

# Biogas Combined Heat and Power Unit

## ENERGIN® M12 CHP B400

### Datasheet, 500 mg NO<sub>x</sub>, EXHE 120 °C



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 <sup>1</sup>	kW	400
Thermal power <sup>2</sup>	kW	463
Gas consumption <sup>3</sup> (LHV)	kW	955
Self consumption <sup>4</sup>	kW	5,7

#### DESIGN

Fuel type	Biogas (50% Methane)	
Lower heating value LHV	kWh/Nm <sup>3</sup>	5,0
Gas flow pressure <sup>5</sup>	kPa	3,5 - 5,0
Inlet air temperature	°C	20
Exhaust temperature	°C	120
Hot water temperature <sup>6</sup>	°C	70 / 90
Hot water flow rate	m <sup>3</sup> /h	20,4

#### EXHAUST EMISSIONS<sup>7</sup> WITHOUT CATALYST

NO <sub>x</sub> <sup>8</sup>	mg/Nm <sup>3</sup>	500
CO	mg/Nm <sup>3</sup>	1000
Formaldehyde	mg/Nm <sup>3</sup>	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



#### PERFORMANCE<sup>9</sup>

Load		100 %	75 %	50 %
Electrical power	kW	400	300	200
Thermal power	kW	463	361	270
Fuel consumption	kW	955	732	524
Gas flow at LHV	Nm <sup>3</sup> /h	192	147	105
Electrical efficiency	%	41,9	41,0	38,2
Thermal efficiency	%	48,5	49,3	51,5
Total efficiency	%	90,4	90,3	89,7
Exhaust gas flow <sup>10</sup>	m <sup>3</sup> /h	1.990	1.461	1.001
Air requirement	m <sup>3</sup> /h	9.684	7.701	6.059
Exhaust air <sup>11</sup>	m <sup>3</sup> /h	8.176	6.593	5.300

#### DIMENSIONS AND WEIGHTS WITH SOUND ENCLOSURE

Length	mm	4.180
Height	mm	2.400
Height with 90° elbow	mm	3.550
Width	mm	1.440
Dry weight	kg	5.720
Operational weight	kg	6.210

#### 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"

<sup>1</sup> +0 % tolerance on electrical power output

<sup>2</sup> - 3/+ 8 % tolerance for thermal power @ 120 °C

<sup>3</sup> +5 % tolerance on fuel consumption

<sup>4</sup> average self consumption without emergency cooling

<sup>5</sup> maximum variation of 10 % for set value

<sup>6</sup> Return/flow temperature

<sup>7</sup> Exhaust emissions related to 5 % oxygen in dry exhaust

<sup>8</sup> Setup for 250 mg/Nm<sup>3</sup> NO<sub>x</sub> possible (changed performance data)

<sup>9</sup> at standard conditions according to ISO 3046-1; cos φ = 1

<sup>10</sup> wet exhaust gas at 120 °C

<sup>11</sup> ΔT = 15 K



R Schmitt Enertec GmbH  
Siemensstraße 13  
56743 Mendig - Germany  
Phone +49 2652 93518 10  
Fax +49 2652 93518 22

R Schmitt Enertec International FZCO  
Apricot Tower, Office # 804, PO Box 341299  
Dubai Silicon Oasis, DSO, UAE  
Phone +971 4 333 5724  
Fax +971 4 333 9133



[www.rschmitt-enertec.com](http://www.rschmitt-enertec.com)  
[info@rschmitt-enertec.com](mailto:info@rschmitt-enertec.com)