

SolarWorld Sunkits

Programs and products to grow your business now and as long as the sun shines.



Partner with the industry leader in solar panel technology, and tap into the earning power of the sun.



BORDER STATES
Supply Chain Solutions™

Why partner with SolarWorld and Border States?

SolarWorld is the largest manufacturer of solar panels in the U.S.—and they are committed to keeping their manufacturing on U.S. soil.

They are also committed to meeting the highest performance, environmental and employment standards.

- Highest quality products
- Reliable delivery schedules
- Warranty and product support
- Meets and exceeds Buy America requirements
- Processes meet stringent U.S. labor and environmental policies

Plus SolarWorld's partner program provides installation training, design services, sales leads and photovoltaic components and helps your business enter the fast-growing solar industry.

From preconstruction to project close out—Border States provides the solar power solutions you need to complete projects on budget and on time. Their dependable on-site inventory management including delivery, staging, kitting and trailers will ensure you get the right materials when and where they're needed.



Why solar? Why now?

Solar is affordable

State and local tax incentives and rebates can reduce the cost of going solar by up to 50 percent. Financing options are now available in many areas to help overcome the upfront costs of going solar.

Solar saves money

Many homeowners experience at least a 50 percent decrease in their electric bills. Some eliminate their electrical expenses altogether.

Solar increases home value

Solar systems can increase home value by 20 times the annual electricity savings. In addition, homes with solar systems tend to sell faster than homes without—15 percent faster by some studies.

At Border States, we are committed to delivering total satisfaction with our products, services and solutions. From pre-construction to project close out, we provide the solar components you need to complete projects on time and on budget.

The SolarWorld Sunkits program is a full-service solution for contractors of all experience levels. Minimize your system design and grow your solar business faster with SolarWorld Sunkits and Border States.

What's your next step?

Become a Registered Installer to grow your business with marketing support from SolarWorld. Experienced installers are invited to become Authorized Installers and boost their growth through additional marketing support and lead referrals.

Registered Installer

Benefits

- Access to high-performance SolarWorld Sunkits systems
- System proposal and design support
- Product training
- Marketing materials
- Co-op fund eligibility²

Requirements

- Complete online registration form
- Attend live or online product training
- Obtain state licenses and certifications

Authorized Installers gain even more benefits.

	Authorized Installer	Commercial Authorized Installer	Registered Installer
Leads	✓	✓	Limited ¹
Marketing Support	✓	✓	✓
Marketing Co-op	✓	✓	✓
Event Support	✓	✓	Limited ¹
Product Discounts	✓	✓	

¹ Some Registered Installers receive sales leads and event support depending on location and experience.

² With purchase of Sunkits systems.

How do I become an Authorized Installer?

1. Complete the online Authorized Installer application
2. Interview with a SolarWorld account manager and admin
3. Pass system audit and enter the program

Why be authorized for residential or commercial installation?

Benefits

- Residential/commercial sales leads
- Authorized Installer credentials
- Exclusive marketing materials
- Marketing co-op funds eligibility
- Residential/commercial system design support
- Marketing and event support
- Training opportunities

Requirements

- Maintain professional business practices
- Deliver high-quality system designs and installations
- Possess a proven solar track record
- Actively promote SolarWorld as primary brand
- Maintain minimum annual sales of 100 or 300 kW, depending on residential or commercial
- Submit Sunmodule system registrations

What are Sunkits?

Sunkits systems are more than a kit—or even the sum of the included parts. The services and support provided by SolarWorld are unsurpassed in the industry.

Support

- Complete SolarWorld system customized to maximize performance
- Sales proposal support
- System design and engineering, if needed
- On-site technical support
- Training support

Components

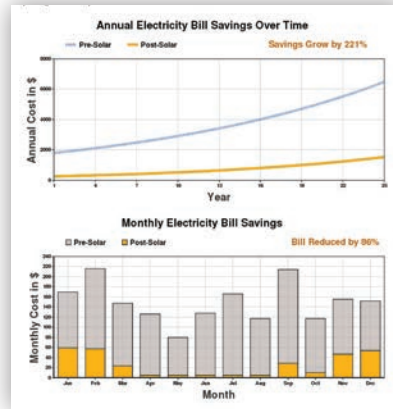
- SolarWorld high-performance Sunmodule Plus modules
- SMA, PV Powered or Enphase inverter options
- Sunfix and other mounting options
- Suntrol Data Logger and other monitoring options
- Additional balance of system components, including grounding lugs and cables



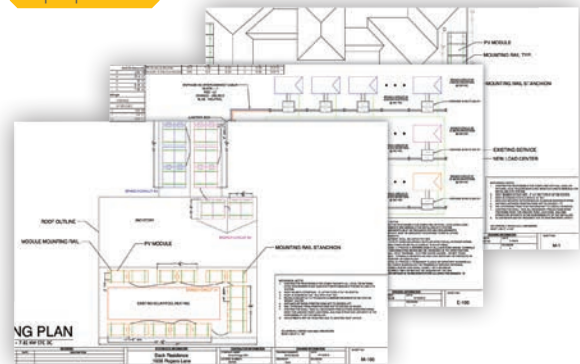
How do I sell Sunkits?

1. Provide an in-home solar consultation
2. Submit a Sunkits location questionnaire
3. Receive a customized sales proposal and close the sale
4. Submit a purchase order and schedule the install
5. Receive custom SolarWorld design to help with permits and installation
6. Install the Sunkits system

SolarWorld will develop customized sales proposals for each of your potential installations. Each proposal forecasts energy production and financial returns over the system's 25-year warranty period. SolarWorld provides complete system design services to reduce your in-house engineering requirements.



Sales proposal

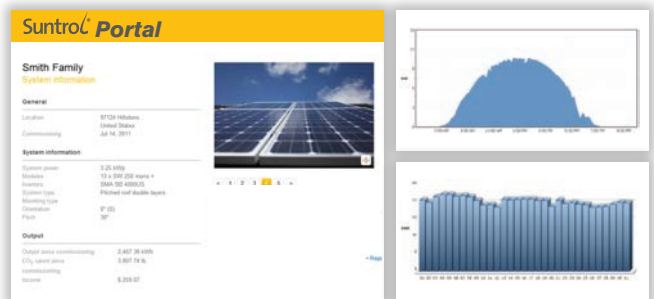


Design services

What is Suntrol monitoring?

Are your customers' SolarWorld systems delivering on their promise? You'll always have the answer with our Suntrol monitoring. It will let you easily monitor all the important performance data of every system, including inverter status, yield forecast and degradation calculations. The Suntrol Portal can be accessed using a smartphone, tablet or a computer to quickly give you an up-to-date view of all your installed systems' performance.

- Data Logger is easy to install and configure
- Compatible with more than 50 inverter brands and up to 3 per single system
- Up to 25 years of data storage
- Free Suntrol Portal and Suntrol App make it easy to monitor systems from wherever you or your customers are



Suntrol Portal

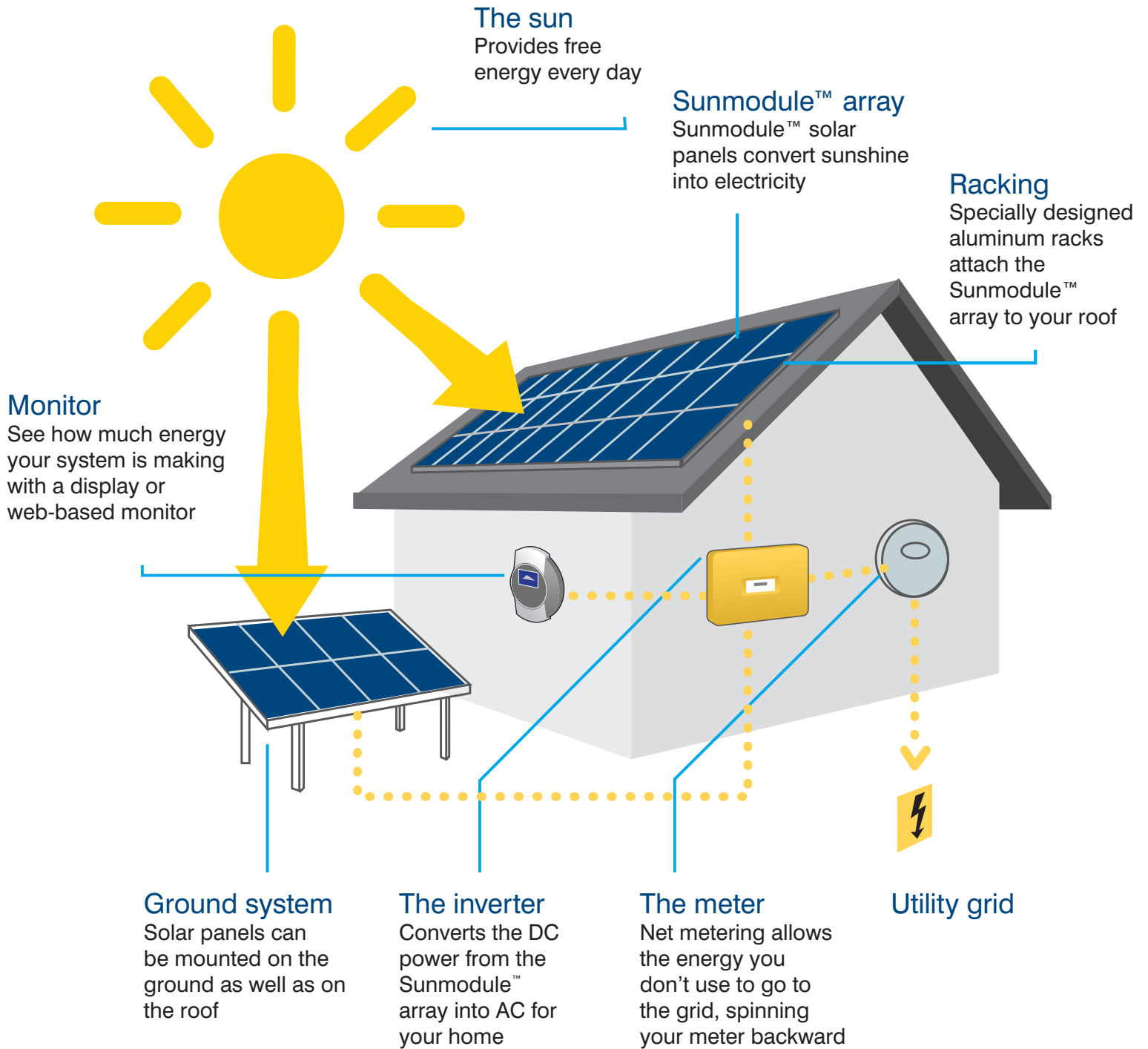


Suntrol Data Logger



Suntrol App

How does solar power work?



The photovoltaic modules (PV) change sunlight into DC power. DC power is then converted to AC power through the inverter. AC power is back-fed into the residential load center and is used while reducing utility-supplied power. Any excess power flows back through the meter to the utility grid, thereby spinning the meter dials backward.

If the inverter senses that utility power is not present, it will remove the PV system from the circuit, leaving the home without power. This is a safety requirement mandated by the utility companies. If the utility power was lost and the PV system was to remain operational, it would provide power back on the utility line and could possibly injure the utility crew working on the power lines.

What's in it for the customer?

When your customers ask, these are the benefits they get after installing a solar system.

Solar power is a long-term investment that ensures continually reducing energy bills. It can be viewed as paying for power up front at a set rate, and the longer it is in use, the better the return on investment. Utility rates usually go up 3–5 percent each year. These systems typically have a life span of more than 30 years and panels are warranted for 25 years. If properly installed by a qualified contractor, maintenance should be minimal.

Is solar the solution?

If your customer is new to solar, run through the qualifications before you start creating your proposals. Homeowners are often not aware of the initial cost or that the installation site should be free of shadows. Many contractors check out a satellite view of the address to prequalify the opportunity.

Customer qualifications:

- Grid-tied solar electric systems for a residential application cost on average about \$30,000–\$40,000 prior to rebates and incentives. Off-grid systems will be double this cost due to batteries and load size.
- The best financial returns for solar electric systems come from saving where utility costs are high and when using the solar electric system for a percentage of the kWh usage rather than the full amount.
- Customers should already be using energy-efficient lighting and products within their homes to lower their kWh usage, allowing for a smaller solar electric system.
- Customers must be aware that a grid-connected solar electric system does not provide power if the utility power goes out.





Site qualifications:

- Solar electric systems require maximum sun exposure for best performance—southern with little or no obstructions. Even minor structures, like a flag pole, passing shadows across the intended solar array can dramatically reduce system performance. Is the customer willing to put the solar panel on the southern-facing roof even if it could be located on the front of the home?
- Is the available roof area on a single plane or parallel plane? Different array planes (facing different directions) require multiple inverters and are more complicated to install.
- Solar electric systems last for more than 30 years and require penetrations into the building structure. Will the current roofing material last at least 15 years before requiring replacement? Is the roofing material tough enough to handle the installation process, and is the building structure substantial enough to handle the added loads of the solar modules?
- Flat roofs and metal structures often require additional structural engineering, particularly when joist spacing is greater than 4 feet.

Site upgrades, cost adders and other considerations:

- Including the breaker required for the solar system, breaker boxes can generally be loaded to 120 percent of the rated amps. Is there sufficient space in the existing breaker panel to add the required system breaker? If not, is the customer willing to upgrade to a larger panel?
- While the provided string inverters have an integral DC disconnect, local codes may require a separate DC or AC disconnect to be provided on either side of the inverter.
- Extra-steep-sloped roofs require scaffolding. Other safety equipment increases the install cost and maintenance cost.
- For longer wiring runs and ground-mount systems, trenches or post holes may be required.

Is the customer still interested?

If your customers are still interested, utilize the estimation worksheet to size up the system either based on utility bill, roof space, building space or budget. When quoting prices to your customers, you should calculate the PV watts multiplied by the \$6–\$9 per PV watt installed price; this will give the customer a price range. Use the calculated PV watts as the quantity for the base system and any required mounting options and price from BSE-Commerce or contact your local BSE customer service representative for your actual kit pricing (excluding labor and mark up).

Estimation worksheet

Utility bill

Example:

- 1 $\frac{\text{annual energy consumption (kWh)}}{\text{number of months in a year}} = \text{kWh per month}$
- 2 $\text{kWh per month} \times \text{PV watts factor}^{(1)} = \text{PV system watts}$
- 3 $\frac{\text{PV system watts}}{255 \text{ watt modules}} = \# \text{ of modules required}$
- 4 take the number of modules required and find the closest smaller system size using the SW module chart ⁽²⁾
- 5 $\frac{\text{PV system watts}}{1,000 \text{ watts}} = \text{rated kW}$

Assume 9,000 kWh annual energy usage
 $\frac{9,000 \text{ kWh}}{12} = 750 \text{ kWh per month}$

Assume we are in Minnesota
 $750 \text{ kWh} \times 10 = 7,500 \text{ watts}$

$\frac{7,500 \text{ w}}{255 \text{ w}} = 29.4 \text{ modules}$

Round down to 28 modules, but when pricing out, remember to use system watts
 $28 \times 255 = 7,140 \text{ watts}$

$\frac{7,140 \text{ w}}{1,000 \text{ w}} = 7.14 \text{ kW}$

Part number required for pitched roof with composition roof at 7.14 kW. Enter quantity of 7,140 for the following component:

[EC0162](#) | [BSE Part # 2728096](#) Sunkit with SMA string inverter and Sunfix mounting hardware

Part number required for flat roof with black module at 7.14 kW. Enter quantity of 7,140 for each of the following components:

[EC0162](#) | [BSE Part # 2728096](#) Sunkit with SMA string inverter and Sunfix mounting hardware

[EZ0020](#) | [BSE Part # 2728116](#) Upgrade adder for black module and black mounting hardware

[EZ0032](#) | [BSE Part # 2728117](#) Upgrade adder for SolarWedge for flat roof installations

Roof space

Example:

- 1 $\text{ft}^2 \text{ of available space}^{(3)} \times 10 \text{ PV watts per ft}^2 = \text{PV system watts}$
- 2 $\frac{\text{PV system watts}}{255 \text{ watt modules}} = \# \text{ of modules required}$
- 3 take the number of modules required and find the closest smaller system size using the SW module chart ⁽²⁾
- 4 $\frac{\text{PV system watts}}{1,000 \text{ watts}} = \text{rated kW}$

Assume 600 ft² of usable roof space
 $600 \text{ ft}^2 \times 10 \text{ watts} = 6,000 \text{ watts}$

Assume we are in Minnesota
 $\frac{6,000 \text{ w}}{255 \text{ w}} = 23.5 \text{ modules}$

Round down to 22 modules, but when pricing out, remember to use system watts
 $22 \times 255 = 5,610 \text{ watts}$

$\frac{5,610 \text{ w}}{1,000 \text{ w}} = 5.61 \text{ kW}$

Part number required for pitched roof with composition roof at 5.61 kW. Enter quantity of 5,610 for the following component:

[EC0162](#) | [BSE Part # 2728096](#) Sunkit with SMA string inverter and Sunfix mounting hardware

Part number required for pitched metal roof at 5.61 kW.

Enter quantity of 5,610 for each of the following components:

[EC0162](#) | [BSE Part # 2728096](#) Sunkit with SMA string inverter and Sunfix mounting hardware

[EZ0040](#) | [BSE Part # 2728128](#) Upgrade adder for S-5! with Sunfix mounting solution

Estimation worksheet

Building space

Example:

- 1 ft^2 of available space \times 2 watts per ft^2 ⁽⁴⁾ = PV system watts
- 2 $\frac{\text{PV system watts}}{255 \text{ watt modules}} = \#$ of modules required
- 3 take the number of modules required and find the closest smaller system size using the SW module chart ⁽²⁾
- 4 $\frac{\text{PV system watts}}{1,000 \text{ watts}} = \text{rated kW}$

Assume 3,000 ft^2 of usable building space
 $3,000 \text{ ft}^2 \times 2 \text{ watts} = 6,000 \text{ watts}$

Assume we are in Minnesota
 $\frac{6,000 \text{ W}}{255 \text{ W}} = 23.5 \text{ modules}$

Round down to 22 modules, but when pricing out, remember to use system watts
 $22 \times 255 = 5,610 \text{ PV watts}$

$\frac{5,610 \text{ w}}{1,000 \text{ w}} = 5.61 \text{ kW}$

Part number required for pitched micro inverter composition roof at 5.61 kW. Enter quantity of 5,610 for the following component:

EC0169 | BSE Part # 2728103 Sunkit with Enphase micro inverter and Sunfix mounting hardware

Part number required for micro inverter ground mount at 5.61 kW. Enter quantity of 5,610 for each of the following components:

EC0169 | BSE Part # 2728103 Sunkit with Enphase micro inverter
 EZ0039 | BSE Part # 2728127 Upgrade adder for Unirac U-LA ground mount

Estimated costs

Example:

- 1 $\frac{\text{customer budget \$}}{\text{high \$ per system PV watt installed}} = \text{PV system watts}$
- 2 $\frac{\text{PV system watts}}{255 \text{ watt modules}} = \#$ of modules required
- 3 take the number of modules required and find the closest small system size using the SW modules chart ⁽²⁾
- 4 $\frac{\text{PV system watts}}{1,000 \text{ watts}} = \text{rated kW}$

Assume \$40,000
 $\frac{\$40,000}{\$9} = 4444.4 \text{ watts}$

$\frac{4444.4}{255} = 17.4 \text{ modules}$

Round down to 14 modules, but when pricing out, remember to use system watts
 $14 \times 255 = 3,570 \text{ PV watts}$

$\frac{3,570 \text{ w}}{1,000 \text{ w}} = 3.57 \text{ kW}$

Part number required for pitched roof with composition roof at 3.57 kW. Enter quantity of 3,570 for the following component:

EC0162 | BSE Part # 2728096 Sunkit with SMA string inverter and Sunfix mounting hardware

Nationally, roof-mounted systems range from \$6–9 per PV watt installed (material and labor). The example above is using the high-dollar per system PV watt installed. To calculate system size based on low dollar per system PV watt, use \$6 as a value in place of \$9. Notes: Calculations are strictly educated calculations, actual system size may vary.

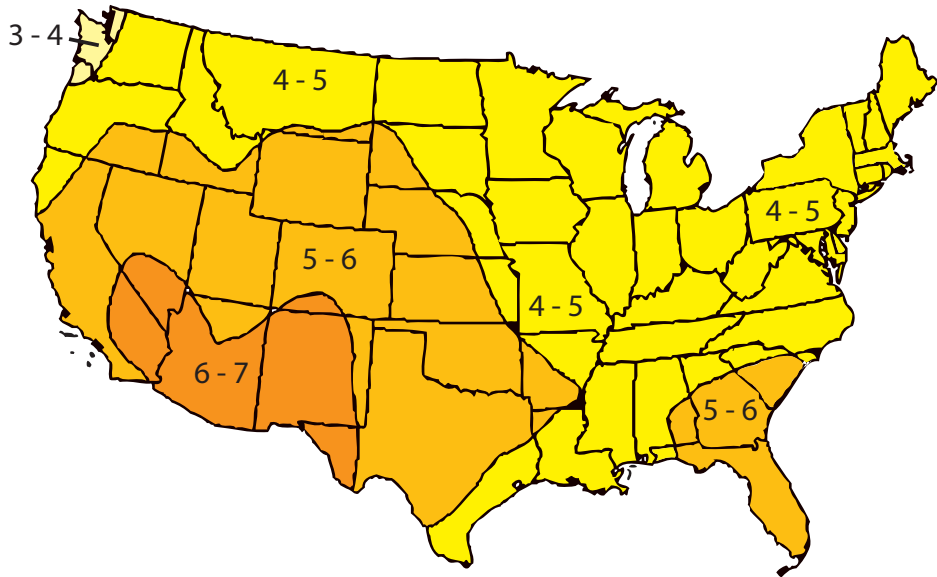
1 Installed PV watts factor to generate 1 kWh per month: Based on average sun-hours per day graph, where sun-hours show 4–5: use 10; where sun hours show 5–6: use 9; where sun-hours show 6–7: use 8.

2 See SW module chart.

3 Appropriate installable roof space: If given full roof size area, get length and width of roof and subtract 3' from all sides for working space around the array; then multiply modified length x width for appropriate square feet.

4 Based on historical averages of electrical usage; only use as a guideline.

Average sun-hours per day



SW module chart

SW mono modules	SMA 2000HFUS 240	SMA 2500HFUS 240	SMA 3000HFUS 240	SMA 3000US 240	SMA 4000US 240	SMA 5000US 240	SMA 6000US 240	SMA 7000US 240	SMA 8000US 240
8	8			9					
9	9			10					
10	10			11					
11		11		12					
12		12		13					
13			13	14					
14			14	20					
20				22					
22				24					
24				26					
26				28					
28				30					
30				33					
33				36					
36				39					
39									

SolarWorld Sunkits

Sunkits are the base system that includes the modules, inverter, racking and composite pitched-roof shingle mounts. Other products are alternative mounts and alternative racking.

Finalize quotes

After you quote, using this product selection, and receive a preliminary or firm order, take the next steps and fill out the questionnaire. The questionnaire must be completed and sent to SolarWorld if a financial proposal is desired for the preliminary order.

Sunkits® (Base kit) – SolarWorld

Complete solar energy system custom designed for your job.

- 60-cell 255 W monocrystalline Sunmodule™ solar panel (number of panels depends on kW required)
- SolarWorld Sunfix plus mounting solution for composition pitched roofs which include Quick Mount PV® classic composition mount flashings
- String inverter (SMA or PV Power) or micro inverter (Enphase)
- Monitoring solutions are not included in the price of the Sunkit but are available separately



Mfr. Model #	kW Rating	Standard	Manufacturer	Inverter type	BSE Part #
EC0160	< 2.3 kW		SMA	String	2728094
EC0161	2.3–2.99 kW		SMA	String	2728095
EC0162	3–9.99 kW		SMA	String	2728096
EC0163	> 9.99 kW		SMA	String	2728097
EC0164	< 2.3 kW		PV Power	String	2728098
EC0165	2.3–2.99 kW		PV Power	String	2728099
EC0166	3–9.99 kW		SMA	String	2728100
EC0167	> 10 kW		SMA	String	2728101
EC0168	< 1.2 kW		Enphase	Micro	2728102
EC0169	1.2–9.99 kW		Enphase	Micro	2728103
EC0170	10–19.99 kW		Enphase	Micro	2728104
EC0171	> 20 kW		Enphase	Micro	2728106

Black Sunmodule™ – SolarWorld

Optional upgrade to black monocrystalline Sunmodule™ solar panel with 2.0 black anodized aluminum frame (number of panels depends on kW required).

- Optional black Quick Mount PV® flashing upon request, no additional charge



Mfr. Model #	BSE Part #
EZ0020	2728116

Classic Composition Mount – Quick Mount PV®

Upgrade for alternate ProSolar, Unirac or DPW Solar rail mounting systems.

- Available in clear anodized or bronze anodized finish
- Made for single bolt installation



Mfr. Model #	Mount	BSE Part #
EZ0026	Alternate	2728119

Classic Shake Mount – Quick Mount PV®

- Available in clear anodized or bronze anodized finish
- Made for single bolt installation
- Use alternate mount when ProSolar, Unirac or DPW Solar railing systems are specified



Mfr. Model #	Mount	BSE Part #
EZ0023	Standard	2728120
EZ0027	Alternate	2784390

Universal Tile Mount – Quick Mount PV®

Universal flashing that allows for flashing for all tile roofs, curved or flat.

- Attaches to roof structure with 2 or 4 fasteners
- Use alternate mount when ProSolar, Unirac or DPW Solar railing systems are specified



Mfr. Model #	Mount	Finish	BSE Part #
EZ0024	Standard	Clear	2728121
EZ0025	Standard	Bronze	2728122
EZ0028	Alternate	Clear	2784391
EZ0029	Alternate	Bronze	2784392

Extensions – Quick Mount PV®

Adds additional stanchion height between PV modules and roof to increase airflow or to clear obstructions.

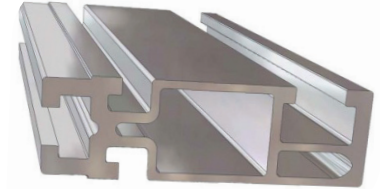
- Made of extruded aluminum
- Use with standard composition or shake mounts
- Available in 2-1/2", 3-1/4" and 4" lengths



Mfr. Model #	BSE Part #
EZ0030	2728123

SolarMount™ Alternate Mount – Unirac®

Alternate rail mount system in lieu of SolarWorld Sunfix rails for pitched roof.

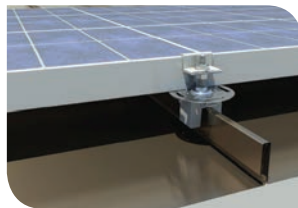


Mfr. Model #	BSE Part #
EZ0035	2728124

Standing Seam – S-5!®

Nonpenetrating mount for metal roofs with standing seams.

- For use with metal roofs only
- Type of seam must be identified prior to ordering



Mfr. Model #	BSE Part #
EZ0040	2728128

Power Rail™ Alternate Mount – DPW Solar

Alternate power rail mount system in lieu of SolarWorld Sunfix rails for pitched roof.



Mfr. Model #	BSE Part #
EZ0045	2728134

RoofTrac™ Alternate Mount – ProSolar

Alternate rail mount system in lieu of SolarWorld Sunfix rails for pitched roof.

- Aluminum and stainless steel components
- Spans are 4' or 6' apart



Mfr. Model #	BSE Part #
EZ0031	2784393

SolarWedge™ – ProSolar

Low-profile mount provides easy install for commercial and residential flat roofs.

- Mounts are attached structurally to the building
- Available in 5°, 10° or 15° tilt angles
- Spans are spaced 6' apart



Mfr. Model #	BSE Part #
EZ0032	2728117

RoofTrac™ – ProSolar

Tilt up kit for flat roof installations.

- Used with patented RoofTrac™ support rail for tilts up to approximately 28°



Mfr. Model #

EZ0033

BSE Part #

2728118

SolarMount™ Tilt Kit – Unirac®

Tilt up kit for flat roof installations.

- Available in 8–12", 18–30", 26–44" or 40–72" adjustable tilt leg



Mfr. Model #

EZ0037

BSE Part #

2728125

SolarWedge™ – ProSolar

Low-profile mount provides easy install for commercial and residential flat roofs.

- Mounts are attached structurally to the building
- Available in 5°, 10° or 15° tilt angles
- Spans are spaced 6' apart



Mfr. Model #

EZ0032

BSE Part #

2728117

RAPIDRAC™ – Unirac®

Ballasted mount racking system for use when no roof penetration is required.

- Fixed 10° angle
- Made for nonpenetration on flat rooftops
- Ballast material not included



Mfr. Model #

EZ0038

BSE Part #

2728126

RoofTrac™ – ProSolar

Tilt up kit for flat roof installations.

- Used with patented RoofTrac™ support rail for tilts up to approximately 28°



Mfr. Model #

EZ0033

BSE Part #

2728118

Ballasted Roof Mount – DPW Solar

Ballasted mount racking system for use when no roof penetration is required.

- Allows for seasonal elevation adjustment
- Ballast material not included



Mfr. Model #

EZ0046

BSE Part #

2728135

SolarDock® Mounting System – SolarDock™

Ballasted mount racking system for use when no roof penetration is required.

- Customizable angle of inclination, but must be greater than 25°
- Allows for unrestricted water drainage
- Ballast material not included



Mfr. Model #	kW	BSE Part #
EZ0042	<20 kW	2728130
EZ0043	20–49.99 kW	2728131
EZ0044	>50 kW	2728130

Large Ground Mounts – DPW Solar

Fixed tilt PV mounting system.

- Several height options; 2–6 modules high in landscape orientations
- Installs over standard 2" or 2-1/2" installer provided schedule 40 or 80 rigid steel pipe
- Capable of any fixed tilt angle



Mfr. Model #	BSE Part #
EZ0047	2728136

GroundTrac® – ProSolar

Ground mounting system designed with a minimum amount of installed footings which greatly reduces labor required at install.

- System integrates with standard installer provided schedule 40 steel pipe
- No cross-bracing required



Mfr. Model #	BSE Part #
EZ0034	2784395

U-LA™ – Unirac®

Large array mount system for ground, roof or open structure installations.

- Aluminum or steel components merge with SolarMount rails and installer-supplied schedule 40 or 80 steel pipe for durable, rigid truss structures
- Accommodates uneven, rocky, sloping terrain or heavy coastal winds



Mfr. Model #	BSE Part #
EZ0039	2728127

POWER-FAB® – DPW Solar

Top of pole PV mount system with single ground penetration.

- Installs over standard installer-supplied schedule 40 or 80 rigid steel pipe
- 6 manual tilt angles available allowing for seasonal elevation adjustment
- Ability to mount up to 4.1 kW on a single pole



Mfr. Model #	BSE Part #
EZ0041	2728129

Solar Trackers® – Wattsun™

Solar trackers with optical sun-sensing device dramatically outperform passive tracking systems. The solid state electronic design and positive drive mechanism insure consistent operation in extreme temperatures and windy conditions.



Mfr. Model #	Axis	Modules	BSE Part #
EZ0048	Single	6	2728137
EZ0049	Dual	6	2728138
EZ0050	Dual	9	2728139
EZ0051	Dual	12	2728140



Contractor steps

Visit potential customer and submit the completed SolarWorld questionnaire to Border States.

Border States and SolarWorld send you a customized financial proposal to help with the sale.

Submit purchase order with the proposal number and requested delivery date to Border States.

Border States instructs SolarWorld to ship directly to your warehouse or job site.

Install the system and collect payment from customer.



A 100% Employee-owned, American Company
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BORDER STATES
Supply Chain Solutions™