

VERTEX® XSPM SOLAR LIGHTING SYSTEM

Stand-alone High Output LED Lighting System



Overview

Mission critical lighting for discerning organisations that value high reliability and performance.

Vertex® XSPM Solar Lighting Systems use industry standard high output LED luminaires mounted on an enlarged base fixed solar pole with the solar panel array attached at the top.

Vertex® XSPM Solar Lighting System Energy Management System (EMS) and Long-Life Advanced Carbon GEL Battery Systems are securely housed in the enlarged base of the pole behind steel locked access doors using *WISE ACTION*® compression latch locking mechanisms.

Vertex® XSPM Solar Lighting System offers the most flexibility of any solar lighting product on the market with various luminaire types, custom pole heights, scalable photovoltaic modules and multiple battery system configurations.

Vertex® XSPM Solar Lighting System is custom designed and built to suit application ensuring that your lighting project has a system designed to meet the exact project specification requirements.

Designed in Australia by Orca Solar Lighting

Performance Summary

Autonomy: Up to 7 Days (Subject to Location Requirements)

Lumen Output: Up to 7,000 Lumens

Luminaire Efficacy: Up to 150 LPW

Colour Rendering Index: Minimum 70 CRI

Colour Temperature: 3000K, 4000K

Warranty: 5 Year Limited Warranty with Performance Guarantee

Specification Selection Criteria							
Project Name:						Type/Label Reference:	
Configuration Code:							
Example: VRT-XSPM-1-6M-200-135Ah-25W-3ME-30K-BP1.8-HDG-D2D							
Product	Luminaire Arrangement	Pole Height	Nominal PV Array Size (W)	Battery System (V/Ah)	Luminaire Power Setting *	Optic Distribution	Luminaire Colour Temperature (CCT)
Vertex® [VRT-XSPM]	SINGLE [1] TWIN [2]	4m	200	12V 135Ah	58W [58W]	Type 3 Short [3SH]	3000K [30K]
		[4M]	[200]	[135Ah]	53W [53W]	Type 3 Medium [3ME]	4000K [40K]
	6m	300	12V 210Ah	48W [48W]	Type 4 Medium [4ME]		
	[6M]	[300]	[210Ah]	43W [43W]			
	8m	375	24V 135Ah	41W [41W]			
	[8M]	[375]	[135Ah]	35W [35W]			
		450	24V 210Ah	30W [30W]			
		[450]	[210Ah]	25W [25W]			
		Other []	Other []	20W [20W]			
Footing Type ^	Pole Finish	Power Profile +		Custom Options			
Bored Pier 1.8m (4-6m Poles) [BP1.8]	Galvanised [HDG] Powder Coat [PC_]	Dusk to Dawn [D2D]	2 Timers [2T_HR_ W- W]	Key Operated Momentary Switch [SWM] Backlight shield [BLS] Other []			
Bored Pier 2.2m (8m Poles) [BP2.2]		3 Timers [3T_HR_ W- W_HR_ W]	Other / Custom []	Notes			

* Power setting availability may be subject to location conditions. Please consult your sales representative for assistance on suitable power options to suit your project.

+ Power Profile setting availability may be subject to location conditions. Please consult your sales representative for assistance on suitable power profile options to suit your project.

^ Footing types are subject to site soil testing and engineered footing design. Please consult your sales consultant for advice on footing design options.

Power Profile Definitions:

Dusk to Dawn [D2D] – Runs the luminaire at static power level from dusk through to dawn

2 Timers [2T..] – Operates the luminaire from dusk for pre-set time frame at one power level, then runs the light at a second power setting for the remainder of the night (example: 5 hours at 40W, dim to 20W for the rest of the night)

3 Timers [3T..] – Operates the luminaire from dusk for pre-set time frame at one power level, then runs the light at a second power setting and then for a third timer and power level (example: 5 hours at 40W, dim to 20W, return to 40W prior to dawn).

Other [T..] – Orca Solar can program systems for dimming level and/or running time according to project requirements.

Please refer to Page 3 for more information on power profiles or consult your sales representative for assistance on suitable profile options to suit your project.

Vertex® Solar Lighting Systems are designed in accordance with AS 4509.2-2010 - Standalone Power Systems (System Sizing Reports available upon request). All products supplied by Orca Solar Lighting adhere to AS/NZS 4509, AS/NZS 5033, AS/NZS 5139 and AS/NZS 3000 electrical, battery and photovoltaic safety standards where applicable.

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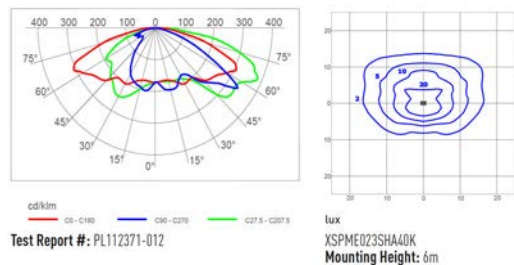


RECOMMENDED CREE® OUTDOOR LUMINAIRE LUMEN MAINTENANCE FACTORS (LMF)					
Ambient	Init. LMF	25k hr ²	50k hr ²	75k hr ³	100k hr ³
15°C	1.02	0.98	0.95	0.91	0.88
20°C	1.00	0.96	0.93	0.89	0.86
40°C	0.98	0.94	0.89	0.84	0.80

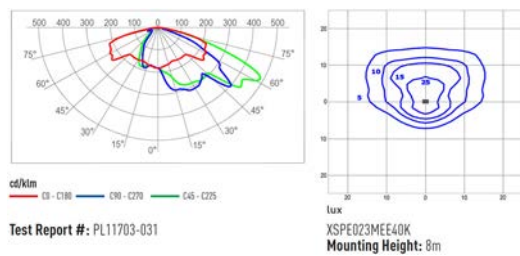
Lumen maintenance values at 25°C are calculated per TM-21 based on LM-80 data and in-situ luminaire testing.
² in accordance with IESNA TM-21-11, Projected Values represent interpolated value based on time durations that are within six times (6X) the IESNA LM-80-08 total test duration (in hours) for the device under testing (DUT) i.e. the packaged LED chip.
³ According with TM-21 the projected value can be just up to 6x the test time.

Performance Summary
 NanoOptic® Precision Delivery Grid™ Optics
Efficacy: Up to 155lm/W
Initial Colour Consistency: 4 MacAdam Steps

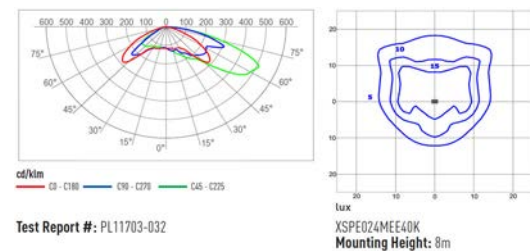
3SH



3ME



4ME



CONSTRUCTION AND MATERIALS

Die cast, low copper <0.1%, aluminium alloy housing for long weathering and reliability.

Luminaire is designed to mount directly to 76mm or 60mm outer dimension tenons or poles and can be tilted +/- 20°, in steps of 5° and mounts to 60mm OD tenons.

Exclusive Colourfast DeltaGuard® finish features an E-Coat epoxy primer with an ultra-durable powder topcoat, providing excellent resistance to corrosion, ultraviolet degradation, and abrasion.

FEATURES

- **Lumen output:** 4000 – 7,000lm
- **Efficacy:** Up to 150lm/W
- **CCT:** 3000K, 4000K
- **CRI:** 70 CRI
- **Initial Colour Consistency:** 4 MacAdam steps
- **Lifetime:** L90B10 up to 140,000 hrs Ta=25°C (According to IEC/ EN 62717 and IESNA TM-21) Calculated LM80 Report at 22,000 hours.
- **Operative temperature:** -40°C up to +50°C
- **Ingress protection rating:** IP66 per IEC 60529
- **Impact resistance rating:** IK08

CREE LIGHTING

XSP High Output Series LED Luminaire



Designed from the ground up as a totally optimized LED street lighting system, XSPM maintains the familiar look of the traditional cobra-head design and delivers substantial energy savings while reducing maintenance time and costs.

Equipped with NanoOptic® Precision Delivery Grid™ optics, XSPM achieves better optical control than traditional street lighting fixtures and efficiently delivers white uniform light for safer-feeling communities.

The luminaire is designed to mount directly to 76mm or 60mm outer dimension tenons or poles with a specific spigot (adjustable arm).

Applications: Roadways, Parking Lots, Walkways and General Area Spaces.

TYPE III SHORT DISTRIBUTION

Input Power (Watts)	3000K	4000K
	Nominal Lumen Output	Nominal Lumen Output
58	6,341	6,676
53	5,922	6,234
48	5,503	5,793
43	4,980	5,242
41	4,768	5,019
35	4,186	4,407
30	3,596	3,785
25	2,976	3,134
20	2,382	2,508

Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -10 and +10% of initial delivered lumens

TYPE III MEDIUM DISTRIBUTION

Input Power (Watts)	3000K	4000K
	Nominal Lumen Output	Nominal Lumen Output
58	6,560	6,906
53	6,126	6,449
48	5,693	5,993
43	5,152	5,423
41	4,932	5,192
35	4,330	4,559
30	3,720	3,916
25	3,079	3,242
20	2,464	2,594

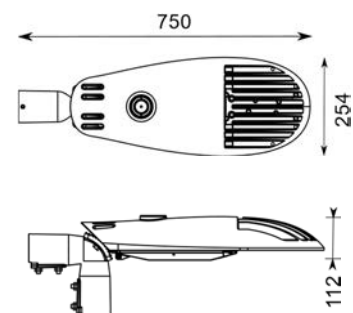
Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -10 and +10% of initial delivered lumens

TYPE IV MEDIUM DISTRIBUTION

Input Power (Watts)	3000K	4000K
	Nominal Lumen Output	Nominal Lumen Output
58	6,628	6,977
53	6,189	6,515
48	5,752	6,055
43	5,205	5,479
41	4,983	5,246
35	4,375	4,606
30	3,758	3,956
25	3,111	3,275
20	2,490	2,621

Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -10 and +10% of initial delivered lumens

WEIGHT AND MAXIMUM WIND AREA	
Weight:	Lateral Surface Wind Exposed:
7kg	0.08m ²



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Form and Function



Optimising Solar Collection

Vertex® XSPM Solar Lighting Systems feature pole-top mounted photovoltaic modules to enable full flexibility of orientation and tilt angle adjustment ensuring that regardless of which way the luminaire is aimed, solar collection will be optimal.

The full 360° orientation and 0-60° locking tilt adjustment allows the photovoltaic module to collect the optimal amount of energy with the photovoltaic facing North and tilted to the appropriate angle to suit the install location relative to the sun's tracking path.

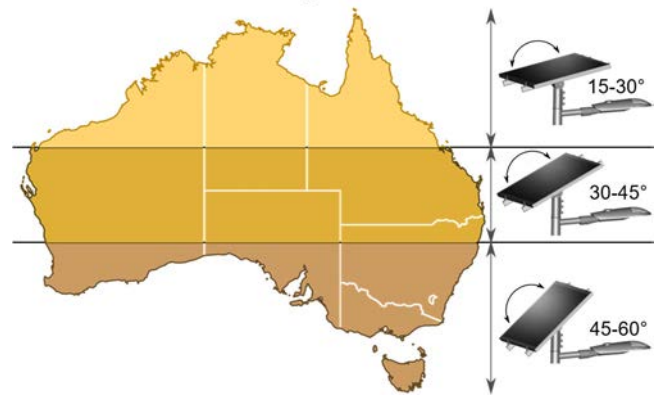
Vertex® XSPM Solar Lighting Systems photovoltaic modules are scaled sufficiently to match power load, site location conditions and minimum autonomy requirements.

Vertex® XSPM Solar Lighting Systems photovoltaic modules are supplied with 10 years warranty and a 25 year performance guarantee to a minimum 80% efficiency.



PV Tilt Angle:	
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PV Module Tilt Angle Guide - Australia

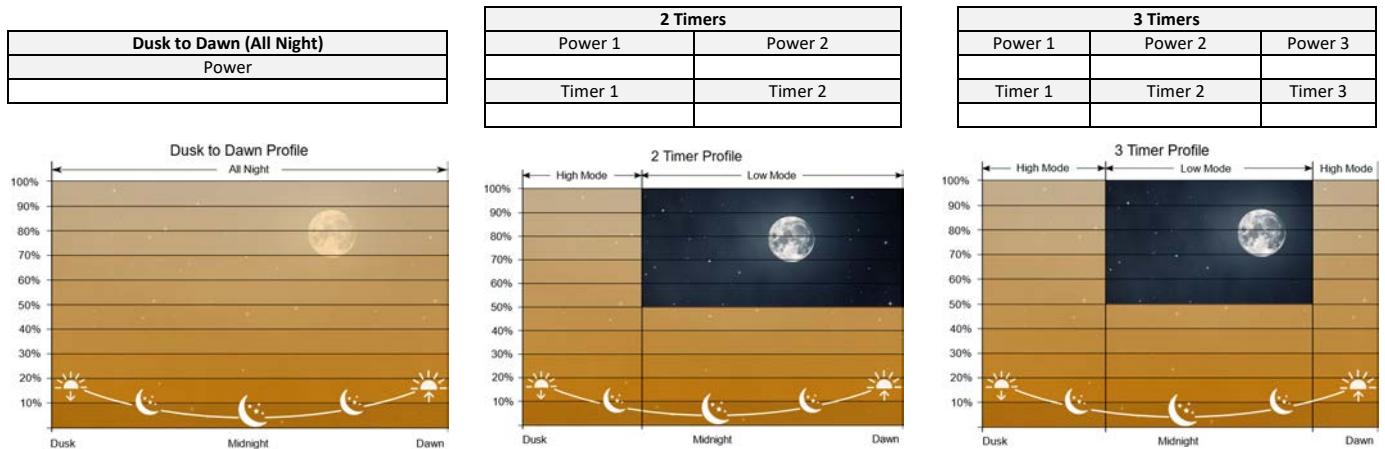


Power Profiles

Vertex® XSPM Solar Lighting Systems features advanced timer and power profiling capabilities which enable the user to set power profile modes and timers to best suit the application.

Power profiles offer the ability to control the lighting so that high light levels can be applied when needed and reduced low light levels when not needed.

This functionality assists with offering higher light output settings to meet standards requirements while assisting to reduce light pollution and meet obtrusive light limitations during curfew hours (AS/NZS 4282). Power profiles can also assist in meeting International Dark Sky Association recommendations by reducing unwanted light in ecological effected areas.



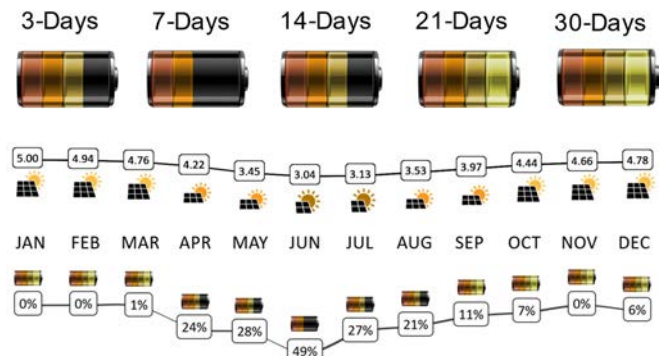
Autonomy (Battery Backup)

Vertex® XSPM Solar Lighting Systems are custom designed utilising NASA solar radiation and weather pattern data for the specified location to ensure year-round performance.

Vertex® XSPM Solar Lighting Systems are designed in accordance with the methodologies of AS/NZS 4509.2-2010 to ensure the photovoltaic module is adequately sized and the discharge continuity of the battery system is balanced year-round.

This process ensures extended life of the premium battery systems used in Vertex® XSPM Solar Lighting System.

Site based calculation reports can be supplied upon request to verify solar and battery system sufficiency.



*Example for illustrative purposes only – Autonomy calculations are subject to location conditions.

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Energy Management

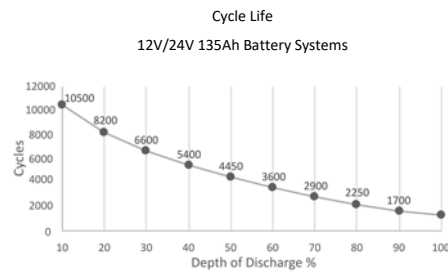
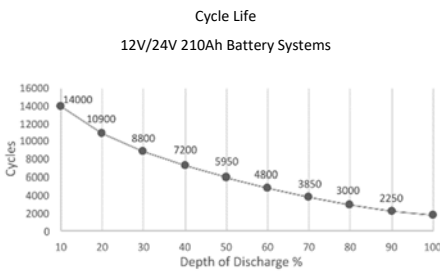
Premium Solar Cycling Battery Systems

Vertex® XSPM Solar Lighting System utilises premium long life SunGEL Ultra batteries specifically designed for solar cycling applications with Advanced Carbon and Catalyst technologies.

Vertex® XSPM Solar Lighting System battery systems are sized and quantified specific to location conditions and autonomy requirements in accordance with AS 4509.2 and AS/NZS 5139.

SunGEL Ultra batteries are Designed in Australia and manufactured with high quality components to suit harsh conditions and can operate in -20 - +55°C operating temperatures.

SunGEL Battery systems have a 20 Year design life under 25°C operating temperature conditions and are supplied with an initial 5 Year limited replacement warranty and an additional 5 Year replacement Pro-Rate warranty (Subject to terms and conditions - available upon request).



Energy Management Systems:

Solar Charge Controller

High Efficiency, Advanced MPPT (maximum power point tracking) with short circuit and over current protection. Minimum efficiency of 99.5% and automatic limit function of maximum photovoltaic input power, ensuring no overload under any circumstance.

LED Driver and Drive Controller

Wide input voltage and high precision constant current control with linear PWM duty cycle dimming control. Minimum 92% efficiency under -40-65° ambient conditions Four function drive control with pre-set dimming level and timeframe programming including autonomous power adjustment synced to battery voltage and ambient temperature conditions.

DC Rated Switchgear and Mounting Panel:

Miniature Circuit Breaker (MCB) DIN Rail mounted safety switches fitted to a fire-retardant mounting panel. Vertex® Energy Management Systems are designed and assembled in Australia conforming to all relevant Australian standards including AS/NZS 3000 Wiring Rules, AS/NZS 5033 PV Array Installation and Safety Standards, AS/NZ 5139 Safety of Battery Systems, and AS/NZS 4509.2-2010 standalone power systems design standards.

Vertex® XSPM Solar Lighting System Energy Management Systems and their components are supplied pre-assembled and pre-configured with a 5 Year limited warranty.

Vertex® Enlarged Base Solar Light Poles:

Vertex® XSPM Solar Lighting Systems use custom designed HDG steel enlarged base solar poles. The enlarged base section of the pole securely houses the Vertex® Energy Management System and battery systems using Southco® VISE ACTION® stainless steel security locks on all access doors.

The enlarged base section is designed to ensure sufficient ventilation to the batteries and Energy Management System components. Having the battery and Energy Management System located in the base of the pole makes installation, maintenance, and component replacement quick and easy.

Vertex® XSPM Solar Lighting System HDG steel enlarged base solar poles and foundation cages are designed in accordance with AS/NZS 4100, AS/NZS 3679, AS/NZS 1163 and AS/NZS 1154.

Battery systems are safely and securely placed on weight rated shelves above the Vertex® Energy Management System which is fixed to a purpose-built mounting bracket positioned for easy access during installation and maintenance.

Vertex® XSPM Solar Lighting System HDG steel enlarged base solar poles are supplied with a 10 Year warranty (powder coat finish warranties vary depending on site conditions, consult Orca Solar Lighting for clarification).



VISE ACTION® Compression Latches by Southco®



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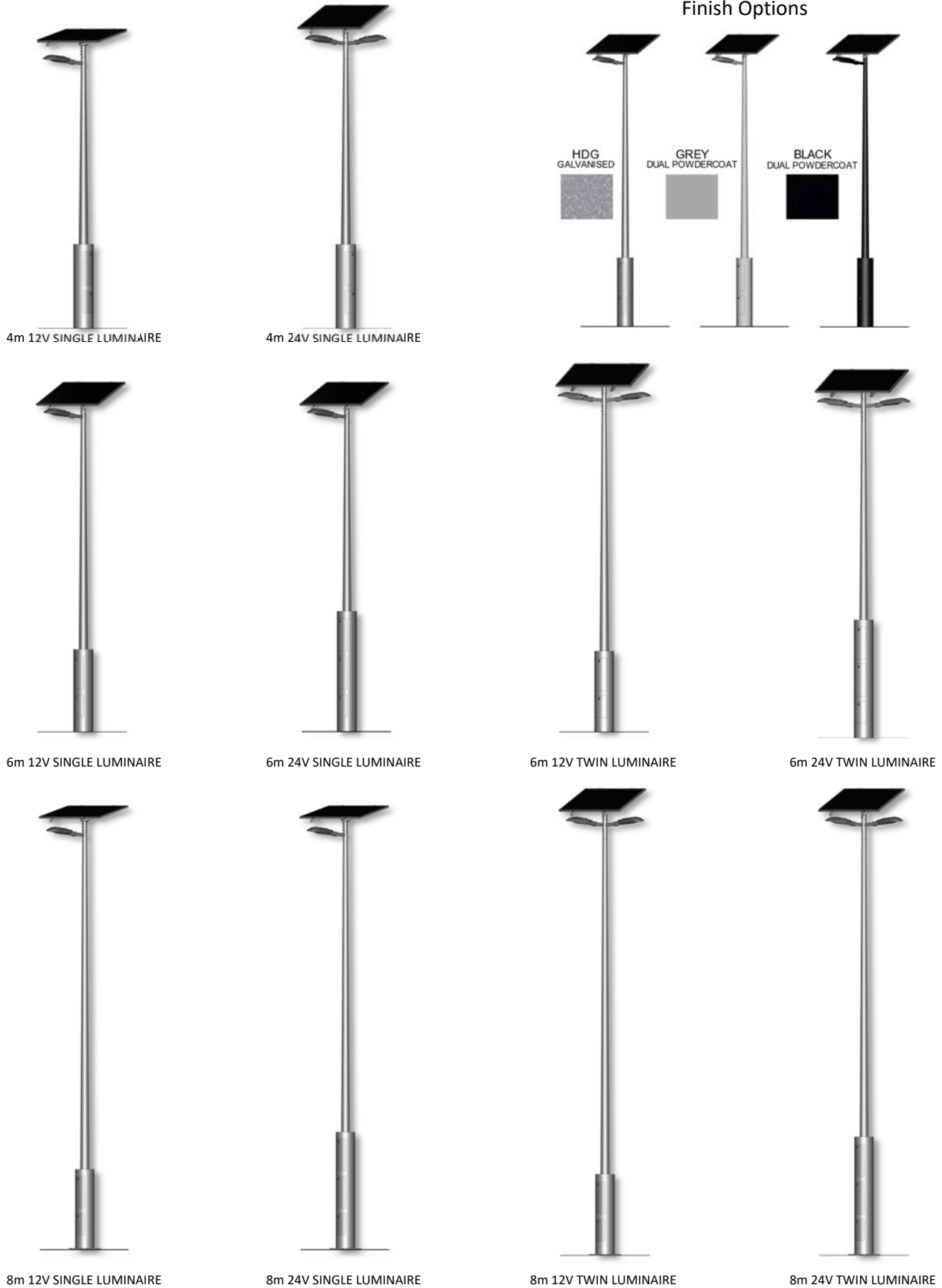


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Configuration Options



NOTE: Additional configuration options may be available, subject to project location and engineering.

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Electrical and Mechanical Specifications

Luminaire (Cree XSPM LED Package)			
LED Type	Cree® XLamp® MD-A		
LED Current	1,500mA (Maximum)	225mA (Minimum)	
LED Power	58W (Maximum)	9W (Minimum)	
LED Lifespan	L90B10 > 140,000hrs at 25°C T ³ (TM-21-2011 @ 22,000 Hrs on LM80 report)		
Lumen Output Range	Maximum Power Setting		Minimum Power Setting
	6,628 (3000K)	6,977 (4000K)	1,051 (3000K) / 1,113 (4000K)
Correlated Colour Temp. (CCT)	3000K / 4000K		
Colour Rendering Index (CRI)	70+ CRI		
Optics / Distribution Type	Type 3 Short, Type 3 Medium or Type 4 Medium (IESNA)		
Optical Material	Optical Grade Acrylic PMMA		
Operating Temperature Range	-40°C to +50°C		
Standards Compliance and Testing	Luminaire Body: AS 1874 (Aluminium) – ISO 12944-5:2007 (Paint Finishes) and ISO 9227 (Corrosion), IEC 60529 (Ingress Protection) LM80-08-2008, IES TM-21-2011 & IEC/EN62717, NATA ISO/IEC 17025 (Photometric).		

Photovoltaic / Solar Engine (STC)				
Nominal PV Array Size	200W	300W	375W	450W
Cell Type	Monocrystalline with 3.2mm Tempered Glass			
Cell Count	72	60	72	144
Rated Power Output (Pmax)	205W	290W	375W	455W
Power Tolerance	+/- 3%			
Max. Power Voltage (Vmp)	38.38V	32.14V	39.0V	41.7V
Open Circuit Voltage (Voc)	45.86V	39.37V	47.8V	49.5V
Short Circuit Current (Isc)	5.72A	9.51A	10.14A	11.66A
Max Power Current (Imp)	5.38A	9.03A	9.62A	10.92A
PV Module Dimensions	1,580mm x 808mm x 35mm	1,658mm x 1,002mm x 35mm	1,960mm x 992mm x 40mm	2,094mm x 1,038mm x 35mm
Standards Compliance and Testing	IEC 61730 (Photovoltaic Module Safety), IEC 61215 (Photovoltaic Modules Design)			

Battery Systems (GEL)				
Battery System Size	12V 135Ah	12V 210Ah	24V 135Ah	24V 210Ah
Chemistry Type	Advanced Carbon GEL			
Rated Capacity Wh	1,620Wh	2,520Wh	3,240Wh	5,040Wh
Rated Capacity Ah	135 Ah (C120)	210 Ah (C120)	135 Ah (C120)	210 Ah (C120)
Rated Voltage	12V	12V	24V	24V
Cell Quantity	1 x 12V Series	2 x 6V Series	2 x 12V Series	4 x 6V Series
Cell Dimensions	394mm x 125mm x 297mm	276mm x 184mm x 265mm	394mm x 125mm x 297mm	276mm x 184mm x 265mm
Cell Unit Weight	38kg	32kg	38kg	32kg
Operating Temperature Range	-20°C to +55°C			
Rated Depth of Discharge (DoD)	50%			
Rated Cycle Life @ 0.2C	4,450 Cycles (C120) 50% DoD	5,950 Cycles (C120) 50% DoD	4,450 Cycles (C120) 50% DoD	5,950 Cycles (C120) 50% DoD
Standards Compliance	AS/NZS 4029.2-2010, AS 4086.1, IEC 60896 21 & 22, IEC 896.2			

Electrical and Control	
Controller Type	Multi-Power Point Tracking (MPPT) with Step-up LED driver
System Voltage	12VDC / 24VDC
Max. Input Voltage	120V
Max. Charge Current	20A
Load Conversion Efficiency	+/- 96%
Load Current Accuracy	≥ 3%
Max. Load Power	50W / 100W
Max. Output Current	3300mA
Load Voltage Range	(Input Voltage +2V) - 60V
Operating Temperature Range	-35°C to +55°C
Smart City Compatibility	LoRaWAN, Zigbee or NB-IoT (via. Modbus) – Additional components required.
Remote Control	2.4Ghz WIFI Remote Control (Parameter Setting and Diagnostic Reporting) *Subject to Model
Standards Compliance and Testing	CE, RoHS (Restriction of Hazardous Substances), EN 61000-6 (Electromagnetic Compatibility / EMC), IEC 62109-1 (Safety of Power Converters), IEC 60529 (Ingress Protection), EN 60590 (Safety of Information Technology Equipment).

Poles	
Material	Hot Dip Galvanized Steel (dual powder coat or marine finishes optional)
Height Options	4m, 6m, 8m (custom heights and hinge pole options available upon request)
Foundation Bolt Arrangement	4m / 6m High
	8m High
Spigot Size	4 x M20 x 280mm P.C.D.
	4 x M24 x 500mm P.C.D.
Spigot Size	Solar/PV Array
	Luminaire Outreach
Standards Compliance and Testing	AS/NZS 1170 (Structural Design Actions), AS/NZS 4100 (Steel Structures), AS/NZS 4600 (Cold-Formed Steel Structures).
	Wind Rating

Vertex® XSPM Solar Lighting System is designed in accordance with AS/NZS 4509.2-2010 – Stand-alone Power Systems (system sizing reports are available upon request).

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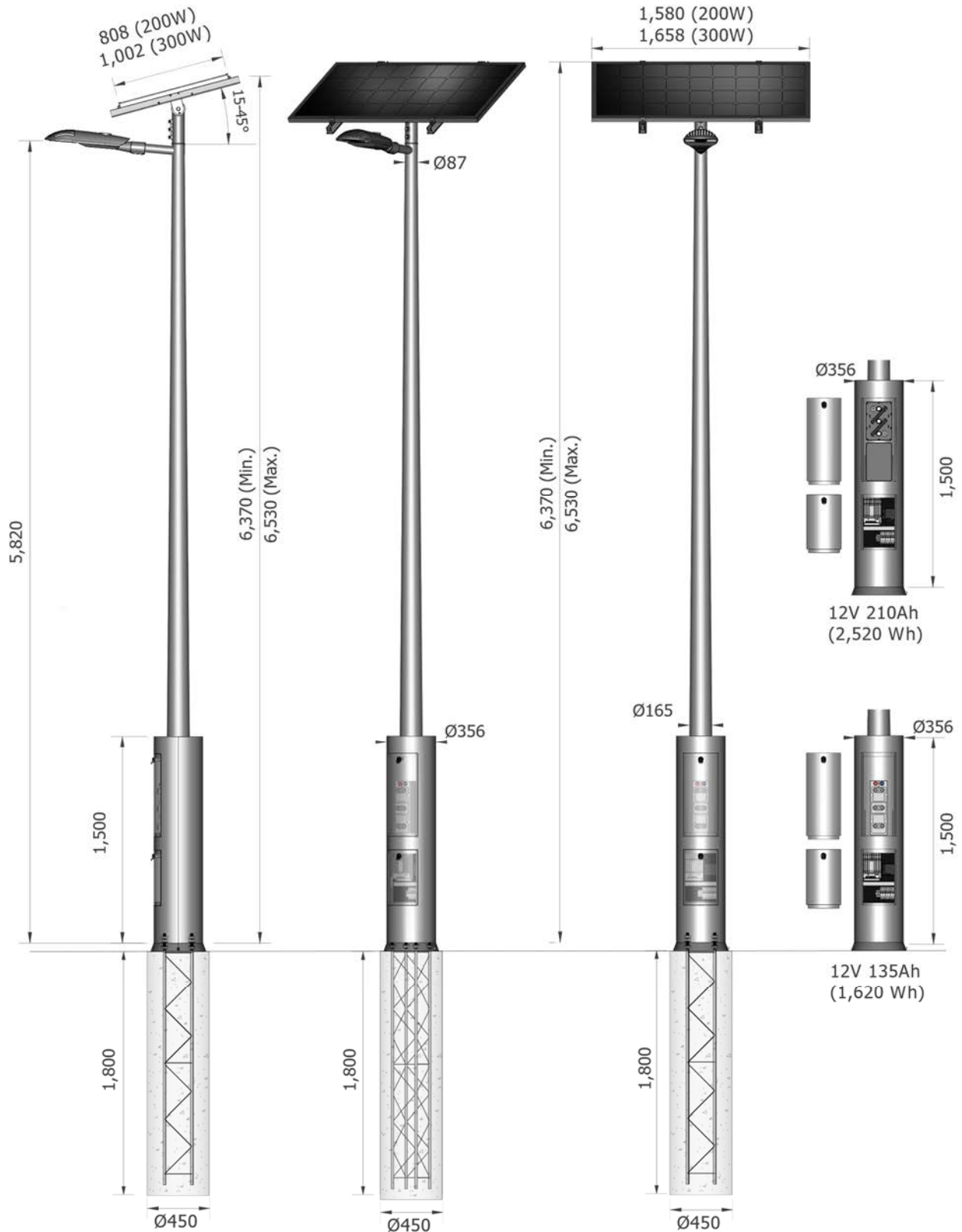


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General Arrangement Detail (Vertex 6m 12V)



NOTICE:

Footings options are detailed for indication purposes only, subject to final design and analysis of footings based on actual site soil conditions and engineering certification by a qualified geotechnical and structural engineer.

All foundations should only be installed by suitably qualified persons.

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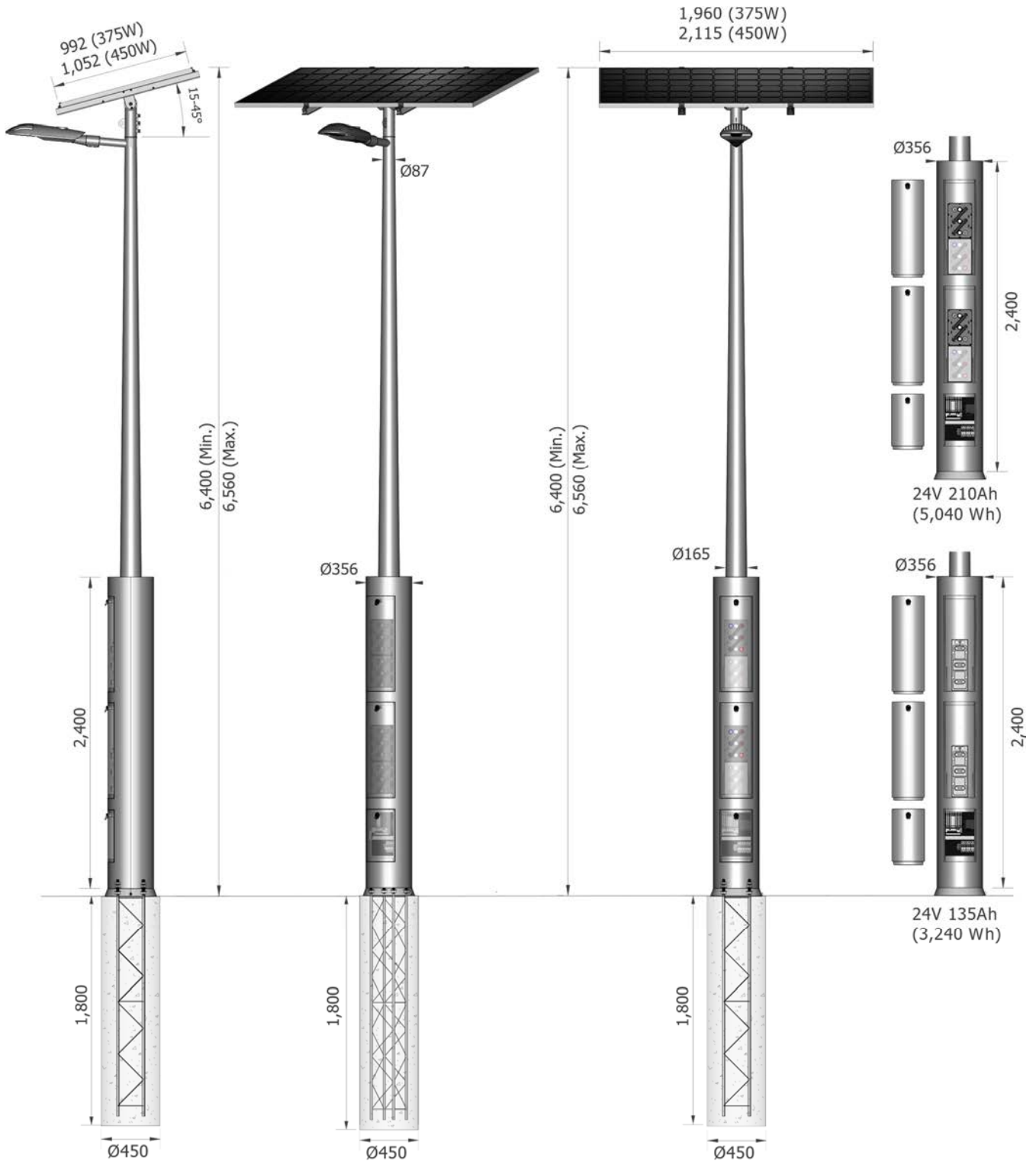


VERTEX® XSPM SOLAR LIGHTING SYSTEM

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General Arrangement Detail (Vertex 6m 24V)



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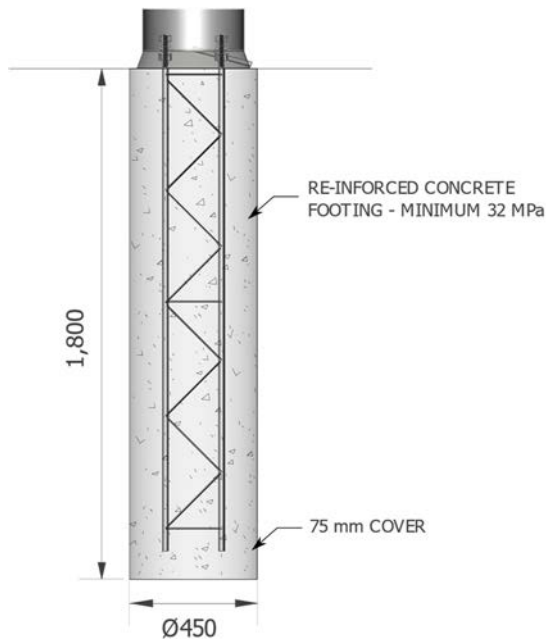
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Footing Options



Bored Pier Footings – 4m to 6m High Vertex Solar Light Poles.

BP1.8 – Suitable for Wind Regions A, B and C (Subject to Location and Soil Conditions).



Depth: 1,800mm
Diameter: \varnothing 450mm
Foundation Bolts: 4 x M20 x 280mm P.C.D.
Steel Reinforcing: 4 – N20
Bending Moment: 29.8kNm *
Shear Force: 5.6kN *
Pole Weight: 150kg (6m High 12V)
Soil Bearing Capacity: 150kPa

* Bending moment and shear force are expressed in Ultimate Limit State terms and are preliminary only, subject to a final design.

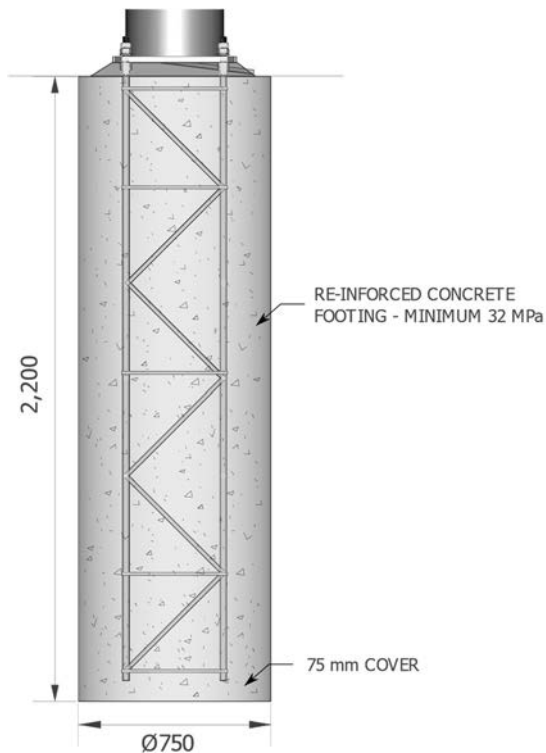
NOTICE:

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Bored Pier Footings – 8m High Vertex Solar Light Poles.

BP2.2 – Suitable for Wind Regions A, B and C (Subject to Location and Soil Conditions).



Depth: 2,200mm
Diameter: \varnothing 750mm
Foundation Bolts: 4 x M24 x 500mm P.C.D.
Steel Reinforcing: 4 – N24
Bending Moment: 48.4kNm *
Shear Force: 5.5kN *
Pole Weight: 250kg (8m High 24V)
Soil Bearing Capacity: 150kPa

* Bending moment and shear force are expressed in Ultimate Limit State terms and are preliminary only, subject to a final design.

NOTICE:

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