



Rapid Solar ShutDown (RSS) Patent # 10,388,802 B2

- Provides fail-safe module-level shutdown
- Very fast: in 2-3 seconds it synchronously shuts down all modules in a string
- Shuts down the entire DC side of a PV system in less than 30 second
- Is activated by a loss of building power for life safety and property preservation.
Can be activated manually for service work or other shutdown needs
- Uses simple, affordable, rugged circuitry for maximum reliability and an unlimited number of on-off cycles: no problem in areas where there are frequent, short drop-outs & brown-outs
- Shorts out solar cells so they do not operate at Voc and also disconnects them from module output (redundancy)
- Is completely fail-safe, and is not reliant on energy from the modules or from an outside source in order to function
- Control voltage of 15 Volts, 60 Hertz AC meets standard for shock hazard in wet conditions
- Meets ride-through requirements at 50% line voltage for 20 seconds for UL1741 and California and does not drop out for 1 second at zero line voltage. (47A.8)
- No emitted EMI/RFI (long wires!)
- No susceptibility to EMI/RFI (walkie-talkies)
- Does not rely on microprocessors or wireless communications which could interfere with reliability
- Includes diagnostic LEDs to make troubleshooting easy
- Will not trigger arc-fault detectors
- Keeps PV modules shut down and safe during installation
- Does not allow modules to be in an open circuit mode during transportation or installation
- Has backup shutdown method in case of fire or overheat: If one module overheats the entire string shuts down
- Meets all fire service requirements
- *No existing assembly line changes necessary*

Ancillary Equipment and Products

Current Source

Actuator

Combined low voltage and PV wire

Combined low voltage and PV wire dual connectors

Testing "wand"

"FireWire" (Trademarked)

Future: required for fire protection in all standard wiring, devices, appliances
etc. (NYC spends 40k per day to identify underground shorts)

Module Level Rapid Solar Shutdown that is Simple, Economical, and Failsafe, for Lifesaftey and NEC Compliance

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Solar Panel Mounting System and Method Patent # US 11,283,396 B2 3/22/2022

An interlocking module frame with *no* mounting hardware required and an integrated wire management and protection system: aka SolarOn and Squirrel Guard

An installer's dream: eliminates handling of a multitude of small parts and tools, makes layout and spacing automatic and simple.

Interlocking self-grounding frame with "captured" bolts

Can be installed in (>?) half the time of typical modules

Can be installed by one person vs 2

No parts to handle on the roof

One tool required

 Fast simple layout

 "Automatic" and consistent alignment of modules

 No measuring required

 Modules stay in place while torquing bolts

Easy wire connections (no lifting and reaching under the modules)

Wires concealed and protected from varmints and chaffing

Reduces the amount of pv wire needed by 60%

Readily adapted to current production with minimal added cost

Eliminates the need for nuts and bolts and clamps and wire clips.

Safer, quicker, cheaper to install.

Reduces procurement, shipping and need for a multiplicity of inventory items.

Ancillary products

 Installation tool

 Layout square

 Squirrel Guard/Wire management can be sold as independent retrofit products

 Built in wire protection and squirrel guard

 Integrates with SolarOff System LLC's RSS

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