

Topic: Transformer-less Inverters

Technical Information:

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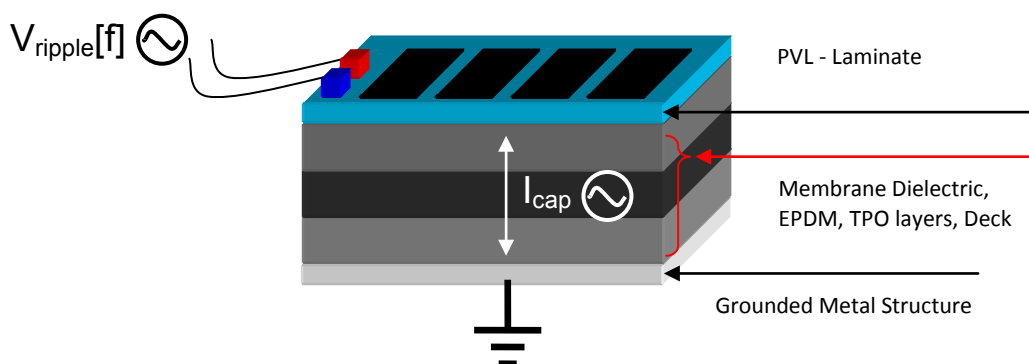
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EU regulations require solar inverters to incorporate automatic detection of potentially unsafe conditions and provide an alarm and switch off if the level exceeds safety regulations. One type of alarm common to many inverters is an alarm that indicates that there is some form of “differential current” flow into the PV array. This is most commonly caused by a ground fault within the array field. The inverter might show an alarm code similar to “R_{ISO}” and/or “dl, differential current”.

Most inverters used in the solar industry today utilize a transformer that, amongst other things, provides galvanic isolation between the AC side of the inverter (i.e. the electrical grid) and the DC side of the inverter (i.e. the PV array). However today, inverter companies around the world are offering transformer-less inverters in an effort to reduce cost and improve the efficiency of inverters for the solar industry. These inverters do not have an isolation transformer in between the electrical grid and the PV array. As a result, a disturbance on the electrical grid (e.g. AC ripple voltage), could result in electricity being back fed through the DC side of the inverter and into the PV array.

All solar modules have a limited ability to store a charge; this is normally insignificant when the solar modules are mounted away from the building. However, *UNI-SOLAR* flexible modules are often mounted directly to a substrate that in many instances forms part of the roof. The steel within the laminate in close proximity to the steel in the building’s roofing system can result in capacitive load on the DC side of the inverter. **NOTE:** the USO PV array capacitance is dependent upon the properties of the roofing material, the size of the PV array, the building substructure and the weather conditions (wet weather will increase the equivalent capacitance of the rooftop solution).

When the USO PV array and building materials form a capacitive load on the DC side of the inverter, current will flow through this “capacitor” and the inverter can interpret this as a hazardous condition and switch itself off.



While this does not represent a safety risk, system performance may be reduced if *UNI-SOLAR* PVL laminates are combined with transformer-less inverters.

For optimal system performance United Solar Ovonic (USO) strongly recommends using inverters with isolation transformers together with our *UNI-SOLAR* products. Loss of performance as a result of using a transformer-less inverter will not be covered by USO's Warranty.

This notice supersedes any previous communications issued by USO regarding the compatibility between our products and transformer-less inverters.