edgeSV
NTEK SYSTEM

USE CASE

# CRAH and CRAC fans

SV500 by NTEK SYSTEM | ESA-based condition monitoring & predictive maintenance

## OVERVIEW

Computer room air handlers (CRAH and CRAC) and air handler fans supply cooled air to the server room. In this scenario SV500 analyzes the voltage and current signals of the motors and VFDs that drive these fans to detect abnormalities in the fans and motors early.

## PROBLEM

Server room fans have little thermal margin, so a fan problem can directly affect server cooling.

- **Impact of losing cooling** - In November 2025 a cooling equipment failure at a CyrusOne data center pushed room temperature above 38 °C, and futures trading at CME Group was halted for about 10 hours.
- **Limited visibility of distributed equipment** - It is hard to see in real time the condition of air handler and air conditioning fans installed throughout the server room.

## EXPECTED OUTCOMES

Abnormalities in scattered server room fans can be identified early and remotely so maintenance can be planned.

- **Early detection of potential failures** - Detects potential failures early to minimize unexpected incidents and risk.
- **Optimized maintenance schedules** - Diagnostic data helps predict and optimize maintenance schedules.
- **Lower cost and downtime** - Higher operating efficiency helps reduce energy consumption, maintenance cost and downtime.

## TARGET EQUIPMENT

CRAH and CRAC fans | Fan drive motors | Air handler fans | VFD

## SOLUTION

### 01 VFD Status Diagnostics

Analyzes the VFD's voltage output and current waveforms to diagnose faults in rectifier diodes, DC-link capacitors, and switching semiconductors (SCRs or IGBTs). Also analyzes the condition of power supply and power quality of the VFD.

### 02 Motor Status Diagnostics

Without installing additional sensors on the equipment, analyzes the voltage and current waveforms supplied to the motor to diagnose mechanical faults (Cavitation, Soft Foot, Bearing, Vibration, etc.), electrical faults (Stator, Cable connection, Heat, Noise, etc.) and Load fluctuation fault.

### 03 Power Quality Status Diagnostics

For power quality diagnosis, saves power quality indicators such as voltage, current, interruptions, sags, harmonics, etc. in trend data.

### 04 Edge AI Server

Performs all diagnostic analysis directly on the edge device. Built-in memory and storage—2GB DDR, 8GB eMMC, and SD card support up to 256GB—enable long-term storage of diagnostic data and waveforms without transmitting them to a server. The built-in web-based UI/UX provides access to real-time data, diagnostic result of the equipment, diagnostic data of the power quality, alarm events, reports and etc. without a separate server.

## Operational Impact of edgeSV

Continuous monitoring and early detection support availability, maintenance and energy efficiency.

| 20~40% | 10~25% | 5~15% | 10~20% |
|---|---|---|---|
| **Reduction in unplanned downtime** | **Maintenance cost savings** | **Energy savings** | **Longer equipment life** |

Illustrative ranges, not verified SV500 results. Actual outcomes depend on site conditions and corrective actions; PoC validation is required.

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