carmanah®
we put solar to work

solar LED area lighting:
an empowering experience

beta LED™

When remarkable freedom and exceptional performance meet, an empowering experience begins.

Imagine being free of the electrical grid. Imagine exceptionally reliable performance. Imagine innovative and nimble technology that responds to its environment. Versatile, adaptable and resilient: Carmanah solar area lighting solutions are boldly turning yesterday's imagination into today's reality.

A brilliant idea: area lighting with no strings attached.

Cut the ties that bind area lighting solutions to the electrical grid; break free of ongoing electrical bills and maintenance schedules. The exceptional technology from two industry leaders creates the first premium quality solar LED area lighting solution.

Using Carmanah solar power solutions and BetaLED™ THE EDGE™ luminaires, area lighting is finally liberated from the limits of trenching, the cost of electrical contractors and the uncertainty of electrical grid performance.

Surprisingly easy to install and flawlessly reliable under even the most demanding conditions, solar area lighting solutions are simply an intelligent choice.

- No trenching, cabling or wiring
- No electrical contractors or technicians required for installation
- Robust design equipped to handle heavy wind loads and temperature extremes
- No scheduled maintenance for up to five years
- Extended lamp life, up to 60,000 hours, means reduced maintenance costs and total cost of ownership
- No electrical bills

Experience the revolution: the first premium quality solar LED area lighting solution

The Environmentally Friendly Solution

Eco-friendly lighting solutions are a savvy decision that can put dollars back into an agency's pocket. Not only does solar area lighting save on energy bills and maintenance costs, it reduces greenhouse gas emissions. In addition, BetaLED THE EDGE luminaires contain no mercury and last five times longer than metal halide, resulting in less environmental waste. This integrated solar area lighting solution can qualify a business for LEED Renewable Energy credits. Contact Carmanah today to find out how LEED credits could apply to your solar area lighting application.

Equipped with Carmanah's proprietary MICROSOURCE® energy management system (EMS), Carmanah solar solutions are designed to perform in the world's most demanding conditions.

At the forefront of solar innovation, the three main components of Carmanah MICROSOURCE energy management system create a dynamically responsive technology that allows a level of control unlike anything else on the market.

Automatic Light Control

Monitoring the charge received from the solar panels each day, Automatic Light Control is what makes Carmanah solar technology nimble. Using a sophisticated patented algorithm, the unit recognizes trends in charge patterns and develops an approximate understanding of installation location and prevailing weather conditions. By dynamically adjusting to the changing relationship between light output and available energy resources, Carmanah solar area lighting systems offer unmatched robustness and reliability.

Power Management

Responsible for the low maintenance, flawless performance and rugged reliability of Carmanah solar area lighting, power management is the cornerstone of MICROSOURCE technology. Monitoring and optimizing battery charge levels, power management technology ensures that energy reserves are always at their peak and protects performance integrity is protected by preventing damaging deep cycling during periods of low solar insolation.

Independent Light Output

The Carmanah MICROSOURCE EMS allows THE EDGE LED (light emitting diodes) luminaires from BetaLED to deliver a constant drive level that is independent of the battery system; this independent light output ensures the vibrancy of Carmanah solar area lighting systems. Configured for the exact product and components being used, independent light output provides for precise control of brightness levels and power consumption.

The self-contained EverGEN solar engine integrates all components within a compact and durable pole-mounted design.

THE EDGE LED Luminaires offer more lumens per watt, excellent uniformity and its modular design is built for durability.

Contemporary design, robust construction and resilient performance:

Carmanah Takes Solar Solutions to New Heights

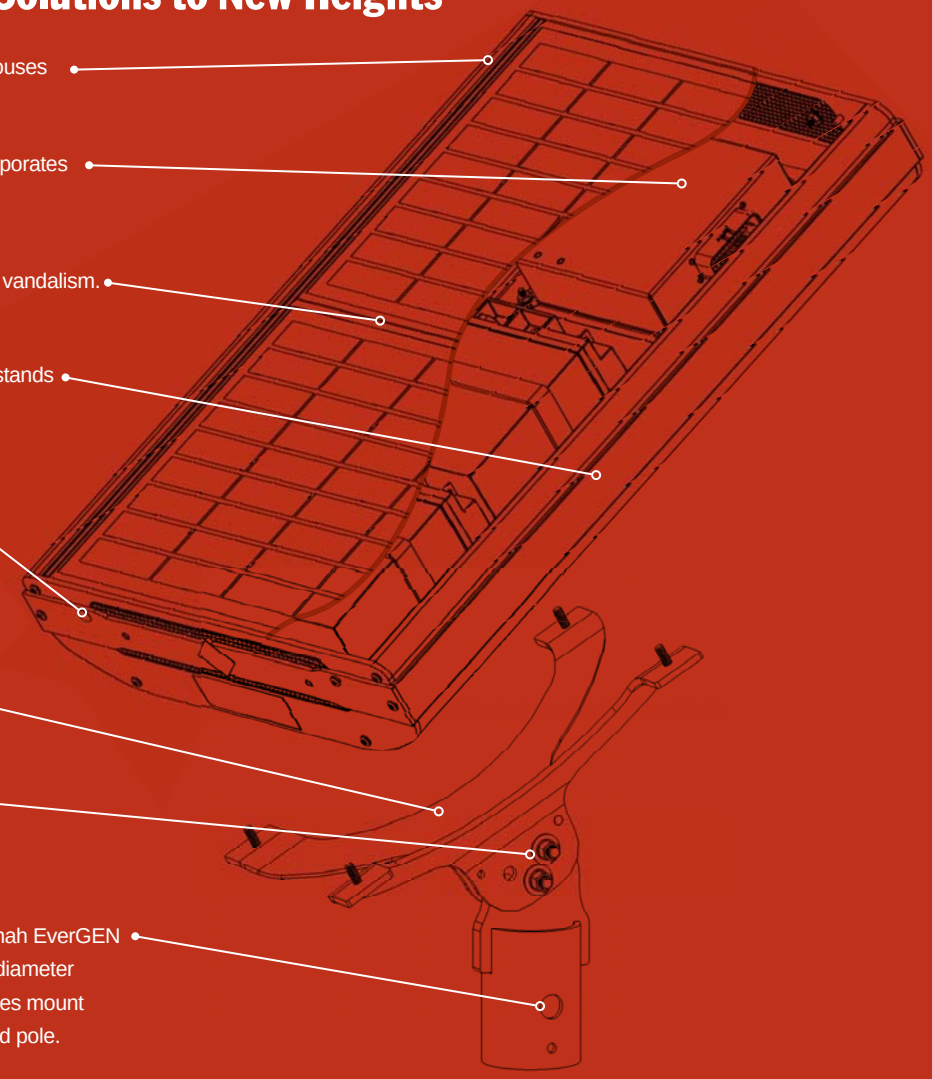
A sleek, self-contained solar engine design houses all components in one compact unit.

Carmanah energy management system incorporates patented MICROSOURCE technology.

A secure enclosure protects against theft and vandalism.

Designed to endure; staunch framework withstands extreme wind loads.

A pivoting top opens to provide easy access to unit components.



The durable powder-coated finish prevents corrosion and damage from the elements.

With variable tilt angle from zero to 60˚, Carmanah EverGEN solar engine can be configured to optimize sun exposure.

Featuring simple pole-top installation, Carmanah EverGEN 10, 20 & 30 W solar engines slip fit onto a 3” diameter round pole. Carmanah 50 & 80 W solar engines mount easily to the side of a 3.5” or 4” diameter round pole.

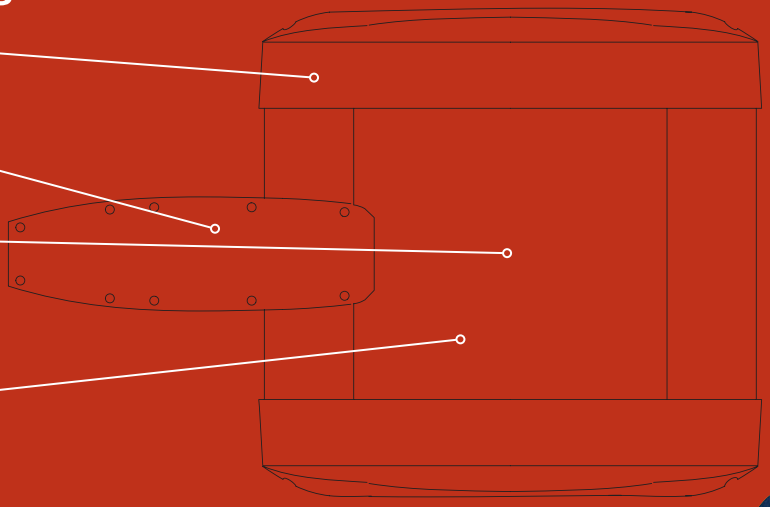
BetaLED Gives Solar Lighting THE EDGE

Meets IES full cut-off standards and International Dark-Sky Association guidelines.

Luminaires feature a direct light bar design and IP-65 rated wiring component.

Maximizing LED advantages, THE EDGE fixtures feature sleek, rugged housings made of low copper content die cast aluminum with Colorfast DeltaGuard™ finish.

THE EDGE signature top screen, designed to minimize debris build-up on the heat sinks, allows for self-cleaning of the entire unit.



IDA APPROVED Dark-Sky Friendly Fixture

THE EDGE LED luminaires from BetaLED

Expert lighting system designer and manufacturer, BetaLED, expands THE EDGE family of products with its latest fixture, designed specifically to work in harmony with Carmanah's proven EverGEN solar engine and energy management technology. Achieving maximum performance and efficiency using standard IES Type II short, Type II long, Type III and Type V distributions, this revolutionary solar area lighting innovation delivers unprecedented optic distribution and uniformity, which further translates into fewer, further spaced poles.

THE EDGE line of LED luminaires sets new standards for performance and efficiency. Balancing form and function, THE EDGE offers more lumens per watt and its modular design is built for durability. With extraordinary heat dissipation qualities and exclusive NanoOptic™ technology that virtually eliminates reflective or refractive losses, THE EDGE luminaire is a natural partner for Carmanah solar technology.

Exclusive BetaLED NanoOptic Provides Superior Light Control

THE EDGE uses a direct-contact refractor optic called NanoOptic, which sits on the LED to provide maximum light output and optimal light control. NanoOptic refractors are made of UV-stabilized High Intensity Discharge (HID) acrylic that is formulated on the basis of decades of field experience with the material. The NanoOptic refractor minimizes all losses and creates efficiencies much greater than traditional reflectors—up to and exceeding 96%.

Operating Profile

The Carmanah solar area lighting system features an intelligent operating profile for the luminaire, and can be configured to provide illumination during times of peak usage. Three types of operating profiles are available:

Split Night:

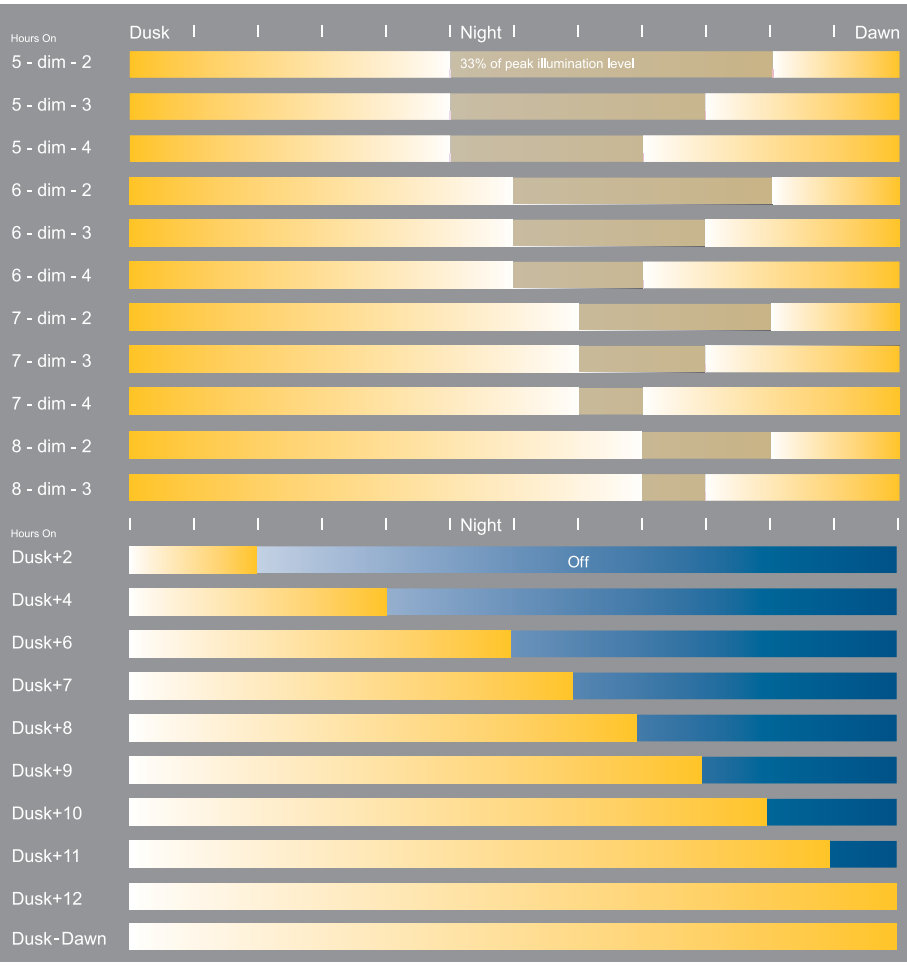
The luminaire turns on at dusk at full intensity for a fixed number of hours, the intensity is then reduced to 33% of full intensity for a portion of the night, and then the luminaire returns to full intensity for a fixed number of hours before dawn. This is an excellent option to maximize light output when needed most, while still providing lighting throughout the night.

Fixed Night:

The luminaire turns on at dusk for a fixed number of hours and then turns off.

All Night:

The luminaire remains on from dusk to dawn at a constant light intensity.



LEDs: the revolution in lighting technology

THE EDGE fixtures utilize high-performance, super-bright white LEDs. These current class-leading performance LEDs exceed 80 lumens per watt at 6000K color temperature, and are resistant to extreme environments and changes in ambient temperatures. LED light sources are the most progressive choice an agency can make, offering several benefits over standard HID light sources:

Dependable performance: As a solid state light source, LEDs are ruggedly shock and vibration resistant, and resilient to extreme temperatures.

Superior lumen maintenance: White LEDs feature excellent lumen maintenance over the life of the product, providing superior lumen maintenance, up to 60,000 hours of operation to 85% lumen maintenance, compared to HID light sources.

Exceptional heat dissipation qualities: All new design ensures proper heat management, effectively increasing luminaire longevity.

Optimum color temperature: Operating at 6000K, LEDs provide strikingly crisp illumination.

Enhanced light uniformity: Eliminates hot spots and minimizes eye adjustments when moving between dark and light areas.

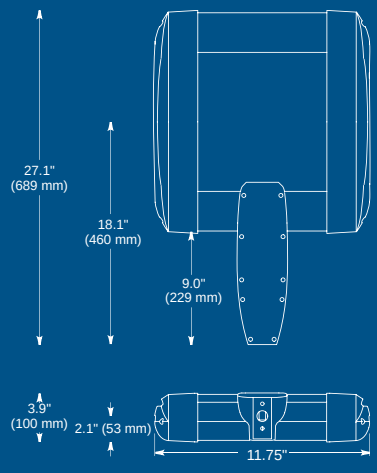
Instant, bright illumination: LED light sources require no warm-up time and provide instant re-strike.

Directional light source: Remarkably simple in design, LED lighting requires no reflectors, increasing efficiency and flexibility, and eliminating the challenges associated with dirt depreciation.

THE EDGE complies with IES full cutoff standards and International Dark-Sky Association guidelines, which encourage darker skies through lighting that creates less skyglow.

DIMENSIONS

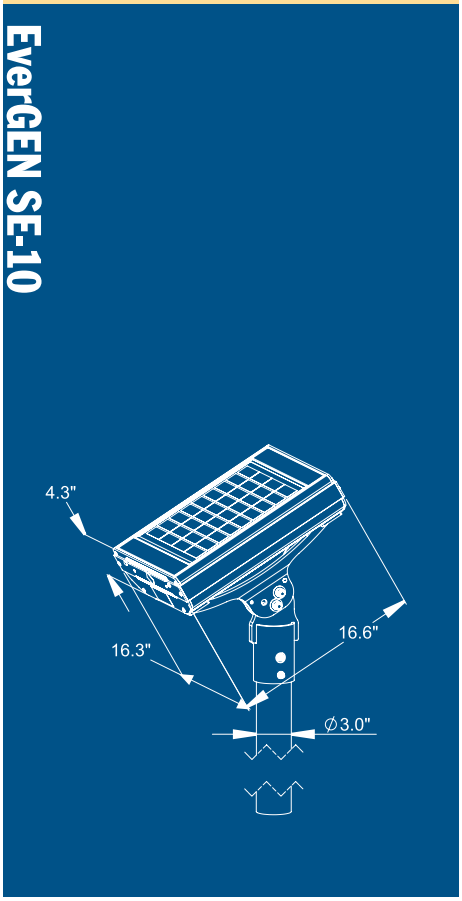
THE EDGE LED Luminaire



SPECIFICATIONS

AREA LIGHTING	
Illumination technology	Single light bar, 20 high-intensity light emitting diodes (LEDs) with NanoOptic secondary optics
Power consumption	2.5 to 20 W (variable based on light level and operating profile)
Photometric Options	IESNA Type II Short, Type II Long, Type III, Type V
Output color	6000K
Minimum color rendering index (CRI)	75
CONSTRUCTION	
Housing	Die-cast aluminum
Finish	Colorfast DeltaGuard finish
Hardware	Corrosion resistant
Mounting	Direct Mount
Ingress protection	IP 65 per IEC 529
Color	White

DIMENSIONS



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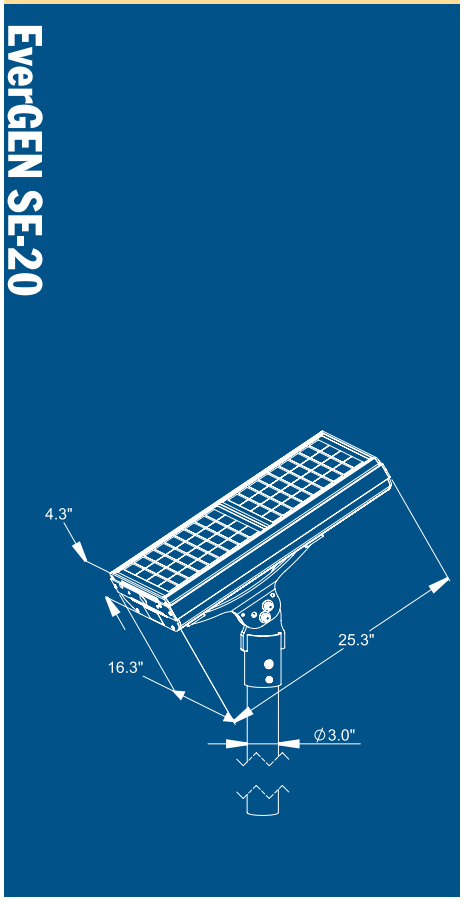

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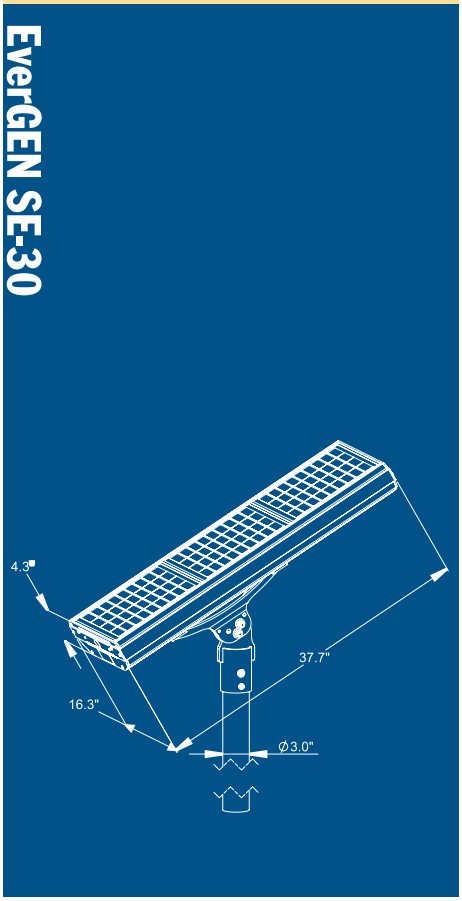
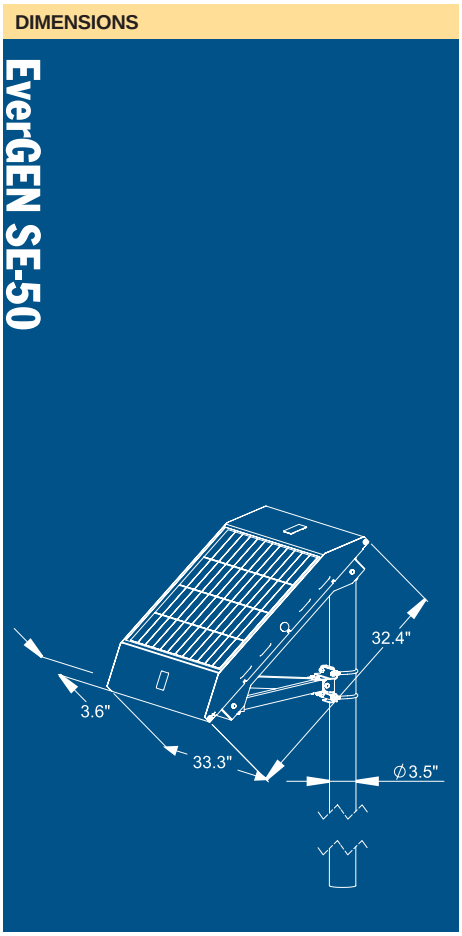


EVERGEN SE-10	
Mechanical	
Housing	Corrosion resistant aluminum
Support bracket	Hardened steel
Powder coated finish	White
Hardware	Stainless steel
Mounting angles	0º, 15º, 30º, 45º, 60º
Effective projected area*	1.67 ft² (0.16 m²)
Weight	41 lb (19 kg)
Pole diameter (Pole not Included)	3 in (7.62 cm)
Energy Management System	
Operating profile	Configurable (see operating profiles)
Power management	MICROSOURCE® code suite

EVERGEN SE-20	
Mechanical	
Housing	Corrosion resistant aluminum
Support bracket	Hardened steel
Powder coated finish	White
Hardware	Stainless steel
Mounting angles	0º, 15º, 30º, 45º, 60º
Effective projected area*	2.5 ft² (0.23 m²)
Weight	62 lb (28 kg)
Pole diameter (Pole not Included)	3 in (7.62 cm)
Energy Management System	
Operating profile	Configurable (see operating profiles)
Power management	MICROSOURCE® code suite

EVERGEN SE-30	
Mechanical	
Housing	Corrosion resistant aluminum
Support bracket	Hardened steel
Powder coated finish	White
Hardware	Stainless steel
Mounting angles	0º, 15º, 30º, 45º, 60º
Effective projected area*	3.72 ft² (0.35 m²)
Weight	84 lb (38 kg)
Pole diameter (Pole not Included)	3 in (7.62 cm)
Energy Management System	
Operating profile	Configurable (see operating profiles)
Power management	MICROSOURCE® code suite

DIMENSIONS



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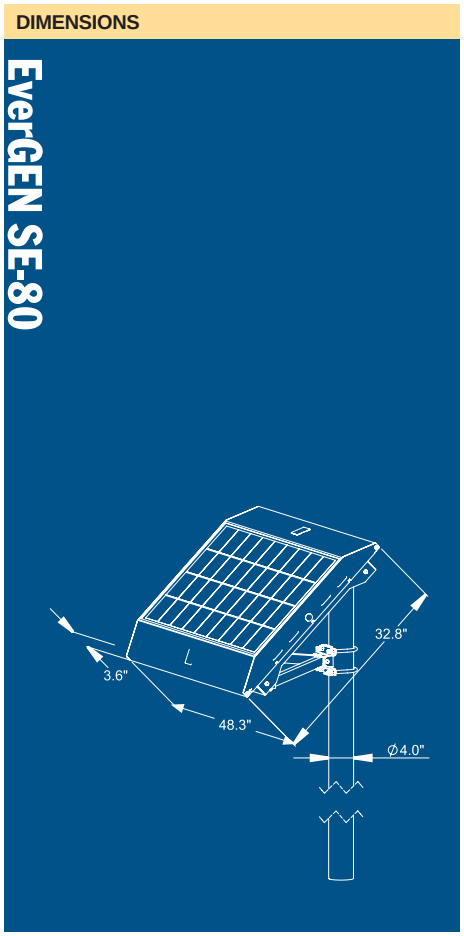


EVERGEN SE-50	
Mechanical	
Housing	Corrosion resistant aluminum
Support bracket	Hardened steel
Powder coated finish	White
Hardware	Stainless steel
Mounting angles	45º
Effective projected area*	5.28 ft² (0.49 m²)
Weight	121 lb (55 kg)
Pole diameter (Pole not Included)	3.5 in (8.75 cm) or 4.0 in (10cm)
Energy Management System	
Operating profile	Configurable (see operating profiles)
Power management	MICROSOURCE® code suite

EVERGEN SE-80	
Mechanical	
Housing	Corrosion resistant aluminum
Support bracket	Hardened steel
Powder coated finish	White
Hardware	Stainless steel
Mounting angles	45º
Effective projected area*	7.78 ft² (0.72 m²)
Weight	177 lb (80 kg)
Pole diameter (Pole not Included)	3.5 in (8.75 cm) or 4.0 in (10cm)
Energy Management System	
Operating profile	Configurable (see operating profiles)
Power management	MICROSOURCE® code suite

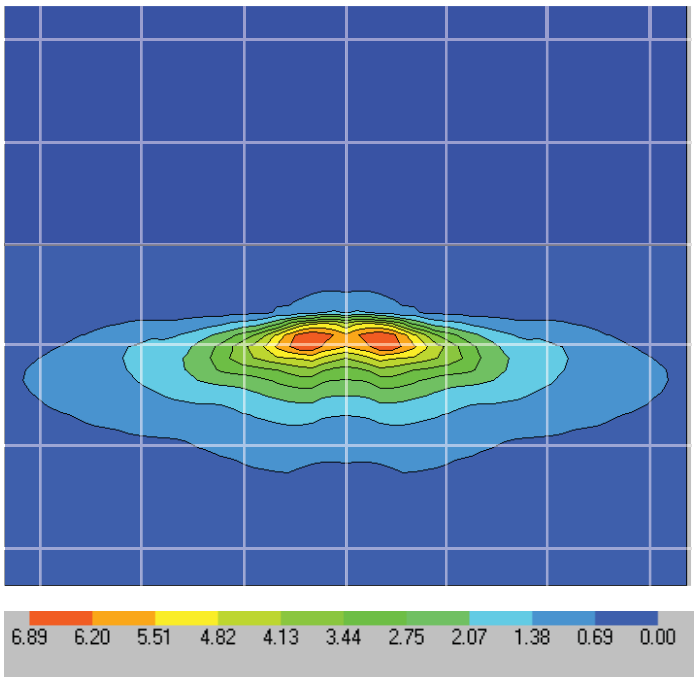
COMMON SPECIFICATIONS	
Environmental	
Ambient Operating temperature range	Standard: 23 to 95 °F (-5 to 35 °C)
	Extended: -4 to 122 °F (-20 to 50 °C)
Wind load	Steady wind speed not to exceed 110 mph (177 km/h)
Shock	10 g's
Vibration	1 Hz, 12" amplitude, 20 years
Other	Direct sunlight required

* EPA measured at steepest mounting angle

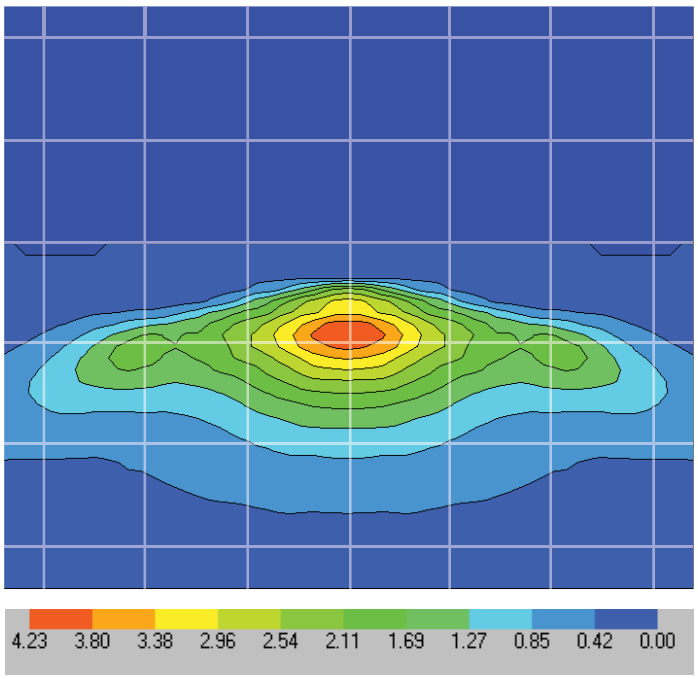
Photometric Plot

Photometric plots are based on 15' mounting height at light level 5. Use multiplier tables to adjust mounting height and light level.
Example: To determine footcandles (fc) values (in legend) for 4m mounting height at light level 2: multiply fc values by 1.3 then multiply by 0.37.
See system selection table p. 11 to determine solar engine size and light level (varies by geographic location).

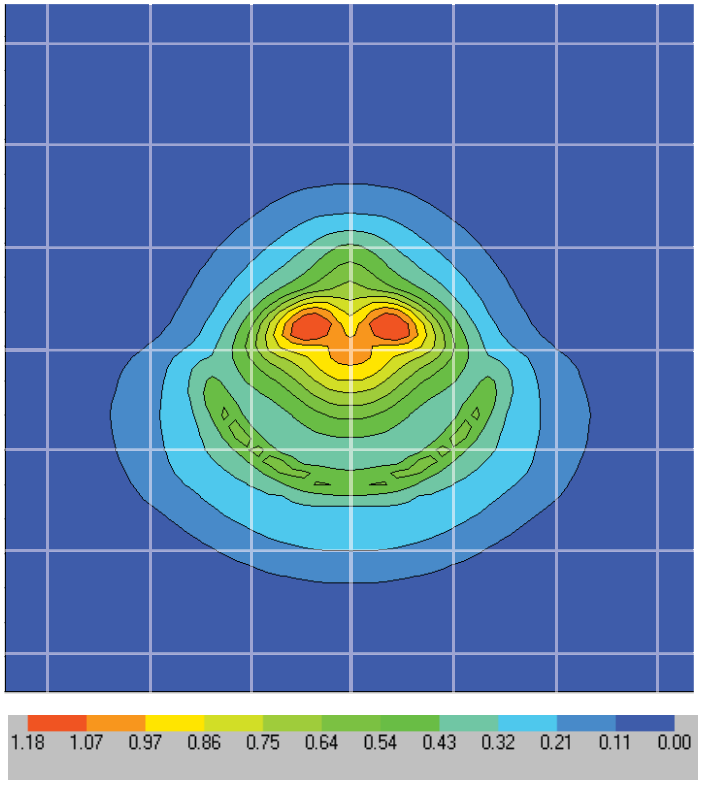
Type II Short



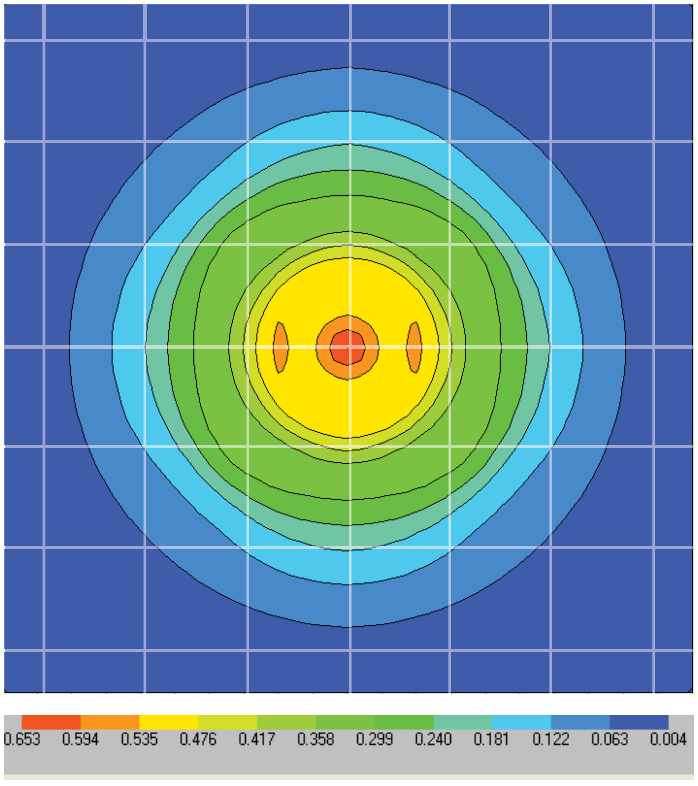
Type II Long



Type III



Type V



One grid space = one mounting height (1 MH)

System Selection

Directions:

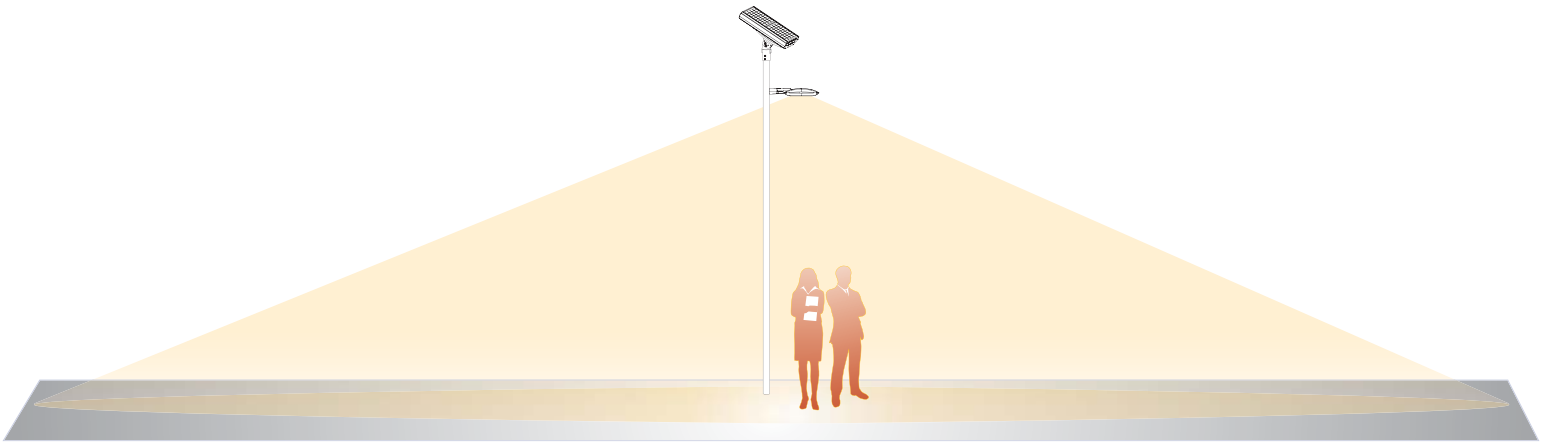
- Determine the required light level from photometric plots page 10.
- Use appropriate multipliers for MH levels.
- Based on location choose the system to meet the desired light level.
- If city is not listed or another operating profile is required contact your Carmanah representative.

Mounting Height		Multiplier
3m	9.8’	2.3
3.5m	11.5’	1.6
4m	13.1’	1.3
4.5m	15’	1.0
5m	16.4’	0.8
5.5m	18’	0.7
6m	19.7’	0.6

Light Level*	Multiplier
1	0.13
2	0.37
3	0.53
4	0.70
5	1.00

*Note: Actual light levels are determined based on real geographic location and operating profile.

		Solar Engine Size														
		EverGEN-10	EverGEN-20	EverGEN-30	EverGEN-50	EverGEN-80	EverGEN-10	EverGEN-20	EverGEN-30	EverGEN-50	EverGEN-80	EverGEN-10	EverGEN-20	EverGEN-30	EverGEN-50	EverGEN-80
	Operating Profile	5 - Dim - 2					Dusk +6					Dusk - Dawn				
North America	Atlanta	-	1	1	1	2	-	1	1	1	3	-	-	1	1	1
	Chicago	-	-	1	1	1	-	1	1	1	2	-	-	-	-	1
	Dallas	-	1	1	1	2	-	1	1	1	2	-	-	1	1	1
	Denver	-	1	1	1	2	-	1	1	1	2	-	-	-	-	1
	Los Angeles	1	1	2	2	3	1	1	2	2	4	-	1	1	1	2
	New York	-	1	1	1	2	-	1	1	2	3	-	-	1	1	1
	Orlando	1	1	2	2	4	1	2	2	3	4	-	1	1	1	2
	Phoenix	-	1	2	2	3	1	1	2	2	4	-	1	1	1	2
	San Francisco	-	1	1	1	2	-	1	2	2	3	-	-	1	1	1
	Seattle	-	-	1	1	1	-	1	1	1	2	-	-	-	-	1
	Toronto	-	-	1	1	1	-	1	1	1	1	-	-	-	-	1
	Nassau	1	1	2	2	3	1	2	3	3	4	-	1	1	1	2
	Mexico City	-	1	1	1	3	1	1	2	2	3	-	1	1	1	1
	Miami	1	1	2	2	4	1	2	2	3	4	-	1	1	1	2
	Operating Profile	5 - Dim - 2					Dusk +6					Dusk - Dawn				
Central & South America	Caracas	-	1	2	3	4	1	1	2	4	5	-	1	1	2	3
	Rio	-	1	1	1	2	-	1	1	1	2	-	-	1	1	1
	Lima	-	1	2	2	4	1	1	2	3	4	-	1	1	1	2
	Santiago	-	1	1	1	2	-	1	1	1	2	-	-	1	1	1
	Buenos Aires	-	1	1	1	3	1	1	2	2	3	-	-	1	1	1
	Operating Profile	5 - Dim - 2					Dusk +6					Dusk - Dawn				
Europe, Africa & Middle East	London	-	-	-	1	1	-	-	1	1	2	-	-	-	-	1
	Paris	-	-	-	1	1	-	-	1	1	2	-	-	-	-	1
	Madrid	-	1	1	1	3	-	1	1	2	3	-	-	1	1	1
	Berlin	-	-	-	1	2	-	-	-	1	2	-	-	-	-	1
	Baghdad	-	1	1	2	3	1	1	2	3	4	-	1	1	1	2
	Abhu Dhabi	1	1	2	3	4	1	2	3	3	5	-	1	1	1	3
	Casablanca	-	1	2	2	4	1	1	2	3	4	-	1	1	1	2
	Lagos	-	1	1	2	3	-	1	1	3	4	-	-	1	1	2
	Cape Town	-	1	2	2	4	1	1	2	3	4	-	1	1	1	2
	Operating Profile	5 - Dim - 2					Dusk +6					Dusk - Dawn				
South East Asia & Pacific	Singapore	-	1	1	2	3	-	1	1	2	4	-	-	1	1	2
	Taipei	-	1	1	1	2	-	1	1	1	2	-	-	1	1	1
	Tokyo	-	1	1	1	2	-	1	1	1	2	-	-	1	1	1
	Sydney	-	1	1	1	3	1	1	2	2	3	-	1	1	1	1
	Melbourne	-	1	1	2	3	-	1	1	3	4	-	-	1	1	2
	Auckland	-	1	1	2	4	1	1	2	3	5	-	-	1	1	2



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About Carmanah Technologies Corporation

As one of most trusted names in solar technology, Carmanah has earned a reputation for delivering strong and effective products for industrial applications worldwide. Industry proven to perform reliably in some of the world's harshest environments, Carmanah's LED lights and power systems provide a durable, dependable and cost effective energy alternative.

For more information on Carmanah solar technology, visit carmanahlighting.com.

About BetaLED

BetaLED, a brand of Beta Lighting, was established to dedicate resources to the emerging use of LED technology for general illumination. Beta Lighting, a Ruud Lighting company, provides the lighting industry with high quality, specification-grade luminaires for exterior lighting applications.

Headquartered in Racine, Wis., Ruud Lighting operates a 450,000-square-foot manufacturing facility and is ISO90001:2000 registered.

For additional exterior LED luminaire information, visit www.BetaLED.com.

Carmanah Technologies Corp.

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