

MEMS Sensors

TDK announces MEMS sensor innovations at CES with two IMUs for consumer and industrial applications

- New InvenSense SmartMotion® IMU offers design flexibility along with high performance for IoT applications
- ICM-42370-P is a high-performance 3-axis accelerometer that is pin compatible with 6-axis IMUs
- Full-scale production of the InvenSense SmartIndustrial™ IMU offers increased accuracy for drones and navigation
- IIM-42653 is a robust, low-noise, low-power 6-axis IMU capable of 4000 dps for gyroscope and 32g for accelerometer

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TDK Corporation (TSE:6762) today announced the availability of two high performance InvenSense motion sensors; the company is showcasing these MEMS sensor innovations in demonstrations at the TDK Consumer Electronics Show (CES) booth #20521 in the Central Hall. The new InvenSense SmartMotion ICM-42370-P is a premium 3-axis accelerometer for consumer applications that require low noise and high sensitivity. The InvenSense SmartIndustrial IIM-42653, a high-FSR 6-axis IMU for industrial applications, is now available in full-scale production.

Ideal for IoT applications, the new SmartMotion ICM-42370-P accelerometer offers industry-leading low noise performance and up to $\pm 16g$ of measurement range. It features 16-bit ADC for high accel sensitivity and supports a wide range of on-chip motion event/activity detection based on interrupt or register access, without additional user programming. These features make it ideal for use cases such as home/industrial appliances, security cameras, and consumer or medical wearables. The new IMU will be available at distributors by February 1, 2024.

"Next-generation wearables and IoT applications require an accelerometer that offers both low noise and high sensitivity. Today we added a new 3-axis accelerometer to our SmartMotion product portfolio to meet that demand," said Song Li, Director of Product Marketing at InvenSense, a TDK Group company. "Its footprint is compatible with our 6-axis IMU, which enables easy transition between a 3-axis and 6-axis solution in customer applications."

Also announced today is a full-scale production of the SmartIndustrial IIM-42653, a 6-axis IMU (3-axis gyroscope + 3-axis accelerometer) that can achieve a gyro-programmable digital output of ± 4000 dps and an accelerometer-programmable output of $\pm 32g$, while achieving an ultra-low gyro noise. These technical features make the IIM-42653 ideal for applications that need robust, fast, and accurate performance, such as industrial or high-end grade AGV, AMR, and drones.

"We introduced the IIM-42653 early in 2023 to select customers with positive customer feedback. Now it's in full production and available to all customers through our distribution channels," said Camilo Delgado, Senior Director of Product Marketing at InvenSense, a TDK Group company.

SmartMotion and SmartIndustrial technology will be demonstrated at the TDK booth at CES from January 9-12, 2024, in Las Vegas. You can find us in the CES Central Hall (LVCC) at TDK booth #20521.

The SmartMotion ICM-42370-P will be available on February 1, 2024 from distributors and via our website at invensense.tdk.com/smartmotion. The SmartIndustrial IIM-42653 is now available across distribution channels, with more information at invensense.tdk.com/smartindustrial or via InvenSense Sales at sales.us@tdk.com. For more information on both IMUs announced today, see the applications, features, and benefits listed below.

SmartMotion IMU

Main applications

- Home/industrial Applications
- Security Cameras/dash Cams
- Consumer and Medical Wearables (IoT)

Main features and benefits

- 3-axis accelerometer with wide full-scale range up to $\pm 16g$
- Industry's leading low noise performance of $100 \mu g/\sqrt{Hz}$ under Low Noise (LN) mode
- 16-bit ADC for and up to 2.25kB FIFO for efficient high resolution sensor data output
- On-chip motion functions for easy motive detection: pedometer, tilt detection, low-g detection, freefall detection, wake on motion, significant motion detection
- Supports latest host interface including 12.5 MHz I3CSM, 1 MHz I2C, 24 MHz SPI
- Drop-in to 6-axis footprint for easy transition between 3-axis and 6-axis based on application requirements
- Thin package: 2.5 x 3.0 x 0.76 mm (14-pin LGA)

SmartIndustrial IMU

Main applications

- Drones
- Navigation Modules
- AGV and AMR Systems

Main features and benefits

- Precise measurements enabled by highly accurate and ultra-low noise sensors
- Support for extended temperature range (-40 °C to 105 °C)
- ± 4000 dps and $\pm 32g$, gyro and accelerometer outputs enables fast and accurate motion sensing
- Support for highly accurate external clock input that helps reduce system level sensitivity error, improve orientation measurement from gyroscope data, and reduce ODR sensitivity to temperature and device-to-device variation
- A comprehensive development and evaluation platform along with necessary software to enable quick-to-market development of customer systems
- Available in a small 2.5x3.0x0.91mm 14-pin LGA package

Glossary

- FSR: Full scale range
- ADC: Analog-to-digital converter
- IoT: Internet of Things
- AGV: Automated guided vehicle
- AMR: Autonomous mobile robot

Key data

Product	Dimensions [mm]	# of Axes	Full-scale Range	Digital interface	Operating Temperature Range
ICM-42370-P	2.5 x 3.0 x 0.76	3	±2g/4g/8g/16g	I3C/I ² C/SPI	-40°C to 85 °C
IIM-42653	2.5 x 3.0 x 0.91	6	Up to ±32g accel; ±4000 dps gyro	I3C/I ² C/SPI	-40°C to 105 °C

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 2023, TDK posted total sales of USD 16.1 billion and employed about 103,000 people worldwide.

About InvenSense

InvenSense, a TDK Group company, is a world-leading provider of Sensing Solutions. InvenSense’s vision of Sensing Everything® targets the consumer electronics and industrial areas with integrated Motion, Sound, Pressure, and Ultrasonic solutions. InvenSense’s solutions combine MEMS (micro electrical mechanical systems) sensors, such as accelerometers, gyroscopes, compasses, microphones, barometric pressure sensors, and ultrasonic time-of-flight sensors with proprietary algorithms and firmware that intelligently process, synthesize, and calibrate the output of sensors, maximizing performance and accuracy. InvenSense’s motion tracking, ultrasonic, audio, fingerprint, location platforms and services can be found in Mobile, Wearables, Smart Home, Industrial, Automotive, IoT, Robotics, and many more types of products. InvenSense became part of the MEMS Sensors Business Group within the Sensor Systems Business Company of TDK Corporation in 2017. In April of 2022, Chirp Microsystems formally merged with InvenSense. 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/tdk-announces-mems-sensor-innovations-at-ces-with-two-imus-for-consumer-and-industrial-applications>.

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