



Gardco OptiForm solar powered system is an off-grid smart solar powered system that includes a luminaire featuring the latest in LED technology, post-top PV panel, batteries and charge controller. The solution offers multiple lumen packages with industry leading efficacy, a complete array of optical distributions, ensuring the right fit for any type of site and area applications. The solar subsystem comes with a pre-tilted bracket for optimum energy collection based on the system configuration, location and wind speed. The system can be tailored to the expected night activities, number of cloudy days and solar irradiance available at the location.

Project: _____

Location: _____

Cat.No: _____

Type: _____

Lamps: _____ Qty: _____

Notes: _____

Part I Ordering guide: Luminaire ^{1, 2, 3}

example: OPFS-SOL-80L-730-T5W-AR1S-MR-PDD01-GBK

Luminaire	Lumen Output	Color Temp.	Distribution	Mounting ⁵	Options	Operating Profiles ⁶	Finish
OPFS-SOL							
OPFS-SOL OptiForm Small Solar	50L 5000 lm	740 4000K	T2M Type 2 medium	AR1S Arm mount 5"	MR Motion response	Luminaire without Motion Response (FD - Fixed Dimming) FDD01 Fixed dimming #1 FDD02 Fixed dimming #2 FD530 100% for 5 hrs, then 30% till sunrise FD550 100% for 5 hrs, then 50% till sunrise	GBK Black GWH White GBZ Bronze GDG Dark Gray GMG Medium Gray
	60L 6000 lm	730 3000K	T3M Type 3 medium	AR2S Arm mount 5 9/16"	EHS External Shield		
	70L 7000 lm	727 ⁴ 2700K	T4M Type 4 medium				
	80L 8000 lm		T4W Type 4 wide				
	90L 9000 lm		T5M Type 5 medium			Luminaire with Motion Response (MR) ⁷ (PD - Profile Dimming) PDD01 Profile dimming #1 PDD02 Profile dimming #2 PD30 100% with motion override and 30% without PD50 100% with motion override and 50% without	
	100L 10,000 lm		T5N Type 5 narrow				
	110L 11,000 lm		T5W Type 5 wide				
	120L 12,000 lm						

Part II Ordering guide: Pole and Solar Subassembly

example: SPR5V-20-P200-30-CB2-VDS-GBK

Pole ⁸	Pole Height ⁹	Solar Panel Power	Solar Panel Tilt Angle	Battery Type/Capacity	Vibration Dampener	Finish
					VDS	
ATR85N 0.188"	18 23	P200 200Wp	10	CB1 Crystal battery 960Wh	VDS Vibration dampening solar	GBK Black
SPR5J 0.180"	19 24	P325 325Wp	20	CB2 Crystal battery 1,680Wh		GWH White
SPR5V 0.250"	20 25		30	CB3 Crystal battery 2,400Wh		GBZ Bronze
SSM8V 0.250"	21 26		40			GDG Dark Gray
	22 27		50			GMG Medium Gray

Default anchor bolts and circles for solar poles

(optional, to be ordered separately) **example:** 1x36-12 1/2-DEC

Anchor Bolts Ordering Code	Pole Family	Bolt Circle Diameter
1x36-11-DEC	ATR85N	11
1x36-12 1/2-DEC	SPR5J	12 1/2
1x36-12 1/2-DEC	SPR5V	12 1/2
1x36-12 1/2-DEC	SSM8V	12 1/2

- Please use our online Outdoor 3D configurator for faster ordering guide (recommended): [Click here](#)
- All system parts I and II must be ordered together and cannot be ordered separately
- Ground rod must be provided and installed by contractor as per National Electrical code (NEC) article 250.52 (A)(5) or the local application regulation agency.
- Extended lead-time may apply (consult factory).
- AR1S to be used with ATR85N, SPR5J and SPR5V poles and AR2S is to only be used with SSM8V pole.
- Operating profiles can be changed in the site via a mobile device using a dedicated app, standard ones are in pages 5 & 6. Factory pre-programmed custom profiles are available upon request.
- Profile Dimming (PD) is only available for luminaires equipped with Motion Response (MR).
- Pole selection is based on height, wind speed, solar system size and tilting angle, please check pages 7 and 8 for poles selection table.
- Luminaire mounting height is 2 ft below the pole height.
- VDS (Vibration Dampening Solar) is only supplied with steel poles (SPR5J, SPR5V, and SSM8V).

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Predicted Lumen Depreciation Data

Derived from LED manufacturer's data and engineering design estimates, based on IESNA LM-80 methodology. Actual experience may vary due to field application conditions. L70 is the predicted time when LED performance depreciates to 70% of initial lumen output. Calculated per IESNA TM21-21.

Ambient Temp°C	L70 per TM-21	Lumen Maintenance % at 100,000 hrs
25°C	>100,000 hours	See table below

Shielding Accessory Kits (order separately)

One shield kit per luminaire

OPF-S-EHS-1*	External house side shield (field installed)
OPF-S-HIS-1**	Internal house side shields. For Area optic types T2M, T3M, and T5N.
OPF-S-HIS-T4-1**	Internal house side shield for Area optic types T4M and T4W, qty 1.
OPF-S-HIS-5M/5W-1**	Internal house side shield for Area optic types T5M and T5W, qty 1

*Must select EHS option on luminaire options section

Ordering Code	Total LEDs	Light Engine Config.	Average System Wattage (W)	Lumen Maintenance at:			
				25K hrs	50K hrs	75K hrs	100K hrs
OPFS-SOL-50L	40	1x40LED	25.6	99%	97%	95%	93%
OPFS-SOL-60L	40	1x40LED	27.2	99%	97%	95%	93%
OPFS-SOL-70L	40	1x40LED	37.4	99%	97%	95%	93%
OPFS-SOL-80L	40	1x40LED	43.3	99%	97%	95%	93%
OPFS-SOL-90L	40	1x40LED	49.5	99%	97%	95%	93%
OPFS-SOL-100L	40	1x40LED	54.8	99%	97%	95%	93%
OPFS-SOL-110L	40	1x40LED	62.3	99%	97%	95%	93%
OPFS-SOL-120L	40	1x40LED	69	99%	97%	95%	93%

4000K, 70CRI LED Lumen Values

Ordering Code	Type 2M			Type 3M			Type 4M		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
OPFS-SOL-50L-740	4958	193.8	B1-U0-G1	4888	191.1	B1-U0-G1	4908	191.9	B1-U0-G1
OPFS-SOL-60L-740	5886	216.3	B2-U0-G2	5803	213.2	B1-U0-G1	5827	214.1	B1-U0-G2
OPFS-SOL-70L-740	7052	188.4	B2-U0-G2	6952	185.7	B2-U0-G2	6981	186.5	B1-U0-G2
OPFS-SOL-80L-740	8043	185.6	B2-U0-G2	7929	183	B2-U0-G2	7962	183.7	B1-U0-G2
OPFS-SOL-90L-740	9067	183.1	B2-U0-G2	8939	180.5	B2-U0-G2	8976	181.3	B1-U0-G2
OPFS-SOL-100L-740	9919	180.9	B2-U0-G2	9779	178.3	B2-U0-G2	9820	179.1	B2-U0-G2
OPFS-SOL-110L-740	10889	174.7	B2-U0-G2	10736	172.2	B2-U0-G2	10780	172.9	B2-U0-G2
OPFS-SOL-120L-740	12006	174.1	B3-U0-G3	11837	171.7	B2-U0-G2	11886	172.4	B2-U0-G2

4000K, 70CRI (cont'd)

Ordering Code	Type 4W			Type 5N			Type 5M			Type 5W		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
OPFS-SOL-50L-740	4456	174.2	B1-U0-G2	5062	197.9	B2-U0-G1	5090	199	B3-U0-G1	4981	194.7	B3-U0-G2
OPFS-SOL-60L-740	5291	194.4	B1-U0-G2	6010	220.8	B3-U0-G1	6043	222	B3-U0-G1	5914	217.3	B3-U0-G2
OPFS-SOL-70L-740	6338	169.3	B1-U0-G2	7200	192.3	B3-U0-G1	7239	193.4	B3-U0-G1	7084	189.2	B3-U0-G2
OPFS-SOL-80L-740	7229	166.8	B1-U0-G2	8212	189.5	B3-U0-G1	8257	190.5	B3-U0-G2	8080	186.5	B3-U0-G2
OPFS-SOL-90L-740	8150	164.6	B2-U0-G2	9258	187	B3-U0-G1	9309	188	B3-U0-G2	9109	184	B3-U0-G3
OPFS-SOL-100L-740	8915	162.6	B2-U0-G3	10128	184.7	B3-U0-G2	10183	185.7	B3-U0-G2	9965	181.7	B4-U0-G3
OPFS-SOL-110L-740	9787	157	B2-U0-G3	11118	178.3	B3-U0-G2	11179	179.3	B4-U0-G2	10940	175.5	B4-U0-G3
OPFS-SOL-120L-740	10791	156.5	B2-U0-G3	12259	177.8	B3-U0-G2	12326	178.8	B4-U0-G2	12062	174.9	B4-U0-G3

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3000K, 70CRI LED Lumen Values

Ordering Code	Type 2M			Type 3M			Type 4M		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
OPFS-SOL-50L-730	4735	185.1	B1-U0-G1	4668	182.5	B1-U0-G1	4688	183.3	B1-U0-G1
OPFS-SOL-60L-730	5621	206.5	B2-U0-G2	5542	203.6	B1-U0-G1	5565	204.5	B1-U0-G2
OPFS-SOL-70L-730	6734	179.9	B2-U0-G2	6639	177.3	B2-U0-G2	6667	178.1	B1-U0-G2
OPFS-SOL-80L-730	7681	177.2	B2-U0-G2	7573	174.8	B2-U0-G2	7604	175.5	B1-U0-G2
OPFS-SOL-90L-730	8659	174.9	B2-U0-G2	8537	172.4	B2-U0-G2	8572	173.1	B1-U0-G2
OPFS-SOL-100L-730	9472	172.7	B2-U0-G2	9339	170.3	B2-U0-G2	9378	171	B1-U0-G2
OPFS-SOL-110L-730	10399	166.8	B2-U0-G2	10253	164.5	B2-U0-G2	10295	165.1	B2-U0-G2
OPFS-SOL-120L-730	11466	166.3	B3-U0-G3	11304	164	B2-U0-G2	11351	164.6	B2-U0-G2

3000K, 70CRI (cont'd)

Ordering Code	Type 4W			Type 5N			Type 5M			Type 5W		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
OPFS-SOL-50L-730	4256	166.4	B1-U0-G2	4835	189	B2-U0-G1	4861	190	B3-U0-G2	4757	186	B3-U0-G2
OPFS-SOL-60L-730	5053	185.7	B1-U0-G2	5740	210.9	B3-U0-G1	5771	212	B3-U0-G2	5647	207.5	B3-U0-G2
OPFS-SOL-70L-730	6053	161.7	B1-U0-G2	6876	183.7	B3-U0-G1	6914	184.7	B4-U0-G2	6766	180.7	B3-U0-G2
OPFS-SOL-80L-730	6904	159.3	B1-U0-G2	7842	181	B3-U0-G1	7885	182	B3-U0-G1	7717	178.1	B3-U0-G2
OPFS-SOL-90L-730	7783	157.2	B2-U0-G2	8841	178.6	B3-U0-G1	8890	179.6	B3-U0-G1	8699	175.7	B3-U0-G2
OPFS-SOL-100L-730	8514	155.3	B2-U0-G3	9672	176.4	B3-U0-G2	9725	177.3	B3-U0-G1	9517	173.5	B4-U0-G3
OPFS-SOL-110L-730	9347	149.9	B2-U0-G3	10618	170.3	B3-U0-G2	10676	171.3	B3-U0-G1	10448	167.6	B4-U0-G3
OPFS-SOL-120L-730	10306	149.5	B2-U0-G3	11707	169.8	B3-U0-G2	11771	170.7	B3-U0-G2	11519	167.1	B4-U0-G3

2700K, 70CRI LED Lumen Values

Ordering Code	Type 2M			Type 3M			Type 4M		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
OPFS-SOL-50L-727	4294	168	B1-U0-G1	4233	166	B1-U0-G1	4251	166	B1-U0-G1
OPFS-SOL-60L-727	5097	187	B1-U0-G1	5026	185	B1-U0-G1	5046	185	B1-U0-G1
OPFS-SOL-70L-727	6107	163	B2-U0-G2	6021	161	B2-U0-G2	6046	162	B1-U0-G2
OPFS-SOL-80L-727	6965	161	B2-U0-G2	6867	159	B2-U0-G2	6895	159	B1-U0-G2
OPFS-SOL-90L-727	7852	159	B2-U0-G2	7741	156	B2-U0-G2	7774	157	B1-U0-G2
OPFS-SOL-100L-727	8590	157	B2-U0-G2	8469	154	B2-U0-G2	8504	155	B1-U0-G2
OPFS-SOL-110L-727	9430	151	B2-U0-G2	9297	149	B2-U0-G2	9336	150	B1-U0-G2
OPFS-SOL-120L-727	10397	151	B2-U0-G2	10251	149	B2-U0-G2	10293	149	B2-U0-G2

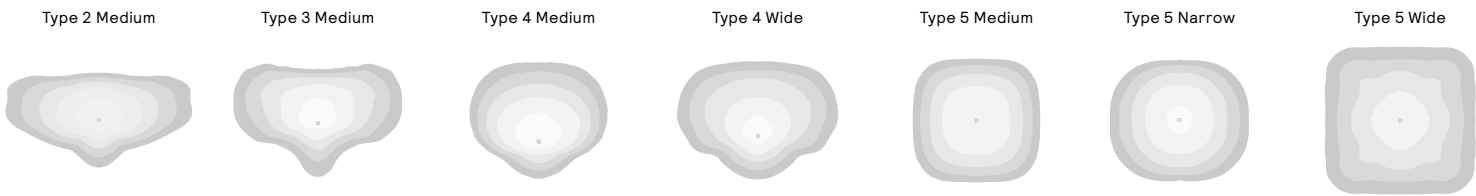
2700K, 70CRI (cont'd)

Ordering Code	Type 4W			Type 5N			Type 5M			Type 5W		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
OPFS-SOL-50L-727	3859	151	B1-U0-G2	4384	171	B2-U0-G1	4408	172	B3-U0-G1	4314	169	B3-U0-G2
OPFS-SOL-60L-727	4582	168	B1-U0-G2	5205	191	B2-U0-G1	5233	192	B3-U0-G1	5121	188	B3-U0-G2
OPFS-SOL-70L-727	5489	147	B1-U0-G2	6235	167	B3-U0-G1	6269	168	B3-U0-G1	6135	164	B3-U0-G2
OPFS-SOL-80L-727	6260	145	B1-U0-G2	7112	164	B3-U0-G1	7151	165	B3-U0-G1	6997	162	B3-U0-G2
OPFS-SOL-90L-727	7058	143	B1-U0-G2	8017	162	B3-U0-G1	8061	163	B3-U0-G2	7889	159	B3-U0-G2
OPFS-SOL-100L-727	7721	141	B2-U0-G2	8770	160	B3-U0-G1	8819	161	B3-U0-G2	8630	157	B3-U0-G2
OPFS-SOL-110L-727	8476	136	B2-U0-G3	9628	154	B3-U0-G2	9681	155	B3-U0-G2	9474	152	B4-U0-G3
OPFS-SOL-120L-727	9345	136	B2-U0-G3	10616	154	B3-U0-G2	10674	155	B3-U0-G2	10446	152	B4-U0-G3

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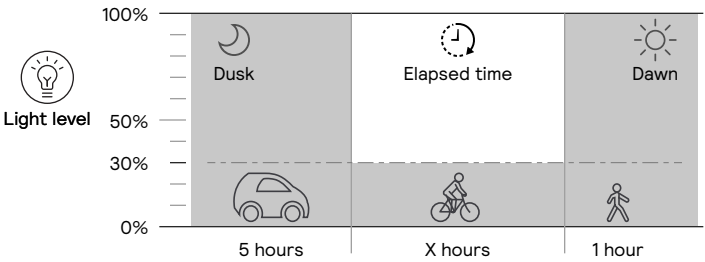
Optical Distributions



FD – Fixed Dimming

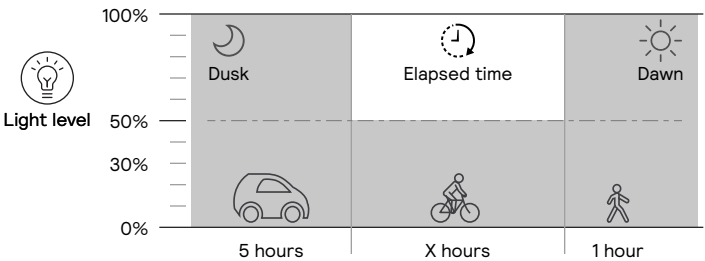
FDD01

- First 5 hours from dusk light level fixed at 100%.
- Remaining hours to dawn minus 1-hour, light level fixed at 30% (dynamic duration based on night length)
- Last 1-hour before dawn, light level fixed at 100%.



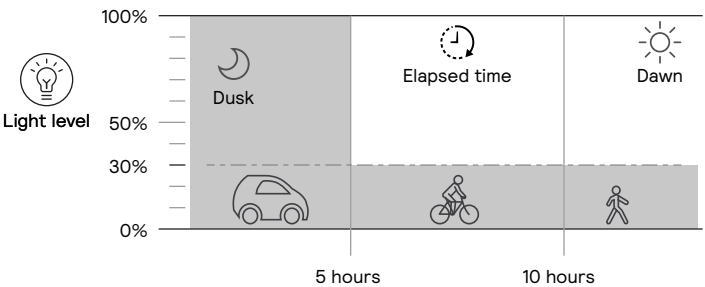
FDD02

- First 5 hours from dusk, light level fixed at 100%.
- Remaining hours to dawn minus 1-hour, light level fixed at 50% (dynamic duration based on the length).
- One hour before dawn, light level fixed at 100%.



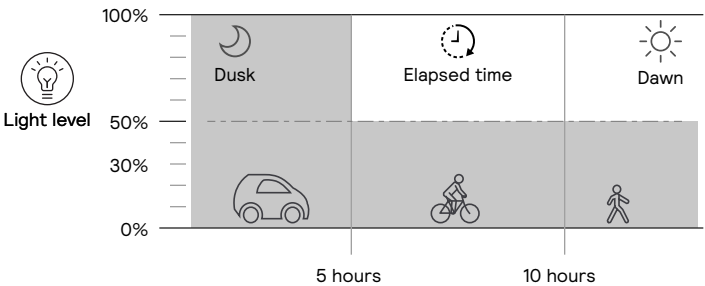
FD530

- First 5 hours from dusk light level fixed at 100%.
- Remaining hours to dawn, light level fixed at 30%.



FD550

- First 5 hours from dusk light level fixed at 100%.
- Remaining hours to dawn, light level fixed at 50%.



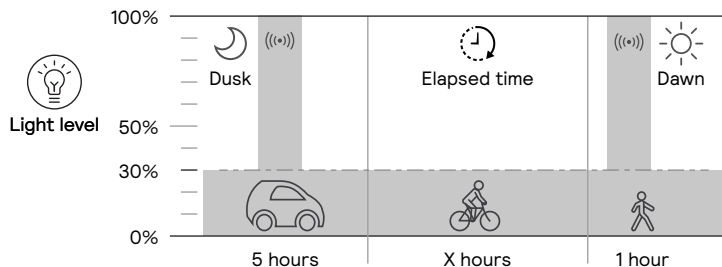
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PD – Profile Dimming

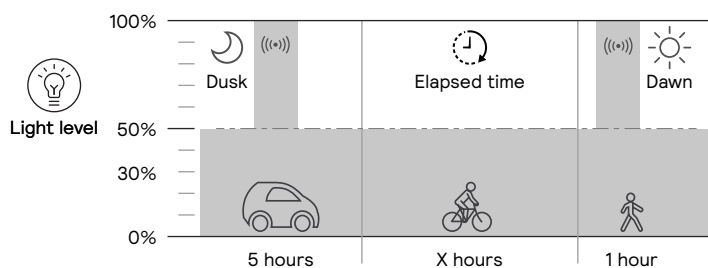
PDD01

- First 5 hours from dusk light level 100% when motion is detected and 30% when no motion is detected.
- Remaining hours to dawn **minus 1-hour**, motion sensor disabled, and light level fixed at 30% (dynamic duration based on night length).
- One hour before dawn, light level at 100% when motion is detected and 30% without motion.



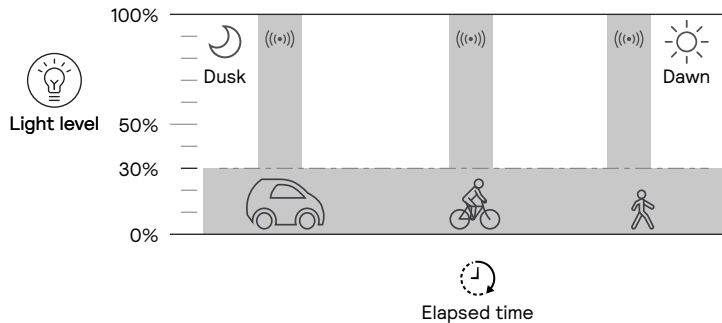
PDD02

- First 5 hours from dusk, light level 100% when motion is detected and 50% when no motion is detected.
- Remaining hours to dawn minus 1-hour, motion sensor disabled, and light level fixed at 50% (dynamic duration based on night length).
- One hour before dawn, light level at 100% when motion is detected and 50% without motion.



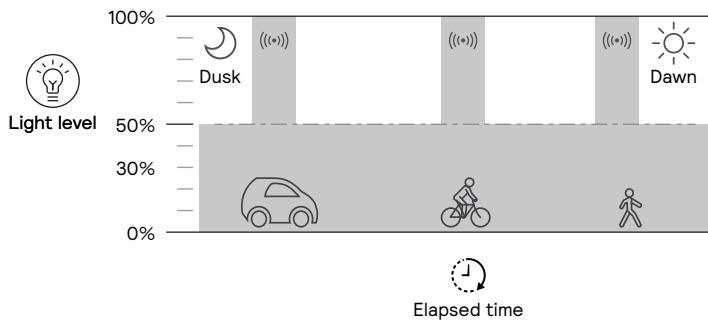
PD30

- Dusk to dawn, light level is at 100% with motion and at 30% without motion.



PD50

- Dusk to dawn, light level is at 100% with motion and at 50% without motion.



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AASHTO Compliant Poles Selection Tables

Luminaire mounting height is 2 ft less than the total pole height

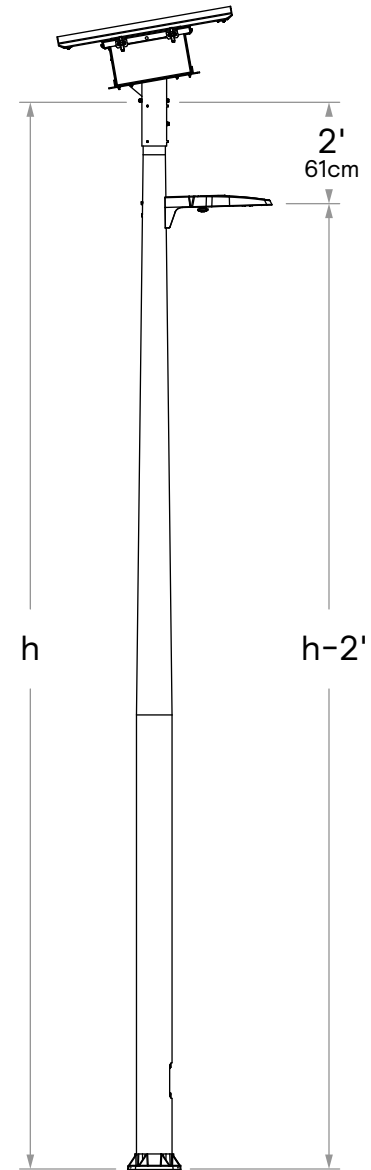
PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 10° tilt	Wind Speed (MPH)	18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
		SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SPR5V	SPR5V
Wind Speed (MPH)	150	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SPR5V	SPR5V
	140	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SPR5V
	130	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V
	120	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J
	110	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J
	100	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J
	90	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N
	80	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N
	70	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N

PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 20° tilt	Wind Speed (MPH)	18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
		SPR5J	SPR5V	SPR5J	SPR5V	SPR5J	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V
Wind Speed (MPH)	150	SPR5J	SPR5V	SPR5J	SPR5V	SPR5J	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V
	140	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V
	130	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V
	120	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SPR5J	SPR5V
	110	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V
	100	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J
	90	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J
	80	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N
	70	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N

PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 30° tilt	Wind Speed (MPH)	18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
		SPR5J	SPR5V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-
Wind Speed (MPH)	150	SPR5J	SPR5J	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V
	140	SPR5J	SPR5J	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V
	130	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SPR5V	SSM8V
	120	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SPR5V	SSM8V
	110	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SSM8V
	100	ATR85N	ATR85N	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V
	90	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J
	80	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J
	70	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N

PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 40° tilt	Wind Speed (MPH)	18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
		SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	-	SSM8V	-	-	-
Wind Speed (MPH)	150	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	-	-	-
	140	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	-	-	-
	130	SPR5J	SSM8V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	-	-
	120	SPR5J	SPR5V	SPR5J	SSM8V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	-
	110	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SSM8V	SPR5V	SSM8V	SPR5V	SSM8V
	100	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SPR5V	SSM8V
	90	ATR85N	ATR85N	ATR85N	SPR5J	ATR85N	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V
	80	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5J
	70	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J

PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 50° tilt	Wind Speed (MPH)	18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
		SSM8V	-	SSM8V	-	SSM8V	-	-	-	-	-
Wind Speed (MPH)	150	SPR5V	SSM8V	SSM8V	-	SSM8V	-	SSM8V	-	-	-
	140	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	-	SSM8V	-	-	-
	130	SPR5J	SSM8V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	-	-	-
	120	SPR5J	SSM8V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	-
	110	SPR5J	SPR5V	SPR5J	SSM8V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	-
	100	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V	SSM8V	SPR5V	SPR5V	SSM8V
	90	ATR85N	SPR5J	ATR85N	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SPR5V	SSM8V
	80	ATR85N	ATR85N	ATR85N	SPR5J	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5V
	70	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J



ATR85B_18FT_OPFS-S_CB12-70GS_200W_10deg

Note: Ground rod must be provided and installed by contractor as per National Electrical code (NEC) article 250.52 (A)(5) or the local application regulation agency.

OPFS-SOL OptiForm

Solar powered system

CSA Compliant Poles Selection Tables

Luminaire mounting height is 2 ft less than the total pole height

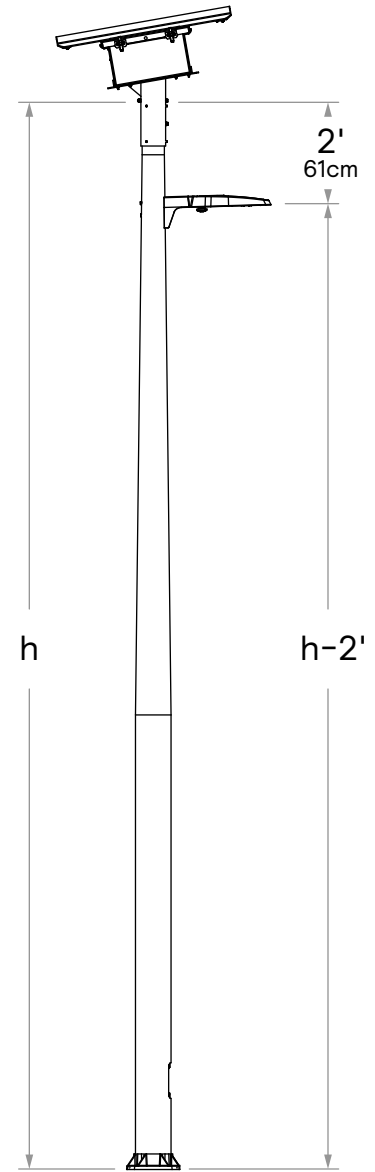
PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 10° tilt		18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
Wind Speed (MPH)	150	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V
	140	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V
	130	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V
	120	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SSM8V	SSM8V	SSM8V
	110	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SSM8V	SSM8V
	100	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V
	90	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J
	80	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J
	70	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N

PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 20° tilt		18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
Wind Speed (MPH)	150	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	-	-	-
	140	SPR5J	SPR5V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-
	130	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V
	120	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V
	110	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V
	100	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SSM8V
	90	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V
	80	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5J
	70	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J

PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 30° tilt		18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
Wind Speed (MPH)	150	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	-	-	-	-	-
	140	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-	-	-
	130	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-
	120	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V
	110	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V
	100	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V	SSM8V	SSM8V
	90	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SSM8V	SSM8V
	80	ATR85N	ATR85N	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V
	70	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J

PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 40° tilt		18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
Wind Speed (MPH)	150	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-	-	-	-	-
	140	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-	SSM8V	-	-	-
	130	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-	SSM8V	-	-	-
	120	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-	SSM8V	-	-
	110	SPR5J	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-
	100	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V
	90	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V	SSM8V	SSM8V
	80	ATR85N	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V	SSM8V
	70	ATR85N	ATR85N	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V

PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 50° tilt		18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
Wind Speed (MPH)	150	SSM8V	-	SSM8V	-	-	-	-	-	-	-
	140	SSM8V	SSM8V	SSM8V	-	SSM8V	-	-	-	-	-
	130	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-	SSM8V	-	-	-
	120	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-	SSM8V	-	-	-
	110	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-
	100	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	-
	90	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V
	80	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SSM8V	SPR5V	SSM8V	SSM8V
	70	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SPR5J	SPR5V



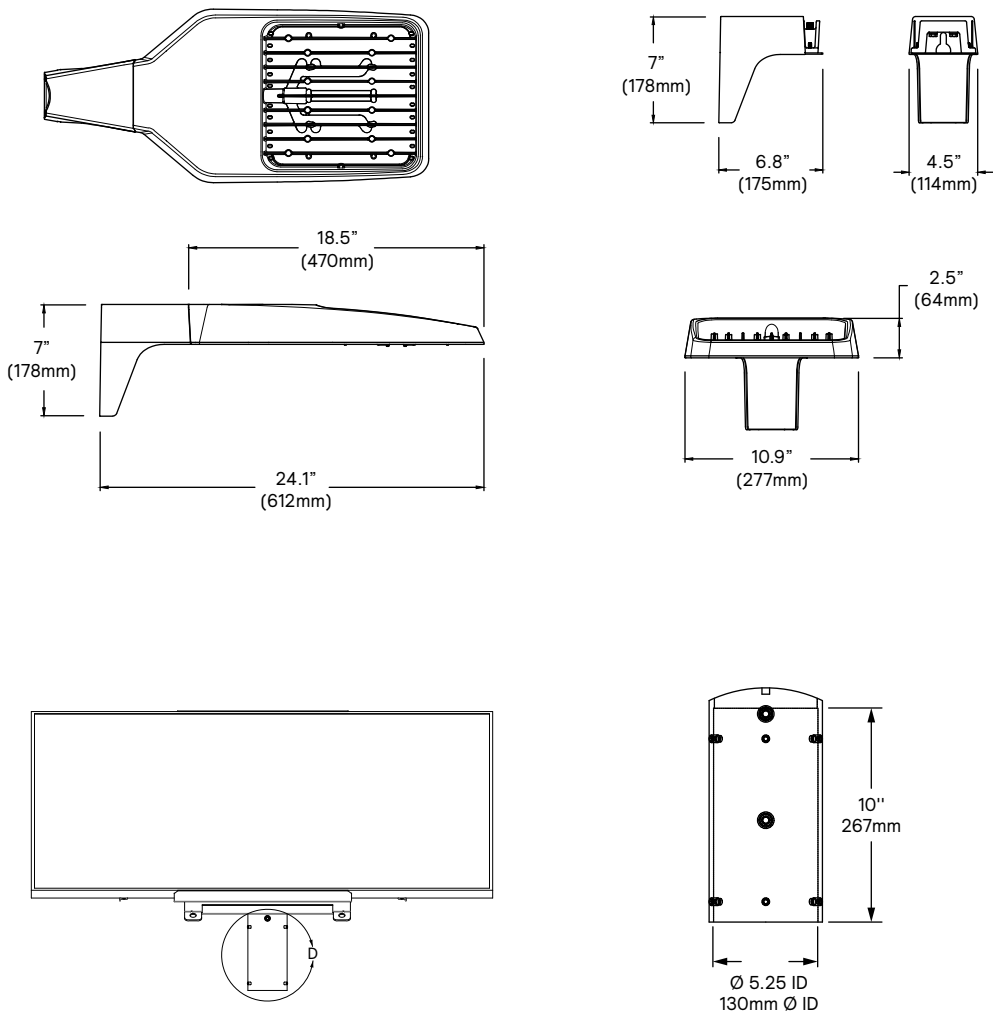
ATR85B_18FT_OPFS-S_CB12-70GS_200W_10deg

Note: Ground rod must be provided and installed by contractor as per National Electrical code (NEC) article 250.52 (A)(5) or the local application regulation agency.

OPFS-SOL OptiForm

Solar powered system

Dimensions



OptiForm Standard Arm

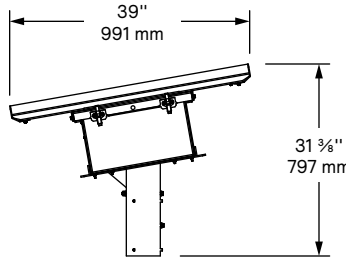
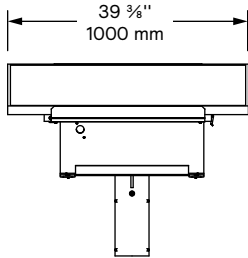
- EPA: 0.2 sq. feet
- Weight: 9 lbs

**Post-Top Solar Subassembly
Tenon (for all versions)**

OPFS-SOL OptiForm

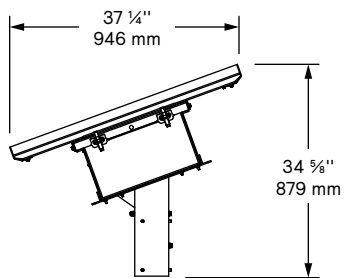
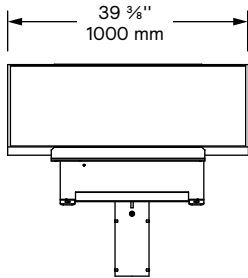
Solar powered system

Dimensions (2.1 with 200Wp PV Panel)



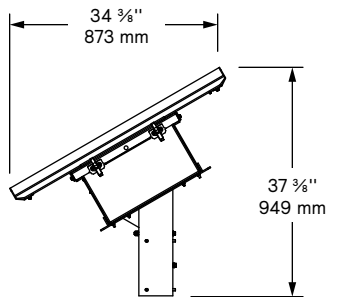
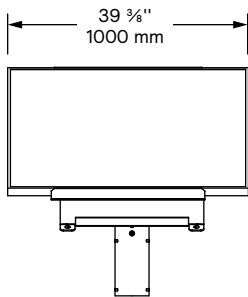
Post-Top Solar Subassembly With 200Wp PV Panel

- Tilt: 10°
- Drag EPA: 2.65 ft²
- Lift EPA: 1.61 ft²
- Max Weight: 256.3 lbs



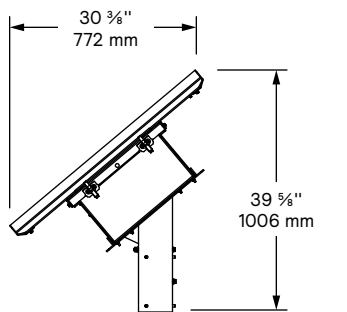
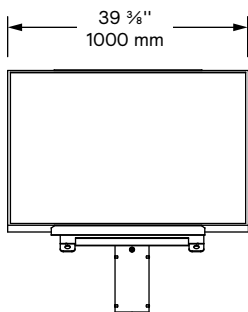
Post-Top Solar Subassembly With 200Wp PV Panel

- Tilt: 20°
- Drag EPA: 3.79 ft²
- Lift EPA: 3.00 ft²
- Max Weight: 256.3 lbs



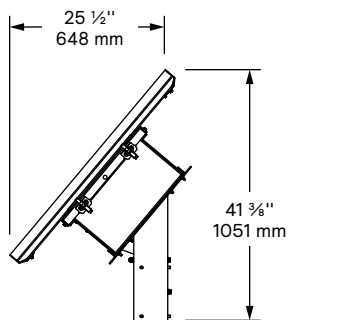
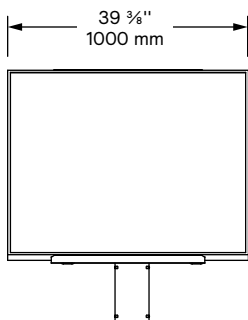
Post-Top Solar Subassembly With 200Wp PV Panel

- Tilt: 30°
- Drag EPA: 5.50 ft²
- Lift EPA: 7.08 ft²
- Max Weight: 256.3 lbs



Post-Top Solar Subassembly With 200Wp PV Panel

- Tilt: 40°
- Drag EPA: 8.00 ft²
- Lift EPA: 8.48 ft²
- Max Weight: 256.3 lbs



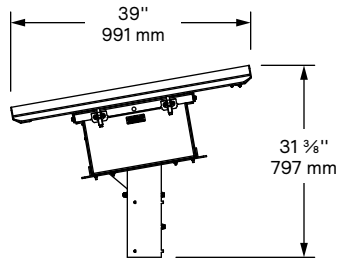
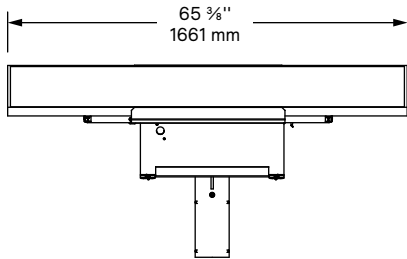
Post-Top Solar Subassembly With 200Wp PV Panel

- Tilt: 50°
- Drag EPA: 9.73 ft²
- Lift EPA: 9.29 ft²
- Max Weight: 256.3 lbs

OPFS-SOL OptiForm

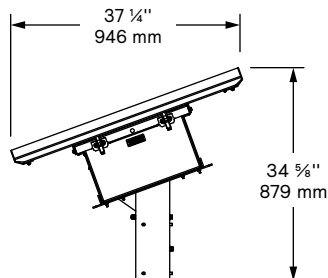
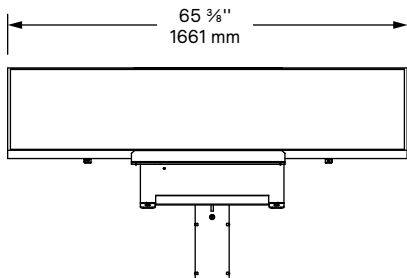
Solar powered system

Dimensions (2.2 with 325Wp PV Panel)



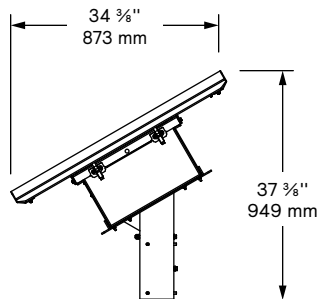
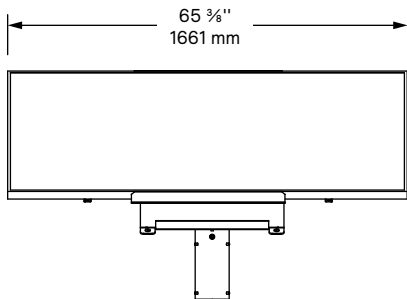
Post-Top Solar Subassembly With 325Wp PV Panel

- Tilt: 10°
- Drag EPA: 3.57 ft²
- Lift EPA: 1.18 ft²
- Max Weight: 273 lbs



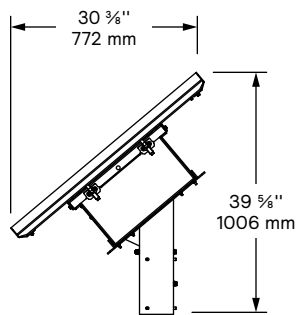
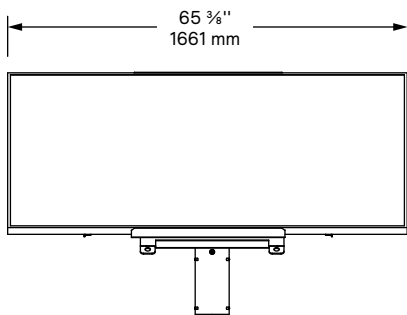
Post-Top Solar Subassembly With 325Wp PV Panel

- Tilt: 20°
- Drag EPA: 5.7 ft²
- Lift EPA: 4.58 ft²
- Max Weight: 273 lbs



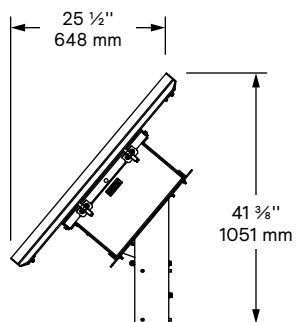
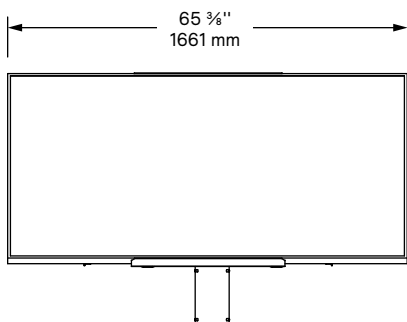
Post-Top Solar Subassembly With 325Wp PV Panel

- Tilt: 30°
- Drag EPA: 7.90 ft²
- Lift EPA: 7.58 ft²
- Max Weight: 273 lbs



Post-Top Solar Subassembly With 325Wp PV Panel

- Tilt: 40°
- Drag EPA: 11.93 ft²
- Lift EPA: 9.55 ft²
- Max Weight: 273 lbs



Post-Top Solar Subassembly With 325Wp PV Panel

- Tilt: 50°
- Drag EPA: 14.84 ft²
- Lift EPA: 11.85 ft²
- Max Weight: 273 lbs

OPFS-SOL OptiForm

Solar powered system

Technical Specifications

Luminaire Subassembly

Product Family	OptiForm Small
Lumen Output Range	5,000 up to 12,000
CCT	2700K, 3000K, 4000K
Distribution	T2M, T3M, T4M, T4W, T5M, T5N, T5W
Motion Sensor	Optional (MR)
Weight (lbs)	9
Operating Temperature	-40 to +122°F / -40 to +50°C
IP Rating	Housing: IP65 / Light Engine: IP66

Solar Module Subassembly

PV Panels Nomenclature	P200	P325
Total Power	200Wp	325Wp
Dimensions (in)	39.41 x 39.41 x 1.38	65.4 x 39.41 x 1.38
Weight (lbs)	28.32	40.78
Module Type	Monocrystalline Silicon Solar Cells	
Panel Mount	Anodized aluminum extrusion	
Tilting Angles	Factory pre-tilted: 10, 20, 30, 40 or 50°	
Operating Temperature	-40 to 185°F / -40 to +85°C	

Battery / Controller Subassembly

Battery Chemistry	Silicon Dioxide (SiO ₂)		
Battery Nomenclature	CB1	CB3	CB3
Capacity (AH)	40AH	70AH	100AH
Capacity (WH)	960Wh	1,680Wh	2,400Wh
Total Subassembly Weight (lbs)	175	216	273
Total Subassembly Dimensions (in)	26.9 x 19.5 x 10.2		
Battery Voltage	24V (2x12V)		
Battery Charge Temperature	-30 to +149°F / -35 to +65°C		
Battery Discharge Temperature	-30 to +149°F / -35 to +65°C		
Enclosure Material	Aluminum & Steel base		
Mounting	Post-Top		
Post-Top Tenon Inner Diameter	5 1/8"		

Charge Controller / LED Driver

Charging Type	MPPT	
LED Driver Type	High-efficiency integrated LED driver	
LED Wattage Range	2.5W to 100W	
Configurable	Yes	
Operating Profiles	Programmable up to 5 steps	
	Dusk to dawn	
Run Time Extension	Enabled	
Interface	Enabled	
Operating Temperature	-30 to +122°F / -35 to +50°C	
Mobile App Data Monitoring	LED voltage, current	Battery voltage, current
	PV voltage, current	Battery temperature
Mobile App Fault Status Monitoring	Load short circuit	Board overtemperature
	Load disconnected	PV overvoltage
	Battery undervoltage, overvoltage, overtemperature	

Poles (see poles selection charts in pages 7 & 8)

Pole Material	Aluminum	Steel
Product Families	ATR85N	SSM8V / SPR5V / SPR5J
Luminaire Mounting Height	16' up to 25'	
Total Pole Height	18' up to 27'	
Max Wind Speed	Up to 150 MPH (check page 7 and 8)	

Certification and Compliance

Luminaire	cULus listed for USA and Canada	
	DLC QPL approved	
	CCTs 2700K & 3000K are Dark Sky approved	
PV Panels	UL 61730 / IEC 61215:2016 / IEC 61730-1 & 2:2016	
Battery	UL 1989 / IEC 60896-21 / IEC 60896-22	
Charge Controller	UL 1741 / UL 8750 / IEC 62109-1 / IEC 61547 / IEC 61347 / CISPR 15	
Poles	Compliant with AASHTO 2001 and CSA AAMA 2603 / ASTM D2244 / ASTM D523 / ASTM D2247	
Whole System	UL 8801	

Limited Warranty

Luminaire	OptiForm Solar	5 years
PV Panel	5 years	
Battery	5 years	
Charge Controller	5 years	
Poles	Aluminum	5 years
	Steel	3 years

OPFS-SOL OptiForm

Solar powered system

Specifications

Housing

Housing and door constructed of low copper die cast Aluminum alloy (A360) with detachable arms for quick mounting. Heatsink is integral to the housing providing passive cooling of LEDs to maintain long LED life. Luminaire housing rated to IP65, LED Modules rated IP66 tested in accordance to Section 9 of IEC 60598-1.

Vibration resistance

Luminaire is tested and rated to standards set forth in ANSI C136.31-2018 Level 2 for Bridge and Overpass applications.

Light engine

Light engine comprises of a module of 40-LED aluminum metal clad board fully sealed with optics. Module is RoHS compliant. Color temperature as per ANSI/NEMA bin 2700 Kelvin nominal (2725 $\pm$ 145K), 3000 Kelvin nominal (3045K $\pm$ 175K) or 4000 Kelvin nominal (3985K $\pm$ 275K), CRI 70 Min. 75 Typical. Other CCT/CRI also available, consult factory. LED light engine is rated IP66 in accordance to Section 9 of IEC 60598-1.

Energy saving benefits

System efficacy up to 224 lms/W with significant energy savings over Pulse Start Metal Halide luminaires. Optional motion sensor provides added energy savings during unoccupied periods.

Optical systems

Site and Area optical distributions include Types 2 Medium, 3 Medium, 4 Medium, 4 Wide, 5 Narrow, 5 Medium, 5 Wide, and Auto Front Row. LEED Corner Left, LEED Corner Right, and Backlight Control distributions also available to provide excellent cutoff to meet the most stringent requirements at property lines. Optional internal shields mount to LED optics and are available with Type 2M, 3M, and 4M distributions. Types 2M and 3M can be rotated at 90° or 270° when specified, and are factory set only. Site and Area optics shall be performance tested per LM-79 and TM-15 (IESNA) certifying their photometric performance. Luminaire designed with 0% uplight (U0 per IESNA TM-15).

Precision Plus optical distributions include Types 2, 3, 4 and 5 and are designed to illuminate pedestrian scale applications by providing lower glare, while still achieving desired distribution, optimized spacing, and excellent uniformity. Optics are made of optical grade polymer refractor lenses and

shall be performance tested per LM-63, LM-79 and TM-15 (IESNA) certifying their photometric performance. Luminaire designed with 0% uplight (U0 per IESNA TM-15).

Mounting

Standard luminaire arm mounts to 5" (with ATR85N, SPR5J and SPR5V) poles or 5 9/16" with SSM8V poles. Poles selection is based on the PV panel size, EPA and wind speed.

Control options

Motion Response (MR): Motion Response module is mounted integral to luminaire and system is factory pre-programmed and can be updated at the site.

Luminaire Useful Life

Refer to IES files for energy consumption and delivered lumens for each option. Based on ISTMT in situ thermal testing in accordance with UL1598 and UL8750, System Reliability Tool. Advance data and LED manufacturer LM 80/TM 21 data, expected to reach 100,000 + hours with >L70 lumen maintenance @ 25°C. Luminaire Useful Life accounts for LED lumen maintenance AND all of these additional factors including: LED life, driver life, PCB substrate, solder joints, on/off cycles, burning hours and corrosion.

Solar Panel

200W or 325W Solar panels with fixed tilt angle 10°, 20°, 30°, 40° or 50° mounted on a steel frame mechanically assembled on an aluminum box c/w door with hinge and latch giving a tool free access to the Crystal battery, charge controller and wiring. Enclosure is rated IP54.

Pole Shaft

Shall be made from a 5" (127mm) round high tensile carbon steel tubing, having a 0.250" (6.4mm) wall thickness, welded to both the bottom and top of the anchor plate.

Maintenance Opening

The pole shall have a 2" x 4 1/2" (51mm x 114mm) maintenance opening centered 20" (508mm) from the bottom of the anchor plate, complete with a weatherproof aluminum cover and a copper ground lug.

Base Cover

Two piece square base cover made from formed aluminum, mechanically fastened with stainless steel screws.

Important

Gardco strongly recommends the installation of the complete lighting assembly with all its accessories upon the anchoring of the pole. This will ensure that the structural integrity of the product is maintained throughout its lifetime.

Wiring

The connection of the luminaire is done using a terminal block connector 600V, 85A for use with #2 14 AWG. wires from the primary circuit, located inside the housing.

Hardware

All exposed screws shall be complete with Ceramic primer seal basecoat to reduce seizing of the parts and offers a high resistance to corrosion. All seals and sealing devices are made and/or lined with EPDM and/or silicone and/or rubber.

Anchor Bolts

Anchor bolts made of ASTM F1554 grade 55 steel with a minimum yield strength of 55,000 psi. Nuts made of ASTM F1554 99 grade A steel or better. The thread adjustment is ANSI class 2B regardless of the diameter of the bolts. Washers made of ASTM grade F 844 steel or better. All galvanized parts are hot dip galvanized with minimum requirement the ACNOR G 164 standard. **Note:** Ground rod must be provided and installed by contractor as per National Electrical code (NEC) article 250.52 (A)(5) or the local application regulation agency

Vibration Resistance

The OPFS SOL meets the ANSI C136.31 2018, American National Standard for Roadway Luminaire Vibration specifications for normal applications.

Mechanical Resistance

This design information is intended as a general guideline only. The customer is solely responsible for proper selection of pole, luminaire, accessories and foundation under the given site conditions and intended usage. The addition of any other item to the pole may dramatically impact the wind load on that pole. It is strongly recommended that a qualified professional be consulted to analyze the loads given the user's specific needs to ensure proper selection of the pole, luminaire, accessories, and foundation. Lumec assumes no responsibility for such complete analysis or product selection. Failure to ensure proper site analysis, pole selection, loads and installation can result in pole failure, leading to serious injury or property damage.