



Inspector™ Application note

Using INSPECTOR™ for Vibration-Based Condition Monitoring (4–20 mA)
Scalable Mechanical Health Insight - Without Complexity



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Why Vibration Monitoring Matters?

Vibration is an early and reliable indicator of mechanical degradation in rotating equipment. Traditional vibration systems can be complex and hard to scale.

Using INSPECTOR™, vibration monitoring is enabled with standard 4–20 mA RMS vibration sensors, delivering continuous condition insight without full vibration analyzer complexity.

Why RMS-Based Vibration Monitoring

Not all assets require detailed spectral vibration analysis. In many industrial applications, overall vibration severity and trend behavior are sufficient to:

- Identify abnormal operating conditions
- Trigger timely maintenance actions
- Detect gradual deterioration
- Escalate to advanced diagnostics only when necessary

INSPECTOR™ applies RMS-based vibration monitoring as a practical and cost-effective approach for baseline condition assessment and long-term trending.

Target Applications Using INSPECTOR™

Vibration-based condition monitoring with 4–20 mA sensors is ideal for:

- Motors, pumps, and fans
- Rolling-element bearing machines
- Medium-sized industrial machinery
- Auxiliary and balance-of-plant equipment
- Remote or unattended installations

Typical use cases include condition-based maintenance programs, early fault detection, and fleet-wide asset health monitoring.

What INSPECTOR™ Monitors

From a single loop-powered RMS vibration signal, INSPECTOR™ provides continuous monitoring of:

- RMS vibration acceleration
- Overall vibration velocity (derived)
- Machine vibration severity level
- Long-term vibration trends
- Operating state (running / not running)

This scope focuses on what maintenance teams need most: severity, trend direction, and actionable status.

Standards-Based Severity Assessment

To ensure consistency and clarity, INSPECTOR™ evaluates vibration severity using ISO 10816 machine classification guidelines.

INSPECTOR™:

- Classifies machines by size and application
- Converts RMS vibration into defined severity zones
- Assigns clear condition states:
 - o Good
 - o Satisfactory
 - o Unsatisfactory
 - o Unacceptable

This standards-based approach makes vibration data comparable, understandable, and suitable for maintenance reporting.

Trend Analysis and Change Detection

Beyond absolute vibration levels, INSPECTOR™ continuously evaluates vibration trends to detect:

- Stable operating conditions
- Gradual vibration increase indicating wear or deterioration
- Sudden vibration increase indicating impact or damage
- Decreasing trends caused by operational or load changes

Trend-based monitoring provides early warning before vibration reaches critical levels.

Simplified Fault Indication Philosophy

Because 4–20 mA sensors provide RMS-only data, INSPECTOR™ applies a simplified fault inference model focused on actionable outcomes rather than over-detailed diagnostics.

Based on severity and trend behavior, INSPECTOR™ indicates:

- Healthy condition
- Possible bearing wear
- Abnormal operating condition
- Warning and alarm states
- Possible impact or breakage
- Machine not running

This avoids false precision and supports clear maintenance decisions.

Value During Commissioning

During installation and commissioning, INSPECTOR™ enables:

- Establishment of vibration baselines
- Verification of acceptable mechanical condition
- Detection of installation or alignment issues
- Confirmation of normal operating behavior

A reliable baseline is essential for effective long-term monitoring.

Value During Operation

In normal operation, continuous vibration monitoring using INSPECTOR™ provides:

- Early detection of mechanical degradation
- Reduced risk of unexpected failures
- Improved maintenance planning
- Objective condition data for asset prioritization

This supports the shift from reactive to condition-based maintenance.

Application Value Using INSPECTOR™

By using INSPECTOR™ for vibration-based condition monitoring, users gain:

- Early mechanical fault detection
- Lower maintenance and inspection costs
- Simple integration using industry-standard sensors
- Reduced unplanned downtime
- Scalable deployment across large asset fleets



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