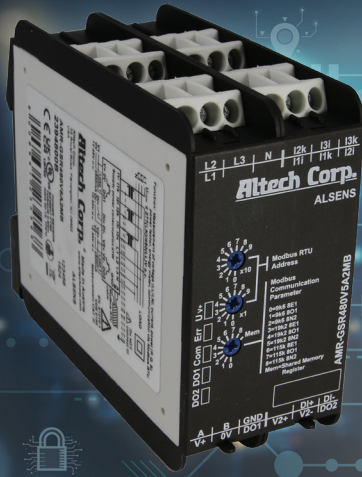




Unlocking Sustainability, Performance and Cost Benefits With Industrial Energy Monitoring

How easy-to-implement energy monitoring systems like the Altech Alsense system can help industrial facilities improve energy efficiency, equipment performance and cost savings.

In today's competitive industrial landscape, energy efficiency isn't just a goal — it's a necessity. With rising energy costs and increasing pressures to reduce carbon footprints, manufacturers are turning to advanced energy monitoring solutions to provide visibility into energy usage and meet sustainability goals.

Yet beyond the obvious environmental benefits, there are significant tangible performance and cost implications to energy monitoring systems too. For example, by monitoring and measuring parameters like reactive power and power factor, these systems enable companies to optimize how energy is being consumed, improving equipment performance and reducing maintenance.

While sophisticated energy monitoring solutions have traditionally been cost-prohibitive for many operations, recent innovations are bridging this gap. New solutions offer an accessible middle ground that brings powerful energy monitoring capabilities to legacy systems through Modbus connectivity. This democratization of energy monitoring technology means that businesses of all sizes can now implement systems that were once reserved for those with substantial capital investment capabilities.

These more accessible monitoring solutions feature integration flexibility and straightforward installation, making them ideal for diverse industrial settings and unlocking new capabilities in older equipment without extensive retrofitting.

Here's how these readily deployable energy monitoring systems are transforming energy from a fixed expense to a dynamic variable ripe for optimization.

Sustainability Advantages of Energy Monitoring

Understanding how automated systems consume energy makes energy management a critical concern for operational sustainability and cost control. Energy monitoring systems provide the visibility and control necessary to optimize these automated processes, ensuring they operate at peak efficiency without unnecessary energy waste. With the increasing global emphasis on sustainability, these technologies also provide the data and insights needed to make informed decisions about energy usage and conservation strategies.



For example, energy monitoring systems like the Alsense Energy Monitor enable manufacturers to track their energy consumption in real-time, identifying areas of waste and opportunities for reduction. Such visibility into energy consumption patterns makes it easier to develop targeted strategies to reduce overall energy usage and the associated carbon emissions.

Energy monitoring systems also play a vital role in ensuring compliance with increasingly strict energy regulations. The Alsense monitor's accurate measurement capabilities — with a base accuracy of $\leq 0.15\%$ for voltage and $\leq 0.25\%$ for current — help facility managers track and record electricity consumption to meet regulatory requirements and align with global sustainability standards.

Examples might include:

- Energy efficiency standards that require reporting of energy consumption.

- Demand response programs that require detailed power usage data.
- ISO 50001 energy management system standard implementation.
- Carbon reduction initiatives that require baseline energy data.

Performance Advantages of Energy Monitoring

In addition to their sustainability benefits, energy monitoring systems provide performance advantages thanks to their ability to enhance operational efficiency. With comprehensive measurement capabilities for voltage, current, active and reactive power, and power factor, these systems allow facilities to:

- Improve their power quality
- Optimize reactive power
- Correct power factor

The result — your plant will run more efficiently at lower costs. Let's take a closer look at these three examples.

Improving Power Quality

Energy monitoring provides a critical foundation for detecting and mitigating power quality issues that affect industrial machine performance. This data allows manufacturers to detect voltage sags, swells, harmonics and other problematic events, which, if left unchecked, can affect equipment performance.

For example, by tracking and analyzing various electrical parameters like voltage and current, the Alsense system helps plant managers identify inefficiencies and anomalies like harmonics and transient events. If left unchecked, harmonics can cause equipment overheating, nuisance tripping and premature component failure, while transient events — which often go unnoticed — can impact machine lifespan and reliability.

The Alsense system's real-time monitoring capabilities provide visibility into the correlation between these events and machine performance issues, empowering operators to identify problematic equipment and take strategic steps to avoid more damaging consequences.

Optimizing Reactive Power

A second example involves reactive power, which plays an important role in maintaining voltage stability in electrical systems. The Alsense monitor's ability to measure reactive power is essential for ensuring proper voltage levels throughout an industrial facility.

Reactive power requires careful optimization: having too little can cause voltage drops, leading to equipment malfunctions or failures, while excessive reactive power can create overvoltage conditions that damage equipment. By monitoring and optimizing reactive power levels, the Alsense system helps manufacturers maintain ideal voltage conditions, ensuring reliable equipment performance and preventing production disruptions.

Reactive power management can also extend the lifespan of industrial equipment by preventing overheating and reducing wear and tear. Excessive reactive power can lead to higher currents and overheating, damaging transformers and motors. By ensuring that equipment operates within optimal parameters, reactive power monitoring helps decrease maintenance costs and prolong service life. The resulting reduction in replacement and repair costs represents a significant long-term financial benefit for industrial operations.

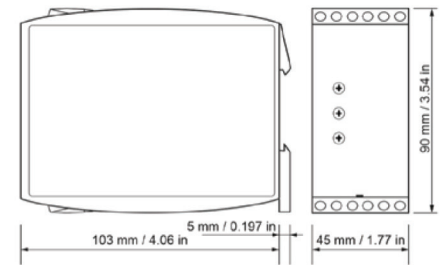
Power Factor Correction and Cost Benefits

By helping plant owners optimize energy consumption and minimize waste, energy monitoring systems unlock significant cost benefits while extending equipment lifespan. A low power factor, which is common with inductive loads like motors and transformers, significantly impacts both operational expenses and equipment reliability.

For manufacturers, a poor power factor creates multiple challenges, including higher electricity bills, utility company penalties and greater equipment strain. When power factor is low, motors and transformers generate excessive reactive power, burdening the power supply system. This, in turn, leads to voltage fluctuations and harmonic distortions that accelerate equipment wear and tear, causing premature component failure and increasing maintenance costs.

By measuring power factor, the Alsense system allows manufacturers to identify problem areas across three-phase systems. By detecting which equipment or processes contribute to power factor issues, facility managers can implement targeted correction measures, thus reducing electricity costs, enhancing power supply stability and extending equipment life.

In addition to power factor correction, another potential area of cost savings involves demand charges based on peak power usage. By monitoring power consumption in real-time, energy monitoring systems like the Alsense enable facilities to manage their demand more effectively and reduce charges.



Users can configure the monitor's digital outputs to implement load-shedding strategies during peak demand periods, automatically turning off non-essential equipment to keep peak demand below threshold levels. This capability can unlock significant cost savings since demand charges often make up a large portion of industrial electricity bills.

The Alsense Energy Monitor Advantage

Energy monitoring systems represent a crucial investment for industrial facilities seeking to enhance sustainability, improve performance and reduce costs. By providing comprehensive visibility into energy usage patterns and power quality issues, these systems enable proactive management of energy resources, leading to significant benefits across industrial operations.

The Alsense Energy Monitor, with its comprehensive measurement capabilities, high accuracy, and flexible integration options, sets a new standard for industrial energy monitoring with its exceptional capabilities and versatility. This compact yet powerful device supports 1- and 3-phase systems with voltages up to 277 VAC (L - N)/ 480VAC (L - L). It can measure currents up to 5A and above, thus a CT can be used to measure higher currents, making it suitable for various industrial applications.

Here's a rundown of its features and benefits:

Accuracy and reliability.

With base accuracy ratings of $\leq 0.15\%$ for voltage, $\leq 0.25\%$ for current and $\leq 0.5\%$ for power measurements, the Alsense monitor provides the precise data needed for effective energy management. This level of accuracy ensures facility managers are receiving the most reliable data possible when making critical operational decisions.

Its robust design, with operating temperatures from -25°C to $+55^{\circ}\text{C}$ and resistance to vibration and shock, also ensures reliable operation even in demanding industrial environments.

Comprehensive capabilities.

The Alsense provides complete energy visibility through its comprehensive monitoring functions, which include:

- Line-to-neutral and line-to-line voltage measurement.
- Current measurement through external CT compatibility.
- Active and reactive power measurement.
- Real-time energy consumption tracking.
- Power factor analysis.

Flexible integration options.

The Alsense monitor features Modbus RTU communication via RS485, allowing seamless integration with existing industrial automation systems. Its digital input and two digital outputs enable interaction with other control systems, making it a versatile component in energy management strategies.

Compact Design and easy installation.

With dimensions of just 22.5 x 90 x 108 mm, the Alsense monitor can be easily installed in existing control panels without requiring significant space. Its DIN rail mounting and flexible positioning options simplify installation in various environments.

Learn More

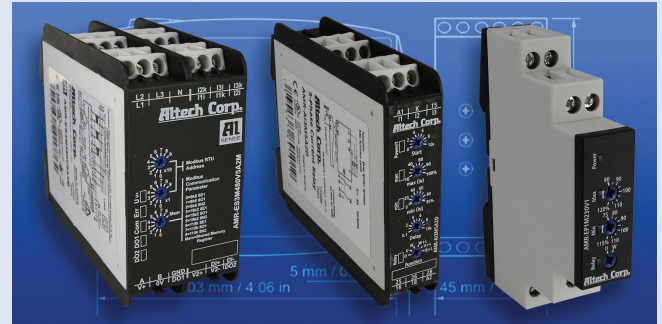
By implementing energy monitoring as part of a comprehensive energy management strategy, industrial facilities can reduce their environmental impact, enhance operational performance and achieve substantial cost savings — a win-win-win proposition in today's competitive and environmentally conscious industrial landscape.

To discover more, please visit: altechcorp.com.

Altech Energy Relay Solutions

SIDEBAR

The Alsense Energy Monitor complements Altech's comprehensive lineup of relays that meet the needs of various industrial applications. These systems include:



▪ Alsense Energy Monitor:

A 1- and 3-phase universal energy meter supporting up to 277 VAC/480 VAC; it can measure currents up to 5A and above, thus a CT can be used to measure higher currents - with digital inputs/outputs and Modbus RTU/RS485 communication.

▪ Voltage Protection Relay:

Monitors 3-phase/3-wire and 3-phase/4-wire systems with true RMS measurement and featuring under/over voltage monitoring, frequency monitoring, phase asymmetry, sequence and failure detection

▪ Current Monitoring Relays:

Available in both single- and three-phase versions, these relays support various current ranges and monitoring functions.

▪ Voltage Monitoring Relay:

Provides flexible voltage monitoring with multiple range options from 1.5 to 300V.

To discover more, please visit: altechcorp.com.