HailSens Edge

Hail Monitoring System

Meteorology | Hydrology

General Description

HailSens HailSens Edge is a **cutting-edge sensor for real-time hail monitoring.** Powered by KIPTEC – KISTERS' Intelligent Platform for Embedded Connectivity – it integrates hail impact measurement, on-board data logging, edge processing, data transmission, and power management into a single autonomous unit. Simply add power and start monitoring.

Using **advanced kinetic impact measurement,** HailSens Edge accurately distinguishes hail from other forms of precipitation. For each detected hailstone, it captures **kinetic energy, equivalent diameter, and precise timestamp, transmitting all data in real time.** Intelligent software enables immediate analysis as events unfold, supporting rapid assessment and configurable near real-time alerts.

Whether you are a meteorologist, insurance professional, solar plant operator, or a real estate manager HailSens Edge delivers **fast, objective insights** at the point of impact. The data supports improved forecasting, parametric insurance applications, and optimized operational decisions – such as **protecting solar assets from damage.**

Secure, standards-based connectivity with MQTT over TLS 1.3 and mutual authentication. Fully compatible with WMO First Mile Protocol and easily integrates into SCADA systems via Modbus TCP or RTU (RS485).

Remote management: Remote configuration and OTA firmware updates reduce site visits. Continuous health monitoring helps detect power or connectivity issues early, minimizing downtime.

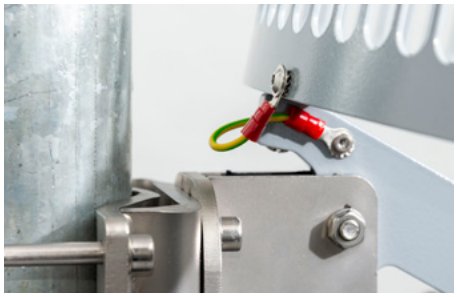
Secure, end-to-end connectivity: LTE Cat M1 / NB IoT enables reliable wireless transmission even from remote sites. TLS 1.3 with unique device and server certificates ensures secure, authenticated, data exchange. Secure boot guarantees only trusted firmware runs. Standard protocols (MQTTS, HTTPS, SFTP) and data formats for file-based data transfer support easy integration with any data platform – no vendor lock-in.

Applications

- Weather services and meteorological offices
- (Re-)Insurance companies
- Solar farms
- Agriculture / farming
- Science and research

Key Features

- Drift-free, ratiometric in-situ sensors for kinetic energy and hail diameter, ensuring lifetime calibration and long-term stability
- Large sensing area (~0.2 m² / 2.15 ft²; Ø 50 cm / 19.7 in) for statistically reliable measurements, even with widely spaced hailstones
- Flexible connectivity with a choice of Ethernet or wireless IP communication
- Simple, single-person installation on 2" to 3" vertical or horizontal pipes
- Seamless integration into existing IT infrastructure via standard Ethernet interface and Modbus TCP protocol



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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: -25 °C ... +70 °C (-30 °F ... +158 °F) – Calibrated measuring range: 0 °C ... +70 °C (32 °F ... 158 °F) – Humidity: 0 – 100 % RH
Electrical Specs	– Voltage range: 10 ... 30 VDC – Power consumption: Idle* 0.25 W max. // peak (LTE-M) 1.7 W max. // peak (2G fallback) 5 W max.
IP Grade	IP 66
Hail Measurement Range	– Measured data: kinetic energy: 0,01 ... 28 J; derived data: pellet diameter 5 ... 50 mm (0.2 ... 1.97 inch) – Lower detection level: >=5 mm / >=0.20" (hail pellets according to WMO)
Data Transmission	– Wireless: IP data modem, antenna SMA connector (antenna not included) – Wired: Ethernet RJ45 – LTE CatM1 (LTE-M) with WMO First Mile Protocol / MQTTS. – Modbus TCP over Ethernet RJ45 connector – Modbus RTU over RS-485 (via M12 8-pin connector) – All IP communication: mutual TLS 1.3 security and authentication – Local: Wi-Fi for configuration via HyComm
Local Storage	– 4 GB onboard memory
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" ... 3" pole
Connectors	Nano SIM Extender | M12 8-pin supply voltage | SMA antenna connector | RJ45 Ethernet
Materials	Housing: powder-coated aluminum; cover/radome: HDPE
Compliance	CE, FCC Class B, UL, RoHS

Accessories and add-ons

datasphere

A KISTERS datasphere companion product

HailSens Edge and datasphere redefine hail sensing by combining advanced measurement technology with seamless online data access. Delivering exceptional detail for every individual hailstone, the integrated system provides high-quality, actionable insights for professionals who rely on precise and reliable data.

Hail Forecasting – HailSens360

HailSens360 takes hail risk management to the next level by combining HailSens Edge's precise, in-situ impact detection with advanced, cloud-based forecasting from KISTERS – purpose-built for hail events. While HailSens Edge delivers real-time measurements of hail size and impact at ground level, HailSens360 enhances this with radar-based forecasts and nowcasting. The result is a unified view of incoming, ongoing, and actual hail impact – so you know when hail is approaching, where it will strike, and how severe it is likely to be. **Please contact us to confirm whether HailSens360 is available in your region of interest.**

Please ask for details.

Learn more at datasphere.online

Specifications are subject to change without notice. Weights and dimensions are indicative. – ©2024 KISTERS AG | Version: 2026-04

KISTERS Australia | sales@kisters.com.au | kisters.com.au
KISTERS Europe | hydromet.sales@kisters.eu | kisters.eu
KISTERS Latin America | sales@kisters-latam.com | kisters-latam.com
KISTERS New Zealand | sales@kisters.co.nz | kisters.co.nz
KISTERS North America | kna@kisters.net | kisters.net

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