Specialized Smart Factory Solution for Predictive Maintenance

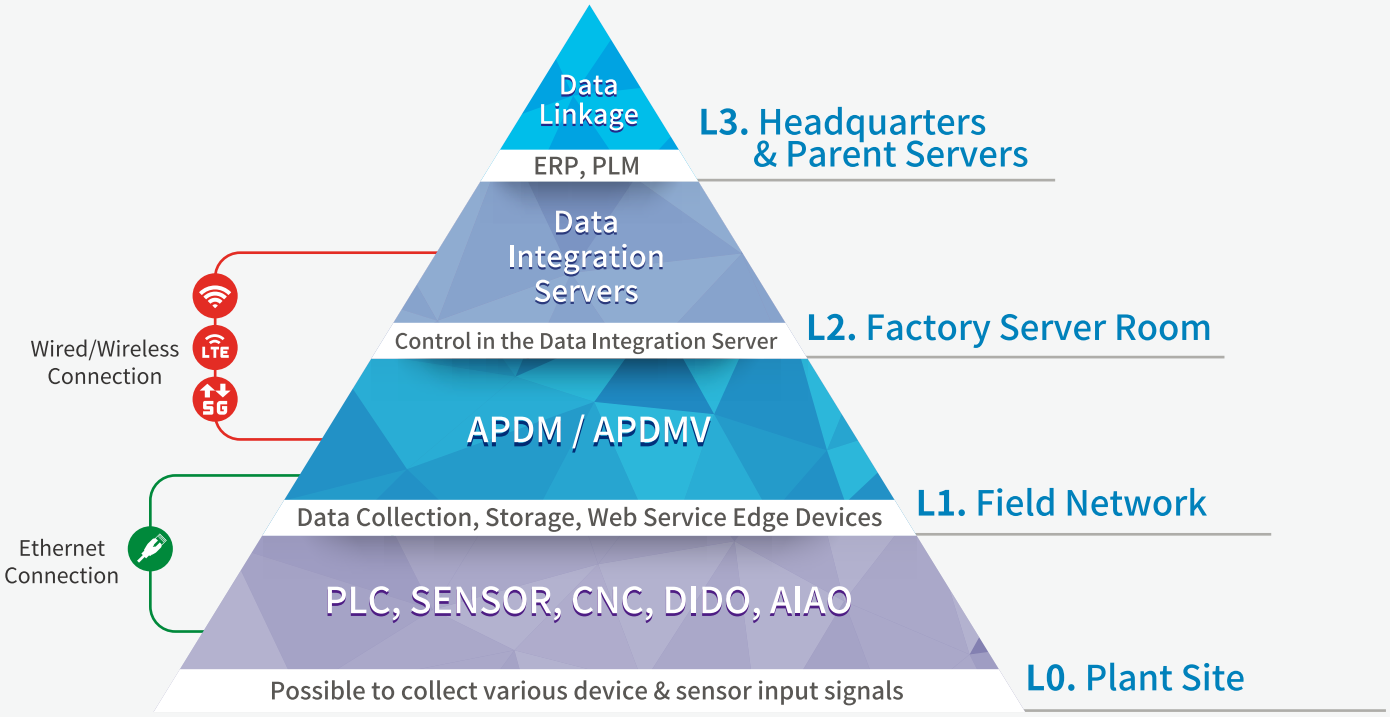
APDM | Active PreDictive Maintenance

AI using machine learning algorithms can be used to analyze system operation data (e.g. spindles, servo motors, tools, and electronic devices), and system failures can be proactively predicted to maximize the system life, product quality and utilization rate.

Remote Control → Statistics/ Analysis → Status Analysis → Heterogeneous Data Integration → Prediction of Failure, Quality

HARDWARE Configuration

APDM is a predictive system maintenance solution that is specialized for collecting and visualizing data on various systems connected by Ethernet.
It automatically collects various data on connected systems by using artificial intelligence (AI).



APDM Features

Easy Installation

Possible to check data immediately after installation

Easy Setup

Possible to check data without additional logic modification

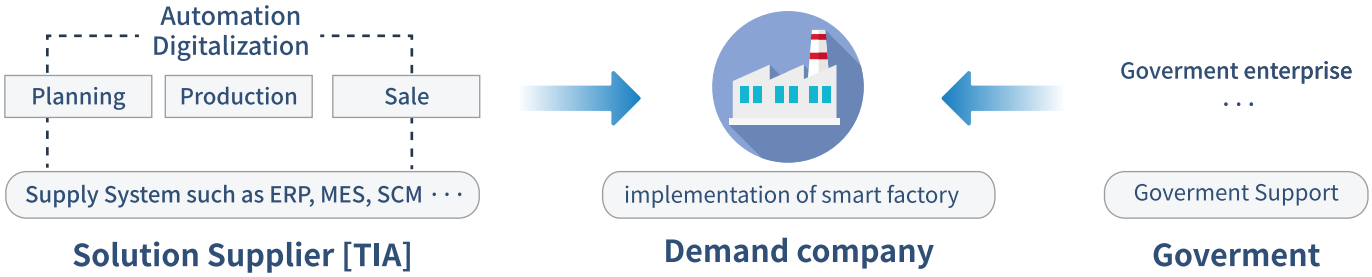
Pattern Analysis

Real-Time Diagnosis & Fault Prediction Possible to do maintenance planning

Logging system

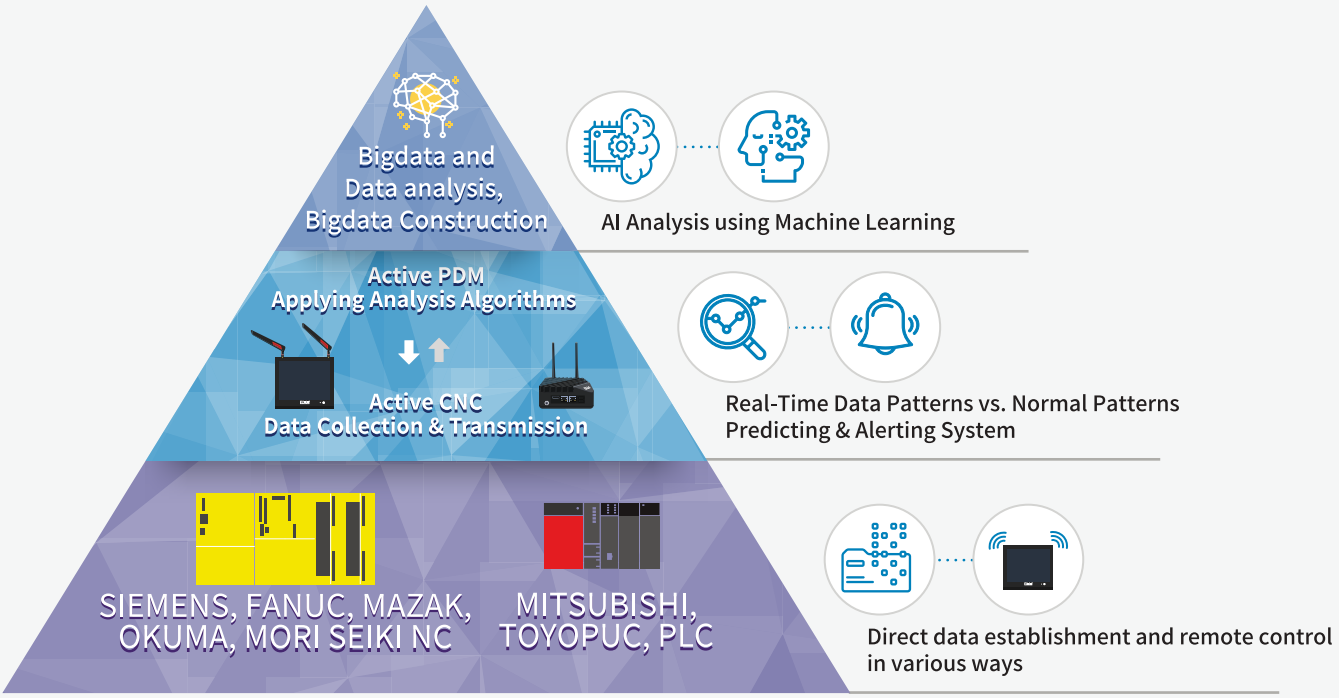
Prevention of Missing Critical Data Possible

Goverment Support Project



SOFTWARE Configuration

ActiveCNC collects data from various makers without expensive collection programs. It is possible to support OPC UA. ActivePDM uses AI to analyze and output data and automatically control the systems based on the results.



APDM License

The licenses for the APDM analysis software are divided into the following types. You can select a proper license and implement the corresponding system according to your environment.

Functions		BASIC	STANDARD	ENTERPRISE
Operation Data	spindle FEED, RPM	○	○	○
	axial loaad, RPM, FEED, coordinates	○	○	○
	tool num, fatal thread	○	○	○
	serial number			○
	G code		○	○
	part code			○
	spindle temp	○	○	○
	axial encoder temp	○	○	○
	status of fan, battery	○	○	○
	usage time	○	○	○
Status	status of machine, tool		○	○
	*fluctuation point mgmt			
Production	production performance		○	○
	capacity analysis			○
Analasys	predicting & alerting machine anomalies			○
	abnormal machine control			○
Quality	*SPC			
	*automatic measuring mahine			
Mobile	mobile application	○	○	○
Energy	*electric management			

* Items shown in blue are optional.

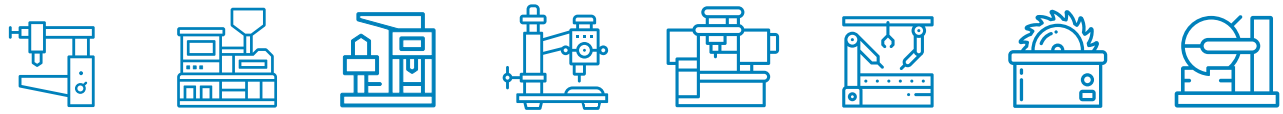
01 What is APDM(Active Predictive Maintenance)?

APDM hardware is a specialized data collection device with a 10.4-inch display.

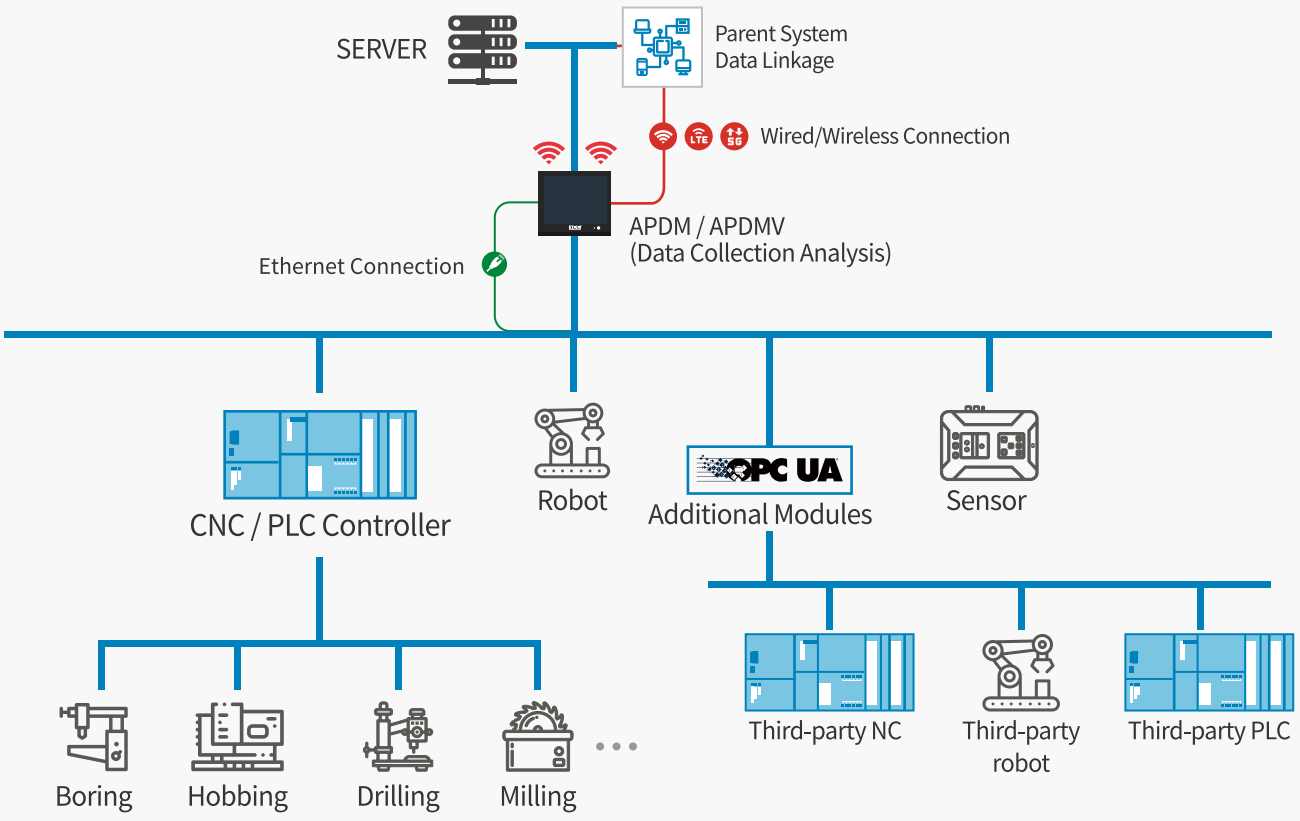
Facility Data Acquisition Unit

You can collect and analyze data immediately by APDM on your machine without any additional PLC logic modification. The analyzed data can be used to system failures by predicting the life of various major parts and tools required for the operation of the system as well as the production, status and alarm information of the system.

Applicable Facilities



Diagram



02 HARDWARE Specification

It is a 10.4-inch touch panel industrial device designed to be thin and light so that it can be easily attached to Machine.
I/F : mSATA, RS-232C, LAN, USB, Wi-Fi(12dBi Antenna)

MODEL	APDMV
System	**Processor** : Intel Dual-Core i5-4300U (3M Cache, 1.90 GHz, Haswell) | **Memory**: 8GB DDR3L **Graphic** : Onboard VGA(Intel HD Graphics) | **Storage** : SSD 128GB
I/O Interface	**Serial**: 1 x RS-232C / 422 / 485 (D-Sub 9-pin, plug) | **LAN** : 2 x RJ-45 10/100 Base-T | **COM Port** : 1 x COM **USB** : 2 x USB 3.0, 2 x USB 2.0 | **Video** : 1 x HDMI, 1 x VGA | **Audio**: 1 x Line-out, 1 x Mic-in
Wireless Network	**IEEE 802.11 b/g/n/ac, Range. radius 30m** | **External Antenna** : 2 x 12dbi
Power Requirement	**Power input** : DC 12V / 5A | **Consumtion** : 60W | **Adapter - Input** : 100 ~ 240 (50 / 60Hz) VAC **Adapter - Output** : DC 12V, 5A
Display	**Front** : IP65 aluminum front bezel | **Display** : 10.4inch LCD back light **Resolution** : 1024 x 768 | **Touch Screen** : 4-Wires Analog Resistive Touch
Operation	**Operating Temperature** : -0 ~ 60°C | **Operating Humidity** : 10 ~ 95%
Size	**Exterior** : Aluminium | **Mounting** : VESA-75/100 compatible | **Weight** : 1.33kg **Dimension**: W250 x H205 X D40mm (with bottom cover : W250 x H220 x D40mm)
OS Support	Windows 10 IoT Enterprise
Software	Active CNC, Active PDM

* Specifications are subject to change depending on options and policies.

MODEL	APDM-mini
System	**Processor** : SoC intergrated. Intel i3-7100U (3M Cache, 2.9 GHz) | **Memory** : 8GB DDR4L 2666MHz, SO-DIMM SD RAM | **Graphic** : Onboard VGA(Intel HD Graphics) | **Storage** : Transcend MTS400 128GB(M.2 Key B 2242)
I/O Interface	**Serial**: 1 x RS-232C / 422 / 485 (D-Sub 9-pin, plug) | **LAN** : 2 x RJ-45 10/100 Base-T **USB** : 2 x USB 3.0 | **SIM Card** : 1 x SIM card socket (internal) | **Display** : 1 x Display Port
Wireless Network	Intel AC9260 (IEEE 802.11 b/g/n/ac, Range. radius 30m)
Power Requirement	**Power input** : DC 12V / 5A | **Consumtion** : 60W | **Adapter Input** : 100 ~ 240 (50 / 60Hz) VAC **Adapter Output** : DC 12V, 3.0A
Operation	**Operating Temperature** : -20°C ~ 60°C | **Operating Humidity** : 10 ~ 95%
Size	**Exterior** : Aluminium | **Mounting** : VESA-75/100 | **Diemsion** : W130 x H130 X D51mm **Weight** : 1kg
OS Support	Windows 10 IoT Enterprise
Software	Active CNC, Active PDM

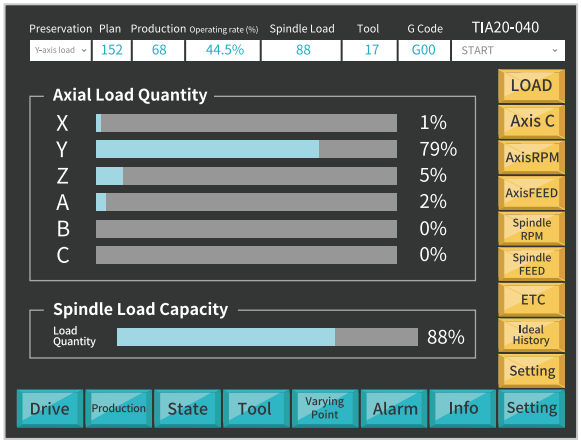
* Specifications are subject to change depending on options and policies.

03 SW Module Configuration

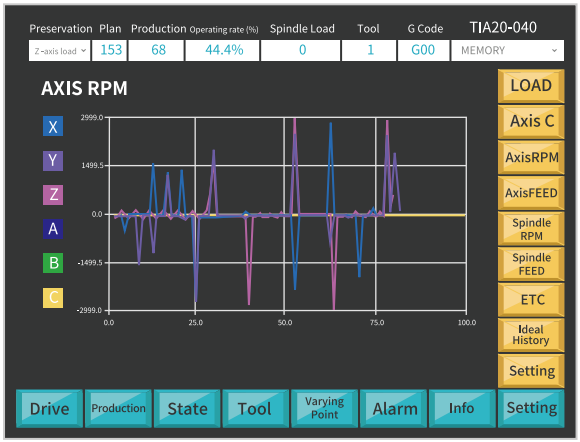
APDM's software consists of the following programs. The details of page configuration may vary depending on the license.

Monitoring

Provides real-time load, status and alarm data on spindles, axes, tools, etc

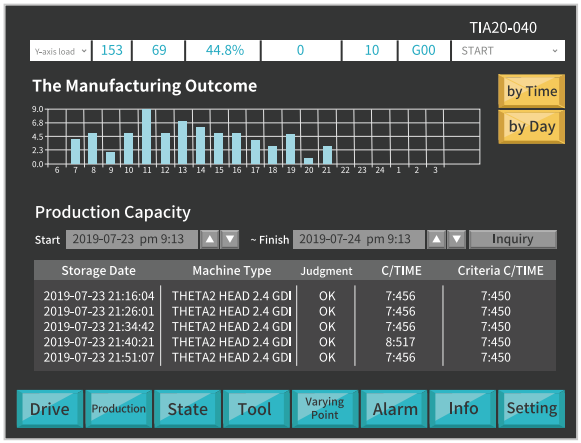


▲ Load on each axis and spindle

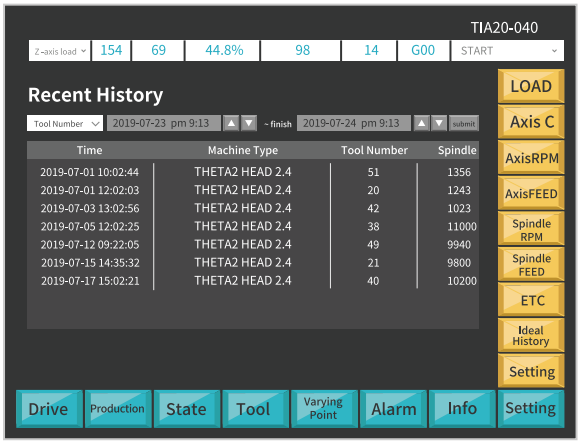


▲ The RPM FEED, and coordinates of each axis and spindle

Counting Results



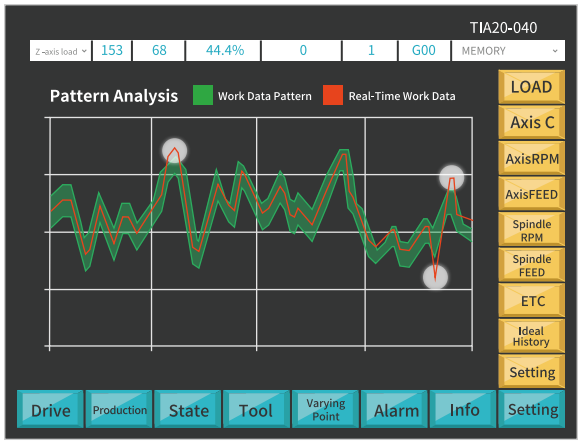
▲ System Production Counts



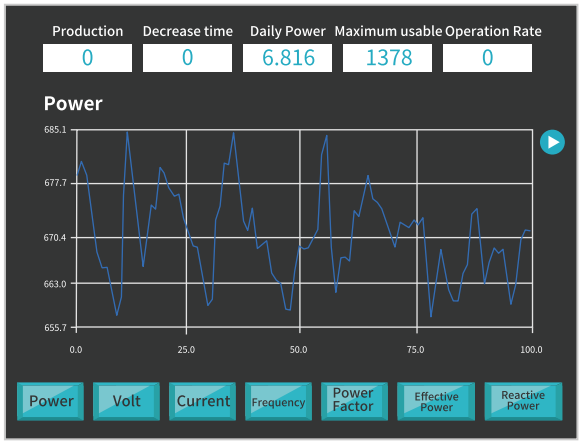
▲ Recent Abnormal History Counting

Predictive Diagnosis

Provides the pattern analysis results and energy consumption.



▲ Product processing predictions compared to learned processing patterns



▲ Power energy analysis according to the system operation

04 Proposal

APDM enables each system unit to be a smart machine. We propose the predictive diagnosis solution for reducing.

Adoption Effect

System Data Systematization
- Quality Data Management
- Machine Data Management

Failure Prediction
- Notification Based on Pre-set Predicted Interval Values

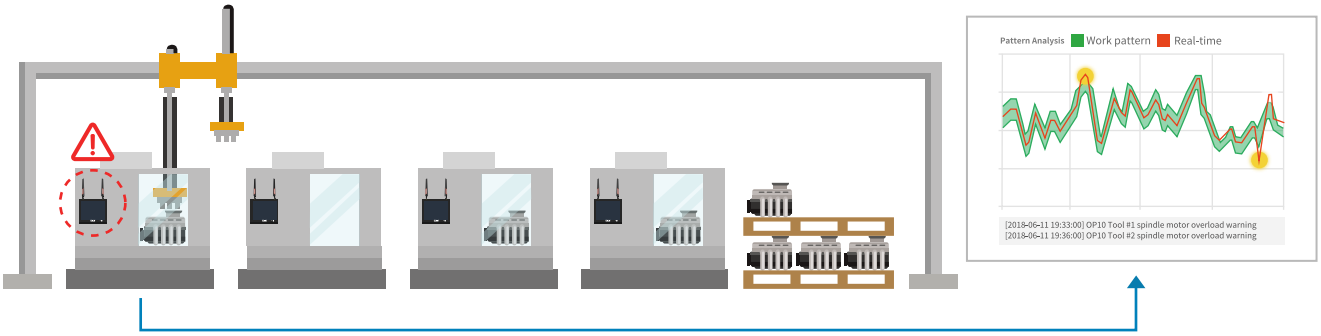
Quality Control
- Possible to analyze and predict mutual values / Optimal Process Environment

Process Environment
- System Failure Pattern Analysis Based on Big Data
- Optimization of Quality and System Numerical Values

- Possible to manage the system, processing quality and tool life with the systematic integrated prediction system.
- Possible to predict system failures and quality abnormalities in advance.
- Possible to minimize the time and cost burden caused by system failures, quality problems, and tool changes.

Productivity	Quality	Sales	Defect rate	Cost	Lead time
30% ▲	33% ▲	17% ▲	45% ▼	15% ▼	27% ▼

Future Development Direction [System Automation]



- If there is an abnormal pattern, the processed product is automatically is automatically ejected in conjunction with the gantry.
- Possible to inform the administrator of an abnormal pattern and to propose a proper correction value by making a comparative analysis of the learned processing pattern and real-time operation pattern.
- Possible to reduce the defective rate by applying the correction value after the administrator's approval.
- Possible to determine the actual tool life by big data analysis, not the set tool life value.

Please scan the QR code
to check the product catalog.