

## MEMS Sensors

### **New TDK 9-axis PositionSense™ solution helps ensure consumer tech users are ‘never lost’**

- PositionSense™ is a 2-chip 9-axis sensor solution for absolute orientation detection and fast sensor calibration at ultra-low power consumption
- Integrates TDK's 6-axis IMU and TDK's 3-axis TMR-based magnetometer, on-chip sensor fusion software, and off-chip pedestrian dead reckoning (PDR) software
- Enables next-gen positioning accuracy for wearables, AR glasses, smartphones, and similar devices

January 7, 2025

TDK Corporation (TSE:6762) announces the InvenSense PositionSense™ – a new 2-chip 9-axis sensor solution enabling next-gen positioning accuracy for navigation, wearable, mobile, and AR/VR devices. As the newest TDK sensor solution for precise orientation and relative position detection, PositionSense integrates TDK's lowest-power 6-axis IMU and TMR-based 3-axis magnetometer with on-chip sensor fusion software and calibration software to enable fast and accurate orientation tracking. PositionSense integrates seamlessly with TDK's industry-leading PDR software for accuracy and power consumption, enabling applications such as geofencing and GNSS duty cycling. Samples are available via direct inquiry with InvenSense sales.

"When your device is built using PositionSense, its users are always on track and never lost," said Joseph Bousaba, CEO of InvenSense, a TDK group company. "When people step out of a subway and ask their watch or phone for directions, they expect to be sent in the proper direction instantly and without delay; the PositionSense sensor solution ensures that happens."

The speed and precision of PositionSense's absolute orientation detection comes from the integration of its components:

- TDK 6-axis SmartMotion® IMU, the lowest-power IMU with high-performance MEMS technology and vibration-resistant gyroscope
- TDK 3-axis magnetometer, the lowest-power magnetometer with high-sensitivity and accuracy, along with magnetic field shock resistance
- TDK on-chip sensor fusion software, enabling fast and accurate 9-axis sensor calibration
- TDK off-chip PDR software, with support for a variety of devices, platforms, and human motions

"The new TDK 9-axis solution provides a best-in-class, fully synchronized IMU and compass solution capable of high accuracy, ultra-low power, and strong magnetic shock resilience, making it ideal for navigation applications," said Jordi Munoz, CEO of mRobotics.

TDK will provide a demonstration of PositionSense during CES 2025 at booth #15815 in Las Vegas, January 7-10. Samples of the PositionSense solution may be requested through InvenSense sales at <https://invensense.tdk.com/positionsense> or by email to [inv.sales.us@tdk.com](mailto:inv.sales.us@tdk.com).

-----

## Glossary

- 6-axis: 3-axis gyroscope + 3-axis accelerometer
- IMU: Inertial measurement unit
- MEMS: Micro-electro-mechanical systems
- TMR: Tunnel-magneto resistance
- PDR: Pedestrian Dead Reckoning

## Main applications\*

TDK PositionSense addresses a wide range of consumer product applications, including but not limited to:

- Smartphones
- Wearables
- Hearables/TWS Earbuds
- AR/VR
- Drones
- Robotics

## Main features and benefits\*\*

- Absolute orientation detection for accurate heading and navigation
- Fast and accurate sensor calibration for magnetic shock resistance
- Ultra-low power consumption for always-on sensing
- PDR software with industry-leading accuracy and power consumption
- Easy-to-integrate turnkey solution for reduced cost/time to market

## Features and benefits by component

### TMR Technology

- High sensitivity
- High accuracy
- Lowest-power magnetometer
- Magnetic field shock-resistance
- Low noise
- Wide range

### IMU Technology

- Lowest power IMU technology
- High-performance MEMS technology
- Industry-first vibration-resistant gyro with BalancedGyro technology
- Low noise accelerometer

## Software

- On-chip sensor fusion and precise time synchronization, for immediate processing of sensor data at exact moment of motion
- Fast and accurate gyro and mag cross-calibration
- Automatic magnetic shock recovery
- PDR application-level software for a variety of operating systems and platforms

Solution Part Number	Description	Part Number Breakdown	HW Features	SW Features (IMU)
ICM-45989-S8	9-axis PositionSense™ for Wearables	ICM-45689 + ICT-15318	±32g, ±4000 dps, Premium spec, 1.8V VDDIO	9-axis sensor fusion; hard iron, soft iron correction; machine learning, tap, bring to see, AID
ICM-45989-S2	9-axis PositionSense™ for Wearables	ICM-45689 + ICT-15312	±32g, ±4000 dps, Premium spec, 1.2V VDDIO	
ICM-45908-S8	9-axis PositionSense™ for IoT	ICM-45608 + ICT-15318	±16g, ±2000 dps, 1.8V VDDIO	9-axis sensor fusion, hard iron/soft iron correction, machine learning, tap/double tap
ICM-45908-S2	9-axis PositionSense™ for IoT	ICM-45608 + ICT-15312	±16g, ±2000 dps, 1.2V VDDIO	

### 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 and deliberately “Attracting Tomorrow.” 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 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 2024, TDK posted total sales of USD 14.6 billion and employed about 101,000 people worldwide.

### About InvenSense

InvenSense, a TDK group company, is a world-leading provider of sensor solutions, including MEMS and magnetic sensors for consumer, industrial, and automotive applications. InvenSense is dedicated to enabling partner success and enhancing lives through sustainable sensor innovation. InvenSense MEMS sensors are known to be best-in-class for reasons that include high performance and reliability, high-volume manufacturing capacity and supply stability, ongoing hardware and software innovation, and ultra-low power consumption. They can be found in Mobile, Wearable, Smart Home, Industrial, Automotive, IoT, and Robotics products, among others. Founded in 2003, InvenSense has a 20+ year history of patented sensor technology across Motion, Sound, and Ultrasonic solutions, including the invention of the 6-axis IMU. In 2017, InvenSense became part of TDK Corporation, based in Tokyo, Japan. InvenSense is headquartered in San Jose, California and has offices worldwide.

-----

You can download this text and associated images from <https://invensense.tdk.com/news-media/new-tdk-9-axis-position-sense-solution-helps-ensure-consumer-tech-users-are-never-lost>

Further information on the products can be found under [www.invensense.tdk.com/positionsense](http://www.invensense.tdk.com/positionsense).

-----

**Contacts for regional media**

Region	Contact		Phone	Mail
Global	Dawn MORTENSEN	InvenSense San Jose, CA, USA	+1 408-501-2368	<a href="mailto:Dawn.Mortensen@tdk.com">Dawn.Mortensen@tdk.com</a>
North America	Sarah MACKENZIE	Publitek Portland, OR	+1 503-720-3743	<a href="mailto:TDK-global@publitek.com">TDK-global@publitek.com</a>