

VERTEX® SL UNO SOLAR LIGHTING SYSTEM

Stand-alone High Output LED Lighting System



Product Overview

Mission critical lighting for discerning organisations that value reliability & performance.

Vertex® SL UNO Solar Lighting Systems are designed and built specifically for AS/NZS 1158.3.1 Pedestrian category lighting applications.

Utilizing the high output Cree UNO LED luminaire mounted on a slimline 180mm OD enlarged base solar pole with the solar panel array attached at the top.

The LiFePO4 battery pack and Energy Management System (EMS) with MPPT Charge Controller and LED Driver are securely concealed within the enlarged base section of the pole behind steel locked doors using Riv-Lok® Friction Drive Security Fixings for easier maintenance access.

Performance Summary

Designed in Australia by Orca Solar Lighting

Autonomy: Up to 5 Days (subject to location requirements)

Battery Capacity: 76Ah 12.8V (973 Wh)

PV Module: 150W Monocrystalline

Lumen Output: Up to 4,000 Lumens

Luminaire Efficacy: Up to 160 LPW

Colour Rendering Index: Minimum 70 CRI

Colour Temperature: 2700K/3000K/4000K

Warranty: 5 Year Limited Warranty with Performance Guarantee

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Specification Criteria

Project Name:		Type/Label Reference:	
Configuration Code:			

Example: VSL-UNO-6M-16W-3SH-30K-BP1.8-PCGY-D2D

Product	Pole Height	Power Profile *	Optic Distribution	Colour Temperature (CCT)	Footing Type ^	Finish	Power Profile +
Vertex® SL UNO [VSL-UNO]	6m [6M]	28W [28W] 25W [25W] 19W [19W] 15W [15W] 12W [12W] 10W [10W] 8W [8W]	150 Wide Street (T3S) 200 Extra Wide Street (T4S) SCP Street & Cycle Path (T2S) ARS RotoSymmetric Area AFN Area Flood Narrow K07 Narrow Street	2700K [27K] 3000K [30K] 4000K [40K]	Bored Pier Footing [BP1.8] Surefoot (Concrete-Free) [SF400] Other/Custom []	Powder Coat Black [PCBK]	Dusk-Dawn [D2D] 2 Timers [2T_HR_W-_HR_W] 3 Timers [3T_HR_W-_W-_HR_W] Other / Custom [T_W-_]

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.

~Option may only be available as a special order and may incur additional lead time for delivery and may be subject to minimum order quantities.

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 25W, dim to 9W 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: 2 hours at 25W, dim to 9W, return to 25W 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 4 for more information on power profiles or consult your sales representative for assistance on suitable profile options to suit your project.

Vertex® SL Solar Lighting Systems are designed in accordance with AS/NZS 4509.2:2010 – Stand-alone 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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LMF LUXEON - RECOMMENDED LUMEN MAINTENANCE FACTORS (LMF) ¹					
Ambient	LMF iniziale	25K hr Projected ² LMF	50K hr Projected ² LMF	75K hr Calculated ³ LMF	100K hr Calculated ³ LMF
25°C	1	0,97	0,94	0,92	0,90

LMF DURIS - RECOMMENDED LUMEN MAINTENANCE FACTORS (LMF) ¹					
Ambient	LMF iniziale	25K hr Projected ² LMF	50K hr Projected ² LMF	75K hr Calculated ³ LMF	100K hr Calculated ³ LMF
25°C	1	0,99	0,98	0,98	0,97

¹ Lumen maintenance values calculated at 25° C, with TM-21 based on LM-80 data and on-site testing.

² In accordance with IESNA TM-21-11, the values shown in the "projected" column represent interpolated and arc values within six times (6X) total duration in hours of the tests (performed according to IESNA LM-80-08) to which the device has been subjected ((DUT) e.g. the LED chip).

³ In accordance with IESNA TM-21-11, the values shown in the column "calculated" are calculated based on a time span greater than six times (6X) the total duration in hours of the tests (performed according to IESNA LM-80-08) to which the device has been subjected ((DUT) e.g. the LED chip).

CREE LIGHTING Energy UNO LED Luminaire

Designed as a complete street lighting system and optimized for LED light sources, it is distinguished by its extraordinary efficiency. Energy UNO provides the best lighting solution. Developed with three product sizes, four lumens package per size, a complete optical range, flux adjustment options and a wide range of light sources together with a comprehensive optical range, stand-alone flow control options and Zhaga connectivity. Energy can be mounted on a pole or bracket with an adjustability of 20° and with 5° increments. Adjustments can be done from outside without having to open the product cover **Applications:** Urban and internal roads, pedestrian walkways and car parks.

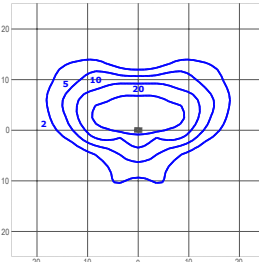
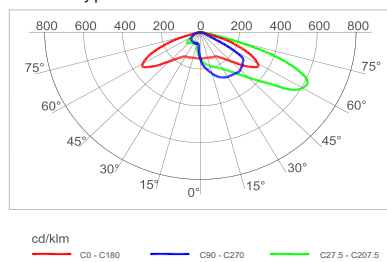


Performance Summary

Efficacy: Up to 160Lm/W

Initial Colour Consistency: 4 MacAdam Steps

150 - Type III Short



Test Report #: 1088-QL21-S03

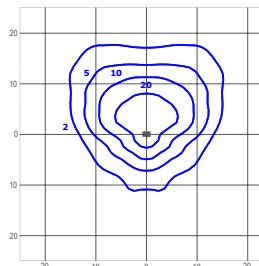
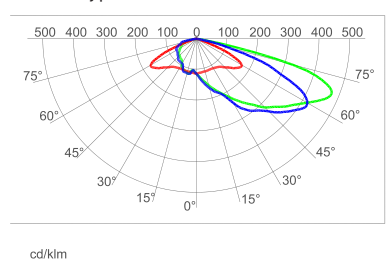
TRSA-2-150-8L-407
Mounting Height: 6m

LUMEN OUTPUT - 150 (Type III Short)

Lumen Package	2700K	3000K	4000K
	Initial Delivered Lumens*	Initial Delivered Lumens*	Initial Delivered Lumens*
2L	1590	1625	1912
4L	3219	3289	3871
6L	4901	5006	5893
8L	6452	6591	7758

* Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -4 and +10% of initial delivered lumens

200 - Type II Short



Test Report #: 1088-QL20-S05

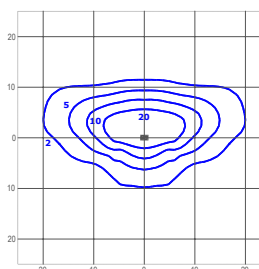
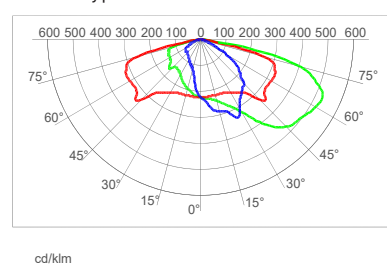
TRSA-2-200-8L-407
Mounting Height: 6m

LUMEN OUTPUT - 200 (Type II Short)

Lumen Package	2700K	3000K	4000K
	Initial Delivered Lumens*	Initial Delivered Lumens*	Initial Delivered Lumens*
2L	1439	1629	1809
4L	2913	3299	3662
6L	4435	5021	5575
8L	5838	6611	7340

* Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -4 and +10% of initial delivered lumens

SCP - Type II Short



Test Report #: 1088-QL20-R15

TRSA-2-SCP-8L-407
Mounting Height: 6m

LUMEN OUTPUT - SCP (Type II Short)

Lumen Package	2700K	3000K	4000K
	Initial Delivered Lumens*	Initial Delivered Lumens*	Initial Delivered Lumens*
2L	1400	1600	1800
4L	2900	3300	3650
6L	4400	5000	5550
8L	5820	6590	7317

* Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -4 and +10% of initial delivered lumens

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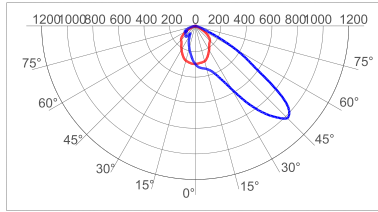
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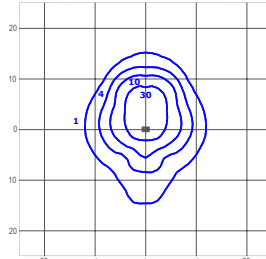
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AFN - Area Flood Narrow



cd/klm
C0 - C180 C90 - C270

Test Report #: 1088-QLZ1-S04

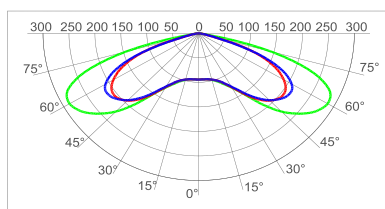


lux
TRSA-2-AFN-8L-407
Mounting Height: 6m

LUMEN OUTPUT - AFN (Area Flood Narrow)			
Lumen Package	2700K	3000K	4000K
	Initial Delivered Lumens*	Initial Delivered Lumens*	Initial Delivered Lumens*
2L	1463	1656	1839
4L	2961	3353	3723
6L	4508	5104	5667
8L	5935	6720	7461

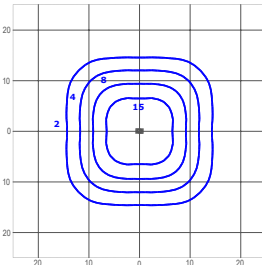
* Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -4 and +10% of initial delivered lumens

ARS - Roto-Symmetric Area



cd/klm
C0 - C180 C90 - C270 C135 - C315

Test Report #: 1088-QLZ1-S05

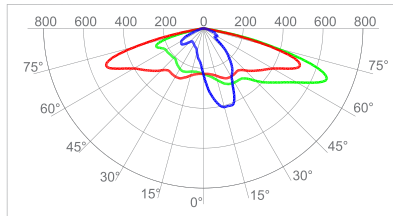


lux
TRSA-2-ARS-8L-407
Mounting Height: 6m

LUMEN OUTPUT - ARS (Roto-Symmetric Area)			
Lumen Package	2700K	3000K	4000K
	Initial Delivered Lumens*	Initial Delivered Lumens*	Initial Delivered Lumens*
2L	1475	1670	1854
4L	2986	3381	3754
6L	4546	5147	5715
8L	5985	6777	7524

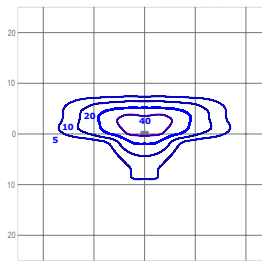
* Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -4 and +10% of initial delivered lumens

K07 - Narrow Street



cd/klm
C0 - C180 C90 - C270 C05 - C185

Test Report #: 1088-QLZ1-S05



lux
TRMA-2-K07-8L-407
Mounting Height: 6m

LUMEN OUTPUT - K07 (Narrow Street)			
Lumen Package	2700K	3000K	4000K
	Initial Delivered Lumens*	Initial Delivered Lumens*	Initial Delivered Lumens*
2L	1538	1742	1934
4L	3114	3526	3915
6L	4740	5367	5959
8L	6241	7067	7846

* Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -4 and +10% of initial delivered lumens

CONSTRUCTION AND MATERIALS

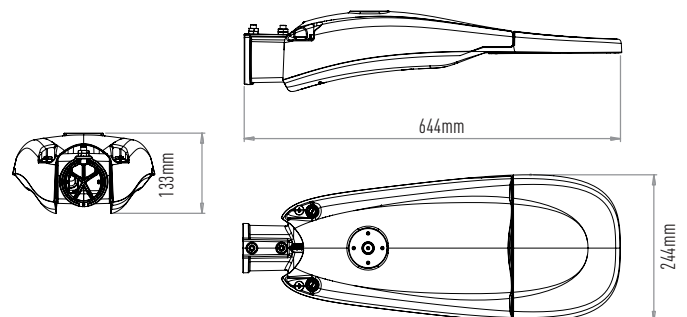
Die cast, low copper <0,1%, aluminium alloy housing for long weathering and reliability.

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.

FEATURES

- **Lumen output:** 4000 – 7,000lm
- **Efficacy:** Up to 160lm/W
- **CCT:** 2700K, 3000K, 4000K
- **CRI:** 70 CRI
- **Initial Colour Consistency:** 4 MacAdam steps
- **Operative temperature:** -40°C up to +50°C
- **Ingress protection rating:** IP66 per IEC 60529
- **Impact resistance rating** IK10

WEIGHT AND MAXIMUM WIND AREA	
Energy Uno weight:	Lateral Surface Wind Exposed:
6.5kg	0.08m ²



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Design Overview

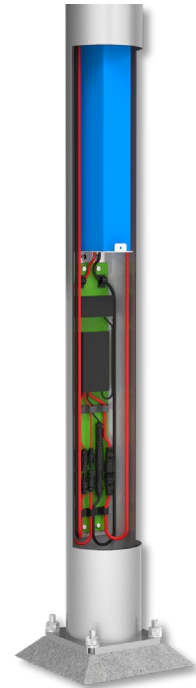
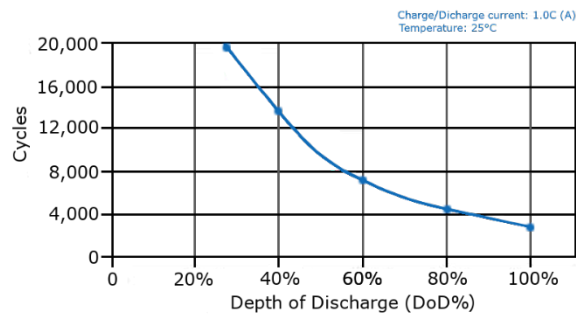
High Efficiency Multi-Directional Monocrystalline Photovoltaic Array

150W monocrystalline photovoltaic panel with a 25 year performance guarantee to 80% efficiency. With an architecturally designed E-Coat dual powder-coat bevelled aluminium extrusion frame, backing plate.

Premium Solar Cycling LiFePO4 Batteries

Vertex® SL UNO Solar Lighting Systems utilises premium long life LiFePO4 973 Wh (76Ah 12.8V) Lithium batteries specifically designed for solar cycling applications.

Vertex® SL UNO Solar Lighting Systems are sized and quantified specific to location conditions and autonomy requirements in accordance with AS/NZS 4509.2-2010



Slimline Enlarged Base Solar Light Poles

Vertex® SL UNO Solar Lighting System poles feature a slimline 180 mm OD cylindrical base section to securely conceal the Vertex® Energy Management System and LiFePO4 Lithium battery pack.

Vertex® SL UNO Solar Lighting System LiFePO4 battery pack is discretely positioned in a storage chamber above the Energy Management System mounting panel within the base section and securely locked into position on a shelf fixed using patented RivLok® security fixings to prevent unauthorised removal.

All electronic components forming the Energy Management System plus battery pack are conveniently positioned in the base of the pole for ease of maintenance while remaining securely stored using a steel door with patented RivLok® security fixings.



Energy Management System

Vertex® SL UNO Solar Lighting System Energy Management System uses premium high efficiency MPPT (maximum power point tracking) solar charge controllers with Integrated LED Drivers that enable programmable power profile setting and multi-stage time scheduling

All components of the Vertex® SL UNO Solar Lighting Systems Energy Management System have a minimum ingress protection rating of IP67.

Compliance

Vertex® SL UNO Solar Lighting Systems are designed to provide a minimum of 30% solar panel oversupply co-efficient as an extra reliability measure in accordance with AS/NZS 4509.2-2010 (Australian standards for stand-alone power systems).

HDG (Hot Dipped Galvanised) steel poles and foundation cages designed in accordance with AS/NZS 4100, AS/NZS 3679, AS/NZS 1163 and AS/NZS 1154.

Vertex® SL UNO Solar Lighting System Energy Management System and LiFePO4 Battery pack are designed in accordance with AS/NZS 4509.2-2010 (Australian standards for stand-alone power systems).



RivLok® Friction Drive Security Fixings

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Form and Function

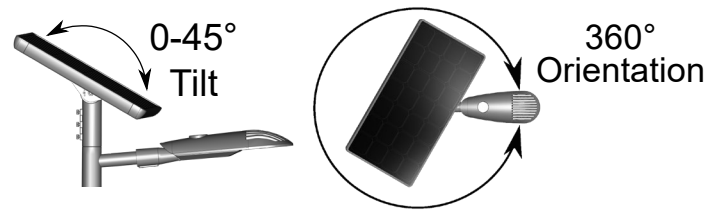
Optimising Solar Collection

Vertex® SL UNO 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 modules 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.

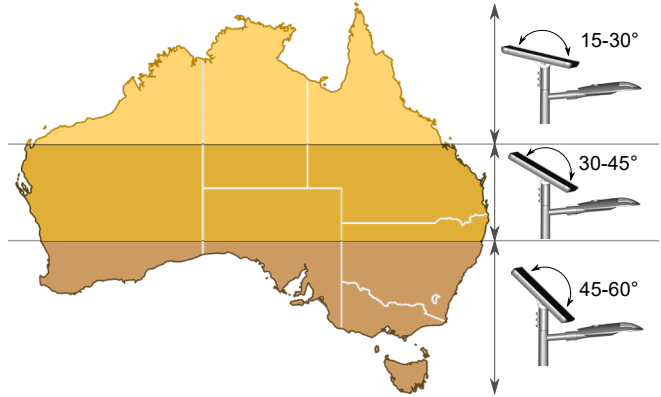
Vertex® SL UNO Solar Lighting Systems photovoltaic modules are scaled sufficiently to match power load, site location conditions and minimum autonomy requirements.

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

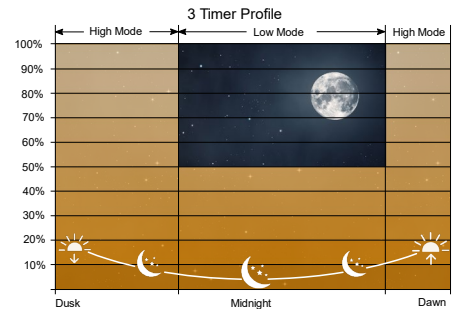
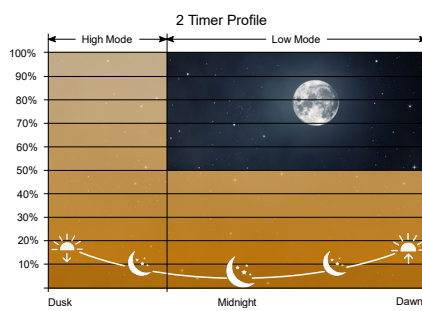
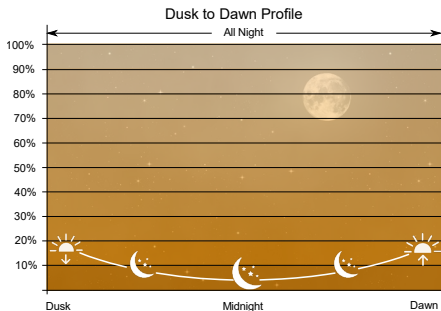
Power profiles offer the ability to control the lighting so that high light levels can be applied when needed and reduced low light levels when not needed.

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.

Dusk to Dawn (All Night)	
	Power

2 Timers	
Power 1	Power 2
Timer 1	Timer 2

3 Timers		
Power 1	Power 2	Power 3
Timer 1	Timer 2	Timer 3



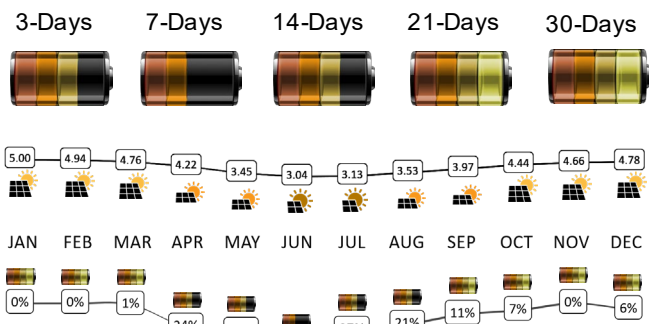
Autonomy (Battery Backup)

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

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

This process ensures the extended life of the premium battery system used in the Vertex® SL UNO 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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Electrical and Mechanical Specifications

Mechanical (Luminaire and PV Module Assembly)	
Construction Material	Aluminium Alloy (<1.0% Cu) with E-Coat Dual Powder Coat Finish
Fixings	316 Stainless Steel
Dimensions	1,222 x 696 x 50 (Solar/PV Module) 644 x 244 x 133 (Luminaire)
Weight	33kg
Ingress Protection Rating(s)	IP66 (LED Module and Optics) IP67 (Electronics & Connections)
Impact Rating(s)	IK08 (LED Optical Lens) IEC 61215 Hail Impact (Solar Module)
Solar/PV Directionality	0-45° tilt at 15° Increments, Full 360° Orientation
Standards Compliance and Testing	Lighting System Body: AS 1874 (Aluminium) – ISO 12944-5:2007 (Paint Finishes) and ISO 9227 (Corrosion), IEC 60529 (Ingress Protection) Pole(s): AS/NZS 4100 (Steel Structures), AS/NZS 3679 (Structural Steel), AS/NZS 1163 (Cold-formed structural steel hollow sections)

Luminaire	
LED Type	Luxeon Lumileds : Used for 075, 100, 125, 200, AFN, ARS, K07, K10, K12 optics. Duris LEDs: Used for 150, SCP, PCL, PCR optics.
LED Current	1050mA (Maximum) 300mA (Minimum)
LED Power	28W (Maximum) 8W (Minimum)
LED Lifespan	L90B10 > 100,000hrs at 25°C T ^a
Lumen Output	Maximum Power Setting 3,429 (2700K) 3,883 (3000K) 4,311 (4000K)
Correlated Colour Temperature (CCT)	2700K / 3000K / 4000K
Colour Rendering Index (CRI)	70+ CRI
Optics / Distribution Type	150 wide Street, 200 extra wide street, SCP street & cycle path, Roto symmetric Area and Area Flood Narrow, Narrow Street K07.
Optical Material	Optical Grade Acrylic PMMA
Operating Temperature Range	-40°C to +50°C
Standards Compliance and Testing	LM80-80-2008, IES TM-21-2011, IK10(EN62262), IP66(IEC60529)

Photovoltaic / Solar Engine (STC)	
Cell Type	Monocrystalline with 3.2 mm Tempered Glass
Cell Count	36
Rated Power Output (Pmax)	150W
Power Tolerance	≥ 3%
Maximum Power Voltage (Vmp)	18.78V
Open Circuit Voltage (Voc)	22.86V
Short Circuit Current (Isc)	8.2A
Maximum Power Current (Imp)	7.99A
Standards Compliance and Testing	IEC 61730 (Photovoltaic Module Safety), IEC 61215 (Photovoltaic Modules Design)

Battery System	
Chemistry Type	Lithium Iron Phosphate (LiFePO4)
Rated Capacity	76Ah (Ampere Hours) 973Wh (Watt Hours)
Rated Voltage	12.8V
Operating Temperature Range	-20°C to +60°C
Rated Depth of Discharge (DoD)	80%
Rated Cycle Life @ 0.2C	≥ 4,000 Cycles at to 80% DoD ≥ 6,000 Cycles to 50% DoD
Standards Compliance	IEC 62133 (Lithium Battery Systems)

Electrical and Control	
Controller Type	Multi-Power Point Tracking (MPPT) with integrated step-up LED driver
System Voltage	12V
Maximum Input Voltage	60V
Maximum Charge Current	15A
Load Conversion Efficiency	95% (Typical)
Load Current Accuracy	≥ 3%
Maximum Load Power	80W
Load Current Range	50mA to 5,600mA
Load Voltage Range	15 - 60 V
Operating Temperature Range	-35°C to +65°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)
Standards Compliance and Testing	CE, RoHS (Restriction of Hazardous Substances), 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
Foundation Bolt Arrangement	4 x M20 x 280mm P.C.D.
Spigot Size	Solar/PV Array Luminaire Outreach Ø 76mm Ø 60mm (custom spigots available upon request)
Standards Compliance and Testing	AS/NZS 1170 (Structural Design Actions), AS 4100 (Steel Structures), AS/NZS 4600 (Cold-Formed Steel Structures).
Wind Rating	Region A, B, C (subject to pole foundation type and soil conditions)

Vertex® SL UNO Solar Lighting System is designed in accordance with AS 4509.2-2010 – Stand-alone 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.

VERTEX® SL UNO SOLAR LIGHTING SYSTEM

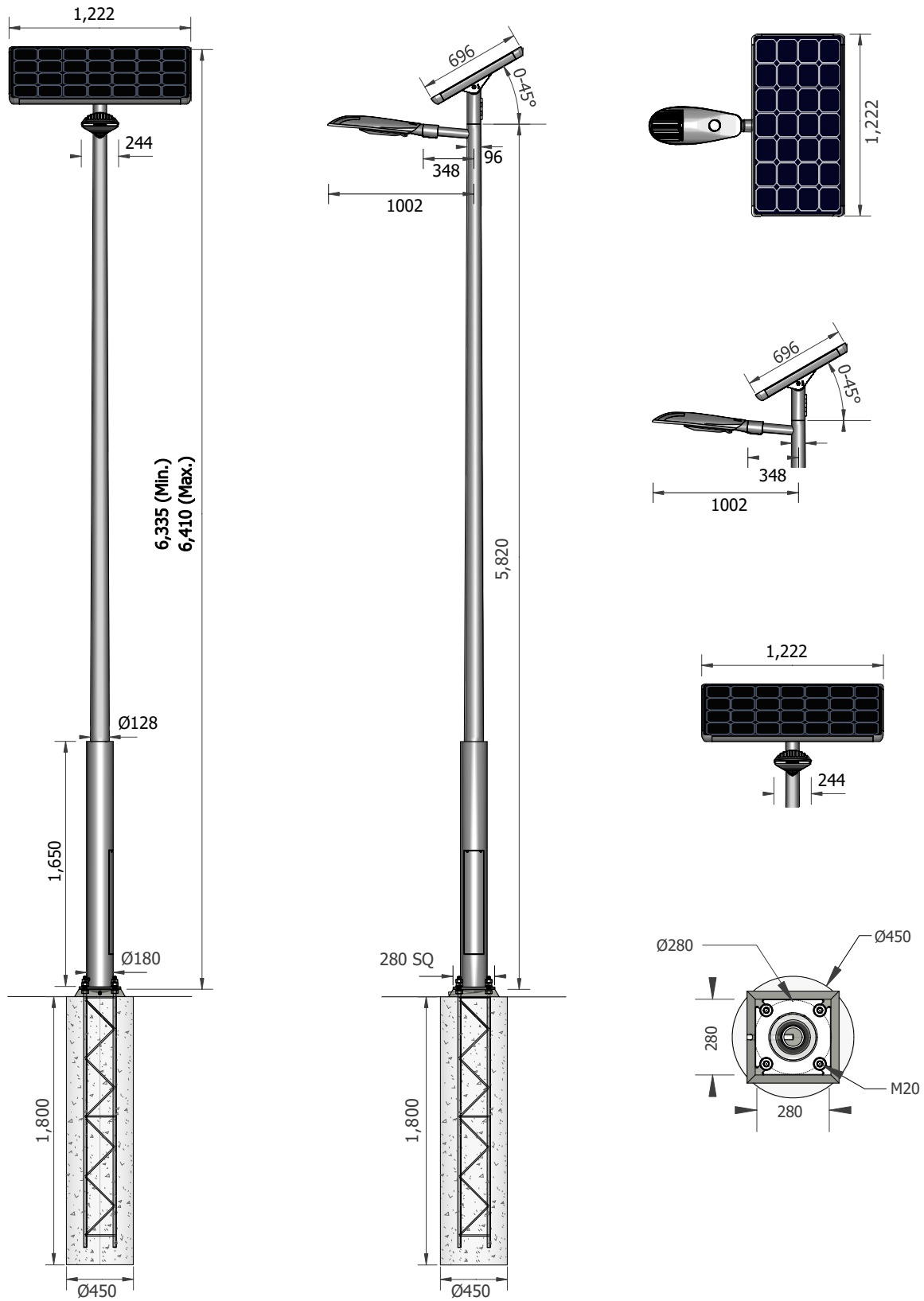
Stand-alone High Output LED Lighting System



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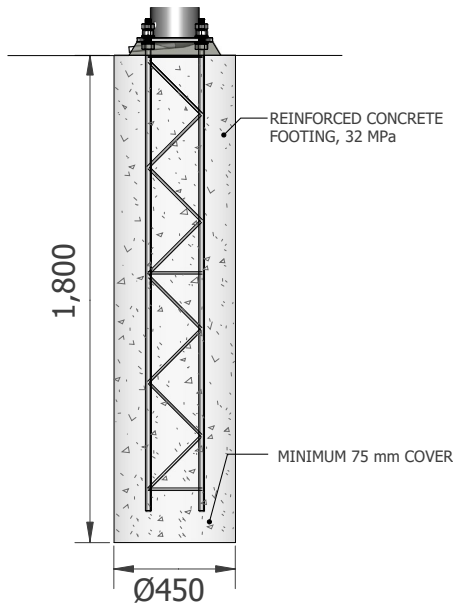
General Arrangement Detail



Footing Options

Bored Pier Footings

BP1.8 – Suitable for Wind Regions A, B and C

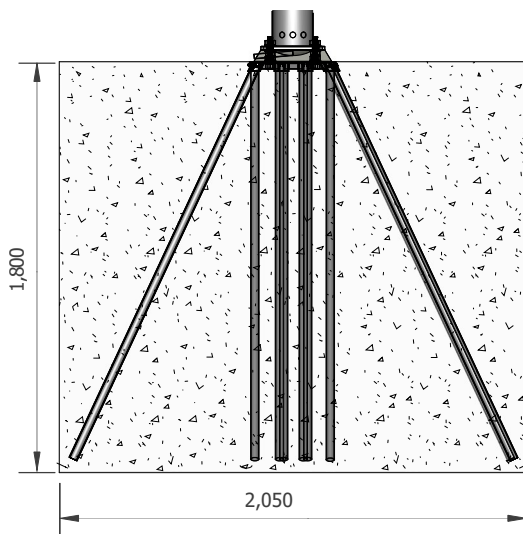


Depth: 1,800mm
 Diameter: Ø 450mm
 Foundation Bolts: 4 x M20 x 280mm P.C.D.
 Steel Reinforcing: 4 x N20
 Bending Moment: 19.8kNm
 Shear Force: 4.1kN
 Pole Weight: 90kg
 Soil Bearing Capacity: 150kPa

Surefoot (Concrete-Free)

SF400 12 Pile – Suitable for Wind Regions A and B

For More Information, visit <https://bmsanchoring.com.au/surefoot-footings/>



Minimum Embedment Depth: 1,800mm
 Pile Size: 1,930mm x 32mmNB x 2.6mm
 Foundation Bolts: 4 x M20 x 280mm P.C.D.
 Material: 70 uM 500g/m² Hot Dip Galvanised
 Bending Moment: 19.8kNm
 Shear Force: 4.1kN
 Pole Weight: 90kg
 Soil Bearing Capacity: 150kPa

NOTICE:

Footing options are 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.