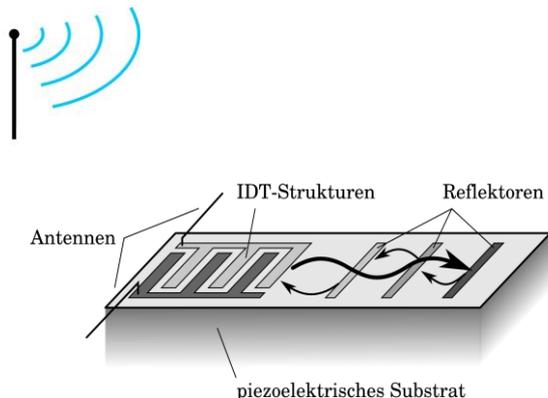


Technical information „SAW temperature measuring unit“

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Radio based SAW sensors use radar echoing to send queries to special sensor units. The response signal is then used to determine the temperature currently present at the measuring point. No additional electronics are needed for the sensor assembly which consequently is entirely passive. The whole unit consists of a tiny SAW-chip set situated in a sealed casing and an antenna adjusted to external influence conditions. The SAW-chip set is made of a piezoelectric crystal interspersed with metallic conductor tracks. Radar signals are then used to generate surface acoustic waves on its surface.

Performance capabilities of the SAW temperature measuring unit

- Simultaneous queries to up to five temperature sensors.
- The current measuring range amounts to 3 Hz.
- Each sensor is capable of an average temperature resolution ranging between +/- 0,1 C.
- Depending on packaging, the system can be used at temperatures up to 300 C.
- Wireless querying has a range up to several meters, depending on environmental conditions.
- Usable in rotating components with a rotation speed up to 1300 r/pm.
- Wireless querying is even possible in a metallic environment and oil mist.
- Specially adapted querying methods combined with intelligent signal processing ensure interference immunity.

Sensor design and query methods

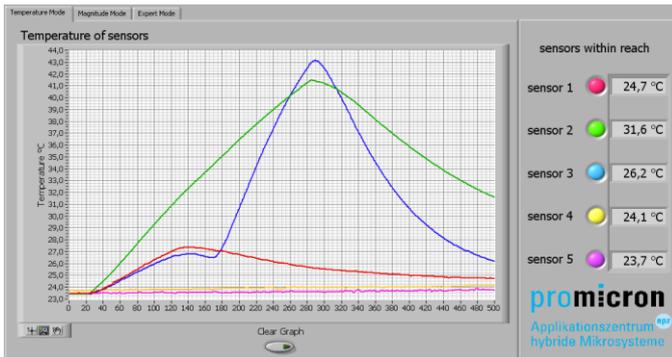
- Querying is effected by means of a radar signal based on the 2,45 GHz ISM frequency band.
- Existing sensors are detected automatically and checked in terms of functionality.
- All sensors are specially coded and the response signals can be allocated accordingly.
- SAW-chips without casing measure 1,2 x 6 x 0,5mm.
- The packaging is customized. For example in a M10-screw head with rod antenna or in a standardised TO39-casing with slot aerial. (please ask for further designs)
- As an alternative the cased SAW-chip set can be separated spatially from the antenna. In this case the two can be connected via a coaxial cable.
- The packaging is hermetically sealed against environmental influences.
- The aerial usually has a length of 3-4 cm. Depending on the area of application other sizes are possible.



Reading unit and evaluation algorithm

The reading unit has an antenna attached to send queries to the sensor assembly via radar. In a closed metal casing the antenna is situated inside the casing while the connecting cable is guided through the frame. Signal processing is an integral part of the sensor system and makes it possible to depict the temperature from the response signal. The parameterisation of the used algorithm can be changed according to the application.

Display software



A basic software to display the change in temperature in time response is available. In addition to that, the number of sensors in range of the radar signal is also shown. The measured values are recorded and available for further analysis.

Customer specific development

Pro-micron has specialised on the development of passive wireless sensor systems. The main focus is set on the application in tough industrial environments. Individual customisation of sensors, packaging and antenna designs allow for a solution perfectly adjusted to the application in question. A demonstration device, usable for customer specific tests, can be provided.



Further possibilities for the use of SAW-sensors

Wireless SAW-sensors can be used to register strains occurring on the SAW-chip, in order to determine force and torque which are affecting components. There is no need for further electronics at the measuring point. In this regard, SAW-sensors offer several benefits in comparison to conventional sensor telemetry which relies on strain gage.

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