



Biogas Combined Heat and Power Unit

ENERGIN® M12 CHP B400

Datasheet, 250 mg NO_x

The ENERGIN® CHP combined heat and power unit simultaneously generates electricity and uses the heat from the engine jacket water and exhaust to heat water. The power output can be controlled between 50 and 100 % of nominal rating. It can be operated in parallel with the public network or with an isolated load. As an option, automatic emergency operation and/or island-parallel operation with other generators is possible.

The unit is supplied as a compact, fully functional unit, with or without a sound attenuating enclosure. The engine, generator, heat exchangers for oil and jacket water and exhaust as well as the control and power panel are mounted, ready for operation on the vibration-decoupled base frame. A lubrication oil system, which allows operation of up to 2000 hours without manual lube oil refilling, is integrated on the unit.

The electrical control system provides protection and control functions for automatic or manual operation. A 12" touch panel informs about operating conditions and allows the operation and parameterization of the system. Various interfaces are available for communication with other power generators and an overhead control system. An Ethernet interface allows connection to the Internet for remote monitoring and remote maintenance.

The entire system is certified according to the BDEW medium voltage directive (Grid code).

TECHNICAL DATA

Manufacturer		R Schmitt Enertec
ENERGIN® Type		M12 CHP B400
Electrical power ¹	kW	400
Thermal power ²	kW	448
Gas consumption ³ (LHV)	kW	981
Self consumption ⁴	kW	5,7

DESIGN

Fuel type		Biogas
Lower heating value LHV	kWh/Nm ³	5,0
Gas flow pressure ⁵	kPa	3,5 - 5,0
Inlet air temperature	°C	20
Exhaust temperature	°C	180
Hot water temperature ⁶	°C	70 / 90
Hot water flow rate	m ³ /h	19,9

EXHAUST EMISSIONS⁷ WITHOUT CATALYST

NO _x	mg/Nm ³	250
CO	mg/Nm ³	1500
Formaldehyde	mg/Nm ³	100

ENGINE

Manufacturer		R Schmitt Enertec
ENERGIN® Type		M12-BTID41
Working principle		4-stroke
Cylinder configuration		12 in V / 90°
Valves per cylinder		4
Aspiration		turbocharged
Mixture cooling		internal
Displacement	ltr	22,6

LUBE OIL

Lube oil volume	ltr	205
Make up tank volume	ltr	157
Consumption	ltr/OH	0,13

ALTERNATOR

Manufacturer		Leroy Somer
Type		LSA 47.2 M8
Voltage	V / Hz	400 / 50
Speed	1/min	1.500
Efficiency	%	96,2



PERFORMANCE⁸

Load		100 %	75 %	50 %
Electrical power	kW	400	300	200
Thermal power	kW	448	350	264
Fuel consumption	kW	981	752	538
Gas flow at LHV	Nm ³ /h	197	151	108
Electrical efficiency	%	40,8	39,9	37,2
Thermal efficiency	%	45,7	46,5	49,1
Total efficiency	%	86,5	86,4	86,3
Exhaust gas flow ⁹	m ³ /h	2.457	1.804	1.236
Air requirement	m ³ /h	9.762	7.762	6.104
Exhaust air ¹⁰	m ³ /h	8.176	6.593	5.300

DIMENSIONS AND WEIGHTS WITH SOUND ENCLOSURE

Length ¹¹	mm	4.180
Height	mm	2.400
Height with 90° elbow	mm	3.550
Width	mm	1.440
Dry weight	kg	5.630
Operational weight	kg	6.220

CONNECTIONS

Exhaust	DN / PN	200 / 10
Fuel gas	DN / PN	65 / 16
Exhaust air	mm	850 x 850
Emergency cooling	DN / PN	65 / 16
Process water	DN / PN	65 / 16
Exhaust condensate	DN / PN	Rp 1/2"

¹ +0 % tolerance on electrical power output

² - 3/+ 8 % tolerance for thermal power @ 180 °C

³ +5 % tolerance on fuel consumption

⁴ average self consumption without emergency cooling

⁵ maximum variation of 10 % for set value

⁶ Return/flow temperature

⁷ Exhaust emissions related to 5 % oxygen in dry exhaust

⁸ at standard conditions according to ISO 3046-1; cos φ = 1

⁹ wet exhaust gas at 180 °C

¹⁰ ΔT = 15 K

¹¹ without optional heating water pump group



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