Hail Monitoring System

HYDROMETEOROLOGY | HYDROLOGY | ALARMS

HailSens: Real-Time Hail Measurement Sensor

Automatic Sensing and Classification of Hail

HailSens is an **advanced sensor system for monitoring hail events in real-time**. The detection of hail impacts (as opposed to other types of icy or watery precipitation) relies on vibration measurement. HailSens provides **accurate, reliable results both quickly and automatically**. A practical tool that saves time and prevents false measurements.

HailSens revolutionizes the technology for sensing hail: It combines sophisticated measuring technology with online provision of data. HailSens **automatically detects hail**, and classifies individual hailstones with respect to their size and damage potential. The sensing area of approximately 0,2 m² ensures that a representative sample of hail pellets generates impacts on the vibrating plate thereby **increasing measurement reliability**. HailSens saves data, transfers it in real-time to evaluation software for statistical evaluations and display of impact results in graphics and tables, and - last but not least - provides **early warnings** using web technology.

The HailSens is available either as stand-alone unit R&D/INS or as the sensor SYNOP integrated in an automatic weather station.

Unique Key Features

- **Online hail detection including kinetic energy and hail diameter**. Compared to the established hail pads, HailSens is more accurate, more reliable, faster, and automatic.
- **Large measurement surface produces statistically relevant results** for any given hail event. The design of the transducer system takes into account the relatively large distance between neighboring pellets in a hail shower.
- **Stand-alone system**: HailSens can be used as a sensor connected to a local data acquisition device or send data over wireless mobile communication channels to the hailsens.online cloud application.
- **Smart sensor with local intelligence**, processing power and the user's choice of IP or non-IP communication, ranging from RS-485 serial and UMTS/3G/4G to LoRa; with new communication standards added in due time.

- **Online warning system reacting instantly to hail impacts**. Warnings and alerts can be issued through hailsens.online with little delay to prevent damage in locations not yet struck by the hail storm.
- **Specific alert mechanisms** (optional): switching relays via digital output, serial datagrams to control systems, ...

hailsens
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Two Options: R&D/INS and SYNOP

Option 1: R&D/INS

HailSens R&D/INS units **operate autonomously** sending data over UMTS/3G/4G with every single impact to the cloud-based hailsens.online application. This is the **optimal tool for network operators with a strong interest in collecting large amounts of data on individual hail events and pellet impacts**. HailSens forwards the data via remote wireless communication. The data can be classified into hail damage classes by hailsens.online cloud application.

Option 2: SYNOP

HailSens SYNOP systems send **serial data telegrams** (statistical summary of the past minute) over RS-485 connections to a local data acquisition system. This device is **ideally suited for Met Office's monitoring network stations reporting to the WMO**. HailSens provides output via RS-485 and data telegram providing both hail YES/NO and quantity information for external generation of SYNOP/METAR codes (i.e. ice pellets > 5 mm according to WMO).

Applications

HailSens is particularly efficient in three areas: First, as an **early warning system** ensuring preventative protection. Secondly, in the **real-time control of mobile infrastructure parts** (closing open roof of a sports stadium, alerting drivers on a highway, closing shutters, turning solar panels into upright position, etc.), and thirdly, simply in the **recording of individual hail impacts**. The rapid and accurate sensing of hail incidents and the ability to immediately forward collected data to a central location where it can be evaluated makes HailSens ideal for:

- Weather Services & Met Offices
- (Re-)Insurance Companies
- Universities, Research Institutes
- Hail Suppression
- Large-Scale Solar System Operators
- Agriculture & Farming
- Civilian and Military Aviation
- Automotive Sector
- Industry and Commerce
- Traffic Security
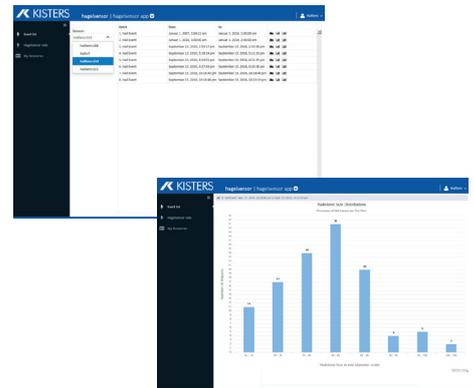
Technical Specifications

Dimensions	
	■ Transducer plate: Ø 500 mm (19.685")
	■ Ground plate (optional): 500 x 500 x 10 mm
	■ Sensor height: 500 mm
	■ Mass: 18-20 kg (non-packaged net-weight)
Operating Range	■ Temperature: 12 °C to +30 °C (storage: -40 to +70 °C)
	■ Relative humidity: 0 to 100 % RH
Power Supply	■ 12-18 VDC
	■ Serial comms: 60 mA @ 12 V (0,7 W)
	■ Wireless IP: 120 mA @ 12 V (1.4 W)
International Protection Marking	IP67

GPRS/3G **ALARM**

Reseller

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