



DuraGEN™ SOLAR ENGINES: RELIABLE OFF-GRID POWER

- Ideal power source for low-voltage devices
- Fast, easy installation
- Intelligent energy management
- Reliable year-round power, day and night



we put solar to work™

Solar Power – Maintenance Free and No Air Pollutants!

Solar power, makes it easier than ever to install and operate electrical equipment anywhere in the world - from desert regions to remote mountain tops! For a fraction of the cost of maintaining a fuel-operated generator, Carmanah's DuraGEN solar engines can generate electricity safely and reliably to run critical remote systems with confidence.

DuraGEN™ Solar Engine Features and Benefits

The DuraGEN™ solar engine is a complete stand-alone solar power supply that provides power to crucial equipment in remote locations for industrial, telecom, and security applications.

Each DuraGEN solar engine comes as a complete, ready to install system and includes the following components:

- Solar module
- Array cabling (and junction box if the system includes more than one module)
- Side pole mount hardware
- Enclosure
- Control panel – with solar controller (15 Amp or 30 Amp depending on the system size), backing plate, breakers
- Batteries – default battery types include the EX1050 (105 Ah battery) and EX1500 (150 Ah battery)
- Battery cabling

Proven Performance

Industrial strength build quality - Carmanah's DuraGEN solar engines are built to tough standards, and designed to function flawlessly in even the most extreme climates and environments. Thousands of Carmanah's DuraGEN solar engines are deployed and operating reliably in environments ranging from desert heat to the arctic cold. All DuraGEN solar engine models are designed to perform reliably in ambient temperatures from -40° to 60° (-40 to 140 F) for dependable worry-free operation.

Pre-wired and pre-tested for fast and simple installation

A reputation for quality - The DuraGEN solar engine is built on Carmanah's years of experience designing solar-powered equipment. Carmanah enjoys a well-earned reputation for top quality, reliable products and professional, efficient services.

Constructed of high-quality, industry-standard components, Carmanah's DuraGEN solar engines come preassembled, pre-wired and ready to install. All connections are clearly labeled and precise installation instructions are included to make installation quick and easy.

Cost Savings

Value - Carmanah DuraGEN solar engines are completely self-sufficient. As an alternative to hard-wired systems, Carmanah's solar power systems significantly reduce installation costs and eliminate expensive electrical permits, maintenance charges and ongoing electricity bills.

Aluminum Enclosures

Durable - The DuraGEN solar engine's aluminum enclosures are made from powder coated, lightweight aluminum offering superior corrosion protection for use in H2S and marine environments

The two and four battery enclosures are UL cUL listed and NEMA rated and available with insulation for use in extreme climates.

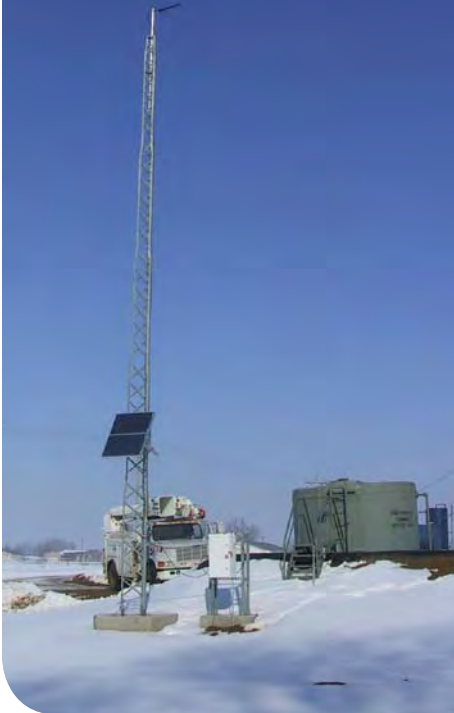
Versatile Applications

Install the DuraGEN solar engine wherever you need power. The DuraGEN solar engine's flexible design means a single DuraGEN solar engine can be used to power all sorts of third-party equipment.

Carmanah's DuraGEN solar engines can provide a steady flow of clean, high quality, dependable power for a wide range of remote and hazardous location applications, including:

- Video surveillance
- Homeland Security
- Security lighting/ surveillance
- UHF/VHF Radio
- Wi-Fi and broadband
- Irrigation control
- Wireless data
- SCADA
- Valve actuation
- Chemical injection pumping
- Electronic flow measurement
- Cathodic protection
- Well-site security
- Traffic monitoring

Security and Surveillance



Telecommunication Sites



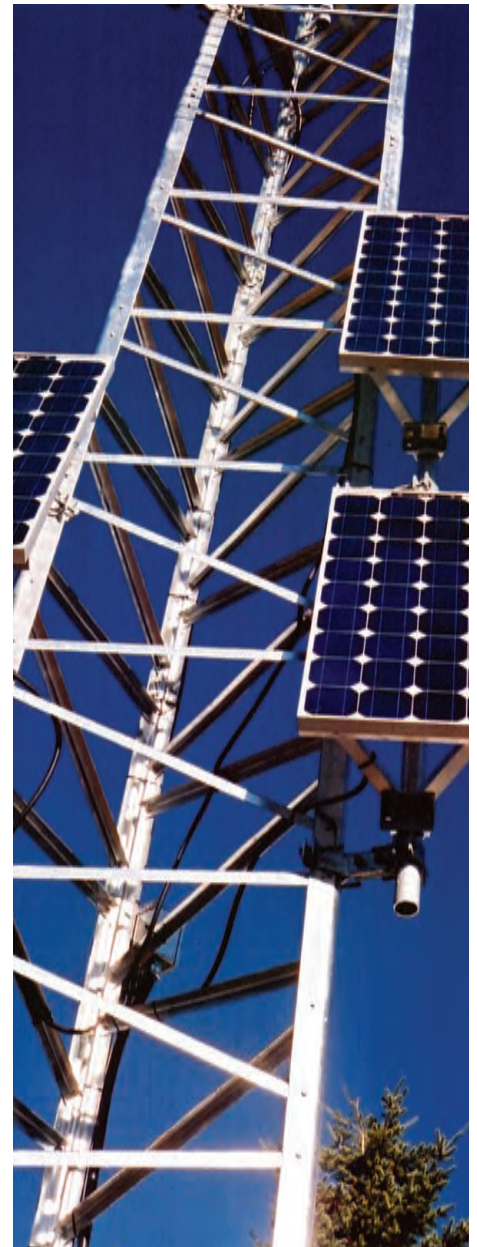
Monitoring Systems



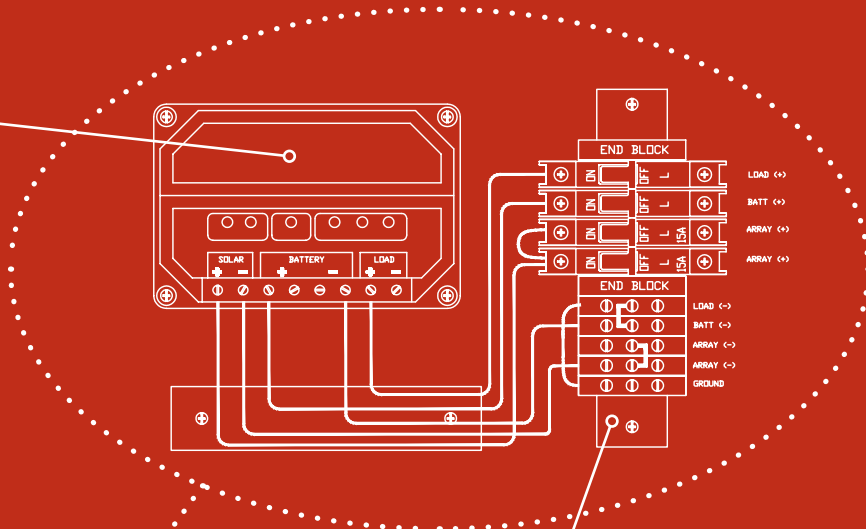
Oil and Gas Applications

The DuraGEN solar engine...

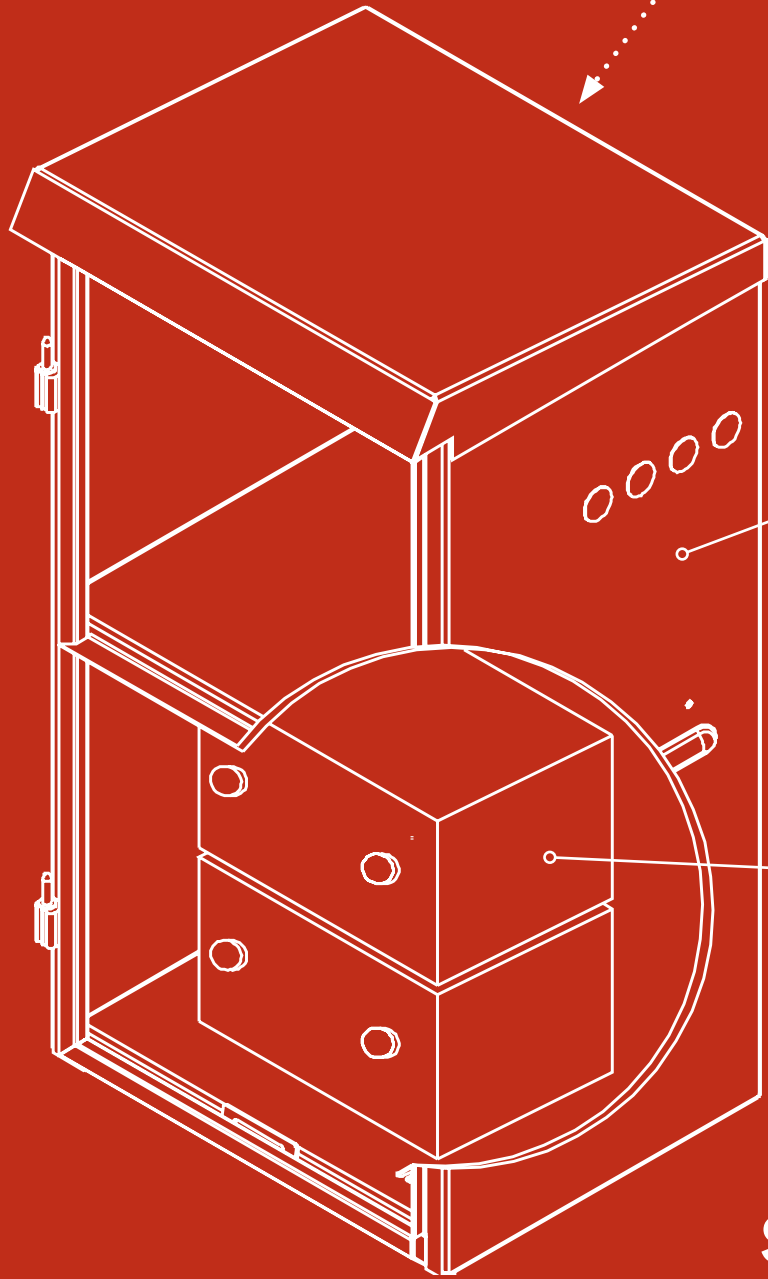
the complete stand-alone solar power supply



**Charge Controller
(mounted inside enclosure)**



**Control Panel
(mounted inside enclosure)**



Aluminum Enclosure

Battery

System Components

Adaptable, reliable,
affordable solutions:
at Carmanah, putting solar
to work is what we do best.

System Options

Carmanah's DuraGEN solar engines are available with a variety of options:

Security mount

Flat pole mount hardware

Pad mount hardware

Lift-ears – for easy lifting using cranes

Battery riser – improves battery cooling in hot climates

Insulation (D2 and D4 only)

Company Support

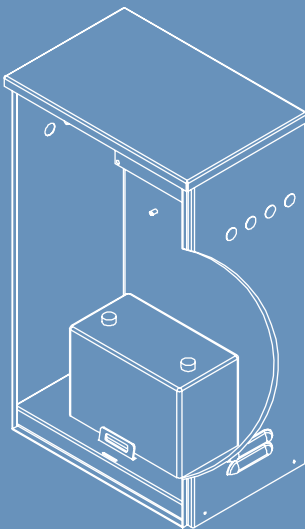
Carmanah products provide years of reliable service, and require little or no maintenance. To ensure customers get the most out of their products, the company offers a range of customer services, from planning and installation to training and ongoing support.

Enclosures

All enclosures are designed to NEMA 3R standards

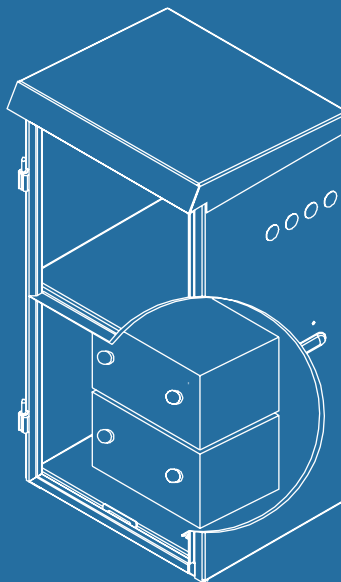
D2 and D4 enclosures are UL and CUL certified

Wiring kits for PV array and battery bank



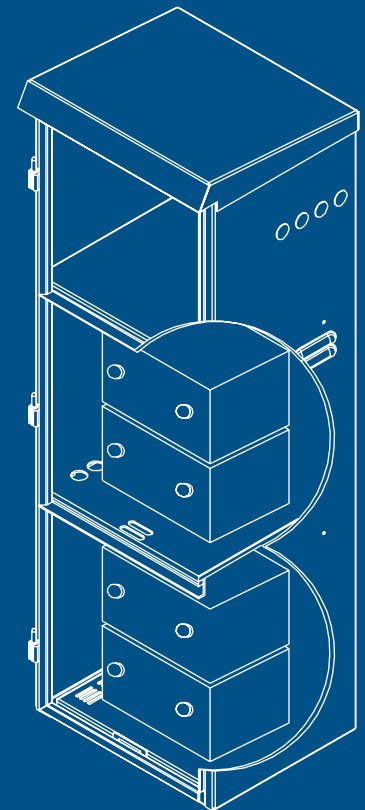
Enclosure

S1



Enclosure

D2



Enclosure

D4

System Sizing and Selection

Carmanah's DuraGEN solar engines are complete, ready to ship and ready to install systems with pre-assembled control panels. The DuraGEN solar engine comes in a variety of standard outputs and configurations to accommodate a wide range of remote power needs. Carmanah's experienced sales staff will help you assess your power requirements, or refer to the specifications chart below.

SYSTEM	WATTS	ENCLOSURE TYPE ¹	VOLTAGE (V DC)	AMP HOURS (Ahr)	SOLAR MODULE WATTS	SOLAR MODULE QUANTITY
DuraGEN™ Solar Engine 20-1-12	20	S1	12	105	20	1
DuraGEN™ Solar Engine 50-1-12	50	S1	12	105	50	1
DuraGEN™ Solar Engine 50-2-12	50	D2	12	210	50	1
DuraGEN™ Solar Engine 80-1-12	80	S1	12	105	80	1
DuraGEN™ Solar Engine 80-1-12	80	S1	12	105	80	1
DuraGEN™ Solar Engine 100-2-12	100	D2	12	210	50	2
DuraGEN™ Solar Engine 100-2-24	100	D2	24	105	50	2
DuraGEN™ Solar Engine 120-2-12	120	D2	12	210	123	1
DuraGEN™ Solar Engine 160-2-12	160	D2	12	210	80	2
DuraGEN™ Solar Engine 160-2-24	160	D2	24	210	175	1
DuraGEN™ Solar Engine 160-4-12	160	D4	12	420	80	2
DuraGEN™ Solar Engine 160-4-24	160	D4	24	210	175	1
DuraGEN™ Solar Engine 240-2-12	240	D2	12	210	123	2
DuraGEN™ Solar Engine 240-2-24	240	D2	24	105	123	2
DuraGEN™ Solar Engine 240-4-12	240	D4	12	420	123	2
DuraGEN™ Solar Engine 240-4-24	240	D4	24	210	123	2
DuraGEN™ Solar Engine 320-2-12	320	D2	12	210	80	4
DuraGEN™ Solar Engine 320-4-12	320	D4	12	420	80	4
DuraGEN™ Solar Engine 340-2-24	340	D2	24	105	175	2
DuraGEN™ Solar Engine 340-4-24	340	D4	24	210	175	2
DuraGEN™ Solar Engine 480-2-12	480	D2	12	210	123	4
DuraGEN™ Solar Engine 480-2-24	480	D2	24	105	175	3
DuraGEN™ Solar Engine 480-4-12	480	D4	12	420	123	4
DuraGEN™ Solar Engine 480-4-24	480	D4	24	210	175	3

¹ S1 supports 1 battery, D2 supports 2 batteries, D4 supports 4 batteries

Use the online configurator to quickly and easily identify the right system for your load requirements. Find this easy to use tool at solarforindustry.com.

Each system consists of three major components:

Solar Panel(s)



Solar panel type and wattage varies with each system.

Batteries



Default battery types include the EX-1050 (105 Ahr) and EX-1500 (150 Ahr).

Controller and Control Panel

(All breaker switches and terminal blocks are CSA and UL approved)



CONTROLLER	15	30
Rated Solar Current	15 A	30 A
Rated Load Current	15 A	30 A
System Voltage	12/24 V	12/24 V

DuraGEN Solar Engine Sizing Calculator

Customer name and point of contact:

Application description:

Specify application location (country, state, province, nearest city, lat/long if known):

Nominal voltage (circle one): 12VDC or 24VDC or _____ VAC and _____ frequency

Autonomous days (circle one; 5 is typical): 1, 3, 5, 10, 20, or other _____

Qty	Equipment	Load (Amps)	Voltage	Load (Watts)	Use (Hrs/Day)	Use (Days/Week)	Total Amp-Hours/Day
1	SCADA controller	0.39	12 VDC	$0.39 \times 12 = 4.7$	10	7	$0.39 \times 10 = 3.9$
						Total	



carmanah®

Carmanah Technologies Corporation

Building 4-203 Harbour Road
Victoria, BC, Canada V9A 3S2

Toll Free: +1.877.722.8877 (US & Canada)

Worldwide: +1.250.380.0052

Fax: +1.250.380.0062

Email: info@carmanah.com

Carmanah is the brand of choice for integrated solar power systems around the world.

Anywhere conventional power is unreliable, unavailable, or unaffordable, Carmanah's unique solar power solutions offer a new level of freedom and convenience.

Carmanah's products are among the best performing and most reliable in the industry — built to provide years of trouble-free service, even under the most extreme environmental conditions.

Call your Carmanah representative today for more information and pricing.

For more information or to find the regional office nearest you, please visit carmanah.com.

© 2008 Carmanah Technologies Corporation. All rights reserved.

Carmanah, EverGEN, DuraGEN, and MICROSOURCE are trademarks or registered trademarks of Carmanah Technologies Corporation. All rights reserved.

solarforindustry.com