MEMS sensors

TDK launches a high-temperature, closed-loop MEMS accelerometer for energy market applications

June 25, 2025

TDK Corporation (TSE:6762) has expanded its MEMS inertial sensors portfolio with the Tronics AXO315®T0, a high-temperature MEMS accelerometer with ±14 *g* input range and a digital interface for measurement while drilling (MWD) applications in the energy market.

Leveraging TDK's unique closed-loop architecture that provides an unprecedented level of vibration rectification and resistance to operational shocks, AXO315T0 exhibits a bias residual error of 0.8 m*g* over its operating temperature range of -30 °C to +150 °C, enabling a precise and continuous inclination measurement for directional drilling tools exposed to high temperatures.

To cope with the stringent reliability constraints required to maximize the productivity of complex drilling operations in severe environments, TDK has qualified AXO315T0 through extensive reliability testing. This includes more than 1000 hours of powered life testing at +165 °C, temperature cycling from -55 °C to +165 °C, as well as high temperature vibration tests (20 *g* RMS random vibration combined with 50 *g* sine sweep).

With a typical bias drift of less than 1 m*g* without recalibration after 1000 hours at high temperature, AXO315T0 brings a digital and low-SWaP alternative to legacy quartz accelerometers, paving the way for a new generation of MWD tools able to operate for long periods at high temperatures with no compromise on performance.

AXO315T0 sensors and evaluation boards are available for sampling and customer evaluations. TDK will further expand its MEMS portfolio for the energy market with a new accelerometer withstanding operating temperatures up to +175 °C.

Glossary

- *g*: Standard gravity (9.806 m/s²)

Main applications

- Measurement while drilling (MWD)
- Logging While drilling (LWD)
- Directional drilling
- Wireline

Main features and benefits

- ±14 *g* input range single-axis accelerometer
- Temperature range: -30 °C to +150 °C
- Bias residual error: 0.8 m*g*
- Powered lifetime: >1000 hours @ 150°C
- Vibration rejection: 20 µ*g*/*g*²
- Noise density: 10 µ*g*/√Hz

About TDK Corporation

TDK Corporation is a world leader in electronic solutions for the smart society based in Tokyo, Japan. Built on a foundation of material sciences mastery, TDK welcomes societal transformation by resolutely remaining at the forefront of technological evolution. It was established in 1935 to commercialize ferrite, a key material in electronic and magnetic products. TDK's comprehensive, innovation-driven portfolio features passive components such as ceramic, aluminum electrolytic and film capacitors, as well as magnetics, high-frequency, and piezo and protection devices. The product spectrum also includes sensors and sensor systems such as temperature and pressure, magnetic, and MEMS sensors. In addition, TDK provides power supplies and energy devices, magnetic heads, software and more. These products are marketed under the product brands TDK, EPCOS, InvenSense, Micronas, Tronics, and TDK-Lambda. TDK focuses on demanding markets in automotive, industrial and consumer electronics, and information and communication technology. The company has a network of design and manufacturing locations and sales offices in Asia, Europe, and in North and South America. In fiscal 2025, TDK posted total sales of USD 14.4 billion and employed about 10,5000 people worldwide.

About Tronics Microsystems

Tronics Microsystems, a TDK Group Company, is a provider of MEMS (Micro-Electro-Mechanical-System) inertial sensors solutions for precise motion sensing, positioning, navigation, and condition monitoring of critical assets. The company offers a comprehensive range of accelerometers, gyroscopes, vibration sensors, and inertial MEMS foundry services, contributing to the digital transformation of transportation, energy, and industrial markets. Founded in 1997, Tronics employs around 100 people in Crolles, near Grenoble (France), where it operates its EN 9100-certified MEMS wafer fab, assembly, packaging, and test facilities. Tronics is majority-owned by TDK Electronics AG since January 2017.

You can download this text and associated images from www.tdk-electronics.tdk.com/en/250625
Further information on the products can be found at www.tronics.tdk.com/inertial-sensors/axo315t

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