# outlierX360

Outlier detection and diagnosis for plant sensor data.

MODULE OF THE INGENEROX360 AI SUITE.

## PRODUCT OVERVIEW

outlierX360 is an industry-agnostic, ML-powered platform that continuously monitors process variables to proactively detect outliers, subtle process drifts, and potential leaks before conventional alarms trigger. It executes continuous fault detection on your existing plant data, autonomously classifying deviations as instrument drift, genuine faults, or expected baseline shifts to completely eliminate alarm fatigue. By delivering vital severity context for every event, it empowers engineering teams to identify anomalies early, preventing asset malfunction.

## 01 Data and Configuration

*Shown: the configure panel, then per-tag setup.*

UPLOAD | FILTERS | CRITICAL TAGS | DISTURBANCES | RUN

DATA FILE: Olefin_cgc_2024.xlsx

DURATION: Last 90 days

PLANT · SUBSYSTEM: Olefin · CGC

GLOBAL DIRECTION: Both | Up | Down

| TAG | DIRECTION | MIN | MAX | CRITICAL | DISTURBANCE |
|---|---|---|---|---|---|
| REACTOR_TEMP | Both | 20.0 | 180.0 | ✓ | — |
| CGC_SUCT_PRESS | Down | 0.5 | 6.0 | ✓ | — |
| AI-201_C2_BTMS | Up | 0.0 | 2.5 | ✓ | — |
| HX_OUT_TEMP | Both | 380 | 460 | ✓ | *w = 0.28* |

**Registry** — plant and subsystem, results kept per pair

**Upload** — wide-format xlsx or csv, timestamp plus numeric tag columns

**Tag controls** — direction up/down/both, min–max filters, critical tags

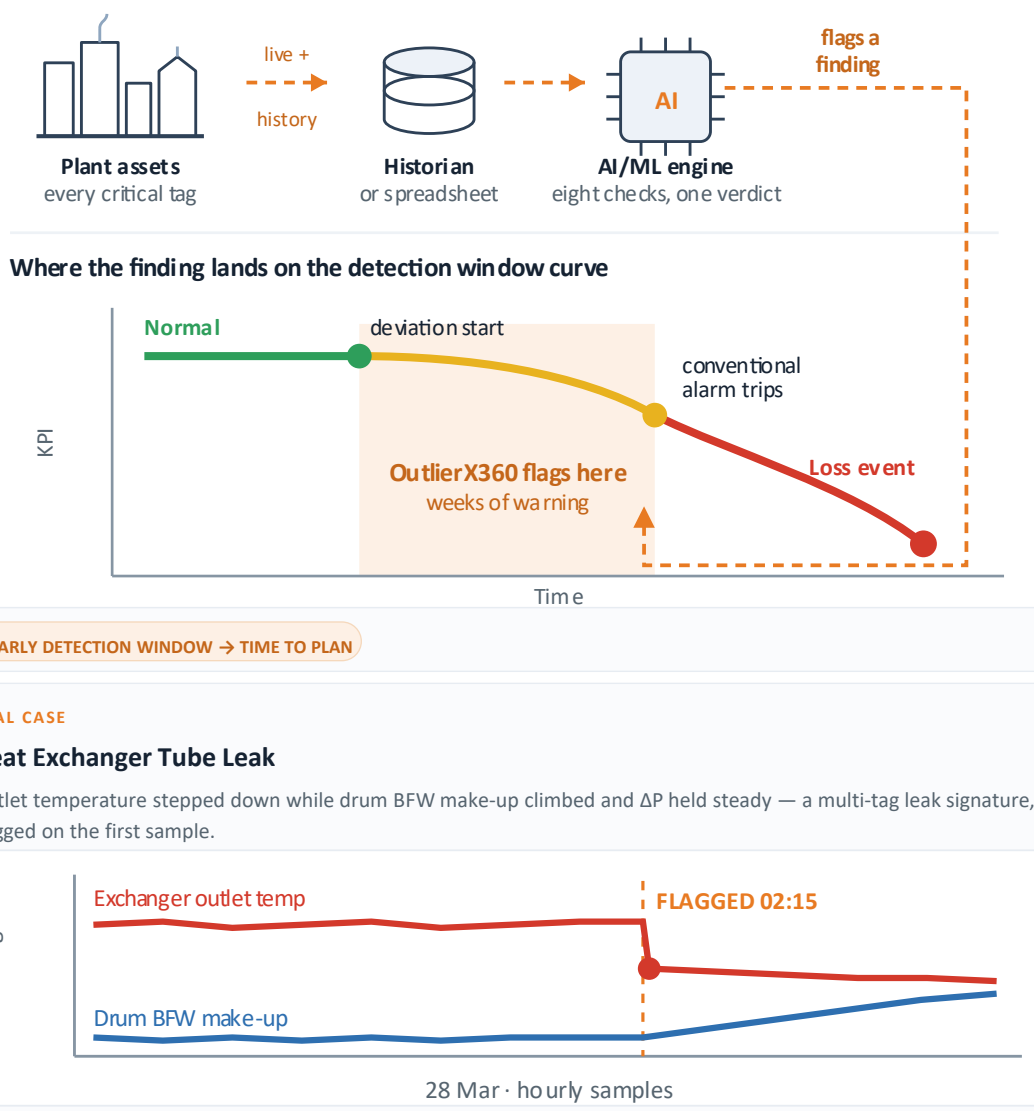
**Disturbances** — up to four known drivers, correlation-weighted

## 02 Detection and Diagnosis

*Shown: how a developing failure is flagged, a real plant case, and the eight checks behind every finding.*

HOW IT WORKS

### Anomaly detection using AI/ML — and why it matters




EARLY DETECTION WINDOW → TIME TO PLAN

THE EIGHT CHECKS

### Detection Engine Suite

*Eight independent checks on every tag; a finding is raised only when several agree.*

- **S1 · Off normal level** — outside the level this tag normally runs at
- **S2 · Out of step** — no longer fits how the unit has been running
- **S3 · Extreme reading** — well beyond the usual spread
- **S4 · Sudden jump** — abrupt move between two readings
- **S5 · Out of line with peers** — moves while related tags do not
- **S6 · Slow drift** — gradual creep over days or weeks
- **S7 · New sustained level** — settled apart from its own history
- **S8 · Drift since start-up** — walk away from as-new performance

REAL CASE

### Heat Exchanger Tube Leak

Outlet temperature stepped down while drum BFW make-up climbed and ΔP held steady — a multi-tag leak signature, flagged on the first sample.




**Flagged by:** sudden jump · out of step with recent operation · out of line with related tags

EQUIPMENT FAULT → INSPECT EXCHANGER

WHAT THE TEAM RECEIVES

### Daily findings list

| TAG | TIMESTAMP | CHECKS | READING | DIAGNOSIS |
|---|---|---|---|---|
| AI-201_C2_BTMS | 14 Mar 06:40 | 3 of 8 | 1.84 mol% | Process issue |
| AI-201_PURITY | 22 Mar 11:05 | 3 of 8 | 97.4 % | Tag issue |
| HX_OUT_TEMP | 28 Mar 02:15 | 3 of 8 | 451 °C | Equipment fault |
| CGC_SUCT_PRESS | 29 Mar 09:30 | 2 of 8 | 3.1 bar | Disturbance |

Reason codes, correlated tags and expected values — exportable, delivered daily.

## 03 One Engine, Many Problems

*One detection engine, many problem types — across process industries.*

ONE ENGINE, SIX PROBLEM TYPES

**OUTLIERX360** — one engine, eight checks per tag

| | |
|---|---|
| **Process drift** | unit walking off its normal operating point |
| **Instrument drift** | sensor reading apart from its peers |
| **Leak detection** | multi-tag signature across connected streams |
| **Reliability issues** | equipment degrading ahead of failure |
| **Performance decay** | efficiency slipping against as -new |
| **Yield and giveaway loss** | product quality giveaway in spec margin |

APPLIED ACROSS INDUSTRIES

- Petrochemicals
- Refining
- Power and utilities
- Metals and mining
- Specialty chemicals
- Pharma and life sciences
- Fertilizers, agrochem
- Pulp, paper, cement

Any plant with time-stamped tag data — the same checks and diagnosis logic transfer unit to unit.

## 04 Business Impact

*What early, diagnosed findings are worth to the operation.*

- **Zero** Loss of production — Early alerts enable preventive action.
- **10x** Faster fault identification — Equipment faults split from sensor drift.
- **24×7** Always-on detection — Every critical variable, around the clock.
- **100%** Proactive posture — Evidence-based maintenance planning.
- **<2%** False positives — Ends alarm fatigue, isolating genuine faults.
- **80%** Less time chasing data — One ranked list replaces trend hunting.

## 05 Platform

*Runs inside your network; no data leaves the plant boundary.*

- **Historian connectivity** — Plug and play with leading plant historians.
- **Live or on-demand** — Monitor continuously, or run a one-off review from a spreadsheet.
- **Daily reporting** — Downloadable daily reports with interactive trends.
- **Gen AI assistant** — Answers plant questions in the operating workflow.
- **Build your own dashboard** — Engineers build the views their unit needs.
- **Quick setup** — Configured and running within two weeks.

DELIVERY

Configured, validated and commissioned by Ingenero Data Science and Domain SMEs.

FLEXIBILITY

Any tag, any plant, any domain — across any industry.

SCALE

Plug in and use at any site, first-time or repeat — virtually no manual configuration required.

Contact: marketing@ingenero.com