

Gap measurement in photovoltaic modules

To date, the production of photovoltaic modules (PV) has been a very complex and cost-intensive process. French company Apollon Solar has developed a new process for the production of PV modules. The systems are produced at French line constructor, Vincent Industrie.

With the method patented under the name NICE (New Industrial Cell Encapsulation), the solar modules are no longer fused with a transparent plastic layer. By using the NICE process, the sealing and leak integrity of the module compound and the long-term stability are significantly improved compared to conventional PV modules.

A metal plate forms the rear side during the production of the NICE modules. The solar cells are arranged on this and electrically connected to each other. Afterwards, spacers are applied as a cover, which prevent contact between the solar cells and the glass pane. A special purpose system then presses the glass pane on to the PV module and evacuates it in doing so. After pressing, the PV module is permanently held together by the vacuum in the module and the external atmospheric pressure. The glass used is a special, anti-reflective type, which allows light to pass through, but prevents the light from reflecting.

Consistent spacing of the front and rear sides is critical during the pressing process. Sensors from Micro-Epsilon's optoNCDT IFS 2402 series are used for this. Integrated in the press, the sensors measure the gap at several positions from one side, between the front and rear side; this gap is between 0.7mm and 2mm. Due to extremely high light intensity, using optoNCDT IFS 2402 series sensors means it is possible to obtain sufficiently large reflections despite the anti-reflective coating. By using a special multipeak software application, the confocal process is



also able to measure the thickness of intermediate layers through glass, including the air gap between two glass panes.

Possible sensor series:

Electronics optoNCDT 2401

Sensor: optoNCDT IFS 2402-10

