



# ZM1™ Low Amperage Overhead Line Sensor

Sentient Energy's ZM1 intelligent line sensor targets low current overhead grid locations such as low-load feeders and overhead lateral lines. The ZM1 reduces outage duration (SAIDI /CAIDI) by analyzing, locating and promptly reporting faults and interruptions.

## Benefits:

- Visibility of low load feeders and laterals
- More precise fault location
- Enhanced fault analysis capabilities
- More granular load profiling
- Simplified deployment

## Monitoring of the Entire Overhead Distribution Grid

The ZM1 is a battery-powered intelligent sensor that complements Sentient Energy's line-powered MM3 Overhead Line Sensor by enabling line monitoring on overhead laterals and portions of the main overhead feeder backbone with low currents. The ZM1 supports fault detection, analysis, and load monitoring, adding visibility of the entire overhead distribution grid.

## SAIDI: Fault Detection and Location

Sentient Energy's ZM1 uses advanced fault detection algorithms and is capable of wirelessly communicating fault information immediately to the utility control center. With ZM1, operators can dispatch crews to the correct faulted location, supported by a super bright visible LED which further confirms the faulted phase. Non-priority fault information is detected, collected, and reported daily to Ample® Analytics.

## SAIFI: High Resolution Sampling

Equipped with high-resolution sampling rate of 130 samples per cycle, the ZM1 line sensor captures and records details with each fault and interruption. This detailed information is used to identify probable fault causes. The ZM1 receives GPS for location, and efficiently enables uploads and downloads over constrained networks allowing data transfers, software upgrades, and configuration changes remotely over the air from the utility's control center.



## High Accuracy Load Monitoring

Sentient Energy's ZM1 captures snapshots of current per a configurable schedule. The data is downloaded daily to Ample Analytics, making it available to users to view for asset management and planning. The resulting data can also be integrated into other utility applications. At low current, ZM1 is able to maintain a high-accuracy load level sensing within 1A.

## Easy to Mount and Maintenance Free for 10 Years

Sentient Energy ZM1 line sensors are easily installed with a hotstick. With a 10-year battery life, the ZM1 will provide years of maintenance-free operation. The remaining battery life is indicated on the Ample screen for advanced replacement planning.

## Proven Cellular Communications

Sentient Energy's ZM1 devices are available with full 4G/LTE support today. The ZM1 reduces the burden on the communications network by transmitting only key fault event characteristics in real time, while forwarding non-priority fault and interval loading data once a day during a daily health check.

## Sentient Energy's Ample Analytics Platform

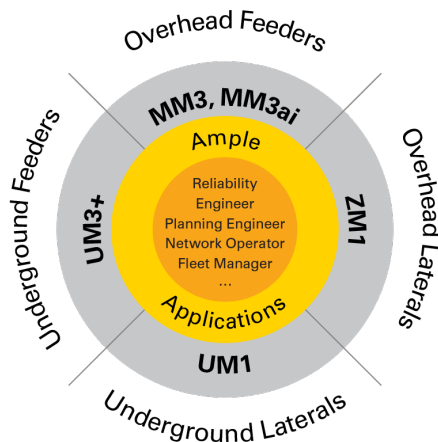
The ZM1, along with Ample Analytics, empowers utility operators to review device health and make desired remote modifications to data collection parameters. The ZM1 integrates seamlessly into Ample and provides critical information on lateral and low load feeder lines.



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## A Complete Grid Analytics System

Sentient Energy's Grid Analytics System consists of the MM3, MM3ai, ZM1, UM3+, and UM1 line sensors, and the Ample Analytics Platform. Each sensor features fault detection and load monitoring capabilities, an LED indicator, GPS, and integrated cellular or mesh communications. The MM3 and MM3ai are used for overhead feeders and the ZM1 monitors overhead laterals as well as low load feeder segments. The UM3+ addresses underground feeders while the UM1 monitors underground residential distribution. All five sensors are designed to maximize the amount of system data gathered while transmitting only the necessary information.



## Ample® Analytics Platform

Sentient Energy's Ample Analytics Platform is a comprehensive set of software tools that turn sensor data into actionable insights for network operators, reliability engineers, and planning engineers. In addition to providing data visualization and analytics, Ample streamlines sensor fleet management and integration of sensor system data into existing OT systems.

## Key Characteristics

Wireless Communications (WAN)	Cellular (4G LTE) – AT&T, Verizon, SoLinc, and additional international carriers Protocols: DNP3/IEC 60870-5-1041 <sup>1</sup>
Battery Life/Technology	10-year expected life / Lithium Thionyl Chloride
Current, Fault Measurement	Up to 10kA peak current; 25kA RMS fault current tolerant
Additional Characteristics	Current direction detection, e-field sensing
Waveform Capture (I & V)	130 samples/cycle (60 Hz) and 156 samples/cycle (50 Hz), 1st – 22nd harmonics
Operating Environment	Up to 44kV (L-L), -40°F to + 185°F (-40C to 85°C)
Conductor Diameter	0.160" to 1.030" / 4.06 mm to 26.16 mm
Conductor Surface Area	12.9 to 537 mm <sup>2</sup>
Physical Size and Construction	7" x 6.5" x 4"; Weight: 3.5lbs; Weather-proof; 10+ year lifespan
Qualifications	ANSI®/IEEE495-2007; FCC part 15; ICES-003; salt fog environmental, AT&T and Verizon certified
Event Notifications	Immediate network messaging, daily health reports, and local superbright high visibility LED FCI-type indicator
Installation	Standard hot stick; minimal installation time with no pole attachments required
Security	Transport Layer Security (TLS)
GPS	Lat/Long location information

<sup>1</sup>DNP/IEC 60870-5-104 through integration gateway

Sentient Energy, a Koch Engineered Solutions company, provides innovative distribution grid solutions and services to enable data-driven decisions that enhance the delivery of safe, reliable, and efficient power. With a vision to help orchestrate the transformation of the distribution grid, we partner with leading utilities to meet today's grid challenges while addressing the electrification needs of tomorrow.

Our grid modernization solutions offer rich system visibility, fault detection and load data, predictive insights, and dynamic VAR control for strategic grid management. And the Sentient Energy professional services team offers deep industry expertise to help utilities gain maximum value from their reliability and predictive analytics initiatives without putting a strain on internal resources.

For more information on how we help transform the distribution grid, visit [sentientenergy.com](https://www.sentientenergy.com) and follow us on [LinkedIn](#).