

— TECHNICAL NOTE 02 — DETECTION METHODS

Many signals, read *as one*.

A proprietary multi-signal analytics stack runs continuously on every monitored asset. Each method below runs in parallel; a correlation layer fuses them, so degradation that hides in one signal surfaces in another. **Threshold alarms fire after the fault — these methods read the approach to it.**

METHOD	TECHNIQUE	BASIS	WHAT IT CATCHES
Vibration severity	RMS velocity severity zoning	ISO 10816/20816	Bearing wear, misalignment, imbalance, looseness
Thermal / delta-T	Approach & return differential tracking	ASHRAE G36	Coil fouling, refrigerant under-charge, HX degradation
Statistical drift	EWMA & CUSUM trend deviation	SPC	Gradual efficiency loss invisible to threshold alarms
Electrical analysis	3-phase current & balance	—	Phase imbalance, harmonics, overload, short-cycling
Level trend	Drawdown & make-up trend	—	Basin imbalance, chilled-water & process-tank drift
Correlated anomaly	Multi-signal correlation	—	Multi-mode degradation no single signal catches
Peer benchmarking	Cross-asset & cross-site comparison	ISO 55000	Outlier assets, worst sites, FM performance variance

Output per asset: a single 0–100 health score, updated every 1–10 minutes; the finding translated into **AED risk-weighted exposure**; and a ranked alert so the worst asset surfaces first.

Typical early warning across deployments is **2–8 weeks before failure** — the window between “cheap to fix and invisible” and “an emergency on your desk.”