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NTEK SYSTEM

USE CASE

Rotating equipment

SV500 by NTEK SYSTEM | ESA-based motor & VFD predictive maintenance

OVERVIEW

Rotating equipment such as motors, pumps, fans and compressors is widely used in manufacturing. In this scenario SV500 analyzes the voltage and current signals of rotating equipment in real time to detect electrical, mechanical and operational abnormalities and supports predictive maintenance.

PROBLEM

Relying only on reactive or time-based maintenance can lead to over-maintenance or unexpected failures.

Key challenges:

- **A fault that vibration checks missed** — At a pumping station in the US, an ESA check of a 700 HP pump motor that vibration checks had judged acceptable found rotor bar damage, and disassembly showed that more than 30% of the rotor bars were broken or damaged.
- **Unexpected stops** — Unexpected failures lead to production loss and recovery cost.
- **Excessive maintenance spending** — Parts are replaced or inspected regardless of actual condition.

EXPECTED OUTCOMES

Abnormalities in rotating equipment can be identified early so maintenance can be planned.

Expected benefits:

- **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

Motors and drive equipment | Pumps | Fans | Compressors | VFD

SOLUTION

SV500 uses ESA to detect and analyze electrical, mechanical and operational abnormalities in rotating equipment.

How SV500 diagnoses:

- **Motor and drive diagnosis** — Detects mechanical unbalance, bearing problems, broken rotor bars, static and dynamic eccentricity, stator coil movement and wedge loosening, winding insulation degradation, torque ripple, soft foot, ground leakage current, shaft misalignment, load-related problems, fan and pump flow turbulence and cavitation, and blade and vane damage.
- **Power spectrum analysis** — Analyzes the phase information of three- phase signals with the Clarke transform, DQ transform and EPVA.
- **VFD operation diagnosis** — For equipment 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.
- **Power quality monitoring** — Analyzes voltage sag/swell, total harmonic distortion (THD) and voltage and current imbalance in real time to detect early the equipment impact and abnormal conditions caused by poor power quality.
- **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.

SUMMARY

SV500 analyzes the voltage and current signals of rotating equipment with ESA, judges abnormalities with adaptive thresholds learned per asset to detect potential failures early, and supports prediction and optimization of maintenance schedules.

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