

TECHNICAL MANUAL **BURNERS**

TECHNICAL SPECIFICATIONS

Model	Part.no	Emission class	Thermal Output kW	Diesel flow rate kg/h	Fuel viscosity °E at 20°C	Electrical power supply	Electrical power absorbed kW	Motor power kW	Noise dBA 1)
BTL 3	35450010		17.8 ÷ 42.7	1.5 ÷ 3.6	1.5	1N AC 50Hz 230V	0.14	0.09	62
BTL 3 H	35450011		16.6 ÷ 42.7	1.4 ÷ 3.6	1.5	1N AC 50Hz 230V	0.25	0.09	62
RiNOx 35 L	35470050	Class 3	19 ÷ 40	1.6 ÷ 3.4	1.5	1N AC 50Hz 230V	0.27	0.11	64
BTL 4	35490010		26.0 ÷ 56.1	2.2 ÷ 4.7	1.5	1N AC 50Hz 230V	0.16	0.11	64
BTL 4 H	35490011		26.0 ÷ 56.1	2.2 ÷ 4.7	1.5	1N AC 50Hz 230V	0.27	0.11	64
BTL 4 P	35500010		26.0 ÷ 56.1	2.2 ÷ 4.7	1.5	1N AC 50Hz 230V	0.16	0.11	64
BTL 6	35510010		31.9 ÷ 74.3	2.7 ÷ 6.3	1.5	1N AC 50Hz 230V	0.16	0.11	64
RiNOx 60 L	35510050	Class 3	38 ÷ 74	3.2 ÷ 6.2	1.5	1N AC 50Hz 230V	0.16	0.11	64
BTL 6 P	35520010		31.9 ÷ 74.3	2.7 ÷ 6.3	1.5	1N AC 50Hz 230V	0.16	0.11	64
RiNOx 60 L2	35520050	Class 3	38 ÷ 74	3.2 ÷ 6.2	1.5	1N AC 50Hz 230V	0.16	0.11	64
BTL 10	35530010		60.2 ÷ 118.0	5.1 ÷ 9.9	1.5	1N AC 50Hz 230V	0.16	0.11	64
BTL 10 P	35540010		60.2 ÷ 118.0	5.1 ÷ 9.9	1.5	1N AC 50Hz 230V	0.16	0.11	64
BTL 14	35610010		83 ÷ 166	7 ÷ 14	1.5	1N AC 50Hz 230V	0.23	0.18	67
BTL 14 P	35620010		83 ÷ 166	7 ÷ 14	1.5	1N AC 50Hz 230V	0.23	0.18	67
RiNOx 190 L2	35640050	Class 3	70 ÷ 190	5.9 ÷ 16.0	1.5	1N AC 50Hz 230V	0.23	0.18	67
BTL 20	35630010		118.6 ÷ 261.0	10 ÷ 22	1.5	1N AC 50Hz 230V	0.23	0.18	67
BTL 20 P	35640010		118.6 ÷ 261.0	10 ÷ 22	1.5	1N AC 50Hz 230V	0.23	0.18	67
BTL 26	35650010		190 ÷ 310	16.0 ÷ 26.1	1.5	1N AC 50Hz 230V	0.3	0.25	71
BTL 26 P	35660010		190 ÷ 310	16.0 ÷ 26.1	1.5	1N AC 50Hz 230V	0.3	0.25	71
SPARK 35 W	3070010		178 ÷ 391	15 ÷ 33	1.5	1N AC 50Hz 230V	0.65	0.37	74
SPARK 35	3071010		178 ÷ 391	15 ÷ 33	1.5	1N AC 50Hz 230V	0.65	0.37	74
SPARK 35 DSG W	3075010		178 ÷ 391	15 ÷ 33	1.5	1N AC 50Hz 230V	0.65	0.37	74
SPARK 35 DSG	3076010		178 ÷ 391	15 ÷ 33	1.5	1N AC 50Hz 230V	0.65	0.37	74
SPARK 35 LX	33960010	Class 3	118.6 ÷ 350.0	10 ÷ 30	1.5	1N AC 50Hz 230V	0.65	0.37	74
TBL 45 P	35710010	Class 2	160 ÷ 450	13 ÷ 38	1.5	1N AC 50Hz 230V	0.59	0.5	76
TBL 45 P	35710015	Class 2	160 ÷ 450	13 ÷ 38	1.5	3N AC 50Hz 400V	0.74	0.65	76
TBL 45 P DACA	35710110	Class 2	160 ÷ 450	13 ÷ 38	1.5	1N AC 50Hz 230V	0.59	0.5	76
TBL 45 LX	35730010	Class 3	130 ÷ 450	11 ÷ 38	1.5	1N AC 50Hz 230V	0.59	0.5	76
TBL 60 P	35750010	Class 2	250 ÷ 600	21 ÷ 51	1.5	3N AC 50Hz 400V	0.74	0.65	77
TBL 60 P DACA	35750110	Class 2	250 ÷ 600	21 ÷ 51	1.5	3N AC 50Hz 400V	0.74	0.65	77
TBL 85 P	35800010	Class 2	200 ÷ 850	17 ÷ 72	1.5	3N AC 50Hz 400V	1.5	1.1	75
TBL 85 P DACA	35800110	Class 2	200 ÷ 850	17 ÷ 72	1.5	3N AC 50Hz 400V	1.5	1.1	75
TBL 75 LX	35820010	Class 3	200 ÷ 750	17 ÷ 63	1.5	3N AC 50Hz 400V	1.5	1.1	75
BT 75 DSPG	3510010		415 ÷ 889	35 ÷ 75	1.5	3N AC 50Hz 400V	1.6	1.1	76
TBL 105 P	35850010	Class 2	320 ÷ 1050	27 ÷ 89	1.5	3N AC 50Hz 400V	1.9	1.5	77
TBL 105 P DACA	35850110	Class 2	320 ÷ 1050	27 ÷ 89	1.5	3N AC 50Hz 400V	1.9	1.5	77
BT 100 DSPG	3514010		533 ÷ 1186	45 ÷ 100	1.5	3N AC 50Hz 400V	2	1.5	78
TBL 130 P	35900010	Class 2	400 ÷ 1300	34 ÷ 110	1.5	3N AC 50Hz 400V	2.6	2.2	83
TBL 130 P DACA	35900110	Class 2	400 ÷ 1300	34 ÷ 110	1.5	3N AC 50Hz 400V	2.6	2.2	83
TBL 160 P	35950010	Class 2	500 ÷ 1600	42 ÷ 135	1.5	3N AC 50Hz 400V	2.6	2.2	83
TBL 160 P DACA	35950110	Class 2	500 ÷ 1600	42 ÷ 135	1.5	3N AC 50Hz 400V	2.6	2.2	83
BT 120 DSPG	3518010		474 ÷ 1660	40 ÷ 140	1.5	3N AC 50Hz 400V	2.7	2.2	81
TBL 210 P	36000010	Class 2	800 ÷ 2100	67 ÷ 177	1.5	3N AC 50Hz 400V	3.4	3	85
BT 180 DSPG	3522010		712 ÷ 2135	60 ÷ 180	1.5	3N AC 50Hz 400V	3.6	3	84
BT 250 DSG 4T	31310010		873 ÷ 3186	74 ÷ 269	1.5	3N AC 50Hz 400V	8	7.5	89
BT 250 DSPG	3526010		873 ÷ 3186	74 ÷ 269	1.5	3N AC 50Hz 400V	8	7.5	89
BT 300 DSG 4T	31510010		1304 ÷ 3854	110 ÷ 325	1.5	3N AC 50Hz 400V	8	7.5	89
BT 300 DSPG	3530010		1304 ÷ 3854	110 ÷ 325	1.5	3N AC 50Hz 400V	8	7.5	89
GI 350 DSPG	6501010		1581 ÷ 4743	133 ÷ 400	1.5	3N AC 50Hz 400V	17.8	15.0+2.2	91
GI 420 DSPG	6506010		1840 ÷ 5522	155 ÷ 466	1.5	3N AC 50Hz 400V	21.3	18.5+2.2	97
GI 510 DSPG	6511010		2430 ÷ 6500	205 ÷ 548	1.5	3N AC 50Hz 400V	22.1	18.5+3.0	97
GI 1000 DSPG	6521010		2500 ÷ 10500	211 ÷ 885	1.5	3N AC 50Hz 400V	26.6	22+4	98

1) Noise levels measured in the Baltur laboratories by means of microphone positioned 1 metre behind the burner running on test boiler, at maximum nominal thermal output.

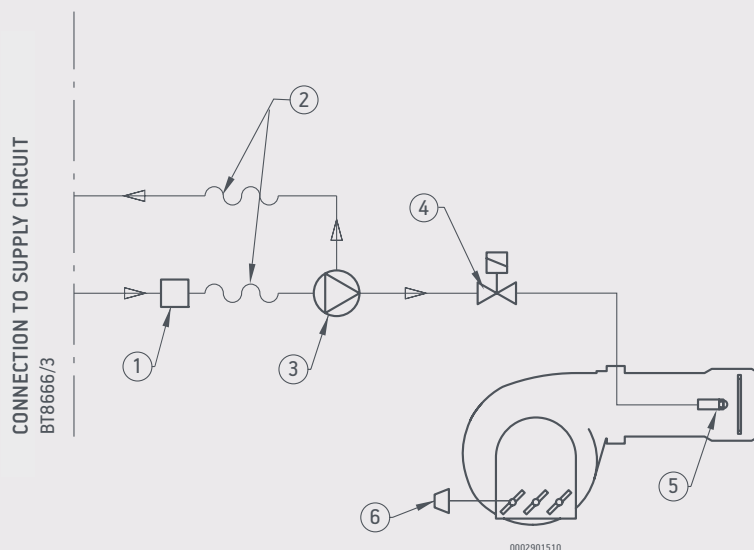
Diesel net heating value: $H_i = 42.70 \text{ MJ/kg} = 10200 \text{ kcal/kg}$.

SINGLE-STAGE

BTL 3-4-6-10-14-20-26 / SPARK 35 / RiNOx 35-60 L

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 Operation solenoid valve (normally closed).
- 5 Nozzle.
- 6 Air regulation manual switch.

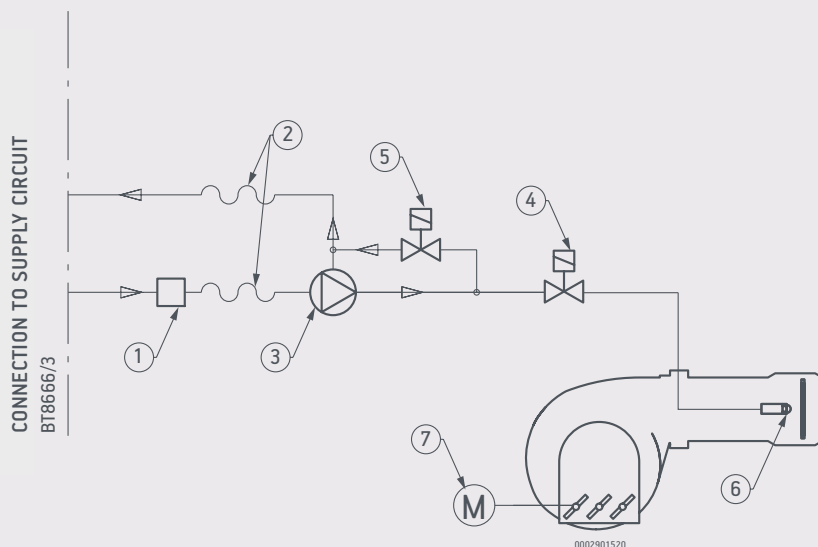


TWO-STAGE

BTL 4-6-10-14-20-26 P / RiNOx 60-190 L2

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 1st stage solenoid valve (normally closed).
- 5 2nd stage solenoid valve (normally open).
- 6 Nozzle.
- 7 Air adjustment servomotor.

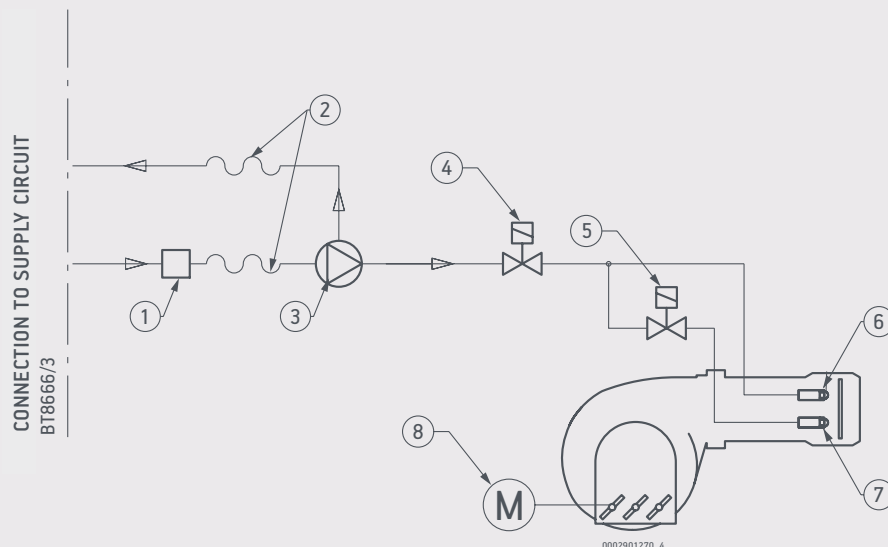


TWO-STAGE

SPARK 35 DSG / SPARK 35 LX

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 1st stage safety solenoid valve (normally closed).
- 5 2nd stage solenoid valve (normally closed).
- 6 1st stage nozzle.
- 7 2nd stage nozzle.
- 8 Modulation servomotor.



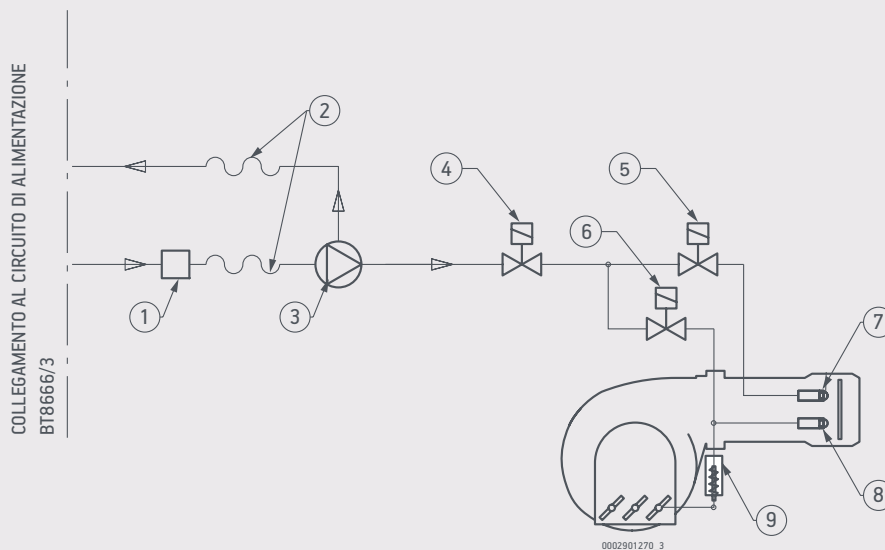
FUNCTIONAL DIAGRAM

TWO-STAGE

TBL 45-60-85-105-130-160 P / TBL 45-75 LX

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 Safety solenoid valve (normally closed).
- 5 1st stage solenoid valve (normally closed).
- 6 2nd stage solenoid valve (normally closed).
- 7 1st stage nozzle.
- 8 2nd stage nozzle.
- 9 Air adjustment hydraulic jack.

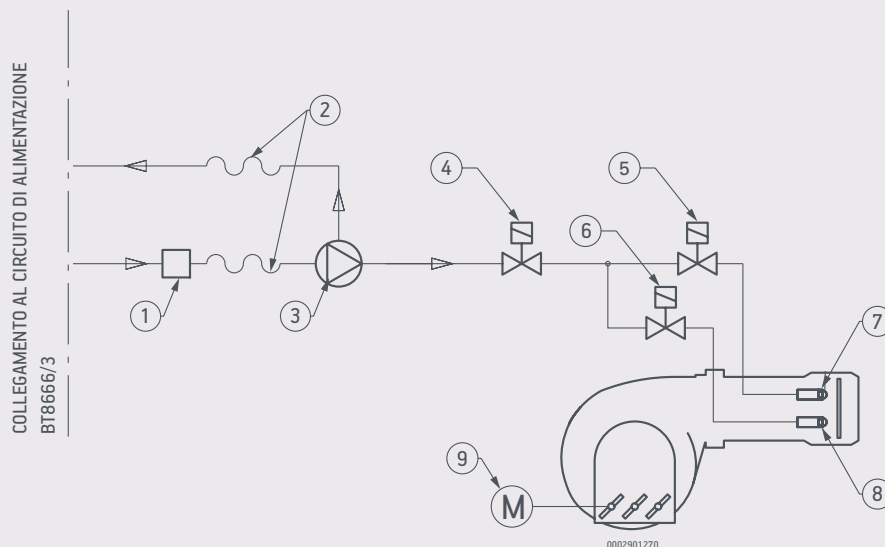


TWO-STAGE

TBL 45-60-85-105-130-160 P DACA / TBL 210 P

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 Safety solenoid valve (normally closed).
- 5 1st stage solenoid valve (normally closed).
- 6 2nd stage solenoid valve (normally closed).
- 7 1st stage nozzle.
- 8 2nd stage nozzle.
- 9 Air adjustment servomotor.

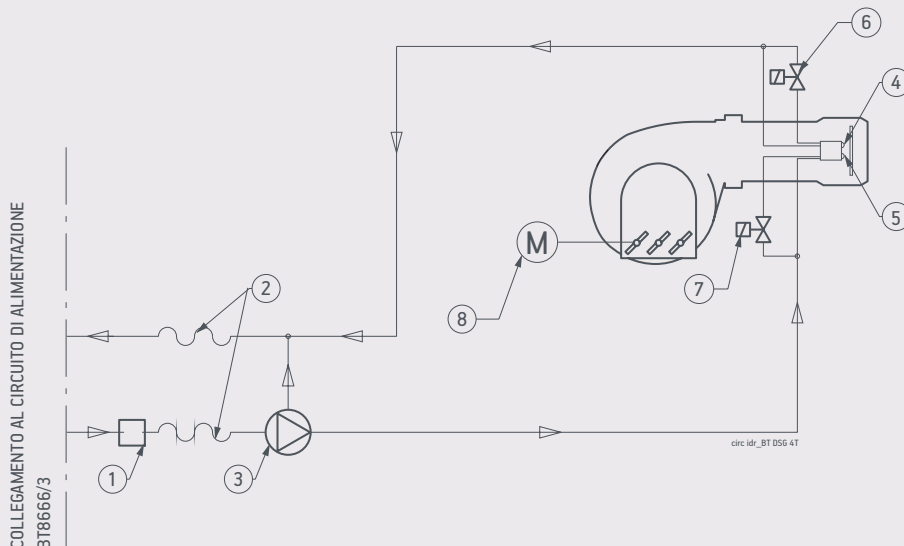


TWO-STAGE

BT 250-300 DSG 4T

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 1st stage nozzle.
- 5 2nd stage nozzle.
- 6 1st stage solenoid valve (normally open).
- 7 2nd stage solenoid valve (normally open).
- 8 Air adjustment servomotor.

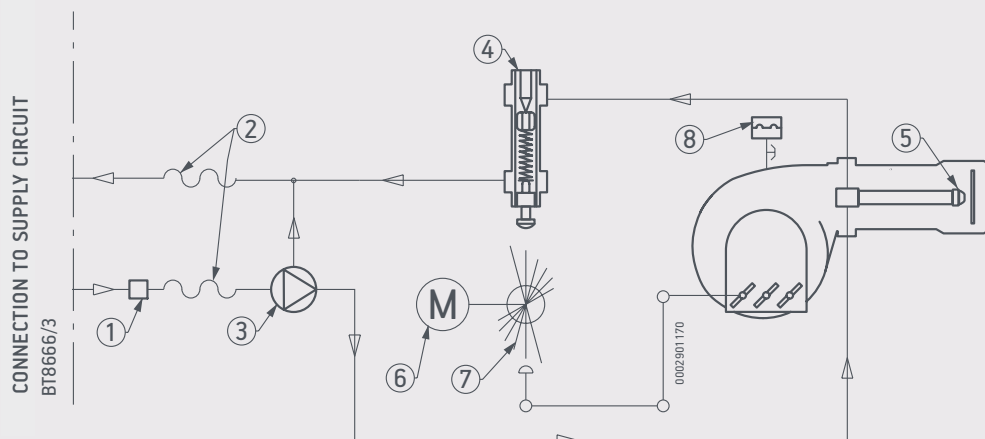


TWO-STAGE PROGRESSIVE / MODULATING BURNERS

BT 75-100-120-180-250-300 DSPG

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 Return pressure regulator.
- 5 Return nozzle.
- 6 Modulation servomotor.
- 7 Air/fuel adjustment disk.
- 8 Air pressure switch.

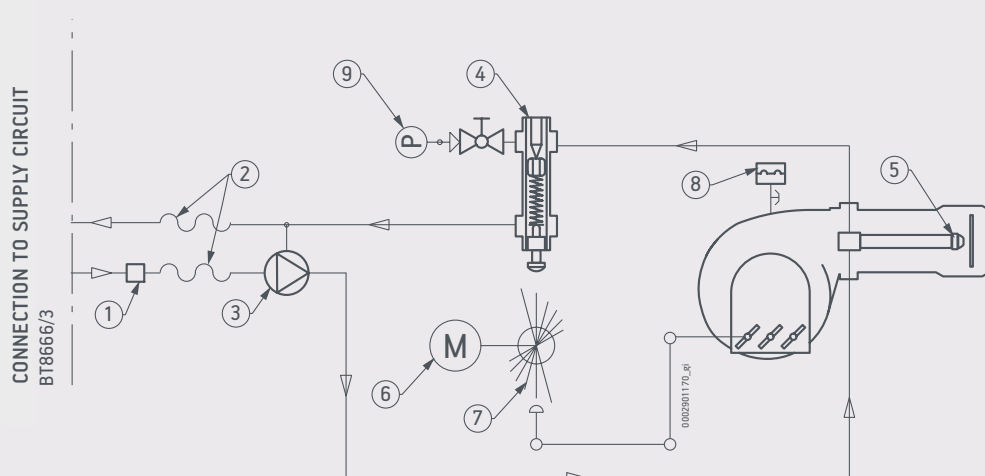


TWO-STAGE PROGRESSIVE / MODULATING BURNERS

GI 350-420-510 DSPG

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 Return pressure regulator.
- 5 Return nozzle.
- 6 Modulation servomotor.
- 7 Air/fuel adjustment disk.
- 8 Air pressure switch.
- 9 Manometer.

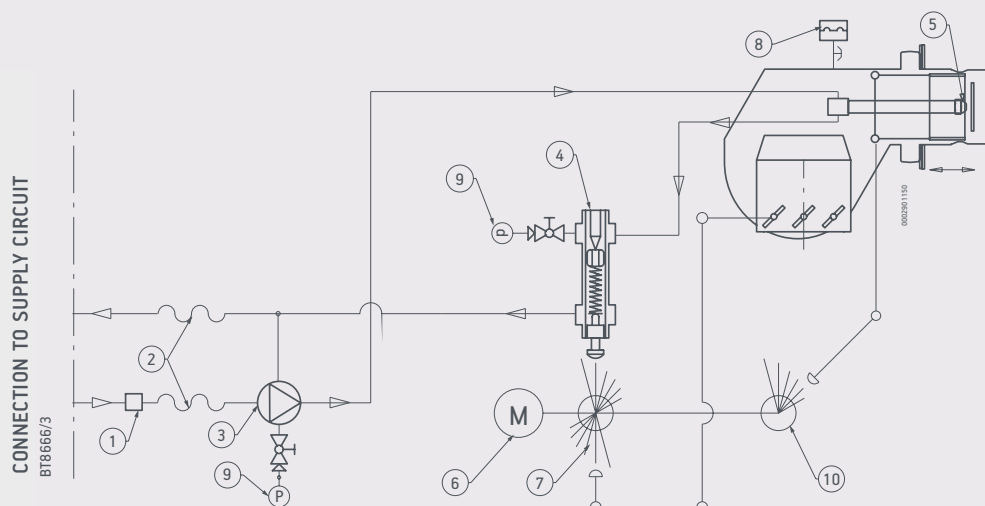


TWO-STAGE PROGRESSIVE / MODULATING BURNERS

GI 1000 DSPG

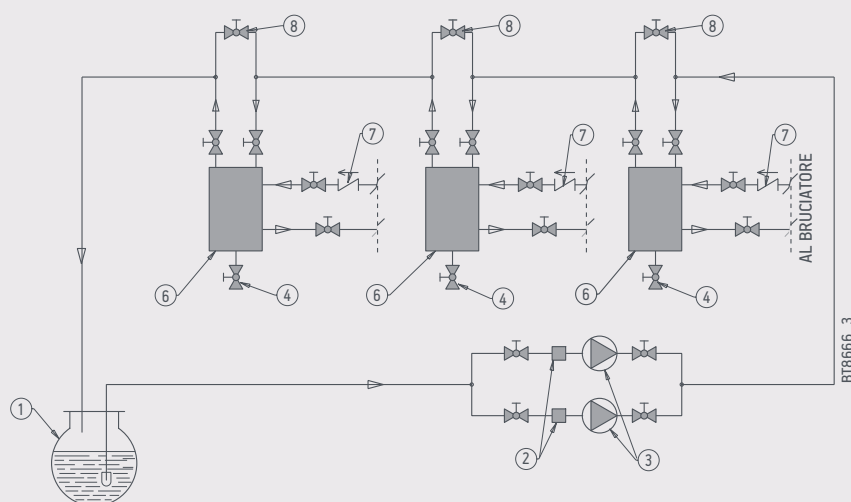
Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 Return pressure regulator.
- 5 Return nozzle.
- 6 Modulation servomotor.
- 7 Air/fuel adjustment disk.
- 8 Air pressure switch.
- 9 Manometer.
- 10 Adjustment disk for air supply to head.



BT8666/3

Fuel feeding hydraulic circuit diagram for one or more diesel burners



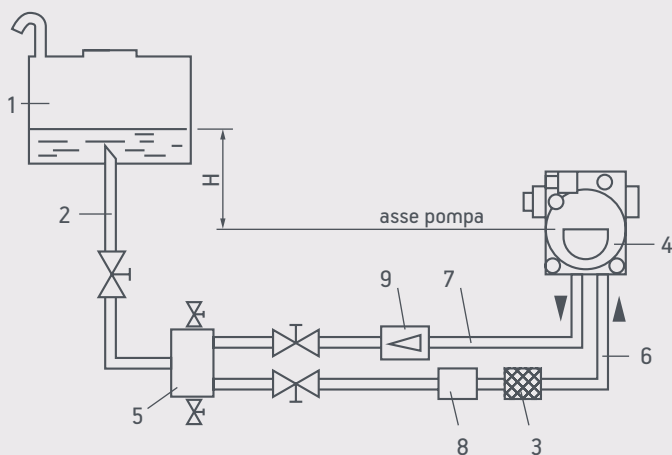
Legend

- 1 Main tank.
- 2 Filter.
- 3 Circulation pump.
- 4 Water and plant discharging.
- 6 Fuel recovery tank and degasser.
- 7 Nonreturn valve.
- 8 By-pass (normally closed).

STANDARD NOZZLES SUPPLIED WITH SYSTEM

Burner model	Burner flow rate		Pump pressure bar	Nozzle flow rate Kg/h	1st stage nozzle		2nd stage nozzle	
	kW	Kg/h			Model	Qty.	Model	Qty.
BTL 3	17.8 ÷ 42.7	1.5 ÷ 3.6	12	2.71	DELAVAN W 60° 0.65 GPH	1		
BTL 3 H	16.6 ÷ 42.7	1.4 ÷ 3.6	12	2.71	DANFOSS S 60° 0.65 GPH	1		
RINOX 35 L	19 ÷ 40	1.6 ÷ 3.4	12	2.50	DELAVAN W 60° 0.60 GPH	1		
BTL 4	26 ÷ 56.1	2.2 ÷ 4.7	12	3.54	DELAVAN W 60° 0.85 GPH	1		
BTL 4 H	26 ÷ 56.1	2.2 ÷ 4.7	12	3.54	DELAVAN W 60° 0.85 GPH	1		
BTL 6	31.9 ÷ 74.3	2.7 ÷ 6.3	12	5.20	DELAVAN W 60° 1.25 GPH	1		
RINOX 60 L	38 ÷ 74	3.2 ÷ 6.2	12	5.50	STEINEN S 60° 1.20 GPH	1		
BTL 10	60.2 ÷ 118	5.1 ÷ 9.9	12	7.29	DELAVAN W 60° 1.75 GPH	1		
BTL 14	83 ÷ 166	7 ÷ 14	12	10.41	DELAVAN B 60° 2.50 GPH	1		
BTL 20	118.6 ÷ 261	10 ÷ 22	12	14.57	DELAVAN W 60° 3.50 GPH	1		
BTL 26	190 ÷ 310	16 ÷ 26.1	12	20.82	DELAVAN W 60° 5.00 GPH	1		
SPARK 35 W	178 ÷ 391	15 ÷ 33	12	24.98	MONARCH PLP 60° 6.00 GPH	1		
SPARK 35	178 ÷ 391	15 ÷ 33	12	24.98	MONARCH PLP 60° 6.00 GPH	1		
BTL 4 P	26 ÷ 56.1	2.2 ÷ 4.7	10 - 22	3.66	DELAVAN W 60° 0.65 GPH	1		
BTL 6 P	31.9 ÷ 74.3	2.7 ÷ 6.3	10 - 22	5.60	DELAVAN W 60° 1.00 GPH	1		
RINOX 60 L2	38 ÷ 74	3.2 ÷ 6.2	12 - 18	6.12	STEINEN S 60° 1.20 GPH	1		
BTL 10 P	60.2 ÷ 118	5.1 ÷ 9.9	10 - 22	7.61	DELAVAN W 60° 1.35 GPH	1		
BTL 14 P	83 ÷ 166	7 ÷ 14	10 - 18	10.20	DELAVAN B 60° 2.00 GPH	1		
RINOX 190 L2	70 ÷ 190	5.9 ÷ 16	10 - 18	12.75	DELAVAN W 60° 2.50 GPH	1		
BTL 20 P	118.6 ÷ 261	10 ÷ 22	10 - 18	15.30	DELAVAN W 60° 3.00 GPH	1		
BTL 26 P	190 ÷ 310	16 ÷ 26.1	10 - 18	20.40	DELAVAN W 60° 4.00 GPH	1		
SPARK 35 DSG W	178 ÷ 391	15 ÷ 33	12	27.06	MONARCH PLP 60° 4.00 GPH	1	MONARCH PLP 60° 2.50 GPH	1
SPARK 35 DSG	178 ÷ 391	15 ÷ 33	12	27.06	MONARCH PLP 60° 4.00 GPH	1	MONARCH PLP 60° 2.50 GPH	1
SPARK 35 LX	119 ÷ 350	10 ÷ 29.5	12	22.90	DELAVAN B 45° 3.00 GPH	1	DELAVAN B 45° 2.50 GPH	1
TBL 45 P	160 ÷ 450	13.5 ÷ 37.9	12	29.14	DANFOSS S 60° 4.00 GPH	1	DANFOSS S 60° 3.00 GPH	1
TBL 45 P DACA	160 ÷ 450	13.5 ÷ 37.9	12	29.14	DANFOSS S 60° 4.00 GPH	1	DANFOSS S 60° 3.00 GPH	1
TBL 45 LX	130 ÷ 450	11 ÷ 37.9	12	22.90	DELAVAN B 45° 3.00 GPH	1	DELAVAN B 45° 2.50 GPH	1
TBL 60 P	250 ÷ 600	21.1 ÷ 50.6	12	37.47	DANFOSS S 45° 5.00 GPH	1	DANFOSS S 45° 4.00 GPH	1
TBL 60 P DACA	250 ÷ 600	21.1 ÷ 50.6	12	37.47	DANFOSS S 45° 5.00 GPH	1	DANFOSS S 45° 4.00 GPH	1
TBL 85 P	200 ÷ 850	16.9 ÷ 71.7	12	50.00	MONARCH PLP 60° 7.00 GPH	1	MONARCH PLP 60° 5.00 GPH	1
TBL 85 P DACA	200 ÷ 850	16.9 ÷ 71.7	12	50.00	MONARCH PLP 60° 7.00 GPH	1	MONARCH PLP 60° 5.00 GPH	1
TBL 75 LX	200 ÷ 750	16.9 ÷ 63.2	12	55.20	DELAVAN B 45° 6.50 GPH	1	DELAVAN B 45° 6.50 GPH	1
TBL 105 P	320 ÷ 1050	27 ÷ 88.5	12	65.00	MONARCH PLP 60° 9.50 GPH	1	MONARCH PLP 60° 6.50 GPH	1
TBL 105 P DACA	320 ÷ 1050	27 ÷ 88.5	12	65.00	MONARCH PLP 60° 9.50 GPH	1	MONARCH PLP 60° 6.50 GPH	1
TBL 130 P	400 ÷ 1300	33.7 ÷ 109.6	12	83.30	MONARCH PLP 60° 10.50 GPH	1	MONARCH PLP 60° 9.50 GPH	1
TBL 130 P DACA	400 ÷ 1300	33.7 ÷ 109.6	12	83.30	MONARCH PLP 60° 10.50 GPH	1	MONARCH PLP 60° 9.50 GPH	1
TBL 160 P	500 ÷ 1600	42.2 ÷ 134.9	12	93.00	STEINEN SS 45° 12.00 GPH	1	STEINEN SS 45° 10.00 GPH	1
TBL 160 P DACA	500 ÷ 1600	42.2 ÷ 134.9	12	93.00	STEINEN SS 45° 12.00 GPH	1	STEINEN SS 45° 10.00 GPH	1
TBL 210 P	800 ÷ 2100	67.5 ÷ 177.1	12	129.60	STEINEN SS 45° 18.00 GPH	1	STEINEN SS 45° 13.00 GPH	1
BT 250 DSG 4T	873 ÷ 3186	73.6 ÷ 268.6	16	173.05	STEINEN SS 45° 20.00 GPH	1	STEINEN SS 45° 8.00 GPH	2
BT 300 DSG 4T	1304 ÷ 3854	109.9 ÷ 324.9	16	221.14	STEINEN SS 45° 28.00 GPH	1	STEINEN SS 45° 9.00 GPH	2

Type of atomization	Type of atomization cone	Delavan	Monarch	Danfoss	Steinen
	Vacuum	A	PL	H	pH:
	Semi empty	E	NS	—	H
	Universal	W	PLP	B	SS
	Full	B	AR	S	Q
	Full average concentration	AR-D	HV	—	—
	Full concentrated	R-D	R	—	S

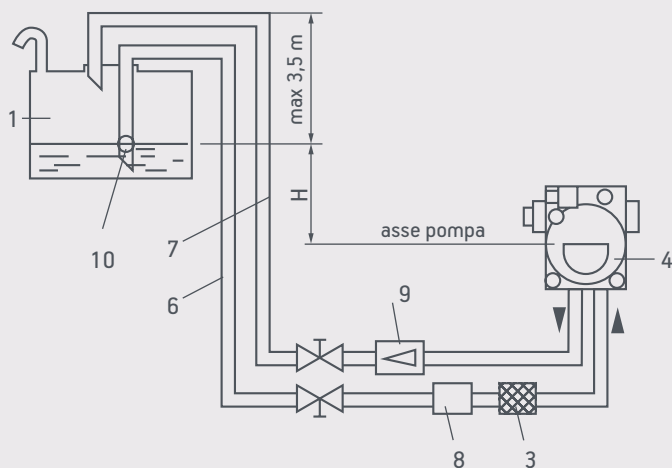


GRAVITY FEED SYSTEM

Legend

- 1** Tank.
- 2** Feeding pipe.
- 3** Wire-net filter.
- 4** Pump.
- 5** Degasifier.
- 6** Suction pipe.
- 7** Burner return pipe.
- 8** Automatic shut-off device with burner off.
- 9** One-way valve.
- 10** Foot valve.
- H** Difference in level between minimum level in tank and pump axis (see table on page 9).

NOTE: Comply with the regulations in force for any components missing in the pipelines.

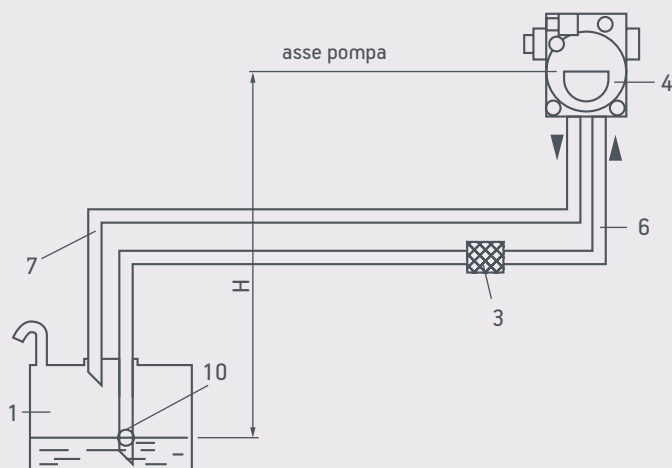


GRAVITY FEED SYSTEM WITH FEED FROM THE TOP OF THE TANK

Legend

- 1** Tank.
- 2** Feeding pipe.
- 3** Wire-net filter.
- 4** Pump.
- 6** Suction pipe.
- 7** Burner return pipe.
- 8** Automatic shut-off device with burner off.
- 9** One-way valve.
- 10** Foot valve.
- H** Difference in level between minimum level in tank and pump axis (see table on page 9).

NOTE: Comply with the regulations in force for any components missing in the pipelines.



INTAKE FEED SYSTEM

Legend

- 1** Tank.
- 3** Wire-net filter.
- 4** Pump.
- 6** Suction pipe.
- 7** Burner return pipe.
- 10** Foot valve.
- H** Difference in level between minimum level in tank and pump axis (see table on page 9).

NOTE: Comply with the regulations in force for any components missing in the pipelines.

TUBING SIZE

Tubing size	Øi (mm)	GRAVITY FEED SYSTEM							GRAVITY FEED SYSTEM WITH FEED FROM THE TOP OF THE TANK							INTAKE FEED SYSTEM						
		10	12	14	16	18	20	21.6	10	12	14	16	18	20	21.6	10	12	14	16	18	20	21.6
	Øe							3/4"							3/4"							3/4"
Pump/tank * difference in level)	H (m)																					
Burner model																						
BTL 3	0.5															26	54					
BTL 3 H																						
RiNOx 35 L																						
BTL 4	1	30							30							24	47					
BTL 4 H																						
BTL 4 P	1.5															18	38					
BTL 6																						
RiNOx 60 L	2	35							35							14	30					
BTL 6 P																						
RiNOx 60 L2																						
BTL 10	2.5															10	23					
BTL 10 P																						
BTL 14																						
BTL 14 P	3	40							40							6	15					
RiNOx 190 L2																						
BTL 20																						
BTL 20 P	3.5																7					
BTL 26																						
BTL 26 P	4	45							45													
SPARK 35 W SPARK 35 SPARK 35 DSG W SPARK 35 DSG SPARK 35 LX	0.5																27	51				
	1		30							30							23	43				
	1.5																19	35				
	2		35							35							15	27				
	2.5																10	20				
	3		40							40							7	13				
	3.5																	6				
TBL 45 P TBL 45 LX TBL 60 P TBL 85 P TBL 75 LX TBL 105 P	0.5																	26	45			
	1			30							30							22	38			
	1.5			35							35							19	31			
	2			35							35							14	25			
	2.5			40							40							11	19			
	3			40							40											
TBL 130 P TBL 160 P TBL 210 P	0.5																	36	55			
	1				40							40						30	48			
	1.5				45							45						25	41			
	2				45							45						20	32			
	2.5				50							50						15	24			
	3				50							50						10	15			
BT 250 DSG 4T	0.5																		21	34		
	1				30	40						30	40						18	29		
	1.5				35	45						35	45						15	24		
	2				35	45						35	45						11.5	19		
	2.5				40	50						40	50						8.5	14		
	3				40	50						40	50						5.5	9		
	3.5																			3.5		
BT 300 DSG 4T	0.5																				34	34
	1						40	40						40	40						29	29
	1.5						45	45						45	45						24	24
	2						45	45						45	45						19	19
	2.5						50	50						50	50						14	14
	3						50	50						50	50						9	9
	3.5																				3.5	3.5
metres Total pipeline length including the vertical section. Deduct 0.25 m for each elbow or gate.																						

*) See diagram on page 8

TECHNICAL SPECIFICATIONS

Model	Part.no	Thermal output kW	Fuel oil flow rate kg/h	Fuel viscosity °E at 50°C	Electrical power supply	Electrical power absorbed kW	Motor power kW	Tank heating element power kW	Noise dBA 1)
BT 17 N	20080010	89 ÷ 189	8.0 ÷ 16.9	7	3N AC 50Hz 400V	2.6	0.37	1.8	70
BT 17 SPN	2040111	89 ÷ 189	8.0 ÷ 16.9	7	3N AC 50Hz 400V	2.6	0.37	1.8	70
BT 35 SPN	2052110	189 ÷ 390	17 ÷ 35	7	3N AC 50Hz 400V	4.2	0.55	3.5	71
BT 40 DSN 4T	2058010	223 ÷ 446	20 ÷ 40	7	3N AC 50Hz 400V	4.2	0.55	3.5	71
BT 50 DSN 4T	2061010	312 ÷ 558	28 ÷ 50	7	3N AC 50Hz 400V	7.5	1.1	6	76
BT 75 DSN 4T	2071010	446 ÷ 837	40 ÷ 75	7	3N AC 50Hz 400V	7.5	1.1	6	76
BT 75 DSNM-D	2500010	446 ÷ 837	40 ÷ 75	50	3N AC 50Hz 400V	12.8	1.10+0.55	10.5	76
BT 75 DSPN	2610010	446 ÷ 837	40 ÷ 75	7	3N AC 50Hz 400V	12.8	1.10+0.55	10.5	76
BT 100 DSN 4T	2076010	558 ÷ 1116	50 ÷ 100	7	3N AC 50Hz 400V	9.4	1.5	7.5	78
BT 100 DSNM-D	2503010	558 ÷ 1116	50 ÷ 100	50	3N AC 50Hz 400V	13.2	1.50+0.55	10.5	78
BT 100 DSPN	2615010	558 ÷ 1116	50 ÷ 100	7	3N AC 50Hz 400V	13.2	1.50+0.55	10.5	78
BT 120 DSN 4T	2081010	669 ÷ 1451	60 ÷ 130	7	3N AC 50Hz 400V	13.1	2.2	10.5	81
BT 120 DSNM-D	2505010	669 ÷ 1451	60 ÷ 130	50	3N AC 50Hz 400V	14.5	2.2+1.1	10.5	81
BT 120 DSPN	2620010	669 ÷ 1451	60 ÷ 130	7	3N AC 50Hz 400V	14.5	2.2+1.1	10.5	81
BT 180 DSN 4T	2086010	725 ÷ 2009	65 ÷ 180	7	3N AC 50Hz 400V	18.5	3	15	84
BT 180 DSNM-D	2507010	725 ÷ 2009	65 ÷ 180	50	3N AC 50Hz 400V	19.9	3.0+1.1	15	84
BT 180 DSPN	2625010	725 ÷ 2009	65 ÷ 180	7	3N AC 50Hz 400V	19.9	3.0+1.1	15	84
BT 250 DSN 4T	2101010	937 ÷ 3170	84 ÷ 284	7	3N AC 50Hz 400V	26	7.5	18	89
BT 250 DSNM-D	2515010	937 ÷ 3170	84 ÷ 284	50	3N AC 50Hz 400V	27.4	7.5+1.1	18	89
BT 250 DSPN	2630010	937 ÷ 3170	84 ÷ 284	7	3N AC 50Hz 400V	27.4	7.5+1.1	18	89
BT 300 DSN 4T	2131010	1220 ÷ 3460	109 ÷ 310	7	3N AC 50Hz 400V	33.5	7.5	25.5	89
BT 300 DSNM-D	2520010	1220 ÷ 3460	109 ÷ 310	50	3N AC 50Hz 400V	36.0	7.5+2.2	25.5	89
BT 300 DSPN	2635010	1220 ÷ 3460	109 ÷ 310	7	3N AC 50Hz 400V	36.0	7.5+2.2	25.5	89
BT 350 DSN 4T	2121010	1284 ÷ 3907	115 ÷ 350	7	3N AC 50Hz 400V	38.0	9	28.5	87
BT 350 DSNM-D	2525010	1284 ÷ 3907	115 ÷ 350	50	3N AC 50Hz 400V	40.5	9.0+2.2	28.5	87
BT 350 DSPN	2640010	1284 ÷ 3907	115 ÷ 350	7	3N AC 50Hz 400V	40.5	9.0+2.2	28.5	87
GI 350 DSPN-D	6533010	1581 ÷ 4743	142 ÷ 425	50	3N AC 50Hz 400V	46.3	15.0+2.2	28.5	91
GI 420 DSPN-D	6538010	1840 ÷ 5522	165 ÷ 495	50	3N AC 50Hz 400V	50.6	18.5+3.0	28.5	97
GI 510 DSPN-D	6543010	2430 ÷ 6500	218 ÷ 582	50	3N AC 50Hz 400V	50.6	18.5+3.0	28.5	97
GI 1000 DSPN-D	6553010	2500 ÷ 10500	224 ÷ 941	50	3N AC 50Hz 400V	66.6	22+4	40	98

1) Noise levels measured in the Baltur laboratories by means of microphone positioned 1 metre behind the burner running on test boiler, at maximum nominal thermal output.

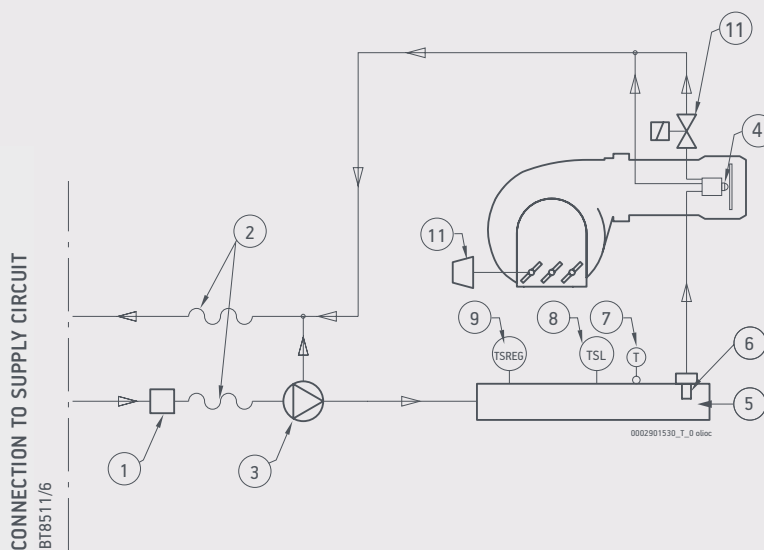
Fuel oil net heating value: $H_i = 40.19 \text{ MJ/kg} = 9600 \text{ kcal/kg}$.

SINGLE-STAGE

BT 17 N

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 1st stage nozzle.
- 5 Electric pre-heater.
- 6 Filter with gas valve.
- 7 Pre-heater thermometer.
- 8 Pre-heater minimum thermostat.
- 9 Pre-heater regulation thermostat.
- 10 Operating solenoid valve (normally open).
- 11 Air regulation manual switch.

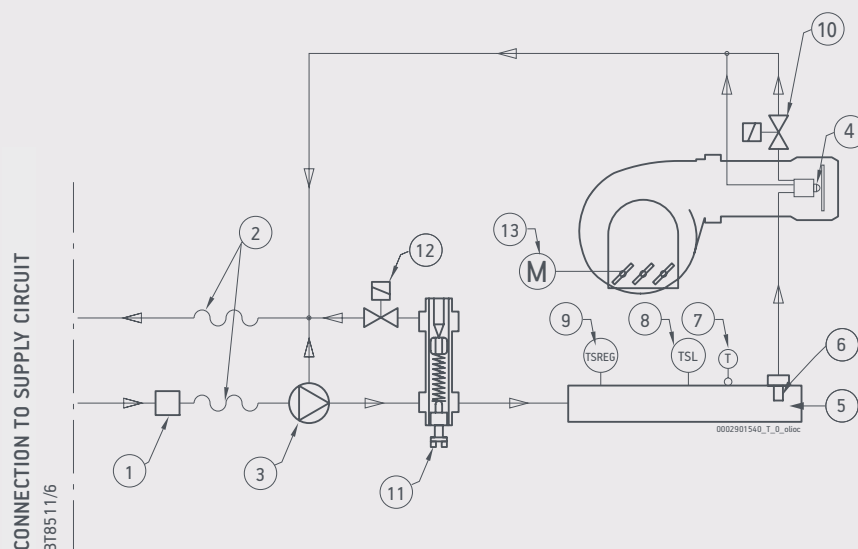


TWO-STAGE PRESSURE DROP BURNERS

BT 17-35 SPN

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 Nozzle.
- 5 Electric pre-heater.
- 6 Filter with gas valve.
- 7 Pre-heater thermometer.
- 8 Pre-heater minimum thermostat.
- 9 Pre-heater regulation thermostat.
- 10 1st stage solenoid valve (normally open).
- 11 1st stage pressure regulator.
- 12 2nd stage solenoid valve (normally open).
- 13 Air adjustment servomotor.

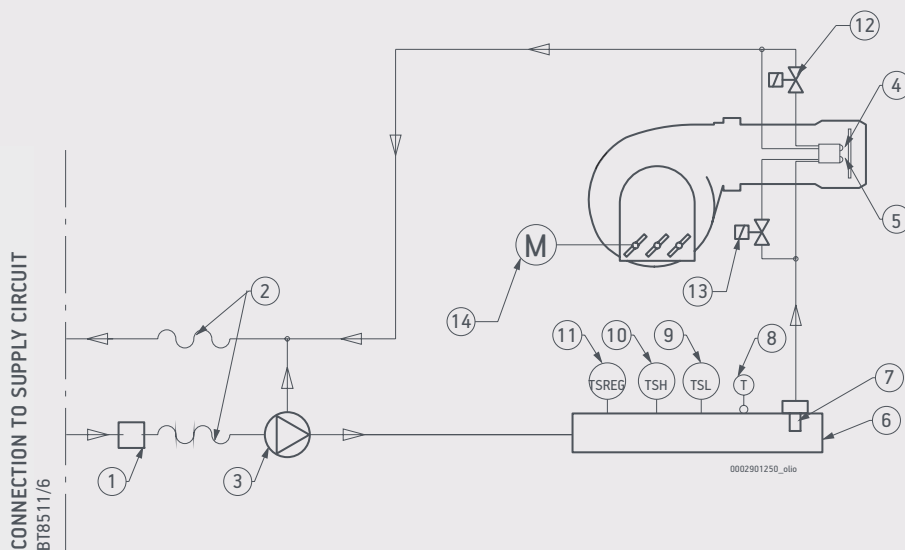


TWO-STAGE

BT 40-50-75-100-120-180-250-300-350 DSN 4T

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 1st stage nozzle.
- 5 2nd stage nozzle.
- 6 Electric pre-heater.
- 7 Filter with gas valve.
- 8 Pre-heater thermometer.
- 9 Pre-heater minimum thermostat.
- 10 pre-heater safety thermostat (from BT 180 onwards).
- 11 Pre-heater regulation thermostat.
- 12 1st stage solenoid valve (normally open).
- 13 2nd stage solenoid valve (normally open).
- 14 Air adjustment servomotor.

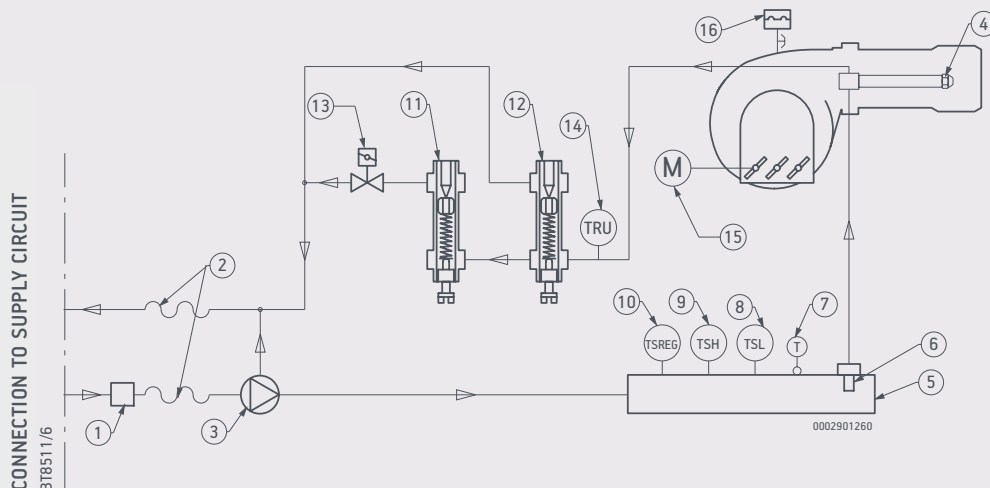


TWO-STAGE

BT 75-100-120-180-250-300-350 DSNM-D

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 Return nozzle.
- 5 Electric pre-heater.
- 6 Filter with gas valve.
- 7 Pre-heater thermometer.
- 8 Pre-heater minimum thermostat.
- 9 Pre-heater safety thermostat (from BT 180 onwards).
- 10 Pre-heater regulation thermostat.
- 11 1st stage pressure regulator.
- 12 2nd stage pressure regulator.
- 13 2nd stage solenoid valve (normally open).
- 14 Return thermostat.
- 15 Air regulation servomotor.
- 16 Air pressure switch.

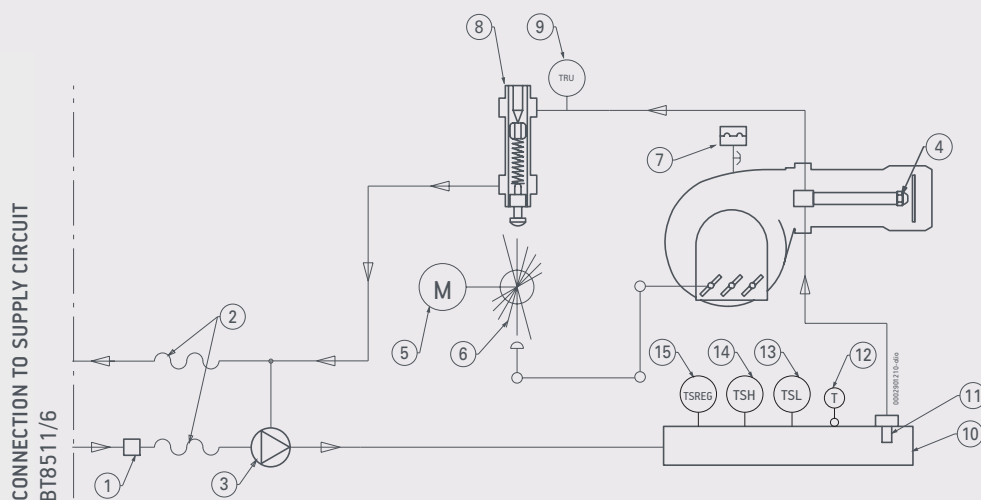


TWO-STAGE PROGRESSIVE / MODULATING BURNERS

BT 75-100-120-180-250-300-350 DSPN

Legend

- 1 Filter.
- 2 Flexible pipe.
- 3 Burner pump.
- 4 Return nozzle.
- 5 Modulation servomotor.
- 6 Air/fuel adjustment disk.
- 7 Air pressure switch.
- 8 Return pressure regulator.
- 9 Return thermostat.
- 10 Electric pre-heater.
- 11 Self-cleaning filter.
- 12 Pre-heater thermometer.
- 13 Pre-heater minimum thermostat.
- 14 Pre-heater safety thermostat (from BT 180 onwards).
- 15 Pre-heater regulation thermostat.

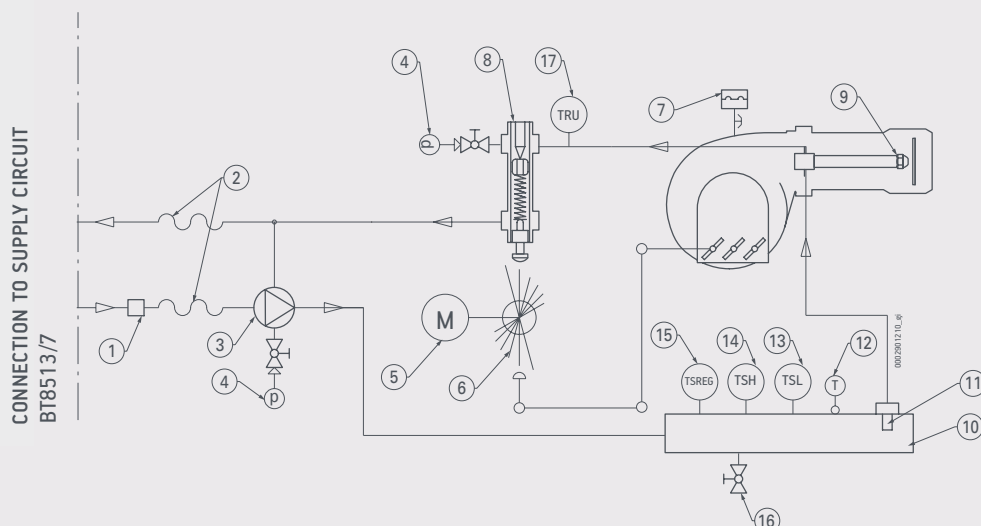


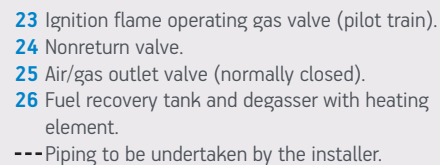
TWO-STAGE PROGRESSIVE / MODULATING BURNERS

GI 350-420-510 DSPN-D

Legend

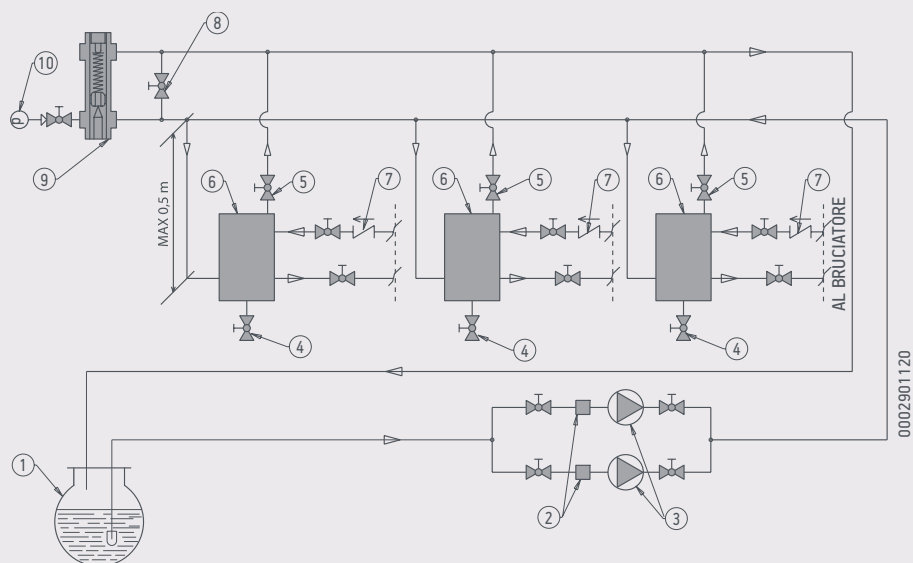
- 1 Filter.
- 2 Flexible pipe.
- 3 Burner pump.
- 4 Manometer.
- 5 Modulation servomotor.
- 6 Air/fuel adjustment disk.
- 7 Air pressure switch.
- 8 Return pressure regulator.
- 9 Return nozzle.
- 10 Electric pre-heater.
- 11 Self-cleaning filter.
- 12 Pre-heater thermometer.
- 13 Pre-heater minimum thermostat.
- 14 Pre-heater safety thermostat.
- 15 Pre-heater regulation thermostat.
- 16 Water and plant discharging.
- 17 Return thermostat.





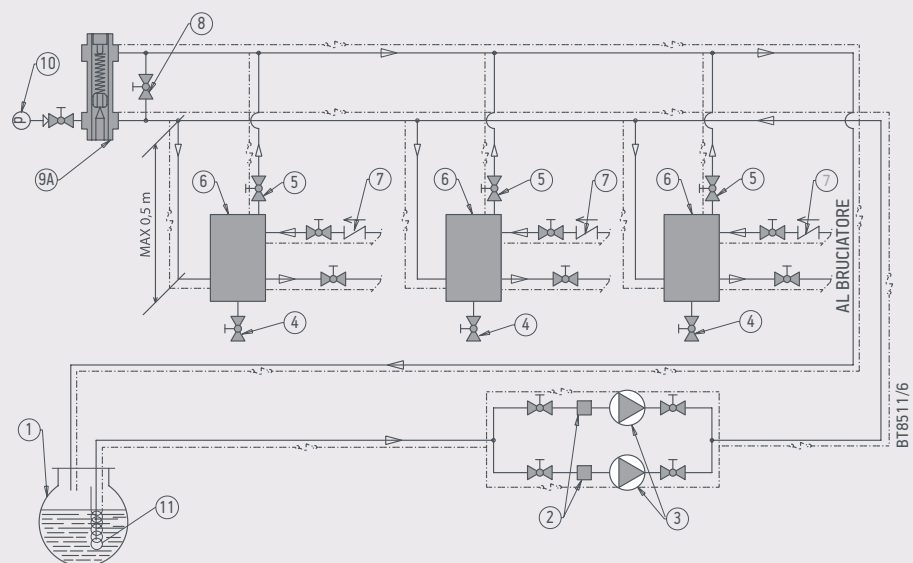
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Fuel feeding hydraulic circuit diagram for one or more fuel oil burners with a rated viscosity of 38cSt (5°E) at 50°C



BT8511/6

Fuel feeding hydraulic circuit diagram for one or more fuel oil burners with max. rated viscosity of 115cSt (15°E) at 50°C



Legend

- 1 Main tank.
- 2 Filter.
- 3 Circulation pump.
- 4 Water and plant discharging.
- 5 Air/gas discharge valve, normally closed, to be slightly opened only in case of gas discharge.
- 6 Fuel recovery tank and degasser.
- 7 Nonreturn valve.
- 8 By-pass (normally closed).
- 9 Adjustable pressure regulator (0.2-1 bar).

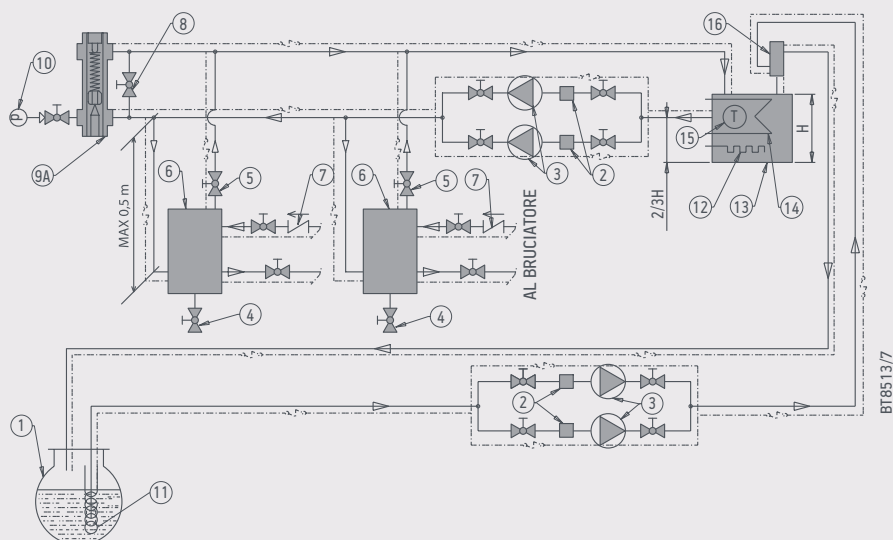
- 9A Adjustable pressure regulator (0.5-2 bar).
- 10 Manometer (0-4 bar).
- 11 Steam or hot water coil for fuel oil heating.
- 12 Heating element.
- 13 Auxiliary heater.
- 14 Steam or hot water coil for oil heating.
- 15 Thermometer.
- 16 Tank diameter 100 mm height 300 mm.

Heated and caulk electric cable necessary for obtaining viscosity > 115cSt (15°E) referred to fuel temperature in the ring-type circuit to be carried out by the customer.

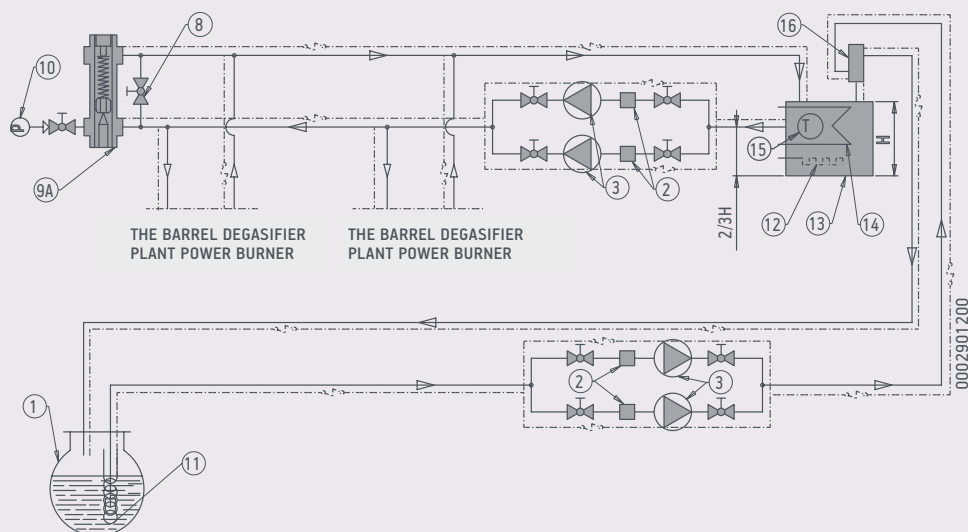
NOTE: The fuel recycling tanks (diameter ~ 150 mm - height ~ 400 mm) must be installed as close as possible to the burner and at least 0.5 m higher than its pump.

Note For sizing of the feeding circuit contact our sales office.

Fuel feeding hydraulic circuit diagram for one or more dense fuel oil burners with max. rated viscosity of 380cSt (50°E) at 50°C with auxiliary heater



Fuel feeding hydraulic
circuit diagram for one
or more dense fuel oil
burners
with max. rated viscosity
of 380cSt (50°E) at 50°C
with auxiliary heater



- 1 Main tank.
- 2 Filter.
- 3 Circulation pump.
- 4 Water and plant discharging.
- 5 Air/gas discharge valve, normally closed, to be slightly opened only in case of gas discharge.
- 6 Fuel recovery tank and degasser.
- 7 Nonreturn valve.
- 8 By-pass (normally closed).
- 9 Adjustable pressure regulator (0.2-1 bar).
- 9A Adjustable pressure regulator (0.5-2 bar).
- 10 Manometer (0-4 bar).

- 11** Steam or hot water coil for fuel oil heating.
 - 12** Heating element.
 - 13** Auxiliary heater.
 - 14** Steam or hot water coil for oil heating.
 - 15** Thermometer.
 - 16** Tank diameter 100 mm height 300 mm.
-**α.....** Electric heating cable and insulation only for viscosity > 115cSt (15°E) pertain to fuel temperature into ring circuit, by customer care.

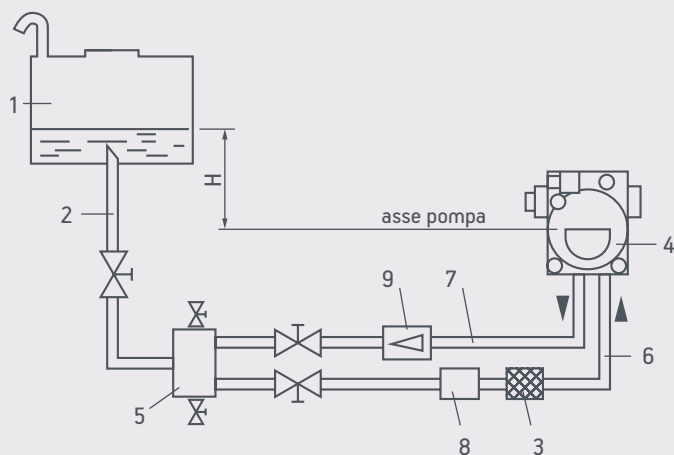
NOTE: The fuel recycling tanks (diameter ~ 150 mm - height ~ 400 mm) must be installed as close as possible to the burner and at least 0.5 m higher than its pump.

Note For sizing of the feeding circuit contact our sales office.

STANDARD NOZZLES SUPPLIED WITH SYSTEM

Burner model	Burner flow rate		Pump pressure bar	Flow Nozzles Kg/h	1st stage nozzle		2nd stage nozzle	
	kW	Kg/h			Model	Qty.	Model	Qty.
BT 17 N	89 ÷ 189	8.0 ÷ 16.9	22	15.40	MONARCH R 45° 2.50 GPH	1		
BT 17 SPN	89 ÷ 189	8.0 ÷ 16.9	18-25	14.80	MONARCH R 45° 2.25 GPH	1		
BT 35 SPN	189 ÷ 90	17 ÷ 35	18-25	26.30	MONARCH PLP 45° 4.00 GPH	1		
BT 40 DSN 4T	223 ÷ 446	20 ÷ 40	25-25	32.90	MONARCH PLP 45° 3.00 GPH	1	MONARCH R 45° 2.00GPH	1
BT 50 DSN 4T	312 ÷ 558	28 ÷ 50	25-25	42.80	MONARCH PLP 45° 4.50 GPH	1	MONARCH R 45° 2.00GPH	1
BT 75 DSN 4T	446 ÷ 837	40 ÷ 75	25-25	56.00	MONARCH HO 45° 6.00 GPH	1	MONARCH HO 45° 2.50GPH	1
BT 100 DSN 4T	558 ÷ 1116	50 ÷ 100	25-25	75.65	MONARCH HO 45° 8.50 GPH	1	MONARCH HO 45° 3.00GPH	1
BT 120 DSN 4T	669 ÷ 1451	60 ÷ 130	25-25	102.00	MONARCH HO 45° 9.50 GPH	1	MONARCH HO 45° 6.00GPH	1
BT 180 DSN 4T	725 ÷ 2009	65 ÷ 180	25-25	128.37	MONARCH HO 45° 13.50 GPH	1	MONARCH HO 45° 6.00GPH	1
BT 250 DSN 4T	937 ÷ 3170	84 ÷ 284	25-25	187.67	MONARCH HO 45° 13.50 GPH	1	MONARCH HO 45° 7.50GPH	2
BT 300 DSN 4T	1220 ÷ 3460	109.3 ÷ 310	25-25	240.20	MONARCH HO 45° 17.50 GPH	1	MONARCH HO 45° 9.50GPH	2
BT 350 DSN 4T	1284 ÷ 3907	115 ÷ 350	25-25	286.30	MONARCH HO 45° 19.50 GPH	1	MONARCH HO 45° 12.00GPH	2

Type of atomization	Type of atomization cone	Delavan	Monarch	Danfoss	Steinen
	Vacuum	A	PL	H	pH:
	Semi empty	E	NS	—	H
	Universal	W	PLP	B	SS
	Full	B	AR	S	Q
	Full average concentration	AR-D	HV	—	—
	Full concentrated	R-D	R	—	S

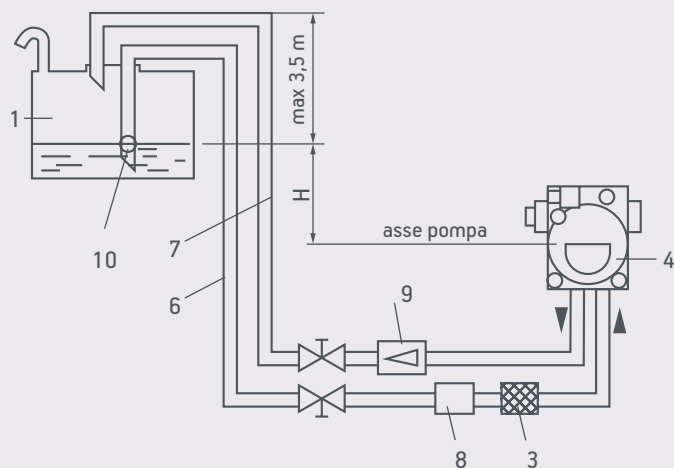


GRAVITY FEED SYSTEM

Legend

- 1 Tank.
- 2 Feeding pipe.
- 3 Wire-net filter.
- 4 Pump.
- 5 Degasifier.
- 6 Suction pipe.
- 7 Burner return pipe.
- 8 Automatic shut-off device with burner off.
- 9 One-way valve.
- 10 Foot valve.
- H Difference in level between minimum level in tank and pump axis (see table on page 19).

NOTE: Comply with the regulations in force for any components missing in the pipelines.

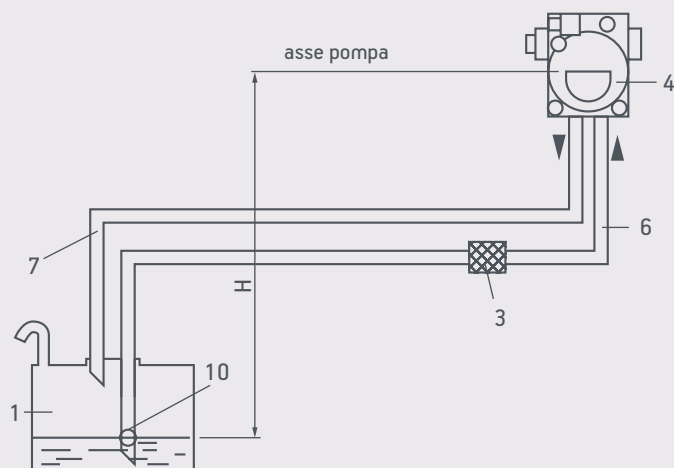


GRAVITY FEED SYSTEM WITH FEED FROM THE TOP OF THE TANK

Legend

- 1 Tank.
- 2 Feeding pipe.
- 3 Wire-net filter.
- 4 Pump.
- 5 Degasifier.
- 6 Suction pipe.
- 7 Burner return pipe.
- 8 Automatic shut-off device with burner off.
- 9 One-way valve.
- 10 Foot valve.
- H Difference in level between minimum level in tank and pump axis (see table on page 19).

NOTE: Comply with the regulations in force for any components missing in the pipelines.



INTAKE FEED SYSTEM

Legend

- 1 Tank.
- 3 Wire-net filter.
- 4 Pump.
- 6 Suction pipe.
- 7 Burner return pipe.
- 10 Foot valve.
- H Difference in level between minimum level in tank and pump axis (see table on page 19).

NOTE: Comply with the regulations in force for any components missing in the pipelines.

TUBING SIZE

Tubing size	Øi (mm)	GRAVITY FEED SYSTEM			GRAVITY FEED SYSTEM WITH FEED FROM THE TOP OF THE TANK			INTAKE FEED SYSTEM		
		27.2	35.9	41.8	27.2	35.9	41.8	27.2	35.9	41.8
Pump/tank * difference in level)	Øe	1	11/4	11/2	1	11/4	11/2	1	11/4	11/2
Burner model	H (m)									
BT 17 N	0.5							22	35	
BT 17 SPN	1	31			31			17	35	
BT 35 SPN	1.5							12	35	
BT 40 DSN 4T	2	35			35			7	21	
BT 50 DSN 4T	2.5	35			35			3	8	
BT 75 DSN 4T	3	35			35					
BT 100 DSN 4T										
BT 120 DSN 4T	0.5								35	40
	1		45			45			30	35
	1.5		45			45			26	35
	2		50			50			13	25
	2.5		50			50			5	10
BT 180 DSN 4T BT 250 DSN 4T	0.5									25
	1			35			35			20
	1.5			40			40			15
	2			50			50			10
	2.5			50			50			5
BT 300 DSN 4T BT 350 DSN 4T	0.5									25
	1			30			30			20
	1.5			35			35			15
	2			40			40			8
	2.5			45			45			3
	3			50			50			
metres										
total pipeline length including the vertical section. Deduct 0.25 m for each elbow or gate.										

*) See diagram on page 18

TECHNICAL SPECIFICATIONS

Model	Part.no	Emission class	Thermal output kW	Natural gas flow rate cu. Nm/h	Electrical power supply	Electrical power absorbed kW	Motor power kW	Noise dBA 1)
BTG 3	17000010		16.6 ÷ 42.7	1.7 ÷ 4.3	1N AC 50Hz 230V	0.16	0.09	62
BTG 3.6 P	17030010		16.3 ÷ 41.9	1.6 ÷ 4.2	1N AC 50Hz 230V	0.22	0.11	64
BTG 6	17040010		30.6 ÷ 56.3	3.1 ÷ 5.7	1N AC 50Hz 230V	0.19	0.11	64
BTG 6 P	17050010		30.6 ÷ 56.3	3.1 ÷ 5.7	1N AC 50Hz 230V	0.22	0.11	64
BTG 11	17060010		48.8 ÷ 99.0	4.9 ÷ 10.0	1N AC 50Hz 230V	0.19	0.11	64
BTG 11 P	17070010		48.8 ÷ 99.0	4.9 ÷ 10.0	1N AC 50Hz 230V	0.22	0.11	64
BTG 12	17170010		35 ÷ 115	3.5 ÷ 11.6	1N AC 50Hz 230V	0.19	0.11	64
BTG 15	17080010	Class 2	50 ÷ 160	5.0 ÷ 16.1	1N AC 50Hz 230V	0.33	0.18	67
BTG 15 P	17090010	Class 2	50 ÷ 160	5.0 ÷ 16.1	1N AC 50Hz 230V	0.37	0.18	67
BTG 15 ME	17130020	Class 2	50 ÷ 160	5.0 ÷ 16.1	1N AC 50Hz 230V	0.37	0.18	67
BTG 20	17100010	Class 3	60 ÷ 205	6.0 ÷ 20.6	1N AC 50Hz 230V	0.33	0.18	67
BTG 20 P	17110010	Class 3	60 ÷ 205	6.0 ÷ 20.6	1N AC 50Hz 230V	0.37	0.18	67
BTG 20 LX	15100010	Class 3	60 ÷ 205	6.0 ÷ 20.6	1N AC 50Hz 230V	0.37	0.18	67
BTG 20 ME	17120020	Class 3	60 ÷ 205	6.0 ÷ 20.6	1N AC 50Hz 230V	0.37	0.18	67
BTG 28	17140010	Class 2	100 ÷ 280	10.1 ÷ 28.2	1N AC 50Hz 230V	0.33	0.18	67
BTG 28 P	17150010	Class 2	80 ÷ 280	8.0 ÷ 28.2	1N AC 50Hz 230V	0.37	0.18	67
BTG 28 ME	17160020	Class 2	80 ÷ 280	8.0 ÷ 28.2	1N AC 50Hz 230V	0.37	0.18	67
TBG 35	17320010	Class 3	80 ÷ 410	8 ÷ 41	1N AC 50Hz 230V	0.54	0.37	74
TBG 35 P	17330010	Class 3	80 ÷ 410	8 ÷ 41	1N AC 50Hz 230V	0.56	0.37	74
TBG 35 PN	17340010	Class 3	80 ÷ 410	8 ÷ 41	1N AC 50Hz 230V	0.56	0.37	74
TBG 45	17200010	Class 3	100 ÷ 450	10 ÷ 45	1N AC 50Hz 230V	0.68	0.5	76
TBG 45 P V	17210020	Class 3	100 ÷ 450	10 ÷ 45	1N AC 50Hz 230V	0.71	0.5	76
TBG 45 PN	17220010	Class 3	100 ÷ 450	10 ÷ 45	1N AC 50Hz 230V	0.68	0.5	76
TBG 45 PN V	17220020	Class 3	100 ÷ 450	10 ÷ 45	1N AC 50Hz 230V	0.71	0.5	76
TBG 45 ME	17230020	Class 3	100 ÷ 450	10 ÷ 45	1N AC 50Hz 230V	0.71	0.5	76
TBG 60	17270010	Class 3	120 ÷ 600	12 ÷ 60	3N AC 50Hz 400V	0.94	0.75	77
TBG 60 P V	17280020	Class 3	120 ÷ 600	12 ÷ 60	1N AC 50Hz 230V	0.98	0.75	77
TBG 60 PN	17290010	Class 3	120 ÷ 600	12 ÷ 60	3N AC 50Hz 400V	0.94	0.75	77
TBG 60 PN V	17290020	Class 3	120 ÷ 600	12 ÷ 60	1N AC 50Hz 230V	0.98	0.75	77
TBG 60 ME	17300020	Class 3	120 ÷ 600	12 ÷ 60	3N AC 50Hz 400V	0.98	0.75	77
TBG 85 P V	17480020	Class 2	170 ÷ 850	17 ÷ 85	1N AC 50Hz 230V	1.2	1.1	75
TBG 85 MC	17540010	Class 2	170 ÷ 850	17 ÷ 85	3N AC 50Hz 400V	1.2	1.1	75
TBG 85 PN	17490010	Class 2	170 ÷ 850	17 ÷ 85	3N AC 50Hz 400V	1.2	1.1	75
TBG 85 PN V	17490020	Class 2	170 ÷ 850	17 ÷ 85	1N AC 50Hz 230V	1.2	1.1	75
TBG 80 LX PN	17520010	Class 3	130 ÷ 800	13 ÷ 80	3N AC 50Hz 400V	1.2	1.1	75
TBG 80 LX PN V	17520020	Class 3	130 ÷ 800	13 ÷ 80	1N AC 50Hz 230V	1.2	1.1	75
TBG 85 ME	17500020	Class 2	170 ÷ 850	17 ÷ 85	3N AC 50Hz 400V	1.2	1.1	75
TBG 80 LX ME	17530020	Class 3	130 ÷ 800	13 ÷ 80	3N AC 50Hz 400V	1.2	1.1	75
TBG 120 P	17550030	Class 2	240 ÷ 1200	24 ÷ 121	3N AC 50Hz 400V	1.6	1.5	77
TBG 120 MC	17610010	Class 2	240 ÷ 1200	24 ÷ 121	3N AC 50Hz 400V	1.6	1.5	77
TBG 110 LX PN	17590010	Class 3	180 ÷ 1200	18 ÷ 121	3N AC 50Hz 400V	1.6	1.5	77
TBG 110 LX PN V	17590015	Class 3	180 ÷ 1200	18 ÷ 121	3N AC 50Hz 400V	1.6	1.5	77
TBG 120 ME	17570020	Class 2	240 ÷ 1200	24 ÷ 121	3N AC 50Hz 400V	1.6	1.5	77
TBG 110 LX ME	17600020	Class 3	180 ÷ 1200	18 ÷ 121	3N AC 50Hz 400V	1.6	1.5	77
TBG 150 P	17620030	Class 2	300 ÷ 1500	30 ÷ 151	3N AC 50Hz 400V	2.4	2.2	83
TBG 150 MC	17680010	Class 2	300 ÷ 1500	30 ÷ 151	3N AC 50Hz 400V	2.4	2.2	83
TBG 140 LX PN	17660010	Class 3	200 ÷ 1450	20 ÷ 146	3N AC 50Hz 400V	2.4	2.2	83
TBG 140 LX PN V	17660015	Class 3	200 ÷ 1450	20 ÷ 146	3N AC 50Hz 400V	2.4	2.2	83
TBG 150 ME	17640020	Class 2	300 ÷ 1500	30 ÷ 151	3N AC 50Hz 400V	2.4	2.2	83
TBG 140 LX ME	17670020	Class 3	200 ÷ 1450	20 ÷ 146	3N AC 50Hz 400V	2.4	2.2	83
TBG 210 P	17690030	Class 2	400 ÷ 2100	40 ÷ 211	3N AC 50Hz 400V	3.2	3	85
TBG 210 MC	17750010	Class 2	400 ÷ 2100	40 ÷ 211	3N AC 50Hz 400V	3.2	3	85
TBG 200 LX PN	17730010	Class 3	475 ÷ 2000	48 ÷ 201	3N AC 50Hz 400V	3.2	3	85
TBG 200 LX PN V	17730015	Class 3	475 ÷ 2000	48 ÷ 201	3N AC 50Hz 400V	3.2	3	85
TBG 210 ME	17710020	Class 2	400 ÷ 2100	40 ÷ 211	3N AC 50Hz 400V	3.2	3	85
TBG 200 LX ME	17740020	Class 3	400 ÷ 2000	40 ÷ 201	3N AC 50Hz 400V	3.2	3	85
BGN 250 MC	16800010		400 ÷ 2500	40 ÷ 251	3N AC 50Hz 400V	7.9	7.5	89
BGN 250 DSPGN ME	16790020		400 ÷ 2500	40 ÷ 251	3N AC 50Hz 400V	7.9	7.5	89
BGN 300 MC	16850010		650 ÷ 3100	65 ÷ 312	3N AC 50Hz 400V	7.9	7.5	89
BGN 300 DSPGN ME	16840020		657 ÷ 2982	66 ÷ 300	3N AC 50Hz 400V	7.9	7.5	89
BGN 350 MC	16900010		900 ÷ 3600	91 ÷ 362	3N AC 50Hz 400V	7.9	7.5	89
BGN 300 LX	15270010	Class 3	400 ÷ 3600	40 ÷ 362	3N AC 50Hz 400V	7.9	7.5	89
BGN 300 LX V	15270015	Class 3	400 ÷ 3600	40 ÷ 362	3N AC 50Hz 400V	7.9	7.5	89
BGN 350 DSPGN ME	16890020		924 ÷ 3500	93 ÷ 352	3N AC 50Hz 400V	7.9	7.5	89
BGN 450 MC	16940010	Class 2	500 ÷ 4300	50 ÷ 433	3N AC 50Hz 400V	7.9	7.5	89
BGN 390 LX	15290010	Class 3	400 ÷ 3950	40 ÷ 397	3N AC 50Hz 400V	7.9	7.5	89
BGN 390 LX V	15290015	Class 3	400 ÷ 3950	40 ÷ 397	3N AC 50Hz 400V	7.9	7.5	89
BGN 450 ME	16950010	Class 2	500 ÷ 4300	50 ÷ 433	3N AC 50Hz 400V	7.9	7.5	89
TBG 480 MC	67190010	Class 3	480 ÷ 4800	50 ÷ 433	3N AC 50Hz 400V	11.4	11	89
TBG 480 ME	67180010	Class 3	480 ÷ 4800	50 ÷ 433	3N AC 50Hz 400V	11.4	11	89
TBG 600 ME	67200010	Class 3	500 ÷ 6000	50 ÷ 604	3N AC 50Hz 400V	11.8	11	88
TBG 800 ME	67220010	Class 3	800 ÷ 8000	80 ÷ 805	3N AC 50Hz 400V	15.8	15	85
GI 1000 LX	15360010	Class 3	1500 ÷ 10850	151 ÷ 1091	3N AC 50Hz 400V	22.5	22	98
GI 1000 LX V	15360015	Class 3	1500 ÷ 10850	151 ÷ 1091	3N AC 50Hz 400V	22.5	22	98
GI 1000 LX ME	66570050	Class 3	1500 ÷ 10850	151 ÷ 1091	3N AC 50Hz 400V	22.5	22	98
TBG 1100 MC	67450010	Class 2	1000 ÷ 11000	101 ÷ 1106	3N AC 50Hz 400V	23	22	89.4
TBG 1100 ME	67440010	Class 2	1000 ÷ 11000	101 ÷ 1106	3N AC 50Hz 400V	23	22	89.4

1) Noise levels measured in the Baltur laboratories by means of microphone positioned 1 metre behind the burner running on test boiler, at maximum nominal thermal output.

Natural gas net heating value: Hi = 35.80 MJ/m³ = 8550 kcal/m³, at the reference conditions of 0°C, 1013 mbar;

SINGLE-STAGE

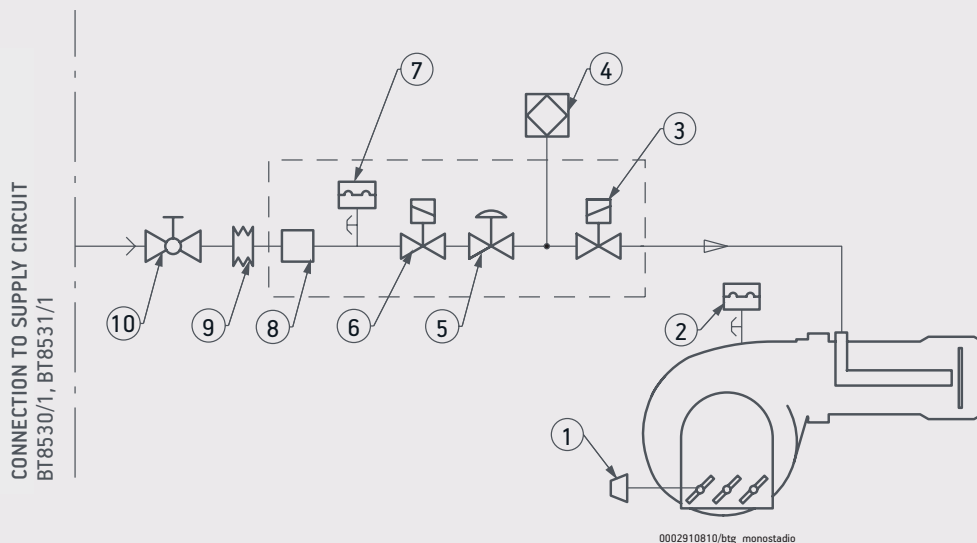
BTG 3-6-11-12-15-20-28 / TBG 35

Legend

- 1 Air regulation manual switch.
- 2 Air pressure switch.
- 3 Operating gas valve.
- 4 Valve seal check on request.
- 5 Gas pressure regulator.
- 6 Safety gas valve.
- 7 Minimum gas pressure switch.
- 8 Gas filter.

Responsibility of the installer

- 9 Anti-vibration joint.
- 10 Ball cock.



SINGLE-STAGE

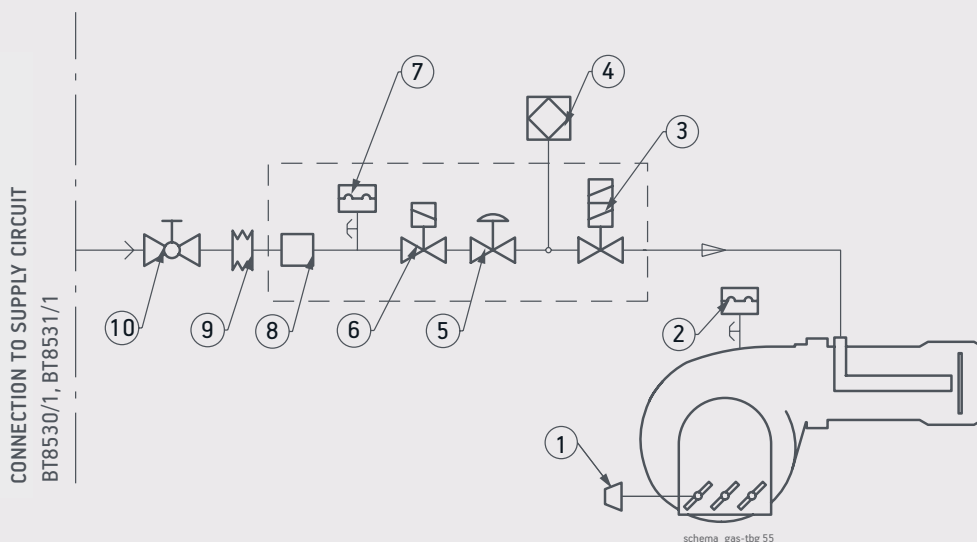
TBG 45-60

Legend

- 1 Air regulation manual switch.
- 2 Air pressure switch.
- 3 Two-stage operating gas valve.
- 4 Valve seal check on request.
- 5 Gas pressure regulator.
- 6 Safety gas valve.
- 7 Minimum gas pressure switch.
- 8 Gas filter.

Responsibility of the installer

- 9 Anti-vibration joint.
- 10 Ball cock.



TWO-STAGE

BTG 3.6-6-11-15-20-28 P

Legend

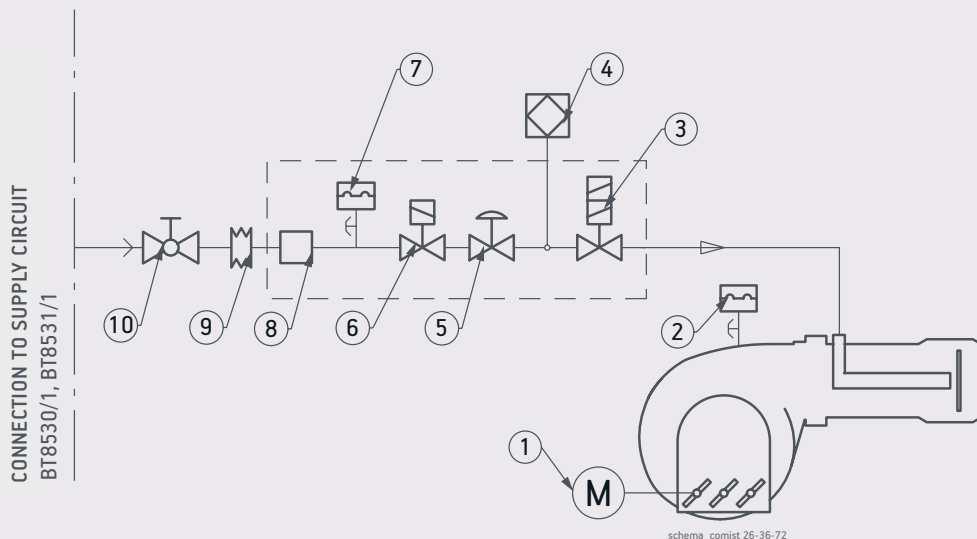
- 1 Air adjustment servomotor.
- 2 Air pressure switch.
- 3 Two-stage operating gas valve.
- 4 Valve seal check on request.
- 5 Gas pressure regulator.
- 6 Safety gas valve.
- 7 Minimum gas pressure switch.
- 8 Gas filter.

Responsibility of the installer

- 9 Anti-vibration joint.
- 10 Ball cock.

Note

The train type depends on the available gas pressure.
Refer to the technical part price list in force.



FUNCTIONAL DIAGRAM

TWO-STAGE

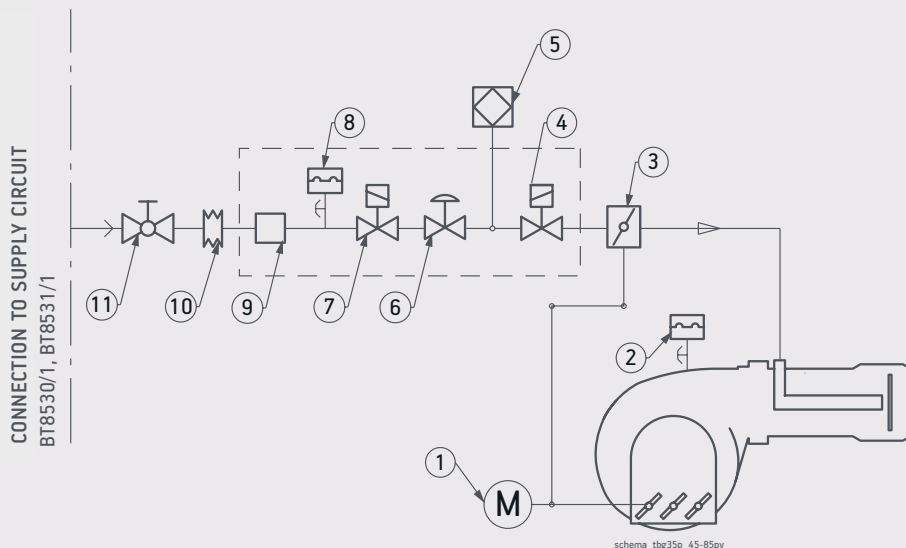
TBG 35 P / TBG 45-60-85 P V

Legend

- 1 Air/fuel regulation servomotor.
- 2 Air pressure switch.
- 3 Throttle gas valve.
- 4 Operating gas valve.
- 5 Valve seal check on request.
- 6 Gas pressure regulator.
- 7 Safety gas valve.
- 8 Minimum gas pressure switch.
- 9 Gas filter.

Responsibility of the installer

- 10 Anti-vibration joint.
- 11 Ball cock.



TWO-STAGE

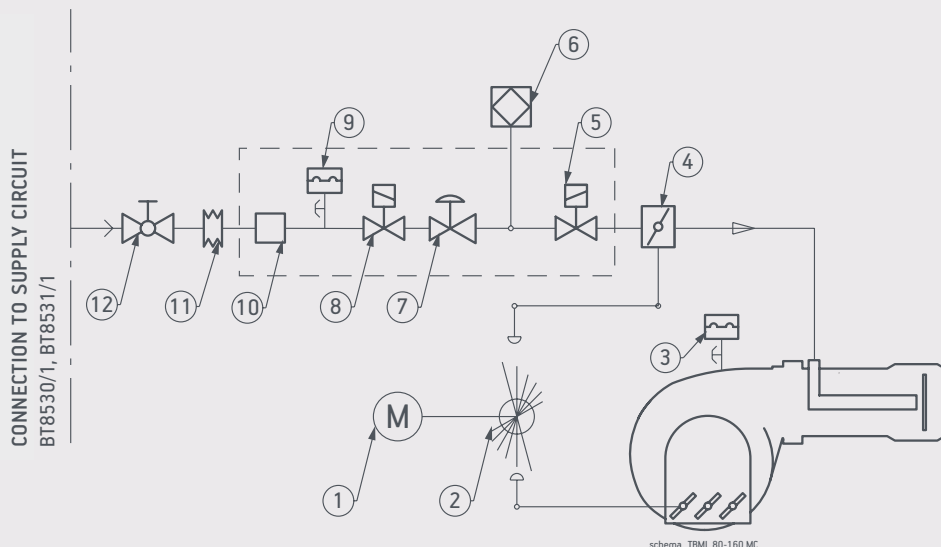
TBG 120-150-210 P

Legend

- 1 Modulation servomotor.
- 2 Air/fuel adjustment disk.
- 3 Air pressure switch.
- 4 Throttle gas valve.
- 5 Operating gas valve.
- 6 Valve seal check.
- 7 Gas pressure regulator.
- 8 Safety gas valve.
- 9 Minimum gas pressure switch.
- 10 Gas filter.

Responsibility of the installer

- 11 Anti-vibration joint.
- 12 Ball cock.



TWO-STAGE PROGRESSIVE / MODULATING BURNERS

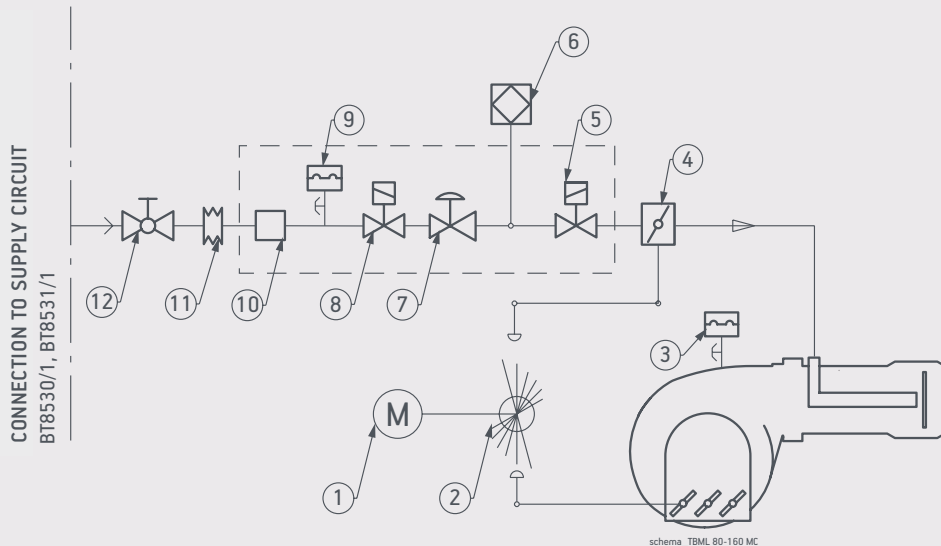
TBG 85-120-150-210 MC / BGN 250-300-350-450 MC

Legend

- 1 Modulation servomotor.
- 2 Air/fuel adjustment disk.
- 3 Air pressure switch.
- 4 Throttle gas valve.
- 5 Operating gas valve.
- 6 Valve seal check.
- 7 Gas pressure regulator.
- 8 Safety gas valve.
- 9 Minimum gas pressure switch.
- 10 Gas filter.

Responsibility of the installer

- 11 Anti-vibration joint.
- 12 Ball cock.



TWO-STAGE PROGRESSIVE / MODULATING BURNERS

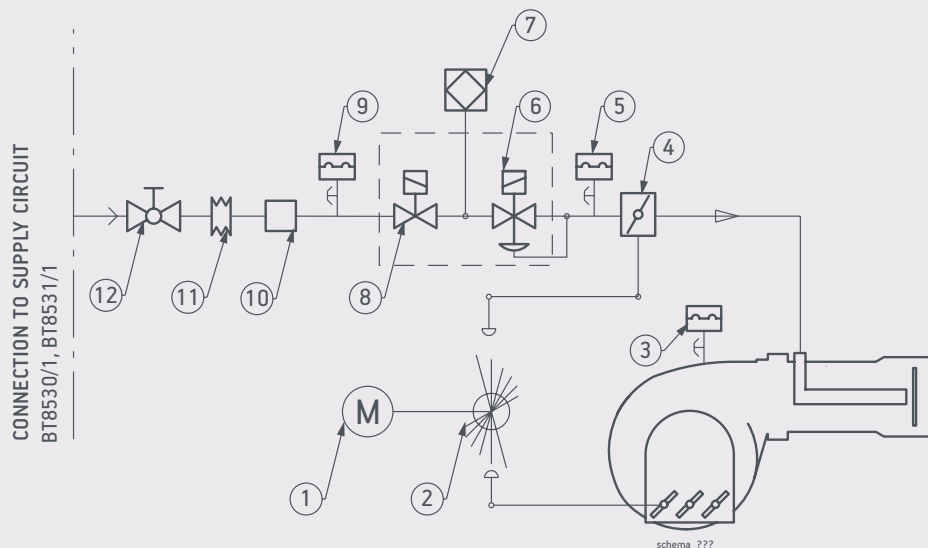
TBG 480-110 MC

Legend

- 1 Modulation servomotor.
- 2 Air/fuel adjustment disk.
- 3 Air pressure switch.
- 4 Throttle gas valve.
- 5 Maximum gas pressure switch.
- 6 Operating gas valve with pressure regulator.
- 7 Valve seal check.
- 8 Safety gas valve.
- 9 Minimum gas pressure switch.
- 10 Gas filter.

Responsibility of the installer

- 11 Anti-vibration joint.
- 12 Ball cock.



TWO-STAGE PROGRESSIVE / MODULATING BURNERS

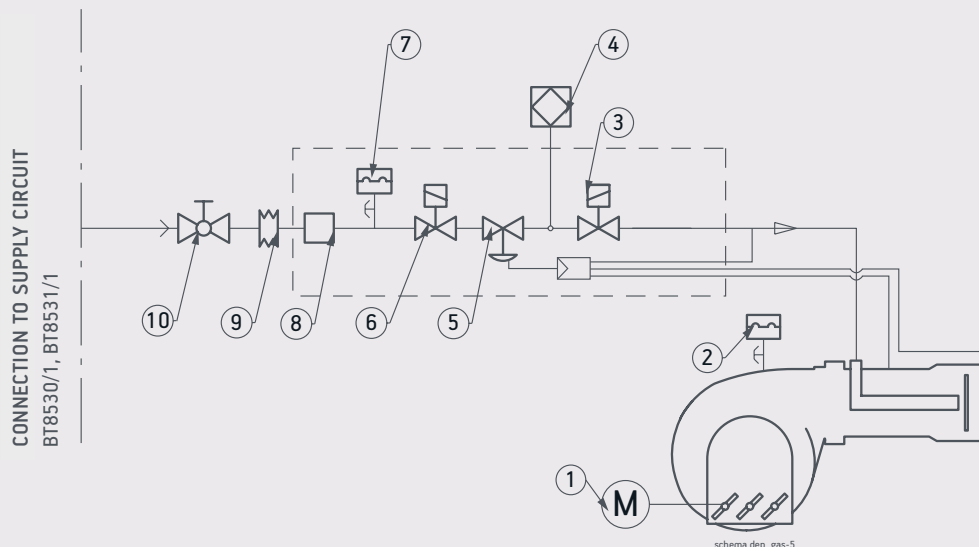
BTG 20 LX / TBG 35-45-60-85 PN
TBG 80-110-140-200 LX PN / BGN 300-390 LX

Legend

- 1 Air adjustment servomotor.
- 2 Air pressure switch.
- 3 Operating gas valve.
- 4 Valve seal check on request for burners with capacity output lower than 1200 kW, standard for burners with capacity output higher than 1200 kW.
- 5 Pressure regulator with pneumatic adjustment.
- 6 Safety gas valve.
- 7 Minimum gas pressure switch.
- 8 Gas filter.

Responsibility of the installer

- 9 Anti-vibration joint.
- 10 Ball cock.



TWO-STAGE PROGRESSIVE / MODULATING BURNERS

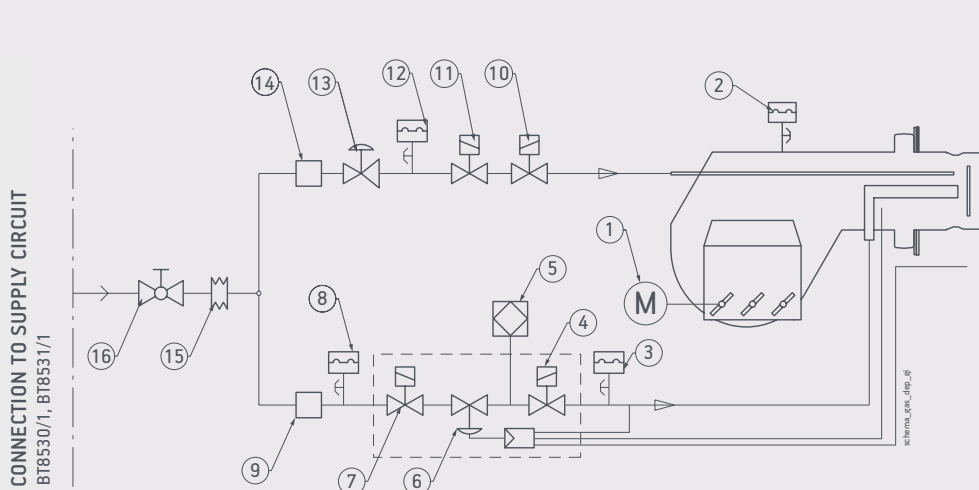
GI 1000 LX

Legend

- 1 Air adjustment servomotor.
- 2 Air pressure switch.
- 3 Maximum gas pressure switch.
- 4 Operating gas valve.
- 5 Valve seal check.
- 6 Pressure regulator with pneumatic adjustment.
- 7 Safety gas valve.
- 8 Minimum gas pressure switch.
- 9 Gas filter.
- 10 Pilot train operating gas valve.
- 11 Pilot train safety gas valve.
- 12 Pilot train minimum gas pressure switch.
- 13 Pilot train pressure regulator.
- 14 Pilot train gas filter.

Responsibility of the installer

- 15 Anti-vibration joint.
- 16 Ball cock.



FUNCTIONAL DIAGRAM

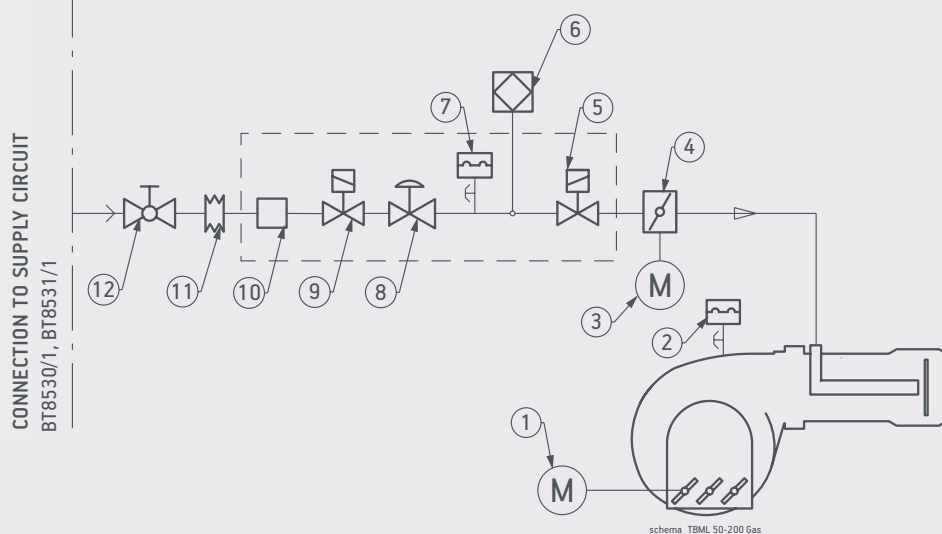
TWO-STAGE PROGRESSIVE / MODULATING BURNERS BTG 15-20-28 ME / TBG 45-60-85-120-150-210 ME / BGN 450 ME
TBG 80-110-140-200 LX ME / BGN 250-300-350 DSPGN ME

Legend

- 1 Air adjustment servomotor.
- 2 Air pressure switch.
- 3 Gas adjustment servomotor.
- 4 Throttle gas valve.
- 5 Operating gas valve.
- 6 Valve seal check.
- 7 Minimum gas pressure switch.
- 8 Gas pressure regulator.
- 9 Safety gas valve.
- 10 Gas filter.

Responsibility of the installer

- 11 Anti-vibration joint.
- 12 Ball cock.



TWO-STAGE PROGRESSIVE / MODULATING BURNERS

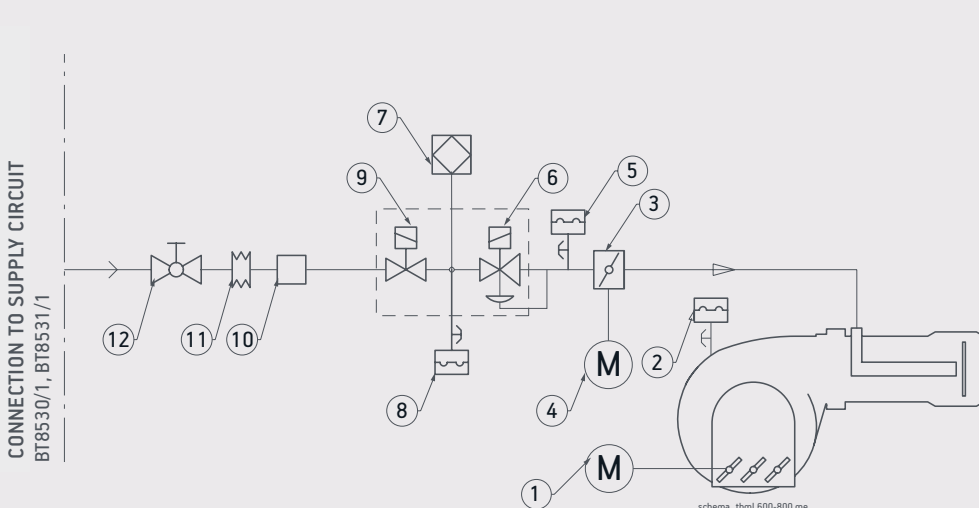
TBG 480-600-800-1100 ME

Legend

- 1 Air adjustment servomotor.
- 2 Air pressure switch.
- 3 Throttle gas valve.
- 4 Gas adjustment servomotor.
- 5 Maximum gas pressure switch.
- 6 Operating gas valve with pressure regulator.
- 7 Valve seal check
- 8 Minimum gas pressure switch.
- 9 Safety gas valve.
- 10 Gas filter.

Responsibility of the installer

- 11 Anti-vibration joint.
- 12 Ball cock.



TWO-STAGE PROGRESSIVE / MODULATING BURNERS

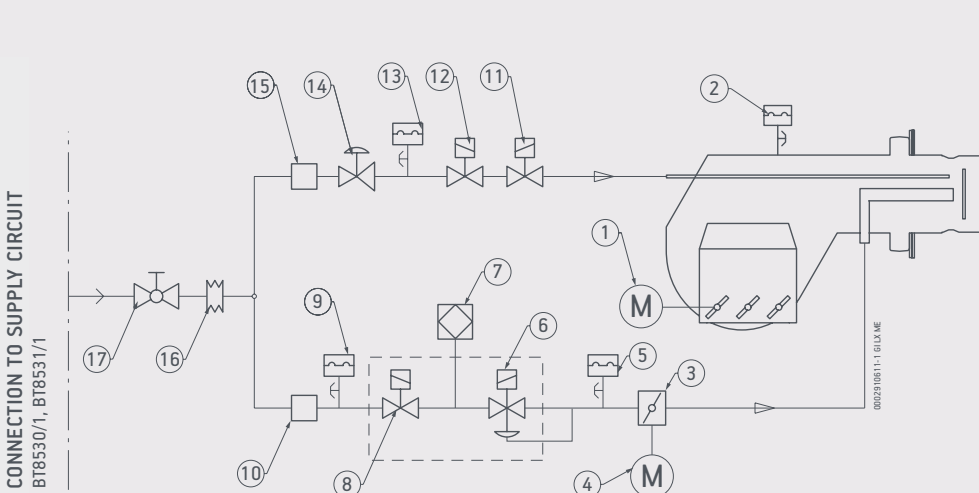
GI 1000 LX ME

Legend

- 1 Air adjustment servomotor.
- 2 Air pressure switch.
- 3 Throttle gas valve.
- 4 Gas adjustment servomotor.
- 5 Maximum gas pressure switch.
- 6 Operating gas valve with pressure regulator.
- 7 Valve seal check.
- 8 Safety gas valve.
- 9 Minimum gas pressure switch.
- 10 Gas filter.
- 11 Pilot train operating gas valve.
- 12 Pilot train safety gas valve.
- 13 Pilot train minimum gas pressure switch.
- 14 Pilot train pressure regulator.
- 15 Pilot train gas filter.

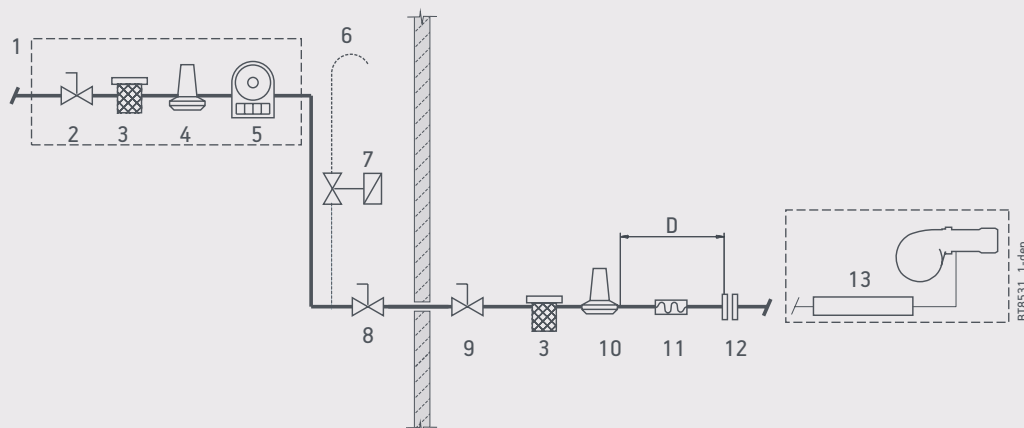
Responsibility of the installer

- 16 Anti-vibration joint.
- 17 Ball cock.



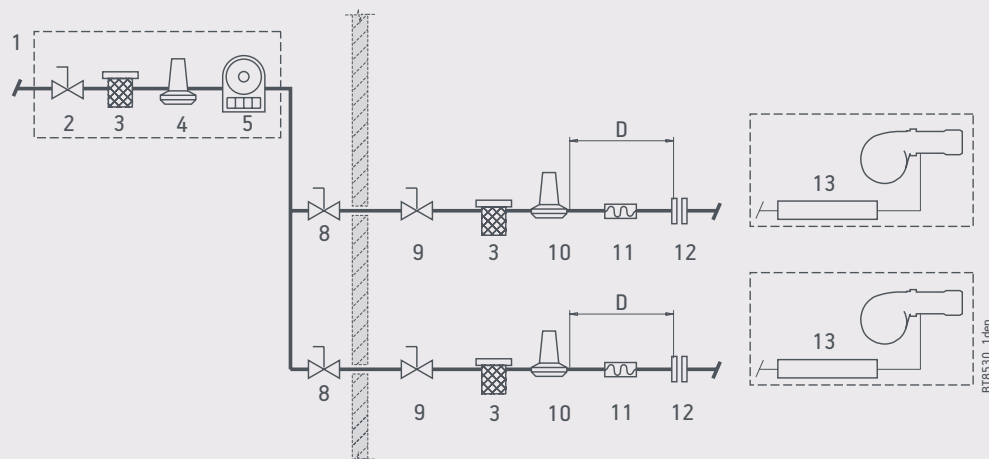
BT8531/1

Schematic diagram for connecting a burner to the medium pressure gas supply network



BT8530/1

Schematic diagram for connecting more burners to the medium pressure gas supply network



Legend

- 1 Measuring and reducing unit.
- 2 Shut-off cock.
- 3 Gas filter.
- 4 Pressure reducer.
- 5 Meter.
- 6 Wire mesh flame trap on discharge into the atmosphere.

- 7 Automatic vent valve, if necessary (it should discharge outside in a suitable place).
- 8 Emergency shut-off cock.
- 9 Ball cock.
- 10 Pressure reducer (suitable for the specific case).
- 11 Anti-vibration joint.
- 12 Flanged coupling.

- 13 Gas train.
- D Distance between pressure stabilizer (or regulator/stabilizer) and gas valves at least 1.5 - 2 m.

TECHNICAL SPECIFICATIONS

Model	Part.no	Emission class	Thermal output kW	Natural gas flow rate cu. Nm/h	Diesel flow rate kg/h	Fuel viscosity °E at 20°C	Electrical power supply	Electrical power absorbed kW	Motor power kW	Noise dBA 1)
MINICOMIST 7	54700010		38.5 ÷ 66.8	3.9 ÷ 6.7	3.2 ÷ 5.6	1.5	1N AC 50Hz 230V	0.43	0.13+0.10	66
MINICOMIST 11	54730010		58.4 ÷ 103.0	5.9 ÷ 10.4	4.9 ÷ 8.7	1.5	1N AC 50Hz 230V	0.43	0.13+0.10	66
COMIST 20	54770010		80 ÷ 230	8.0 ÷ 23.1	6.7 ÷ 19.4	1.5	1N AC 50Hz 230V	0.58	0.25+0.10	74
COMIST 26 SP	54800010		130 ÷ 340	13.1 ÷ 34.2	11.0 ÷ 28.7	1.5	1N AC 50Hz 230V	0.70	0.37+0.10	74
TBML 60 P	56470010	Class 2	200 ÷ 600	20 ÷ 60	17 ÷ 51	1.5	3N AC 50Hz 400V	1.1	0.65+0.10	76
TBML 50 MC	56450010	Class 3	100(200)* ÷ 500	10 ÷ 50	17 ÷ 42	1.5	3N AC 50Hz 400V	1.1	0.65	76
TBML 50 ME	56460010	Class 3	100(200)* ÷ 500	10 ÷ 50	17 ÷ 42	1.5	3N AC 50Hz 400V	1.1	0.65	76
TBML 80 MC	56490010	Class 3	180(350)* ÷ 850	18 ÷ 85	30 ÷ 72	1.5	3N AC 50Hz 400V	1.5	1.1	77
TBML 80 ME	56500010	Class 3	180(350)* ÷ 850	18 ÷ 85	30 ÷ 72	1.5	3N AC 50Hz 400V	1.5	1.1	77
TBML 120 MC	56530010	Class 3	250(450)* ÷ 1200	25 ÷ 121	38 ÷ 101	1.5	3N AC 50Hz 400V	1.9	1.5	76
TBML 120 ME	56540010	Class 3	250(450)* ÷ 1200	25 ÷ 121	38 ÷ 101	1.5	3N AC 50Hz 400V	1.9	1.5	76
TBML 150 P	56550010	Class 2	550 ÷ 1500	55 ÷ 151	46 ÷ 126	1.5	3N AC 50Hz 400V	2.6	2.2	83
TBML 160 MC	56570010	Class 3	350(550)* ÷ 1600	35 ÷ 161	40 ÷ 135	1.5	3N AC 50Hz 400V	3.4	3	85
TBML 160 ME	56580010	Class 3	350(550)* ÷ 1600	35 ÷ 161	46 ÷ 135	1.5	3N AC 50Hz 400V	3.4	3	85
TBML 200 MC	56610010	Class 2	450(700)* ÷ 2000	45 ÷ 201	59 ÷ 169	1.5	3N AC 50Hz 400V	3.4	3	83
TBML 200 ME	56620010	Class 2	450(700)* ÷ 2000	45 ÷ 201	59 ÷ 169	1.5	3N AC 50Hz 400V	3.4	3	83
COMIST 250	55110010		1127 ÷ 3380	113 ÷ 340	95 ÷ 285	1.5	3N AC 50Hz 400V	9.1	7.50+0.75	89
COMIST 250 DSPGM	53580050		1127 ÷ 3380	113 ÷ 340	95 ÷ 285	1.5	3N AC 50Hz 400V	9.9	7.50+0.75	89
COMIST 300	55160010		1304 ÷ 3878	131 ÷ 390	110 ÷ 327	1.5	3N AC 50Hz 400V	9.1	7.50+0.75	89
COMIST 300 DSPGM	53600050		1304 ÷ 3878	131 ÷ 390	110 ÷ 327	1.5	3N AC 50Hz 400V	9.9	7.5+1.5	89
TBML 350 ME	56710010	Class 3	600(800)* ÷ 3600	60 ÷ 362	67 ÷ 304	1.5	3N AC 50Hz 400V	9.9	7.5+1.5	86
TBML 600 ME	67300010	Class 3	800(2000)* ÷ 6000	80 ÷ 604	169 ÷ 506	1.5	3N AC 50Hz 400V	14	11.0+2.2	88
TBML 800 ME	67320010	Class 3	800(2000)* ÷ 8000	80 ÷ 805	169 ÷ 675	1.5	3N AC 50Hz 400V	18	15.0+2.2	85
GI MIST 1000 DSPGM	6687010		2500 ÷ 10500	251 ÷ 1056	211 ÷ 885	1.5	3N AC 50Hz 400V	26.5	22+4	98

Model	Part.no	Thermal output kW	Natural gas flow rate cu. Nm/h	Fuel oil flow rate kg/h	Fuel viscosity °E at 50°C	Electrical power supply	Electrical power absorbed kW	Motor power kW	Tank heating element power kW	Noise dBA 1)
COMIST 72 N	55380010	348 ÷ 916	35 ÷ 92	31 ÷ 82	7	3N AC 50Hz 400V	9.9	1.10+0.75	7.5	76
COMIST 122 N	55410010	652 ÷ 1364	66 ÷ 137	58 ÷ 122	7	3N AC 50Hz 400V	14	2.20+0.55	10.5	84
COMIST 180 NM	55460010	688 ÷ 1981	69 ÷ 199	62 ÷ 177	7	3N AC 50Hz 400V	19.9	3.0+1.1	15	84
COMIST 180 DSPNM	5428010	688 ÷ 1981	69 ÷ 199	62 ÷ 177	7	3N AC 50Hz 400V	19.9	3.0+1.1	15	84
COMIST 250 NM	55510010	1127 ÷ 3380	113 ÷ 340	101 ÷ 303	7	3N AC 50Hz 400V	27.5	7.5+1.1	18	89
COMIST 250 DSPNM	54300050	1127 ÷ 3380	113 ÷ 340	101 ÷ 303	7	3N AC 50Hz 400V	27.5	7.5+1.1	18	89
COMIST 300 NM	55560010	1304 ÷ 3878	131 ÷ 390	117 ÷ 347	7	3N AC 50Hz 400V	36.1	7.5+2.2	25	89
COMIST 300 DSPNM	54320050	1304 ÷ 3878	131 ÷ 390	117 ÷ 347	7	3N AC 50Hz 400V	36.1	7.5+2.2	25	89
GI MIST 350 DSPNM-D	67050050	1581 ÷ 4743	159 ÷ 477	142 ÷ 425	50	3N AC 50Hz 400V	46.6	15.0+2.2	28.5	91
GI MIST 420 DSPNM-D	67080050	1840 ÷ 5522	185 ÷ 555	165 ÷ 495	50	3N AC 50Hz 400V	50.9	18.5+3.0	28.5	97
GI MIST 510 DSPNM-D	67110050	2430 ÷ 6500	244 ÷ 654	218 ÷ 582	50	3N AC 50Hz 400V	50.9	18.5+3.0	28.5	97
GI MIST 1000 DSPNM-D	6717010	2500 ÷ 10500	251 ÷ 1056	224 ÷ 941	50	3N AC 50Hz 400V	66.7	22.0+4.0	40	98

1) Noise levels measured in the Baltur laboratories by means of microphone positioned 1 metre behind the burner running on test boiler, at maximum nominal thermal output.

*) Minimum thermal power upon diesel operation.

Net heating value

Methane gas: $H_i = 35.80 \text{ MJ/m}^3 = 8550 \text{ kcal/m}^3$, at the reference conditions 0°C, 1013 mbar;

Diesel oil: $H_i = 42.70 \text{ MJ/kg} = 10200 \text{ kcal/kg}$.

Fuel oil: $H_i = 40.19 \text{ MJ/kg} = 9600 \text{ kcal/kg}$.

SINGLE-STAGE DUAL FUEL BURNERS

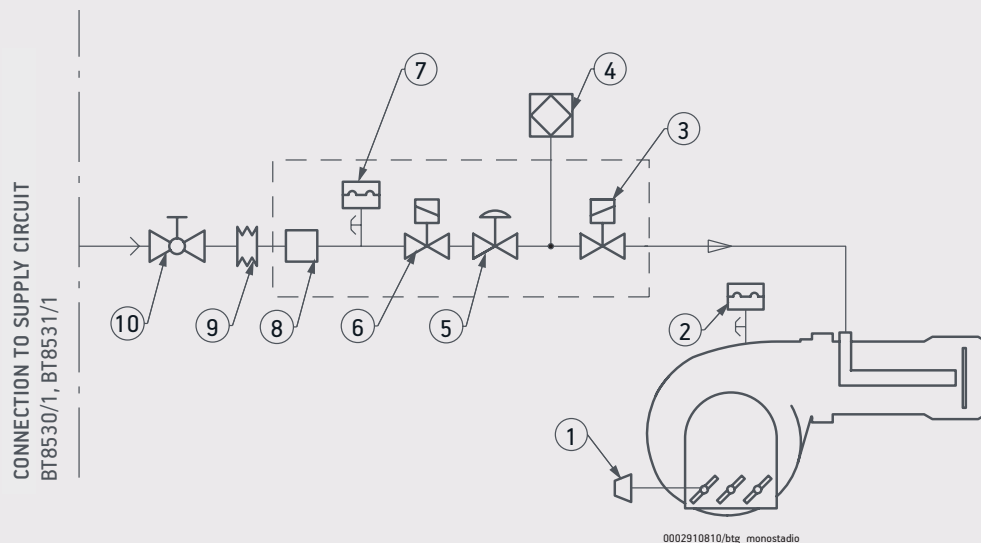
MINICOMIST 7-11 / COMIST 20

Legend

- 1 Air regulation manual switch.
- 2 Air pressure switch.
- 3 Operating gas valve.
- 4 Valve seal check on request.
- 5 Gas pressure regulator.
- 6 Safety gas valve.
- 7 Minimum gas pressure switch.
- 8 Gas filter.

Responsibility of the installer

- 9 Anti-vibration joint.
- 10 Ball cock.



TWO-STAGE PRESSURE DROP DUAL FUEL BURNERS

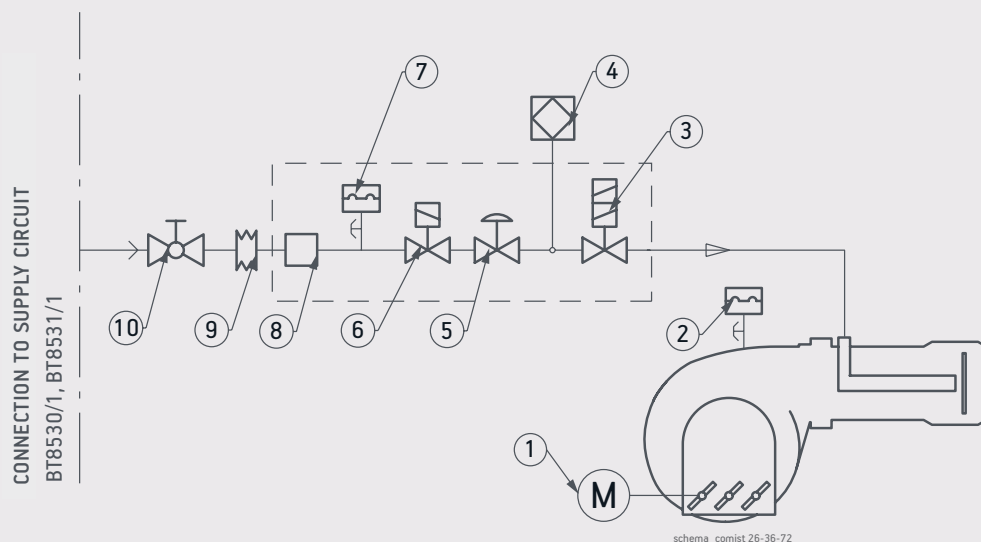
COMIST 26 SP

Legend

- 1 Air adjustment servomotor.
- 2 Air pressure switch.
- 3 Two-stage operating gas valve.
- 4 Valve seal check on request.
- 5 Gas pressure regulator.
- 6 Safety gas valve.
- 7 Minimum gas pressure switch.
- 8 Gas filter.

Responsibility of the installer

- 9 Anti-vibration joint.
- 10 Ball cock.



FUNCTIONAL DIAGRAM - GAS SECTION

TWO-STAGE DUAL FUEL BURNERS

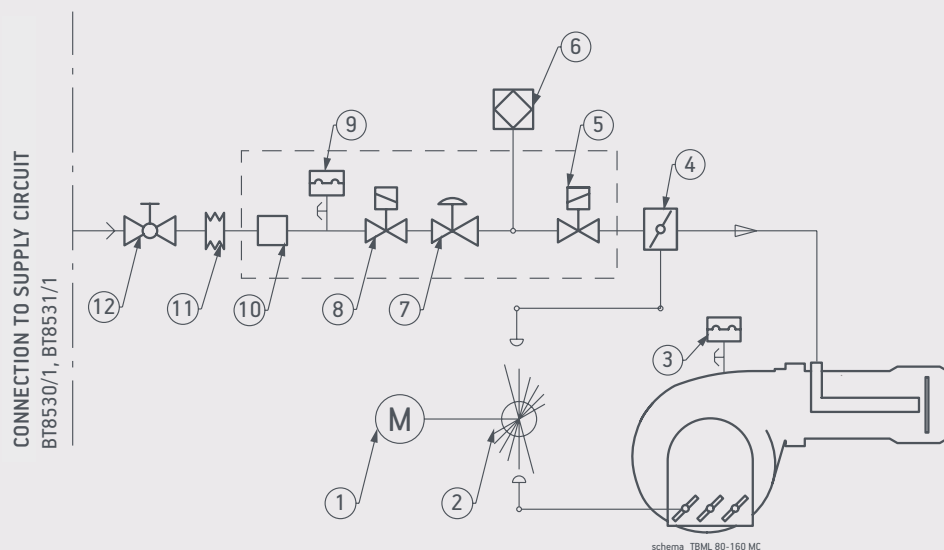
TBML 60-150 P

Legend

- 1 Modulation servomotor.
- 2 Air/fuel adjustment disk.
- 3 Air pressure switch.
- 4 Throttle gas valve.
- 5 Operating gas valve.
- 6 Valve seal check.
- 7 Gas pressure regulator.
- 8 Safety gas valve.
- 9 Minimum gas pressure switch.
- 10 Gas filter.

Responsibility of the installer

- 11 Anti-vibration joint.
- 12 Ball cock.



TWO-STAGE DUAL FUEL BURNERS

COMIST 72 N

Legend

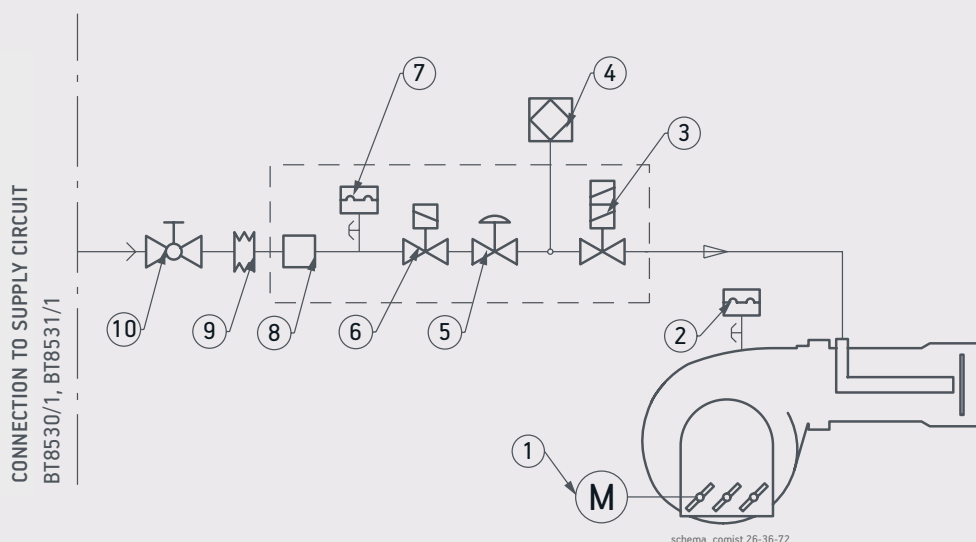
- 1 Air adjustment servomotor.
- 2 Air pressure switch.
- 3 Two-stage operating gas valve.
- 4 Valve seal check on request.
- 5 Gas pressure regulator.
- 6 Safety gas valve.
- 7 Minimum gas pressure switch.
- 8 Gas filter.

Responsibility of the installer

- 9 Anti-vibration joint.
- 10 Ball cock.

Note

The train type depends on the available gas pressure.
Refer to the technical part price list in force.



TWO-STAGE DUAL FUEL BURNERS

COMIST 250-300 / 122 N / 180-250-300 NM

Legend

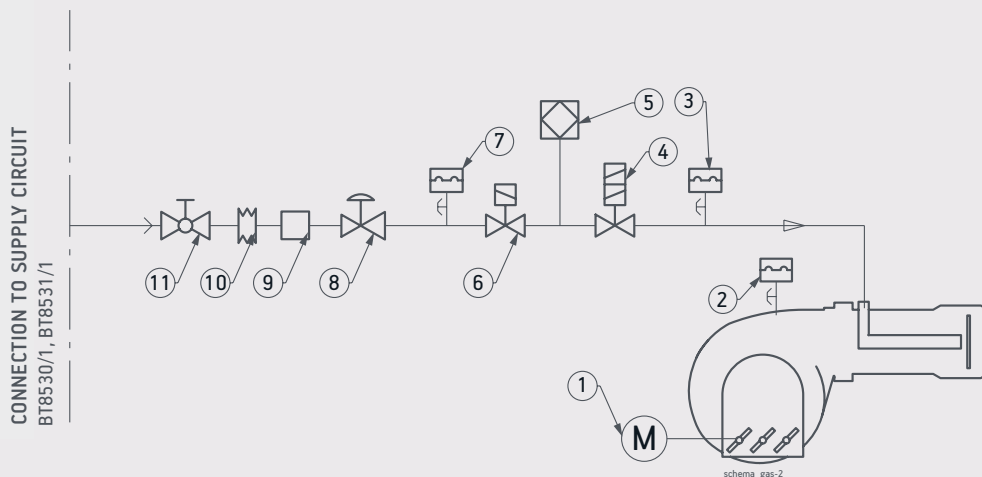
- 1 Air adjustment servomotor.
- 2 Air pressure switch.
- 3 Maximum gas pressure switch.
- 4 Two-stage operating gas valve.
- 5 Valve seal check
- 6 Safety gas valve.
- 7 Minimum gas pressure switch.
- 8 Gas pressure regulator.
- 9 Gas filter.

Responsibility of the installer

- 10 Anti-vibration joint.
- 11 Ball cock.

Note

The train type depends on the available gas pressure.
Refer to the technical part price list in force.



TWO-STAGE PROGRESSIVE / MODULATING DUAL FUEL BURNERS

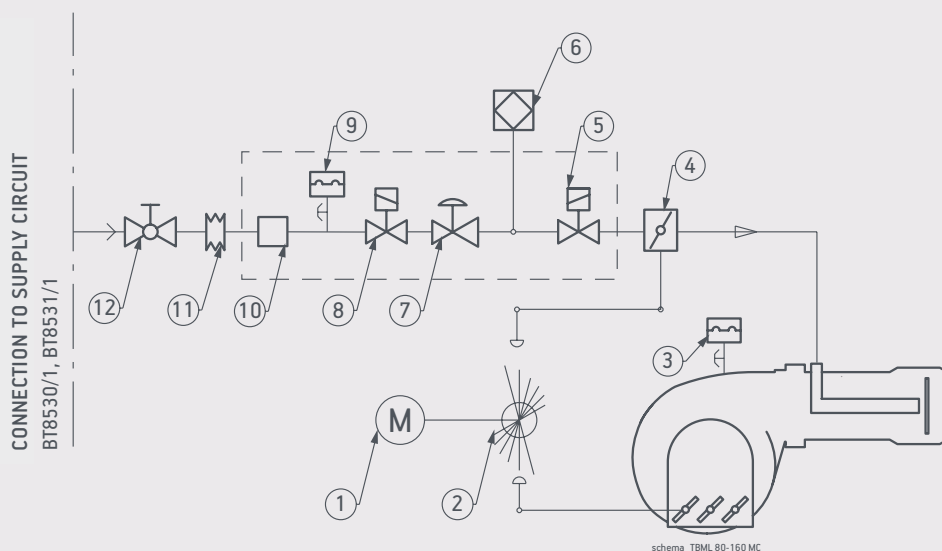
TBML 50-80-120-160-200 MC

Legend

- 1 Modulation servomotor.
- 2 Air/fuel adjustment disk.
- 3 Air pressure switch.
- 4 Throttle gas valve.
- 5 Operating gas valve.
- 6 Valve seal check.
- 7 Gas pressure regulator.
- 8 Safety gas valve.
- 9 Minimum gas pressure switch.
- 10 Gas filter.
- 11 Anti-vibration joint.
- 12 Ball cock.

Responsibility of the installer

- 11 Anti-vibration joint.
- 12 Ball cock.



FUNCTIONAL DIAGRAM - GAS SECTION

TWO-STAGE PROGRESSIVE / MODULATING DUAL FUEL BURNERS

COMIST 250-300 DSPG/180-250-300 DSPNM

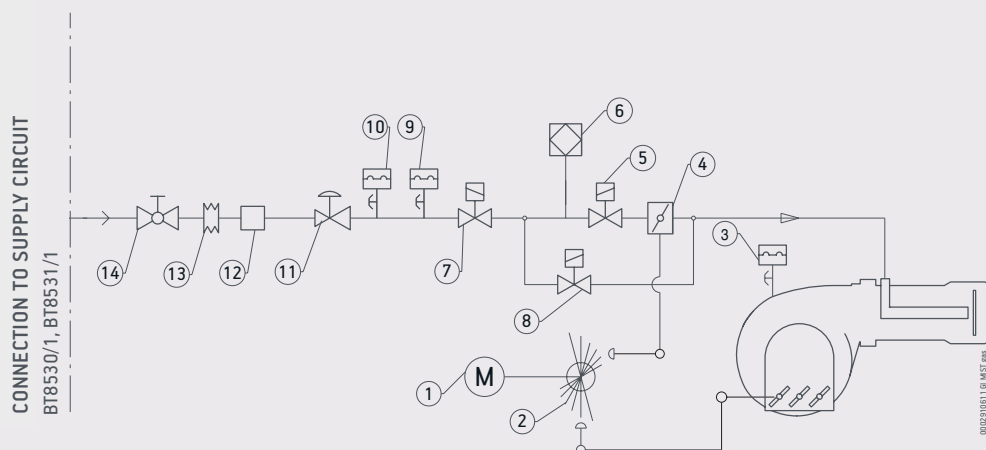
GI MIST 350-420-510 DSPNM-D

Legend

- 1 Modulation servomotor.
- 2 Air/fuel adjustment disk.
- 3 Air pressure switch.
- 4 Throttle gas valve.
- 5 Operating gas valve.
- 6 Valve seal check.
- 7 Safety gas valve.
- 8 Pilot gas valve.
- 9 Minimum gas pressure switch.
- 10 Maximum gas pressure switch.
- 11 Gas pressure regulator.
- 12 Gas filter.

Responsibility of the installer

- 13 Anti-vibration joint.
- 14 Ball cock.



MODULATING DUAL FUEL BURNERS

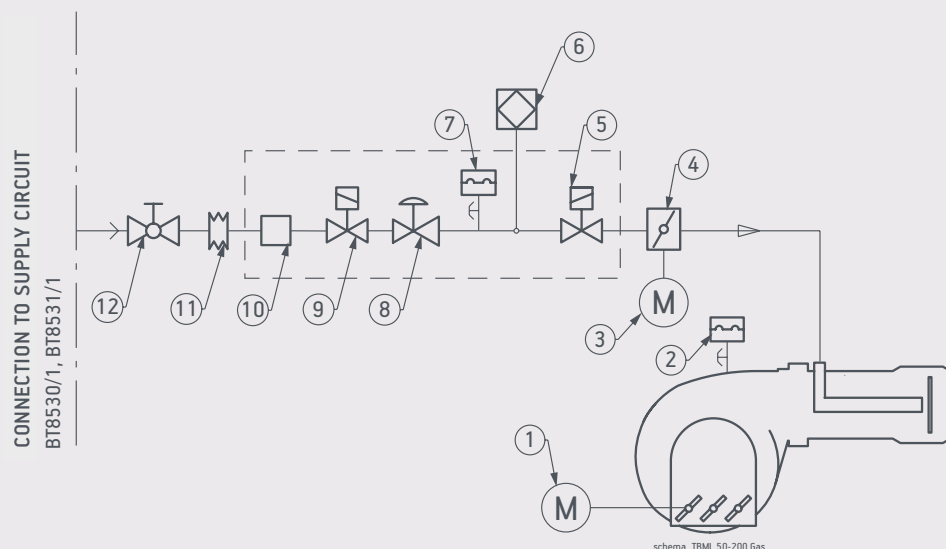
TBML 50-80-120-160-200 ME

Legend

- 1 Air adjustment servomotor.
- 2 Air pressure switch.
- 3 Gas adjustment servomotor.
- 4 Throttle gas valve.
- 5 Operating gas valve.
- 6 Valve seal check.
- 7 Minimum gas pressure switch.
- 8 Gas pressure regulator.
- 9 Safety gas valve.
- 10 Gas filter.

Responsibility of the installer

- 11 Anti-vibration joint.
- 12 Ball cock.



MODULATING DUAL FUEL BURNERS

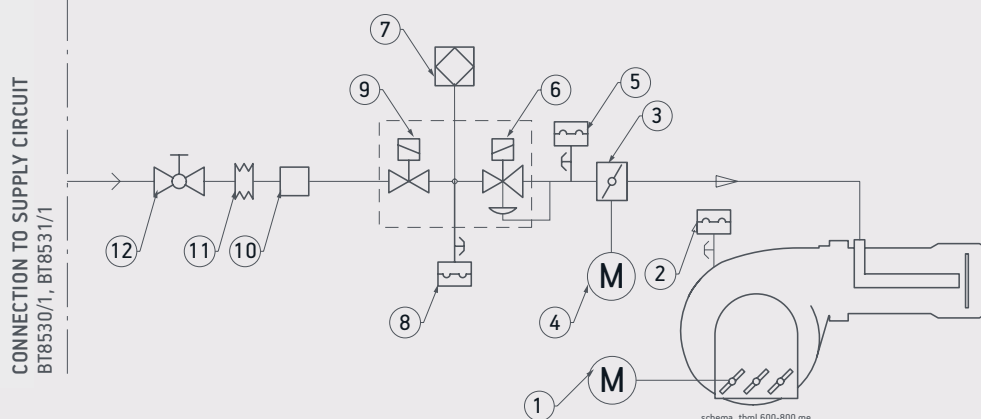
TBML 350-600-800 ME

Legend

- 1 Air adjustment servomotor.
- 2 Air pressure switch.
- 3 Throttle gas valve.
- 4 Gas adjustment servomotor.
- 5 Maximum gas pressure switch.
- 6 Operating gas valve with pressure regulator.
- 7 Valve seal check
- 8 Minimum gas pressure switch.
- 9 Safety gas valve.
- 10 Gas filter.

Responsibility of the installer

- 11 Anti-vibration joint.
- 12 Ball cock.



TWO-STAGE PROGRESSIVE / MODULATING DUAL FUEL BURNERS

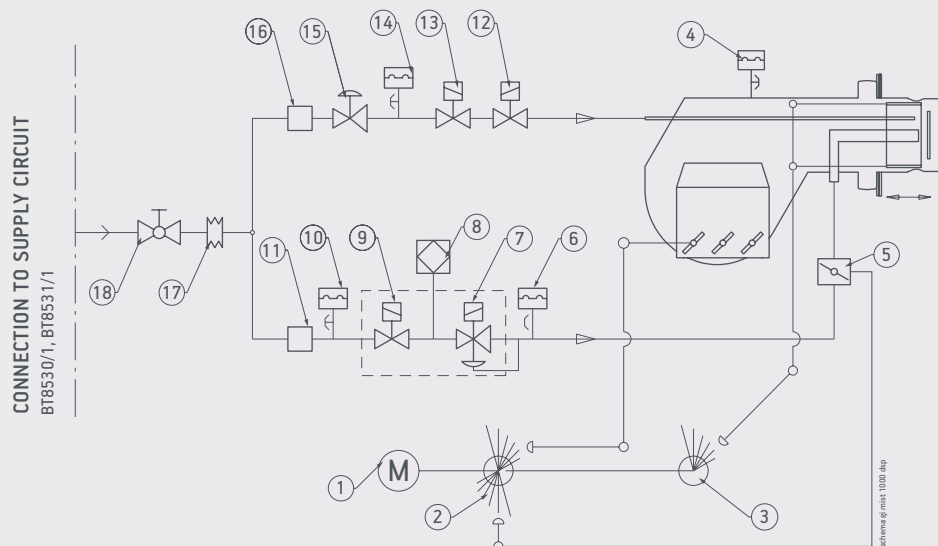
GI MIST 1000 DSP...

Legend

- 1 Modulation servomotor.
- 2 Air/fuel adjustment disk.
- 3 Adjustment disk for air supply to head.
- 4 Air pressure switch.
- 5 Throttle gas valve.
- 6 Maximum gas pressure switch.
- 7 Operating gas valve with pressure regulator.
- 8 Valve seal check.
- 9 Safety gas valve.
- 10 Minimum gas pressure switch.
- 11 Gas filter.
- 12 Pilot train operating gas valve.
- 13 Pilot train safety gas valve.
- 14 Pilot train minimum gas pressure switch.
- 15 Pilot train pressure regulator.
- 16 Pilot train gas filter.

Responsibility of the installer

- 17 Anti-vibration joint.
- 18 Ball cock.



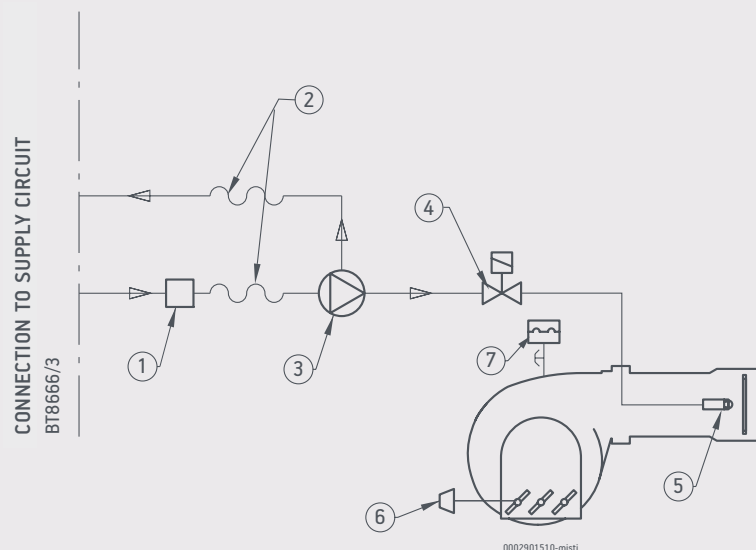
FUNCTIONAL DIAGRAM - DIESEL SECTION

SINGLE-STAGE GAS/DIESEL DUAL FUEL BURNERS

MINICOMIST 7-11 / COMIST 20

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 Operation solenoid valve (normally closed).
- 5 Nozzle.
- 6 Air regulation manual switch.
- 7 Air pressure switch.

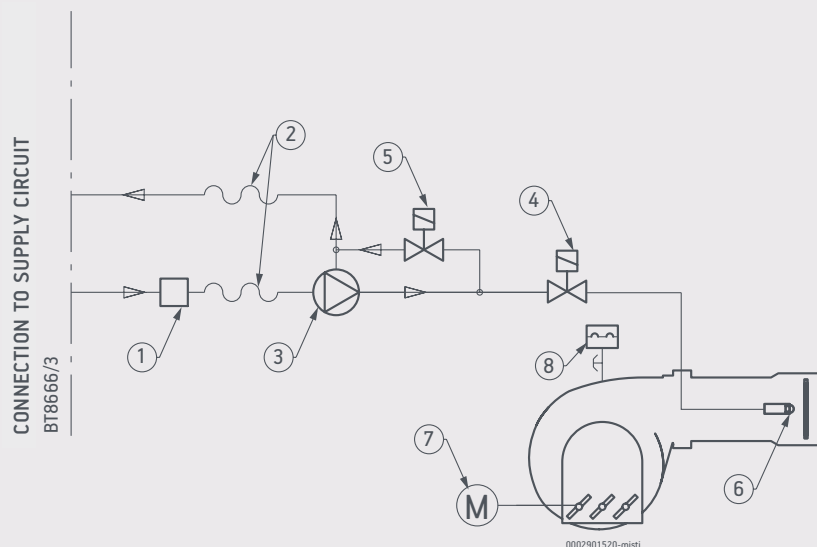


PRESSURE DROP TWO-STAGE GAS/DIESEL DUAL FUEL BURNERS

COMIST 26 SP

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 1st stage solenoid valve (normally closed).
- 5 2nd stage solenoid valve (normally open).
- 6 Nozzle.
- 7 Air adjustment servomotor.
- 8 Air pressure switch.

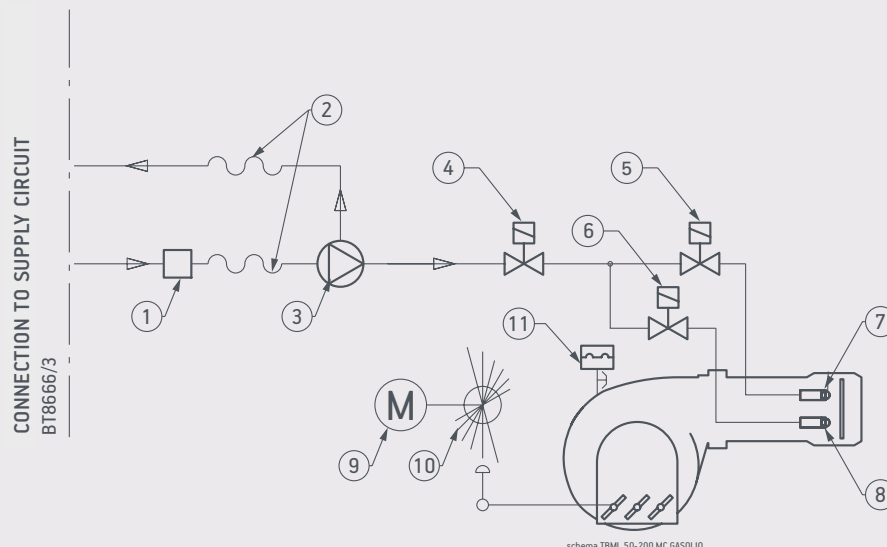


TWO-STAGE GAS/DIESEL DUAL FUEL BURNERS

TBML 50-80-120-160-200 MC

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 Safety solenoid valve (normally closed).
- 5 1st stage solenoid valve (normally closed).
- 6 2nd stage solenoid valve (normally closed).
- 7 1st stage nozzle.
- 8 2nd stage nozzle.
- 9 Modulation servomotor.
- 10 Air/fuel adjustment disk.
- 11 Air pressure switch.

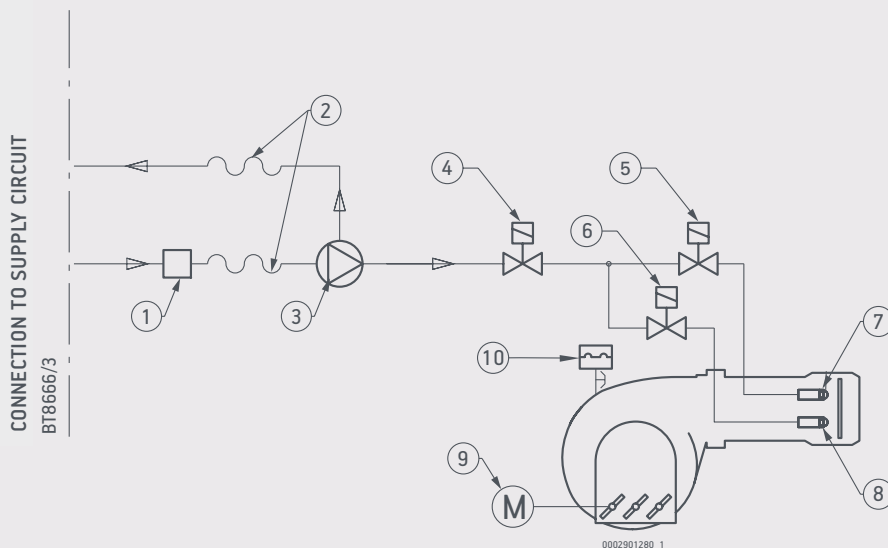


TWO-STAGE GAS/DIESEL DUAL FUEL BURNERS

TBML 60-150 P / TBML 50-80-120-160-200 ME

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 Safety solenoid valve (normally closed).
- 5 1st stage solenoid valve (normally closed).
- 6 2nd stage solenoid valve (normally closed).
- 7 1st stage nozzle.
- 8 2nd stage nozzle.
- 9 Air adjustment servomotor.
- 10 Air pressure switch.

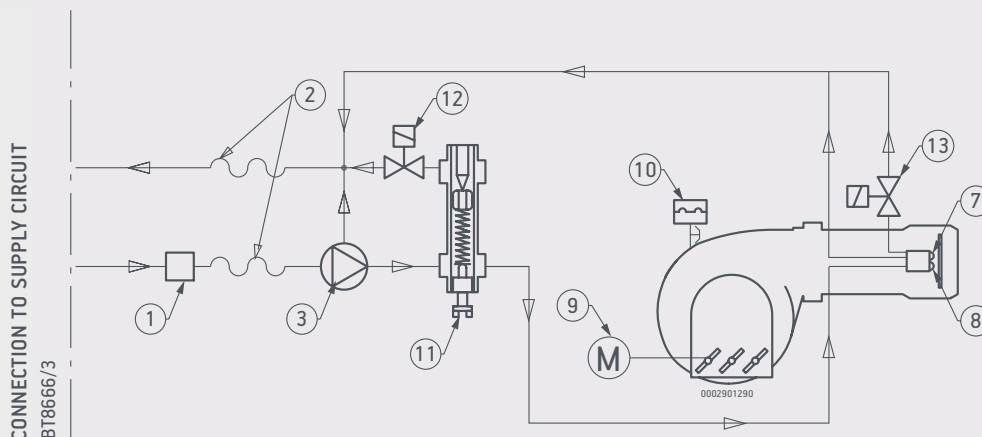


TWO-STAGE GAS/DIESEL DUAL FUEL BURNERS

COMIST 250-300

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 7 1st stage nozzle.
- 8 2nd stage nozzle.
- 9 Air adjustment servomotor.
- 10 Air pressure switch.
- 11 Pressure regulator.
- 12 2nd stage solenoid valve (normally open).
- 13 1st stage solenoid valve (normally open).

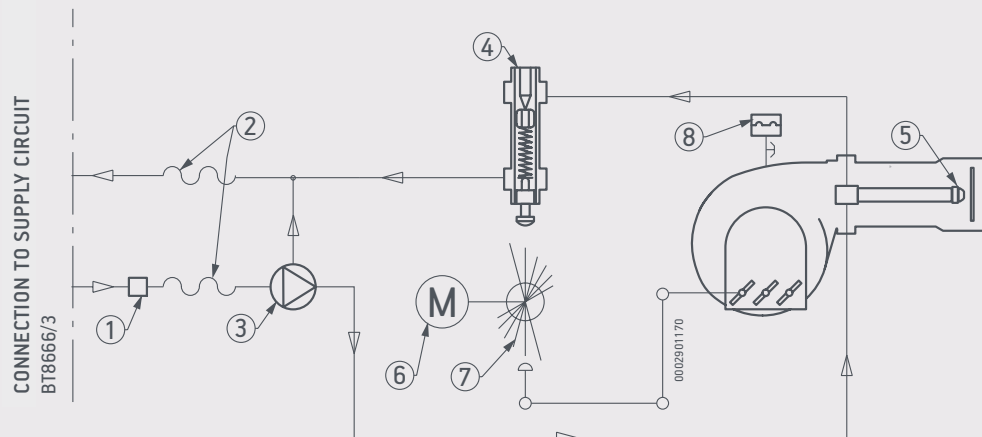


TWO-STAGE PROGRESSIVE/MODULATING GAS/DIESEL DUAL FUEL BURNERS

COMIST 250-300 DSPGM

Legend

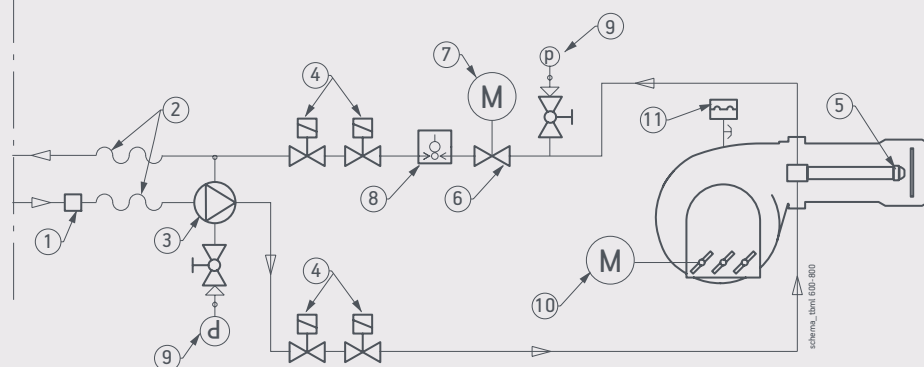
- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 Return pressure regulator.
- 5 Return nozzle.
- 6 Modulation servomotor.
- 7 Air/fuel adjustment disk.
- 8 Air pressure switch.



Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 Operating solenoid valve (normally closed).
- 5 Return nozzle.
- 6 Diesel flow rate regulator.
- 7 Diesel regulator servomotor.
- 8 Maximum diesel pressure switch.
- 9 Manometer.
- 10 Air adjustment servomotor.
- 11 Air pressure switch.

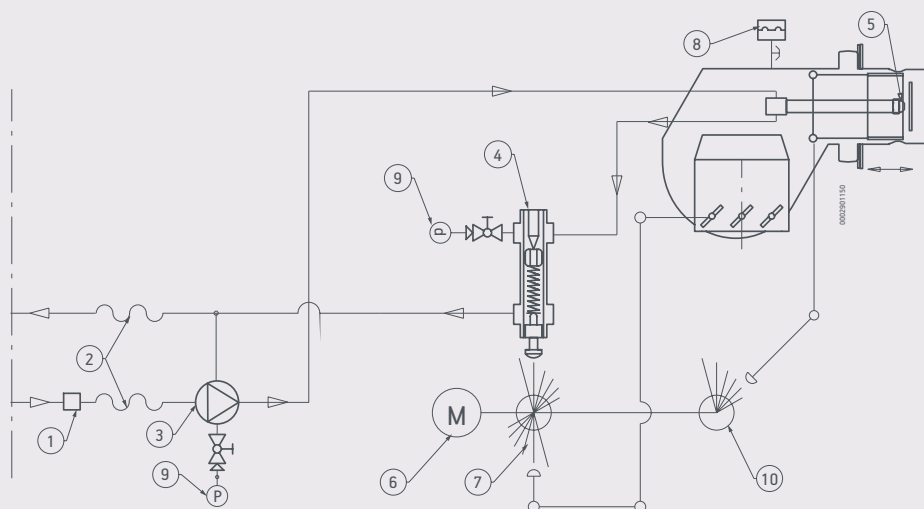
CONNECTION TO SUPPLY CIRCUIT
BT8666/3



Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 Return pressure regulator.
- 5 Return nozzle.
- 6 Modulation servomotor.
- 7 Air/fuel adjustment disk.
- 8 Air pressure switch.
- 9 Manometer.
- 10 Adjustment disk for air supply to head.

CONNECTION TO SUPPLY CIRCUIT
BT8666/3

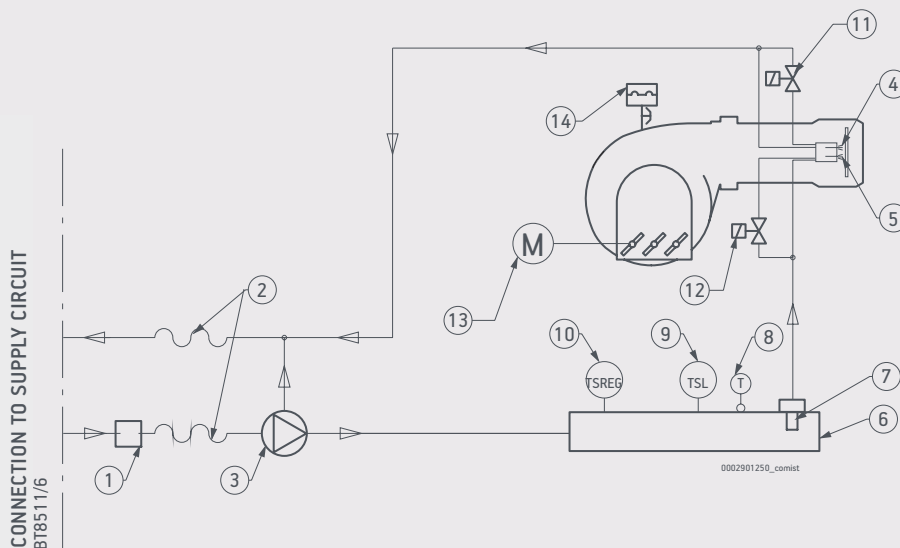


TWO-STAGE FUEL OIL/GAS DUAL FUEL BURNERS

COMIST 72 N

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 1st stage nozzle.
- 5 2nd stage nozzle.
- 6 Electric pre-heater.
- 7 Filter with gas valve.
- 8 Pre-heater thermometer.
- 9 Pre-heater minimum thermostat.
- 10 Pre-heater regulation thermostat.
- 11 1st stage solenoid valve (normally open).
- 12 2nd stage solenoid valve (normally open).
- 13 Air adjustment servomotor.
- 14 Air pressure switch.

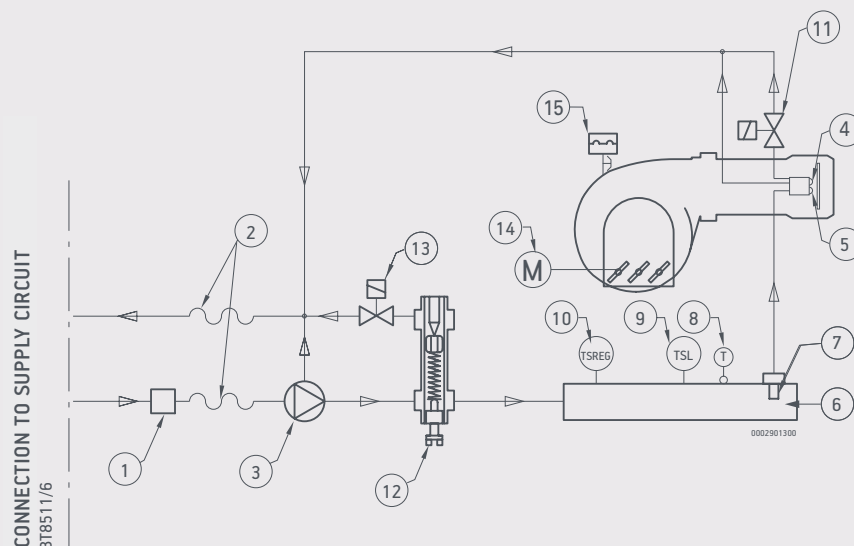


TWO-STAGE FUEL OIL/GAS DUAL FUEL BURNERS

COMIST 122 N

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 1st stage nozzle.
- 5 2nd stage nozzle.
- 6 Electric pre-heater.
- 7 Filter with gas valve.
- 8 Pre-heater thermometer.
- 9 Pre-heater minimum thermostat.
- 10 Pre-heater regulation thermostat.
- 11 1st stage solenoid valve (normally open).
- 12 Pressure regulator.
- 13 2nd stage solenoid valve (normally open).
- 14 Air adjustment servomotor.
- 15 Air pressure switch.

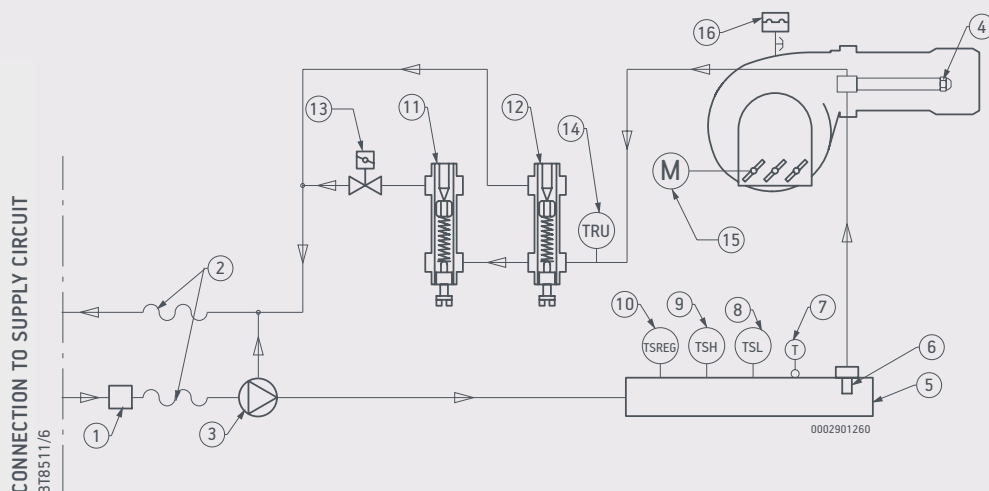


TWO-STAGE FUEL OIL/GAS DUAL FUEL BURNERS

COMIST 180-250-300 NM

Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 Return nozzle.
- 5 Electric pre-heater.
- 6 Filter with gas valve.
- 7 Pre-heater thermometer.
- 8 Pre-heater minimum thermostat.
- 9 Pre-heater safety thermostat.
- 10 Pre-heater regulation thermostat.
- 11 1st stage pressure regulator.
- 12 2nd stage pressure regulator.
- 13 2nd stage solenoid valve (normally open).
- 14 Return thermostat.
- 15 Air regulation servomotor.
- 16 Air pressure switch.

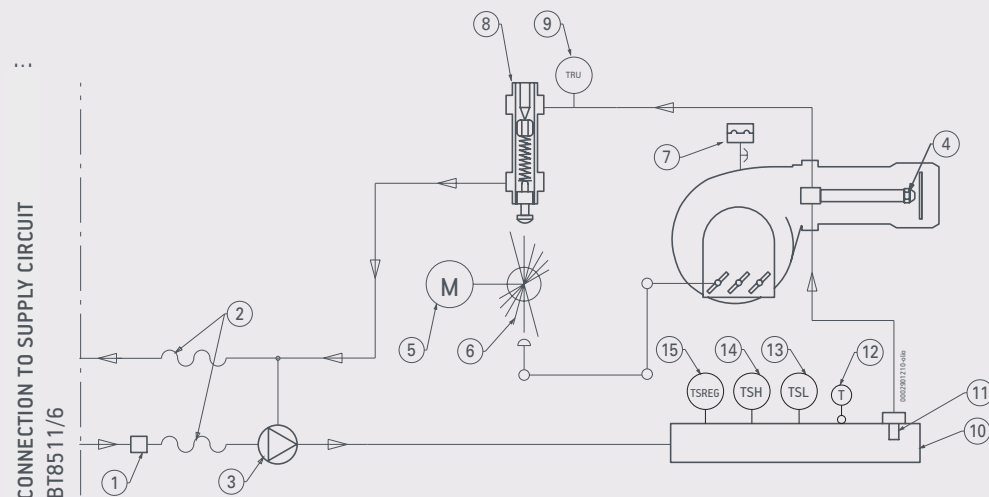


TWO-STAGE PROGRESSIVE / MODULATING FUEL OIL/GAS DUAL FUEL BURNERS

COMIST 180-250-300 DSPNM

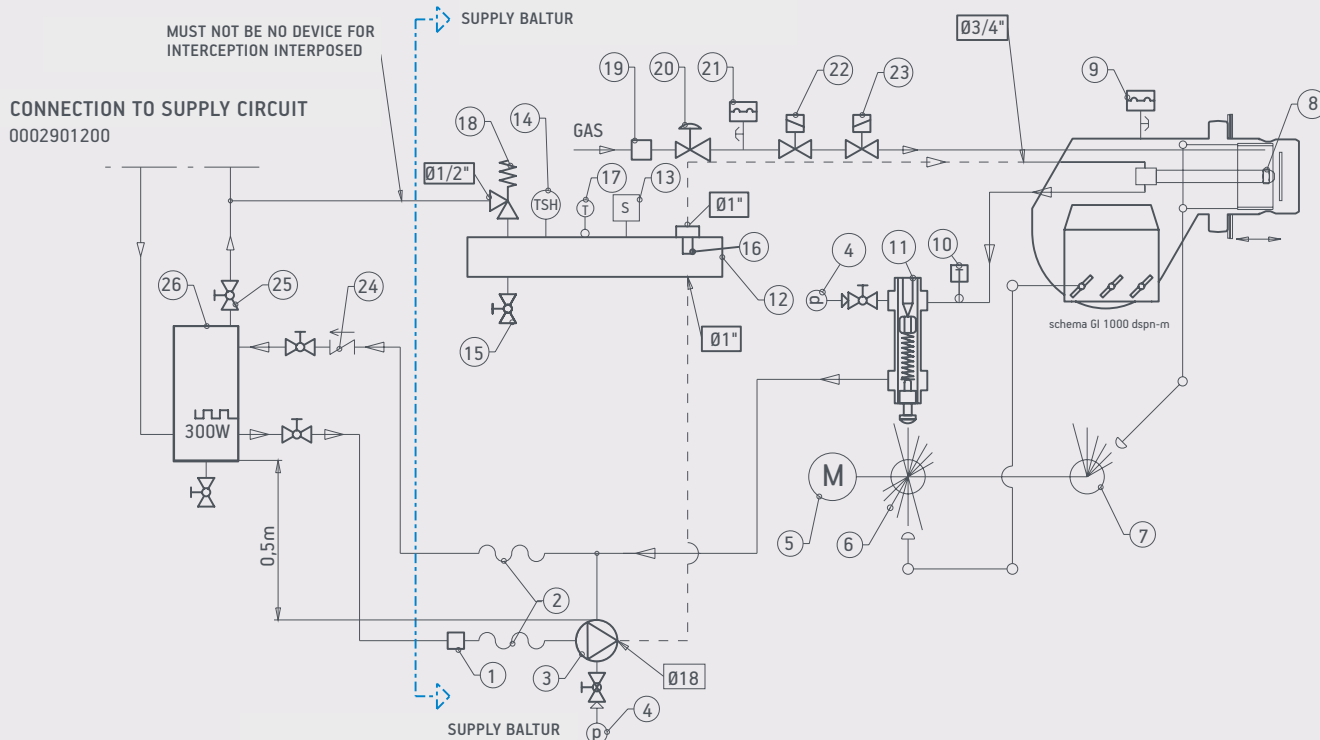
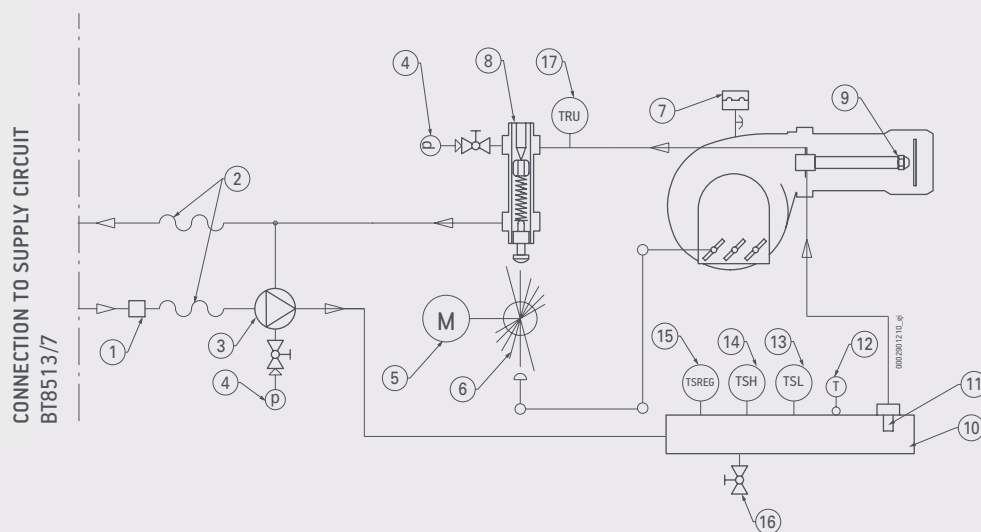
Legend

- 1 Filter.
- 2 Flexible pipe
- 3 Burner pump.
- 4 Return nozzle.
- 5 Modulation servomotor.
- 6 Air/fuel adjustment disk.
- 7 Air pressure switch.
- 8 Return pressure regulator.
- 9 Return thermostat.
- 10 Electric pre-heater.
- 11 Self-cleaning filter.
- 12 Pre-heater thermometer.
- 13 Pre-heater minimum thermostat.
- 14 Pre-heater safety thermostat.
- 15 Pre-heater regulation thermostat.



Legend

- 1 Filter.
- 2 Flexible pipe.
- 3 Burner pump.
- 4 Manometer.
- 5 Modulation servomotor.
- 6 Air/fuel adjustment disk.
- 7 Air pressure switch.
- 8 Return pressure regulator.
- 9 Return nozzle.
- 10 Electric pre-heater.
- 11 Self-cleaning filter.
- 12 Pre-heater thermometer.
- 13 Pre-heater minimum thermostat.
- 14 Pre-heater safety thermostat.
- 15 Pre-heater regulation thermostat.
- 16 Water and plant discharging.
- 17 Return thermostat.



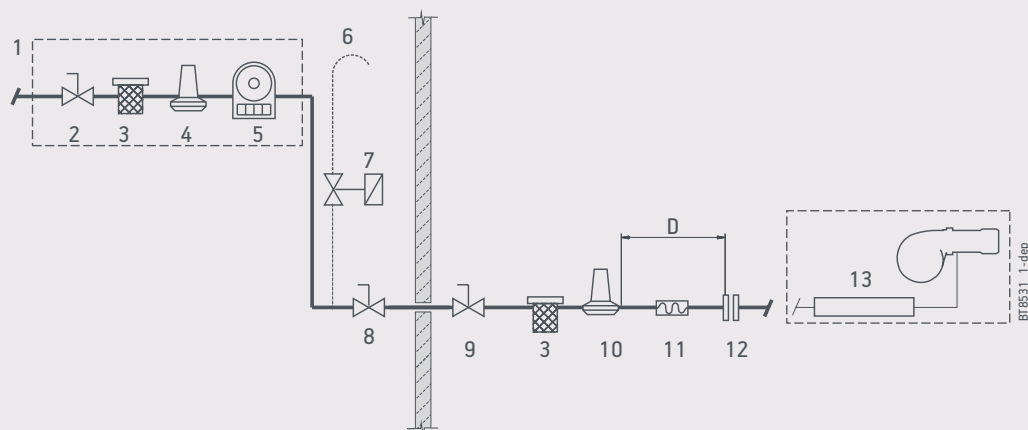
Legend

- 1 Filter.
- 2 Flexible pipe.
- 3 Burner pump.
- 4 Pressure gauge.
- 5 Modulation servomotor.
- 6 Air/fuel adjustment disk.
- 7 Adjustment disk for air supply to head.
- 8 Return nozzle.
- 9 Air pressure switch.
- 10 Return thermostat.
- 11 Return pressure regulator.
- 12 Electric pre-heater.
- 13 Minimum temperature and pre-heater regulation control probe.
- 14 Pre-heater maximum thermostat.
- 15 Air/gas outlet valve (normally closed).
- 16 Self-cleaning filter.
- 17 Pre-heater thermometer.
- 18 Pre-heater safety valve.
- 19 Ignition flame gas filter (pilot train).
- 20 Ignition flame gas (pilot train) pressure regulator.
- 21 Minimum ignition flame (pilot train) gas pressure switch.
- 22 Ignition flame safety gas valve (pilot train).
- 23 Ignition flame operating gas valve (pilot train).
- 24 Nonreturn valve.
- 25 Air/gas outlet valve (normally closed).
- 26 Fuel recovery tank and degasser with heating element.

--- Piping to be undertaken by the installer.

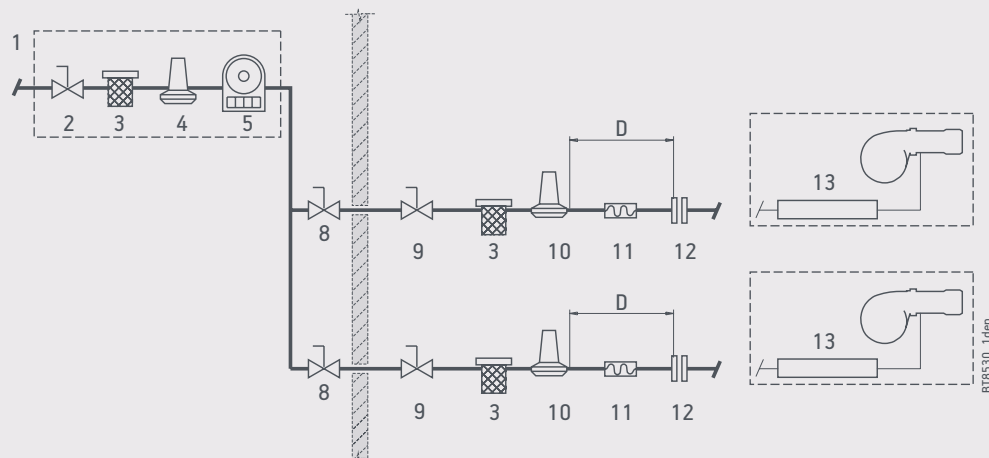
BT8531/1

Schematic diagram for connecting a burner to the medium pressure gas supply network



BT8530/1

Schematic diagram for connecting more burners to the medium pressure gas supply network

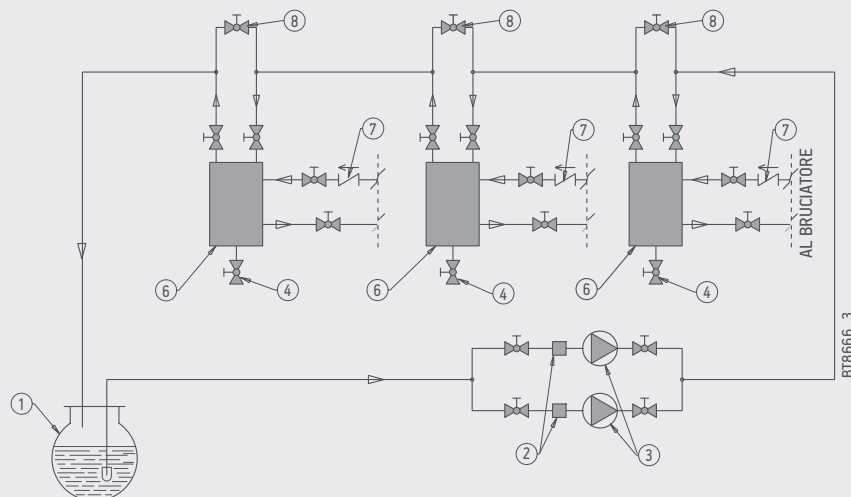


Legend

- | | | |
|--|---|---|
| 1 Measuring and reducing unit. | 7 Automatic vent valve, if necessary (it should discharge outside in a suitable place). | 13 Gas train. |
| 2 Shut-off cock. | 8 Emergency shut-off cock. | D Distance between pressure stabilizer (or regulator/stabilizer) and gas valves at least 1.5 - 2 m. |
| 3 Gas filter. | 9 Ball cock. | |
| 4 Pressure reducer. | 10 Pressure reducer (suitable for the specific case). | |
| 5 Meter. | 11 Anti-vibration joint. | |
| 6 Wire mesh flame trap on discharge into the atmosphere. | 12 Flanged coupling. | |

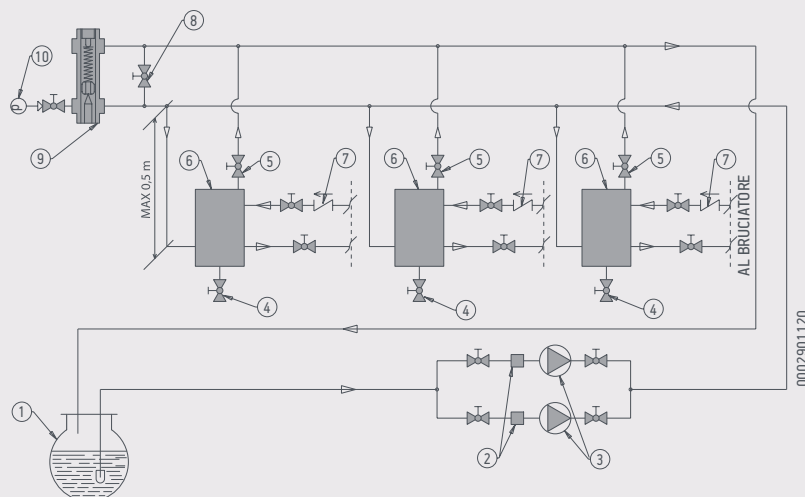
BT8666/3

Fuel feeding hydraulic circuit diagram for one or more diesel burners



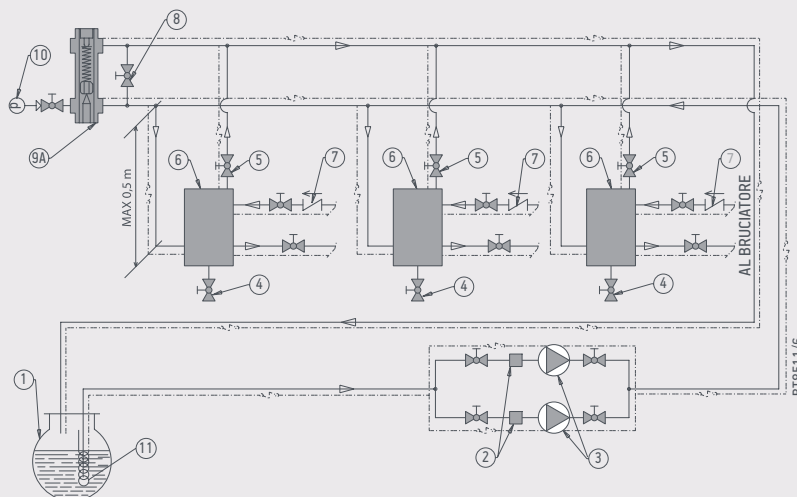
0002901120

Fuel feeding hydraulic circuit diagram for one or more fuel oil burners with a rated viscosity of 38cSt (5°E) at 50°C



BT8511/6

Fuel feeding hydraulic circuit diagram for one or more fuel oil burners with max. rated viscosity of 115cSt (15°E) at 50°C



Legend

- 1 Main tank.
- 2 Filter.
- 3 Circulation pump.
- 4 Water and plant discharging.
- 5 Air/gas discharge valve, normally closed, to be slightly opened only in case of gas discharge.
- 6 Fuel recovery tank and degasser.
- 7 Nonreturn valve.
- 8 By-pass (normally closed).
- 9 Adjustable pressure regulator (0.2-1 bar).

9A Adjustable pressure regulator (0.5-2 bar).

10 Manometer (0-4 bar).

11 Steam or hot water coil for fuel oil heating.

12 Heating element.

13 Auxiliary heater.

14 Steam or hot water coil for oil heating.

15 Thermometer.

16 Tank diameter 100 mm height 300 mm.

Heated and caulk electric cable necessary for obtaining viscosity > 115cSt (15°E) referred to fuel temperature in the ring-type circuit to be carried out by the customer.

NOTE: The fuel recycling tanks (diameter ~ 150 mm - height ~ 400 mm) must be installed as close as possible to the burner and at least 0.5 m higher than its pump.

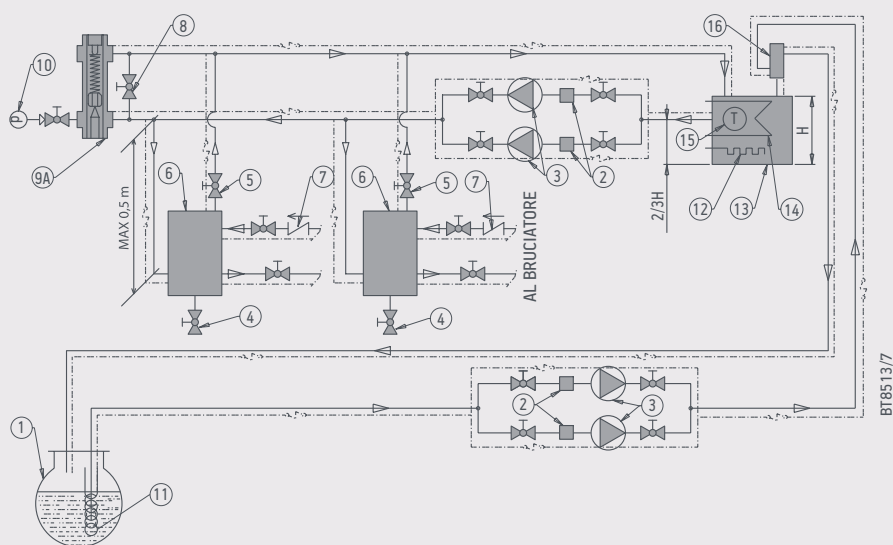
Note For sizing of the feeding circuit contact our sales office.

FUEL FEEDING HYDRAULIC CIRCUIT DIAGRAM

BT8513/7

Fuel feeding hydraulic circuit diagram for one or more dense fuel oil burners

with max. rated viscosity of 380cSt (50°E) at 50°C with auxiliary heater

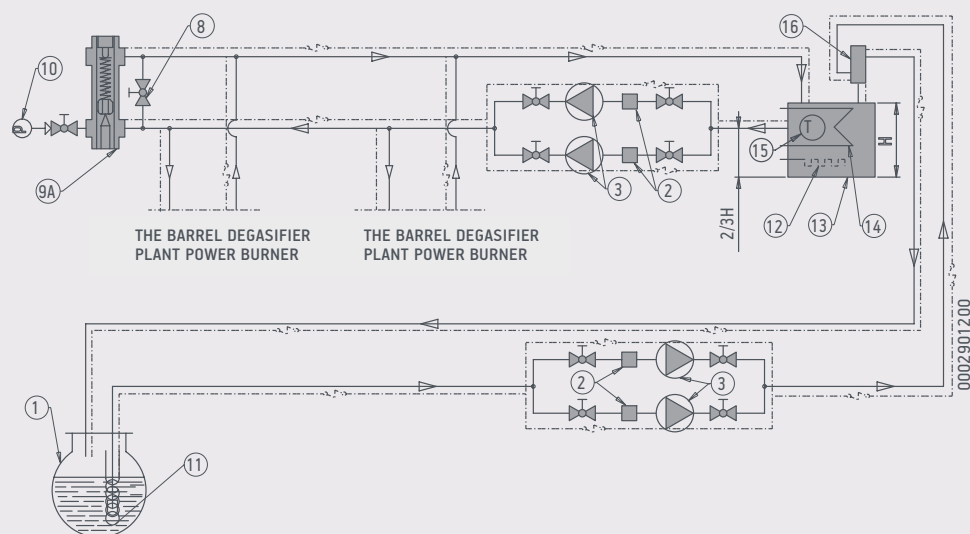


BT8513/7

0002901200

Fuel feeding hydraulic circuit diagram for one or more dense fuel oil burners

with max. rated viscosity of 380cSt (50°E) at 50°C with auxiliary heater



0002901200

Legend

- 1 Main tank.
- 2 Filter.
- 3 Circulation pump.
- 4 Water and plant discharging.
- 5 Air/gas discharge valve, normally closed, to be slightly opened only in case of gas discharge.
- 6 Fuel recovery tank and degasser.
- 7 Nonreturn valve.
- 8 By-pass (normally closed).
- 9 Adjustable pressure regulator (0.2-1 bar).
- 9A Adjustable pressure regulator (0.5-2 bar).
- 10 Manometer (0-4 bar).

11 Steam or hot water coil for fuel oil heating.

12 Heating element.

13 Auxiliary heater.

14 Steam or hot water coil for oil heating.

15 Thermometer.

16 Tank diameter 100 mm height 300 mm.

Electric heating cable and insulation only for viscosity > 115cSt (15°E) pertain to fuel temperature into ring circuit, by customer care.

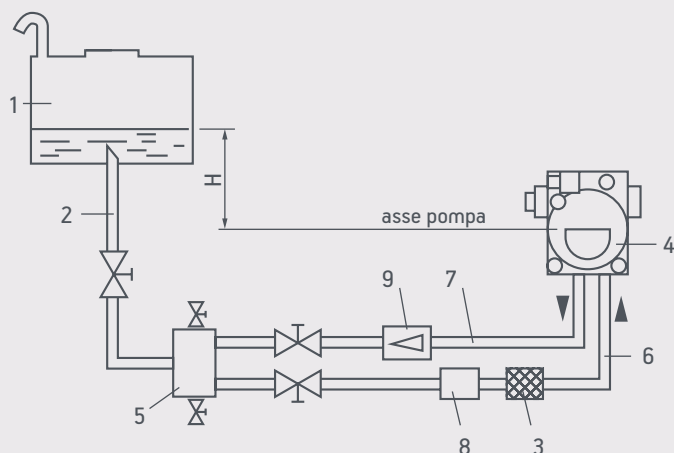
NOTE: The fuel recycling tanks (diameter ~ 150 mm - height ~ 400 mm) must be installed as close as possible to the burner and at least 0.5 m higher than its pump.

Note For sizing of the feeding circuit contact our sales office.

STANDARD NOZZLES SUPPLIED WITH SYSTEM

Burner Model	Burner flow rate		Pump pressure bar	Nozzle flow rate Kg/h	1st stage nozzle		2nd stage nozzle	
	kW	Kg/h			Model	Qty.	Model	Qty.
MINICOMIST 7	38.5 ÷ 66.8	3.2 ÷ 5.6	12	4.58	MONARCH R 60° 1.10 GPH	1		
MINICOMIST 11	58.4 ÷ 103.0	4.9 ÷ 8.7	12	6.87	MONARCH R 60° 1.65 GPH	1		
COMIST 20	80 ÷ 230	6.7 ÷ 19.4	12	12.49	MONARCH PLP 45° 3.00 GPH	1		
COMIST 26 SP	130 ÷ 340	11.0 ÷ 28.7	8 - 16	19.23	MONARCH PLP 45° 4.00 GPH	1		
TBML 60 P	200 ÷ 600	17 ÷ 51	12	37.47	MONARCH PLP 45° 4.50 GPH	1	MONARCH PLP 45° 4.50 GPH	1
TBML 50 MC	200 ÷ 500	17 ÷ 42	12	29.14	MONARCH PLP 45° 3.50 GPH	1	MONARCH PLP 45° 3.50 GPH	1
TBML 50 ME	200 ÷ 500	17 ÷ 42	12	29.14	MONARCH PLP 45° 3.50 GPH	1	MONARCH PLP 45° 3.50 GPH	1
TBML 80 MC	350 ÷ 850	30 ÷ 72	12	54.08	STEINEN SS 45° 8.00 GPH	1	STEINEN SS 45° 5.00 GPH	1
TBML 80 ME	350 ÷ 850	30 ÷ 72	12	54.08	STEINEN SS 45° 8.00 GPH	1	STEINEN SS 45° 5.00 GPH	1
TBML 120 MC	450 ÷ 1200	38 ÷ 101	12	74.94	STEINEN SS 45° 10.00 GPH	1	STEINEN SS 45° 8.00 GPH	1
TBML 120 ME	450 ÷ 1200	38 ÷ 101	12	74.94	STEINEN SS 45° 10.00 GPH	1	STEINEN SS 45° 8.00 GPH	1
TBML 150 P	550 ÷ 1500	46 ÷ 126	12	93.74	MONARCH PLP 60° 12.00 GPH	1	MONARCH PLP 60° 10.50 GPH	1
TBML 160 MC	550 ÷ 1600	46 ÷ 135	12	93.66	MONARCH HV 45° 12.00 GPH	1	MONARCH HV 45° 10.50 GPH	1
TBML 160 ME	550 ÷ 1600	46 ÷ 135	12	93.66	MONARCH HV 45° 12.00 GPH	1	MONARCH HV 45° 10.50 GPH	1
TBML 200 MC	700 ÷ 2000	59 ÷ 169	12	116.64	STEINEN SS 45° 15.00 GPH	1	STEINEN SS 45° 13.00 GPH	1
TBML 200 ME	700 ÷ 2000	59 ÷ 169	12	116.64	STEINEN SS 45° 15.00 GPH	1	STEINEN SS 45° 13.00 GPH	1
COMIST 250	1127 ÷ 3380	95 ÷ 285	10 - 16	168.26	STEINEN SS 45° 26.00 GPH	1	STEINEN SS 45° 4.50 GPH	2
COMIST 300	1304 ÷ 3878	110 ÷ 327	10 - 16	221.14	STEINEN SS 45° 28.00 GPH	1	STEINEN SS 45° 9.00 GPH	2
COMIST 72 N	348 ÷ 916	31 ÷ 82	25 - 25	56.00	MONARCH HO 45° 6.00 GPH	1	MONARCH HO 45° 2.50 GPH	1
COMIST 122 N	652 ÷ 1364	58 ÷ 122	18 - 25	85.60	MONARCH HO 45° 10.50 GPH	1	MONARCH HO 45° 2.50 GPH	1

Type of atomization	Type of atomization cone	Delavan	Monarch	Danfoss	Steinen
	Vacuum	A	PL	H	pH:
	Semi empty	E	NS	—	H
	Universal	W	PLP	B	SS
	Full	B	AR	S	Q
	Full average concentration	AR-D	HV	—	—
	Full concentrated	R-D	R	—	S

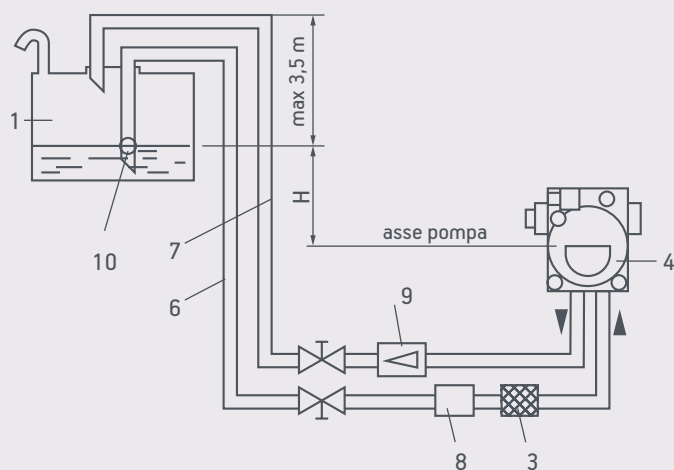


GRAVITY FEED SYSTEM

Legend

- 1 Tank.
- 2 Feeding pipe.
- 3 Wire-net filter.
- 4 Pump.
- 5 Degasifier.
- 6 Suction pipe.
- 7 Burner return pipe.
- 8 Automatic shut-off device with burner off.
- 9 One-way valve.
- 10 Foot valve.
- H Difference in level between minimum level in tank and pump axis (see table on page 43).

NOTE: Comply with the regulations in force for any components missing in the pipelines.

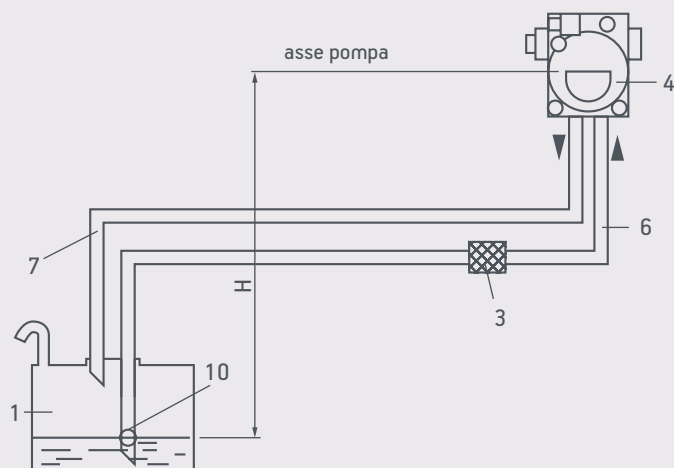


GRAVITY FEED SYSTEM WITH FEED FROM THE TOP OF THE TANK

Legend

- 1 Tank.
- 2 Feeding pipe.
- 3 Wire-net filter.
- 4 Pump.
- 6 Suction pipe.
- 7 Burner return pipe.
- 8 Automatic shut-off device with burner off.
- 9 One-way valve.
- 10 Foot valve.
- H Difference in level between minimum level in tank and pump axis (see table on page 43).

NOTE: Comply with the regulations in force for any components missing in the pipelines.



INTAKE FEED SYSTEM

Legend

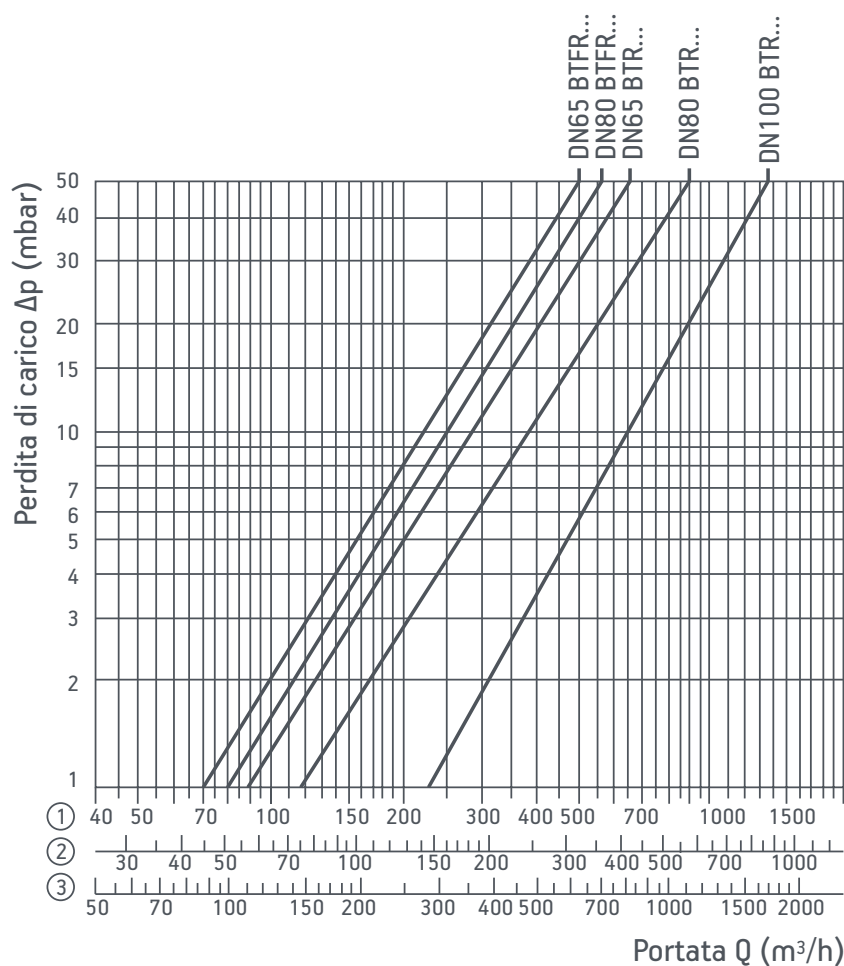
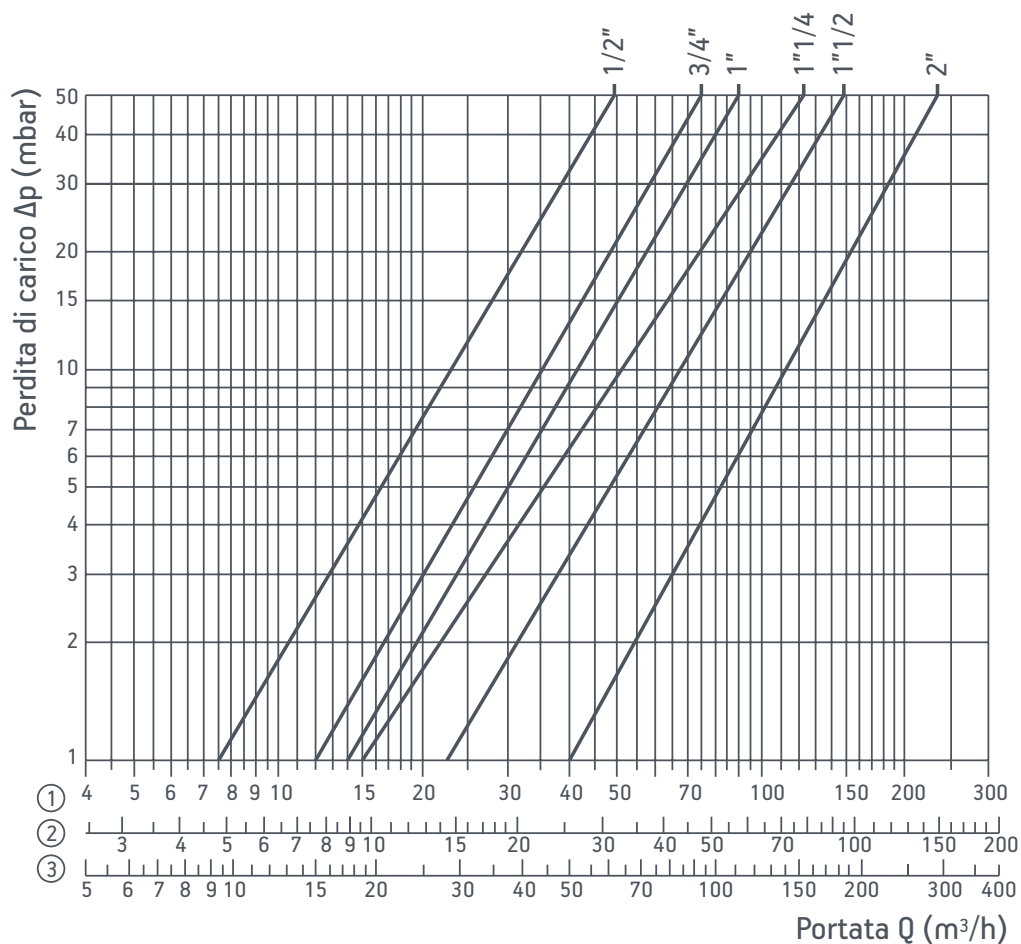
- 1 Tank.
- 3 Wire-net filter.
- 4 Pump.
- 6 Suction pipe.
- 7 Burner return pipe.
- 10 Foot valve.
- H Difference in level between minimum level in tank and pump axis (see table on page 43).

NOTE: Comply with the regulations in force for any components missing in the pipelines.

TUBING SIZE

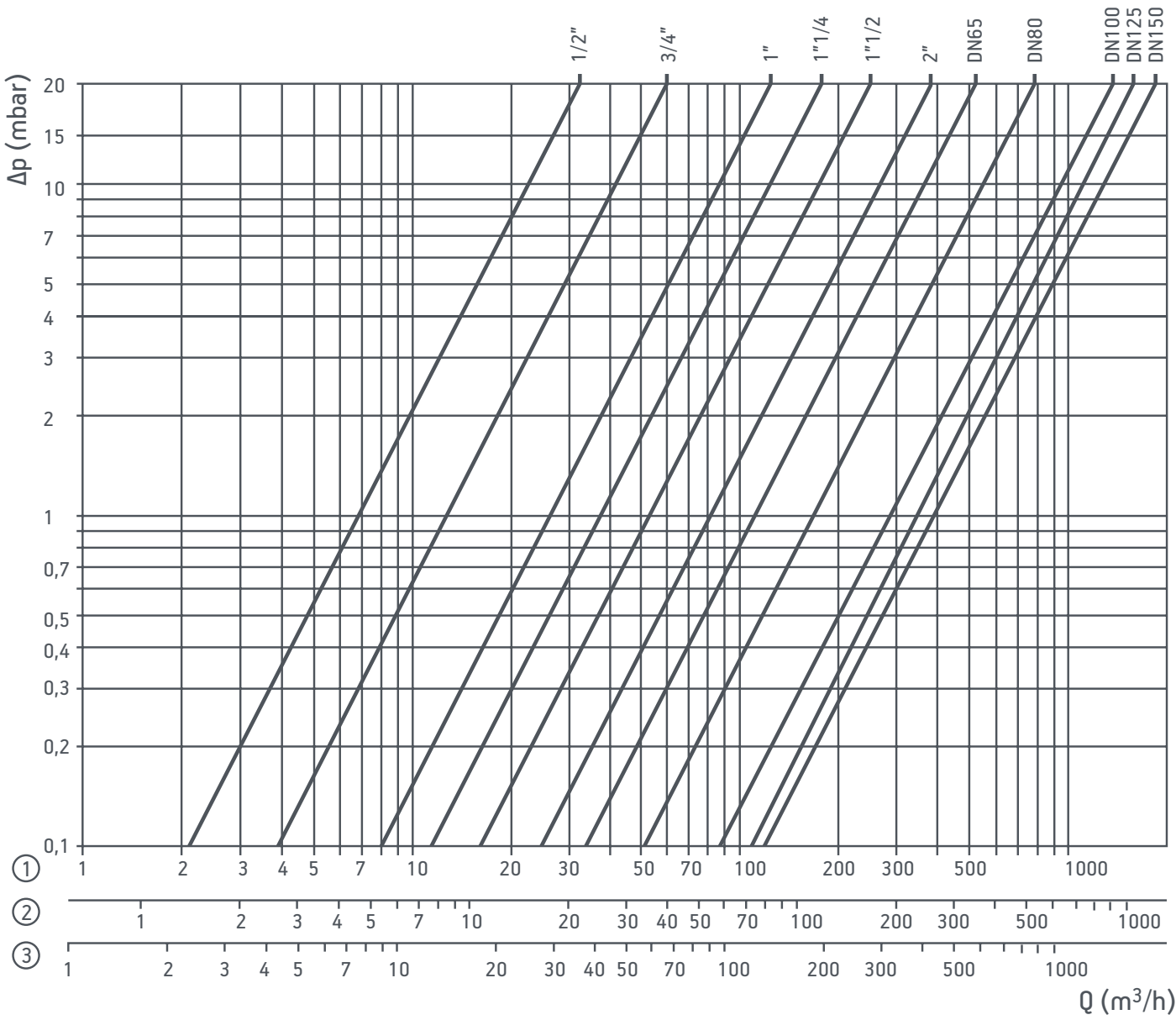
		GRAVITY FEED SYSTEM										GRAVITY FEED SYSTEM WITH FEED FROM THE TOP OF THE TANK								INTAKE FEED SYSTEM											
Tubing size	Øi (mm)	10	12	14	16	18	20	21.6	27.2	41.8	10	12	14	16	18	27.2	41.8	10	12	14	16	18	20	21.6	27.2	35.9	41.8				
	Øe							3/4"	1"	1"1/2						1"	1"1/2							3/4"	1"	1"1/4	1"1/2				
Pump/tank * difference in level)	H (m)																														
Burner model																															
MINICOMIST 7 MINICOMIST 11 COMIST 20	0.5																														
	1	20	30											20	30																
	1.5																														
	2	25	35											25	35																
	2.5																														
	3	30	40											30	40																
	3.5																														
	4	35	45											35	45																
COMIST 26 SP	0.5																														
	1	30											30																		
	1.5																														
	2	35											35																		
	2.5																														
	3	40											40																		
	3.5																														
4	45											45																			
TBML 60 P TBML 50 MC TBML 50 ME TBML 80 MC TBML 80 ME	0.5																														
	1	30												30																	
	1.5	35												35																	
	2	35												35																	
	2.5	40												40																	
	3	40												40																	
TBML 120 MC TBML 120 ME TBML 150 P TBML 160 MC TBML 160 ME TBML 200 MC TBML 200 ME	0.5																														
	1	40												40																	
	1.5	45												45																	
	2	45												45																	
	2.5	50												50																	
	3	50												50																	
	3.5																														
	4																														
COMIST 250 COMIST 300	0.5																														
	1	40				40											30		40												
	1.5	45				45											35		45												
	2	45				45											35		45												
	2.5	50				50											40		50												
	3	50				50											40		50												
	3.5																														
COMIST 72 N	0.5																														
	1	31																		31											
	1.5																														
	2	35																		35											
	2.5	35																		35											
	3	35																		35											
COMIST 122 N	0.5																														
	1	35																		35											
	1.5	40																		40											
	2	50																		50											
	2.5	50																		50											
metres																															
Fuel feeding pipe length.deduct 0.25 m for each elbow or gate.																															

metres
Fuel feeding pipe length, deduct 0.25 m for each elbow or gate.



Legend

- 1 Natural gas $dv: 0.62$.
- 2 L.P.G. $dv: 1.56$.
- 3 Town gas $dv: 0.45$.



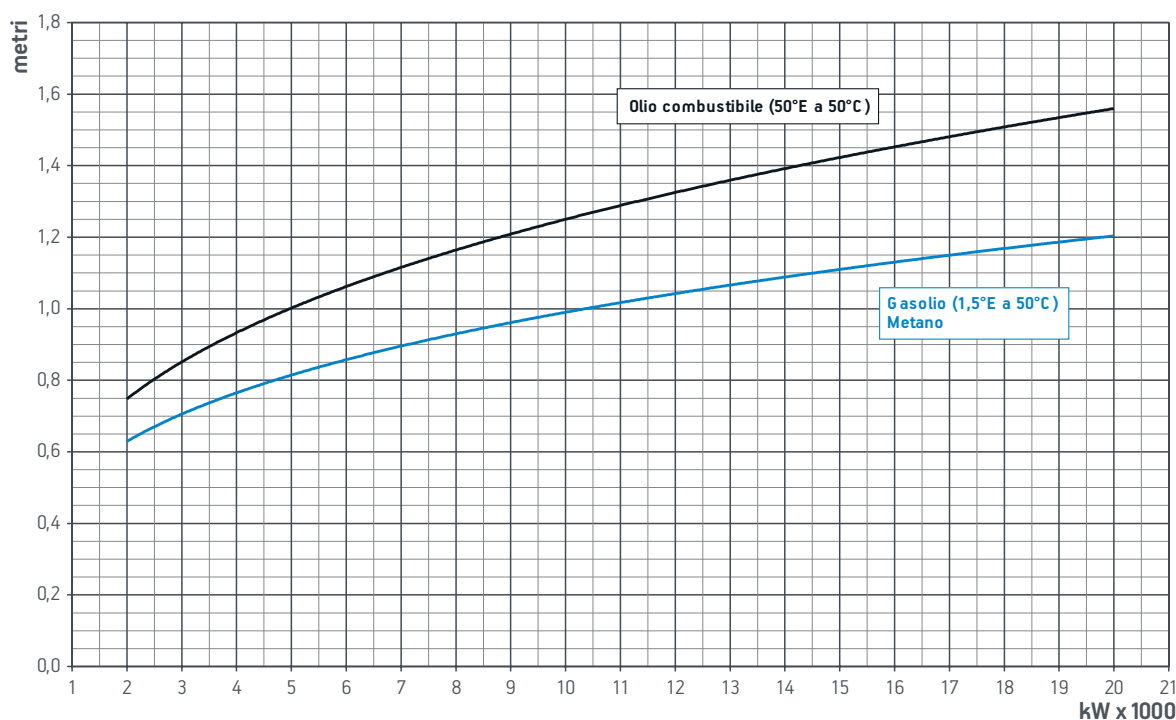
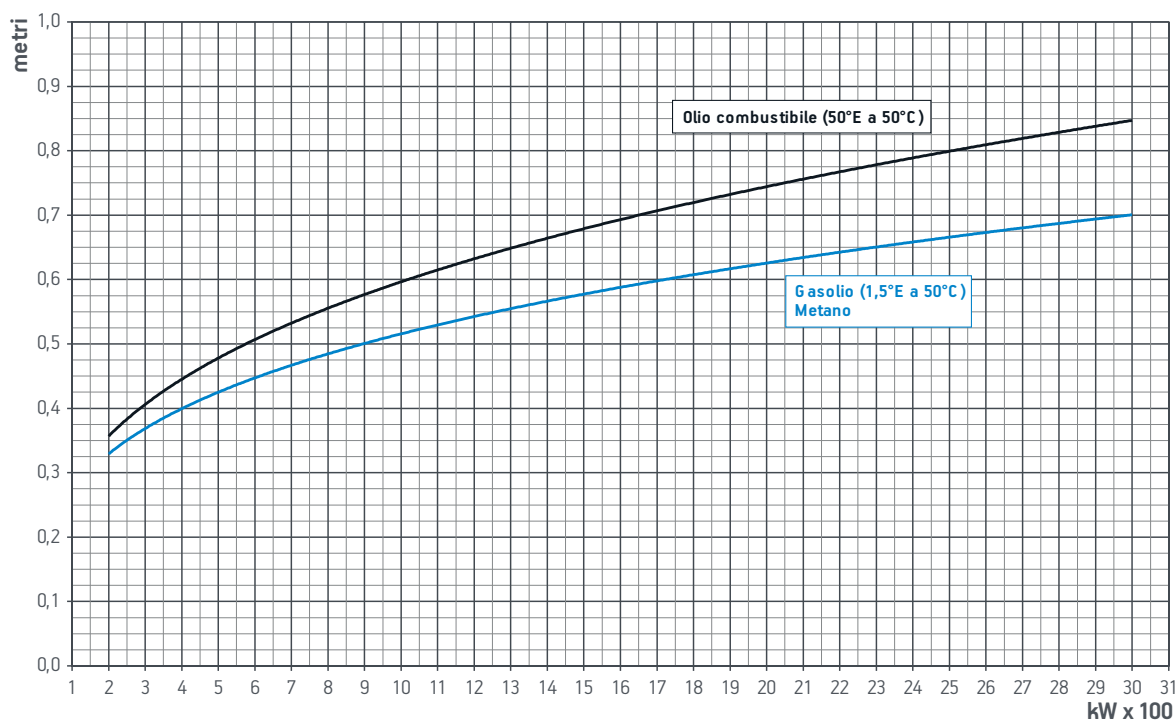
NOZZLE FLOW RATE TABLE FOR SINGLE-STAGE AND TWO-STAGE DIESEL BURNERS

Nozzles	Pump pressure in bar																					Nozzles
G.P.H.	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	G.P.H.
0.40	1.18	1.27	1.36	1.44	1.52	1.59	1.67	1.73	1.80	1.86	1.92	1.98	2.04	2.10	2.15	2.20	2.25	2.31	2.36	2.40	2.45	0.40
0.45	1.33	1.43	1.53	1.62	1.68	1.79	1.87	1.95	2.02	2.10	2.16	2.23	2.29	2.36	2.42	2.48	2.54	2.60	2.65	2.70	2.76	0.45
0.50	1.47	1.59	1.70	1.80	1.90	1.99	2.08	2.17	2.25	2.33	2.40	2.48	2.55	2.62	2.69	2.75	2.82	2.88	2.94	3.00	3.05	0.50
0.55	1.62	1.75	1.87	1.98	2.06	2.19	2.29	2.38	2.47	2.56	2.65	2.73	2.80	2.88	2.96	3.03	3.10	3.17	3.24	3.30	3.37	0.55
0.60	1.77	1.91	2.04	2.16	2.28	2.39	2.50	2.60	2.70	2.79	2.88	2.97	3.06	3.14	3.22	3.30	3.38	3.46	3.53	3.61	3.68	0.60
0.65	1.91	2.07	2.21	2.34	2.47	2.59	2.71	2.82	2.92	3.03	3.12	3.22	3.31	3.41	3.49	3.58	3.66	3.75	3.83	3.91	3.98	0.65
0.75	2.20	2.38	2.55	2.70	2.85	2.99	3.12	3.25	3.37	3.49	3.61	3.72	3.82	3.93	4.03	4.13	4.23	4.32	4.42	4.51	4.60	0.75
0.85	2.50	2.70	2.89	3.06	3.23	3.39	3.54	3.68	3.82	3.96	4.09	4.21	4.33	4.45	4.57	4.68	4.79	4.90	5.00	5.11	5.21	0.85
0.90	2.65	2.86	3.06	3.25	3.39	3.58	3.75	3.90	4.05	4.19	4.33	4.46	4.59	4.71	4.84	4.96	5.07	5.19	5.30	5.41	5.51	0.90
1.00	2.94	3.18	3.40	3.61	3.80	3.99	4.16	4.33	4.50	4.65	4.81	4.96	5.10	5.24	5.37	5.51	5.64	5.76	5.89	6.01	6.13	1.00
1.10	3.24	3.50	3.74	3.97	4.18	4.38	4.58	4.77	4.95	5.12	5.29	5.45	5.61	5.76	5.91	6.06	6.20	6.34	6.48	6.61	6.74	1.10
1.20	3.53	3.82	4.08	4.33	4.56	4.78	5.00	5.20	5.40	5.59	5.77	5.95	6.12	6.29	6.45	6.61	6.76	6.92	7.07	7.21	7.35	1.20
1.25	3.68	3.97	4.25	4.50	4.75	5.00	5.20	5.40	5.60	5.80	6.00	6.20	6.35	6.55	6.70	6.85	7.05	7.20	7.35	7.50	7.65	1.25
1.35	3.97	4.29	4.59	4.87	5.13	5.38	5.62	5.85	6.07	6.28	6.49	6.69	6.88	7.07	7.26	7.44	7.61	7.78	7.95	8.11	8.27	1.35
1.40	4.12	4.45	4.76	5.05	5.29	5.57	5.83	6.06	6.30	6.52	6.73	6.94	7.14	7.33	7.52	7.71	7.89	8.07	8.24	8.41	8.58	1.40
1.50	4.42	4.77	5.10	5.41	5.70	5.90	6.24	6.50	6.75	6.98	7.21	7.43	7.65	7.86	8.06	8.26	8.46	8.65	8.83	9.01	9.19	1.50
1.65	4.86	5.25	5.61	5.95	6.27	6.58	6.87	7.15	7.42	7.68	7.93	8.18	8.41	8.64	8.87	9.09	9.30	9.51	9.71	9.92	10.11	1.65
1.75	5.15	5.56	5.95	6.31	6.65	6.98	7.29	7.58	7.87	8.15	8.41	8.67	8.92	9.17	9.41	9.64	9.86	10.09	10.30	10.52	10.72	1.75
2.00	5.89	6.30	6.80	7.21	7.60	7.97	8.33	8.67	8.99	9.31	9.61	9.91	10.20	10.48	10.75	11.01	11.27	11.53	11.78	12.02	12.26	2.00
2.25	6.62	7.15	7.65	8.15	8.55	8.97	9.37	9.75	10.12	10.47	10.85	11.15	11.47	11.79	12.09	12.39	12.68	12.97	13.25	13.52	13.79	2.25
2.50	7.36	7.95	8.50	9.01	9.50	9.97	10.41	10.83	11.24	11.64	12.02	12.39	12.75	13.10	13.44	13.77	14.09	14.41	14.72	15.02	15.32	2.50
2.75	8.09	8.74	9.35	9.92	10.43	10.96	11.45	11.91	12.37	12.80	13.22	13.63	14.02	14.41	14.78	15.14	15.50	15.85	16.19	16.52	16.85	2.75
3.00	8.83	9.54	10.20	10.82	11.40	11.96	12.49	13.00	13.49	13.96	14.42	14.87	15.30	15.72	16.12	16.52	16.91	17.29	17.66	18.03	18.35	3.00
3.25	9.57	10.33	11.05	11.72	12.33	12.95	13.53	14.08	14.62	15.13	15.62	16.10	16.57	17.03	17.47	17.90	18.32	18.73	19.14	19.53	19.92	3.25
3.50	10.30	11.13	11.90	12.62	13.30	13.95	14.57	15.17	15.74	16.29	16.83	17.34	17.85	18.34	18.81	19.28	19.73	20.17	20.61	21.03	21.45	3.50
3.75	11.04	11.92	12.75	13.52	14.23	14.94	15.61	16.25	16.86	17.45	18.03	18.58	19.12	19.65	20.16	20.65	21.14	21.61	22.08	22.53	22.98	3.75
4.00	11.77	12.72	13.60	14.42	15.20	15.94	16.65	17.33	17.99	18.62	19.23	19.82	20.40	20.95	21.50	22.03	22.55	23.06	23.55	24.04	24.51	4.00
4.50	13.25	14.31	15.30	16.22	17.10	17.94	18.73	19.50	20.24	20.95	21.63	22.30	22.95	23.57	24.19	24.78	25.37	25.94	26.49	27.04	27.58	4.50
5.00	14.72	15.90	17.00	18.03	19.00	19.93	20.82	21.67	22.48	23.27	24.04	24.78	25.49	26.19	26.87	27.54	28.19	28.82	29.44	30.05	30.64	5.00
5.50	16.19	17.49	18.70	19.83	20.90	21.92	22.90	23.83	24.73	25.60	26.44	27.25	28.04	28.81	29.56	30.29	31.00	31.70	32.38	33.05	33.70	5.50
6.00	17.66	19.00	20.40	21.63	22.80	23.92	24.98	26.00	26.98	27.93	28.84	29.73	30.59	31.43	32.25	33.04	33.82	34.58	35.33	36.05	36.77	6.00
6.50	19.13	20.67	22.10	23.44	23.70	25.91	27.06	28.17	29.23	30.26	31.25	32.21	33.14	34.05	34.94	35.80	36.64	37.46	38.27	39.06	39.83	6.50
7.00	20.60	22.26	23.79	25.24	26.60	27.90	29.14	30.33	31.48	32.58	33.65	34.69	35.69	36.67	37.62	38.55	39.46	40.35	41.21	42.06	42.90	7.00
7.50	22.07	23.85	25.49	27.04	28.50	29.90	31.22	32.50	33.73	34.91	36.05	37.16	38.24	39.29	40.31	41.31	42.28	43.23	44.16	45.07	45.96	7.50
8.00	23.54	25.43	27.20	28.85	30.38	31.89	33.31	34.66	35.98	37.23	38.46	39.64	40.79	41.91	43.00	44.06	45.09	46.11	47.10	48.07	49.03	8.00
8.50	25.01	27.02	28.90	30.65	32.28	33.88	35.39	36.83	38.22	39.56	40.86	42.12	43.34	44.53	45.69	46.81	47.91	48.99	50.05	51.08	52.09	8.50
9.00	26.49	28.61	30.60	32.45	34.18	35.87	37.47	39.00	40.47	41.89	43.27	44.59	45.89	47.15	48.38	49.57	50.73	51.87	52.99	54.08	55.15	9.00
9.50	27.96	30.21	32.29	34.25	36.10	37.87	39.55	41.17	42.72	44.22	45.67	47.07	48.44	49.77	51.06	52.32	53.55	54.76	55.93	57.09	58.22	9.50
10.00	29.43	31.79	34.00	36.06	37.98	39.86	41.64	43.33	44.97	46.54	48.07	49.55	50.99	52.39	53.75	55.07	56.36	57.64	58.88	60.09	61.28	10.00
10.50	30.90	33.39	35.69	37.86	40.06	41.73	43.74	45.41	47.20	48.90	50.50	52.00	53.50	55.00	56.40	57.80	59.20	60.50	61.80	63.10	64.30	10.50
11.00	32.37	34.97	37.40	39.67	41.78	43.84	45.80	47.66	49.47	51.20	52.88	54.50	56.09	57.63	59.13	60.58	62.00	63.40	64.77	66.10	67.41	11.00
11.50	33.84	36.56	39.10	41.47	43.68	45.84	47.88	49.83	51.72	53.52	55.28	56.98	58.64	60.25	61.81	63.33	64.82	66.28	67.71	69.11	70.48	11.50
12.00	35.32	38.20	40.80	43.30	45.60	47.80	50.00	52.00	54.00	5												

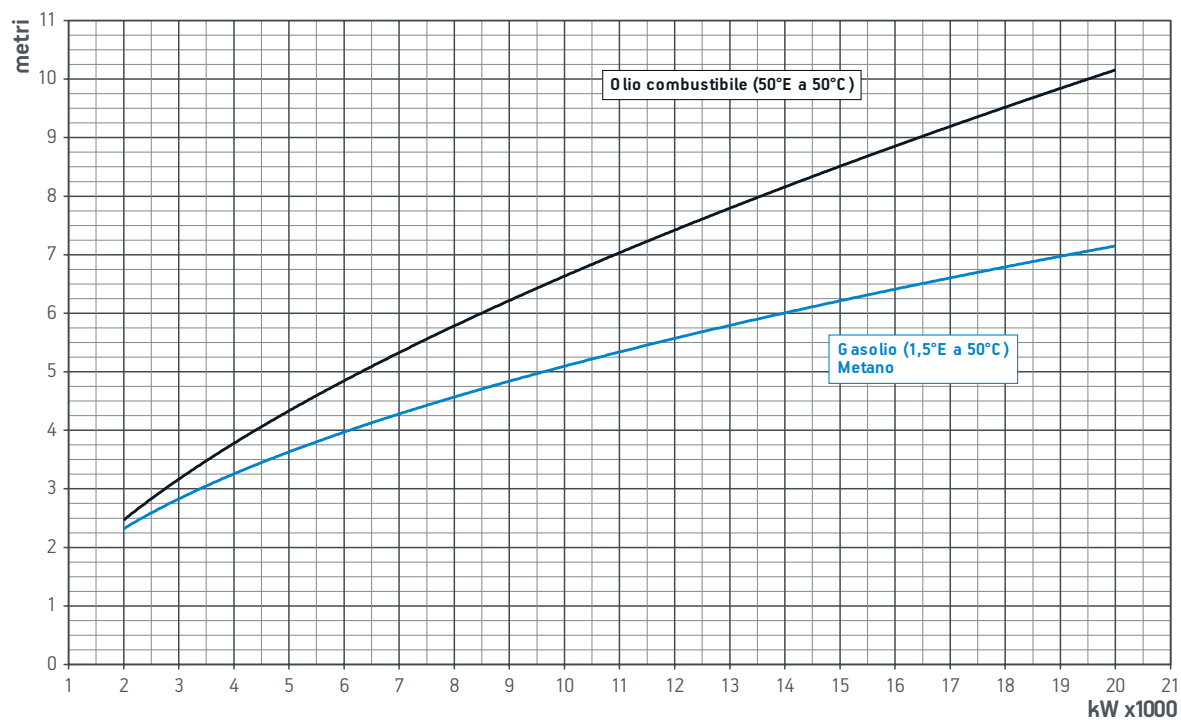
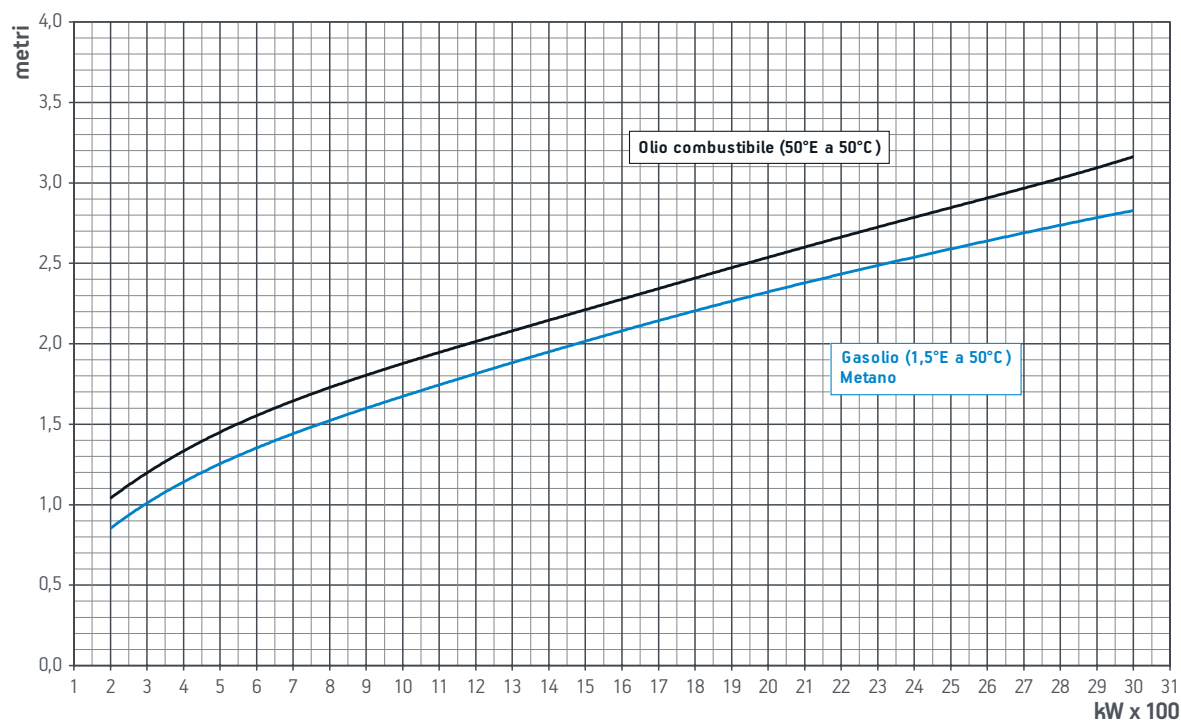
NOZZLE FLOW RATE TABLE FOR SINGLE-STAGE AND TWO-STAGE FUEL OIL BURNERS

Nozzles		Pump pressure in bar																				Nozzles		
		G.P.H.	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	G.P.H.
0.60	2.5	2.6	2.7	2.8	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	0.60
0.65	2.7	2.8	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	0.65
0.75	3.1	3.3	3.4	3.6	3.7	3.8	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	0.75
0.85	3.5	3.7	3.9	4.0	4.2	4.3	4.5	4.6	4.7	4.9	5.0	5.1	5.2	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	0.85
0.90	3.7	3.9	4.1	4.3	4.4	4.6	4.7	4.9	5.0	5.1	5.3	5.4	5.5	5.7	5.8	5.9	6.0	6.1	6.3	6.4	6.5	6.6	6.7	0.90
1.00	4.2	4.4	4.6	4.7	4.9	5.1	5.3	5.4	5.6	5.7	5.9	6.0	6.2	6.3	6.4	6.6	6.7	6.8	7.0	7.1	7.2	7.3	7.4	1.00
1.10	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	7.5	7.7	7.8	7.9	8.0	8.1	1.10
1.20	5.0	5.2	5.5	5.7	5.9	6.1	6.3	6.5	6.7	6.9	7.1	7.2	7.4	7.6	7.7	7.9	8.1	8.2	8.4	8.5	8.7	8.8	8.9	1.20
1.25	5.2	5.4	5.7	5.9	6.1	6.3	6.5	6.6	6.8	7.0	7.2	7.3	7.5	7.7	7.8	8.0	8.2	8.4	8.5	8.7	8.9	9.0	9.1	1.25
1.35	5.6	5.9	6.2	6.4	6.6	6.9	7.1	7.3	7.5	7.7	7.9	8.1	8.3	8.5	8.7	8.9	9.1	9.2	9.4	9.6	9.7	9.8	9.9	1.35
1.40	5.8	6.1	6.4	6.6	6.9	7.1	7.4	7.6	7.8	8.0	8.2	8.4	8.6	8.8	9.0	9.2	9.4	9.6	9.7	9.9	10.1	10.2	10.3	1.40
1.50	6.2	6.5	6.8	7.1	7.4	7.6	7.9	8.1	8.4	8.6	8.8	9.0	9.3	9.5	9.7	9.9	10.1	10.3	10.4	10.6	10.8	11.0	11.1	1.50
1.65	6.9	7.2	7.5	7.8	8.1	8.4	8.7	9.0	9.2	9.5	9.7	10.0	10.2	10.4	10.6	10.9	11.1	11.3	11.5	11.7	11.9	12.1	12.2	1.65
1.75	7.3	7.6	8.0	8.3	8.6	8.9	9.2	9.5	9.8	10.0	10.3	10.6	10.8	11.0	11.3	11.5	11.7	12.0	12.2	12.4	12.6	12.8	13.0	1.75
2.00	8.3	8.7	9.1	9.5	9.9	10.2	10.5	10.9	11.2	11.5	11.8	12.1	12.3	12.6	12.9	13.2	13.4	13.7	13.9	14.2	14.4	14.7	15.0	2.00
2.25	9.4	9.8	10.3	10.7	11.1	11.5	11.8	12.2	12.6	12.9	13.2	13.6	13.9	14.2	14.5	14.8	15.1	15.4	15.7	15.9	16.2	16.5	16.8	2.25
2.50	10.4	10.9	11.4	11.9	12.3	12.7	13.2	13.6	14.0	14.3	14.7	15.1	15.4	15.8	16.1	16.5	16.8	17.1	17.4	17.7	18.0	18.3	18.7	2.50
2.75	11.4	12.0	12.5	13.0	13.5	14.0	14.5	14.9	15.4	15.8	16.2	16.6	17.0	17.3	17.7	18.1	18.4	18.8	19.1	19.5	19.8	20.2	20.6	2.75
3.00	12.5	13.1	13.7	14.2	14.8	15.3	15.8	16.3	16.8	17.2	17.7	18.1	18.5	18.9	19.3	19.7	20.1	20.5	20.9	21.3	21.6	22.0	22.4	3.00
3.25	13.5	14.2	14.8	15.4	16.0	16.6	17.1	17.6	18.1	18.6	19.1	19.6	20.1	20.5	20.9	21.4	21.8	22.2	22.6	23.0	23.4	23.8	24.2	3.25
3.50	14.6	15.3	16.0	16.6	17.2	17.8	18.4	19.0	19.6	20.1	20.6	21.1	21.6	22.1	22.5	23.0	23.5	23.9	24.4	24.8	25.2	25.6	26.0	3.50
3.75	15.6	16.4	17.1	17.8	18.5	19.1	19.7	20.3	20.9	21.5	22.1	22.6	23.1	23.7	24.2	24.7	25.2	25.6	26.1	26.6	27.0	27.5	28.0	3.75
4.00	16.6	17.5	18.2	19.0	19.4	20.4	21.1	21.7	22.3	23.0	23.5	24.1	24.7	25.3	25.8	26.3	26.8	27.4	27.9	28.4	28.8	29.3	29.8	4.00
4.50	18.7	19.6	20.5	21.4	22.2	22.9	23.7	24.4	25.1	25.8	26.5	27.1	27.8	28.4	29.0	29.6	30.2	30.8	31.3	31.9	32.4	33.0	33.5	4.50
5.00	20.8	21.8	22.8	23.7	24.6	25.5	26.3	27.1	27.9	28.7	29.4	30.2	30.9	31.6	32.2	32.9	33.6	34.2	34.8	35.4	36.0	36.6	37.2	5.00
5.50	22.9	24.0	25.1	26.1	27.1	28.0	29.0	29.8	30.7	31.6	32.4	33.2	34.0	34.7	35.5	36.2	36.9	37.6	38.3	39.0	39.7	40.4	41.1	5.50
6.00	25.0	26.2	27.4	28.5	29.6	30.6	31.6	32.6	33.5	34.4	35.3	36.2	37.0	37.9	38.7	39.5	40.3	41.0	41.8	42.5	43.3	44.0	44.8	6.00
6.50	27.1	28.4	29.6	30.8	32.0	33.1	34.2	35.3	36.3	37.3	38.3	39.2	40.1	41.0	41.9	42.8	43.6	44.5	45.3	46.1	46.9	47.8	48.6	6.50
7.00	29.1	30.6	31.9	33.2	34.5	35.7	36.9	38.0	39.1	40.2	41.2	42.2	43.2	44.2	45.1	46.1	47.0	47.9	48.8	49.6	50.5	51.4	52.3	7.00
7.50	31.2	32.7	34.2	35.6	36.9	38.2	39.5	40.7	41.9	43.0	44.1	45.2	46.3	47.3	48.4	49.4	50.3	51.3	52.2	53.2	54.1	55.1	56.0	7.50
8.00	33.3	34.9	36.5	38.0	39.4	40.8	42.1	43.4	44.7	45.9	47.1	48.2	49.4	50.5	51.6	52.6	53.7	54.7	55.7	56.7	57.7	58.7	59.7	8.00
8.50	35.4	37.1	38.8	40.3	41.9	43.3	44.8	46.1	47.5	48.8	50.0	51.3	52.5	53.7	54.8	55.9	57.0	58.1	59.2	60.2	61.3	62.3	63.4	8.50
9.00	37.5	39.3	41.0	42.7	44.3	45.9	47.4	48.8	50.3	51.6	53.0	54.3	55.6	56.8	58.0	59.2	60.4	61.6	62.7	63.8	64.9	66.0	67.1	9.00
9.50	39.5	41.5	43.3	45.1	46.8	48.4	50.0	51.6	53.1	54.5	55.9	57.3	58.7	60.0	61.3	62.5	63.8	65.0	66.2	67.3	68.5	69.6	70.8	9.50
10.00	41.6	43.7	45.6	47.5	49.2	51.0	52.7	54.3	55.8	57.4	58.9	60.3	61.7	63.1	64.5	65.8	67.1	68.4	69.6	70.9	72.1	73.4	74.7	10.00
10.50	43.7	45.8	47.9	49.8	51.7	53.5	55.3	57.0	58.6	60.2	61.8	63.3	64.8	66.3	67.7	69.1	70.5	71.8	73.1	74.4	75.7	77.0	78.3	10.50
11.00	45.8	48.0	50.2	52.2	54.2	56.1	57.9	59.7	61.4	63.1	64.7	66.3	67.9	69.4	70.9	72.4	73.8	75.2	76.6	78.0	79.3	80.7	82.0	11.00
11.50	47.9	50.2	52.4	54.6	56.6	58.6	60.6	62.4	64.2	66.0	67.7	69.4	71.0	72.6	74.2	75.7	77.2	78.7	80.1	81.5	82.9	84.3	85.7	11.50
12.00	49.9	52.4	54.7	57.0	59.1	61.2	63.2	65.1	67.0	68.9	70.6	72.4	74.1	75.8	77.4	79.0	80.5	82.1	83.6	85.1	86.5	88.0	89.5	12.00
12.50	52.0	54.6	57.0	59.3	61.6	63.7	65.8	67.8	69.8	71.7	73.6	75.4	77.2	78.9	80.6	82.3	83.9	85.5	87.0	88.6	90.1	91.6	93.1	12.50
13.00	54.1	56.8	59.3	61.7	64.0	66.3	68.5	70.6	72.6	74.6	76.5	78.4	80.3	82.1	83.8	85.6	87.3	88.9	90.5	92.1	93.7	95.3	96.9	13.00
13.50	56.2	59.0	61.6	64.1	66.5	68.8	71.1	73.3	75.4	77.5	79.5	81.4	83.3	85.2	87.1	88.8	90.6	92.3	94.0	95.7	97.3	99.0	100.7	13.50
14.00	58.3	61.2	63.8	66.4	69.0	71.4	73.7	76.0	78.2	80.3	82.4	84.4	86.4	88.4	90.3	92.1	94.0	95.8	97.5	99.2	100.9	102.6	104.3	14.00
14.50	60.3	63.3	66.1	68.8	71.4	73.9	76.4	78.7	81.0	83.2	85.4	87.5	89.5	91.5	93.5	95.4	97.3	99.2	101.0	102.8	104.6	106.4	108.2	14.50
15.00	62.4	65.5	68.4	71.2	73.9	76.5	79.0	81.4	83.8	86.1	88.3	90.5	92.6	94.7	96.7	98.7	100.7	102.6	104.4	106.3	108.2	110.0	111.8	15.00
15.50	64.5	67.7	70.7	73.6	76.3	79.0	81.6	84.1	86.6	88.9	91.2	93.5	95.7	97.9	100.0	102.0	104.0	106.0	107.9	109.9	111.8	113.7	115.6	15.50
16.00	66.6	69.9	73.0	75.9	78.8	81.6	84.3	86.8	89.4	91.8	94.2	96.5	98.8	101.0	103.2	105.3	107.4	109.4	111.4	113.4	115.4	117.4	119.4	16.00
16.50	68.7	72.1	75.2	78.3	81.3	84.1	86.9	89.6	92.1	94.7	97.1	99.5	101.9	104.2	106.4	108.6	110.8	112.9	114.9	117.0	119.0	121.0	123.0	16.50
17.00	70.8	74.3	77.5	80.7	83.7	86.7	89.5	92.3	94.9	97.5	100.1	102.6	105.0	107.3	109.6	111.9	114.1	116.3	118.4	120.5	122.6	124.7	126.8	17.00
17.50	72.8	76.4	79.8	83.1	86.2	89.2	92.1	95.0	97.7	100.4	103.0	105.6	108.0	110.5	112.8	115.2	117.5	119.7	121.9	124.0	126.2	128.4	130.6	17.50
18.00	74.9	78.6	82.1	85.4	88.7	91.8	94.8	97.7	100.5	103.3	106.0	108.6	111.1	113.6	116.1	118.5	120.8	123.1	125.3	127.6	129.8	132.1	134.4	18.00
18.50	77.0	80.8	84.4	87.8	91.1	94.3	97.4	100.4	103.3	106.2	108.9	111.6	114.2	116.8	119.3	121.8	124.2	126.5	128.8	131.1	133.4	135.7	138.0	18.50
19.00	79.1	83.0	86.6	90.2	93.6	96.9	100.1																	

The flame diameter depends on the quantity of burnt fuel (indicative values)



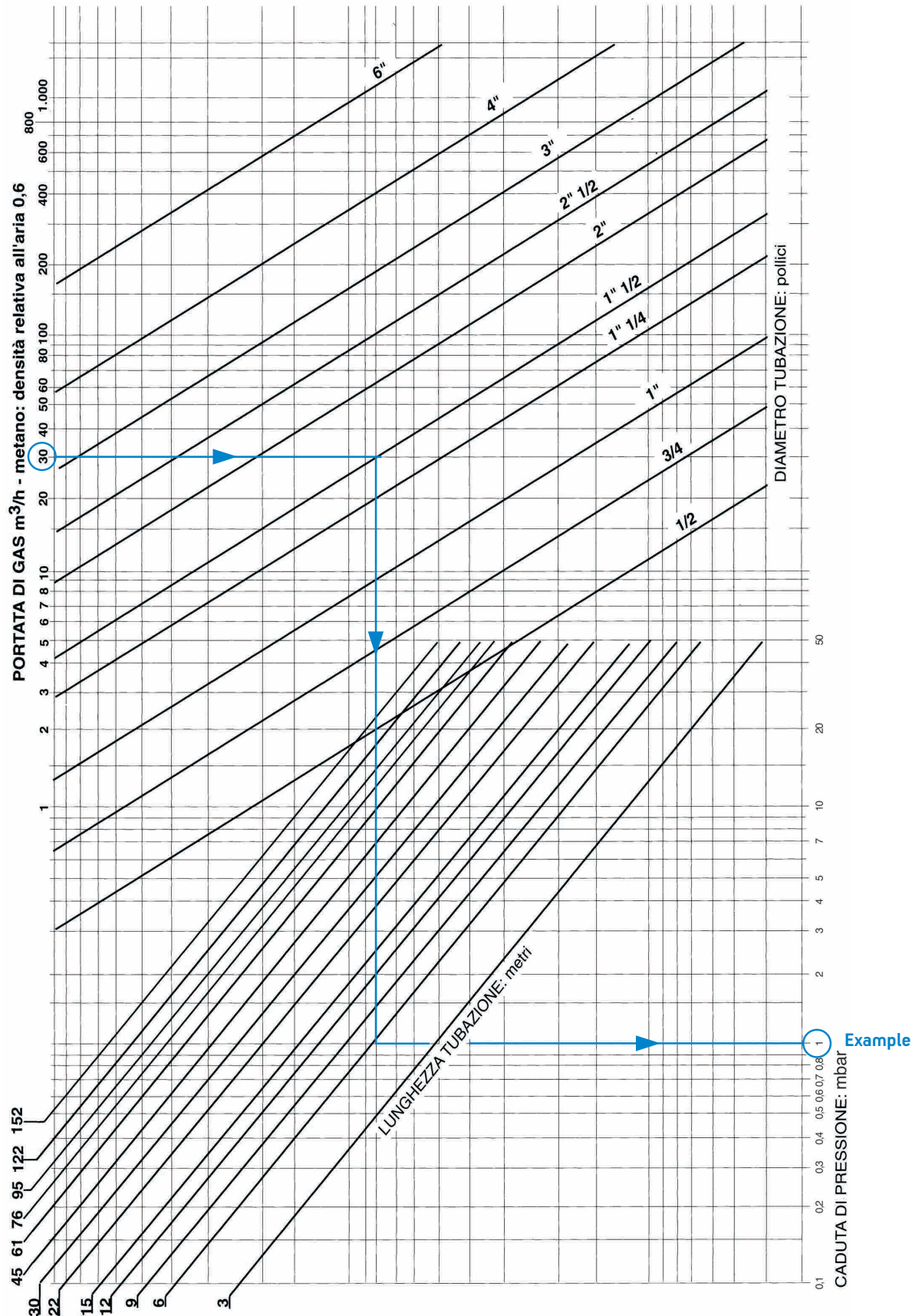
The flame length depends on the quantity of burnt fuel (indicative values)



GAS FEED PIPE SIZING

EXAMPLE

With a natural gas flow rate of 30 m³/h and a gas supply tube with 1 1/2" diameter and 6 m long, a gas pressure drop equal to 1 mbar will occur.



CONVERSION TABLES OF THE UNITS OF MEASUREMENT

When values are converted, note that the value obtained is never exactly identical to the original value. Round off the result of the calculation to a number of decimal places no higher than that of the original value.

Attention - The following Tables are used to convert International Standard (IS) units.

	multiply by	to obtain
acro	0.405	ha
bar	*100	kPa
tank (42 USA gal. petroleum)	159	L
	0.159	m³
Btu IT	1.055	kJ
Btu/ft³	37.3	kJ/m³: J/L
Btu/gal	0.279	kJ/L
Btu·ft/h·ft²·°F	1.731	W/(m·K)
Btu·in(h·ft²·°F) (thermal conductivity, K)	0.144	W/(m·K)
Btu/h	0.252	kcal/h
Btu/h	0.293	W
Btu/ft²	11.4	kJ/m²
Btu/(y·ft²)	0.000293	kWh/(y·m²) (not SI)
Btu (y ft²)	0.0000114	GJ/(y·m²)
Btu/(h·ft²)	3.15	W/m²
Btu/(h·ft²·°F) (overall heat transmission coefficient, U) (thermal conductivity, C)	5.68	W/(m²·K) W/(m²·°C)
Btu/(lb·°F) (specific heat, c)	4.19	kJ/(kg·K)
bushel	0.0352	m³
calorie, gram	4.19	J
calorie, kilogram, kilocalorie	4.19	kJ
centipoise, (absolute, dynamic) viscosity, m	*1.00	mPa·s
centistoke, kinematic viscosity u	*1.00	mm²/s
dyna/cm²	*0.100	Pa
EDR hot water (150 Btu/h)	44	W
EDR steam (240 Btu/h)	70.3	W
EER	0.293	COP
ft	*0.3048	m
ft	*304.8	mm
ft/min, fpm	0.00508	m/s
ft/s; fps	*0.3048	m/s
ft water column	2.99	kPa
ft water column for every 100 ft of pipe	0.0981	kPa/m
ft²	0.0929	m²
ft²·h·°F/Btu (thermal resistance, R)	0.176	m²·K/W
ft²/s, kinematic viscosity, u	92900	mm/s
ft³	28.3	L
ft³	0.0283	m³
ft³/h, cfh	7.87	mL/s
ft³/min, cfm	0.472	L/s
ft³/s, cfs	28.3	L/s
ft·lb _f (pair or moment)	1.36	N·m
ft·lb _f /l (specific energy)	2.99	J/kg
ft·lb _f /min (power)	0.0226	W
USA gallon (231 m³)	3.79	L
gallon	0.00379	m³
gph	1.05	
gpm	0.0631	L/s
gpm/ton ref.	0.0179	mL/J
grain (1/7000 lb)	0.0648	g
gr/gal	17.1	mg/L
gr/lb	0.143	g/kg
HP (boilers)	9.81	kW
HP (550 ft·lb/s)	0.746	kW
inch	*25.4	mm
inch of mercury (60°F)	3.38	kPa
inch of water (60°C)	249	Pa
in/100 ft, thermal expansion	0.833	mm/m
in·lb _f (pair or moment)	113	mN·m

The conversion values have been rounded off to three or four significant decimal places, which may permit conversions which are sufficiently accurate for the majority of applications. In order to obtain a more accurate conversion table with more significant decimal places, refer to ASTM E 380.

	multiply by	to obtain
in²	645	mm²
in³ (volume)	16.4	mL
in³/min (SCIM)	0.273	mL/s
in³ (section modulus)	16400	mm³
in³ (section moment)	416000	mm⁴
km/h	0.278	m/s
kWh	*3.60	MJ
kWh/(y·ft²)	0.0388	GJ/(y·m²)
kWh/1000cfm	2.12	J/L
kilopond (kg force)	9.81	N
kip (1000 lbf)	4.45	kN
kip/in² (ksi)	6.89	MPa
litre	*0.001	m³
micron of mercury (60°F)	133	mPa
mile	1.61	km
nautical mile	1.85	km
mph	1.61	km/h
millibar	*0.100	kPa
mm of mercury (60°F)	0.133	kPa
mm of water (60°F)	9.80	Pa
m of water	9.80	kPa
ounce (mass, avoirdupois)	28.3	g
ounce (force or tension)	0.278	N
ounce (liquid, USA)	29.6	mL
ounce inch (pair, moment)	7.06	nN·m
ounce (avoirdupois) per gallon	7.49	g/L
perm (permeance)	57.4	ng/(s·m²·Pa)
perm inch (permeability)	1.46	ng/(s·m·Pa)
pint (liquid, USA)	473	mL
lb (mass)	0.454	kg
lb (mass)	454	g
lb _f (force or tension)	4.45	N
lb/ft (uniform load)	1.49	kg/m
lb _m (ft·h) viscosity (absolute, dynamic m)	0.413	mPa·s
lb _f (ft·s) viscosity (absolute, dynamic m)	1490	mPa·s
lb/h	0.126	g/s
lb/min	0.00756	kg/s
lb of vapour an hour at 212°F (100°C)	0.284	kW
lb/ft²	47.9	Pa
lb _f s/ft² viscosity (absolute, dynamic m)	47900	mPa·s
lb/ft²	4.88	kg/m²
lb/ft³ (density, r)	16.0	kg/m³
lb/gallon	120	kg/m³
ppm (mass)	*1.00	mg/kg
psi	6.89	kPa
quad	1.055	EJ
quart (liquid, USA)	0.946	L
square (100ft²)	9.29	m²
tablespoon (approx.)	15	mL
teaspoon (approx.)	5	mL
therm (USA, kilogram calorie)	105.5	MJ
thermie	1000	kcal
ton, long (2 240 lb)	1.016	t; Mg
ton, short (2 000 lb)	0.907	t; Mg
refrigeration ton (12000Btu/h)	3.52	kW
torr (1 mm Hg at 0°C)	133	Pa
watt per square foot	10.8	W/m²
yd	*0.9144	m
yd²	0.836	m²
yd³	0.765	m³

CLASSIFICATION AND REQUIREMENTS OF THE LIQUID FUELS FOR INDUSTRIAL AND DOMESTIC THERMAL USE

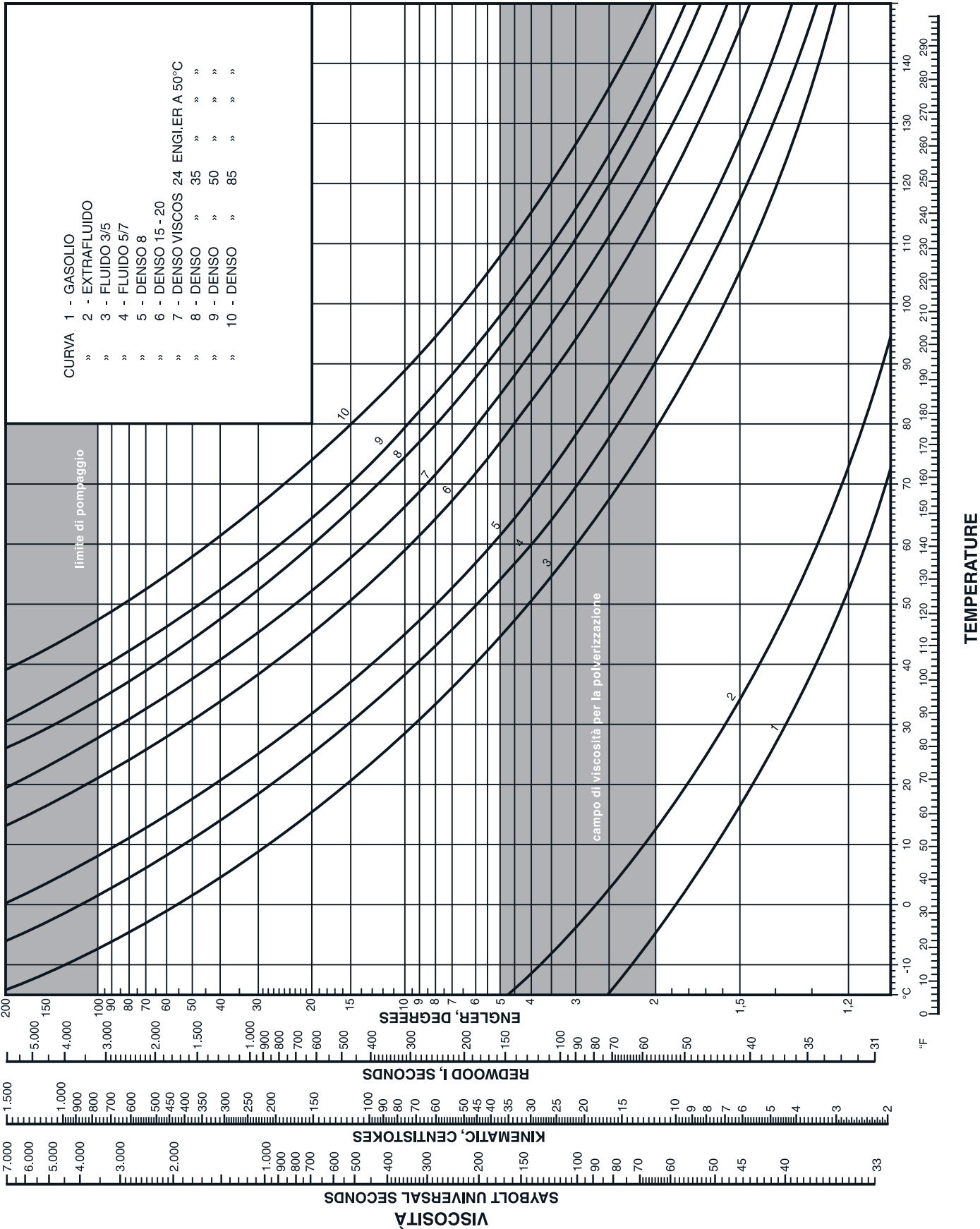
Liquid fuel type	Kerosene	Diesel	Fuel oil and other heavy petroleum distillates	very fluid BTZ	fluid BTZ	semifluid BTZ	dense ATZ	dense BTZ	Test methods	
Unit feature	A	B	(1)	(2) (3)	(4) (5)	(6) (7)	(8) (9)	(10)		
Flash point	°C	≥21	≥55	>65	>65	>65	>65	>65		EN ISO 2719
Density at 15°C	kg/m ³	From 770 to 830	From 815 to 875							UNI EN ISO 3675
Viscosity:										
at 50°C	mm ² /s			<21.2	From 21.2 to 37.4	From 37.5 to 91.0	>91			UNI EN ISO 3104
at 50°C	°E			<3.0	From 3.0 to 5.0	From 5.1 to 12.0	>12			UNI EN ISO 3104
at 40°C	mm ² /s		From 2.0 to 7.4							UNI EN ISO 3104
Distillate:										
at 150°C	% (v/v)		≤2 1)							UNI EN ISO 3405
at 210°C	% (v/v)	<90								UNI EN ISO 3405
at 250°C	% (v/v)	≥65	<65							UNI EN ISO 3405
at 300°C	% (v/v)			≤60	≤60	≤60	≤60	≤60		UNI EN ISO 3405
at 350°C	% (v/v)		≥85	<85	<85	<85	<85	<85		UNI EN ISO 3405
Water and sediments	% (v/v)	≤0.05	≤0.05	≤0.5	≤1.0	≤1.0				ISO 3734
Water	% (v/v)						≤1.5	≤1.5		ISO 3733
Sediments	% (m/m)						≤0.5	≤0.5		UNI EN ISO 3735
Cold filtering point	°C		≤0							UNI EN 116
Yield point	°C		≤-6							ISO 3016
Sulphur	% (m/m)	≤0.2	≤0.2	≤0.3	≤1.0	≤0.3	≤1.0	≤0.3	≤1.0	UNI EN ISO 8754
Carbon residue	% (m/m)			≤6	≤15	≤6	≤15	≤18	≤15	UNI EN ISO 10370
Nickel + Vanadium	mg/kg	≤15	≤15	≤50	≤180	≤50	≤180	≤230	≤180	UNI EN 13131
Ashes	% (m/m)			≤0.05	≤0.10	≤0.15	≤0.20	≤0.20	≤0.20	UNI EN ISO 6245
PCB	mg/kg	<4	<4	<4	<4	<4	<4	<4	<4	UNI EN 12766-2
PCT	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	pEN 12766-3

Use		Kerosene	Diesel	B	Fuel oil and other heavy petroleum distillates												
					very fluid BTZ (1)	fluid BTZ (2)	semifluid BTZ (3)	dense BTZ (4)	dense ATZ (5)	dense BTZ (6)	(7)	(8)	(9)	(10)			
for industrial applications	total nominal output ≤3 MW	•		•		•				•						•	
	total nominal output >3 MW	•		•		•	•	•		•	•					•	•
	nominal output in every single furnace no lower than 50 MW													•			
	where fuel oil is produced.												•				
	When the sulphur compounds are fixed and combined during production in a percentage no lower than 60% resulting product.															•	
Domestic and commercial applications •				•		•				•						•	

1) It is not necessary when the flash point is higher or equal to 65°C.

BTZ Low sulphur content.

ATZ High sulphur content.



Flow rates expressed in volume (m³/h at 15°C, 1013 mbar) for natural gas with air density of 0.6 (according to UNI7128-72), calculated for steel pipes, with a max. load loss of 1 mbar

Outer diameter		3/8 GAS	1/2 GAS	3/4 GAS	1 GAS	1 1/4 GAS	1 1/2 GAS	2 GAS	2 1/2 GAS	3 GAS
Inner diameter mm		13.2	16.6	22.2	27.9	36.6	42.5	53.8	69.6	81.6
Thickness mm		2.0	2.3	2.3	2.9	2.9	2.9	3.2	3.2	3.6
Virtual length m		Flow rates m ³ /h								
	2	3.09	5.89	13.04	24.13	50.82	76.58	145.15	288.70	441.42
	4	2.09	3.99	8.82	16.31	30.34	51.72	99.19	197.75	302.27
	6	1.66	3.17	7.02	12.97	27.29	41.10	78.79	158.46	242.17
	8	1.41	2.70	5.96	11.02	23.18	34.90	66.91	135.24	206.91
	10	1.25	2.38	5.25	9.71	20.42	30.75	58.94	119.11	183.13
	15	0.99	1.89	4.18	7.71	16.22	24.42	46.79	94.55	146.01
	20	0.84	1.61	3.55	6.55	13.77	20.73	39.72	80.25	123.92
	25	0.74	1.41	3.12	5.77	12.13	18.26	34.98	70.66	109.10
	30	0.67	1.28	2.82	5.20	10.93	16.46	31.53	63.68	98.32
	40	0.57	1.08	2.39	4.42	9.28	13.97	26.76	54.04	83.43
	50	0.50	0.95	2.11	3.89	8.17	12.30	23.56	47.58	73.45
	75	0.40	0.76	1.67	3.09	6.49	9.76	18.69	37.74	58.26
	100	0.34	0.64	1.42	2.62	5.50	8.28	15.86	32.02	49.42

Flow rates expressed in volume (m³/h at 15°C, 1013 mbar) for propane gas (LPG) with air density of 1.56 (according to UNI7128-72), calculated for steel pipes, with a max. load loss of 0.5 mbar *).

Outer diameter		3/8 GAS	1/2 GAS	3/4 GAS	1 GAS	1 1/4 GAS	1 1/2 GAS	2 GAS	2 1/2 GAS	3 GAS
Inner diameter mm		13.2	16.6	22.2	27.9	36.6	42.5	53.8	69.6	81.6
Thickness mm		2.0	2.3	2.3	2.9	2.9	2.9	3.2	3.2	3.6
Virtual length		Flow rates m ³ /h								
	2	1.50	2.70	6.00	11.0	23.0	35.0	–	–	–
	4	1.00	1.80	4.10	7.4	15.0	24.0	45.0	82	135
	6	0.80	1.50	3.20	6.1	12.0	19.0	35.0	66	108
	8	0.70	1.30	2.80	5.2	10.6	16.4	30.0	58	92
	10	0.60	1.10	2.60	4.7	9.5	14.5	27.0	52	81
	15	0.50	0.90	2.00	3.8	7.6	11.5	21.5	43	65
	20	0.40	0.78	1.70	3.2	6.4	9.8	18.4	36	55
	25	0.32	0.69	1.50	2.9	5.7	8.7	16.1	32	49
	30	–	0.62	1.40	2.6	5.1	8.0	14.7	29	45
	40	–	0.55	1.20	2.2	4.5	6.8	12.5	25	38
	50	–	0.46	1.05	2.0	3.8	6.1	11.1	22	34
	60	–	–	–	1.8	3.5	5.5	10.0	20	30
	80	–	–	–	1.5	3.0	4.6	8.6	17	26
	100	–	–	–	–	2.7	4.2	7.6	15	23

*) For a load loss of 1 mbar, the flow rates must be increased by 45%; for a load loss of 2 mbar the flow rates must be increased 110%.

Combustion features for liquid fuels

Fuel	NHV	CO ₂ % Practice	CO ₂ % Theory	Max. opacity	Max. CO%	O ₂ % Practice
Diesel	10,200 kcal/kg	10 ÷ 13	15.44	2	0.1	3 ÷ 7
F.O. (5°E at 50°C)	9,600 kcal/kg	10 ÷ 13	16.12	6	0.1	4 ÷ 8
F.O. (Above 5°E at 50°C)	9,300 kcal/kg	10 ÷ 13	16.12	6	0.1	4 ÷ 8
Natural gas (CH₄)	8.550 kcal/m _n ³	8 ÷ 10	11.61	–	0.1	3 ÷ 7
L.P.G. (Propane C₃ H₈)	22.000 kcal/m _n ³	10 ÷ 12	13.8	–	0.1	3 ÷ 6
Town Gas	4.500 kcal/m _n ³	8 ÷ 10	–	–	0.1	–

Combustion air for common fuels

Fuel	Theory m ³ /m ³ or m ³ /kg	Practice m ³ /m ³ or m ³ /kg
Natural gas	9.6	12
Propane (LPG)	23.8	32
Butane (LPG)	30.9	41.7
Diesel	11.3	15.7
F.O.	10.8	15

Pipes for gas thread, medium series according to UNI 8863

Conventional designation	Outer diameter mm	Inner Diameter mm	Thick mm	Weight kg/m
1/4	13.5	8.8	2.35	0.65
3/8	17.2	12.5	2.35	0.85
1/2	21.3	16.0	2.65	1.22
3/4	26.9	21.6	2.65	1.58
1	33.7	27.2	3.25	2.44
1 1/4	42.4	35.9	3.25	3.14
1 1/2	48.3	41.8	3.25	3.61
2	60.3	53.0	3.65	5.10
2 1/2	76.1	68.8	3.65	6.51
3	88.9	80.8	4.05	8.47
4	114.3	105.3	4.50	12.1
5	139.7	130.0	4.85	16.2
6	165.1	155.4	4.85	19.2

Conversion table of temperatures °C - °F

°C	°F	°C	°F	°C	°F	°C	°F
-20	-4.0	-3	26.6	14	57.2	35	95
-19	-2.2	-2	28.4	15	59.0	40	104
-18	-0.4	-1	30.2	16	60.8	45	113
-17	1.4	0	32.0	17	62.6	50	122
-16	3.2	1	33.8	18	64.4	55	131
-15	5.0	2	35.6	19	66.2	60	140
-14	6.8	3	37.4	20	68.0	65	149
-13	8.6	4	39.2	21	69.8	70	158
-12	10.4	5	41.0	22	71.6	75	167
-11	12.2	6	42.8	23	73.4	80	176
-10	14.0	7	44.6	24	75.2	85	185
-9	15.8	8	46.4	25	77.0	90	194
-8	17.6	9	48.2	26	78.8	95	203
-7	19.4	10	50.0	27	80.6	100	212
-6	21.2	11	51.8	28	82.4	110	230
-5	23.0	12	53.6	29	84.2	120	248
-4	24.8	13	55.4	30	86.0	130	266

Flue draught

Average temperature of gas in flue	Size in mm of water column for each metre of height	Height of the flue above the combustion chamber mid point in metres								
		15	18	20	25	30	35	40	45	50
120	0.277	4.1	4.9	5.5	6.9	8.3	9.6	11.0	12.4	13.8
140	0.317	4.7	5.7	6.3	7.9	9.5	11	12.6	14.2	15.8
160	0.360	5.4	6.4	7.2	9	10.8	12.6	14.4	16.2	18
180	0.395	5.9	7.1	7.9	9.8	11.8	13.8	15.8	17.7	19.7
200	0.425	6.3	7.6	8.5	10.6	12.7	14.8	17	19.1	21.1
220	0.458	6.8	8.2	9.1	11.4	13.7	16	18.3	20.6	22.9
240	0.486	7.2	8.7	9.7	12.1	14.5	17	19.4	21.8	24.3
260	0.515	7.7	9.2	10.3	12.8	15.4	18	20.6	23.1	25.7
280	0.535	8	9.6	10.7	13.3	16	18.7	21.4	24	26.7
300	0.557	8.3	10	11.1	13.9	16.7	19.4	22.2	25	27.8
320	0.577	8.6	10.3	11.5	14.4	17.3	20.1	23	25.9	28.8
340	0.599	8.9	10.7	11.9	14.9	17.9	20.9	23.9	26.9	29.9
360	0.619	9.2	11.1	12.3	15.4	18.5	21.6	24.7	27.8	30.9
380	0.635	9.5	11.4	12.7	15.8	19	22.2	25.4	28.5	31.7
400	0.649	9.7	11.6	12.9	16.1	19.4	22.7	25.9	29.2	32.4

Table: absorption and dimensioning of fuses table for three-phase electrical motors at 2800 RPM (2-pin)

Motor at full load						Minimum size of delayed fuse in Amperes	
HP	kW	h%	cos j	Amperes			
				V 230	V 400		
0.25	0.18	64	0.77	1.00	0.58	2	2
0.35	0.25	68	0.78	1.28	0.74	2	2
0.50	0.37	69	0.78	1.79	1.03	4	2
0.75	0.55	72	0.80	2.52	1.46	6	2
1.00	0.75	73	0.83	3.20	1.85	8	4
1.50	1.10	75	0.84	4.60	2.65	10	6
2.00	1.50	77	0.86	5.90	3.40	16	8
3.00	2.20	80	0.85	8.50	5.00	25	10

Motor at full load						Minimum size of delayed fuse in Amperes	
HP	kW	h%	cos j	Amp.			
				V 230	V 400		
4.00	3.00	81	0.87	11.10	6.40	35	16
5.50	4.00	83	0.86	14.90	8.60	40	25
7.50	5.50	85	0.89	19.20	11.10	63	35
10.00	7.50	86	0.89	25.20	14.60	80	40
12.50	9.00	87	0.89	31.00	18.00	100	63
15.00	11.00	87	0.88	38.00	22.00	125	63
20.00	15.00	87	0.88	50.60	29.30	160	100
25.00	18.50	88	0.89	67.80	35.70	200	125

Saturated water steam

Pressure kg/cm ²	Temperature °C	Specific Volume m ³ /kg	Specific Weight kg/m ³	Heat of liquid cal/kg	Heat content cal/kg	Evaporation heat cal/kg	Entropy cal/kg °C
0.01	6.7	131.7	0.0076	6.73	600.1	593.4	2.1447
0.02	17.2	68.28	0.0465	17.24	604.8	587.5	2.0847
0.04	28.6	35.46	0.02820	28.65	609.8	581.1	2.0253
0.06	35.8	24.10	0.04134	35.81	312.9	577.1	1.9908
0.08	41.2	18.45	0.05421	41.14	615.2	574.1	1.9664
0.10	45.4	14.95	0.06688	45.41	617.0	571.5	1.9478
0.12	49.1	12.60	0.07938	49.01	618.5	569.5	1.9326
0.14	52.2	10.89	0.09177	52.13	619.9	567.8	1.9197
0.16	54.9	9.612	0.1040	54.88	621.1	566.2	1.9087
0.18	57.4	8.605	0.1162	57.36	622.1	564.7	1.8890
0.20	59.7	7.795	0.1283	59.61	623.1	563.5	1.8803
0.25	64.6	6.322	0.1582	64.49	625.1	560.6	1.8718
0.30	68.7	5.328	0.1877	68.61	626.8	558.2	1.8567
0.35	72.3	4.614	0.2169	72.27	628.0	556.0	1.8443
0.40	75.4	4.069	0.2458	75.36	629.5	554.1	1.8334
0.50	80.9	3.301	0.3029	80.81	631.6	550.8	1.8150
0.60	85.5	2.783	0.3594	85.4	633.4	548.0	1.8001
0.70	89.5	2.400	0.4152	89.43	634.9	545.5	1.7874
0.80	93.0	2.125	0.4705	92.99	636.2	543.2	1.7767
0.90	96.2	1.904	0.5253	96.19	637.4	541.2	1.7673
1.0	99.1	1.725	0.5797	99.12	638.5	539.4	1.7587
1.1	101.8	1.578	0.6337	101.81	639.4	537.6	1.7510
1.2	104.3	1.455	0.6876	104.32	640.3	536.0	1.7440
21.3	106.6	1.350	0.7410	106.66	641.3	534.5	1.7315
1.4	108.7	1.259	0.7942	108.85	642.0	533.1	1.7315
1.5	110.8	1.180	0.8472	110.92	642.8	531.9	1.7260
1.6	112.7	1.111	0.8990	112.89	643.5	530.6	1.7200
1.7	114.6	1.050	0.9524	114.76	644.1	529.3	1.7161
1.8	116.3	0.9952	1.005	115.64	644.7	528.2	1.7115
1.9	118.0	0.9460	1.057	118.24	645.3	527.1	1.7071
2.0	119.6	0.9016	1.100	119.87	645.8	525.9	1.7029
2.2	122.6	0.8240	1.213	122.9	646.8	523.0	1.6952
2.4	125.5	0.7601	1.310	125.8	647.8	522.0	1.6884
2.6	128.1	0.7052	1.418	128.5	648.7	520.2	1.6819
2.8	130.5	0.6578	1.520	131.0	649.5	518.5	1.6759

Pressure kg/cm ²	Temperature °C	Specific Volume m ³ /kg	Specific Weight kg/m ³	Heat of liquid cal/kg	Heat content cal/kg	Evaporation heat cal/kg	Entropy cal/kg °C
3.0	132.0	0.6166	1.622	133.4	650.3	516.9	1.6703
3.2	135.1	0.5804	1.723	135.6	650.9	515.3	1.6650
3.4	137.2	0.5483	1.824	137.8	651.6	513.8	1.6601
3.6	139.2	0.5196	1.925	139.8	652.2	512.4	1.6557
3.8	141.1	0.4939	2.026	141.8	652.8	511.0	1.6514
4.0	142.9	0.4706	2.125	143.6	653.4	509.8	1.6474
4.2	144.7	0.4495	2.225	145.4	653.9	508.5	1.6435
4.4	146.4	0.4303	2.324	147.2	654.4	507.2	1.6398
4.6	148.0	0.4127	2.423	148.9	654.9	506.0	1.6362
4.8	149.6	0.3965	2.522	150.5	655.4	504.9	1.6329
5.0	151.1	0.3816	2.621	152.1	655.8	503.7	1.6207
5.5	154.7	0.3489	2.867	155.8	656.9	501.1	1.6220
6.0	158.1	0.3213	3.112	159.2	657.8	498.5	1.6151
6.5	161.2	0.2980	3.356	162.5	658.6	496.1	1.6088
7.0	164.2	0.2778	3.600	165.6	659.4	493.8	1.6029
7.5	167	0.2603	3.842	168.5	660.1	491.7	1.5973
8.0	169.6	0.2448	4.085	171.3	660.8	489.5	1.5922
8.5	172.1	0.2311	4.326	173.9	661.4	487.5	1.5875
9.0	174.5	0.2180	4.568	176.4	662.0	485.6	1.5827
9.5	176.8	0.2080	4.809	178.8	662.5	483.6	1.5782
10	179	0.1981	5.040	181.2	663	481.8	1.5740
11	183.2	0.1808	5.530	185.6	663.9	478.3	1.5661
12	187.1	0.1664	6.010	189.8	664.7	475.0	1.5592
13	190.7	0.1541	6.486	193.5	665.4	471.0	1.5520
14	194.1	0.1485	6.967	197.1	666.0	468.9	1.5404
15	197.4	0.1343	7.446	200.5	666.6	466.0	1.5406
16	200.4	0.1262	7.925	203.9	667.1	463.2	1.5351
17	203.4	0.1190	8.405	207.1	667.6	460.4	1.5300
18	206.1	0.1126	8.886	210.1	667.9	457.8	1.5251
19	208.8	0.1068	9.366	213.0	668.2	455.2	1.5205
20	211.2	0.1016	9.846	215.8	668.5	452.7	1.5140
22	216.2	0.09251	10.81	221.3	668.9	447.7	1.5078
24	220.8	0.08492	11.78	226.1	669.3	443.2	1.5000
26	225.0	0.07846	12.75	230.8	669.5	438.7	1.4926
28	229.0	0.07288	13.72	235.2	669.6	434.4	1.4857
30	232.8	0.06802	14.70	239.5	669.7	430.2	1.4793

Data reported in this brochure shall be considered as indicative and not binding;
Baltur reserves the right to change them without previous notice.