alphasystem

The intelligent health check for mining trucks!

alphasystem is a revolutionary predictive diagnostic system for mining applications. It includes the diagnosis of all kinds of combustion engines, turbochargers, traction motors, gearboxes and bearings. It helps to strike and maintain a perfect balance between operating and maintenance costs.
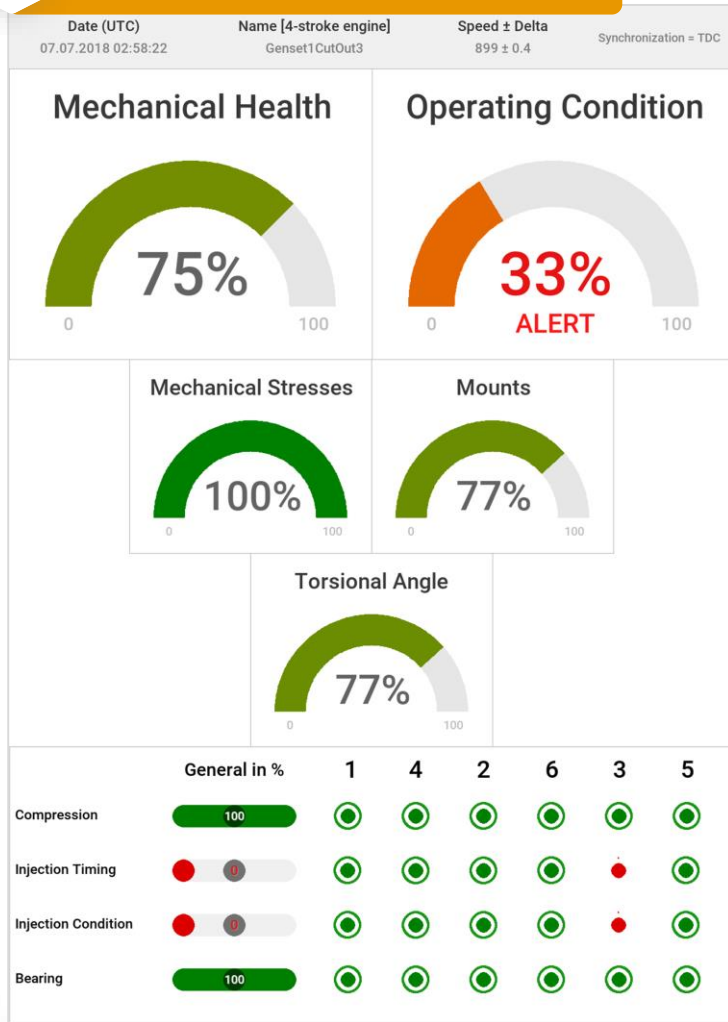
Direct Benefits:

- Eliminate catastrophic breakdowns
- Pinpoint faults during operation
- Reduce operational costs, no need to do routine checks
- Extend maintenance intervals safely
- Real time diagnostics system
- Indicate overall health of the equipment
- ROI in less than six months

alphaengine

Date (UTC)	Name [4-stroke engine]	Speed ± Delta	Synchronization = TDC
07.07.2018 02:58:22	Genset1CutOut3	899 ± 0.4	

Mechanical Health
75%
0 — 100

Operating Condition
33%
ALERT
0 — 100

Mechanical Stresses
100%
0 — 100

Mounts
77%
0 — 100

Torsional Angle
77%
0 — 100

	General in %	1	4	2	6	3	5
Compression	100	●	●	●	●	●	●
Injection Timing	● 0	●	●	●	●	●	●
Injection Condition	● 0	●	●	●	●	●	●
Bearing	100	●	●	●	●	●	●

Example of an engine diagnostic report

Information about Engine Condition

Non-cylinder specific indicators

Mechanical Health is the overall indication of the mechanical condition of the engine.

Operating Condition indicates how efficiently the engine is running.

Mechanical Stresses informs about the presence of unexpected stress pulses in the crankshaft twist.

Mounts indicates engine imbalance due to non-optimal thermal health and inertial resistance of moving parts.

Torsional Angle informs about dynamic torsion in the crankshaft.
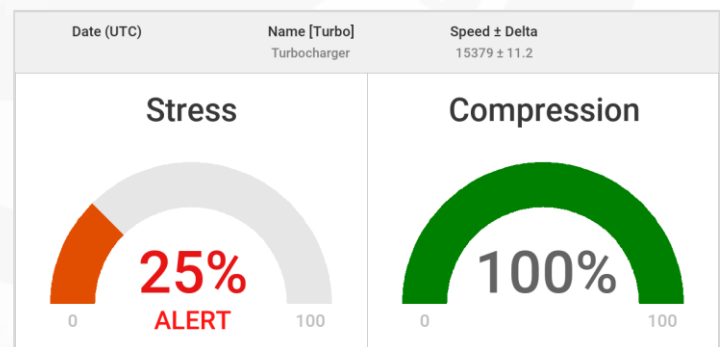
Cylinder specific indicators

Compression compares cylinder pressures and indicates power loss or efficiency of the engine.

Injection gives an information about injection timing and fuel atomization.

Bearing indicates dynamic behavior of bearings and all moving parts.

alphaturbo

With a turbocharger blade passing speed sensor, the turbo's efficiency and mechanical health can be determined by two indicators. Compression informs about speed variations due to bearing friction giving a feedback about efficiency of turbine, compressor and rotor shaft. Stress indicates presence of mechanical shock pulses during operation indicating a mechanical damage of turbine, compressor or rotor shaft.

Date (UTC)	Name [Turbo]	Speed ± Delta
	Turbocharger	15379 ± 11.2

Stress
25%
ALERT
0 — 100

Compression
100%
0 — 100

Example of a turbocharger diagnostic report
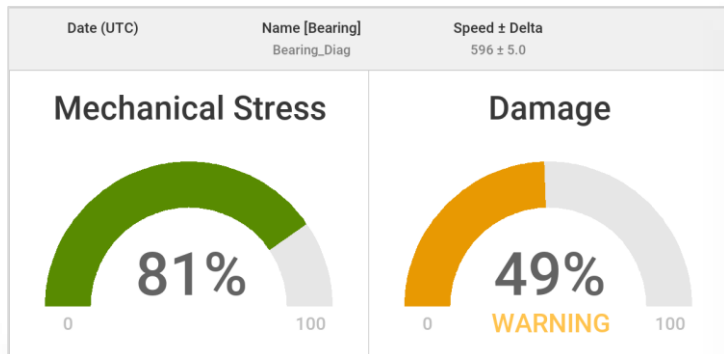
Product Features

- Inline and V-type
- 2 or 4 stroke engines
- Up to 30 cylinders
- Diesel, natural gas, gasoline, or heavy furnace oil engines
- Independent of engine manufacturer
- One speed sensor gives information about overall operating condition
- Second speed sensor enables cylinder specific diagnosis
- Third speed sensor enables turbocharger diagnosis

Example of a bearing diagnostic report

alphabearing

Excessive wear of axle bearings can result in reduced bearing lifetime, increased operating costs, and unscheduled maintenance of mining trucks and other equipment. By using **alphabearing** for bearing health condition monitoring, a fault can be detected at its initial stage. This allows sufficient time for repairs before significant failures occur, supporting operators to improve scheduling of their maintenance.
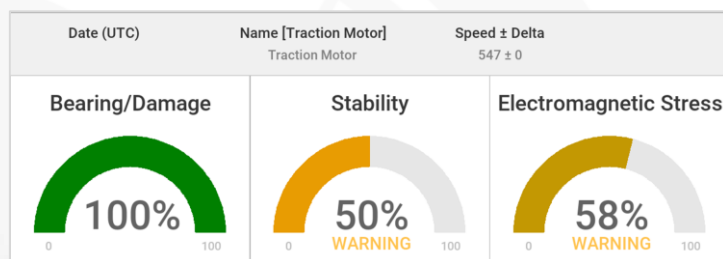
alphamotor

alphamotor is designed to determine the health condition of several motor parts (rotor, static and dynamic eccentricities, bearings) of electric and traction motors by analyzing torsional vibration of the shaft. The system has a built-in automatic expert system which provides the possibility of remote motor monitoring. It is of non-invasive nature and offers broad fault coverage. **alphamotor** is suitable for almost all electric and traction motors and is easy to install or retrofit.
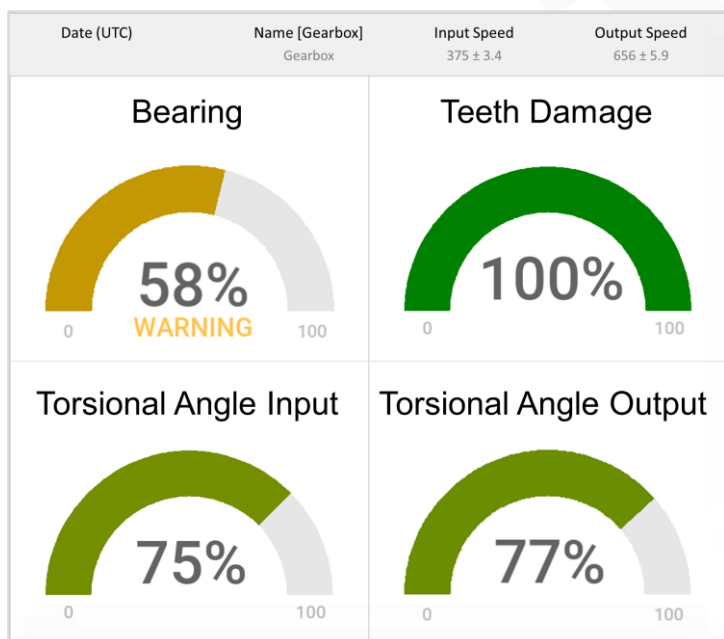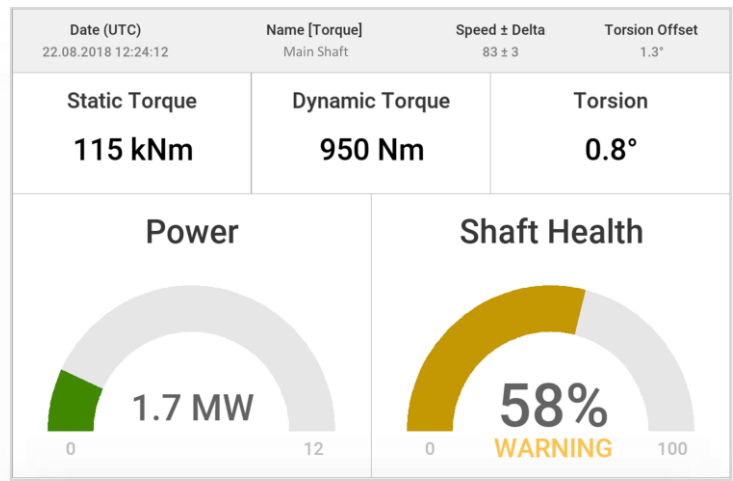

Example of a motor report

alphagearbox

Gearboxes are critical assets and any failure leads to expensive repair costs and down-time. **alphagearbox** diagnostics is based on torsional vibrations of the shaft. The system supports early fault detection, enabling users to prevent breakdowns before catastrophic failure. **alphagearbox** can diagnose the type of damage and it's source, based on changes in the torsional vibration signal. The system is able to predict problems well in advance.

Example of a gearbox diagnostic report

alphatorque

By providing the true mechanical work being generated by the rotor shaft, torque can be used to determine the true efficiency of the system: mechanical energy in - versus electrical energy out. This can be obtained by the information provided by **alphatorque**, which is suitable for all shaft diameters and shaft speeds without the requirement of any electronic parts that have to be installed on the shaft.

Date (UTC) 22.08.2018 12:24:12	Name [Torque] Main Shaft	Speed ± Delta 83 ± 3	Torsion Offset 1.3°
Static Torque **115 kNm**	Dynamic Torque **950 Nm**		Torsion **0.8°**

Power	Shaft Health
1.7 MW	58% WARNING

Example of a torque report

alphacloud

alphasystem collects diagnostic reports of measured devices and sends them from anywhere to **alphacloud** or any customer's cloud via GSM or other connected communication channel. This offers an unprecedented advantage and boosts your cost savings. **alphacloud** makes it possible for the condition monitoring and predictive maintenance to take place at any time and from any location via web-based access and coordination and helps to

- Reduce site visits with remote equipment monitoring and control.
- Ensure continuous operation of equipment, no matter how remote.
- Receive alerts, alarms and quickly identify problems as they occur.
- Improve operations, reduce costs and increase production/profits.

Benefits of alphasystem

Extended and optimized power train lifetime	Avoidance of unnecessary shutdowns	Easy retrofit on all powertrains
Early detection of impending failures	Quick ROI and reduced energy cost	Significant savings due to targeted maintenance

alphamotor
alphagearbox
alphatorque
alpha system
alphaengine
alphabearing
alphacompressor