MODULE DATA SHEET

E3 NV LLC

powered exclusively by CAT

250 kWe Cogeneration Module

Caterpillar® SI Engine
Marathon Synchronous Generator

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

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

EQUIPMENT

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

Engine

G3412NA manufactured by Caterpillar

60° V-12 cylinder, 4-stroke cycle, naturally aspirated

137 mm bore x 152.4 mm stroke

9.7:1 compression ratio

Generator

Marathon model 433RSL4021 - 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 [a]	
Continuous Electric Output @ 1.0 pf	kWe		250	
Mechanical Power	bhp	kWb	349	260
RPM			1,800	
Heat Rate	Btu/kWe-hr	MJ/kWe-hr [b]	11,147	11.7
Combined Efficiency	%		85.7	
electrical efficiency	%		30.6	
thermal efficiency	%		55.1	
Fuel Consumption @ 905 Btu/scf – LHV	scfh	nm^3/h	3,079	87.2
Fuel Consumption	therms per hour	kW	27.8	816.7
Total Thermal Energy Output	Btu/hour	kW	1,537,600	447
heat from water jacket	Btu/hour	kW	1,026,200	301
heat from exhaust	Btu/hour	kW	511,400	150
cooling (absorption chilling) [c]	tons	kW	89 - 102	
engine out exhaust temperature	°F	°C	1,150	621
module out exhaust temperature	°F	°C	305	152
exhaust flow	lbm/hour	kg/hour	2,458	1,115
minimum cogeneration loop water flow	gpm	m^3/hour	100	22.7
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% O_2	0.15	10
CO	grams/bhp-hour	ppmv@15% O_2	0.6	100
noise	dBA @ meters		< 65 [d]	
Generator Electrical Output	3 phase AC voltage		120/208, 120/240, or 277/480	

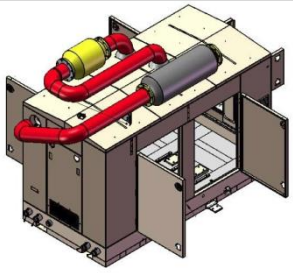
[a] 50 Hz values available on request

[b] heat rate assumes maximum exhaust back pressure of 2 inches Hg (6.7 kPa)

[c] depending on site conditions and application parameters

[d] 600 V available on request

DIMENSIONS



Length	134”	3.40m
Height	84”	2.13m
Width	67”	1.70m
Weight	11,460lb	5,200kg

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