Hail Monitoring System

Meteorology | Hydrology

General Description

HailSens IoT is an **advanced sensor for monitoring hail events in real-time**. The detection of hail impacts (as opposed to other types of icy or watery precipitation) relies on kinetic impact measurement. The characteristics of each detected hailstone (kinetic energy, equivalent diameter and timestamp of the impact) are both recorded and forwarded in real-time. Software at the receiver side can proceed to **immediate assessment of a hail event** while it is unfolding, and, subsequently, can be programmed to **issue near real-time alerts** based on the incoming data.
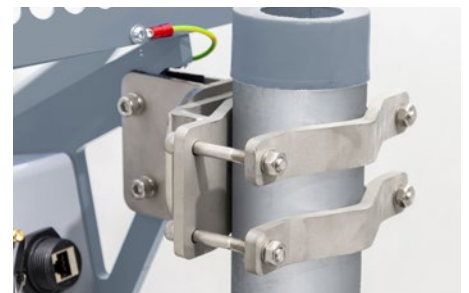
HailSens IoT revolutionizes the technology for sensing hail: It combines sophisticated measuring technology with online access to data. Its **unmatched level of detail per hailstone** makes the data extremely useful to every professional looking for objective comprehensive hail data. Whether you are a meteorologist or atmospheric physicist, a (re-)insurance claims adjuster, or the operator of a large professional solar power plant: HailSens provides **objective and fast insights into the in-situ impact of hail events**. The data can be used to optimize prediction models, calculate or control parametric insurance indices, tilt professional solar panels into upright position, etc.

Applications

– Weather Services and Meteorological Offices
– (Re-)Insurance Companies
– Solar Farms
– Agriculture / Farming
– Science and Research

Features

– Drift-free ratiometric in-situ kinetic energy and hail diameter sensors with life-time calibration and long-term stability
– Large sensing area of approximately 0.2 m² / 21.5 ft² (diameter 50 cm / 19.7 in) provides statistically relevant results for any given hail event (considering the relatively large distance between neighboring hailstones)
– Choice of Ethernet or wireless IP communication
– Easy installation by one person on 2" to 4" vertical or horizontal pipe.
– Straightforward integration into existing IT infrastructure via Ethernet port

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Technical Specifications

Accuracy	Kinetic energy and pellet equivalent diameter: +/- 10 % (according specific mass density on ice and spheric model)
Operating and Measuring Ranges	– Deployment operating and storage temperature: –40 °C to +70 °C (–40 °F to +158 °F) – Calibrated measuring range: 0 °C to +70 °C (32 °F to 158 °F) – Humidity: 0 - 100 % RH
Electrical Specs	– Voltage range: 10V – 18V (DC) – Power consumption: typical 60 mA@12V (0.7 W), wireless comms engaged max. 120 mA@12V (1.4 W)
IP Grade	IP 66
Hail Measurement Range	– Measured data: kinetic energy: 0,01 to 28 J; derived data: pellet diameter 5 to 50 mm (0.2 to 1.97 inch) – Lower detection level: >=5 mm / >=0.20" (hail pellets according to WMO)
Data Transmission	– Wireless: IP data modem, antenna SMA connector – Wired: Ethernet RJ45
Data Exchange Interface/M2M	JSON to defined RESTful web service
Data Content	JSON: timestamp, kinetic energy, equivalent diameter
Datagram Frequency	– No hail: heartbeat every 6h – Hail event: near real-time during hail events: one dataset/pellet impact
Calibration and Drift	Lifetime calibration and drift-free differential measurement by in-situ ratiometric principle and compensation
Dimensions and Weight	– Sensor plate (round): Ø 500 mm (19.685 in), height: 300 mm (11.81 in), weight: 6.5 kg (14.33 lbs) – Mounting: 2" to 4" pole

Accessories and Add ons

datasphere: **datasphere**

datasphere is an online data management system. Special functionalities are available to store, manage and visualize hail data. Classification schemes based on either size or kinetic energy or even damage potential are available and can be adapted to user needs. Data download for further processing by the user is also available. Finally, datasphere offers alarm settings. Please visit datasphere.online for details.

KISTERS Hail Mitigation Systems:
Highly localized software systems integrating various data sources and modelling techniques including HailSens IoT to provide early warning, reduce false positives and ensure the operator of precious vulnerable infrastructure has time to activate protective measures, such as tilting solar panels in upright position. To ensure best results, a Hail Mitigation System is customized in a project to meet the exact characteristics and needs of each location, solar power plant, etc.

Please ask for details.

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