

Lightning Surge Suppression in Residential Systems

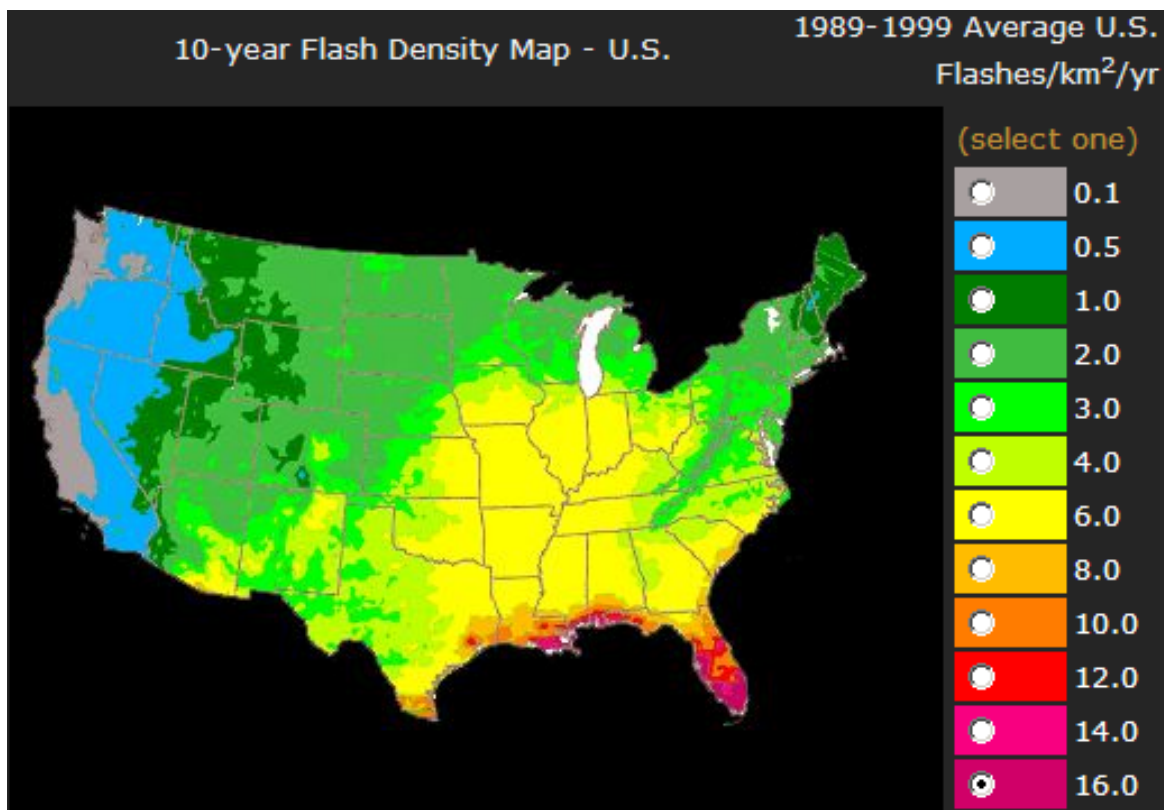
In certain parts of North America, the statistical frequency of lightning strikes near a photovoltaic (PV) installation can be high enough such that it is recommended that a lightning protection device be installed as part of the system. This technical brief points out geographic areas where the frequency of lightning strikes is high and provides an example of an applicable off-the-shelf product. Enphase does not warrant or guarantee the performance of any of these products.

Discussion

A lightning strike does not actually need to strike the equipment or building where a PV system is installed in order to cause damage. Indeed, a strike that is near enough will often induce voltage spikes in the electrical grid that can damage equipment. Enphase Microinverters have integral surge protection that is more robust than most string inverters. However, if the surge has sufficient energy, the protection built into the microinverter can be exceeded, and the equipment may be damaged.

Since the Enphase Limited Warranty does not cover “acts of God” such as lightning strikes, and since lightning strikes can occur anywhere, it is best practice to install surge protection as part of any solar installation. However, there are some geographic areas where the statistical probability of a damaging lightning strike is very high. For instance, in some parts of Florida the average frequency is 16 flashes per square kilometer per year, while in nearly all of California, Oregon and Washington the average number of flashes per square kilometer per year is a mere 0.5 or less.

The following diagram shows the frequency that lightning strikes occur relative to the location in the United States. (Lightning Density Map provided by Global Atmospheric, Inc. Tucson Arizona).

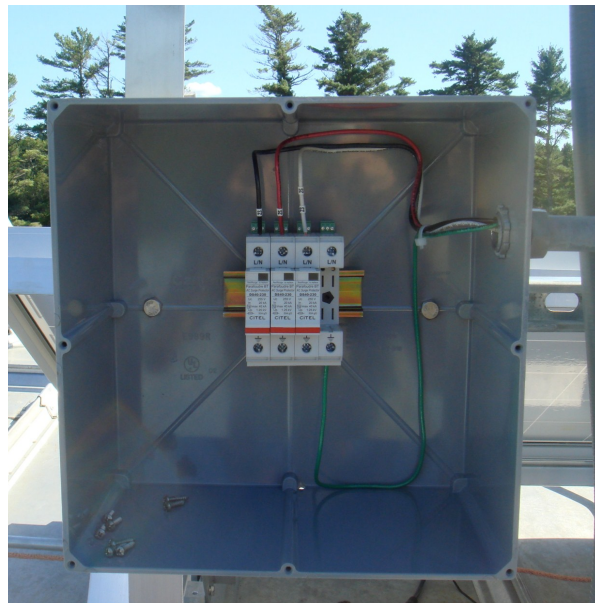


Recommendation

In areas with lightning flash incidence greater than 3.0 per square kilometer per year, the following lightning protection device is recommended for use with Enphase Energy Microinverters:

- **Vendor:** Citel
- **Part Number:** DS72RS-120
- **Application:** Residential 120/240V Split Phase where N-G bond exists. (See the vendor datasheet for DS70R, (which includes the DS72RS-120) at http://www.citelprotection.com/english/citel_data_sheets/ac_protection/).
- For commercial sites, contact Citel at <http://www.citelprotection.com/> for information on a unit to fit your needs.

The protection device is usually wired to the load center, but mounted in a separate box as shown. Install per vendor instructions.



Conclusion

Although not common, lightning strikes are an eventuality that must be addressed, especially in certain parts of the world. Following the guidelines in this document will help minimize any lightning related issues with your installation.