FRAUNHOFER INSTITUTE FOR INTEGRATED CIRCUITS IIS

PRESS RELEASE

Using Energy Harvesting to power wireless sensors in production environment

Nuremberg: Wireless sensors are an essential component in the Industrial Internet of Things IIoT. To record and transmit various kinds of physical parameters and data, such sensors require permanent power. Fraunhofer IIS has developed a self-sufficient power supply specifically for IIoT sensors that uses existing vibrations, for example from machines, to generate electrical energy. Thus, these sensors can be used for condition monitoring in production and require neither power cables nor constant battery changes.

Wireless sensors are being increasingly used in production environments. IIoT system architectures are implemented to connect machines, plants and IT systems with each other in order to achieve better resource efficiency, productivity and maintenance. Smart sensors that transmit information to the IT system by radio signals are needed to collect the necessary data. However, these sensors require sufficient power. The advantage of a self-sufficient power supply is that neither a power cable nor a frequent battery change is necessary.

Self-sufficient energy supply of IIoT sensors with Energy Harvesting

With Energy Harvesting technologies, sensors for detecting wear or damage on machines can be powered with energy independently in so-called condition monitoring scenarios. Fraunhofer IIS technologies offer enormous advantages over conventional battery-powered energy supplies, especially in hard-to-reach locations or where data is very frequently collected. With the extremely efficient power management electronics from Fraunhofer IIS, even the smallest currents or voltages from vibration or thermal converters can be used. Existing vibrations and temperature differences in production plants are thus used to generate energy for sensors. Therefore, machine conditions can be monitored and analyzed permanently and maintenance-free.

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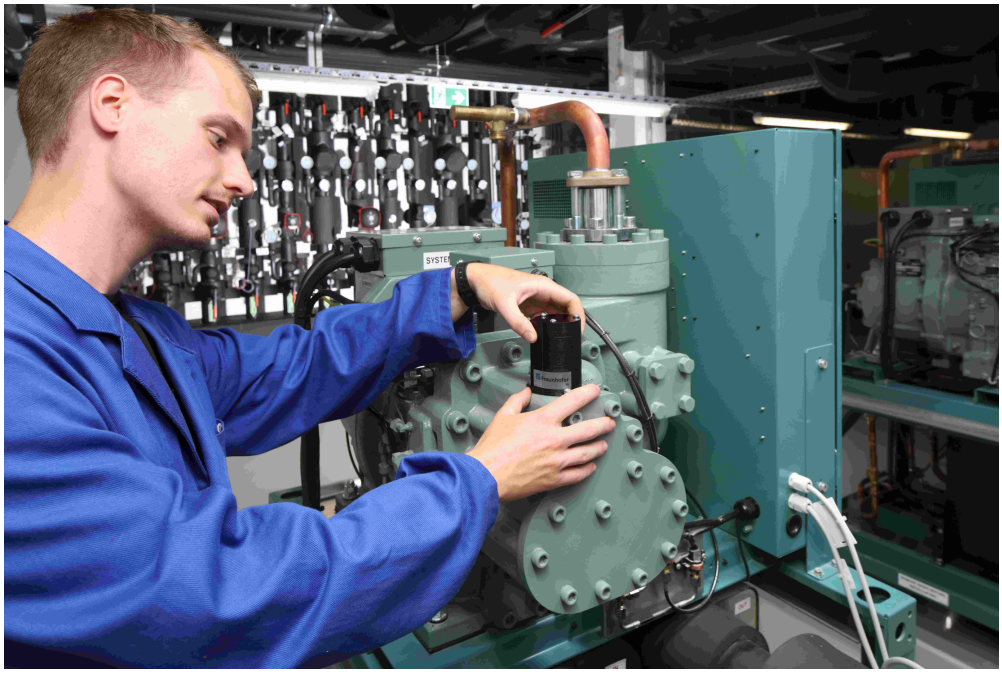

Self-sufficient power supply for IIoT sensors with the vibration converter from Fraunhofer IIS. ©Fraunhofer IIS/Kurt Fuchs | Image in color and print quality: www.iis.fraunhofer.de/pr.

Newly developed vibration converter from Fraunhofer IIS

Even smallest accelerations of 100 mg are sufficient to generate sufficient electrical energy that several sensors can be powered and data can be transferred to an IT system wirelessly. Fraunhofer IIS group »Integrated Energy Supplies« is focused on the development of highly efficient power management systems and power supplies as well as complete micro energy systems. The developed voltage converters and maximum power point trackers can work with minimal voltages and currents and are thus able to use and store smallest amounts of energy from the environment to be used for powering small wireless sensors. The optimum mechanical, thermal and electrical design of all system components means that highly efficient applications can be implemented in the smallest possible space, and the minimum of installation and maintenance effort clearly sets them apart from the state of the art.

The Fraunhofer-Gesellschaft is the leading organization for applied research in Europe. Its research activities are conducted by 72 institutes and research units at locations throughout Germany. The Fraunhofer-Gesellschaft employs a staff of 25,000, who work with an annual research budget totaling more than 2.3 billion euros.

The **Fraunhofer Institute for Integrated Circuits IIS** is one of the world's leading application-oriented research institutions for microelectronic and IT system solutions and services. It is the largest of all Fraunhofer Institutes. Research at Fraunhofer IIS revolves around two guiding topics:

In the area of **"Audio and Media Technologies"**, the institute has been shaping the digitalization of media for more than 30 years now. Fraunhofer IIS was instrumental in the development of mp3 and AAC and played a significant role in the digitalization of the cinema. Current developments are opening up whole new sound worlds and are being used in virtual reality, automotive sound systems, mobile telephony, streaming and broadcasting.

In the context of **"cognitive sensor technologies"**, the institute researches technologies for sensor technology, data transmission technology, data analysis methods and the exploitation of data as part of data-driven services and their accompanying business models. This adds a cognitive component to the function of the conventional "smart" sensor.

970 employees conduct contract research for industry, the service sector and public authorities. Founded in 1985 in Erlangen, Fraunhofer IIS has now 14 locations in 11 cities: Erlangen (headquarters), Nuremberg, Fürth, Dresden, further in Bamberg, Waischenfeld, Coburg, Würzburg, Ilmenau, Deggendorf and Passau. The budget of 184 million euros is mainly financed by projects. 22 percent of the budget is subsidized by federal and state funds.

Detailed information on: www.iis.fraunhofer.de/en