greenVIRONMENT

High-pressure Renewable Gas - Microturbine

Efficient & Ultra-low emissions

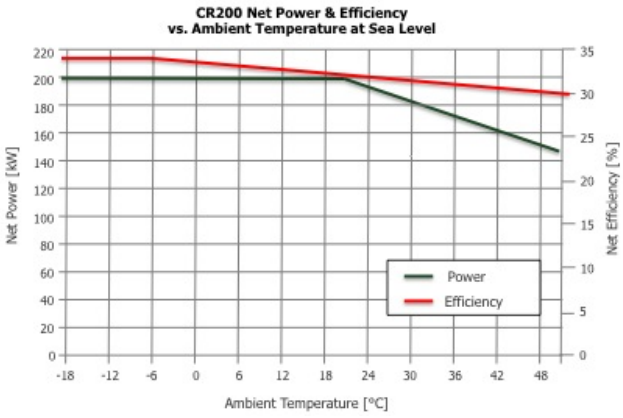
CHARACTERISTIC

- 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
- Further component of the CHP plant: compressor station and combination of control cabinet for the CHP plant
- Optional equipment: Gas balancing, Heat Exchanger, Remote monitoring and control

CR200 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
- Can be installed both 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

- High temperature 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 65 B	GVM 200 B	GVM 400 B [1]
Power Output			
Electrical Power Output	65 kW	200 kW	400 kW
Electrical Efficiency	29 (± 2)%	33 (± 2)%	33 (± 2)%
Thermal Power Output (90°C/70°C)[2]	99 kW	230 kW	450 kW
Thermal Power Output (140°C/120°C)[3]	Interpretation follows		
Fuel			
Net Heat Rate (LHV)	224 kW	606 kW	1.212 kW
Biogas @ 50% methane concentration	45 m³/h	120 m³/h	240 m³/h
H_2S content	≤2,500 ppmv		
Exhaust Characteristics			
Exhaust Gas Temperature	309°C (588.2 °F)	280°C (536 °F)	280°C (536 °F)
Exhaust Gas Mass Flow	0.49 kg/s (1.08 lbs/s)	1.33 kg/s (2.93 lbs/s)	2.66 kg/s (5.86 lbs/s)
Exhaust Gas Flow (under normal conditions)	0.38 m³/s	1.03 m³/s	2.06 m³/s
Exhaust Energy	164 kW	394 kW	788 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	100 A RMS	290 A RMS	580 A RMS
Electrical Service	3 Phase, 4 wire		
Basic Data			
Height	2110 mm (83.01 in)	2490 mm (98.03 in)	2490 mm (98.03 in)
Width	762 mm (30.00 in)	1700 mm (66.93 in)	1700 mm (66.93 in)
Length	1956 mm (77.01 in)	3660 mm (144.09 in)	3660 mm (144.09 in)
Weight	758 kg (1,671.10 lbs)	2270 kg (5,004.49 lbs)	2270 kg (5,004.49 lbs)
Minimum Clearance Requirements			
- Vertical Clearance	610 mm (24.02 in)	610 mm (24.02 in)	610 mm (24.02 in)
- Left & Right	760 mm (29.92 in)	1100 mm (43.31 in)	1100 mm (43.31 in)
- Front	760 mm (29.92 in)	1100 mm (43.31 in)	1100 mm (43.31 in)
- Rear	910 mm (35.83 in)	1800 mm (70.87 in)	1800 mm (70.87 in)
Sound Level (nominal at 10 m)	65 db(A)	65 db(A)	68 db(A)
Maximum Rotation	96,000 U/min	60,000 U/min	60,000 U/min
Primary Pressure	100 mbar		
Isolated Operation	Not available		

(1) The dimensions of the microturbine (Height x Width x Length) and the clearance requirements apply to one microturbine with 200 kW.
(2) @ H_2S content until 100 ppm.
(3) @ 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)