

Artificial Intelligence

TDK announces launch of TDK SensEI's edgeRX Vision for detecting ultra-small customer product defects with AI

- TDK has unveiled the latest TDK SensEI product line, edgeRX Vision, an ultra-fast, AI-powered defect detection system that analyzes customer product images or movies and is capable of identifying components as small as 1 mm with exceptional precision.
- The system boosts production efficiency by reducing false positives and minimizing downtime, operating at speeds of up to 2,000 parts per minute.

July 15, 2025

TDK Corporation (TSE: 6762) unveiled today the latest TDK SensEI product line, edgeRX Vision.

edgeRX Vision is a high-speed defect detection system that analyzes customer product images or movies and is capable of identifying even the smallest components—down to 1 mm by 0.5 mm—with exceptional precision.

Powered by advanced AI, the system delivers real-time, highly accurate defect detection while significantly reducing false positives. Working in conjunction with TDK SensEI's edgeRX platform and sensors, edgeRX Vision enhances existing hardware infrastructure to minimize unnecessary machine stoppages and ensure a smoother, more efficient production flow. Operating at speeds of up to 2,000 parts per minute, even slight reductions in downtime can lead to substantial revenue gains—making edgeRX Vision an essential solution for high-throughput manufacturing environments.

Key features of edgeRX Vision include:

- High-precision product defect detection
- Adaptive learning and continuous improvement
- Reduced false positives and negatives
- Scalability across product lines

AI-based machine vision has evolved into a highly advanced and reliable technology, widely adopted across industries for its speed, precision, and adaptability. Modern systems leverage edge AI to process visual data in real time, reducing latency and dependence on cloud infrastructure. Transformer-based architectures and unified models like DINOv2 and SAM enable a wide range of vision tasks—such as detection, segmentation, and classification—without the need for task-specific retraining. These systems are also becoming more label-efficient through self-supervised and few-shot learning, lowering the cost of data preparation. Integration with language models has introduced multi-modal capabilities, allowing for more intuitive human-machine interaction. With these enhancements and new capabilities transforming the industry, now is a pivotal moment for TDK SensEI to introduce edgeRX Vision to the marketplace. AI-driven vision systems have become more scalable, robust, and cost-effective than ever before, making them essential for high-throughput, real-world production environments.

“edgeRX Vision will further enhance our existing automatic optical inspection (AOI) capabilities with high-velocity, AI-powered defect detection—right at the edge,” said Ken Takekawa, CEO of TDK Components USA. It's capable of handling even the smallest MLCCs, measuring down to 1 mm by 0.5 mm, with exceptional precision. By deploying AI on our existing hardware, we significantly reduced the total cost of ownership by minimizing false positives. This improvement will lead to fewer machine stoppages due to inspection overkill and result in much higher production throughput. At speeds of up to 2,000 parts per minute, even small-time savings translate into substantial revenue gains.”

“The launch of edgeRX Vision marks a significant milestone in our mission to bring intelligent automation to the factory floor,” said Sandeep Pandya, CEO of TDK SenseI. “By harnessing the power of AI, edgeRX Vision delivers precise, real-time defect detection that enhances operational efficiency and product quality. Working seamlessly with our edgeRX sensors, this solution extends the capabilities of the edgeRX platform, offering manufacturers a smarter, more integrated approach to high-speed production challenges.”

Glossary

- **Edge AI:** The deployment of artificial intelligence models directly on local hardware (edge devices), allowing real-time data processing without needing to send data to the cloud
- **Transformer-Based Architectures:** A class of deep learning models (e.g., Vision Transformers or ViTs) that process visual data using attention mechanisms, offering improved performance over traditional convolutional neural networks (CNNs)
- **Unified Vision Models:** AI models like DINOv2 and Segment Anything Model (SAM) that can perform multiple vision tasks (e.g., detection, segmentation, classification) without needing separate models for each task
- **Few-Shot Learning:** The ability of a model to learn new tasks or recognize new patterns from a very small number of examples
- **Multi-Modal AI:** Systems that combine different types of data—such as images and text—to perform tasks like visual question answering or image captioning. Examples include models like CLIP and BLIP-2
- **False Positives/Negatives:** In defect detection, a false positive is when a good part is incorrectly flagged as defective, while a false negative is when a defective part is missed
- **AOI:** Automatic Optical Inspection

Main applications

- Electronics manufacturing
- Pharmaceuticals
- Food and beverage

Main features and benefits

- **Improved Product Quality:** ensuring consistent detection of defects, leading to higher-quality output
- **Reduced False Positives:** Minimizes unnecessary rejections, keeping production lines running smoothly
- **Increased Throughput:** Enables faster inspection without compromising accuracy, boosting production efficiency
- **Lower Operational Costs:** Reduces labor costs and waste by automating inspection and minimizing rework

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 North and South America. In fiscal 2025, TDK posted total sales of USD 14.4 billion and employed about 105,000 people worldwide.

About TDK SenseI

TDK SenseI (***Sensor Edge Intelligence***) focuses on developing smart platform solutions that integrate TDK's advanced sensor systems, sophisticated software design, and machine learning expertise. These platforms bring together our hardware components—ranging from motion, magnetic, microphone, and current sensors to temperature and battery/energy harvesting solutions—with our software and edge AI technologies. The result is a powerful fusion of hardware and intelligence that creates actionable insights, enabling predictive maintenance and performance optimization.

You can download this text and associated images from: <https://sensei.tdk.com/edgerx-vision-press-release/>

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