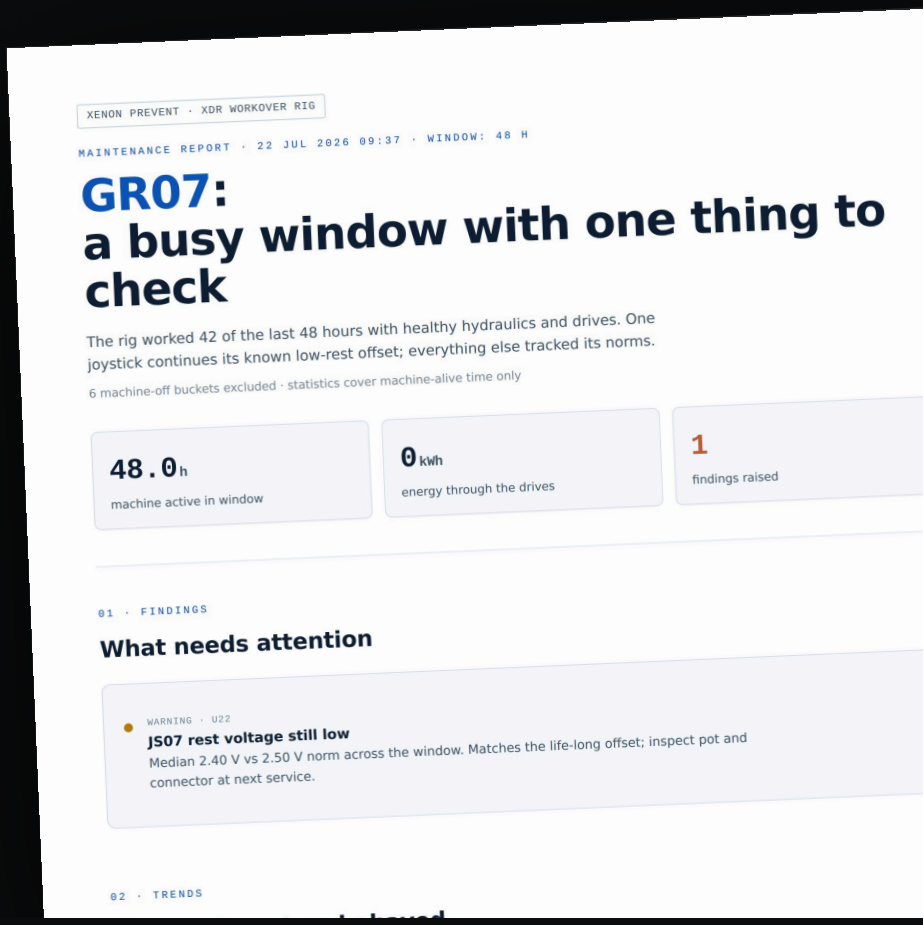
XDR
Engineered For Safety



XDR XENON
ARTIFICIAL INTELLIGENCE

CONDITION MONITORING · CASES, NOT ALARMS

PRODUCT LINE · ANY REPORTING MACHINE

Prevent

Reads the machine's live telemetry, judges it against norms written by its engineers, and raises numbered cases instead of alarms.

Ten rules
GOVERN EVERY ASSESSMENT

Two layers
DETERMINISTIC ABOVE AI

Cases
THAT OPEN, ESCALATE AND CLOSE

Any machine
THAT REPORTS TELEMETRY

EXPLORATION DRILL RIGS PTY LTD
REDBANK, QUEENSLAND, AUSTRALIA

PRODUCT LINE
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THE PROBLEM

Everyone streams telemetry. *Nobody reads the alarms.*

Telemetry is cheap. Judgement is not. Most condition monitoring streams numbers into a dashboard, sets a threshold on each one, and calls the result a warning. Crews learn to ignore it inside a month, because the thresholds fire on things that are not faults.

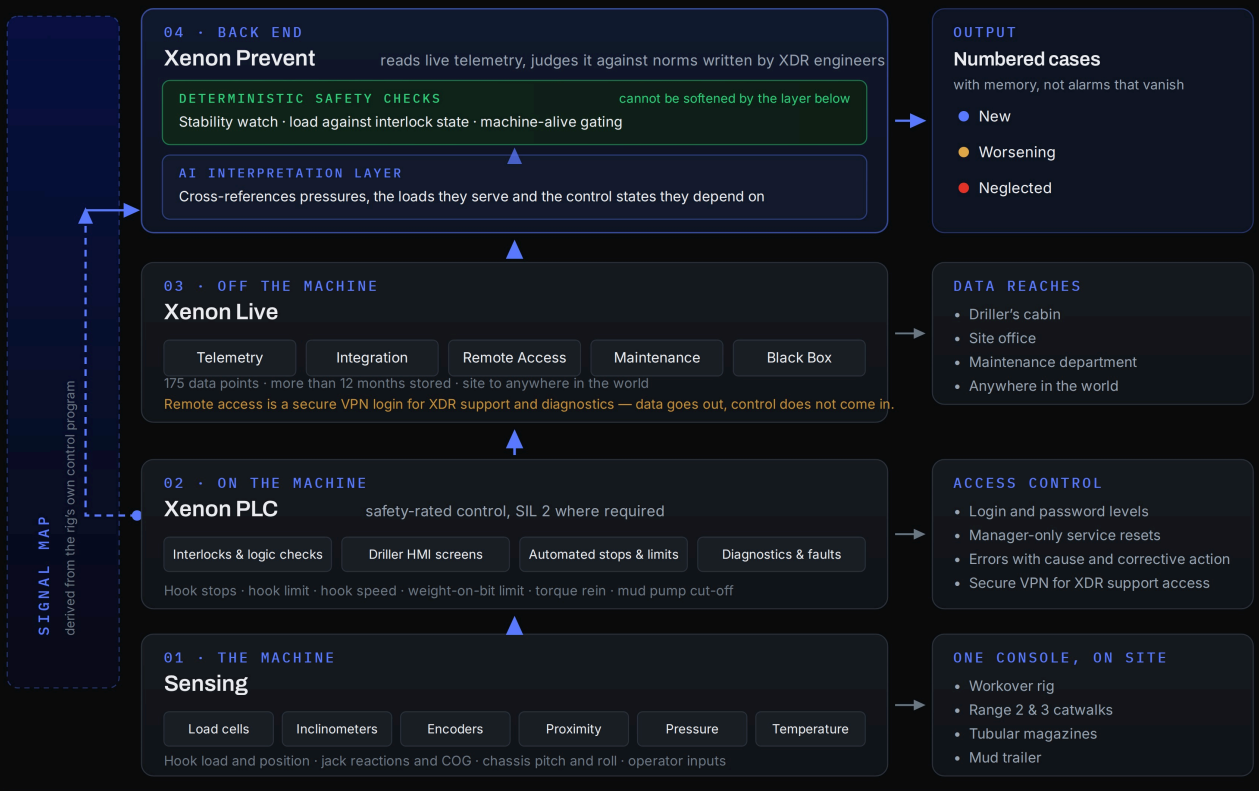
Xenon Prevent is the judgement layer. It reads live telemetry from a machine and assesses it against norms written by engineers who know that machine — then raises a small number of numbered cases that persist, escalate and close. It is built to be quiet, and to be right when it is not.

CONTENTS

01 / HOW IT WORKS

Four layers, and one *that cannot be argued with*.

Sensing on the machine, a safety-rated PLC running it, telemetry off it, and Prevent watching. The safety checks sit structurally above the interpretation layer — an inference cannot soften a stability finding.



A machine that is not reporting is never judged — telemetry holds its last value when a rig powers down, so Prevent gates every statistic to machine-alive time.

THE SIGNAL MAP RUNS UP THE LEFT — NORMS DERIVED FROM THE MACHINE'S OWN CONTROL PROGRAM, NOT INFERRED FROM THE OUTSIDE

01.1 / THE TWO LAYERS

Deterministic on top. *Always.*

01 **Deterministic safety checks**	Fixed, engineer-written rules that cannot be softened by anything below them. Stability watch, load against interlock state, machine-alive gating. These are code, not inference, and they run first.	NOTE Cannot be overridden by the layer below
02 **AI interpretation layer**	Cross-references a pressure, the load it serves, and the control state it depends on, into subsystem findings. It reasons about the machine — hydraulic circuits, drives, interlocks, control-system behaviour — rather than about individual sensors.	NOTE Reasons within the machine

WHERE THE NORMS COME FROM

The signal map comes from the control program

Norms are written per model and per serial number, working from the signal map taken from the machine's own control program. Not guessed from a packed status word, not inferred from correlation — read from the source that defines what each channel means.

The assessment is scoped

One assessment is one complete evaluation of one machine over a defined window. Norms, alive-gating, operating state and cases all inherit that scope.

Engineers write the norms

Each datapoint carries a description and an expected behaviour, authored by people who know the machine. Prevent judges against those, which is why it can tell a design behaviour from a fault.

02 / THE TEN RULES

Rules that outrank *convenience*.

These apply to every assessment, on every machine. Most exist to stop Prevent saying something that is not true — which is the whole difficulty in condition monitoring, and the reason most of it gets ignored.

01

No polling, no analysis

Telemetry hangs at its last value when a machine powers down. A latest value is not current truth. Prevent analyses only windows where the device was actively reporting, and excludes machine-off buckets from every statistic.

02

Settle buffer

Nothing is judged for a few seconds after data resumes.

03

Expected-off is not down

Safety-switched hardware de-powers by design on E-stop, safety-open and power-up. Design behaviour is never reported as downtime.

04

Safety-critical channels are real until disproven

On a safety-critical channel, “sensor fault” is never the first explanation. A machine in genuine trouble produces exactly the readings a faulty sensor would.

05

Analyse the machine, not the sensors

Conclude an instrumentation fault only after stating what real machine behaviour was ruled out.

06

Setpoints are targets, not limits

Small overshoot on a setpoint is normal operation. Only sustained or large deviation is flagged.

07

Sentinel values are comms, not physics

0xFFFF-family bad-read markers are excluded from statistics; their frequency is counted instead, because that frequency is itself a signal.

08

Don't re-flag the expected

If a datapoint's own norm says a behaviour is known, it is not a finding.

09

Coarse-to-fine confirmation

Any claim that two conditions coincided in time is re-checked against raw, time-aligned telemetry before it becomes a finding. Aggregate statistics never establish temporal coincidence on their own.

10

Cases, not alarms

Findings become numbered cases with memory — opened, tracked, escalated and closed — instead of alerts that fire and vanish.

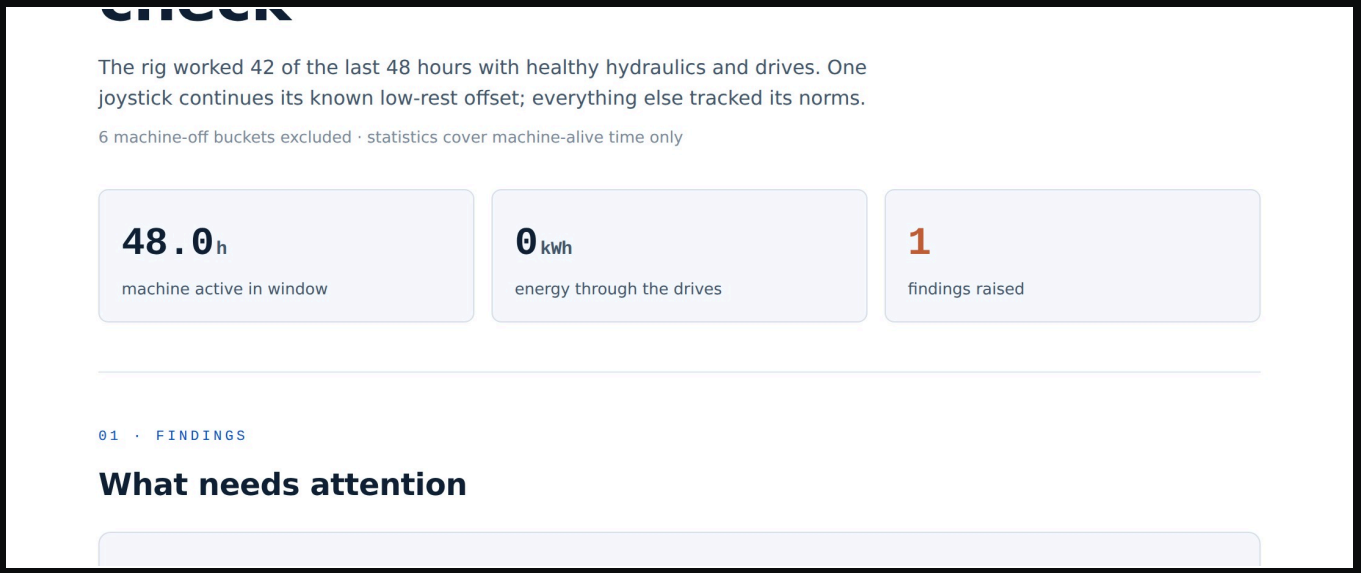
03 / CASES, NOT ALARMS

A problem that *remembers it was raised*.

An alarm fires and vanishes. A case opens, carries its evidence, escalates if it worsens, and is raised again if it is ignored. The difference matters most on the findings nobody wants to deal with.

New	A case opens the first time a finding survives confirmation. It carries the evidence that raised it.
Worsening	An open case that is trending the wrong way escalates. The crew hears about it again because it changed, not because time passed.
Neglected	A serious case left open without action is raised again. Silence is not consent.

Prevent alerts on the new, the worsening and the neglected. Everything else it holds in the assessment and says nothing about. That silence is engineered, not incidental — it is what makes the alerts worth reading. A monitoring system that speaks every day teaches people to stop listening.



A FINDING AS IT APPEARS IN THE ASSESSMENT — THE MEASUREMENT, THE NORM IT WAS JUDGED AGAINST, AND THE ACTION

04 / THE ASSESSMENT

One window, one *verdict*.

Every assessment is a document, not a dashboard state. It says what the window showed, what needs attention, and how each system behaved — in language a maintenance planner can act on without a data analyst.

A verdict, not a dashboard

Each assessment opens with a plain-language finding: what the window showed and whether anything needs attention.

Statistics gated to machine-alive time

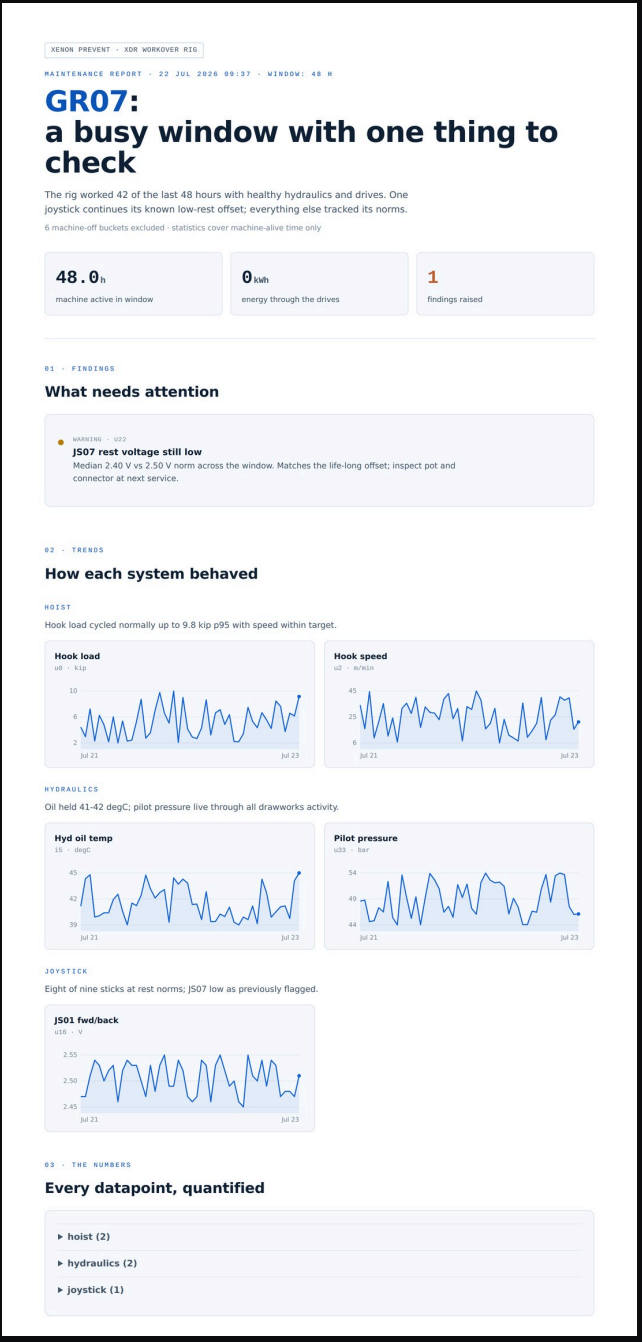
Hours worked, energy through the drives, findings raised — all computed only over windows in which the machine was actually reporting.

Findings with evidence

Each finding states the measurement, the norm it was judged against, and the recommended action — at the level of detail a maintenance planner can act on.

Trends per subsystem

How each system behaved across the window, so a rising trend is visible before it becomes a finding.



AN ASSESSMENT FOR ONE MACHINE OVER A 48 HOUR WINDOW

04.1 / AT THE MACHINE

The same system the operator *is already using*.

Prevent sits on top of Xenon — the PLC that runs the machine and the telemetry that streams off it. The operator's console is the source of the signal map, and it ships with selectable colour sets for operators with impaired colour vision.

THE CONSOLE RUNNING THE TRIPPING SCREEN — HOOK LOAD, HOOK POSITION AND THE DEADMAN INTERLOCK PROMPT

THE SAME CONSOLE ON THE MUD SCREEN — FLOW RATE, PRESSURE AND THE PRESSURE CUT-OFF

05 / ANY REPORTING MACHINE

The rules are not *drilling rules*.

Machine-alive gating, expected-off, setpoint tolerance, sentinel handling and temporal confirmation are properties of industrial telemetry. What changes between one industry and the next is the signal map, the norms, and the deterministic layer written for that domain.

Where it applies	Any machine that reports telemetry and has engineers who know how it should behave. The rules above are not drilling rules — machine-alive gating, expected-off, setpoint tolerance, sentinel handling and temporal confirmation are properties of industrial telemetry, not of any one industry.
What a new domain needs	A signal map from the machine's control program, norms authored per model and serial, and a telemetry feed. The deterministic layer is written for the domain; the interpretation layer and the case model carry over.
Where it has been proven	Developed and back-tested on XDR's own workover rig fleet, against historical telemetry including a real loss-of-stability event, where the deterministic stability watch and the case model were validated against known outcomes.

WHAT PREVENT NEVER DOES

It does not drive the machine. Prevent reads telemetry and writes assessments — control stays with the machine's own safety-rated system, and remote access is a support VPN, not an operating channel. Nothing Prevent concludes can move an actuator.

WHY IT IS DIFFERENT

The signal-to-noise ratio *is the product*.

Quiet by design

Alerts on the new, the worsening and the neglected. Nothing else. The signal-to-noise ratio is the product.

Deterministic safety on top

The safety checks are fixed code sitting structurally above the AI layer. An interpretation cannot talk the system out of a stability finding.

Judged against the machine's own definition

Norms derived from the control program, per model and per serial number — not generic thresholds applied to a channel name.

Cases that remember

Numbered, tracked and closed. A problem that was raised last month is still raised this month if nobody acted.

Evidence for after the event

Every assessment is a document. When something does go wrong, there is an objective record of what the machine was doing and what it was told.

Portable across industries

The judgement architecture is machine-agnostic. What changes per domain is the signal map, the norms and the deterministic layer.

SUPPLIED BY

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SCOPE

Prevent enhances maintenance and safety decision-making. It does not replace site-specific procedures, regulatory requirements or professional engineering judgement.