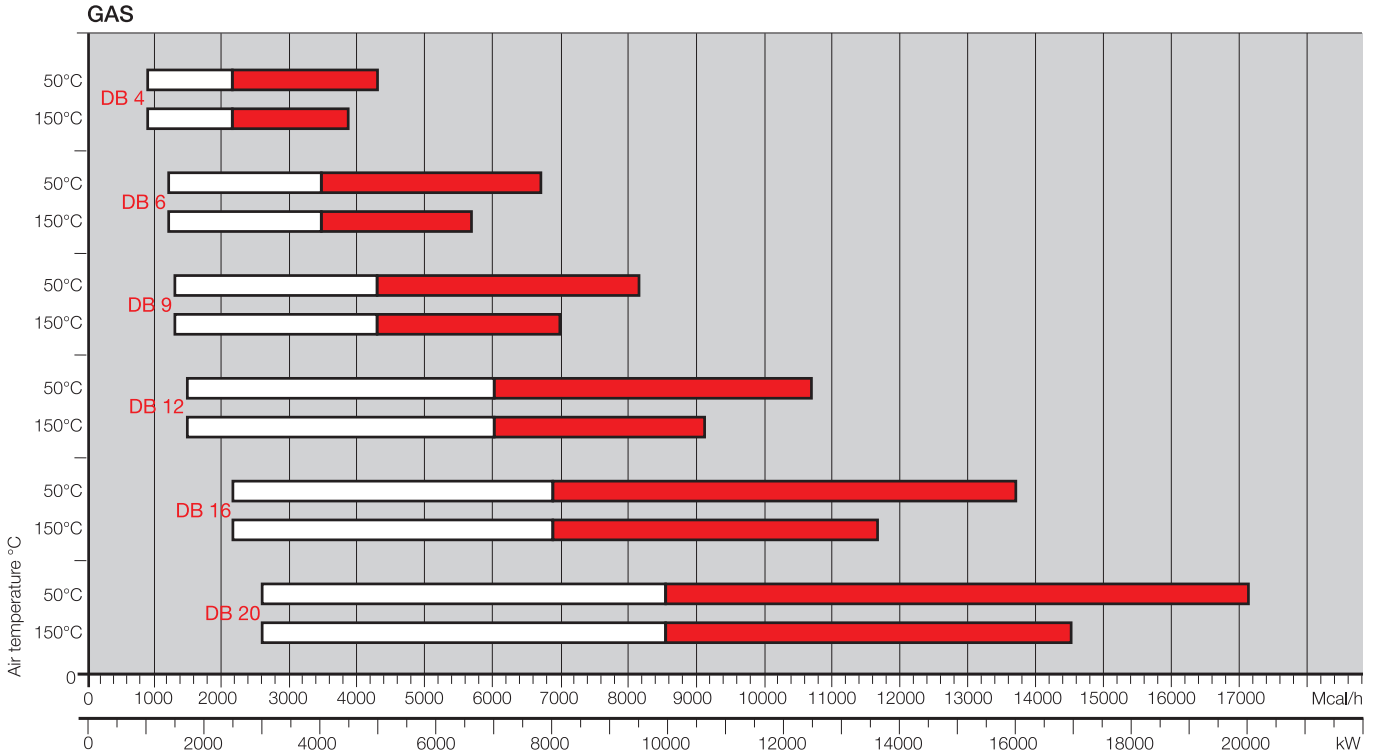


DB 4	1000/2500 ÷	5000 kW
DB 6	1400/4000 ÷	7800 kW
DB 9	1500/5000 ÷	9500 kW
DB 12	1700/7000 ÷	12500 kW
DB 16	2500/8000 ÷	16000 kW
DB 20	3000/10000 ÷	20000 kW

# Industrial Dual Block Oil, Gas and Dual Fuel Burners

## DB SERIES

### FIRING RATES



Modulation range Working field

Test conditions conforming to EN 267- EN676

Temperature: 20°C

Pressure: 1013.5 mbar

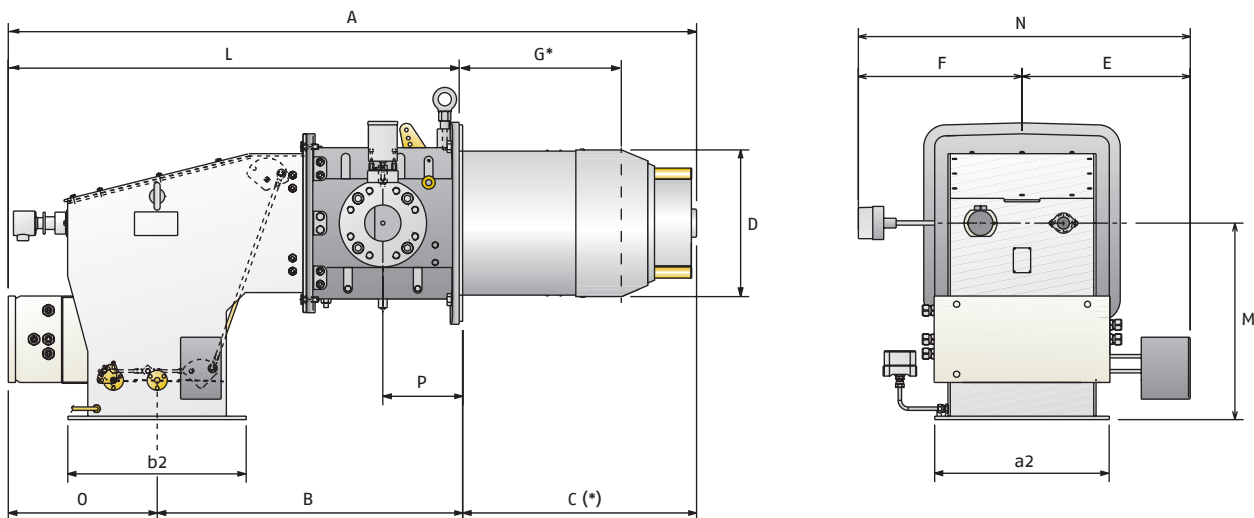
Altitude: 100 m a.s.l.

## DB SERIES

### Overall dimensions (mm)

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

#### BURNER



MODEL	A	B	C	D	E	F	L (L*)	M	N	O	P
▶ DB 4	1577	700	536	313	385	375	1033 (1217)	450	760	341	183
▶ DB 6	1577	700	536	363	385	375	1033 (1217)	450	760	341	183
▶ DB 9	1857	851	662	413	420	333	1195 (1539)	550	753	344	208
▶ DB 12	1857	851	662	456	420	333	1195 (1539)	550	753	344	208
▶ DB 16	2080	852	797	544	486	448	1283 (1600)	761	934	431	258
▶ DB 20	2080	852	797	590	486	448	1283 (1600)	761	934	431	258

L = gas version

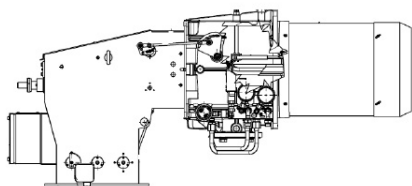
L\* = oil and dual fuel versions

a2 - b2 = see "Burner-boiler mounting flange" dimensions table

(\*) Instructions about how to realize the fettling are reported in the manual of the burner in the chapter "Fixing to the boiler".

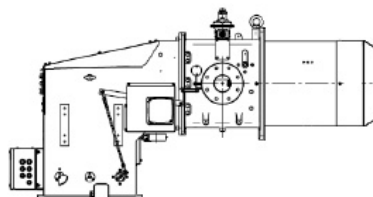
### GAS CONNECTIONS

DB 4: DN 65  
DB 6: DN 80



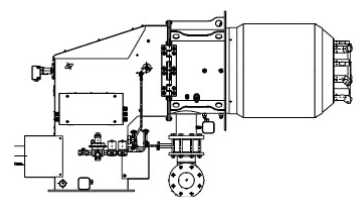
DN 65 gas connection from below  
Elbow adapter DN 65 required  
DN 80 gas connection from below (for gas versions). Elbow adapter DN 80 required.

DB 9 - 12



DN 80 gas connection from below (for gas versions). Elbow adapter DN 80 required.

DB 16 - 20



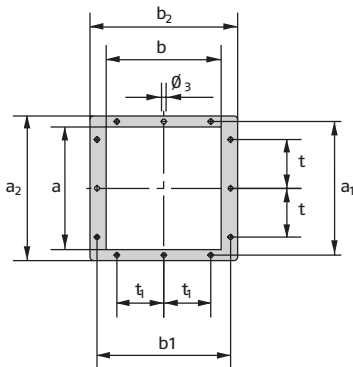
DN 100 gas connection from the side  
Elbow 100/100 adapter already included as standard equipment

## DB SERIES

### Overall dimensions (mm)

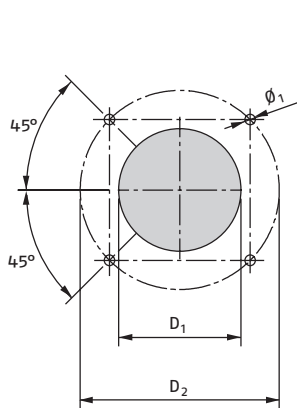
#### BURNER - BOILER MOUNTING FLANGE

AIR DUCT CONNECTION

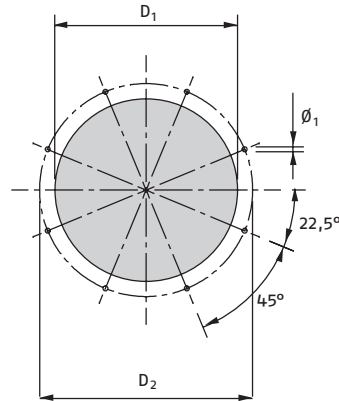


FIXING TO THE BOILER

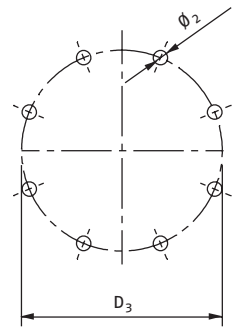
DB 4 - 6 - 9 - 12



DB 16 - 20



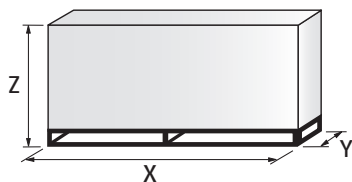
GAS SUPPLY



MODEL	a	a <sub>1</sub>	a <sub>2</sub>	b	b <sub>1</sub>	b <sub>2</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	t	t <sub>1</sub>	Ø <sub>1</sub>	Ø <sub>2</sub>	Ø <sub>3</sub>
▶ DB 4	329	370	400	308	370	409	350	452	145 - DN 65	130	130	M18	4x45°M16	13
▶ DB 6	329	370	400	308	370	409	380	495	160 - DN80	130	130	M18	M16	13
▶ DB 9	436	476	506	400	440	470	420	608	160 - DN 80	200	180	M20	M18	11
▶ DB 12	436	476	506	400	440	470	465	608	160 - DN 80	200	180	M20	18	11
▶ DB 16	562	620	652	452	510	542	560	700	180 - DN 100	260	205	M16	18	11
▶ DB 20	562	620	652	452	510	542	600	700	160 - DN 100	260	205	M16	18	11

#### PACKAGING

Overall dimensions and weights to estimate the delivery.

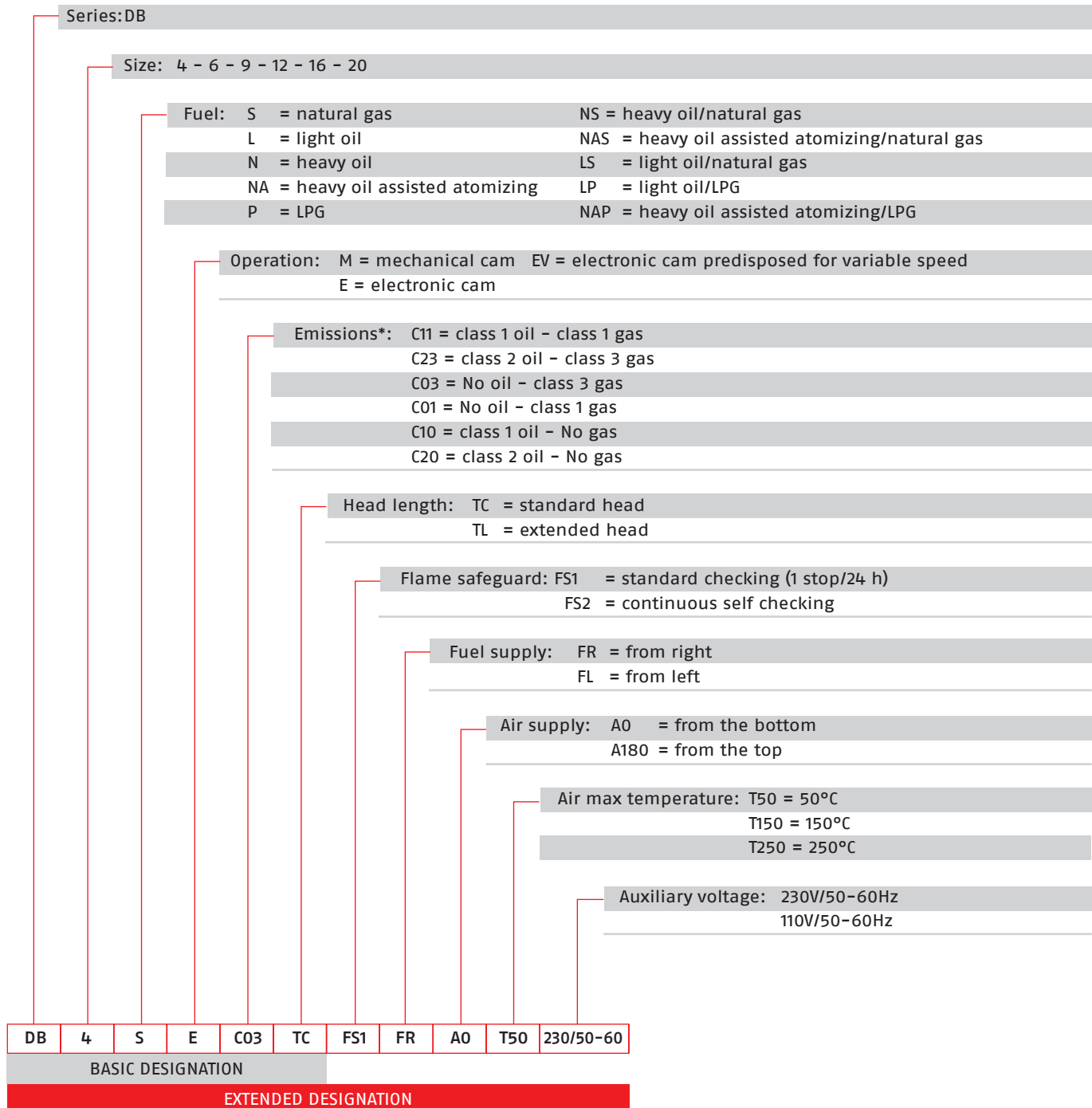


MODEL	X	Y	Z	kg
▶ DB 4	2100	1000	1200	200
▶ DB 6	2040	1180	1125	200
▶ DB 9	2040	1180	1125	270
▶ DB 12	2040	1180	1125	250
▶ DB 16	2200	1000	1300	530
▶ DB 20	2200	1000	1300	550

## DB SERIES

# Specification

## DESIGNATION OF SERIES



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

## DB SERIES

# Specification

## DB SERIES - STATE OF SUPPLY

### All burners

Dual block forced draught burner, two stages progressive or modulating operation (with a kit), separate supply, fully automatic, made up of:

- Air damper for air setting with variable profile cam controlled by a servomotor (version /M – mechanical cam)
- Air damper for air setting with air servomotor managed by microprocessor (version /E – electronic cam)
- Variable geometry combustion head that can be set according the required output
- Combustion head servomotor managed by microprocessor (version /E – electronic cam DB16-20 only)
- Pilot burner with two gas valves and pressure regulator (as standard on DB9-12-16-20 only)
- Minimum air pressure switch
- Flame inspection window
- Electrical interface box with ignition transformer inside
- Opening hinge to have easier combustion head inspection and maintenance
- IP54 protection level.

### Oil Burner

- Photocell for flame detection
- Nozzle pipe
- Safety nozzle valve
- Oil lance without nozzle (nozzle must be ordered separately)
- Valves group with safety oil valves
- Oil capacity regulator controlled by air servomotor linkage (version /M – mechanical cam)
- Oil capacity regulator with servomotor managed by microprocessor (version /E – electronic cam)
- Maximum oil pressure switch on the return circuit
- Pressure gauge on delivery and return circuit.

### Standard equipment:

- screws for fixing the burner flange to the boiler
- thermal screen
- instruction handbook for installation, use and maintenance
- spare parts catalogue.

### Gas Burner

- Photocell for flame detection
- Maximum gas pressure switch
- Butterfly gas valve controlled by air servomotor linkage (version /M – mechanical cam)
- Butterfly gas valve with servomotor managed by microprocessor (version /E – electronic cam)
- Gas pressure test point to the combustion head.

### 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
- high voltage burner ignition for DB 4÷6
- pilot burner ignition for DB 9÷20 (for DB 4÷6 on demand)
- instruction handbook for installation, use and maintenance
- spare parts catalogue.

### Dual fuel Burner (Oil/Gas)

- Photocell for flame detection
- Nozzle pipe
- Safety nozzle valve

## DB SERIES

# Specification

### DB SERIES - STATE OF SUPPLY

- Oil lance without nozzle (nozzle must be ordered separately)
- Valves group with safety oil valves
- Oil capacity regulator controlled by air servomotor linkage (version /M – mechanical cam)
- Oil capacity regulator with servomotor managed by microprocessor (version /E – electronic cam)
- Maximum oil pressure switch on the return circuit
- Pressure gauge on delivery and return circuit
- Maximum gas pressure switch
- Butterfly gas valve controlled by air servomotor linkage (version /M – mechanical cam)
- Gas/oil servomotor managed by microprocessor (version /E – electronic cam) for butterfly gas valve / oil capacity regulator control
- Gas pressure test point to the combustion head.

#### 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
- high voltage burner ignition for DB 4÷6
- pilot burner ignition for DB 9÷20 (for DB 4÷6 on demand)
- instruction handbook for installation, use and maintenance
- spare parts catalogue.

# Industrial Dual Block Oil, Gas and Dual Fuel Burners

## DB SERIES

### Models available

#### Burners

	MODEL **						FUEL	HEAT OUTPUT *		
								(kW)	OIL (kg/h)	GAS (Nm <sup>3</sup> /h)
LOW NOX MODELS	DB 4	SE	TC	A 0	FS1	230/50-60 Hz	Natural gas	1000/2500-5000	-	500
	DB 4	SE	TC	A 180	FS1	230/50-60 Hz	Natural gas		-	500
	DB 6	SE	TC	A 0	FS1	230/50-60 Hz	Natural gas	1400/4000-7800	-	780
	DB 6	SE	TC	A 180	FS1	230/50-60 Hz	Natural gas		-	780
	DB 9	SE	TC	A 0	FS1	230/50-60 Hz	Natural gas	1500/5000-9500	-	950
	DB 9	SE	TC	A 180	FS1	230/50-60 Hz	Natural gas		-	950
	DB 12	SE	TC	A 0	FS1	230/50-60 Hz	Natural gas	1700/7000-12500	-	1250
	DB 12	SE	TC	A 180	FS1	230/50-60 Hz	Natural gas		-	1250
	DB 16	SE	TC	A 0	FS1	230/50-60 Hz	Natural gas	2500/8000-16000	-	1600
	DB 16	SE	TC	A 180	FS1	230/50-60 Hz	Natural gas		-	1600
DB 20	SE	TC	A 0	FS1	230/50-60 Hz	Natural gas	3000/10000-20000	-	2000	
DB 20	SE	TC	A 180	FS1	230/50-60 Hz	Natural gas		-	2000	
OTHER MODELS AVAILABLE	DB 4	SM	TC	A 0	FS1	230/50-60 Hz	Natural gas	1000/2500-5000	-	500
	DB 4	SM	TC	A 180	FS1	230/50-60 Hz	Natural gas		-	500
	DB 4	LE	TC	A 0	FS1	230/50-60 Hz	Light oil		422	-
	DB 4	LE	TC	A 180	FS1	230/50-60 Hz	Light oil		422	-
	DB 4	LSE	TC	A 0	FS1	230/50-60 Hz	Light oil / Natural gas		422	500
	DB 4	LSE	TC	A 180	FS1	230/50-60 Hz	Light oil / Natural gas		422	500
	DB 4	LSM	TC	A 0	FS1	230/50-60 Hz	Light oil / Natural gas		422	500
	DB 4	LSM	TC	A 180	FS1	230/50-60 Hz	Light oil / Natural gas		422	500
	DB 4	NM	TC	A 0	FS1	230/50-60 Hz	Heavy oil		450	-
	DB 4	NM	TC	A 180	FS1	230/50-60 Hz	Heavy oil		450	-
	DB 4	NSM	TC	A 0	FS1	230/50-60 Hz	Heavy oil / Natural gas		450	500
	DB 4	NSM	TC	A 180	FS1	230/50-60 Hz	Heavy oil / Natural gas		450	500
	DB 6	SM	TC	A 0	FS1	230/50-60 Hz	Natural gas		-	780
	DB 6	SM	TC	A 180	FS1	230/50-60 Hz	Natural gas		-	780
	DB 6	LE	TC	A 0	FS1	230/50-60 Hz	Light oil		658	-
	DB 6	LE	TC	A 180	FS1	230/50-60 Hz	Light oil		658	-
	DB 6	LSE	TC	A 0	FS1	230/50-60 Hz	Light oil / Natural gas		658	780
	DB 6	LSE	TC	A 180	FS1	230/50-60 Hz	Light oil / Natural gas		658	780
	DB 6	LSM	TC	A 0	FS1	230/50-60 Hz	Light oil / Natural gas		658	780
	DB 6	LSM	TC	A 180	FS1	230/50-60 Hz	Light oil / Natural gas		658	780
DB 6	NM	TC	A 0	FS1	230/50-60 Hz	Heavy oil	703	-		
DB 6	NM	TC	A 180	FS1	230/50-60 Hz	Heavy oil	703	-		
DB 6	NSM	TC	A 0	FS1	230/50-60 Hz	Heavy oil / Natural gas	703	780		
DB 6	NSM	TC	A 180	FS1	230/50-60 Hz	Heavy oil / Natural gas	703	780		
DB 9	SM	TC	A 0	FS1	230/50-60 Hz	Natural gas	1500/5000-9500	-	950	
DB 9	SM	TC	A 180	FS1	230/50-60 Hz	Natural gas		-	950	
DB 9	LE	TC	A 0	FS1	230/50-60 Hz	Light oil		801	-	
DB 9	LE	TC	A 180	FS1	230/50-60 Hz	Light oil		801	-	
DB 9	LSE	TC	A 0	FS1	230/50-60 Hz	Light oil / Natural gas		801	950	
DB 9	LSE	TC	A 180	FS1	230/50-60 Hz	Light oil / Natural gas		801	950	
DB 9	LSM	TC	A 0	FS1	230/50-60 Hz	Light oil / Natural gas		801	950	
DB 9	LSM	TC	A 180	FS1	230/50-60 Hz	Light oil / Natural gas		801	950	

\* Max capacity is referred to:

Light oil net calorific value 11,8 kWh/kg - 10200 kcal/kg - Viscosity at 20°C 4-6 mm<sup>2</sup>/s (cSt)  
 Heavy oil net calorific value 11,1-11,3 kWh/kg - 9545-9720 kcal/kg - Viscosity at 20°C 500 mm<sup>2</sup>/s (cSt)  
 G20 net calorific value 10 kWh/Nm<sup>3</sup> - Density 0,71 kg/Nm<sup>3</sup>  
 G25 net calorific value 8,6 kWh/Nm<sup>3</sup> - Density 0,78 kg/Nm<sup>3</sup>  
 LPG net calorific value 25,8 kWh/Nm<sup>3</sup> - Density 2,02 kg/Nm<sup>3</sup>

\*\* FS1 operation as standard. FS2 on demand.



## DB SERIES

## Models available

### Burners

	MODEL **						FUEL	HEAT OUTPUT *		
								(kW)	OIL (kg/h)	GAS (Nm <sup>3</sup> /h)
OTHER MODELS AVAILABLE	DB 9	LSM	TC	A 180	FS1	230/50-60 Hz	Light oil / Natural gas	1500/5000-9500	801	950
	DB 9	NM	TC	A 0	FS1	230/50-60 Hz	Heavy oil		856	-
	DB 9	NM	TC	A 180	FS1	230/50-60 Hz	Heavy oil		856	-
	DB 9	NSM	TC	A 0	FS1	230/50-60 Hz	Heavy oil / Natural gas		856	950
	DB 9	NSM	TC	A 180	FS1	230/50-60 Hz	Heavy oil / Natural gas		856	950
	DB 12	SM	TC	A 0	FS1	230/50-60 Hz	Natural gas	1700/7000-12500	-	1250
	DB 12	SM	TC	A 180	FS1	230/50-60 Hz	Natural gas		-	1250
	DB 12	LE	TC	A 0	FS1	230/50-60 Hz	Light oil		1054	-
	DB 12	LE	TC	A 180	FS1	230/50-60 Hz	Light oil		1054	-
	DB 12	LSE	TC	A 0	FS1	230/50-60 Hz	Light oil / Natural gas		1054	1250
	DB 12	LSE	TC	A 180	FS1	230/50-60 Hz	Light oil / Natural gas		1054	1250
	DB 12	LSM	TC	A 0	FS1	230/50-60 Hz	Light oil / Natural gas		1054	1250
	DB 12	LSM	TC	A 180	FS1	230/50-60 Hz	Light oil / Natural gas		1054	1250
	DB 12	NM	TC	A 0	FS1	230/50-60 Hz	Heavy oil		1126	-
	DB 12	NM	TC	A 180	FS1	230/50-60 Hz	Heavy oil		1126	-
	DB 12	NSM	TC	A 0	FS1	230/50-60 Hz	Heavy oil / Natural gas		1126	1250
	DB 12	NSM	TC	A 180	FS1	230/50-60 Hz	Heavy oil / Natural gas		1126	1250
	DB 16	SM	TC	A 0	FS1	230/50-60 Hz	Natural gas	2500/8000-16000	-	1600
	DB 16	SM	TC	A 180	FS1	230/50-60 Hz	Natural gas		-	1600
	DB 16	LE	TC	A 0	FS1	230/50-60 Hz	Light oil		1349	-
DB 16	LE	TC	A 180	FS1	230/50-60 Hz	Light oil	1349		-	
DB 16	LSE	TC	A 0	FS1	230/50-60 Hz	Light oil / Natural gas	1349		1600	
DB 16	LSE	TC	A 180	FS1	230/50-60 Hz	Light oil / Natural gas	1349		1600	
DB 16	LSM	TC	A 0	FS1	230/50-60 Hz	Light oil / Natural gas	1349		1600	
DB 16	LSM	TC	A 180	FS1	230/50-60 Hz	Light oil / Natural gas	1349		1600	
DB 16	NM	TC	A 0	FS1	230/50-60 Hz	Heavy oil	1441		-	
DB 16	NM	TC	A 180	FS1	230/50-60 Hz	Heavy oil	1441		-	
DB 16	NSM	TC	A 0	FS1	230/50-60 Hz	Heavy oil / Natural gas	1441	1600		
DB 16	NSM	TC	A 180	FS1	230/50-60 Hz	Heavy oil / Natural gas	1441	1600		
DB 20	SM	TC	A 0	FS1	230/50-60 Hz	Natural gas	3000/10000-20000	-	2000	
DB 20	SM	TC	A 180	FS1	230/50-60 Hz	Natural gas		-	2000	
DB 20	LE	TC	A 0	FS1	230/50-60 Hz	Light oil		1686	-	
DB 20	LE	TC	A 180	FS1	230/50-60 Hz	Light oil		1686	-	
DB 20	LSE	TC	A 0	FS1	230/50-60 Hz	Light oil / Natural gas		1686	2000	
DB 20	LSE	TC	A 180	FS1	230/50-60 Hz	Light oil / Natural gas		1686	2000	
DB 20	LSM	TC	A 0	FS1	230/50-60 Hz	Light oil / Natural gas		1686	2000	
DB 20	LSM	TC	A 180	FS1	230/50-60 Hz	Light oil / Natural gas		1686	2000	
DB 20	NM	TC	A 0	FS1	230/50-60 Hz	Heavy oil		1802	-	
DB 20	NM	TC	A 180	FS1	230/50-60 Hz	Heavy oil		1802	-	
DB 20	NSM	TC	A 0	FS1	230/50-60 Hz	Heavy oil / Natural gas	1802	2000		
DB 20	NSM	TC	A 180	FS1	230/50-60 Hz	Heavy oil / Natural gas	1802	2000		

\* Max capacity is referred to:

Light oil net calorific value 11,8 kWh/kg - 10200 kcal/kg - Viscosity at 20°C 4-6 mm<sup>2</sup>/s (cSt)

Heavy oil net calorific value 11,1-11,3 kWh/kg - 9545-9720 kcal/kg - Viscosity at 20°C 500 mm<sup>2</sup>/s (cSt)

G20 net calorific value 10 kWh/Nm<sup>3</sup> - Density 0,71 kg/Nm<sup>3</sup>

G25 net calorific value 8,6 kWh/Nm<sup>3</sup> - Density 0,78 kg/Nm<sup>3</sup>

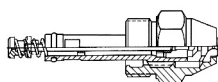
LPG net calorific value 25,8 kWh/Nm<sup>3</sup> - Density 2,02 kg/Nm<sup>3</sup>

\*\* FS1 operation as standard. FS2 on demand.

Other versions are available on request.

### Burner accessories

#### Nozzles for DB 4 - 6 - 9 - 12 - 16 - 20



The nozzles must be ordered separately. The following table shows the features and codes on the basis of the maximum required fuel output. One nozzle required for each burner, able to guarantee the calculated oil delivery.

BURNER	RATED DELIVERY ton/h*	RATED DELIVERY kg/h	NOZZLES TYPE W2 - 45° CODE	RATED DELIVERY kg/h	NOZZLES TYPE B5 - 45° - AA CODE	RATED DELIVERY kg/h	NOZZLES TYPE CT5 - 45° CODE
▶ DB 4 - 6 - 9	3	200	3045438	200	3009800		
		225	3045440	225	3009801		
		250	3045442	250	3009802		
	4	275	3045444	275	3009803		
		300	3045446	300	3009804		
		325	3045448	325	3009805		
	5	350	3045450	350	3009806		
		375	3045452	375	3009807		
	6	400	3045454	400	3009808		
		425	3045455	425	3009809		
▶ DB 6 - 9		450	3045456	450	3009810		
		475	3045457	475	3009811		
		500	3045458	500	3009812		
		525	3045459	525	3009813		
	8	550	3045460	550	3009814		
		575	3045461	575	3009815		
		600	3045462	600	3009816		
		650	3045463	650	3009817		
		700	3045464	700	3009818		
		750	3045465	750	3009819		
▶ DB 9				800	3009820		
	12			850	3009821		
▶ DB 12						700	20006462
▶ DB 12 - 16						800	20006465
▶ DB 12 - 16 - 20						900	20006468
	15					1000	20006469
	16					1100	20006470
▶ DB 16 - 20						1200	20006471
	18					1300	20006472
	20					1400	20006473
						1500	20006474
▶ DB 20						1600	20006475
						1700	20006476
	25					1800	20006477

Nozzles:

W2 maximum modulating ratio 1:4 (interchangeable with B5)

B5 maximum modulating ratio 1:5 (interchangeable with W2)

CT5 maximum modulating ratio 1:5 bigger shape

\*steam boiler size according to:

N.C.V. heavy oil = 11,16 kWh/kg

combustion air = 50°C

1 ton/h = 775 kW (eff = 90%)

For steam/air assisted atomizing, special nozzles available on demand.

## DB SERIES

### Burner accessories

#### High pressure flexible tubes



In order to facilitate the connection of the burner to the fuel line adduction there are flexible tubes available according to the following table.

BURNER	TUBE DIAMETER	TUBE LENGTH (mm)	MAXIMUM WORKING PRESSURE (bar)	TUBE CODE
▶ DB 4 - 6	1/2"	1500	40	3094227
▶ DB 9 - 12 - 16 - 20	3/4"	2000	40	3094226

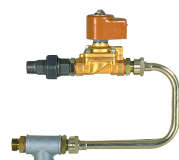
#### High pressure oil filter



In order to protect the hydraulic circuit of the burner from the possible presence of particles in the combustion line, these following filters are available.

BURNER	FILTER DIAMETER	FILTERING DEGREE (µm)	FILTER CODE
▶ DB 4 - 6	1/2"	500	3091881
▶ DB 9 - 12 - 16 - 20	3/4"	500	in progress

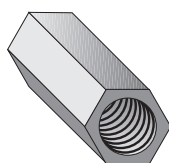
#### Circulation group (by-pass valve)



If the burner is far away from the pumping group it is possible to install a circulation group that allows the circulates of the heated fuel during the stand-by phase.

BURNER	GROUP DIAMETER	GROUP CODE
▶ DB 4 - 6	1/2"	in progress
▶ DB 9 - 12 - 16 - 20	3/4"	in progress

#### Check valve



In order to avoid fuel return, that could damage the hydraulic circuit, "check valve" are available.

BURNER	VALVE DIAMETER	VALVE CODE
▶ DB 4 - 6	1/2"	in progress
▶ DB 9 - 12 - 16 - 20	3/4"	3012660

#### Potentiometer kit



Depending on the servomotor fitted to the burner, a three-pole potentiometer (1000 Ω) can be installed to check the position of the servomotor. The KITS available for the various burners are listed below.

BURNER	POTENTIOMETER KIT CODE
▶ DB 4 - 6 - 9 - 12 - 16 - 20	3010021