



## Grid-tied Solar System Overview

For SolarEdge "StorEdge" + LG Systems

Prepared by Cevyn L Miles-Monaghan, August 2017

# Residential SolarEdge StorEdge PV/Battery System Overview





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# Safety Information

In the case of an emergency, call 911 first and then contact  
mtvSolar:

Mountain View Solar, LLC  
11500 Valley Road  
Berkeley Springs, WV 25411  
  
(304) 258-4733 or 877-96-SOLAR

### Ground Faults:

Use extreme caution any time an electrical fault is indicated by the system!

The inverters will shut-down if a ground-fault is detected. This will not necessarily eliminate the fault. Refrain from touching metal system components if a ground fault is indicated.

In the event of a ground fault warning:

**CALL US IMMEDIATELY!**

Always contact us if you have any concerns regarding the system. Do not open any electrical enclosures within the system; there are no user serviceable components inside. Doing so may void the manufacturer's warranty.

For technical documents or information, please email [cevyn@mtvsolar.com](mailto:cevyn@mtvsolar.com) so that attachments can be sent as needed.

Our master electrician is Jason Arnold, [jason@mtvsolar.com](mailto:jason@mtvsolar.com)

For general inquiries, mtvSolar may be reached via [info@mtvsolar.com](mailto:info@mtvsolar.com) or 304-258-4733.



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### Circuit Breakers

Circuit breakers are intended to protect wiring and components from dangerous meltdown due to overload or short circuit. A correctly functioning breaker will not trip unless an overload condition has occurred for a period of time. A tripped breaker can be re-set by the owner to resume operation.



The image above shows two breakers. The top one is ON and normal, the bottom one is tripped. The handle will be more centered and orange can be seen through the window to indicate that it had tripped. To reset a tripped breaker, correct the overload situation, and then switch it all the way to the OFF position, and then back ON.

### Fuses

Fuses are also protection devices but they can not be reset. The fuses in a solar PV system are often large and can carry high voltages and current. Fuses are generally hidden behind a cover secured with a screw and/or locked. If proper procedure is not followed during fuse replacement, electrocution and/or burns can result. Therefore it is **strongly advised** to contact mtvSolar for service if a fuse is suspected to have blown.





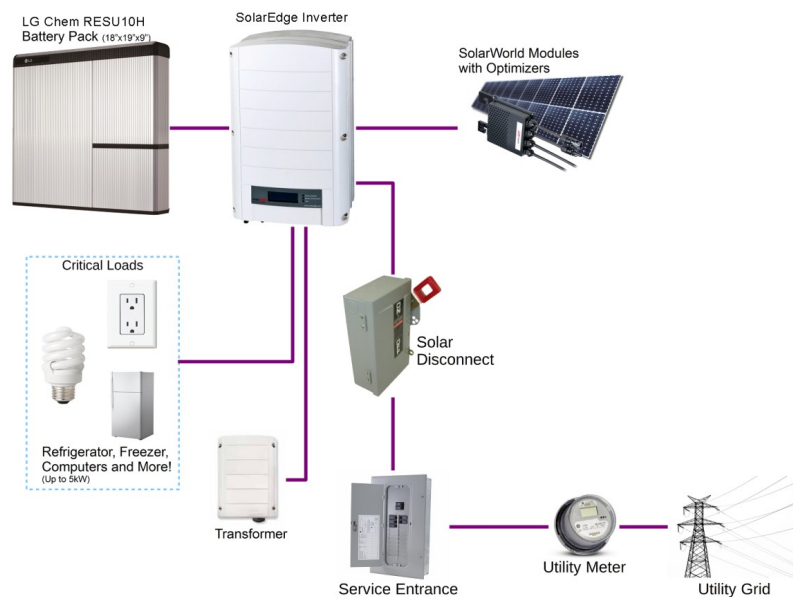
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### About Your System

Congratulations on the installation of your SolarEdge/LG solar backup system! SolarEdge represents the most advanced inverter system available for the conversion of power from the photo-voltaic array to power your house can use. In general, this is how it's all connected together:



The SolarWorld modules each have an optimizer which is a DC-DC converter that maximizes the power available from that module. If some modules are shaded, the optimizers ensure that the remainder are not affected.

The power from the optimized array is fed into one or more SolarEdge inverters. These actually convert the DC power into AC power for your home. This power is either back-fed into a circuit breaker in your main service panel, or is supply side tapped if the array is too large to back-feed a breaker.

Your house uses whatever power it needs first, and any excess flows back out to the grid to accumulate a kilowatt-hour credit on your power bill for later use via a process called net-metering. If the utility power fails, the inverter automatically switches into backup mode and keeps the critical loads powered from the battery and solar.

More details on each of these components follows.



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### Utility Power Failures

Your SolarEdge "StorEdge" system with LG battery is referred to as a hybrid system. When utility power is present, power is back-fed to the utility and counted as a credit via a process called net metering. This is the normal grid-tied mode of operation.

When the utility power fails, the inverter immediately ceases sending power to the utility as required by code. Soon after, it switches into an off-grid mode where the critical loads panel continues to receive power from the solar and batteries. The main service panel in the home remains without power.

While operating on solar and batteries, there is a finite amount of power available. It is important to observe the battery state of charge via the inverter screen to ensure you don't run out of energy unexpectedly:



Button located here

To view the battery info screen, push the green button on the underside of the inverter repeatedly until it appears as shown. The SOE % number indicates charge level.

On a sunny day if you have sufficient solar gain the battery may be charging or full while the loads continue to operate. If there is not enough solar for all of the load, the battery will assist. At night, the battery carries the load completely until sunrise.

All of this is automatic. When the power initially fails, all loads in the home will be without power. Within a few seconds, the StorEdge energizes the critical loads panel without any user intervention.

Upon return of utility power, the inverter will switch back into grid-tied mode. After a 5 minute countdown, provided there is more solar energy available than the battery needs to recharge, the inverter will resume feeding excess power back into the utility.



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### Surge Suppressors

Your system may have surge suppressors installed to help protect your inverters from power spikes.

The blue ones are the solar-side protection devices:



Each suppression device has two blue LEDs inside. When the sun is shining, these LEDs will both be lit. If at any time you notice one or both LEDs not lit and the sun is shining, contact mtvSolar for inspection.

The gray ones are the grid-side protection devices:



Each device has two green LEDs inside that will be lit during normal operation. If utility power is off, these lights will not be lit. If utility power is on and these lights are not lit, the device may need replacement.



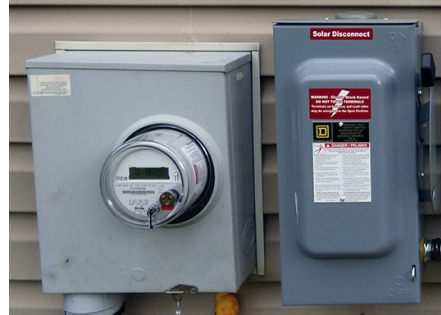
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### Disconnects

Your system will have an AC electrical disconnect switch. This is required by the utility and will be located close to your utility meter:



Switching this disconnect OFF will disconnect the system from the utility. The critical loads will operate just the same as during a power failure.

Your system will also have a DC disconnect switch below the SolarEdge inverter:



Switching this disconnect OFF will cause the connection between the inverter, the battery and the solar array to be turned off immediately.

During normal operation, all disconnects will be in the ON position.

If at any time you need to turn the system off completely, switch all disconnects to the OFF position. Refer to the LG User's Guide to turn off the battery if the system is to remain off for more than a couple of days.



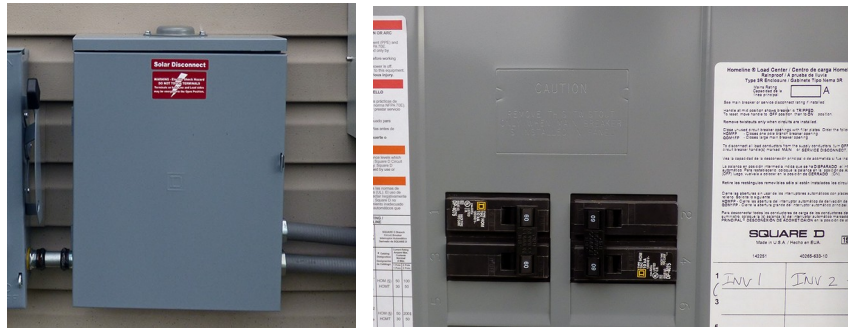
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### AC Combiner

If your system has more than one inverter, you will also have an AC combiner as part of the installation:



The combiner will contain circuit breakers, one for each inverter. During normal system operation, all breakers should be ON.

### Optimizers

SolarEdge optimizers are located beneath each panel of your array and are warrantied for 25 years:



These are maintenance free. If there is a problem with an optimizer, it can be diagnosed via the Internet monitoring portal.





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### Solar Modules

Solar panels, more accurately known as solar modules, comprise the array:



SolarWorld modules are largely maintenance free. Rain showers do the washing, and snow generally slides off rather quickly after a storm.

If your panels are on the ground, a micro-fiber mop on a long pole can be used to wipe them clean if you desire, however this will not drastically increase your production unless they are very dirty.

If your panels are on the roof we do not recommend that you attempt to clean them by yourself. Contact mtvSolar for recommendations.

### LG Chem RESU10H Battery



The battery in your system is a state-of-the-art wall mounted lithium battery storing 9.3kWh of usable energy. It can supply up to 5kW of power continuously.

The battery itself has a display with no buttons. The display will indicate that it is on and charging (shown above), discharging, or indicate a fault. See the attached LG guide for specific details. The battery is maintenance free and warranted for 10 years.



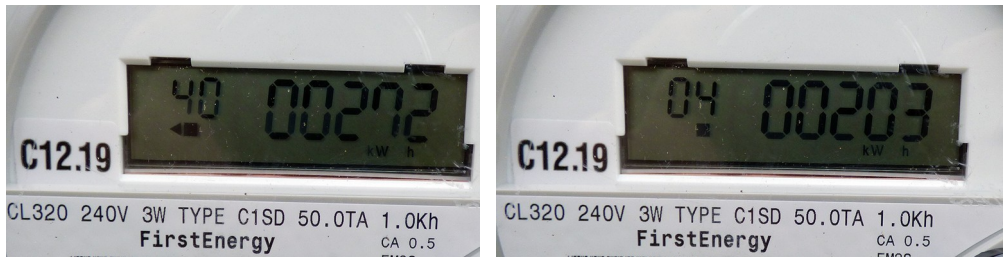
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### Utility Net Meter

Typically within a month after installation is completed your utility company will swap your meter for a net meter:



Depending on your utility company, your net meter may look slightly different. Since most systems we install are serviced by FirstEnergy, this is the example shown above. Your utility company can explain your particular meter if it is different.

The most common net meter will rotate between two different displays. The one with the 40 indicates power you've sent TO the grid, and the one with the 04 indicates power you've pulled FROM the grid.

### About Net Metering

The term "net metering" refers to the process of counting the number of kilo-watt hours of energy you use, and the number you push back into the grid. A bit of subtraction yields your "net" energy use.

For example, in the photos above the amount pulled from the utility is 203kWh, and the amount pushed back to the utility is 272kWh. Therefore, there is a net surplus of 69kWh.

The difference at each meter reading is added to a kWh credit on your utility bill. If you use more power than you make from solar, this credit is drawn from before you are billed. You'll only start being billed once your credit is exhausted.

Typically, during the summer is when a credit will accumulate, and then it will be drawn down in winter.

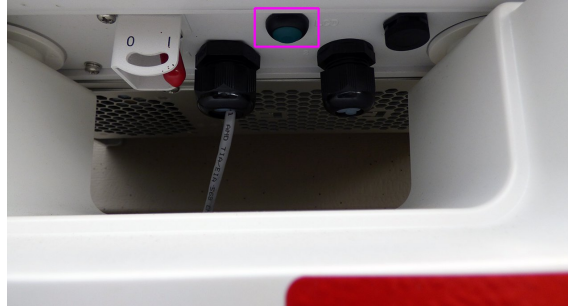


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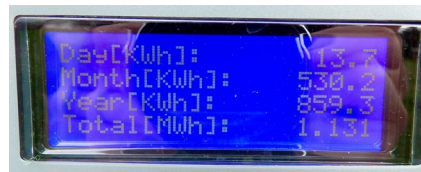
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### Viewing Inverter Information

On the underside of the inverter, above the DC disconnect, is a small green button:



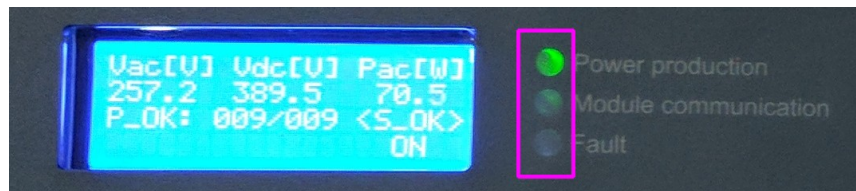
Pushing this button will cycle through various screens, including current status and power being produced, as well as one depicting total lifetime production:



In the photo at left, you see that in this example 24 out of 24 optimizers are working. The S\_OK indicates it's connected to the Internet. And the Pac[W] field indicates current production. In the photo at right, you can see the accumulated production over time.

### Faults

There are three LEDs on the front of the inverter:



The top green LED indicates the inverter is on and making power. This is normal. The middle yellow LED flashes each time an optimizer talks to the inverter. The bottom red LED indicates a fault. If the fault LED is lit, contact mtvSolar and we will diagnose online and issue instructions accordingly.

If pushing the green button has no effect, and all three LEDs are on, reset the inverter by turning the AC and DC disconnects off, wait a minute, and then turn them back on again. Refer to "disconnects" above. If the fault does not resolve, contact mtvSolar.



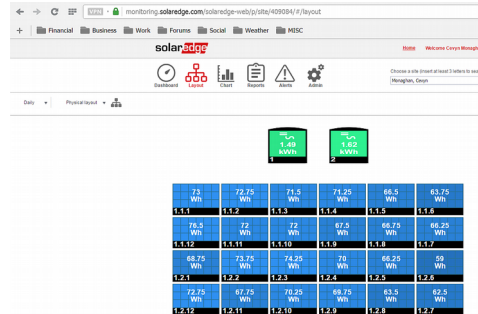
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### Internet Monitoring

Your SolarEdge system comes with Internet cloud based monitoring. Provided that the Inverter has a reliable Internet connection, it will report production data which can be viewed online:



After your net meter is set and the system is turned on, we will "map" the array. This means creating a computer layout in the portal representative of your actual solar array, so that you can see the panels as they are positioned.

Once this is complete, SolarEdge will dispatch an email to the email address we have on file. This message sometimes goes to bulk/spam folders, so check there periodically. Once you have this email, there is a link inside that you must click and follow through the onscreen prompts to set up access to the portal.



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### Additional Resources

LG Chem RESU10H User's Guide

[http://www.mtvsolar.com/Resources/LGChem\\_RESU10\\_Guide.pdf](http://www.mtvsolar.com/Resources/LGChem_RESU10_Guide.pdf)

New System Installed - Your Next Steps

<http://www.mtvsolar.com/Resources/SystemInstalledNextSteps.pdf>

SolarEdge Monitoring portal documentation

[http://www.mtvsolar.com/Resources/SolarEdge\\_monitoring-portal-user-guide.pdf](http://www.mtvsolar.com/Resources/SolarEdge_monitoring-portal-user-guide.pdf)

SolarEdge Monitoring troubleshooting

[http://www.mtvsolar.com/Resources/SolarEdge\\_Troubleshoot\\_ForCustomer.pdf](http://www.mtvsolar.com/Resources/SolarEdge_Troubleshoot_ForCustomer.pdf)

Reading Lifetime production totals, step by step

[http://www.mtvsolar.com/Resources/SolarEdge\\_ReadingProduction.pdf](http://www.mtvsolar.com/Resources/SolarEdge_ReadingProduction.pdf)

SolarEdge Optimizer pairing procedure

[http://www.mtvsolar.com/Resources/SolarEdge\\_Pairing\\_ForCustomer.pdf](http://www.mtvsolar.com/Resources/SolarEdge_Pairing_ForCustomer.pdf)

We also have other resources available in our customer resources section of our web site:

<http://www.mtvsolar.com/customer-resources/>

### Customer service

For technical issues, you may email me directly at [cevyn@mtvsolar.com](mailto:cevyn@mtvsolar.com) and I can diagnose many of them online.

For other questions, you may contact your mtvSolar sales representative or call our main office at 304-258-4733.

### SolarEdge Manufacturer Web Site

<http://www.solaredge.us>