Conceal Exposed PV System Wiring

Photovoltaic (PV) modules are connected to one another in series to obtain higher electrical voltages for commercial and residential power generation. Connected by wire leads between each module’s junction box on the back of the module and with an additional length of wire to complete the unit, these connection systems leave hazardous and unsightly exposed wires under the array.

A UCF researcher has now developed a design for PV module connections that offers a solution to the problems brought on by exposed wires. With hidden wires, this system minimizes the risk of vandalism and can help to eliminate the need for security fencing on ground mount arrays, as required by electrical code for arrays with exposed wiring. The new connection system prevents hazards of wire damage from chafing or pinching, fires from short circuiting wires, and accidental electrical damage. With faster and easier installation, the new system also keeps wire insulation from degrading in the sun.

Technical Details
PV modules can now be connected in series with no exposed wires. With the new design, modules are connected via plugs on each side of the module frame. All wiring is built into the module frame and connects internally to the plug, including the home run wiring to complete the circuit, which is contained within the frame of each module. The modules feature a positive and negative connection on one side, with two positive connections on the other side. To install the modules, each is placed on a mounting rack and slid into place, where it can then be plugged into the connections of the module or modules next to it. The two positive connectors on the far end of the series involve a jumper plug that connects the home run wiring. On the opposite end of the series, a set of modules has a plug with a junction box for connecting conduit and wire to the inverter or another junction box.

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Benefits
- Prevents accidental electrical damage
- Minimizes risk of vandalism
- No security fencing needed on ground mount arrays
- Prevents damaged wires from chafing or pinching
- Prevents fires from short circuiting wires
- Easier installation

Applications
- Photovoltaic (PV) modules in strings, series, and arrays

Tech Fields
Solar and Thermal

Keywords
photovoltaic, PV, wiring, solar

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