

GEMS - Guardian Element Monitoring System



GUARDING CLIENT UPTIME | PROTECTING TRADE



What is GEMS?

GEMS (Guardian Element Monitoring System) is an intelligent remote monitoring and diagnostic platform designed to protect commercial hot water systems from unexpected failure.

Developed by Electrical 2 Mechanical, GEMS continuously monitors heating elements, thermostats, temperatures, and power usage to detect issues before they impact business operations.

Instead of waiting for water to go cold and reacting to emergencies, GEMS provides real-time visibility and early warning alerts, allowing engineers to act before downtime occurs.

Key Features

- Continuous live monitoring of heating elements and system performance
- Real-time dashboards showing temperature, power, voltage, and system health
- Automatic fault detection and diagnostics
- Remote investigation without site disruption
- Data-driven maintenance decisions





Reduce Downtime & Protect Revenue

Traditional reactive maintenance often leads to emergency call-outs, delayed repairs, and lost trading hours. GEMS shifts maintenance from reactive to predictive by identifying failing components early, allowing planned intervention instead of crisis response.

Operational Benefits

- Fewer emergency call-outs
- Faster diagnostics and repair planning
- Improved engineer efficiency
- Increased equipment lifespan

Data-Driven Insights

Detailed performance data allows site managers and maintenance teams to make informed decisions based on real usage rather than assumptions.

Sustainability & Energy Savings

GEMS helps clients reduce unnecessary energy consumption by monitoring heating patterns and highlighting inefficiencies such as:

- Elements running longer than required
- Temperature drift and heat loss
- Electrical inefficiencies and abnormal load patterns

By optimising heating cycles and identifying failing components early, businesses reduce wasted energy, lower carbon impact, and support sustainability targets.

THE VALUE OF CONNECTED INSIGHT

From reaction to informed action.

REACTIVE APPROACH

01 / DISCOVER

Hot water goes cold

02 / REPORT

A problem is reported

03 / INVESTIGATE

Arrange attendance

04 / REPAIR

Diagnose and plan work

WITH G.E.M.S

01 / MONITOR

Observe system signals

02 / IDENTIFY

Detect abnormal behaviour

03 / NOTIFY

Share fault information

04 / RESPOND

Plan informed attendance

Earlier insight.
Better informed maintenance.

Illustrative process. Response arrangements are agreed for each installation.



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ISO 14001 Environmental Compliance & Sustainability Alignment

The GEMS – Guardian Element Monitoring System has been designed to directly support organisations operating under ISO 14001 Environmental Management Systems by reducing energy waste, preventing environmental incidents, and enabling data-driven sustainability improvements.



Environmental Benefits Delivered by GEMS

Energy Waste Reduction

GEMS continuously monitors heating element performance, ensuring systems operate only when required. Faults such as failed thermostats, inefficient elements, or uncontrolled heating are detected immediately, preventing unnecessary energy consumption.

Carbon Footprint Reduction

By maintaining optimal heating efficiency and eliminating undetected energy losses, GEMS helps reduce overall electrical demand and associated CO₂ emissions, contributing directly to organisational carbon reduction targets.

Preventative Environmental Protection

Early detection of system faults prevents overheating, component failure, and potential environmental hazards such as water loss, excessive energy discharge, or equipment damage.

Environmental Performance Monitoring

GEMS provides precise, timestamped energy and operational data via secure dashboards, enabling organisations to demonstrate environmental performance improvements and support ISO 14001 audit requirements.

Supports Continuous Improvement (ISO 14001 Clause 10)

GEMS enables measurable, ongoing optimisation of energy usage and system efficiency, aligning with ISO 14001 requirements for continual environmental performance improvement.

Alignment with ISO 14001 Core Principles

GEMS supports compliance with key ISO 14001 framework elements:

- Monitoring and measurement of environmental performance
- Reduction of energy consumption and waste
- Prevention of environmental incidents
- Data-driven continuous improvement
- Evidence-based environmental reporting

Commercial and Compliance Advantages

Deployment of GEMS assists organisations in:

- Supporting ISO 14001 certification and audits
- Demonstrating environmental responsibility to stakeholders
- Reducing operational energy costs
- Supporting ESG and sustainability reporting
- Strengthening environmental risk management

Compliance, Safety & Technical Assurance

Designed for Commercial and Regulated Environments

The GEMS Guardian Element Monitoring System has been engineered specifically for deployment within commercial premises including restaurants, airports, rail stations, care facilities, and public buildings. The system operates safely alongside existing electrical installations without altering protection characteristics or introducing additional load risks.

GEMS is a monitoring and diagnostic system and does not interfere with core safety protection devices such as MCBs, RCBOs, or thermal safety cut-outs.

Electrical Compliance Alignment

GEMS supports and operates in accordance with the intent of:

- BS 7671 – Requirements for Electrical Installations (IET Wiring Regulations)
- Electricity at Work Regulations 1989
- Provision and Use of Work Equipment Regulations (PUWER)
- ISO 14001 Environmental Management Systems
- ISO 45001 Occupational Health and Safety (alignment through fault prevention)

The system is installed using compliant electrical methods and industry-standard protective devices.

Fail-Safe System Design

GEMS is designed with safety as the highest priority:

- Passive monitoring — no interference with safety protection devices
- Thermal cut-outs and thermostats remain primary safety controls
- Monitoring failure cannot cause system failure
- Local operation remains fully independent if monitoring is offline
- No risk of unintended heating or electrical activation

If GEMS is disconnected, the heating system continues to operate normally.

Data Security & Integrity

GEMS uses secure communication protocols and local buffering to ensure reliable data capture and reporting.

- Secure encrypted communications
- No reliance on consumer cloud platforms
- Local data logging with automatic recovery after connection loss
- Full audit trail of system performance and fault events

This ensures reliable operational and compliance reporting.

Installation & Deployment

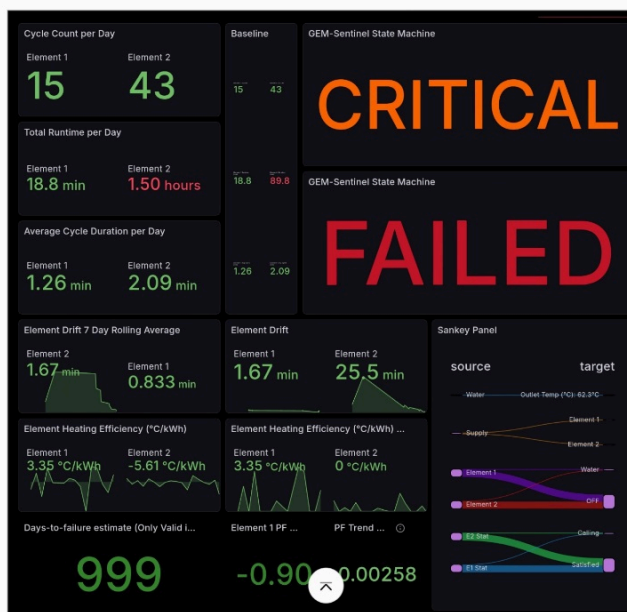
Typical installation is completed without operational disruption.

- Non-intrusive installation method
- Compatible with existing commercial hot water systems
- Scalable from single cylinder to enterprise-wide deployment
- Installed by qualified electrical engineers

Built for Enterprise-Level Reliability

GEMS has been developed specifically for demanding commercial environments where downtime is unacceptable.

The system enables proactive maintenance, improves operational reliability, and supports compliance with environmental and operational standards.



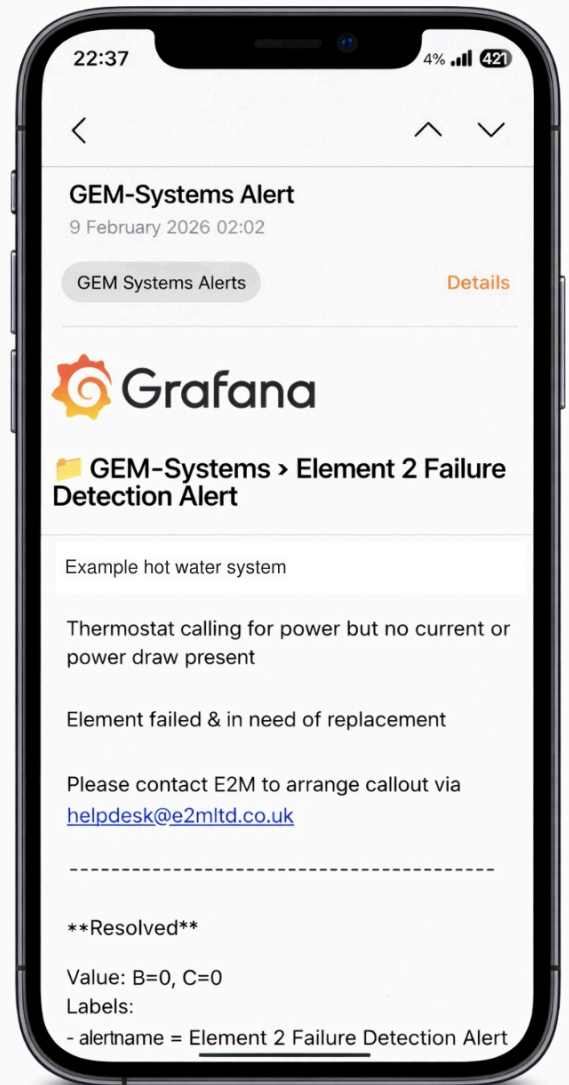
GEMS provides enterprise-grade monitoring, compliance support, and predictive diagnostics for mission-critical hot

How GEMS Works

1. Sensors monitor heating elements and system performance in real time.
2. Data is analysed continuously to detect abnormal behaviour.
3. Automatic alerts notify engineers before failures affect service.
4. Engineers arrive informed, reducing downtime and repeat visits.

Why Choose Electrical 2 Mechanical?

- Designed by engineers for real commercial environments
- Built around reliability, compliance, and safe
- Scalable across single or multi-site portfolio



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