

edgeSV

NTEK SYSTEM

USE CASE

Cooling tower fans

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

OVERVIEW

Cooling tower fans release heat from the cooling water into the atmosphere. In this scenario, SV500 analyzes voltage and current signals from the motors and VFDs that drive the fans to detect fan and motor abnormalities early.

PROBLEM

Cooling tower fans operate for long periods under conditions that vary with generating output and season.

- **Growing use of VFD drives** - An EPRI evaluation of power-plant cooling tower fans reported that VFD operation delivered the greatest net benefit compared with single- and two-speed arrangements.
- **Distributed large equipment** - Fans installed in hard-to-reach locations, such as the top of a cooling tower, are difficult to inspect one by one in the field.

EXPECTED OUTCOMES

Teams can identify abnormalities in distributed fan equipment early and remotely, enabling planned maintenance.

- **Early detection of potential failures** - Detects developing faults early to minimize unexpected incidents and operational risk.
- **Optimized maintenance schedules** - You can predict and optimize maintenance schedule based on diagnostic data.
- **Reduce cost and downtime** - It helps reduce energy consumption, maintenance costs and downtime by increasing equipment driving efficiency.

TARGET EQUIPMENT

Cooling Tower Fan | Fan Drive Motor | VFD

SOLUTION

SV500 uses ESA to analyze electrical signals from fan drive motors and VFDs and diagnose abnormalities in the fans and motors.

- **Fan diagnosis** - Detects mechanical unbalance, blade or vane damage, and flow turbulence.
- **Motor and drive equipment diagnosis** - Detects bearing problems, broken rotor bars, static and dynamic eccentricity, shaft misalignment, soft foot, and load-related problems.
- **VFD driving status diagnosis** - For VFD-driven fans, SV500 analyzes voltage, current, and frequency signals on the VFD secondary (output) side at 8 kHz to predict and diagnose potential faults.
- **Power Quality Monitoring** - Analyzes voltage sag and swell, total harmonic distortion (THD), and voltage and current unbalance in real time to detect equipment impacts and abnormal conditions caused by degraded power quality.
- **Adaptive thresholds** - Machine learning learns each asset's normal state and evaluates its condition using thresholds that adapt to load. This applies criteria suited to the specific asset and operating condition instead of a fixed threshold.
- **Web dashboard and data integration** - The built-in web dashboard shows each diagnostic parameter in real time, allowing remote condition checks. Data can be integrated with upper-level systems over Modbus RTU, Modbus TCP, MQTT, and RESTful API.

SUMMARY

SV500 uses ESA to analyze voltage and current signals from the motors and VFDs that drive cooling tower fans. Adaptive thresholds that follow operating conditions help detect mechanical unbalance, bearing problems, blade damage, and other abnormalities early.

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