**Grid-tied Solar System Overview**

For SolarEdge Systems

Prepared by Cevyn L Miles-Monaghan, Sept 2017

# Residential SolarEdge

## PV System Overview

# 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.**

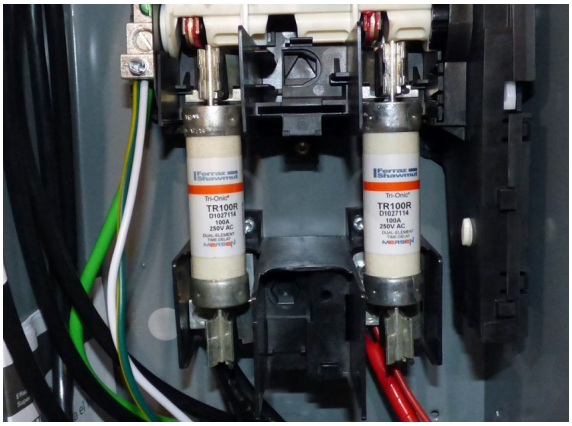
## Circuit Breakers

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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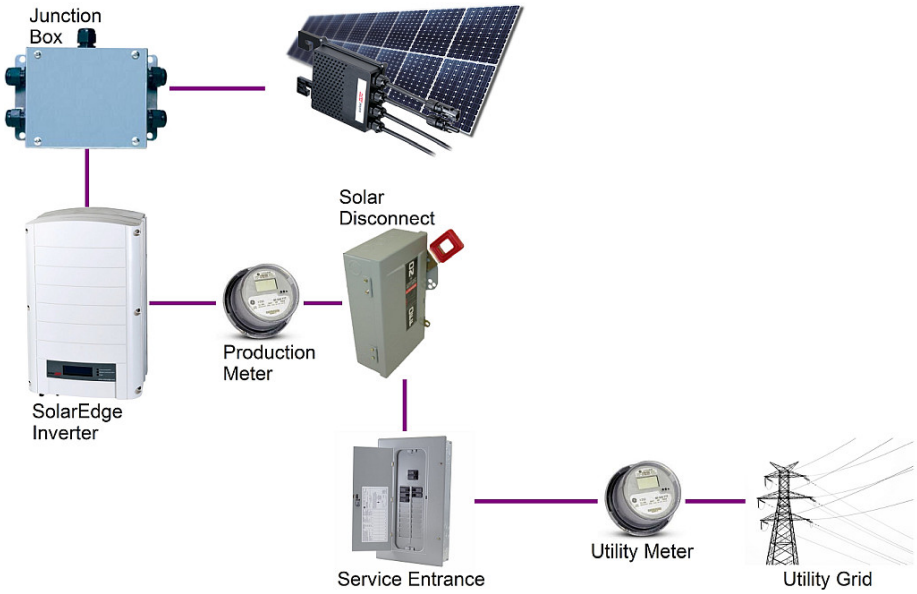
## About Your System

Congratulations on the installation of your SolarEdge based solar energy 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.

More details on each of these components follows.

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## Utility Power Failures

Your SolarEdge system is a grid-tied system. This means that utility power must be operational for the system to operate.

Your system is installed in accordance with the national electric code (NEC). Solar systems that are connected to the utility grid are required to shut down automatically upon loss of utility-supplied power per NEC 690.61.

This feature is called anti-islanding. The purpose is to prevent workers on the power lines from being electrocuted during repairs when they believe the line to be de-energized.

Your SolarEdge inverter(s) are UL 1741 listed and meet the requirements of NEC 690.61.

Upon restoration of utility power, the system will wait 5 minutes for stable power and then resume operation.

If mtvSolar also installed a battery backup system in combination with your SolarEdge system, then it may be AC coupled and capable of functioning without utility power. Your mtvSolar sales rep can answer questions related to backup power during utility power failure.

## Surge Suppressors

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

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.

## 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 cause the entire system to power down immediately.

Your system will also have a DC disconnect switch similar to as shown below for each SolarEdge inverter:


Switching this disconnect OFF will cause the connection between that inverter and the 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.

## 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:

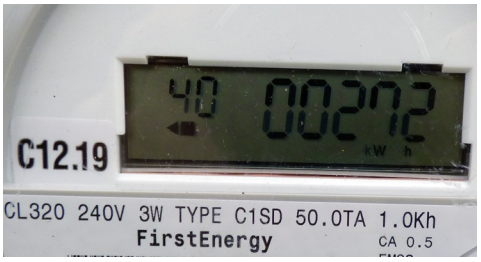
SolarWorld modules are largely maintenance free. Rain showers do the washing, and snow generally slides off rather quickly after a storm.

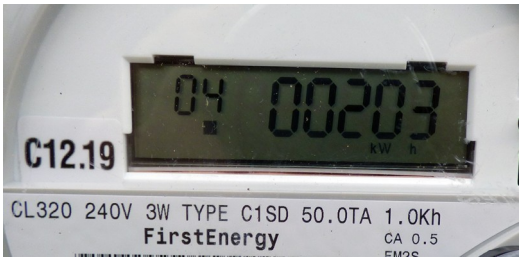
If your panels are on the ground, a micro-fiber mop on a long pole can be used to wipe them clean if you desire, however this will not drastically increase your production unless they are very dirty.

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

## 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.

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## 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.

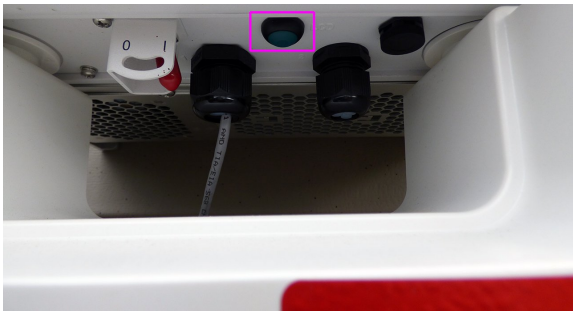
For example, in the photos above the amount pulled from the utility is 203kWh, and the amount pushed back to the utility is 272kWh. Therefore, there is a net surplus of 69kWh.

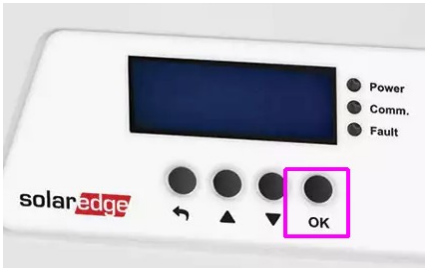
The difference at each meter reading is added to a kWh credit on your utility bill. If you use more power than you make from solar, this credit is drawn from before you are billed. You'll only start being billed once your credit is exhausted.

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

## Viewing Inverter Information

Push the button, either the green button or OK button, depending on the style of inverter you have:





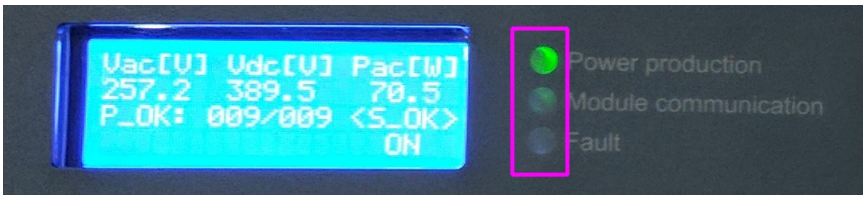
Pushing this button will cycle through various screens, including current status and power being produced, as well as one depicting total lifetime production:



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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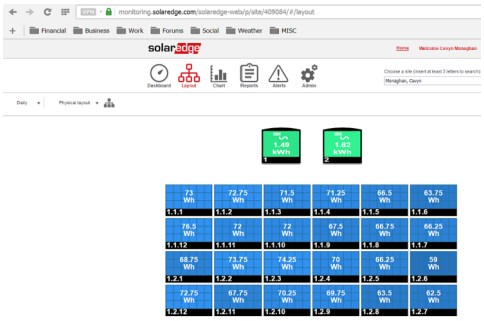
## Internet Monitoring

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.

## Additional Resources

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

SolarEdge Monitoring troubleshooting
http://www.mtvsolar.com/Resources/SolarEdge_Troubleshoot_ForCustomer.pdf

Reading Lifetime production totals, step by step
http://www.mtvsolar.com/Resources/SolarEdge_ReadingProduction.pdf

SolarEdge Optimizer pairing procedure
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 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