

MANUFACTURING EXECUTION & OEE PLATFORM

Every feature, and exactly what it does.

The complete reference to the platform — each capability named as it appears on your machine's Features tab, so what you read here is what you switch on.

13

features, switched on per machine

3

execution models, side by side

0

numbers keyed in by an operator

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What PulseMQ is

One platform covering the ground between your controls and your ERP: it watches the machines, records what was produced, tells people when something needs attention, and keeps the paperwork that proves it.

LEVEL 2 – CONTROLS

Reads, never fights

Your PLCs and HMIs stay in charge of the process. PulseMQ subscribes to what they publish and writes back only where you explicitly wire it — a recipe download, a job command, an acknowledgement.

LEVEL 3 – EXECUTION

Runs the work

Recipes, batches, jobs, work orders, material lots, maintenance and quality records live here, tied to the machine that made them and the shift that ran them.

LEVEL 4 – BUSINESS

Reports upward

Shift and batch reports, OEE history, genealogy, ERP postings and exports feed the people and systems that never walk the floor.

ROLES AND THE SCREEN EACH ONE LIVES ON		
PERSON	THEIR SCREEN	WHAT THEY GET FROM IT
Operator	Operator Station	The active batch or job, materials to scan, phase progress, and the commands their machine accepts.
Technician	Tasks (tablet)	Their own PM queue, the procedure, the photos, the required lockout document, and a signature line.
Supervisor	Multi-Machine Overview	Every machine's state at a glance, live OEE, alarms, and the shift's numbers so far.
Engineer	Machine Configuration	Tags, signal mapping, OEE baselines, alarms, states and the ISA-88 / ISA-106 wiring.
Quality	Quality Management	Holds, test results, serials, grade specs and material test reports.
Plant manager	Historical Analytics	Trends, losses, bottlenecks, and comparisons between machines, shifts and operators.
Administrator	System Administration	Users, roles, locations, alarm and notification policy, scheduled reports.

What sets PulseMQ apart

Most of this platform is table stakes done properly. These ten are the things customers tell us they did not find elsewhere — and every one of them exists because a plant got burned by the alternative.

01 — INTEGRATION

The MES writes your PLC tag structure

Point-and-click mapping is the part of every MES project that overruns. PulseMQ inverts it: configure the machine, then **download the tag structure it expects** — as a Rockwell **L5X** you import straight into Studio 5000, an **Ignition UDT**, or a plain CSV tag list. ISA-88 recipe structures export the same way. Your controls engineer builds against a generated contract instead of a spreadsheet of names, and both sides match on the first try.

Section 17 · also feeds the IoT bridge

02 — TRACEABILITY

Material is bound to the station, not the screen

Scan the position label on the machine, then the material. The platform pairs the two, so the lot is recorded against the port it was physically loaded into — not against whichever slot happened to be highlighted. The failure mode that ruins genealogy is designed out.

Section 09

03 — CONTROL INTEGRITY

Every command comes back with a receipt

A job is not "started" because somebody clicked start. PulseMQ sends a sequence number, the controller echoes it, and only then is the job confirmed — with the machine's own timestamp as the start time. No acknowledgement inside the timeout means a flagged job and a retry button. A command cannot fail silently.

Section 08

04 — MEASUREMENT HONESTY

A counter reset is never counted as production

Output boundaries trigger on increment only. When a power cycle drops the roll counter from 50 to 6, most systems book 6 rolls. PulseMQ books nothing, because that is what happened.

Section 08

05 — MEASUREMENT HONESTY

Offline and idle are different answers

A machine that has stopped talking is not a machine that is running slowly. PulseMQ reports the difference everywhere, so a dead gateway can never quietly present itself as a good shift.

Sections 03 & 06

06 — FIELD WORK

The tablet tells the truth about the network

Every answer on a PM form goes through the same on-device queue whether you are online or not, and shows as *Queued* until the server confirms it. There is no optimistic "saved" that turns out to be a lie when the tech walks out of the basement.

Section 10

07 — COMPLIANCE

History cannot be rewritten later

A dispatched recipe is frozen at dispatch; a completed form pins the exact template revision it was performed against; a signature is append-only and can only be superseded, never edited. Editing today's master cannot change what yesterday's record says was done.

Sections 08, 10 & 19

08 — SAFETY

The right document, for the right machine, every time

A PM template asks for a *kind* of document — a lockout procedure — and the machine supplies its own current revision. If it is missing, dispatch is refused and names what is missing rather than sending the tech with someone else's procedure. An authoritative wrong answer is treated as worse than no answer.

Section 10

09 — DIAGNOSTICS

The machine's own screen, without the bandwidth

Rather than framing the controller's full on-device application, PulseMQ fetches its declarative manifest once and streams only live values — roughly two hundred times less data per update, which is what makes a live process mimic usable over a plant's mobile uplink. The device stays the source of truth; the dashboard is a pure renderer.

Section 14

10 — CONFIGURATION

A switch that is on cannot pretend to be finished

Every feature card shows two things: whether it is enabled, and whether the configuration behind it is actually complete. Combined with merge-never-replace config writes, a half-finished setup announces itself instead of producing confident, empty dashboards.

Sections 02 & 17

The feature set

PulseMQ is switched on a machine at a time. Every capability below is a card on that machine's **Features** tab: turn it on, and its own configuration tab appears. Nothing you do not use is in anybody's way.

PRODUCTION PERFORMANCE MONITORING

OEE Monitoring

Track Overall Equipment Effectiveness with production metrics, shift targets and analytics. Includes availability, performance and quality calculations.

Configured on the OEE and Metrics tabs · Section 05

SCHEDULED MAINTENANCE MANAGEMENT

Maintenance Tracking

Track maintenance tasks with counter-based or time-based schedules. Monitor service history, reset counters and configure alerts.

Configured on the Maintenance tab · Section 10

CENTRALIZED MAINTENANCE SCHEDULING

Enhanced Maintenance

Schedule maintenance for all machines from one location. View cross-machine predictions, prioritise tasks and manage assignments from the Overview page. Brings Schedule, Parts Inventory, Task Templates and PM Forms together on one screen — the standalone Parts tab folds into it.

Managed from the Overview page · Section 10

ALERT AND NOTIFICATION SYSTEM

Alarm Notifications

Configure alarm detection, severity levels and notification routing to users. Set up real-time alerts for machine issues.

Configured on the Alarms tab · Section 07

ENVIRONMENTAL PERFORMANCE MONITORING

Sustainability Tracking

Track energy efficiency, water usage, waste reduction and carbon footprint. Enables the Environmental tab, where you map the meters a machine publishes, and the environmental widgets that display them live. Automatic ESG rollups and scoring are still in development — section 13 draws the line.

Configured on the Environmental tab · Section 13

AUTOMATED REPORTING SYSTEM

Reports & Analytics

Generate scheduled machine performance reports with OEE metrics, maintenance summaries and trend analysis. Configure email delivery and recipients.

Configured on the Reports tab · Section 11

EQUIPMENT HIERARCHY & PACKML STATES

ISA-88 Equipment Modules

Configure equipment modules with ISA-88 / IEC 61512 hierarchy. Track PackML states (18-state model), enable batch tracking and hierarchical OEE calculations.

Equipment Modules, Batch Tracking & Queue tabs · Section 08

ENABLE BATCH FEATURES ON A CONTINUOUS LINE

ISA-88 Hybrid Mode

The same toggle, shown under this name on a continuous machine: adds batch tracking to a continuous line, enabling the Equipment Modules, Batches and Queue tabs. ISA-106 features are not available while hybrid mode is on.

Continuous machines only · Section 08

RAW MATERIALS, GENEALOGY & TRACEABILITY

Material Tracking & Genealogy

Track raw material inputs (bill of materials), actual versus target quantities, consumption per batch, and parent-child genealogy records. Essential for recalls, quality investigations and regulatory compliance (FDA, ISO, IATF). Includes MES-controlled label printing.

Appears once ISA-88 is enabled
• Section 09

ISA-95 PRODUCTION ORDER TRACKING

Job Tracking

Track production jobs with start and stop, output counting and progress monitoring. Uses ISA-95 standard job infrastructure without ISA-88 batch or ISA-106 continuous process complexity. Ideal for discrete parts machines with simple job workflows.

Parts machines without ISA-88
• Section 08

FULL CONTINUOUS PROCESS SUPPORT

ISA-106 Continuous Process

State tracking, material genealogy, job boundaries, production context, ISA-95 PLC interface (UDT mapping and handshake) and work order management.

Configured on the ISA-106 tab
• Section 08

CONNECT TO EPICOR, SAP, ORACLE OR OTHER ERP

ERP Integration

Bi-directional data exchange with ERP systems: import production orders, export completions, sync material masters, post receipts and create non-conformances. Supports Epicor Kinetic REST API v2 with auto-sync. Enables the Quality tab for grade specs, holds, test results, tube serials and MTR generation.

ISA-106 tab → Work Order → ERP Integration
• Section 12

NATURAL LANGUAGE MES OPERATIONS

AI Assistant

Ask questions and give commands in plain English — check machine status, dispatch work orders, look up schedules, investigate downtime. Powered by Claude on AWS Bedrock, with per-machine budget controls. Usage is tracked and capped monthly.

Opens from the machine page ·
Section 15

STREAM THE ON-DEVICE UI INTO THE MACHINE PAGE

Diagnostics / HMI Embed

Adds a Diagnostics / HMI tab that frames the live AlarmIQ diagnostics and playback — and optionally the Bridge HMI — from this machine's on-device controller. The device stays the source of truth; the dashboard only displays it.

Requires gateway enrolment ·
Section 14

WHICH FEATURES A MACHINE CAN HAVE

A machine's production mode is set once, at creation, and it decides which execution model is on offer. The rest are available to every machine.

EXECUTION FEATURES BY PRODUCTION MODE		
PRODUCTION MODE	EXECUTION FEATURES OFFERED	RULE
Parts	ISA-88 Equipment Modules , or Job Tracking	Job Tracking is offered when ISA-88 is off — the simple path for discrete machines.
Continuous	ISA-106 Continuous Process , or ISA-88 Hybrid Mode	Mutually exclusive. Hybrid mode brings batch tracking to a continuous line, and ISA-106 features stand down while it is on.
Hybrid	ISA-88 Equipment Modules with live availability	Availability comes from the PLC; performance and quality resolve at batch completion.
Any mode	OEE Monitoring · Maintenance Tracking · Enhanced Maintenance · Alarm Notifications · Sustainability Tracking · Reports & Analytics · ERP Integration · AI Assistant · Diagnostics / HMI Embed	Switched on independently, in any combination.

A feature card tells you whether it is actually set up.

Each card on the Features tab shows not just on or off, but whether the configuration behind it has been completed — so a switch that is on but unwired cannot quietly look finished.

Part one — included with every machine

Connect a machine and this is what you get, before any feature is switched on. It is the ground the rest of the catalogue is measured against.

Live floor monitoring

The screens people leave open all day. State, rate, output and alarms for every machine in the building, updating as the machines change — not on a refresh button.

WHAT YOU ARE LOOKING AT

MULTI-MACHINE OVERVIEW

The whole plant on one page

Every machine as a card or a dense table — your choice, remembered per user. Filter by location, set the refresh cadence, or refresh on demand.

● Running ● Idle ● Fault

MACHINE CARD

State, rate, output, alarms

Current status with the label your plant actually uses, live OEE, the active job or batch, current process values, and any alarm standing against it.

MACHINE DETAILS

One machine, in full

A configurable widget dashboard plus tabs for OEE, alarms, maintenance counters and job history — the view an engineer opens when something looks wrong.

PROCESS TRENDS

Temperatures, speeds, pressures

Any configured process value from any machine, charted together over a time range you pick, with zoom, pan and a legend that names the source signal.

CELL LAYOUT

Where the machine is

A plant-floor view of machines by area and cell, so a new supervisor can find the asset the alarm is talking about.

NOTICES

Told, not discovered

On-screen notices when a device pairs, a material is scanned, a batch completes or a command fails — raised where the person is already looking.

— **Configurable widgets**

Each machine dashboard is built from widgets — OEE summary, process value cards, active job, availability timeline, alarm list, maintenance counters — arranged and saved per machine.

— **Status your way**

Machine state can come from a single boolean tag (with inverted logic if that is how the PLC was wired) or from a multi-state word, each value given its own label, colour and running or stopped meaning.

— **Light and dark**

A dark theme for control rooms and night shifts, a light theme for offices, chosen per user.

— **Installs like an app**

The dashboard installs to a tablet or panel PC home screen and opens full-screen without browser furniture.

Downtime & availability

Every stop is detected from the machine itself and timed to the second. The question that follows — *why* — is where the platform asks for a human.

DETECTING THE STOP

Automatic stop detection

State changes are captured as they happen and held as a timeline. No one has to notice a stop for it to be recorded.

State vocabulary

Each state value on the machine is given a name your plant recognises, a colour, a category and whether it counts as running — so "Ready" and "Starved" stop being lumped together as "not running".

EXPLAINING THE STOP

Planned versus unplanned

Downtime is split by category, so changeovers and scheduled maintenance do not score against availability the way a breakdown does.

Downtime analysis

Stops ranked by duration and frequency across a date range, machine set or shift — the Pareto that tells you which fix to fund.

Reason coding

An operator-facing prompt to classify a stop against your own reason-code list, so the record carries a cause and not just a duration. *Rolling out — see section 22.*

Offline versus stopped

A machine that has stopped talking is shown as offline, distinctly from a machine that is present and idle. The difference matters and the platform never blurs it.

Part two — the features you choose

Ten entries covering the thirteen switches on a machine's Features tab.

Each one says what it does, what you have to supply, and where it sits — so you can take the ones that fit your plan and leave the rest.

OEE Monitoring

Production performance monitoring: Overall Equipment Effectiveness with production metrics, shift targets and analytics — calculated continuously from machine signals rather than reconstructed from a clipboard at the end of the shift.

THE THREE FACTORS

FACTOR 1

Availability

Running time against planned time, built from the machine's own state signal and its downtime record — including the stops nobody wrote down.

FACTOR 2

Performance

Actual rate against the ideal rate for what is running now — cycle time for discrete parts, line speed for continuous product.

FACTOR 3

Quality

Good output against total output, from reject and defect counters or from post-run disposition on batch processes.

THREE PRODUCTION MODES, THREE WAYS OF MEASURING

SET ONCE AT MACHINE CREATION – THE PLATFORM MEASURES ACCORDINGLY

MODE	TYPICAL ASSET	HOW THE THREE FACTORS ARE DERIVED
Parts	Presses, assembly cells, CNC	Counts and cycle time from the PLC. All three factors calculated live.
Continuous	Extruders, winders, coaters	Length, weight and line speed from the PLC. All three factors calculated live.
Hybrid	Batch equipment with discrete output	Availability live from the PLC; performance and quality resolved once the batch completes and is dispositioned.

SETTING THE TARGETS

— Targets and baselines

Ideal cycle time, ideal line speed, target output per shift, standard shift length and a target percentage for each factor — each set as a fixed value or read live from a PLC tag when the product changes the target.

ON THE SCREEN

— OEE Dashboard

A dedicated screen per machine: the headline number, the three factors, target versus actual, and the trend behind it.

— KPI strip

A compact banner of the numbers that matter, sized for a wall display above the line.

— Factor spider chart

Availability, performance and quality against target on one radar — the fastest way to see which leg is short.

— Availability timeline

A running band of state changes across the shift, so a forty-minute gap is something you can point at rather than infer.

— Hierarchical OEE

With ISA-88 equipment modules enabled, OEE rolls up through the equipment hierarchy rather than stopping at the machine.

OVER TIME

— Shift capture

At every shift boundary the shift's OEE and its component numbers, downtime, running time and counts are written to history automatically, on your shift calendar and time zone.

— Loss waterfall

Planned time stepped down through each category of loss to the good product that actually came out — the chart that starts improvement conversations.

— OEE heatmap

Machines down one axis, days or shifts across the other, so a pattern that repeats every Monday night stops hiding inside an average.

WHAT IT NEEDS FROM YOU A state signal and a count, length or weight signal from the controller, plus the ideal rate for what that machine runs. No new hardware.

WHERE IT SITS The measurement layer. Every other number in this guide — downtime, job progress, shift reports — is reported against these three factors, so this is the one most plants switch on first.

Alarm Notifications

Alarm detection, severity levels and notification routing to users. Catch the problem while it is still small, and put it in front of the one person who can do something about it — not in a mailbox everybody ignores.

THE CYCLE, END TO END

DEFINE

Alarm configuration

Build an alarm on any signal: threshold, range, equality, or a condition combining several tags. Give it a severity, a message and a routing rule. Import and export the whole set as CSV.

DETECT

Evaluated on every update

Conditions are checked as data arrives, including alarm words packed as bitfields, so an alarm raises on the message that caused it.

NOTIFY

Routed to people

Assign alarms to individuals, roles or locations, on a schedule that knows who is on shift, with escalation when nobody responds.

CLOSE

Acknowledged and recorded

Acknowledge or dismiss from the dashboard; every raise, value and clear is kept in history with its trigger and resolve values.

WHAT IS STANDING RIGHT NOW

— Active alarm view

Standing alarms per machine, colour-coded by severity, with the value that tripped them and how long they have been up.

— Alarm history

A searchable record of every alarm event with duration, machine and resolution — the source for reliability analysis.

FINDING THE PATTERN

— Alarm analytics

Frequency by alarm and machine, occurrences over time, and a bubble view weighing how often an alarm fires against how long it stays up. Nuisance alarms separate themselves from real ones.

— Stale alarm cleanup

When a machine goes offline mid-alarm, open alarms are re-evaluated rather than left standing forever.

REACHING THE RIGHT PERSON

— Notification schedules

Shift-aware routing: the night alarm goes to the night contact.

— Test before you trust

Fire an alarm deliberately from the configuration screen to prove the whole path — condition, routing, delivery — before you rely on it.

— Auxiliary equipment alarms

Alarms from supporting equipment monitored at the edge — saws, pumps, dust collection — surface in the same list as machine alarms.

WHAT IT NEEDS FROM YOU The tags worth watching and an email address per person. Existing PLC alarm words can be used as they are, including packed bitfields.

WHERE IT SITS The attention layer. It runs on the same readings as OEE, so an alarm and the downtime it caused are the same event rather than two records to reconcile.

Production execution

Plants do not all make things the same way, so PulseMQ carries three execution features and lets each machine use the one that matches it — with ISA-95 work orders sitting above all three.

ISA-88 EQUIPMENT MODULES

Equipment hierarchy and PackML states. For processes that make a defined quantity to a recipe: the MES owns the recipe and downloads it to the equipment. On a continuous machine the same toggle is offered as **ISA-88 Hybrid Mode**.

— Equipment hierarchy

Equipment modules configured to the ISA-88 / IEC 61512 hierarchy, each with its own signals and material tracking, and hierarchical OEE calculated up the tree.

— PackML state tracking

The full 18-state PackML model read back from the equipment, per machine and per phase.

— Master recipes

Versioned recipes with phases, parameters, material requirements, expected outputs and linked maintenance requirements. Searchable by name, code or product.

— Recipe lifecycle

Draft, review, approved, active, obsolete — with a status history that records who moved it and when.

— Approval signatures

Recipe approval and material disposition can require an electronic signature: a stated meaning, the signer's password re-verified at the moment of signing, an unbroken hash chain over the record, and separation between the person who authored and the person who approves.

— Import and export

Recipes move between sites and systems as JSON. Duplicate an existing recipe as the starting point for a new one.

— Dispatch to the machine

Pick recipe, machine and parameters; the control recipe is frozen at dispatch, so a later edit to the master cannot rewrite history. Pre-batch maintenance is checked, with a supervisor override that is recorded.

— Batch queue

Queued, ready, running, held, completed and aborted batches per machine, with scheduling, priority and a queue tab of their own.

— Material interlock

The equipment can hold until the required materials are verified. The operator scans, the platform confirms against the recipe, and only then is the cleared flag written back.

— Quality checks and events

In-batch quality results and events recorded against the batch record.

— Disposition

Accept, reject or rework at completion, signed where your process requires it.

— Equipment arbitration

When two batches want the same shared equipment module, requests are queued, granted and released explicitly instead of colliding.

— Archive and restore

Completed batches move to long-term storage on your schedule and can be pulled back intact for an audit.

— Batch analytics

Phase durations, material consumption and yield across batches, with a side-by-side comparison of any two or more and a bottleneck summary that names the phase costing you the most.

ISA-106 CONTINUOUS PROCESS

Full continuous process support: state tracking, material genealogy, job boundaries, production context, the ISA-95 PLC interface and work order management. The PLC owns the recipe; PulseMQ observes, records and reconciles.

— **Jobs**

A job is a continuous run with a target and many outputs. Create it by hand, dispatch it from a work order, or let the line create it — in autonomous mode a job opens by itself when the line starts producing.

— **Production context**

Recipe, product, lot, order and roll identifiers are read from the PLC or HMI, logged on change and attached to the job, so what the line was actually set to is what gets recorded.

— **Procedural states**

Idle, startup, threading, ramp, normal, transition, wash, shutdown and fault, mapped from your own state word and usable as the machine's headline status.

— **Job boundaries**

A roll change, cut or index is detected from a counter increment — and only an increment, so a power cycle that resets the counter is never mistaken for production. Each output is recorded with its own length, weight, defect count and the state the line was in.

— **Output categorisation**

Product made during a transition can be accepted, sorted or rejected per output, and the decision follows the material into inventory.

— **Production logging**

Actual length or weight against target, average speed and a projected finish, updated continuously through the run, with auto-complete on target.

— **ISA-95 PLC interface**

UDT mapping and handshake between MES and controller — the structured exchange described below.

— **Quality & serialisation**

Serial number generation for produced units, with facility code and default grade, feeding the Quality tab.

— **Job labels**

Label data published to a printer at every output, at job end, on a quantity threshold, on a PLC signal, or on demand.

★ **STANDOUT** **Boundaries trigger on increment only.** When a power cycle drops the roll counter from 50 to 6, a naive system books six rolls. PulseMQ books nothing — a decrement is a reset, not production. The same discipline applies to every counted signal feeding OEE.

JOB TRACKING

ISA-95 production order tracking for discrete parts machines with simple job workflows — the standard job infrastructure without ISA-88 batch or ISA-106 continuous complexity.

— Start and stop

Open a job, run it, close it. No recipe download, no phase model.

— Output counting

Good and reject counts read from the machine and totalled against the job.

— Progress monitoring

Quantity against target with elapsed and projected time, on the machine card and the job list.

WORK ORDERS & PRODUCTS · ISA-95

— Work order lifecycle

Created, scheduled, released, in progress, paused, completed, closed — with quantities, due date, priority and the customer or ERP order reference carried through.

— Schedule board

A calendar and timeline view of the coming work, with drag-and-drop scheduling across machines.

— Linked execution

A work order links to the jobs or batches that fulfil it; progress rolls up automatically and the order can complete itself when the quantity is met.

— Operating mode

Autonomous, scheduled, observation, work-order or manual — how much the line is trusted to start work on its own, set per machine.

— Product Catalog

Products with type and status, a bill of materials covering inputs, outputs and by-products, and routing steps. A dispatch can be validated against material availability before it goes out.

THE MACHINE HANDSHAKE

★ **STANDOUT** **The start time is the machine's, not the button's.** PulseMQ sends a sequence number with every command and waits for the controller to echo it back before the job counts as started. Miss the timeout and the job is flagged with a retry — so "we dispatched it and nothing happened" stops being a thing that can happen quietly.

— Commands with receipts

Every command sent to a PLC carries a sequence number the controller echoes back. The job is confirmed only when the machine says it received it, and the start time recorded is the machine's — not the moment somebody clicked.

— Timeout and retry

If no acknowledgement arrives inside your timeout, the job is flagged and a retry button appears. A silent failure is not one of the possible outcomes.

— Job control UDT

A structured exchange in the controller: command, identifiers, targets, units, rates, operator, tool and material going down; state, counts, progress, cycle time, speed, faults and consumption coming back.

— Auxiliary commands

Machine-specific buttons — purge, index, reset, tare — configured per machine and published to the PLC on press, with the permission to press them controlled by role.

FULL MODE

At the machine

The running batch or job, phase timeline, materials to load with their status, live scanning, and the commands that machine accepts — sized for a panel next to the line.

KIOSK MODE

At the store room

A scanner-driven station for receiving material and closing out lots, with barcode input, GS1-128 parsing and a running audit list. No keyboard required.

WHAT IT NEEDS FROM YOU A production mode chosen when the machine is created, and — if you want PulseMQ to dispatch work rather than just watch it — a handshake block in the controller. The UDT for it is generated for you.

WHERE IT SITS The work layer. It turns a running machine into a recorded job, batch or work order, and it is what makes materials, quality and reporting attributable to something a customer ordered.

Material Tracking & Genealogy

Track raw material inputs, actual versus target quantities, consumption per batch and parent-child genealogy records — essential for recalls, quality investigations and regulatory compliance. From the pallet at goods-in to the roll on the truck, verified at the machine rather than reconciled afterwards.

★ **STANDOUT** **Two scans, and the lot is bound to a physical port.** Position label first, material second. Genealogy usually breaks because a material was recorded against the slot that was highlighted on screen rather than the one it went into — so the platform never asks the operator to get that right.

DEFINING WHAT YOU BUY

— Material Catalog

Material definitions with unit of measure, GS1 identifiers, and how each is tracked — by weight, volume, length, count or time.

— Bill of materials

The inputs a recipe or product expects, with target quantities, compared against what was actually consumed.

RECEIVING AND HOLDING STOCK

— Receiving

Create lots on receipt with quantity, supplier, expiry and barcode. Print a label if the supplier's is not usable.

— Lots and sublots

A lot can be broken into sublots on carriers, each staged, delivered and consumed independently, with its own reservations and consumed quantity.

— Lot status

Quarantine, released, consumed, expired. Material that has not been released cannot be consumed by mistake.

AT THE MACHINE

— Two-step scanning

The operator scans the position label on the machine, then the material barcode. The platform pairs them, so a material is bound to the station it was actually loaded into — not to whichever slot happened to be highlighted on screen.

— Barcode parsing

GS1-128 and common vendor formats are parsed into material, lot, subplot, supplier, quantity, unit and expiry. Field names that differ between suppliers are normalised on the way in.

— Verification with the PLC

The controller asks, PulseMQ answers: is this the right material, in the right quantity, released and unexpired? A pass writes the bound lot back to the machine; a fail returns a status code and the line stays held.

— Load and close-out

The first scan loads and verifies; the second closes the lot out and computes what was actually consumed. Rejections are explicit and carry a reason.

THROUGH THE RUN

— Consumption tracking

Consumption follows a PLC tag through the run — either as a running total or as discrete deductions — with manual entry available when a material is not instrumented.

— Mid-run changeover

Swapping a lot part way through a batch or job is supported where you allow it, optionally requiring the machine to acknowledge the change.

— **Genealogy records**

Input lots are linked to the outputs they became, and outputs become lots in their own right. Given a finished roll you can name every input that went into it; given a suspect input you can name everything it touched.

— **Demand overview**

What upcoming scheduled batches and jobs will need, against what is on hand.

— **Material History**

Viewed by batch — everything one batch consumed — or by material — everywhere one lot went.

— **MES-controlled label printing**

Output labels triggered at batch end, at each output, on a threshold, on a PLC signal or manually, using your template and field layout.

WHAT IT NEEDS FROM YOU A barcode scanner at the machine, printed position labels, and ISA-88 enabled on that machine. Suppliers' own GS1 labels are read as they are.

WHERE IT SITS The traceability layer. It sits on top of production execution: a lot is bound to the job or batch that consumed it, which is what makes a recall a query rather than an investigation.

Maintenance Tracking & Enhanced Maintenance

Two features, deliberately separate: **Maintenance Tracking** watches one machine's counters and schedules, and **Enhanced Maintenance** plans across every machine from one place. Digital PM forms carry the work out on the floor.

MAINTENANCE TRACKING

Counter-based or time-based schedules on the machine itself, with service history, counter resets and alerts.

— Maintenance counters

Cycles, hours, length or any counted quantity tracked against a setpoint, shown as a progress bar with the remaining amount, and reset from the dashboard by anyone with the permission.

— Time-based schedules

Intervals in days or weeks for the work that comes round on a calendar rather than a counter.

— Due and overdue

Counters approaching or past their setpoint raise a maintenance condition on the machine and can notify like any other alarm.

— Task templates

Per machine and per counter: the procedure text, required parts, required tools, estimated downtime, and who it should go to.

— Pre-batch check

Dispatching a batch to a machine with maintenance due warns before it goes, with an override that is recorded against the batch.

— Service history

Every reset, every completed task, every override — kept with the machine.

Centralised scheduling: plan maintenance for every machine from one place, on the Overview page. Switching it on **consolidates** maintenance — the standalone Parts tab folds into this screen rather than sitting beside it, so there is one place to plan from instead of two.

THE MAINTENANCE MANAGEMENT SCREEN — FOUR SUB-TABS	
SUB-TAB	WHAT YOU DO THERE
Schedule	Everything coming due across the plant, filtered by machine and by status — overdue, scheduled or predicted — and sorted by due date, machine or priority.
Parts Inventory	Spare parts held against machines and tasks, so a job can say whether the part is on the shelf before a tech walks to the crib.
Task Templates	The procedure, parts, tools, estimated downtime and assignee for each recurring job.
PM Forms	The digital form line — authoring, dispatch and review. Person-scoped, so it deliberately ignores the machine filter above: a technician's queue is theirs wherever they open it.

— Cross-machine predictions

What is coming due across the plant, projected from counters that are still running, so work can be grouped before it becomes urgent.

— Prioritisation

Rank the queue across every machine rather than machine by machine.

— Assignment

Allocate work to people or teams from the same screen, against the production schedule.

The paper preventive-maintenance packet, replaced end to end:
authored, published, dispatched, completed on a tablet, reviewed,
and returned as a PDF report.

Reachable two ways, gated one way.

Technicians open their queue at `/tasks` — an installable app on the tablet. Planners reach the same workspace as the PM Forms sub-tab of Maintenance Management. It is one workspace, not two copies, and both doors check the same permission. It does not require Enhanced Maintenance: the forms line works on its own.

★ **STANDOUT** **Offline is the normal path, not the fallback.** Every answer goes through the same on-device queue whether the tablet has signal or not, and reads *Queued* until the server confirms it. The offline code runs every day instead of only on the day it matters — and a technician is never shown "saved" for work that never left the device.

AUTHOR

Template builder

Sections and items with checks, readings, comments, photos and required documents. Preview exactly what the technician will see.

IMPORT

From your existing PDF

Import the form you already use. Drag a box around a photo or a region on the page to attach it to an item, so the new form looks like the one your techs recognise. A blank authoring template is provided if you would rather start from a form we designed.

PUBLISH

Versions that hold still

A draft is freely editable; a published revision is frozen. Completed forms pin the exact version they were performed against, so a later revision can never rewrite a record. Retire a revision to take it out of circulation without deleting its history.

DISPATCH

To a named technician

Assign to a person and a machine. Reassign or cancel later without losing the trail.

PERFORM

Tablet queue, offline first

An installable app showing only that technician's work. Every answer is queued on the device and marked *Queued* until the server confirms it — so a dead zone costs nothing, and nothing is ever shown as saved when it is not.

EVIDENCE

Photos and signatures

Capture pictures against any item, and sign on the glass. Signatures are held inside the record, not filed alongside it.

SAFETY

Machine-specific documents

A template asks for a kind of document — a lockout procedure, say — and the machine supplies its own copy, always the current revision. If a required document is not on file, dispatch is refused and names what is missing; the technician's record stamps exactly which revision they were shown.

REVIEW

Submitted, checked, accepted

Incomplete submissions are refused and the missing items are marked on the form. A reviewer accepts or rejects with comments; a rejected form goes back for resubmission.

DELIVER

The completed report

A PDF rendered from the stored record against the pinned template: failed checks with their comments, a findings summary, the safety revision shown, signatures, review outcome, and a content hash on every page. Filed automatically into the document vault.

VAULT

Document library

Manuals, procedures, drawings and completed reports held per machine with full revision history. Upload a new revision; every earlier one stays retrievable.

ASSIST

Suggested descriptions

When you import a reference document alongside a checklist, the platform can propose a description for each row. It only ever suggests — the author ticks what to accept, and nothing is written without them.

REFERENCE

The procedure beside the check

The technician keeps the reference photo or page open next to the checklist item instead of flipping between documents.

WHAT IT NEEDS FROM YOU A counter or a calendar interval per job. PM forms additionally need a tablet per technician — any browser will do — and your existing paper forms, which can be imported as PDFs.

WHERE IT SITS The upkeep layer. Maintenance Tracking watches one machine's counters; Enhanced Maintenance plans across the plant and brings Parts Inventory, Task Templates and PM Forms onto one screen.

Reports & Analytics

Scheduled machine performance reports with OEE metrics, maintenance summaries and trend analysis, delivered by email — plus the interactive analytics behind them. Everything the platform records is queryable after the fact, and everything on screen can leave as a file.

HOW YOU ASK A QUESTION

FILTER

Ask a specific question

Date range, machine multi-select, location and shift, with grouping by hour, shift, day or week and your choice of line, bar or area chart.

COMPARE

Against each other

Machine against machine, shift against shift, operator against operator, batch against batch — side by side rather than in two exports.

EXPLAIN

Find the cause

Loss waterfalls, downtime Pareto, phase Gantt charts, bottleneck summaries and defect breakdowns that point at where the time went.

DELIVER

Automatically

Scheduled reports built from a template, generated daily, weekly or monthly, emailed to a distribution list and kept in an archive.

THE CHARTS

— Summary cards

The headline numbers for the current selection, before you look at a single chart.

— OEE trend and heatmap

The three factors over time, and a machine-by-period grid that exposes patterns an average hides.

— Cycle time trend

Cycle time drift over a run or a week — the early signal that something mechanical is changing.

— Quality and defects

Defect counts and categories by machine, product and period.

— Job history

Completed jobs with targets, actuals, speeds, outputs and durations, plus a timeline of every change made to a job during its run.

— Batch performance

Phase timings, material consumption and quality outcomes per batch, with comparison and bottleneck analysis across a set.

— Alarm analysis

Alarm frequency and duration by machine and period, including the bubble view that separates nuisance alarms from costly ones.

— Machine hierarchy view

Roll performance up from machine to cell to area, or drill from the plant number down to the asset behind it.

LEAVING THE PLATFORM

— Exports

Historical and batch data as CSV; batch and job reports as PDF; recipes, alarm and tag configuration as JSON or CSV; QR labels as printable sheets.

WHAT IT NEEDS FROM YOU A distribution list and a schedule. Everything reported is already being recorded, so nothing new is collected.

WHERE IT SITS The reporting layer. It reads the history the other features write, which is why it improves as you switch more of them on.

ERP Integration & Quality

Bi-directional data exchange with your ERP — and, with it, the Quality Management tab. Turning on ERP Integration turns on both.

THE EXCHANGE

INBOUND

Orders arrive

Import production orders from the ERP and sync material masters, so the schedule your operators see is the schedule the business committed to.

OUTBOUND

Completions post back

Export completions, post receipts and create non-conformances — the shop floor's result reaches the business system without a re-key.

CONNECTOR

Epicor Kinetic REST API v2

A direct connector with auto-sync on your interval. SAP, Oracle and other systems connect through the same order-import and completion-export interface.

ENABLED WITH IT

Quality Management

A Quality tab on the machine page covering holds, tests, serials, grade specs and material test reports.

QUALITY MANAGEMENT

— Quality Holds

Place and release holds against material or output, with status tracked and counted on the tab so nothing on hold quietly ships.

— Test Results

Record test outcomes against the product, with pending tests surfaced as work still to do.

— **Tube Serials**

Serial numbers generated per produced unit, using a facility code and default grade configured on the machine, and traceable back through genealogy.

— **Grade Specs**

The specification each grade must meet, held as the reference test results are judged against.

— **MTR Reports**

Material test reports generated from the recorded results and serials — the certificate that travels with the product.

— **Non-conformances**

Raised in PulseMQ and posted to the ERP, so a quality event is one record in two systems rather than two records that disagree.

WHAT IT NEEDS FROM YOU An ERP endpoint and credentials. Epicor Kinetic ships as a direct connector; SAP, Oracle and others connect through the same order-import and completion-export interface.

WHERE IT SITS The business layer, and the door to Quality Management. Orders arrive from the ERP, completions and non-conformances post back, so the shop floor result reaches the business system without a re-key.

Sustainability Tracking

ESG ROLLUPS IN DEVELOPMENT

Environmental performance monitoring. Map a meter — power, flow, temperature, humidity — on the Environmental tab and it behaves like any other signal in the platform: live on the dashboard, on the trends chart, and in history. The long-run ESG layer that rolls those readings into scores and period reports is still being built.

STATUS **Two halves, at different stages.** Live monitoring of a mapped environmental signal works today. Automatic ESG aggregation — per-shift and per-period rollups, sustainability scoring, and the reporting views built on them — is in development. If you have a compliance reporting obligation, talk to us about timing before you plan around it.

AVAILABLE TODAY

— Environmental tab

Configure the environmental signals a machine publishes — power, flow, temperature, humidity and similar — with display names, units and visibility, exactly as you would any process metric.

— Power monitoring

A power consumption widget reads the machine's mapped energy signal and charts it over time, including peak-window analysis for spotting the demand spikes that drive a utility bill.

— Environmental widgets

Water usage, waste reduction and carbon footprint widgets display whichever signal you bind to them, with target and capacity thresholds, so a site that already meters water can put it on the dashboard now.

— Trends and history

Environmental signals chart alongside production values on the Trends tab and are retained with the rest of the machine's history.

— Automatic rollups

Per-shift and per-period aggregation of energy, water and waste into a reportable record, rather than a live reading you watch.

— Sustainability scoring

The composite ESG score and its dashboard.

— Carbon derivation

Emissions from energy consumption. When it ships, the conversion factor will be one you set and can defend to an auditor.

WHAT IT NEEDS FROM YOU Metering that publishes a reading — energy, flow or similar. This is the one feature whose limit is instrumentation on the machine rather than software.

WHERE IT SITS The environmental layer. It reads meters the same way OEE reads production signals, so consumption is attributable to the run that caused it rather than to a site bill.

Diagnostics / HMI Embed

Bring the machine's own on-device screen into the dashboard, so a supervisor investigating a fault does not have to walk to the panel — without the dashboard ever pretending to be the controller.

★ **STANDOUT** **A live mimic that survives a mobile uplink.** Instead of streaming the device's whole on-board application, PulseMQ fetches its structure once and then moves only the changing values — around two hundred times less data per update. That is the difference between a process mimic that is pleasant to watch and one nobody opens twice.

WHAT YOU SEE

— Live diagnostics

The AlarmIQ diagnostics and playback view from the machine's on-device controller, framed inside a Diagnostics / HMI tab on the machine page.

— Bridge HMI

Optionally the operator HMI itself, alongside the diagnostics view.

— Process mimic

A native process mimic rendered in the dashboard from the device's own declarative manifest — the structure is fetched once and only live values stream, which keeps it responsive over a mobile uplink.

HOW IT IS DELIVERED

— Read-only by design

The device stays the source of truth and the dashboard only displays it. There is no write path through the embed; anything that changes the machine still goes through the device's own permission checks.

— Gateway enrolment

Requires the device to be enrolled in the gateway registry, and the viewer to be signed in — the stream is not open to the network.

WHAT IT NEEDS FROM YOU

The machine's on-device controller enrolled in the gateway registry.
Nothing is installed on the device.

WHERE IT SITS

A window, not a layer. The device stays the source of truth and the dashboard only displays it, so a supervisor can see the machine's own screen without walking to the panel.

AI Assistant

Natural language MES operations. Ask questions and give commands in plain English — powered by Claude on AWS Bedrock, with per-machine budget controls and monthly usage caps.

WHAT YOU CAN ASK IT

— Ask about the plant

Check machine status, look up schedules, investigate downtime — answered from live and historical data, in the context of the machine you have open.

WHAT IT CAN DO

— Give it work

Dispatch work orders, add a maintenance item, define a process value, create a task template, adjust an OEE baseline — described in words, performed against the real configuration.

— Guided machine setup

Walks a new machine through the whole chain: create, choose features, map status, map process and production signals, select OEE signals, set baselines, add alarms and maintenance, then validate the result.

BOUNDARIES

— Bounded by your roles

The assistant can do exactly what the signed-in person could do by hand, and nothing more. Significant changes are confirmed before they are made.

— Costs you can see

Budget controls are set per machine and usage is tracked and capped monthly, so the feature cannot run up a bill quietly.

WHAT IT NEEDS FROM YOU Nothing. Set a monthly budget per machine and it is ready; it can only do what the signed-in person could do by hand.

WHERE IT SITS A way in, not a layer of its own. It reaches the same data and the same actions as the screens, which makes it most useful on the configuration work that would otherwise mean hunting through tabs.

Part three — choosing

Which features a machine can take, what each one depends on, and three routes in.

What fits, and what it costs you to adopt.

Every feature is switched on a machine at a time, so you can start narrow and widen later. Two things decide what is available: the machine's production mode, and whether a feature depends on another.

SELECTION MATRIX – THE THIRTEEN SWITCHES ON THE FEATURES TAB

FEATURE	AVAILABLE ON	DEPENDS ON	WHAT YOU SUPPLY
OEE Monitoring	Any mode	—	A state signal, a count or length signal, and the ideal rate
Alarm Notifications	Any mode	—	The tags worth watching, and an email address per person
Maintenance Tracking	Any mode	—	A counter or a calendar interval per job
Enhanced Maintenance	Any mode	Maintenance Tracking	A tablet per technician for PM forms; your existing forms as PDFs
ISA-88 Equipment Modules	Parts — and Continuous, where it appears as Hybrid Mode	—	PackML states from the controller
Material Tracking & Genealogy	Wherever ISA-88 is on	ISA-88 Equipment Modules	A scanner at the machine and printed position labels
Job Tracking	Parts, when ISA-88 is off	—	A count signal and a target
ISA-106 Continuous Process	Continuous, when ISA-88 is off	—	A state word and a boundary counter
Reports & Analytics	Any mode	Whatever you want reported	A distribution list and a schedule
ERP Integration	Any mode	—	An ERP endpoint and credentials

FEATURE	AVAILABLE ON	DEPENDS ON	WHAT YOU SUPPLY
Quality Management	Any mode	ERP Integration	Grade specifications and your test regime
Sustainability Tracking	Any mode	—	Metering that publishes a reading
AI Assistant	Any mode	—	A monthly budget per machine
Diagnostics / HMI Embed	Any mode	—	The on-device controller enrolled in the gateway

THREE ROUTES IN

ROUTE 1 — SEE THE PLANT

Start with the numbers nobody has

OEE Monitoring, Alarm Notifications and Reports & Analytics. Inside a week you know your real availability, which stops repeat, and which machine is quietly costing the most — without changing how anyone works.

Needs signals you already publish

ROUTE 2 — RUN THE WORK

Then make it attributable

Add the execution model that matches each machine, and Material Tracking where lots matter. Now a number belongs to a job, a batch and a lot, rather than to a shift in general.

Needs a handshake block and scanners

ROUTE 3 — ANSWER TO OTHERS

Then close the paperwork

ERP Integration and Quality, Enhanced Maintenance with PM forms, and electronic signatures where your process demands them. This is the band that replaces clipboards, spreadsheets and a per-seat forms subscription.

Needs an ERP endpoint and tablets

WORTH KNOWING Nothing here is a one-way door. A feature can be switched off again, a machine can be deactivated so it stops consuming anything while keeping its history, and the production mode is the only choice that is fixed at machine creation.

Appendix

Worked examples, and the technical reference behind the catalogue.

Worked examples

Three ordinary days, to show how the features in Part two behave once they are switched on and something goes wrong.

A DISCRETE LINE, MONDAY MORNING

— 06:00 — the shift opens itself

The line starts and the machine's state signal changes. PulseMQ opens the shift, starts the availability timeline and begins counting. Nobody logs in to start anything.

— 08:12 — a stop nobody would have written down

The line idles for eleven minutes. It lands on the timeline with its own duration, and the operator is asked to classify it against your reason-code list.

— 09:40 — performance drifts

Cycle time creeps four per cent above ideal. The trend shows it as a slope rather than a single bad reading, which is the difference between a tooling conversation and a shrug.

— 14:00 — shift close

The shift's OEE, its three factors, downtime split and counts are written to history automatically, on your shift calendar. The report arrives by email without anyone assembling it.

A BATCH THAT WILL NOT START WITH THE WRONG DRUM

— The recipe is dispatched

A supervisor picks recipe, machine and parameters. The control recipe is frozen at dispatch, so editing the master tomorrow cannot change what ran today.

— The equipment holds

The controller raises its verification-required flag. Nothing starts until the materials are confirmed.

- **The operator scans**

Position label first, then the drum's own GS1 label. PulseMQ checks it is the right material, in the right quantity, released and unexpired.

- **A wrong drum is refused**

The answer goes back as a status code and the line stays held — before the batch is made, not after it is dispositioned.

- **The right drum clears it**

The bound lot is written back to the controller, the cleared flag is set, and the batch runs. That lot is now part of the batch's genealogy for as long as the record exists.

A PM IN A BASEMENT WITH NO SIGNAL

- **The work is dispatched**

A planner assigns the published form to a named technician and a machine. If the machine's lockout procedure is not on file, dispatch is refused and says so.

- **The tech walks out of coverage**

Their tablet already holds the form. Answers, readings and photos are captured normally.

- **Nothing claims to be saved**

Every answer sits in the on-device queue marked *Queued*. The app does not tell them the work is filed when it is not.

- **They come back upstairs**

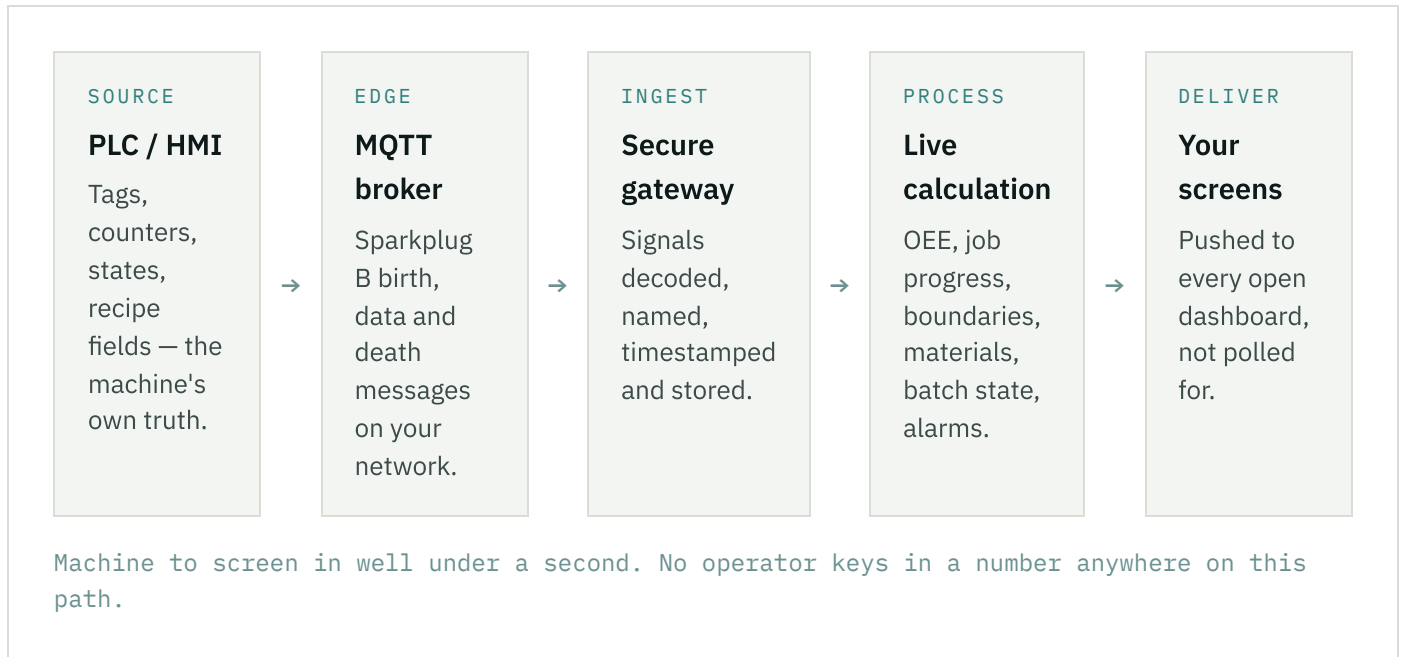
The queue drains, the server confirms each batch, and only then do the answers stop showing as queued.

- **The record closes**

Submission is checked server-side; anything missing is marked on the form. A reviewer accepts it, and a PDF is filed to the machine's vault with the lockout revision that was shown and a content hash on every page.

How your data arrives

PulseMQ speaks Sparkplug B over MQTT — the industrial standard for publishing machine data. If your controls can publish it, we can read it; if they cannot, a small edge gateway bridges the gap. Nothing on the machine is replaced.



— Sparkplug B native

Birth, data, death and command messages are handled as the specification intends — a device that reconnects re-declares everything it publishes, so PulseMQ never runs on a stale tag list.

— Report-by-exception aware

Sparkplug publishes only what changed. PulseMQ holds the full picture between updates and force-reads the handful of signals where a missed change would matter, such as command acknowledgements.

— Automatic device discovery

Every node and device that announces itself is registered with its published tag list, its parent node and its last-seen time — including sensors, saws, pumps and other equipment hanging off a machine.

— Tag naming you control

Raw controller tags are normalised and then mapped to friendly names, units and categories. Rename on the screen without touching the PLC.

— Offline detection

A sweep every five minutes flags any machine that has gone quiet past its threshold, marks it offline, records the transition, and re-evaluates its open alarms.

— Tiered storage

Live values stream straight to screens; a durable record is written on a slower cadence for recovery and reporting; state changes, acknowledgements and completed outputs are written the instant they happen.

— Historical archive

Every processed message is also filed to long-term storage in a query-friendly layout, so an audit two years from now can still reconstruct the shift.

— Works with old iron

Twenty-year-old controllers are in scope. The requirement is a route to MQTT, not a modern PLC.

Plant model & equipment

The platform holds a model of your plant, not just a list of machines

— which is what lets a number roll up and a fault drill down.

— Hierarchy

Company, location, area, cell, machine — following the ISA-95 model, with work centres and cell positions.

— Cell Layout

A visual view of areas and cells with the machines in them and their live status, expandable down to the asset. Administrators add areas and cells and assign machines from the same screen.

— Machine roles

Primary, auxiliary or standalone. An auxiliary asset — a saw, a conveyor, a dust collector — is attached to its parent machine and reports against it.

— Line topology

Upstream and downstream relationships between machines, so a stoppage can be read in the context of what feeds it.

— Equipment modules

Sub-units within a machine defined as a tree, each with its own signals and material tracking, and each able to be arbitrated between competing batches.

— Equipment types

Reusable definitions, so the tenth machine of a kind is configured from a pattern rather than from scratch.

— Equipment capability

Which equipment can execute which procedure — checked before a batch is sent somewhere it cannot run.

— QR labels

Printable labels for machines, positions and devices, so scanning replaces typing an asset number.

Machine configuration

All of it is configuration, not code. Turn a feature on and its tab appears; every screen in this guide is driven by settings an engineer can change on a Tuesday afternoon without a software release.

★ **STANDOUT** **Mapping runs the other way round.** Configure the machine in PulseMQ, then generate the PLC's tag structure from it — L5X for Studio 5000, an Ignition UDT, or a CSV tag list. Your controls engineer imports a generated contract instead of hand-typing names from a spreadsheet, which is where most MES integrations lose their first three weeks.

CONFIGURATION TABS – THE ONES YOU SEE DEPEND ON THE FEATURES YOU ENABLE

TAB	WHAT YOU SET THERE
General	Name, identifiers, location, work centre, production mode, time zone, serial number.
Features	The thirteen feature cards in section 02 – on, off, and whether each is fully configured.
MQTT Config	Namespace, broker settings and heartbeat expectations.
MQTT Tags	Everything the machine publishes – search, filter, alias, categorise and add custom tags.
Tag Management	Tag naming, units and categories, with CSV import and export.
Metrics	OEE signals, production signals, continuous OEE, flexible production and environmental signals: which tag feeds each, its display name, unit and visibility.
Maintenance	Counter definitions and setpoints, interval or cycle based, and task templates.
Alarms	Alarm creation and editing, conditions, severity, notification, test firing, CSV import and export.
Environmental	Temperature, humidity and other environmental factors to track and log.
Equipment Module	The ISA-88 module tree, its signal mapping and its material tracking structures.
Batch Tracking	Batch configuration, PackML signals, material interlock and validation structures.
Batch Queue	Queue behaviour and how batches line up for the machine.
Recipe	Recipe download mode, recipient, queue location and parameter-to-signal mapping.
Material Catalog	Material definitions, units of measure, GS1 codes and tracking mode.

TAB	WHAT YOU SET THERE
ISA-106	Procedural states, job boundaries, production context, production logging, recipe structure, material tracking, quality and serialisation, operating mode and ERP integration.
PLC Integration	Communication settings, state mapping, command paths and handshake timing.
Auxiliary	Auxiliary equipment, pairing, scan modes and machine-specific commands.
Reports	Report templates, metric selection, schedule and email recipients.

Configuration changes merge — they never replace.

Editing one section of a machine's setup leaves every other section untouched. A half-filled form cannot wipe out settings it was not showing.

— Signal path builder

Structured tag paths are assembled from a base path, an element and a field, matching the UDT structures your controls team already built — with either separator convention.

— UDT generation

Generate the PLC tag structure straight from the machine's configuration and download it as a Rockwell **L5X** for Studio 5000, an **Ignition UDT** in JSON, or a flat **CSV tag list** for the PLC and IoT bridge. The screen tells you how many tags it will produce before you download.

— ISA-88 recipe structures

Recipe and phase structures export as L5X on the same principle, so the controller's recipe interface is generated rather than transcribed.

— Setup wizard

A guided path for a new machine, from creation through features, signals and baselines to validation — by hand or through the AI Assistant.

— Cost control

A machine can be deactivated so it stops consuming processing and storage, while its configuration and history stay intact.

Scanners, printers & devices

The hardware around the machine is registered, addressed and testable from the same place as the machine itself.

Device types

- Label printers
- Barcode scanners
- Scales
- RFID readers
- Vision systems
- Marking systems

Connections

- Network
- USB
- Serial
- MQTT
- Edge gateway

Management

- Register, edit and remove
- Assign to a machine or position
- Send a test
- Live online status
- Printable QR label

— Pairing by scan

Pair a handheld scanner or an auxiliary asset to a machine by scanning its label — no address typed, no configuration file edited.

— Scan modes

Devices can be set to load, close-out or reject modes, so the same scanner serves several steps without a menu.

— Print targets

Label printers receive job, batch and material label data on the triggers configured per machine.

Users, roles & security

Access is decided on the server for every request — not by hiding buttons in the browser — and a company's data is reachable only by that company's people.

STANDARD ROLES	
ROLE	TYPICALLY HOLDS
Viewer	Read-only access to dashboards, metrics and history.
Maintenance	Their own task queue, PM forms, counter resets and maintenance records.
Supervisor	Production execution — dispatch, start, pause, complete, disposition — plus everything a viewer sees.
Engineer	Machine configuration, tags, signals, alarms and OEE setup.
Customer Admin	Users, locations, alarm and notification policy and reports, across their own company.
Administrator	Full platform administration, including multi-company operation for service providers.

— Sign-in

Managed accounts with password policy and session expiry, or your own identity provider by SAML or OIDC federation, so people use the credentials they already have.

— Permission matrix

Permissions are grouped by area — machines, users, system, alarms, materials, reports, maintenance — and defined once, so the screen and the server can never disagree about who may do what.

— Enforced on the server

Every request carries the caller's identity and is checked against their role and their company before anything is read or written. An unrecognised role is denied, not waved through.

— **Company isolation**

Data is partitioned by customer. One company's users cannot reach another's machines, batches, recipes or documents.

— **Electronic signatures**

Where your process needs them: a stated meaning, the password re-verified at the moment of signing, an unbroken hash chain over the signed record, separation of duties between author and approver, and an append-only history. Signatures are never editable or deletable — only superseded.

— **Audit trail**

Configuration changes, dispositions, overrides, resets and approvals are recorded with who, what and when.

— **Emergency lockdown**

An administrator can lock the platform to a maintenance screen immediately if something needs to stop.

— **Recoverable by design**

Continuous backup with point-in-time recovery on operational data, and configuration held with change history.

Data, retention & integration

Your production data belongs to you, stays retrievable, and leaves the platform in formats other systems can read.

— Live signal store

Current and recent machine values, kept hot for the dashboards and the calculations behind them.

— Production records

Jobs, batches, work orders, material lots, genealogy, alarms and maintenance records, each held as its own record and queryable by machine, status and date.

— Shift history

Per-shift OEE with its component numbers, downtime split and counts, retained for long-term trending.

— Long-term archive

Completed jobs and batches move to archival storage on a schedule, leaving a searchable index behind, and can be restored intact. Older archives roll to cold storage automatically to keep costs down.

— Query-ready layout

The archive is written in a partitioned, analytics-friendly structure, so your own BI or data science tooling can read it directly.

— REST API

The same interface the dashboard uses is available to your systems: machines, jobs, batches, work orders, materials, recipes, alarms and reports.

— Live subscriptions

For applications that need push rather than poll — machine status, job progress and batch status stream out as they change.

— ERP exchange

Orders in, completions and receipts out, on the connector described in section 12.

— File exchange

CSV for historical and tabular data, JSON for recipes and configuration, PDF for reports and completed forms.

Deployment & operations

Two ways to run it, and the same product either way.

OPTION A

Cloud

Managed and hosted, reached from any browser on the plant network or off it. Updates arrive continuously and you maintain no servers. Your edge publishes outbound — no inbound holes in your firewall.

OPTION B

On-premise

For sites that cannot reach the internet at all. The platform runs inside your network with no external dependencies, and every feature that would otherwise call out degrades to a working manual path rather than disappearing.

— Installation

Typically live within a week. Network access and a tag list is most of what we need from you, and there is no production stoppage to install.

— Alongside SCADA

PulseMQ does not replace your control system. It reads what the control system publishes and adds the execution, history and reporting layer above it.

— Devices

Desktop browsers, plant-floor panel PCs and tablets. The tablet experience installs as an app and keeps working through a network outage.

— Multi-site

Several locations under one company, with per-location filtering, per-location notification routing, and roll-up reporting across them.

— Health monitoring

Connection state per machine, message logging with retention, and offline detection — you find out from the platform, not from a supervisor.

What we are building next

Stated plainly, because a roadmap item described as a finished feature is how trust gets lost. These are built or building, not yet in general use.

— Downtime reason coding

Operator-facing stop classification against your own reason-code list, feeding cause into the availability analysis. Built and provisioned; rolling out to production lines.

— ESG rollups & scoring

Live environmental monitoring works today (section 13). What is still being built is the layer above it: per-shift and per-period aggregation of energy, water and waste into reportable records, the composite sustainability score, and carbon derived from consumption on a factor you set.

— Maintenance alarm baselines

Clearing a maintenance alarm from a counter reset, by holding the baseline the alarm was raised against.

— Additional ERP connectors

Epicor Kinetic ships as a direct connector today. SAP and Oracle connect through the order-import and completion-export interface; direct connectors for those are in development.



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