

# MODULE DATA SHEET



*powered exclusively by* 

## **BENEFITS**

### **Caterpillar Engine**

- proven reliable and durable for long life
- worldwide product support
- multiple fuel options including natural gas, biogas and LPG

### **Marathon Generator**

- single-bearing, PMG excited, DVR controlled

### **Compliance**

- meets or exceeds industry standards including UL, Rule 21, IEEE and SCAQMD

### **Utility Interconnection**

- integrated, fault protection switchgear for simplified interconnection
- stored energy breaker for quick transition

### **GenView™ Control System**

- Internet based remote system monitoring
- onboard data capture, storage, and communication capable of 24/7 narrowband and wireless connection
- trend analysis to anticipate wear
- early alerts to system problems to minimize downtime

### **Exhaust Emissions**

- NSCR system with A/F Ratio Control
- complies with SCAQMD Rule 1110.2

### **Integrated Design**

- primary containment protects the environment from fluid leaks
- removable door and roof panels for maximum serviceability
- rain-tight construction provides protection from weather
- sound attenuated cabinet and air ducts for noise reduction
- integrated battery charger for reliable operation

## **138 kWe Low Energy Fuel Cogeneration Module**

**Caterpillar® SI Engine  
Marathon Synchronous Generator**

E3NV designs, develops and manufactures cogeneration modules unmatched in reliability and cost-effectiveness.

## **EQUIPMENT**

In addition to the standard module features and equipment (see module configuration document), the following equipment is specific to this module only:

### **Engine**

G3406NA manufactured by Caterpillar  
in-line 6 cylinder, 4-stroke cycle, naturally aspirated  
137 mm bore x 165 mm stroke, 14 liters displacement  
10.3:1 compression ratio

### **Generator**

Marathon model 432RSL4009 - 12 lead  
reconnectable synchronous  
PMG brushless excitation

### **Air Intake System**

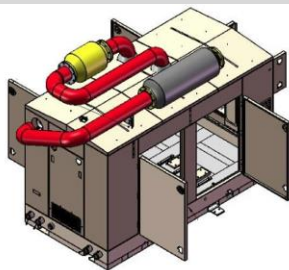
outside combustion air ducted to a standard Caterpillar two-stage air cleaner  
inlet temperature up to 110°F (43°C) before derate

### **Complete System Heat Recovery**

stainless steel, brazed plate engine jacket water loop isolation heat exchanger  
stainless steel, water jacketed, exhaust heat exchanger

**TECHNICAL DATA**

Frequency	Hz		60 <sup>(a)</sup>	
Continuous Electric Output @ 1.0 pf	kWe		138	
Mechanical Power	bhp	kWb	194	145
RPM			1,800	
Heat Rate	Btu/kWe-hr	MJ/kWe-hr <sup>(b)</sup>	12,164	12.8
Combined Efficiency	%		84.0	
electrical efficiency	%		28.1	
thermal efficiency	%		55.9	
Fuel Consumption @ 593 Btu/scf – LHV	scfh	nm³/h	2,830	80.1
Fuel Consumption	therms per hour	kW	16.7	492
Total Thermal Energy Output	Btu/hour	kW	939,630	275
heat from water jacket	Btu/hour	kW	634,680	186
heat from exhaust	Btu/hour	kW	304,950	89
cooling (absorption chilling) <sup>(c)</sup>	tons		55 – 62	
engine out exhaust temperature	°F	°C	1,137	614
module out exhaust temperature	°F	°C	305	152
exhaust flow	lbm/hour	kg/hour	1,567	710
minimum cogeneration loop water flow	gpm	m³/hour	60	13.6
maximum cogeneration loop water pressure	psig	bar	100	6.8
maximum module out water temperature	°F	°C	207	97
nominal cogeneration return temperature	°F	°C	176	80
Environmental				
NOx	grams/bhp-hour	ppmv@15% O₂	0.15	10
CO	grams/bhp-hour	ppmv@15% O₂	0.6	100
noise	dBA @ 3 meters		< 65	
Generator Electrical Output	3 phase AC voltage <sup>(d)</sup>		120/208, 120/240, or 277/480	
<sup>(a)</sup> 50 Hz values available on request				
<sup>(b)</sup> heat rate assumes maximum exhaust back pressure of 2 inches Hg (6.7 kPa)				
<sup>(c)</sup> depending on site conditions and application parameters				
<sup>(d)</sup> 600 V available on request				

**DIMENSIONS**

Length	134"	3.40m
Height	84"	2.13m
Width	67"	1.70m
Weight	10,140lb	4,600kg

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