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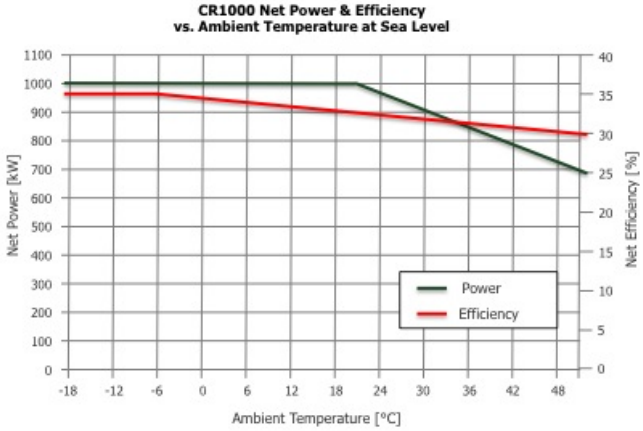
High-pressure Renewable Gas - Microturbine

Efficient & Ultra-low emissions

CHARACTERISTIC

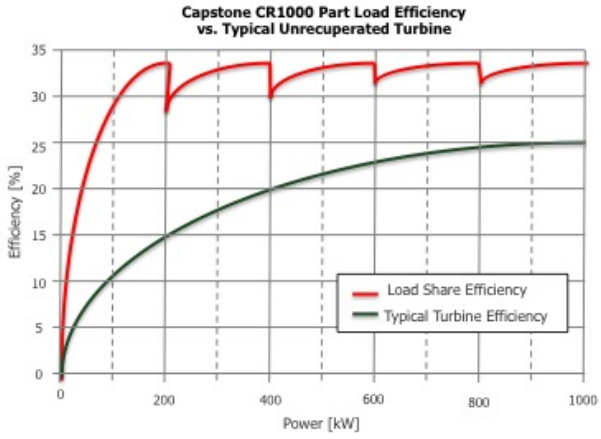
- Grid connect operation until 4 MW
- Minimal methane concentration: 35%
- One moving part: Minimal maintenance and downtime (no lubricating oil, no dangerous fluid or material)
- Ultra-low emissions, economic use for direct drying
- Small, modular design allows for easy, low-cost installation
- Digital control of performance
- Built-in display and user-friendly software
- RS232 interface
- Integrated utility synchronization and protection with a modular design
- Upgrade from 600 kW to 800 kW or 1 MW with field installed Capstone 200 kW power modules
- Further component of the CHP plant: compressor station and combination of control cabinet
- Optional equipment: Gas balancing, Heat Exchanger, Remote monitoring and control

CR1000 Capstone Microturbine



YOUR BENEFIT

- Low cost of operations: patented air bearing
- Long maintenance intervals with low cost (about every 4,000 operating hours)
- Minimal exhaust emission levels that are significantly below the current legal requirements
- Low vibration
- Suitable for indoor and outdoor installation
- Long service live (up to 80,000 operating hours)
- Very good partial load behavior
- Remote monitoring and control via Internet



FOR YOUR APPLICATIONS

- Industrial hot water
- Biogas treatment process
- Digestate drying and industrial drying process
- Hot water
- Solution for satellite

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TECHNICAL SPECIFICATIONS

The key component of the Combined Heat and Power (CHP) plant for burning biogas and converting into electrical and thermal energy are the Capstone microturbine. The NO_x and CO emissions are far below those of a combustion engine. The electrical power output is infinitely variable.

	GVM 600 B	GVM 800 B	GVM 1000 B
Power Output			
Electrical Power Output	600 kW	800 kW	4000 kW
Electrical Efficiency	33 (± 2)%		
Thermal Power Output (90°C/70°C)(1)	Interpretation follows		
Thermal Power Output (140°C/120°C)(2)	Interpretation follows		
Fuel			
Net Heat Rate (LHV)	1818 kW	2424 kW	3030 kW
Biogas @ 50% methane concentration	360 m³/h	480 m³/h	600 m³/h
H_2S content	≤2,500 ppmv		
Exhaust Characteristics			
Exhaust Gas Temperature	280°C (536 °F)		
Exhaust Gas Mass Flow	3.99 kg/s (8.79 lbs/s)	5.32 kg/s (11.73 lbs/s)	6.65 kg/s (14.66 lbs/s)
Exhaust Gas Flow (under normal conditions)	3.08 m³/s	4.11 m³/s	5.14 m³/s
Exhaust Energy	1,182 kW	1,576 kW	1,970 kW
Carbon monoxide (CO) @ 15% O_2	< 70 mg/m³		
Nitrogen oxide (NOx) @ 15% O_2	< 10 mg/m³		
Formaldehyde (CH_2O) @ 15% O_2	< 5 mg/m³		
Electrical Performance			
Voltage	400 to 480 VAC		
Frequency	50/60 Hz		
Max. Output Current @ 400V	870 A RMS	1160 A RMS	1450 A RMS
Electrical Service	3 Phase, 4 wire		
Basic Data			
Height	2900 mm (114.17 in)		
Width	2400 mm (94.49 in)		
Length	9100 mm (358.27 in)		
Weight	11,475 kg (25,298 lbs)	12,791 kg (28,199 lbs)	14.106 kg (31,098 lbs)
Minimum Clearance Requirements			
- Vertical Clearance	610 mm (24.02 in)		
- Left & Right	1500 mm (59.05 in)		
- Front	1500 mm (59.05 in)		
- Rear	1800 mm (70.86 in)		
Sound Level (nominal at 10 m)	70 db(A)	71 db(A)	72 db(A)
Maximum Rotation	60,000 U/min		
Primary Pressure	100 mbar		
Isolated Operation	Not available		

(1) @ H_2S content until 100 ppm.
(2) @ H_2S content until 500 ppm.

Nominal full power performance at ISO conditions: 15°C, 1013 mbar
Specification are not warranted and are subject to change without notice. (Status: 01/2012)