

Planar Transformer Features 10-kV Partial Discharge Extinction Voltage

[Payton America](#) has announced development of a 10-kW planar transformer which it says is the first high-voltage planar transformer with a partial discharge extinction voltage (<10 pC) of 10 kV between primary, secondary and core. The transformer handles a total output power of 10 kW at 250 kHz, or 95 V at 100 A, with 400-V input voltage.

Designed for a full-bridge topology, it dissipates 80 W at 99.2% efficiency and operates from -55°C to 150°C. The transformer measures 100 mm (length) x 80 mm (width) x 40 mm (height) and weighs less than 600 g (see the figure).

As Jim Marinos, executive VP at Payton America explains, partial discharges (PD), as defined by IEC 60270, are localized dielectric discharges in a partial area of a solid or liquid electrical dielectric insulation system under high-voltage field stress. Partial discharges in a transformer deteriorate its insulation and can lead to failure of the transformer.

Marinos likens the PD problem to corona issues. "A very small sharp protrusion within the transformer can cause a long term failure due to higher local electric field ionization. Basically the transformer can fail after many years of operation," says Marinos. He adds that this is a problem because "some of the critical applications that Payton works with require over 20+ years of operation."

He further explains that achieving such a high PD extinction voltage requires three steps in the transformer design and development process. "First is the analysis work and simulation—Payton uses Ansys Maxwell. Then comes the design, and lastly, testing. The testing requires specialized equipment with special software to analyze results and control the testing. Payton uses a system made by MPS in Germany."

For more information email jim@paytongroup.com or see the [website](#).



Figure. Payton says its 10-kW planar transformer is the first high-voltage planar transformer with a partial discharge extinction voltage (<10 pC) of 10 kV between primary, secondary and core. Because partial discharges in a transformer deteriorate its insulation and can lead to failure of the transformer, they degrade its long-term reliability. By addressing this problem, Payton can satisfy the demands of critical applications requiring 20+ years of operation.