PULSEMQ
INDUSTRIAL MACHINE INTELLIGENCE

PulseMQ™

Platform Guide

The Industrial Machine Intelligence Platform

> Machines already know what is happening.
> PulseMQ explains why.

INSIDE THIS GUIDE

Contents

KEY MESSAGE

Industrial software should not only report events — it should explain them.

WHY PULSEMQ

Every machine already knows

Every sensor changes state, every cylinder strokes, every PLC evaluates thousands of logic decisions a second. That activity is the machine telling you precisely how it works — yet traditional software only records what happened, never why.

PulseMQ™ reads the engineering knowledge already written into your controllers and turns it into plain answers that operators, maintenance technicians and engineers can act on immediately.

TRADITIONAL SOFTWARE ANSWERS

- What happened?
- What value changed?
- Which alarm occurred?

PULSEMQ ANSWERS

- Why won't the machine start?
- Which permissive is blocking production?
- Which sequence changed?
- What is beginning to drift?
- What should maintenance investigate first?

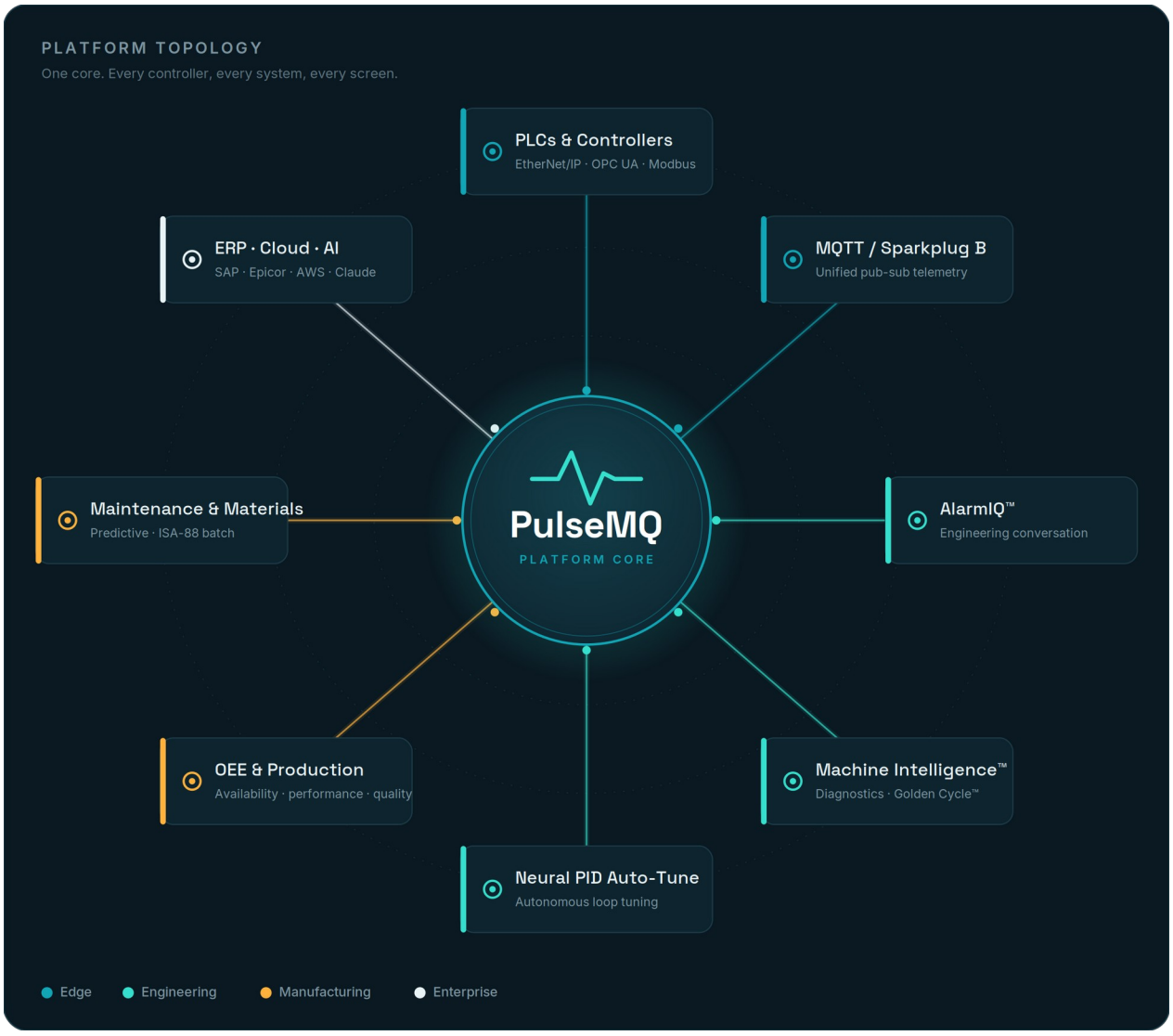
KEY MESSAGE

Program the machine. Configure the understanding.

THE PLATFORM

One platform. Three layers.

PulseMQ™ runs from the edge device to the enterprise dashboard as one connected system — a single core that speaks to every controller, every business system and every screen on the floor.



ARCHITECTURE

From the edge to the enterprise

Data flows up the stack and understanding flows back down — every layer adding meaning while sharing the same live model of the machine.

Layer	What it does	Who it serves
Edge	Acquire & normalize data, run ISA-88/106 control	Controls / IT
Engineering Layer™	Read PLC logic, explain behaviour, hold the model	Maintenance / Engineering
Manufacturing	OEE, analytics, maintenance & materials	Production / Management
Enterprise	Cross-plant reporting & integration	Leadership

PULSEMQ™
INDUSTRIAL MACHINE INTELLIGENCE

01

PLATFORM LAYER · EDGE

PulseMQ-Edge™

Securely acquire and normalize industrial data — right at the machine, on open standards.

EtherNet/IP · OPC UA · Modbus · MQTT / Sparkplug B

ISA-88 batch & ISA-106 continuous control HMIs

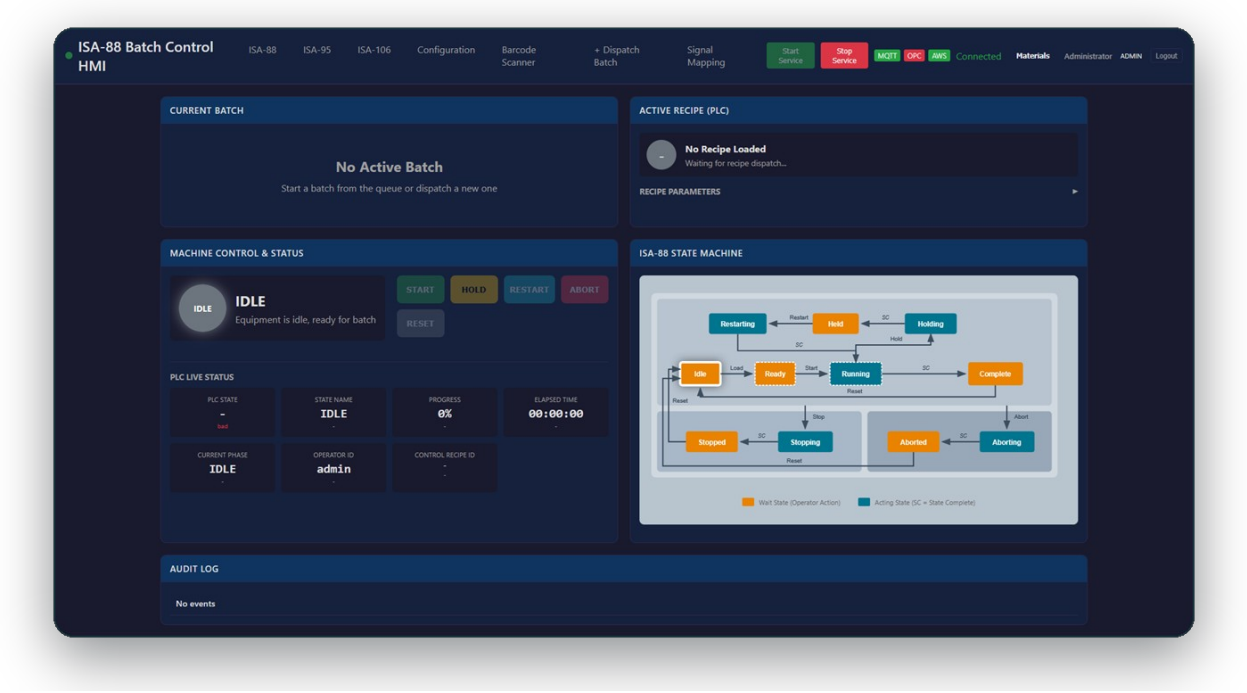
Runs on the edge device — no cloud dependency

PULSEMQ EDGE™ · LAYER 01

Standards-based control, on the box

PulseMQ-Edge™ connects directly to your PLCs over open industrial protocols and runs full ISA-88 batch and ISA-106 continuous-process control right on the device — with live equipment state machines, interlocks and permissives, recipe dispatch and audit logging built in.

CONNECTS OVER EtherNet/IP · OPC UA · Modbus · MQTT / Sparkplug B



ISA-88 batch

A live equipment state machine driven straight from PLC state.

ISA-106 continuous

Startup, shutdown and grade-change procedures with live interlocks.

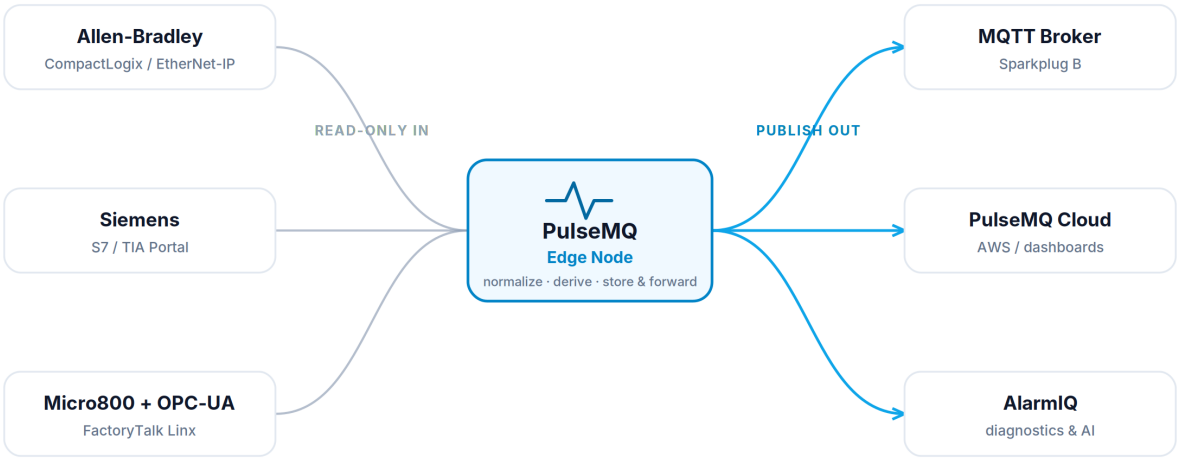
On the edge

Runs on the device, connected over open standards — no cloud required.

ARCHITECTURE

One hub. Every controller, every screen.

PulseMQ-Edge™ runs as a node beside your line. Controllers feed it read-only; it normalizes every tag and publishes one clean stream to the broker, the cloud and the apps — a hub-and-spoke model with no new hardware on the plant floor.



One Edge node handles a full line. Mixed Rockwell and Siemens controllers land in the same model; tags index in one to three minutes and publish as clean Sparkplug B. Add a second node for the next line — the topology doesn't change, it just repeats.

02

THE ENGINEERING LAYER

AlarmIQ™

A chat console for every machine — ask in plain English and it answers from your live PLC logic.

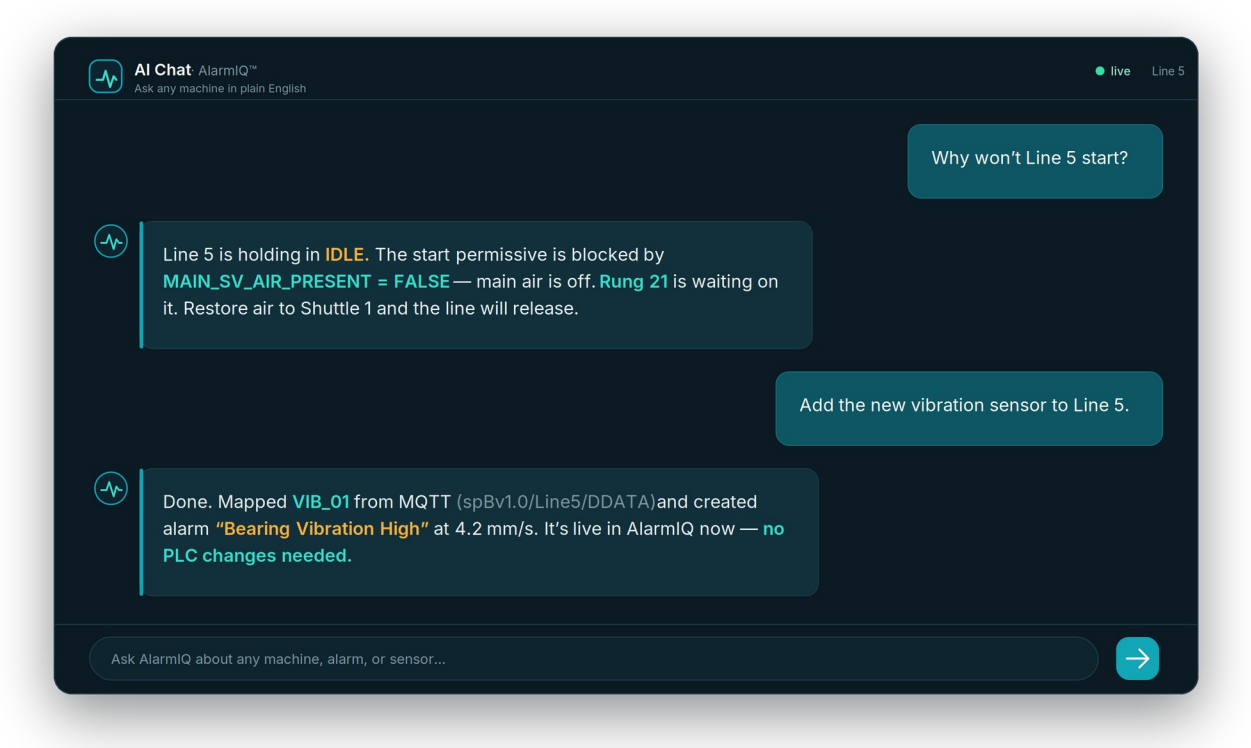
- Plain-English chat for operators & engineers
- Machine Intelligence · Golden Cycle · Replay
- Neural PID — and it reads your live ladder logic

ALARMIQ™ · ENGINEERING CONVERSATION™

Ask the machine. In plain English.

AlarmIQ™ turns troubleshooting into an engineering conversation. Operators, maintenance and engineers simply ask — “Why won’t Line 5 start?” — and get a straight, evidence-based answer drawn from live PLC logic, machine state and alarm history. It can even act on your words: map a new signal or set up an alarm, no programming required. Powered by Claude.

ANSWERS Why it stopped · What changed · What to check first



Anyone can ask

Plain-English questions — no tags, no ladder, no training.

Grounded in truth

Every answer is tied to live logic, state and alarms.

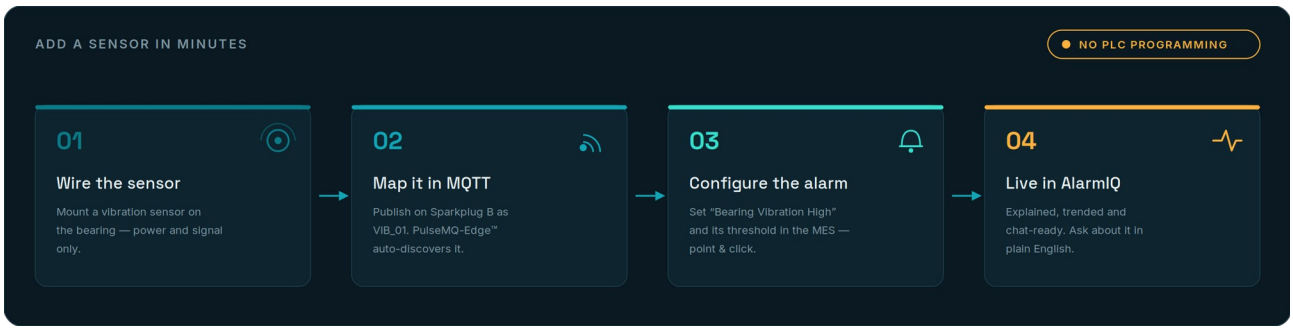
It can act

Map signals and configure alarms straight from chat.

EXTEND WITHOUT CODE

Add a sensor in minutes, not weeks

Need to watch a new failure mode? Bolt on a vibration sensor, publish it over MQTT, and configure the alarm in the MES — PulseMQ-Edge™ discovers it automatically and AlarmIQ™ starts explaining it. No PLC download, no controls engineer, no production stop.



The same path works for any signal — temperature, pressure, motor current, flow. If it can publish to MQTT, PulseMQ can map it, alarm on it and explain it.

Any signal

Temperature, pressure, motor current, flow — anything on MQTT.

Any vendor

Mixed-vendor sensors and PLCs, side by side, nothing to code.

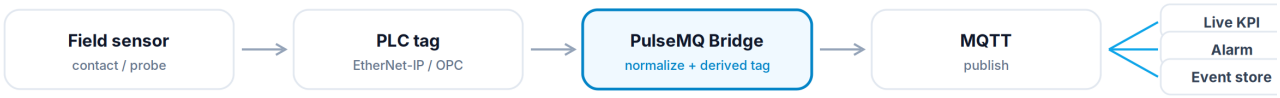
Minutes, not weeks

No PLC download, no controls engineer, no production stop.

FROM ONE CONTACT TO A DECISION

Here’s a real one, end to end

Every field signal follows the same short path — read off the controller, given meaning, then delivered three ways at once.



Worked example — Extruder Zone 1 over-temperature

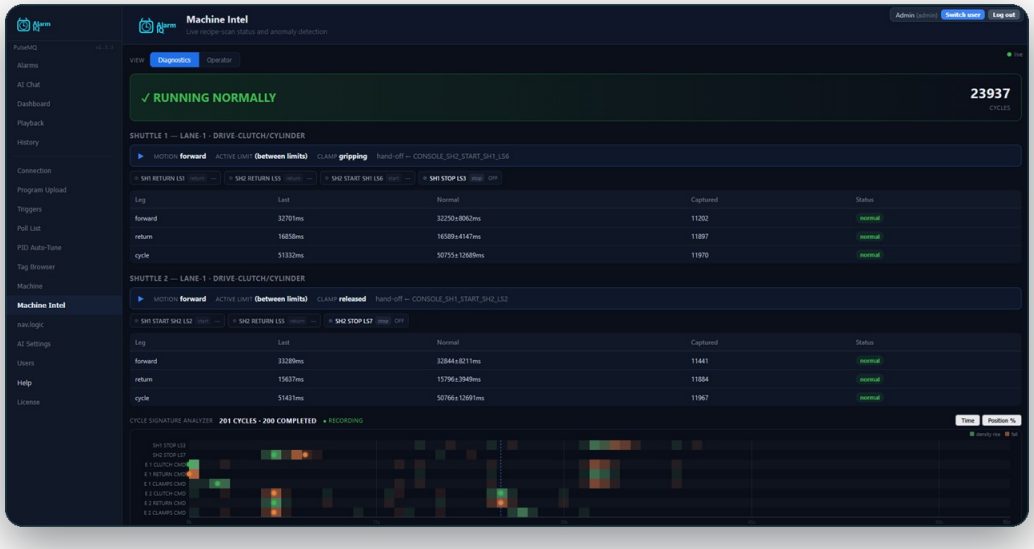
```
raw    Zone1_TempPV     = 152°F ·        Zone1_SP    = 145°F

rule   Zone1_OverTemp   = ( Zone1_TempPV > Zone1_SP + 5 ) →        TRUE
```

Alarm: Zone 1 over setpoint | OEE availability dips | Event logged 14:03:07 · first-out

Derived tags are configured, not coded — boolean logic and thresholds evaluated on the live stream, with every value carrying the source tags it was computed from.

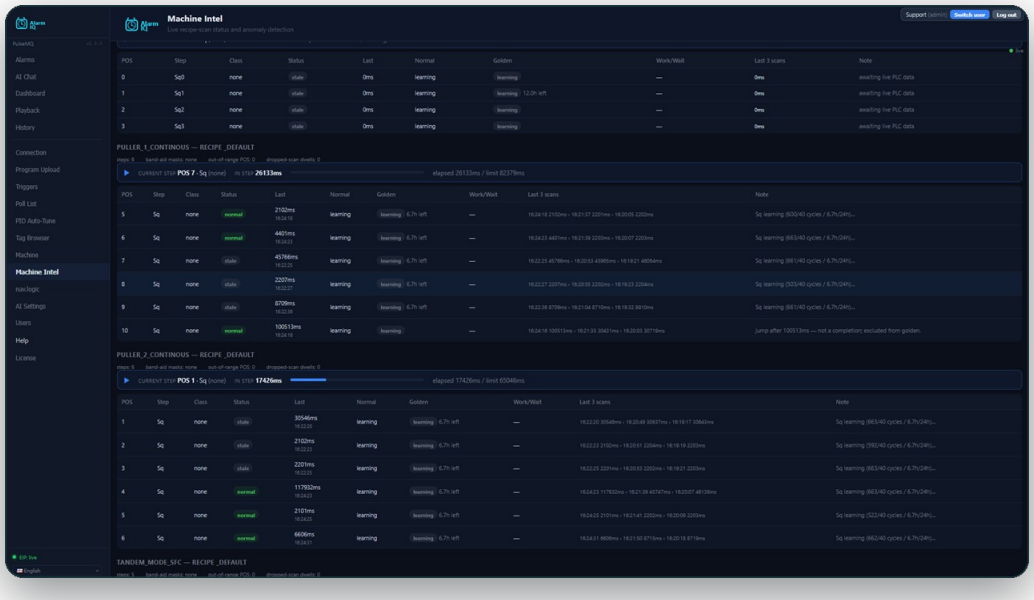
Machine Intelligence™

AlarmIQ learns every leg of the cycle — forward, return, total — and flags drift against the normal range. A live signature heatmap surfaces anomalies across thousands of cycles, long before they turn into downtime.



Golden Cycle™

Every cycle is measured against a learned Golden Cycle™ — the machine's own proven-good run. Dwell times, step order and hand-offs are checked continuously, so a sequence that drifts out of pattern is caught the moment it happens.



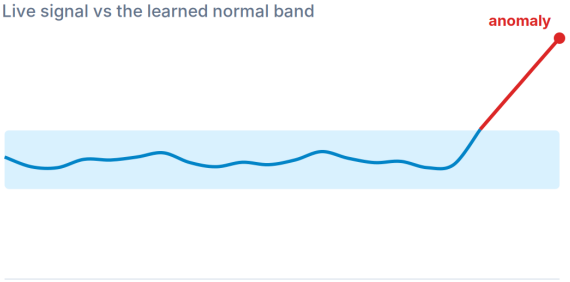
ALARMIQ™ INTELLIGENCE

It doesn’t just alarm. It understands.

AlarmIQ learns how each machine normally behaves, flags the moment it drifts, and explains the stop in plain language — traced to the exact rung.

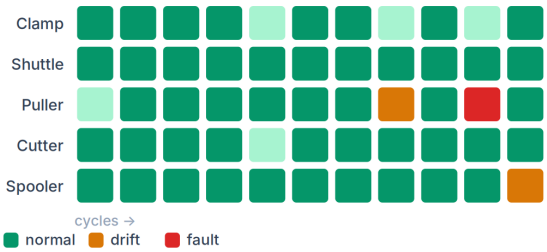
Anomaly detection

Live signal vs the learned normal band



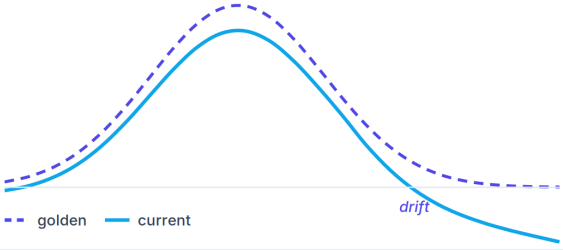
Machine Signature™

Every mechanism, marked against normal



Golden Cycle™

Proven-good reference vs the current run



Replay & root cause

“Why won’t cell 3 start?” — scrubbed to first-out

E-stop circuit OK	14:02:58
Guard closed	14:02:58
Air pressure LOW — first-out	14:03:01
Start permissive dropped	14:03:01

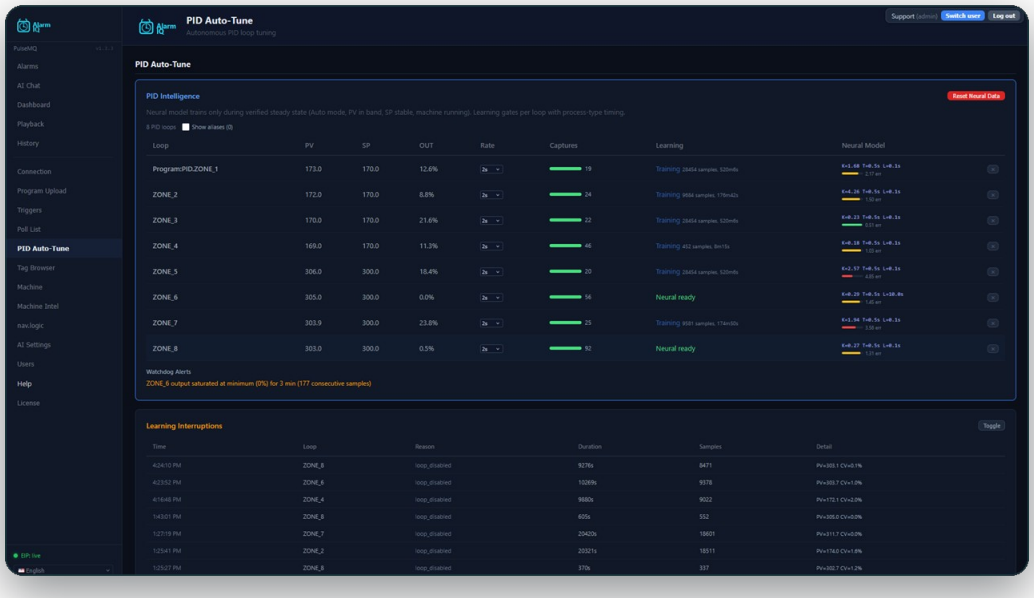
Charts show representative data. AlarmIQ learns each mechanism leg by leg across tens of thousands of cycles — detection is deterministic and explainable, and every flag carries the tags and cycle it came from.

Replay™

Replay™ captures the tag states leading up to every alarm. Scrub back through the seconds before a fault and see exactly which tag changed first — evidence, not guesswork, about what tripped the machine.

PID Auto-Tune evaluation

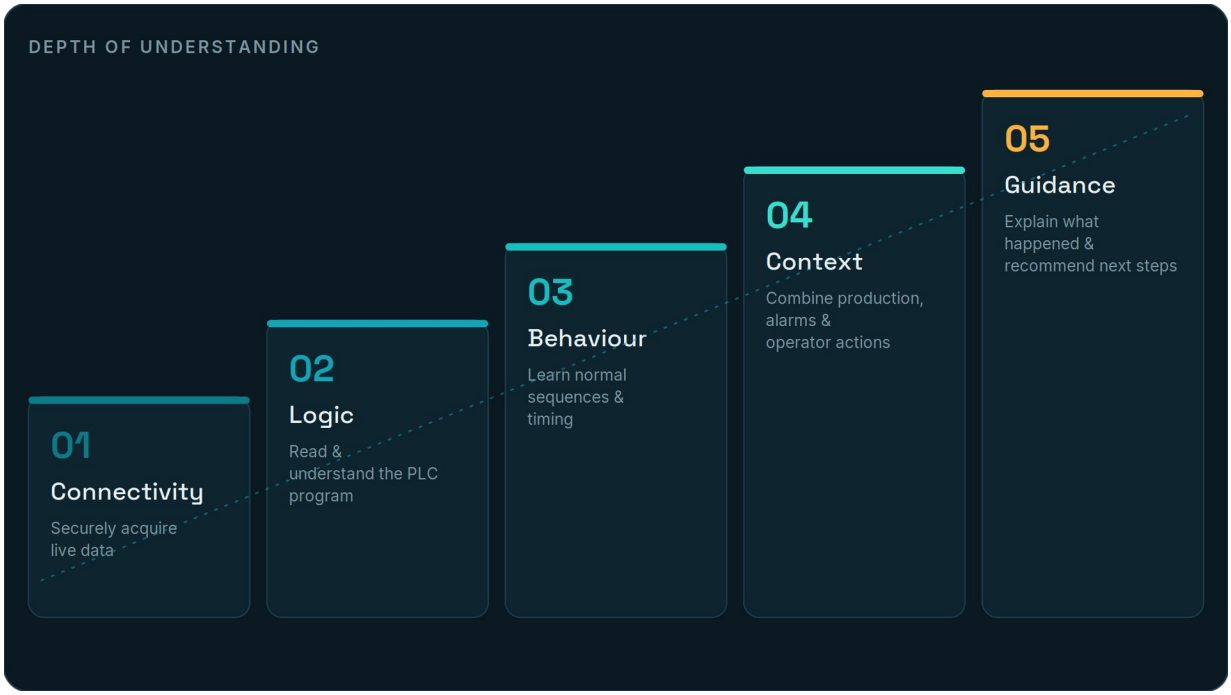
A neural model learns each loop's dynamics during verified steady state, derives FOPDT gains and recommends tuning — autonomously, per loop, with watchdogs that catch saturated or runaway outputs.



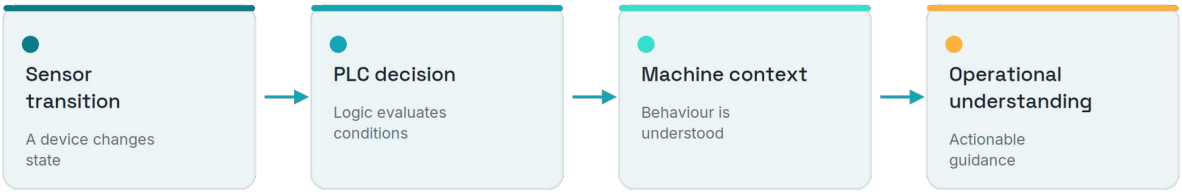
DEPTH OF UNDERSTANDING

Five layers of intelligence

Every plain-English answer is built on a stack of understanding — PulseMQ climbs from raw connectivity to clear guidance, turning machine data into something people can act on.



HOW INFORMATION BECOMES KNOWLEDGE

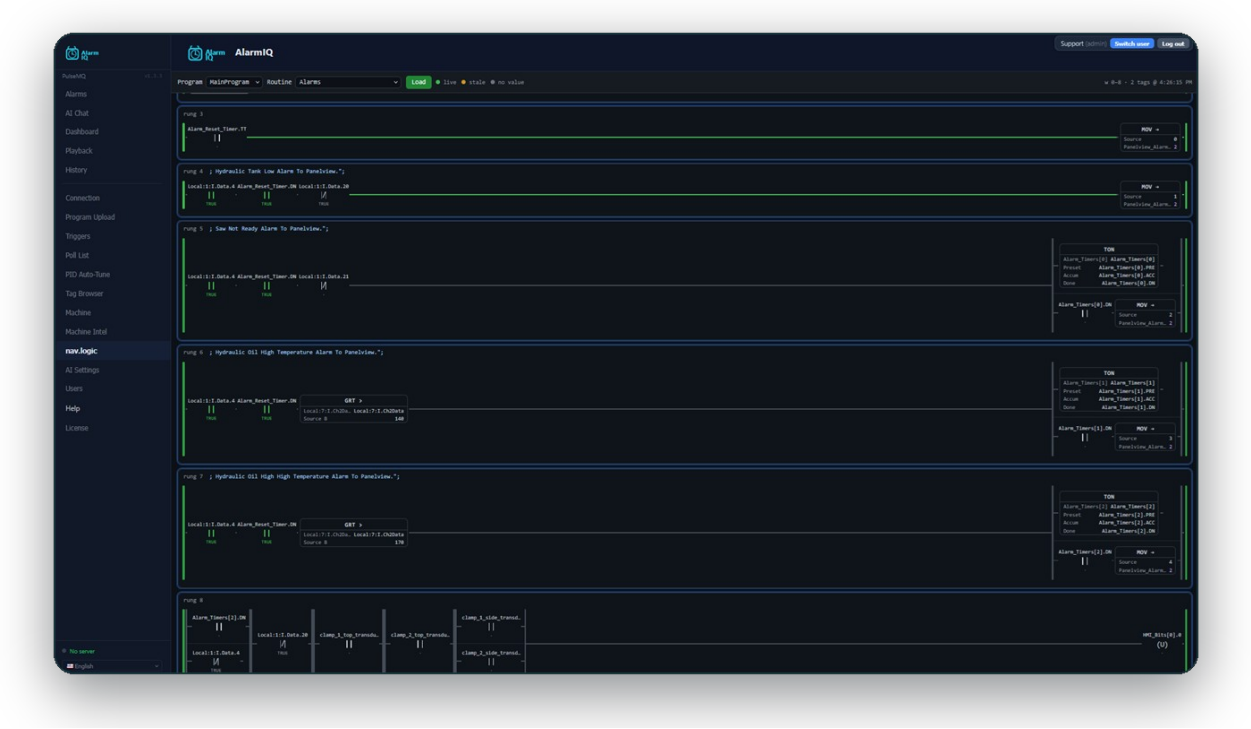


UNDER THE HOOD

And it reads your live PLC logic

Beneath every plain-English answer, AlarmIQ™ is reading your actual ladder logic with real-time tag state — every rung, contact, timer and comparison lit as the machine runs. When you need to go deep, you see exactly which rung and which permissive is holding the line, without ever leaving the platform.

READS Rungs & contacts · Timers · MOV / GRT · Live tag state



See what's blocking

Spot the exact rung and permissive holding the line.

Live tag state

Real-time values on every contact, timer and comparison.

No offline hunting

Read the running program — not a stale export.

PULSEMQ™
INDUSTRIAL MACHINE INTELLIGENCE

03

PLATFORM LAYER · MANUFACTURING

Manufacturing

Turn machine understanding into production performance across every line and plant.

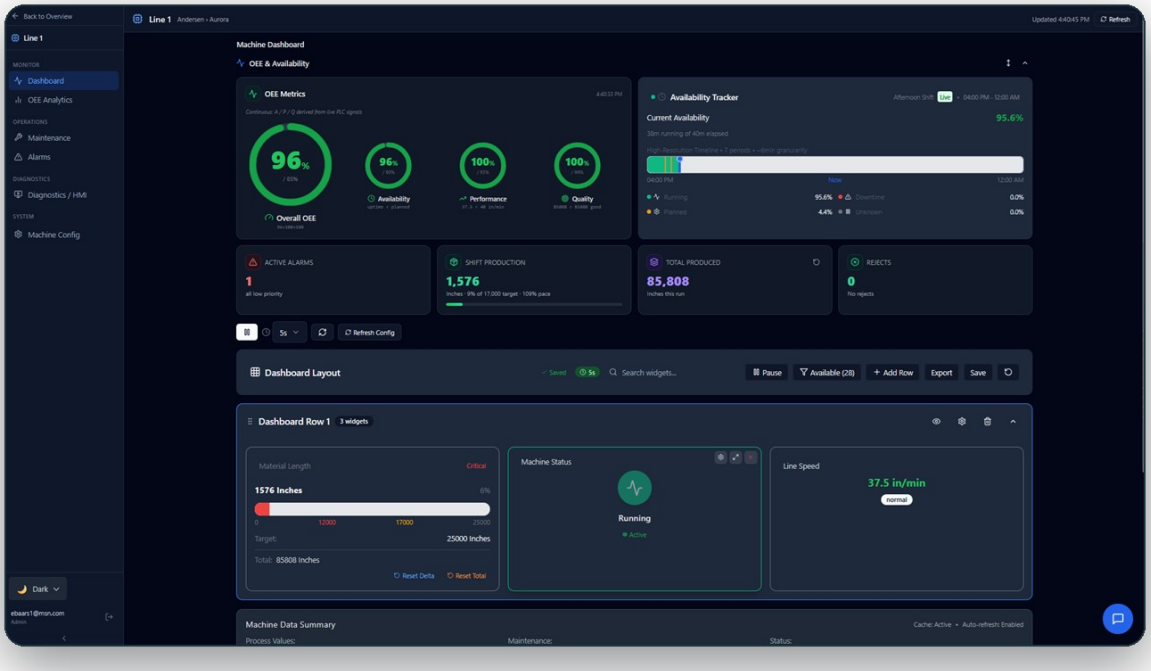
- Live OEE, availability & shift production
- Alarm-impact analytics & predictive maintenance
- Materials, ISA-88 batch, ERP & AI integration

MANUFACTURING · LAYER 03

Live OEE, the moment it happens

Availability, performance and quality are derived continuously from live PLC signals — not hand-keyed at the end of a shift. Every line reports real OEE, shift production and pace in real time, with drill-down to the alarm or stoppage behind every number.

TRACKS Availability · Performance · Quality · Shift production



Derived live

Availability, performance and quality from real PLC signals.

Drill down

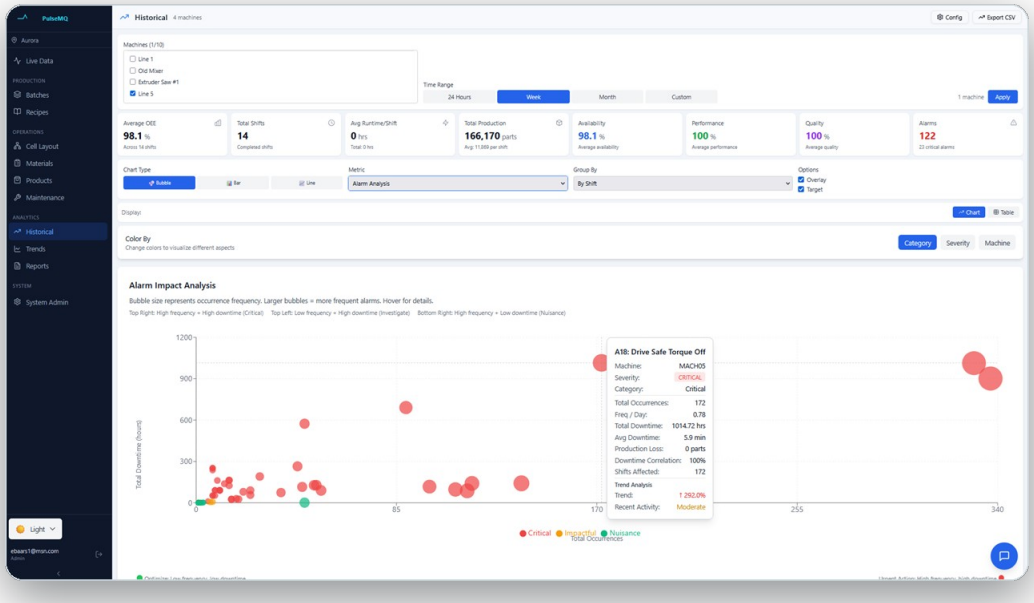
Trace any number to the alarm or stoppage behind it.

Every line

Multi-machine overview with live shift production and pace.

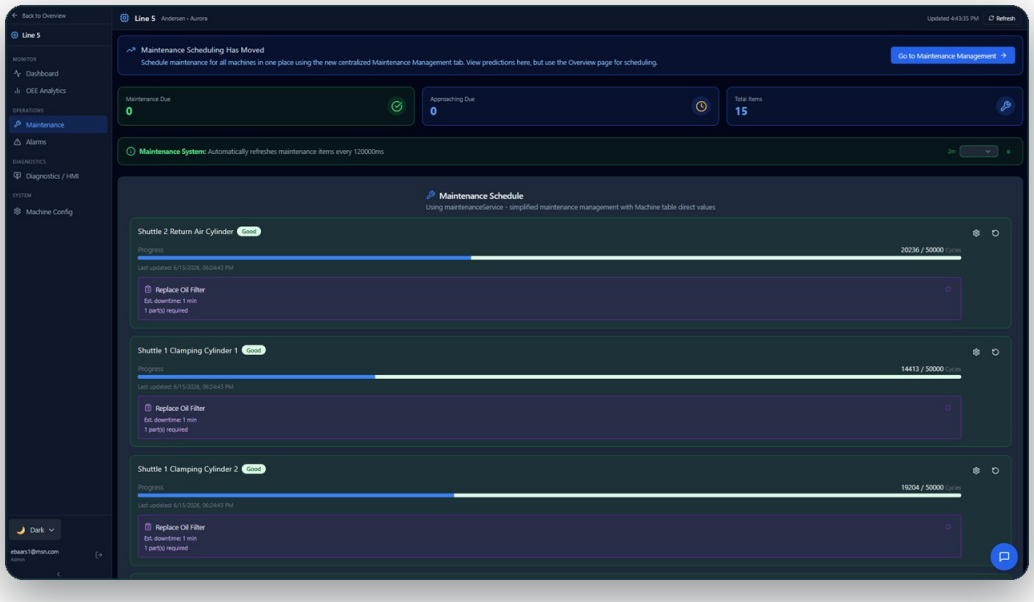
Alarm-impact analytics

Every alarm is ranked by frequency and downtime, so you can see what actually costs you production. Critical, investigate or nuisance — quantified, with trend, across the whole fleet.



Predictive maintenance

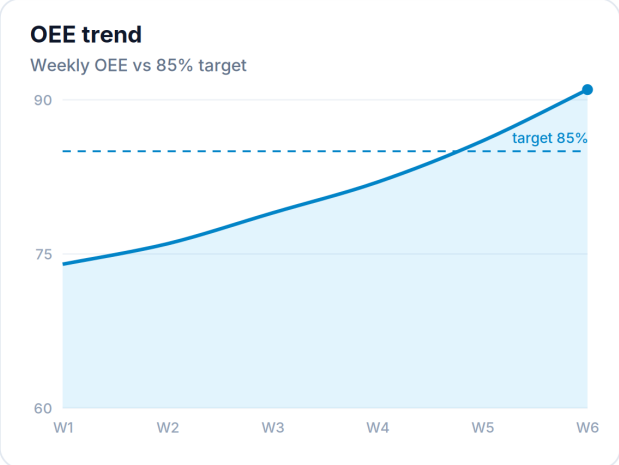
Cycle-based counters track every actuator against its service interval, so maintenance is scheduled on real wear — not a calendar. Work orders carry the part and the expected downtime.

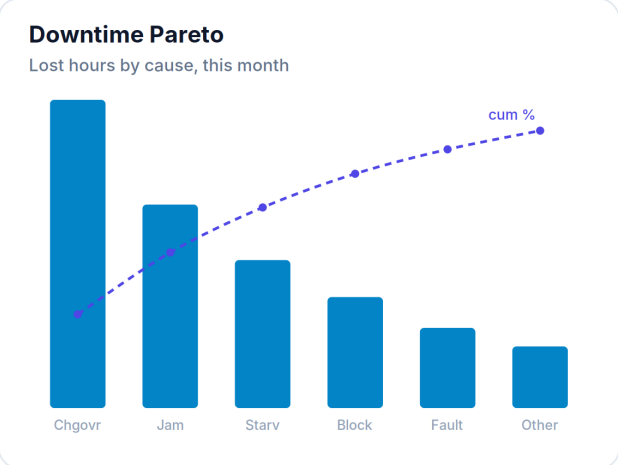


THE NUMBERS

Proof in the graphs your team already trusts

The same views your morning meeting runs on — OEE moving the right way, and losses ranked so you fix the biggest one first.





86% → 92%
OEE across 6 weeks.

1 cause
= 35% of all lost hours.

−70%
time to diagnose a stop.

Charts show representative data. Your figures come straight from your own controllers — measured, reason-coded and defensible in the morning meeting, not typed into a spreadsheet a shift later.

OPEN BY DESIGN

Built to fit your plant

PulseMQ™ complements the automation you already run. Deploy on a single machine or a whole site, connect mixed-vendor equipment over open standards, and integrate with the systems of record you depend on — without ripping anything out. It is built for continuous engineering: every alarm resolved, every cycle learned and every sensor added makes the next problem easier to solve.

Open standards

EtherNet/IP, OPC UA, Modbus and MQTT / Sparkplug B — connect any controller.

Enterprise integration

Bi-directional ERP sync for Epicor, SAP and Oracle, plus ISA-88 and ISA-106 models.

AI assistant

Ask questions and run operations in plain English, powered by Claude on AWS.

KEY MESSAGE

Every improvement becomes the foundation for the next.

NEXT STEPS

Ready to see it on your line?

Most plants start with a single machine. Pick the line that costs you the most diagnosis time, and we'll have it explaining itself within weeks.

Step	What happens
1. Walkthrough	A short call to see the platform live on a machine like yours.
2. Pilot	PulseMQ-Edge™ connects to one line over open standards — no PLC changes.
3. Expand	Add capabilities and machines from the Capability Registry™, at your pace.

pulsemq.com
hello@pulsemq.com

PulseMQ™

The Industrial Machine Intelligence Platform

Machines already know what
is happening.
PulseMQ explains why.