BOXKIT-PHM

Predictive Maintenance DemoBox

Features

- Closely aligned with industrial application scenarios and project cases, highly practical
- Capable of configuring and simulating equipment failures to generate abnormal vibration signals
- Comprehensive application of EdgeAI knowledge and skills, covering data acquisition, wireless networking, gateway and edge computing, and agent development
- Compact structure for easy deployment in classrooms, labs, and diverse settings

Overview

This training kit is designed based on an industry solution for predictive maintenance in smart factory equipment. It consists of a device fault simulation unit, wireless sensors, a gateway, and edge computing service software, enabling equipment health monitoring based on the ISO-10816 protocol. Suitable for teaching, research, and testing focused on predictive maintenance in smart manufacturing, automation, and artificial intelligence disciplines.

Solution Highlights

Industry-Aligned:

The solution architecture and training content are designed around typical smart manufacturing-equipment predictive maintenance scenarios, offering strong practicality and close alignment with industry demands.

Comprehensive and Advanced Functionality:

The product features rich functionality, incorporating advanced edge AI technology and industrial agent development techniques to meet diverse learning and practical needs.

Extensive Expansion Interfaces:

Equipped with communication and power expansion ports, it facilitates easy data acquisition from vibration sensors or simulation devices, supporting customized scenario training.

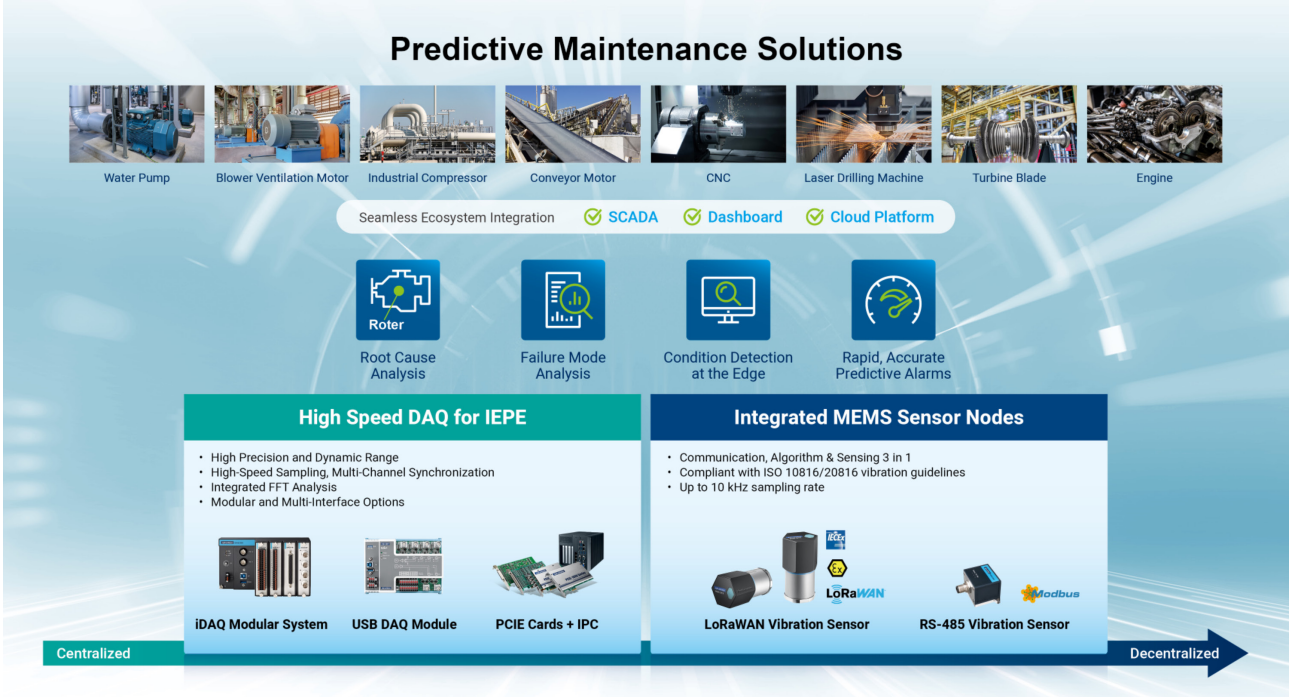
Multi-Platform Compatibility:

Supports both cloud-based learning via Advantech's Industrial Cloud Platform and optional agent development platform for hands-on industrial agent creation.

Portable and Compact Design:

Its compact and lightweight form factor makes it ideal for carrying to training labs, academic exchanges, and solution demonstrations, enabling learning and practice anytime, anywhere.

Technical Architecture



Practical Case

Practical Case 1 Using HVAC fan fault diagnosis in the semiconductor industry as an example, the training kit simulates excessive vibration values at the non-drive end of the P1 fan in the fresh air unit and the No. 6 fan motor in the process cooling tower. Combining an edge AI system enables fan fault diagnosis, while the Advantech Industrial Cloud Platform facilitates data visualization and alarm notifications.

Practical Case 2 Simulates a bearing inner ring failure in a dust removal fan at a blast furnace iron tapping area in the steel industry. This failure causes periodic impact characteristics in the fan's rotational frequency, as reflected in acceleration and envelope waveforms. The edge AI system diagnoses the fan fault and issues an immediate on-site inspection alert.

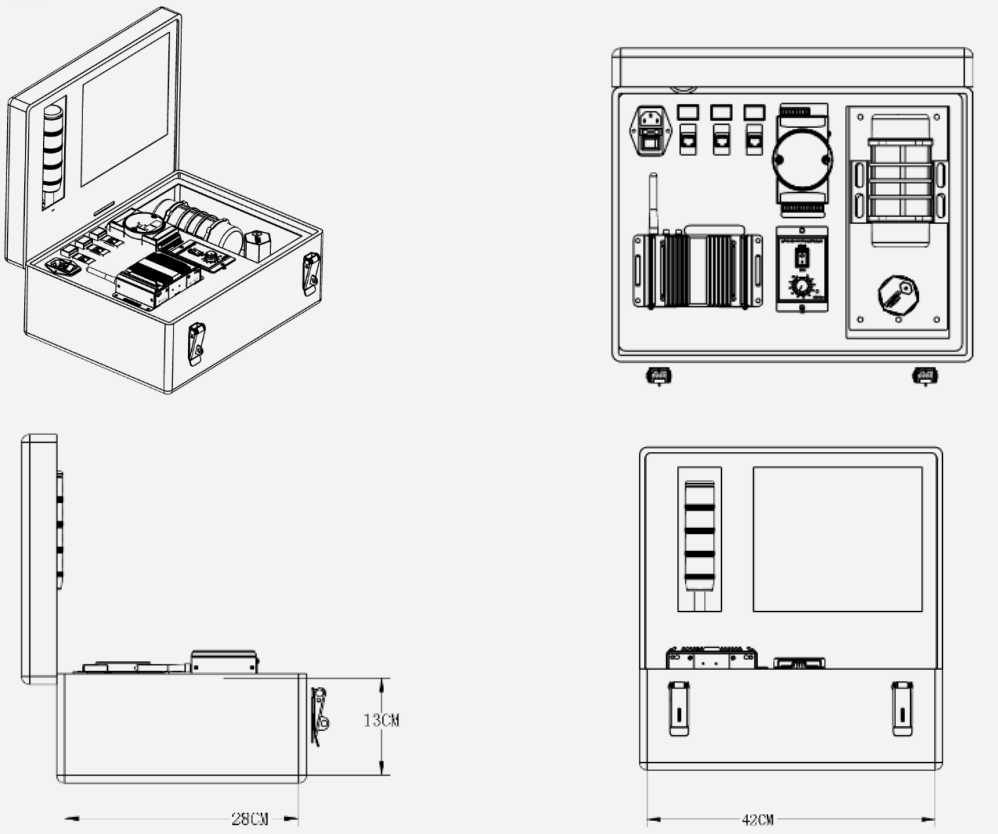
Module Functionality

No.	Name	Model and Function	No.	Name	Model and Function
01	Vibration Sensor	WISE-4012; Collects vibration signals	01	Control Module	ADAM-6050; Edge Control
02	Wireless Gateway	WISE-6610; Protocol Conversion	02	Speed Controller	Adjusts motor speed
03	Three-color indicator light	24V; three-color; displays health status	03	Motor	220V AC; Monitoring equipment
04	Buzzer and indicator light	24V; Audible Alarm	04	Edge Computing Software	IoT-Edge; Data Acquisition, Processing,and Visualization

Demobox integrates extensive hardware and software resources. For detailed functionality, refer to the specific user manual, including but not limited to:

- Power & Interfaces: Power socket, pass-through Ethernet port, terminal blocks
- Indicators and Display: LED indicators, tri-color indicator
- Control Components: Speed controller, data module
- Sensors: Vibration sensor
- Industrial Cloud Platform: IoT Edge (Required), IoT Suite (Optional), AI AgentBuilder (Optional)

Dimensions and Appearance



Hardware Module Functionality List

No.	Training Content
I	Vibration Sensor Installation and Configuration
2	LoRa Gateway Configuration and Wireless Networking
3	RTU Configuration and Communication Testing
4	Edge Computing Software Installation and Data Acquisition
5	ISO-10816 Vibration Monitoring Program Design
6	Monitoring Interface Dashboard Development and Design
7	Health Alarm and Interlock Setup and Testing
8	Data Upload to Cloud and Visual Monitoring on Cloud/Mobile Endpoints (Optional)
9	Industrial AI Agent Development (Optional)
10	Industrial AI Agent Device Diagnostic Application Testing and Optimization (Optional)

Ordering Information

Product	Specifications	Description
Industrial Intelligence (Predictive Maintenance) Training Kit	Standard Edition	Rapidly establish practical case studies for predictive maintenance scenarios in smart manufacturing equipment.
IoT Edge Device Networking and Edge Computing Services	Standard Edition	Deployable at the edge to collect device data locally, manage devices, and perform data analysis, processing, forwarding, and visualization.
IoT Suite (Optional) Advantech Industrial IoT Platform	Standard Edition	IoTSuite is a comprehensive industrial IoT platform delivering integrated cloud-edge-device practical experiences for teaching and training. By integrating core industrial IoT applications such as industrial process automation, energy monitoring, and workplace environment monitoring, the platform creates immersive learning environments for students.
AI Agent (Optional) Advantech AI Agent Development Platform	Standard Edition	Advantech's AgentBuilder platform delivers rich industrial agent use cases for teaching and training, covering scenarios like equipment maintenance, production management, environmental safety and health management, and supply chain optimization. By integrating Advantech's factory best practices, it empowers university teaching and training through scenario-based solutions. With zero-code or low-code configuration, it enables knowledge base Q&A, data analysis, and intelligent equipment control, significantly lowering the barrier to industrial agent development and supporting the cultivation of industrial AI talent in higher education.