

Press Release

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Heribert Schmidt Receives Joseph von Fraunhofer Prize 2011

HERIC® Topology Reduces Losses in Solar PV Inverter by Half

On Thursday, May 26, Dr. Heribert Schmidt from the Fraunhofer Institute for Solar Energy Systems ISE was awarded the Joseph von Fraunhofer Prize for applied research. The prize ceremony took place at the 2011 Fraunhofer Annual Meeting in the Meistersingerhalle in Nuremberg, Germany. His highly efficient HERIC® topology has already been integrated many times in various solar PV inverters. In 2009, a world record inverter efficiency of over 99 percent could thus be achieved for the conversion of direct current from photovoltaics into grid-compatible alternating current.

“In a solar system, a high inverter efficiency is just as important as a high solar cell efficiency, since the entire current flows into the grid through the inverter,” explains Dr. Heribert Schmidt. “If in a 100 kW photovoltaic system, for example, the inverter has one percent less efficiency, the losses over 20 years total about 6000 euro based on today’s EEG compensation rate. Also, more efficient inverters produce less heat. This, in turn, reduces the thermal stress on the electronic components and the amount of required cooling, increasing the inverter lifetime. Less heat sinks are then necessary, thus reducing the amount of material used as well as the overall weight. As a result, resources are conserved and the logistics become simpler.”

HERIC® stands for “Highly Efficient and Reliable Inverter Concept.” It stands out in its ability to cut losses by half as well as its suitability for daily use due to its high electromagnetic compatibility EMC. With the HERIC® topology, it was first possible to use highly sophisticated

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inverters developed in the laboratory and at the same time comply with the EMI regulations.

“With the HERIC® topology, Fraunhofer ISE has made an important contribution to the success story of photovoltaics. By the end of 2010, the cumulative installed PV capacity in Germany amounted to approximately 17 gigawatts (GWp), producing an annual energy of 12 terrawatthours (TWh) for 2010,” says Professor Eicke R. Weber, Director of the Fraunhofer Institute for Solar Energy Systems ISE.

Inverters are a key component in solar PV systems. They couple the DC solar cell current to the public electricity grid, requiring grid-compatible AC-current. Every second, the inverter chops the direct current, generated by the solar cells, into 16 000 small parts and produces a pure sine wave that is grid-compatible. The special characteristic of HERIC® does not lie in its components, but rather in the topology, i.e. the arrangement and switching of the components. The inverter topology ensures that the solar cells at the inverter input and the electricity grid at the inverter output are electrically isolated from each other at specific moments in time. Thus, undesirable reactive current and electromagnetic interference can be avoided.

Dr. Heribert Schmidt, born 1952, studied electrical engineering at the RWTH Aachen where he also received his doctoral degree. Since 1988, he works at the Fraunhofer Institute for Solar Energy Systems ISE. Additionally he teaches in the field of “Photovoltaic Systems” at the University Karlsruhe (KIT) since 1995.

Since 1978, the Joseph von Fraunhofer Prize has been awarded on an annual basis to scientists employed at Fraunhofer for solving applications-oriented problems. This year, three prizes were awarded, worth € 20,000 each.

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Dr. Heribert Schmidt, winner of the Fraunhofer Prize 2011, invented a new circuitry for the inverter. With the HERIC® technology, it was possible to achieve a world record for inverter efficiency of >99% at Fraunhofer ISE (©Dirk Mahler).

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