

Use Case

kontron
The Power of IoT

Predictive Maintenance with Edge AI High-Performance Systems for AI-Based Condition Monitoring in Industrial Production



**Real-Time
Responses to
Critical Events**

**Lower Latency
than Cloud-
Based Solutions**

**Reduced
Network Load
through Local
Data Processing**

**Greater Data
Security and
System
Availability**

Predictive Maintenance with Edge AI

High-Performance Systems for AI-Based Condition Monitoring in Industrial Production

Modern production environments generate enormous amounts of data. Sensors in machines and systems continuously record operating parameters such as temperature, vibration, pressure, and energy consumption. This data forms the basis for new industrial applications—particularly predictive maintenance.

By the use of Artificial Intelligence, machine conditions can be analyzed in real time and potential failures detected at an early stage. Instead of planning maintenance intervals solely based on time, predictive maintenance enables condition-based maintenance. This allows companies to reduce unplanned downtime, optimize maintenance costs, and significantly increase the availability of their equipment.

Edge computing plays a central role in this process: Data is analyzed directly in the production environment—close to machines and sensors—without having to go via remote cloud systems. This allows large amounts of data to be evaluated more quickly and decisions to be made in real time.

Real-Time Data Analysis

Predictive maintenance is based on the continuous analysis of large streams of sensor data. Advanced machine learning algorithms identify patterns that may indicate wear, malfunctions, or impending failures.

Typical data sources include:

- › Vibration sensors
- › Temperature and pressure sensors
- › Motor and energy consumption data
- › Production and process data

By combining this information, AI models can accurately assess the condition of machines and predict maintenance needs early on.

However, as production facilities become increasingly digitized, the volume of data to be processed also grows. As a result, edge computing is becoming increasingly important: data is processed, analyzed, and filtered locally before being transmitted to central systems or cloud platforms.

Powerful edge servers make it possible to analyze data directly in the production environment and gain valuable insights in real time.

Edge Performance for AI-Based Production Optimization

With robust, industrial-grade computer systems, Kontron offers high-performance platforms for edge computing and AI applications in industrial environments.

Key Applications

Typical Edge AI Applications in Manufacturing:

- › Continuous condition monitoring of machines and equipment
- › Real-time analysis of sensor data directly on the production line
- › AI-based detection of anomalies and deviations
- › Prediction of wear and maintenance needs
- › Integration of production, IoT, and machine data
- › Optimization of maintenance and service processes

Equipped with the latest generation of Intel® Core™ processors featuring up to 24 processor cores, these systems enable fast processing of large data sets and complex analytical models. This makes them ideal for applications such as predictive maintenance, industrial data analysis, or AI-based production optimization.

The rugged industrial design ensures reliable operation even in demanding environments. At the same time, the modular system design allows for flexible adaptation to different application requirements – for example, through the addition of GPUs, storage media, or network interfaces.

High Demands on Edge Platforms

Typical requirements include:

- › High computing power for AI algorithms
- › Parallel processing of large sensor data streams
- › GPU support for machine learning
- › Reliable 24/7 operation
- › Flexible scalability for new applications
- › Industrial robustness and long-term availability

Predictive Maintenance with Edge AI



High-Performance Systems for AI-Based Condition Monitoring in Industrial Production

› High computing power with latest generation Intel® Core™ processors

enables computationally intensive real-time processes and the processing of large volumes of data, as well as complex analytical models for AI-based production optimization

› Use of high-performance GPUs (e.g., NVIDIA)

for accelerated inference processes and real-time analysis

› Reliable 24/7 operation under demanding conditions

ensuring high availability of machines and systems and uninterrupted production

› Long-term product availability of up to 10 years

provides planning certainty for machines and equipment with long service life and approval cycles

› Modular expandability and flexible design

support integration into existing IT structures and allow adaptation to new technologies

› Made in Europe – Short response times and close collaboration with regional partners

simplify support and ensure stable supply chains

› Flexible installation: 1U / 2U / 4U rackmount, or Box PC for wall mounting, DIN Rail, and installation in control cabinets, etc.

facilitates integration into industrial IoT environments and existing infrastructures

› Efficient, maintenance-free, and low-noise cooling

ensures a long service life with low power consumption

› RAID support and hot-swap storage options

enhance data security and enable uninterrupted operation

› Tool-free replacement of fans, filters, and drives

reduces maintenance effort and minimizes downtime

Experienced Partner

Kontron has many years of experience in developing high-performance computer systems for industrial applications. The company's rackmount servers, Box PCs, and embedded solutions are used worldwide in numerous Industry 4.0 and edge computing applications.

With application-ready platforms and comprehensive engineering services, Kontron supports OEMs and system integrators in developing high-performance, future-proof edge AI solutions.



Predictive Maintenance with Edge AI

Products

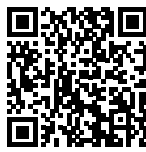
KBox B-203/204-RPL

Compact Industrial PC with the latest generation of Intel® processors and a wide range of expansion options.



KBox B-301-RPL

High-performance industrial PC with the latest generation of Intel® processors for AI applications.



KISS Rackmount Systems

Industrial-grade rackmount systems with the latest generation of Intel® processors for demanding and noise-sensitive environments.



About Kontron

Kontron AG (www.kontron.com, ISIN AT0000A0E9W5, WKN A0X9EJ, KTN) is a leading IoT technology company. For more than 20 years, Kontron has been supporting companies from a wide range of industries to achieve their business goals with intelligent solutions. From automated industrial operations, smarter and safer transport to advanced communications, connectivity, medical, and energy solutions, the company delivers technologies that add value for its customers.

Kontron has around 7,000 employees in over 20 countries worldwide and is listed on the SDAX® and TecDAX® of the German Stock Exchange.

Global Headquarters

Kontron Europe GmbH

Gutenbergstraße 2
85737 Ismaning, Germany
Tel.: + 49 821 4086-0
Fax: + 49 821 4086-111
info@kontron.com

Learn more
[AI at the Edge | Kontron](#)



© Copyright 2026 Kontron. All rights reserved.

All data is for information purposes only and not guaranteed for legal purposes. Information has been carefully checked and is believed to be accurate; however, no responsibility is assumed for inaccuracies. Kontron and the Kontron logo and all other trademarks or registered trademarks are the property of their respective owners and are recognized. Specifications are subject to change without notice.



kontron
The Power of IoT