edgeSV
NTEK SYSTEM

USE CASE

Indoor air quality systems

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

OVERVIEW

Keeping indoor air quality under control requires air handling units (AHU) and supply/exhaust fans to run reliably. In this scenario SV500 measures and analyzes the three-phase voltage and current signals of the fan drive motors with PTs and CTs to detect abnormalities in the fans and motors early.

PROBLEM

HVAC fans and motors run for long hours and can slowly deteriorate through wear.

- **An exhaust fan failure case** - At North District Hospital in Hong Kong a ground fault in an exhaust fan of the isolation ward negative-pressure exhaust system triggered an alarm, and operation returned to normal in about 20 minutes after switching to the standby exhaust fan.
- **Common AHU faults** - A study of more than 60,000 HVAC units in US commercial buildings reported faults in 40% of AHUs on a daily basis.
- **Hidden early abnormalities** - Early faults in fans and motors are hard to find in routine inspection, and action is sometimes taken only after a failure.
- **Distributed equipment** - It is hard to check on site the operating condition of HVAC equipment scattered throughout a building.

EXPECTED OUTCOMES

Abnormalities in HVAC fan equipment can be identified early 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

AHU fans | Fan drive motors | Supply and exhaust fans | VFD

SOLUTION

SV500 uses ESA to analyze the voltage and current signals of fan motors and diagnose abnormalities in the motor and drive equipment.

- **Fan and motor diagnosis** - Detects mechanical unbalance, bearing problems, shaft misalignment, fan flow turbulence, blade and vane damage and load-related problems.
- **VFD operation diagnosis** - For fans driven by a VFD, SV500 analyzes voltage, current and frequency signals on the VFD secondary (output) side at 8 kHz to predict and diagnose potential faults.
- **Adaptive thresholds** - Machine learning learns the normal state of each asset and judges condition with thresholds that adapt to load. Criteria matched to each asset and load condition are applied instead of fixed thresholds.
- **Web dashboard and data integration** - The equipment web server dashboard shows status per diagnostic parameter in real time, so condition can be checked without a site visit, and data can be integrated with upper-level systems over Modbus RTU, Modbus TCP, MQTT and RESTful API.

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.

NTEK SYSTEM © 2026 | www.nteksys.com | ntek@nteksys.com