ENERGY AND UTILITIES

# Diesel and gas engines, gensets

Exhaust temperature per cylinder, read against the other cylinders at equal load, shows injector, valve and turbo faults first.

Status: Project-based Blueprint

## The five failures that matter

| # | COMPONENT AND FAILURE | SIGNALS | TYPICAL WARNING | TENEURO |
|---|---|---|---|---|
| 1 | **Injectors**: wear, dripping<br>A worn or dripping injector sprays poorly. Combustion in that cylinder becomes uneven and the ECU compensates as long as it can. | Exhaust gas temperature per cylinder as deviation from the mean at equal load, rail pressure, ECU cylinder balancing corrections, specific fuel consumption, smoke. | Weeks. | Yes. Vibration and acoustics in the injection crank-angle window. Needs a phase reference and high-rate sampling. |
| 2 | **Turbocharger**: bearing wear, fouling<br>Fouling lowers turbocharger efficiency: less air at the same load and hotter exhaust. Worn bearings increase clearances and noise. | Boost pressure against load, turbo speed where available, temperatures before and after the turbine, charge air temperature, metals in oil analysis. | Weeks to months for fouling; weeks for bearings. | Yes. Synchronous and sub-synchronous components tied to turbo speed, and the audible whine. |
| 3 | **Main and big-end bearings**: wear, seizure<br>A thin oil film or degraded oil wears the bearing lining down to metal contact. Damage can end in seizure or a crankcase explosion. | Bearing temperatures where fitted, oil pressure and temperature, metals in oil analysis, oil mist detector. | Weeks to months with oil analysis; days with temperatures. The oil mist detector gives minutes to hours: it protects, it does not predict. | Partly. Only at an advanced stage: low-frequency impacts and more mechanical noise. |
| 4 | **Valves, rings and liners**: burnt valves, blow-by<br>A valve that does not seal loses compression and overheats. Worn rings and liners let combustion gas into the crankcase (blow-by). | Exhaust gas temperature per cylinder, crankcase pressure, oil consumption, compression pressure from tests. | Weeks to months. | Yes. Valve closing impacts show clearly in vibration and acoustics synchronised with crank angle. |
| 5 | **HT/LT cooling**: heat exchanger fouling, water pump failure<br>Deposits reduce heat transfer in the exchangers. The water pump loses flow as its bearings or seal wear. | Temperature differences across the high- and low-temperature (HT/LT) circuits and heat exchangers at equal load, engine outlet temperature, water pressure, thermostatic valve opening. | Months for fouling; weeks for the pump. | Partly. Yes for the pump (bearing vibration, cavitation noise). No for fouling, which is thermal. |

Also relevant: Starting system of standby gensets: batteries and starter motor; Viscous torsional vibration damper (needs a dedicated torsional measurement); Alternator: bearings and winding insulation.


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## What we usually find in the plant, and how we read it

| SYSTEM | VIA | LEVEL | PREREQUISITE |
|---|---|---|---|
| AVEVA PI | PI Web API | **Native** | Engine data already stored in PI; read access to the server. |
| ComAp InteliGen / InteliSys / InteliLite | Modbus TCP/RTU via Teneuro | **1-day activation** | Free Modbus port and register map. On older models without Ethernet, a communication module on the customer side. |
| Deep Sea Electronics 7000/8000 series | Modbus TCP/RTU via Teneuro | **1-day activation** | Modbus port and register map. |
| DEIF AGC 150 / AGC-4 MK II | Modbus TCP/RTU via Teneuro | **1-day activation** | Modbus port and register map. |
| Engine ECUs, standard J1939 PGNs | SAE J1939 (CAN) via Teneuro | **1-day activation** | DBC/J1939 file with the PGNs. |
| Proprietary ECU diagnostics | Manufacturer tools and licences | **Project-based** | Agreement with the engine manufacturer. |
| Ship alarm and monitoring systems | Read-only output on a separate network | **Project-based** | Agreed with the automation integrator and the classification society (IACS UR E26/E27). |

## Where predictive maintenance does not pay off

• Small engines with a spare on the shelf, where a stop has no consequences.
• Standby gensets with no data even from periodic test runs.

There, good preventive maintenance costs less. We will tell you before we start.

## Standards we work with

**ISO 14224** — Taxonomy of components and failure modes for combustion engines and generators.
**ISO 17359** — Method to choose failure modes, parameters and monitoring intervals.
**ISO 13374** — Data chain from acquisition to state, diagnosis, prognosis and action.
**ISO 20816-6** — Vibration severity of reciprocating machines above 100 kW. Overall values only: diagnosis needs crank-angle analysis.
**IACS UR M10** — Crankcase protection with oil mist detection: protection, not prediction.

Warning times are indicative orders of magnitude from literature and practice: they depend on the duty profile and are validated on your fleet. Last updated 2026-10-03.

**Next step:** put your plant forward for a pilot — info@plasmiam.com · https://www.plasmiam.com/en/assets/diesel-gas-engines


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