edgeSV
NTEK SYSTEM

USE CASE

Leakage current and power quality

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

OVERVIEW

Pumps and blowers driven by VFDs can trip because of power disturbances. In this scenario SV500 measures the three-phase voltage and current of pumps and blowers to monitor power quality and motor and VFD condition together.

PROBLEM

Power disturbances can lead to the shutdown of treatment equipment.

- **Power disturbances and VFD trips** - At the Commerce Township wastewater treatment plant in Michigan, USA, frequent power disturbances after VFDs were installed forced operators to reset process equipment manually, resulting in several hours of unplanned shutdown and damage to two VFDs.
- **Difficulty identifying the cause** - Only after installing a voltage monitor did the same plant confirm that the timing of voltage disturbances matched the VFD overvoltage trips, and it used this data in discussions with the utility.

EXPECTED OUTCOMES

Power quality events and equipment condition can be recorded together so abnormalities can be handled in advance.

- **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

Inflow pumps | Aeration blowers | VFD

SOLUTION

SV500 analyzes power quality in real time from the voltage and current signals of pumps and blowers and, with ESA, also diagnoses the condition of motors and VFDs.

- **Power quality monitoring** - Analyzes voltage sag/swell, total harmonic distortion (THD) and voltage and current imbalance in real time to identify equipment impact and abnormal conditions caused by poor power quality at an early stage.
- **Power and energy measurement** - Measures active, reactive and apparent power, power factor and energy, viewable on the dashboard.
- **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.
- **Motor and drive diagnosis** - Detects mechanical unbalance, bearing problems, shaft misalignment, winding insulation degradation, ground leakage current and load-related problems.
- **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.