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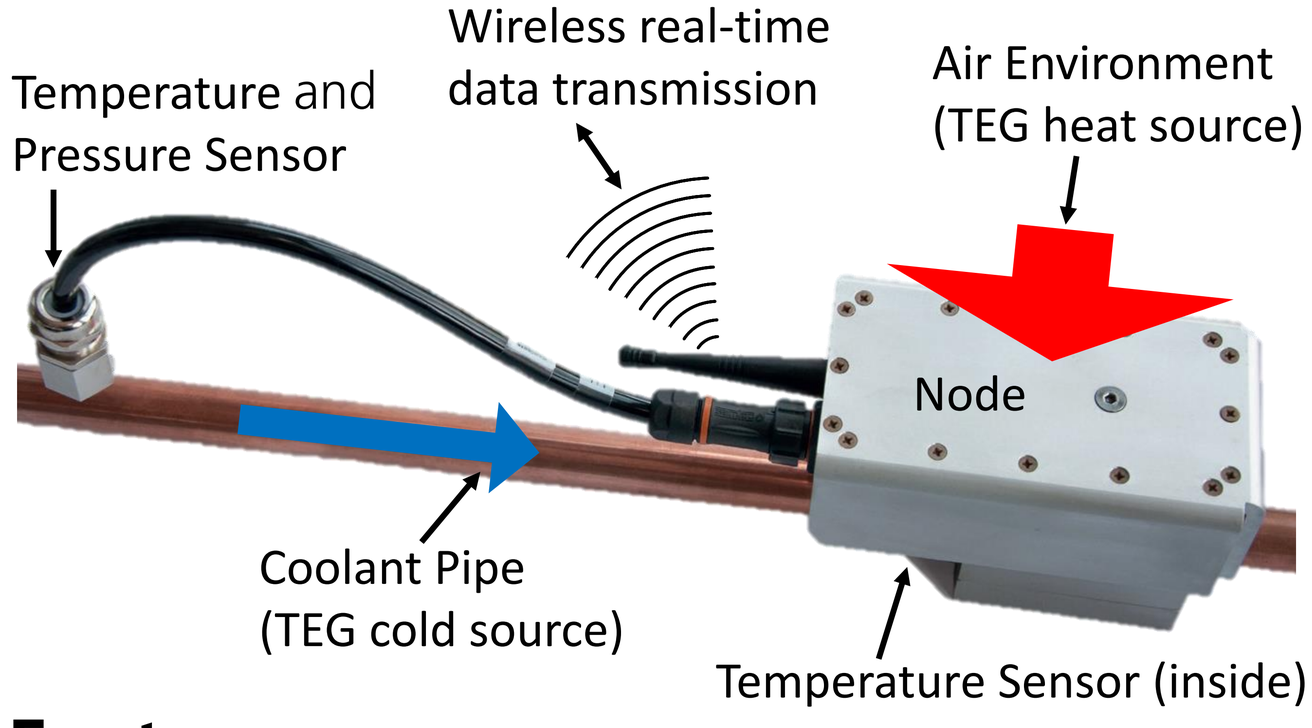
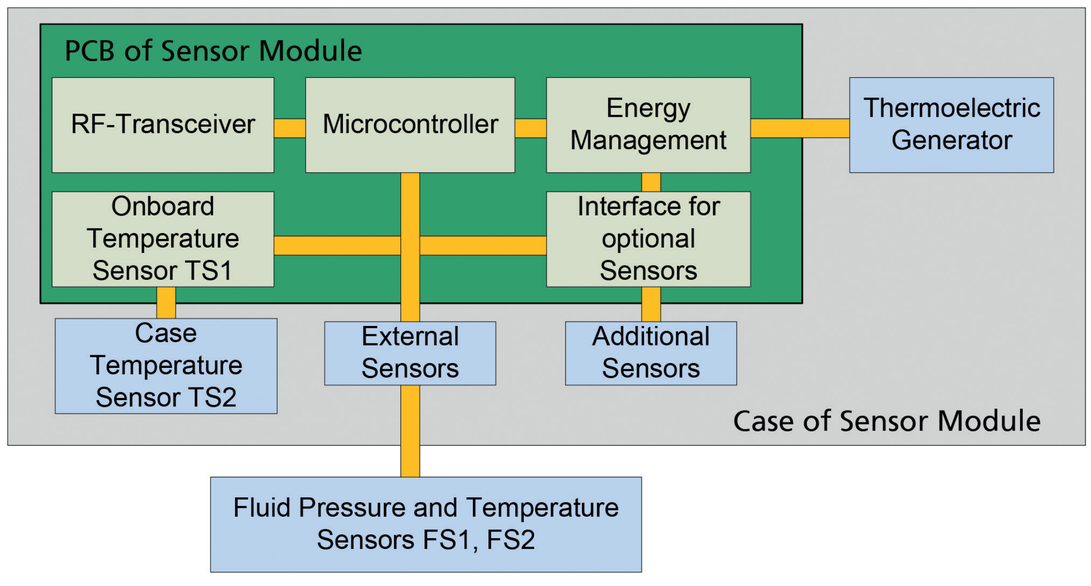
TEG powered Wireless Sensor System for Process Monitoring and Control

Abstract:

The industrial environment of a manufacturing plant is a suitable field of application for a variety of measuring tasks for process monitoring on the use of thermoelectric generators (TEG) for the power supply of wireless sensor modules. This demonstrator shows a realized self-sustaining system for coolant monitoring and control. Subject is a continuous pressure and temperature measurement at each mold of a cooling system. The energy for operation of the sensor module is provided by a TEG using the temperature difference between the coolant tube and the "warm" environment. In combination with a specific power management a robust, industry-compliant solution has been obtained.





Features:

- Self-sustaining operation supplied by a thermoelectric generator (TEG)
- Battery-free operation from a few Kelvin of temperature difference
- Wireless real-time data transmission with a large number of sensors
- Demonstrator with pressure and temperature sensor
- Flexible architecture, also suitable for other energy harvesting technologies and applications

Several energy sources are usable for harvesting:

- Ambient light (solar cells)
- Lateral movement of parts (piezo elements,
- Linear induction generators)
- Rotating parts (dynamos)
- Radio waves (antennas with rectifier)
- Process heat (thermoelectric generators)

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