Battery-Free Wireless Sensor System Monitors Busbars and Busways

FREIBURG, Germany -- (BUSINESS WIRE) -- qNODE is a wireless condition monitoring sensor and Micropelt's solution to increasing both operating safety and power availability in 24/7 production environments.

The Freiburg, Germany, based leader in thermal energy harvesting has co-developed the self-powered temperature monitoring sensor with Schneider Electric, the French leader in medium and low voltage electrical power distribution. Degraded or loose joints of high current busway elements and likewise connections of current consumers to busbars are subject to improper assembly and they degrade over time. Any loose or corroded joint or connection causes increasing resistive heat before eventually a fatal burnout occurs when the load peaks.

Wireless temperature monitoring was identified as a potential solution allowing for both low cost and practically continuous coverage of all load situations. A wireless sensor would be small and easy to mount in both new and existing installations, targeting any number of monitoring points in a customer facility. Common wireless solutions, however, are powered by batteries whose maintenance would inevitably require regular shutdown of the electrical power system and consequently a production stop.

Thermal energy harvesting was identified as an ideal match, because any current load causes resistive heat which thermo harvesting can turn back to electric power. Micropelt's chip-scale thermoelectric technology generates 140 millivolts per Kelvin (K) of temperature differential. This permits highly efficient DC conversion and enough power to sustain ultra-low power (ULP) wireless devices on a duty cycle basis, where sensing and transmitting takes fractions of a second and occurs every minute or so.

TE-qNODE, a thermoharvesting wireless sensor which generates its power from the resitive heat of the device it is monitoring, is the result of the Micropelt and Schneider Electric collaboration. The Qnode in a matter of seconds slips over a busbar in a single-handed operation, being held in place by a solid clamp which can be adjusted to common bar sizes. If the temperature of the surface is 5°C or more above the surrounding air temperature the embedded Micropelt thermoharvester generates the power to transmit the hosting busbar's temperature every second.

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