
Energy-Autonomous Climate Sensor

1 Features

- Measurement of temperature and humidity
- Temperature range: -40°C to 125°C
- Relative humidity range: 0% to 100%
- Two minute sample rate
- Data reduction by use of Send-On-Delta (SoD) procedure:
 - Temperature: delta of 0.5°C
 - Humidity: delta of 3.0 rH%
- At minimum one transmit of a heartbeat every hour
- Usage of Energy Harvesting
- Average consumption (per 24 h):
 - 2.634 J with SoD enabled (92 % data reduction)
- Average illuminance needed per day for continuous operation
 - 428 lx per 24 h
 - 1465 lx per 8 h

2 Applications

- Heating control
- Climate control
- Humidity alert

3 Methodologies

- Intervall based measuring
- Send on Delta approach
- Hibernating

4 Description

The Ultra Low Power Energy-Autonomous Climate Sensor is a wireless sensor node based on hardware specifically designed to be able to be powered only by energy harvesting sources.

In this case amorphous solar cells are used for harvesting light energy. These types of solar cells can make use of even weak or diffuse light.

The sensor node samples a new data word every two minutes. In the meantime the processor is shut off and only awakened by an ultra low power timer. New data is only transmitted if the difference to the last sent data is significant.

