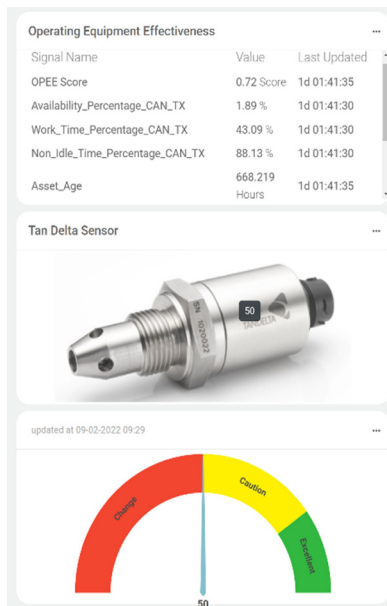


Providing Real-Time Equipment Monitoring with Elevat Machine Connect and Tan Delta: Full Spectrum Holistic (FSHTM) oil quality analysis

HydraForce has partnered with Elevat and Tan Delta Systems, to deliver customers with a state-of-the-art real time condition analysis sensor that can be easily integrated into a HydraForce manifold assembly. The Tan Delta sensor detects and measures all wear and contamination with the goal of improving machine uptime, availability, and performance in the field.



HydraForce recommends this new technology for use in a variety of industries including Speciality Agriculture, Construction, Material Handling and Mining; where high value equipment requires a reliable oil condition monitoring system.

Adding the Tan Delta Sensor to an elevat-iot connected dashboard, will provide both productivity and reliability indicators for actionable intelligence and condition-based monitoring.

Background

The quality of hydraulic oil in a system, is critical to the overall performance of a machine. At present most mobile machine

designers and manufacturers use 'oil sampling' to monitor fluid conditions within a machine. However, this method requires diligence and can be easily missed for a number of reasons including high fluid monitoring costs, difficulty in obtaining the samples, and extended timeframes in receiving the results. Regular oil sampling is considered a part of good machine maintenance but can be simply ignored or forgotten, leading to poor overall oil health.

Oil Quality Sensors that are currently on the market have provided limited benefits to customers, as they commonly use a method that measure the dielectric constant of the oil – based on the theory that as the oil degrades, the capacitance decreases. These types of sensors have suffered issues including lack of sensitivity, temperature instability, and lack of repeatability.

Benefits of Tan Delta

The Tan Delta sensor provides accurate and holistic oil condition monitoring that is guaranteed to deliver multiple operational benefits to maintain oil health, thus, leading to significant immediate and long-term financial benefits:

- Improved cash flow and a reduction in daily operating costs, through a reduction in daily maintenance costs derived from the ability to accurately predict the optimal service point, which safely extends the time between maintenance.
- Increased Equipment Efficiency. Ensuring optimal oil condition helps to reduce fuel consumption and maximizes output.

For detailed information and specifications, visit www.hydraforce.com or contact your local HydraForce representative at www.hydraforce.com/distributors/world.htm

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- **Optimized Maintenance Scheduling:** servicing can be optimized, as equipment is only serviced when it is required, and operators can rest assured that any unexpected changes in the oil condition will be immediately reported and detected. This is in comparison to normal schedules, which are conservative and result in over maintenance, leading to reductions in productive time of the equipment.
- **Increased equipment life:** ongoing maintenance of optimal oil conditions, coupled with the ability to identify equipment issues, prevents the unnecessary wear and damage of equipment. Thus, significantly extending the operational life of equipment and overall machine health, as optimal oil conditions prevent unnecessary wear and damage.
- **Prevents Catastrophic Failure:** frequently, equipment issues are evidenced by unexpected changes in oil condition. However, Tan Delta sensitivity detects even low-level changes, allowing the operator to take action to prevent equipment failure.
- **Environment Protection:** accurate oil management reduces oil changes and reduces oil waste to an absolute minimum.

The OQSxG2: Tan Delta Oil Quality Sensor

The new Tan Delta Oil Quality Sensor (OQSxG2) provides Full Spectrum Holistic (FSHTM) oil quality analysis, which enables users

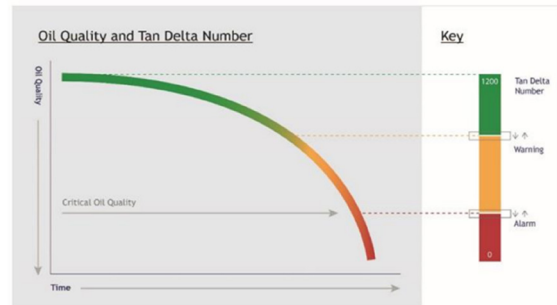


to observe any changes within the oil composition, including signs of contamination or abnormalities in the oil chemistry, both of which can be instantaneously measured and reported, to provide

ongoing analysis of the oil state.

The sensor technology uses a patented method to continuously monitor the ratio of two key measurements called capacitance and conductance, to provide a real-time measurement (permittivity). The OQSxG2 sensor compares this measurement reading to the expected permittivity for the oil, at the given temperature. The difference between the two readings then provides an accurate statement of the oil quality – a process that occurs hundreds of times per second, to allow for reliable monitoring.

Following this, the permittivity reading is converted to a Tan Delta Number (TDN), which rates the oil condition on a scale from 1200 to 0, to allow users to easily understand the analysis. The scale has three colour coded stages, including: Optimum (GREEN), Warning (AMBER) and Alarm (RED).



The OQSxG2 is designed for flexible integration, and works successfully with all oil types, making it suitable for any equipment. It can be easily installed in the tank line of a manifold with HydraForce Cartridge Valves, and positioned strategically so the sensor head is continuously immersed in oil to allow the sensor technology to monitor the behaviour of the oil, and detect any issues or changes including general wear, water ingress, viscosity and contamination.

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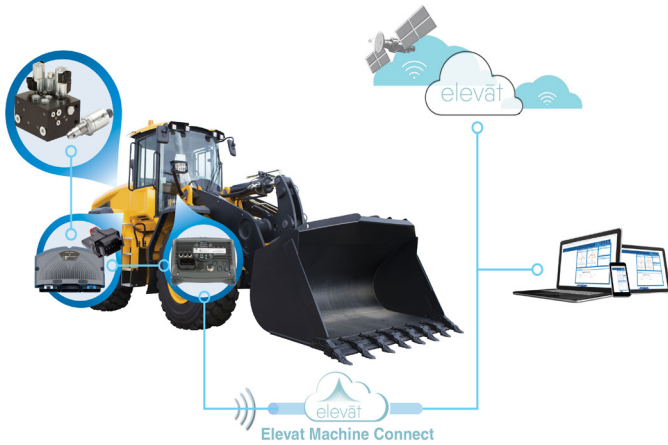
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Better performance comes from working together.

October 2022

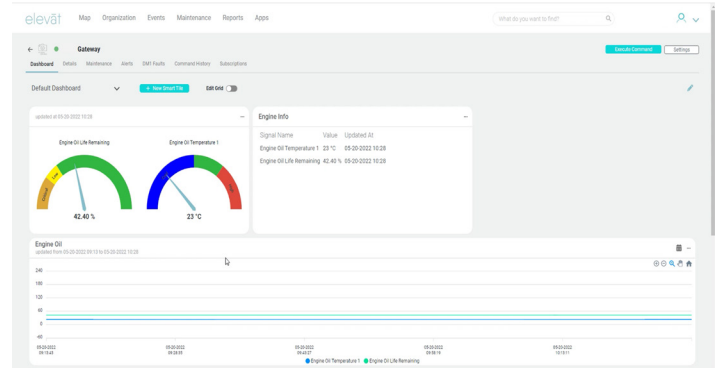
This combination of electronic controller architecture with telematics, provides multiple benefits to users, including real-time data and ongoing alerts of oil conditions. The reported information will prevent excessive wear of hydraulic components and catastrophic failures that can occur when machines are in operation. This will lead to increased productivity, and reductions in machine downtimes and maintenance costs.

HydraForce's Partnership with Elevät & Tan Delta



HydraForce's collaboration with both Elevät and Tan Delta, provides an integrated telematics solution for the market.

HydraForce's recent partnership with Elevät, allows operators to use an application on the Elevät Machine Connect platform that can be paired with the Tan Delta oil conditioning sensor. This holistic application will visualize data from the Tan Delta Sensor, providing customized alerts to inform the operator or owner when the asset requires maintenance, or an oil change.



By subscribing to Elevät Telematics Software for your machine telematics services, and integrating a Tan Delta sensor from HydraForce into your hydraulic system, you have the opportunity to use the Elevät Application for the Tan Delta Sensor and incorporate it into the rest of your telematics solution, so that it works as one system.

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