THE SOLAR ERA

The dwindling sources of petroleum and rising cost have led governments everywhere to seek alternative sources of energy. Some of these alternate sources include hydroelectricity (dams), wind, tidal, geothermal, and solar. All but solar involve mechanical devices that wear out with time, require special locations, are noisy, and require huge investment. In contrast, photovoltaic solar is silence, never wear out, and will work anywhere in the solar system!

Solar energy consists of either thermal or photovoltaic technology. Thermal solar energy converts the sun's heat to electricity. Therefore, it is also dependent on locations (will not work in the Antarctica or on Mars). What is left is solar photovoltaic, which truly works silently everywhere in the solar system. Initial investment is as small as a single solar panel and the dedication of a little space to expose it to the sun. Our sun was born five billion years ago and is expected to have another 5 billion years before it turns into a Red Giant, engulfing the Earth in that process. With panel meeting sunshine, you will smile, as the electricity meter turns backward! The following describes two types of solar systems, System A and System B.

Off-Grid Systems (System A)

Off-grid systems mean your solar panel system is not designed to connect to the utility grid. Figure 1 shows the components of an off-grid system: solar panel(s), solar regulator, and batteries. For DC-powered components (12 volts), you can connect them directly to the batteries or into the load terminals of the solar regulator. For AC-powered components (120 volts), you connect your batteries to an off-grid inverter, which will output 120 VAC. Appendix D describe some of the terminologies used.

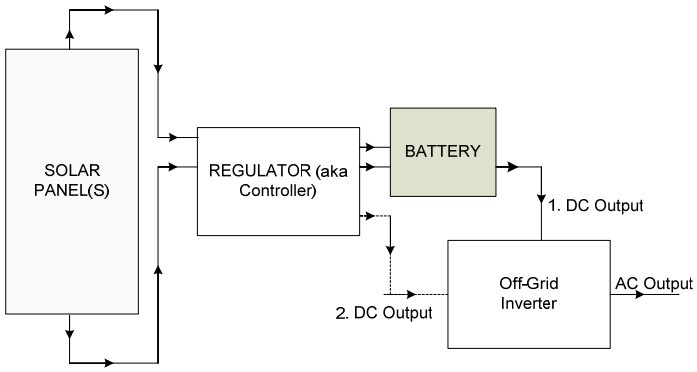


Figure 1. Off-Grid System.

Components Needed

Charge Batteries

Solar Panel (minimum 90W recommended, see Appendix A)
Solar Regulator (see Appendix B)

Deliver the AC Power

Battery (deep-cycle batteries recommended)
Power Inverter (model STD1000WOG, see Figure C1) must not plug to the grid, will explode. If connecting inverter's AC output to building's wiring, ensure building is *disconnected* from grid.

On-Grid Systems (System B)

On-grid systems mean your solar panel system is designed to connect to your utility grid to push solar generated energy into the grid, thus reversing the electricity meter. Figure 2 shows an on-grid system. In an on-grid system, you do not use any batteries but instead the grid serves as your virtual batteries.

Figure 2. On-Grid System.

Note: Our solar panels are designed **for outdoors** (e.g., rooftop, take hailstorm, rain)

Batteries are expensive, take up storage, heavy, and corrode because of the chemical (sulfuric acid) inside them. Most on-grid systems require an electrician to setup a special electrical box to connect to the grid, but not ours. As shown in figure 2, our special on-grid system is plug-n-play; you simply plug the inverter's output into the wall outlet.

In addition, our on-grid inverter is stackable, which means you can add more of them as your power needs increase. It has Island Effects Protection, which automatically cutoff power into the grid whenever your grid has a blackout. This prevents you from electrocuting any public utility technicians working outside to fix the blackout.

Components Needed

Solar Panels (90W or 130W, one or more panels needed, Appendix A)

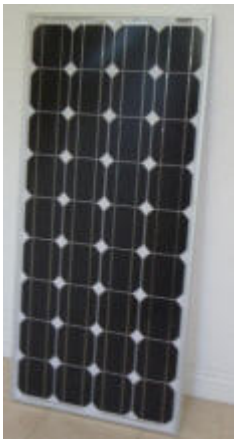
Power Inverter (model STD1000WG to deliver the AC Power and plug directly to wall outlet, see Figure C2). Output from this inverter will terminate whenever your grid has a blackout (i.e., Island Effects Protection activated, to avoid electrocuting utility repair people). Power pushed into the wall will slow down and possibly reverse your power meter!

Check with your power utility company for building codes compliance. Our 1,000W inverter is stackable, e.g., buy two to get 2,000W. Each inverter will service about ten 90W or eight 130W solar panels.

Appendix A –Solar Panels

130 Watts: STE130W

Brand New. High Efficiency and Newer Monocrystalline Technology. 5 years manufacturer warranty, 25 years on 80% of rated wattage. Anodized aluminium frame. 24.4V(Vmp), 5.33A (Imp), Open circuit: 28.8V, 5.81 amperes. Maximum system voltage: 1000 volts. Textured, tempered solar glass. Dimension: 42.5 x 31.75 x 1.5" inches.



90 Watts: STD90W

Brand New. High Efficiency and Newer Monocrystalline Technology. 25 years manufacturer warranty. Anodized aluminium frame. 18.11V, 4.97A peak. Open circuit: 22.32 volts, 5.25 amperes. Maximum system voltage: 1000 volts. Textured, tempered solar glass. Dimension: 47.2 x 21.7 x 1.38 inches.

45 Watts: STD45W

Brand New. High Efficiency and Newer Monocrystalline Technology. 25 years manufacturer warranty. Anodized aluminium frame. 17.58V, 2.57A peak. Open circuit: 22 volts, 2.76 amperes. Maximum system voltage: 6000 volts. Textured, tempered solar glass. Dimension: 24.8 x 21.7 x 1.1 inches.
Note: We also have a 90W Foldable panel using two of the 45W.

Junction Box w/MC4 connectors

Foldable 90W

Appendix B – SolarTorrent Regulators

<table>
<tr>
<td> 

STCMPPT10
10 Amperes, to 480W panels. Take panels 12-40V, batteries 12-24V.
280 grams, 135x100x31 mm.</td>
<td>MPPT
Up to 40%
More
Efficient</td>
<td> 

STCMPPT15
15 Amperes, to 720W panels. Take panels 12-40V, batteries 12-24V.
280 grams, 135x100x31 mm.</td>
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<td> 

STCMPPT30
30A, to 1200W. Takes panels 12-40V (12V batteries), 12-80V (24V batteries).
760 gram, 193x112x53 mm.</td>
<td>MPPT
Up to 40%
More
Efficient</td>
<td> 

STCMPPT60
60A, to 6,600W. Takes panels 12-110V, batteries 12-24V.
1110 gram, 210×125×50mm.</td>
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STCPWM25A
25A, to 1,000W. Takes panels 12-40V, batteries 12-24V. LCD Display.
280 grams, 135x100x31 mm.</td>
<td>PWM</td>
<td> 

STCPWM15A
15A, to 720W. Takes panels 12-40V, batteries 12-24V.
280 grams, 135x100x31 mm.</td>
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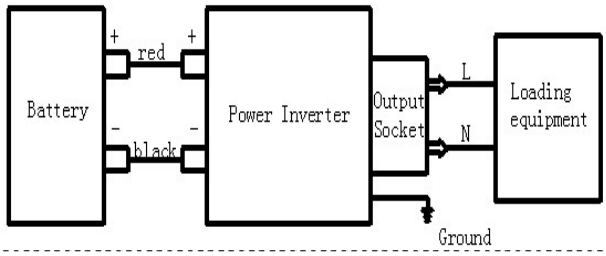
Appendix C – INVERTERS

Our pure sine wave inverter converts Battery DC (12V) to AC (120V, 1000W). Unlike Modified Sine Wave inverters that output square wave and cause a humming noise in stereo equipments and other static issues in AC electronics, pure sine mimics the power grid's power waveform exactly. The statics from modified sine wave may damage your electronics over time. Buy our pure since wave inverter for trouble-free AC power.



1KW Off-Grid Model (System A): STD1000WOG

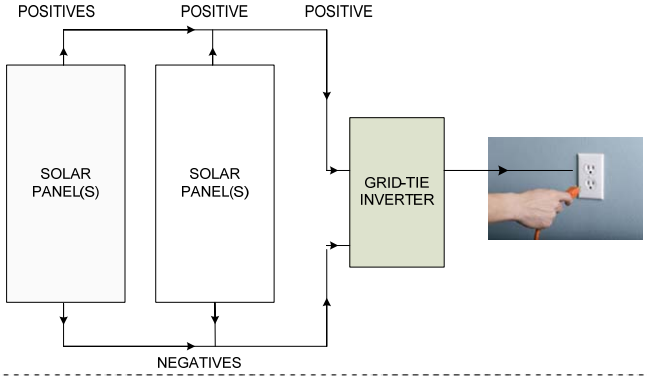
12V DC input, 120V AC, 60Hz, Pure Sine Wave

CE Certified. Output: AC 120V, 60Hz. Surge to 2KW
Size: 11.5 x 6.5 x 3 ins, Weight: 7.6 lbs.
Low Battery Shutdown: 9.7 to 10V DC
High Battery Shutdown: > 15V
Automatic Overload and High Temperature Shutdown
Includes a duplex 3-prong socket

 **3KW Off-Grid, Surge to 6KW**	CE Certified. Output: AC 120V, 60Hz. Size: 16 x 6 x 6 ins, Weight: 13.5 lbs. Low Battery Shutdown: 10 ± 0.5V DC High Battery Shutdown: >15.5V Automatic Overload and High Temperature Shutdown. Include a dozen fuses, two pairs of quality DC cables ($90 value), and two Universal Sockets

Figure C1 – 1KW and 3KW Off-Grid Inverters

STE1000WG Prof'l Inverter, with LCD



On-Grid Model (System B): STD1000WG
Solar Panels (to 28V) Input, 120V AC, 60 Hz Pure Sine Wave Outpt

Figure C2 – On-Grid (Grid-Tie) Inverter

STD1000WG Solar to Power Grid. 1,000 watts AC on-grid inverter with built-in MPPT function and Pure Sine Wave output . Push solar energy directly into the utility grid and reverse the electricity meter! No battery needed, do **not** use batteries as input. Island Effects Protection, Auto-fan. Plug-n-Play, no hard wired to grid needed. AC and DC cables included.

Input: Solar DC 10.5 to 28V (connect panels in parallel only to avoid exceeding volts limit, e.g., use panel rated 17V like our 90W or our 28V, 130W). For panels in series (not recommended), use a Converter to bring volts down first.
Output: AC 120V, 60Hz, auto-synchronize with grid's power.
Safety: CE Certified. Conform to EN61000-3-2 and DIN VDE 126 standards.
Size: 12 x 6.5 x 2 ins, Weight: 4.7 lbs. Nighttime Power Usage < 1W.

STE1000WG 1KW inverter for panels of up to **50V DC** (takes the 90, 130W or larger-wattage panels) that takes solar/wind/battery as input power and doubled as an off-grid inverter. DC Input: Solar/Wind turbine (20-44VDC), or battery (24V)
AC Output: 120VAC, 60Hz (to grid or Load terminals)
DC Output: To battery (24V)
Dimension: 17.5 x 13.75 x 4 ins. Weight: 39 lbs
LCD display: Solar watts/AC watts, inverter's temperature, volts/current I/O, on/off-grid (standby) mode

Appendix D – Terminologies

On-Grid or Grid-Tie

Power generated from solar panels goes through a grid-tie inverter to convert panel's direct current (DC) to alternating current (AC) of the grid. No batteries are needed.

Off-Grid

Power from batteries (12V) goes through a off-grid inverter to convert current (DC) to alternating current (AC) for use with AC-based equipments (e.g., television). No solar panels are needed, but may be use to recharge the batteries.

Inverter

A electrical device that converts DC power to AC power (120VAC, 60Hz). On-grid and off-grid inverters are not interchangeable!

Pure Sine Wave

The power waveform from pure sine wave inverter is identical to that from your utility grid. Cheaper inverters only produce modified wave, which is square in waveform that may not run sensitive electronics and possibly damage them over time.

Monocrystalline

This is the type of solar cell used in the solar panel. Monos are more efficient than the cheaper Polycrystalline-type panels, which deteriorate fast under the sun.

WARNING

On-grid and off-grid inverters are different and not interchangeable. Never connect the output of an off-grid inverter to the grid (wall outlet of homes). If these warnings are not heeded, your inverter will smoke and possibly explode, voiding all warranties. There are unmistakable signs when the internal components of an inverter smoke or its ratings exceeding (by panels).

SOLARTORRENT
WHOLESALE PRICE LIST

Wholesale prices ($shiping in parentheses). Californians, adds sales tax. Prices subject to changes without notice (some are introductory prices, e.g., the inverters). We beat others' prices, show/call us.

SOLAR PANELS (5-year workmanship, 25-year/80% power limited warranty)

10 Watts (STB10W)	$50 (15)
45 Watts (STC45W)	$170 (28)
90 Watts (STD90W)	$249 (38)
90 Watts (STD90WFold, foldable w/regulator)	$438 (38)
130 Watts (STE130W)	$375 (60)

SOLAR REGULATORS

15A, PWM (STCPWM15A)	$49 (12)
25A, PWM (STCPWM25A)	$170 (12)
10A, MPPT (STCMPPT10)	$95 (12)
15A, MPPT (STCMPPT15)	$138 (12)
30A, MPPT (STCMPPT30)	$238 (30)
60A, MPPT (STCMPPT60)	$399 (30)

INVERTERS

Off-Grid Pure Sine 1000 Watts (STD1000WOG)	$238 (28)
Off-Grid Pure Sine 3000 Watts (ST3000W)	$548 (35)
Grid-Tie 1000 Watts (STD1000WG)	$589 (30)
Grid-Tie 1000 Watts (STE1000WG), w/LCD	$998 (55), introductory price

BUNDLES (more savings!)

Nine 90W panels + STD1000WG	$2775 (320)
Six 130W panels + STD1000WG	$2483 (288)

We take credit cards or PayPal if you buy online. Payments by checks get a $10 discount for each item over $250. Please write checks payable to:

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