

USE CASE

Smart Building HVAC Systems

edgeRX™ by TDK SenseI | Predictive Maintenance using Edge AI

OVERVIEW

HVAC systems are the backbone of smart buildings, ensuring occupant comfort, air quality, and energy efficiency. However, failures in critical components such as fans, compressors, pumps, and motors can lead to downtime, increased energy consumption, and poor building performance. TDK SenseI's edgeRX™ enables predictive maintenance by continuously monitoring HVAC equipment health using edge sensors, AI-driven analytics, and real-time alerts to optimize reliability and efficiency.

PROBLEM

HVAC systems operate continuously under varying loads, making them prone to wear, imbalance, and inefficiencies over time. Traditional maintenance often fails to detect early signs of degradation in rotating equipment and thermal systems.

Key challenges include:

Unexpected equipment failures (fans, compressors, pumps) impacting building comfort and operations

High energy costs due to inefficient system performance or undetected faults

Limited visibility into real-time equipment condition across distributed building assets

Reactive maintenance practices leading to higher repair costs and service disruptions

EXPECTED OUTCOMES

With edgeRX™ deployed in HVAC systems, building operators can improve reliability, reduce energy costs, and enhance occupant experience through smarter maintenance practices.

Expected benefits include:

Reduced downtime by identifying issues early in fans, motors, and compressors

Improved energy efficiency through detection of abnormal operating conditions

Lower maintenance costs by shifting from reactive to predictive servicing

Enhanced system reliability and lifespan with continuous condition monitoring

SOLUTION

HVAC systems operate continuously under varying loads, making them prone to wear, imbalance, and inefficiencies over time. Traditional maintenance often fails to detect early signs of degradation in rotating equipment and thermal systems.

How edgeRX™ optimizes compressed air systems:

Continuous monitoring: Sensors collect vibration and temperature data from motors, fans, compressors, and pumps in real time.

Edge AI analytics: Data is processed locally, enabling fast detection of abnormal conditions without relying solely on cloud processing.

Predictive insights: AI/ML models identify patterns associated with wear, imbalance, or inefficiency before failures occur.

Actionable alerts: Maintenance teams receive real-time notifications to address issues proactively.

Centralized dashboard: Enables building-wide visibility, trend analysis, and performance benchmarking across HVAC assets.

SUMMARY

TDK SenseI's edgeRX™ brings predictive maintenance to smart building HVAC systems by combining continuous sensing, edge AI analytics, and centralized insights. By detecting early signs of equipment degradation and optimizing system performance, edgeRX™ helps building operators reduce energy consumption, improve reliability, and ensure consistent comfort and air quality.

