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Wireless Temperature Sensor Operating in Complete Metallic Environment Using Permanent Magnets

A novel wireless temperature sensor remotely measures temperature through thick metal plates, enabling reliable monitoring of mechanical components in enclosed metallic environments where wired sensors are impractical.

A sensor is a device that receives and responds to a signal. Modern sensors measure a physical quantity, such as temperature, voltage, magnetic field, and torque, and convert it into a signal that can be read by an observer or an electronic instrument. However, the sensitivity of most sensors today is limited by the relative distance away from the desired entity and interference from external noise created by conductors of radio and electromagnetic waves, e.g., air and metal, respectively.

Researchers at Purdue University have developed a novel wireless temperature sensor that works in environments completely surrounded by metal. By incorporating a commercially available technology that detects changes in magnetic fields with temperature, this technology measures temperature remotely at long distances through thick metal plates without active components, such as transistors, in the high temperature region. Thus, this technology is useful to monitor components and areas where wired sensors are not practical due to rotating shafts, enclosed metallic environments, and the lack of maneuverable space. By obtaining temperature data remotely, the lifetime of mechanical components can be more accurately estimated and sudden failures can be detected sooner.

Advantages:

-Technology works with wireless sensors

-Flexibility for use in a variety of situations; no longer limited to wired use

-Remote access to data

Potential Applications:

Technology ID
66115

Category
Robotics & Automation/Perception & Sensing
Materials Science & Nanotechnology/Thermal Management Materials & Solutions

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-Maintenance/monitoring of mechanical components

TRL: 5

Intellectual Property:

Provisional-Patent, 2012-03-06, United States | Utility Patent, 2013-05-31, United States | CON-Patent, 2014-02-28, United States | CIP-Patent, N/A, United States

Keywords: Wireless temperature sensor, metal environment monitoring, remote temperature sensing, magnetic field temperature detection, metallic enclosed sensor, component maintenance, mechanical component monitoring, long-distance temperature measurement, non-wired sensor, high temperature sensor, Electrical Engineering, Sensors, Temperature, Wireless