Reducing Processing/Manufacturing Costs and Improving Quality with AI Processing and Diagnosis Technologies

◆ Features

◆ Diagram

Reducing tool costs with appropriate tool change!

IoT diagnostic technology finds the appropriate life from the torque of the main and feed axes according to processing conditions and predicts tool wear. By using tools for the full duration of their service life, tool costs and tool change labor time are reduced.
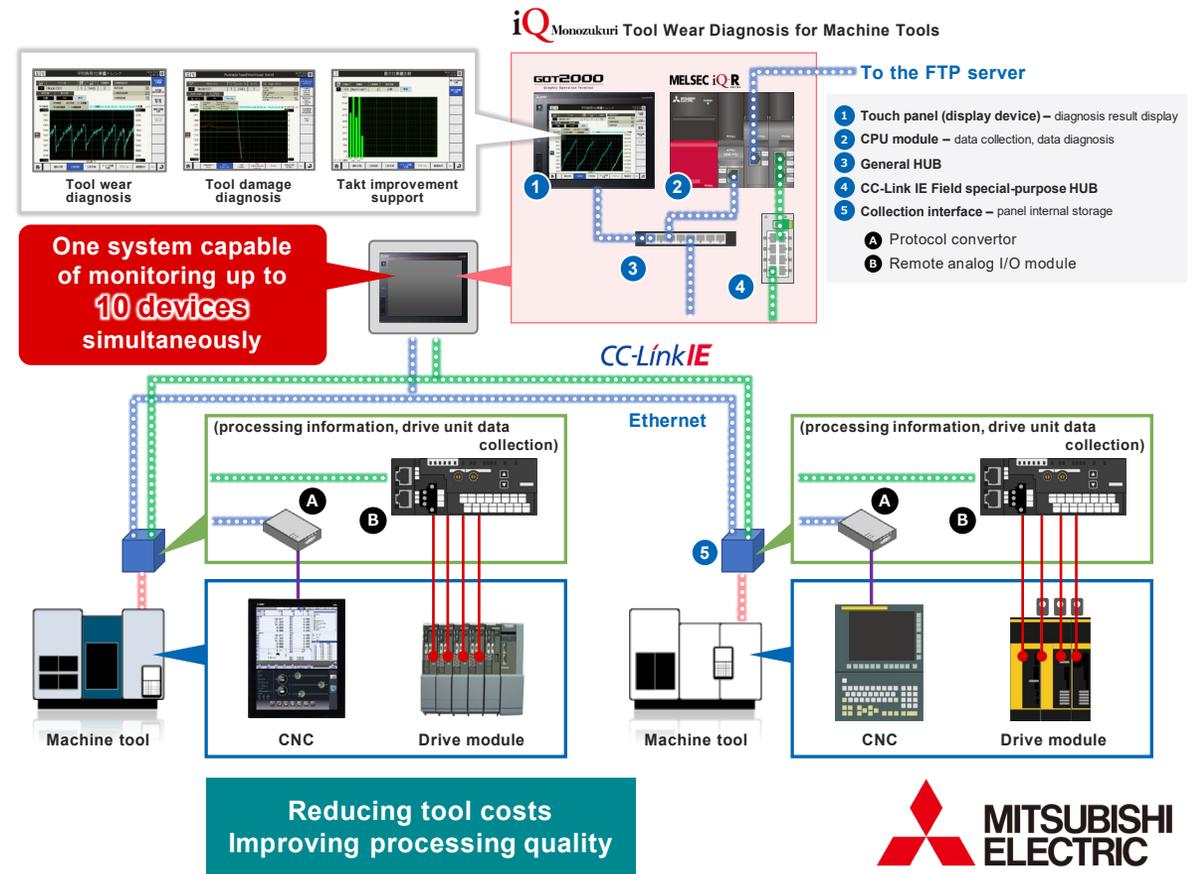
Automatic diagnosis of tool damage and automatic detection of processing defects!

Supports calculation of abnormal judgment thresholds from past good product processing data and air cut data. Prevents the outflow of defective products by detecting machining defects such as tool breakage and defects, material defects, and previous process defects.

Experience benefits with an evaluation support service!

Mitsubishi Electric's dedicated engineers provide support from installation of evaluation machines to data analysis during implementation studies.
It is possible to determine whether this solution can be applied and verify the benefits of introduction in advance.

iQ Monozukuri Tool Wear Diagnosis for Machine Tools

- Tool wear diagnosis
- Tool damage diagnosis
- Takt improvement support

To the FTP server

1. Touch panel (display device) – diagnosis result display
2. CPU module – data collection, data diagnosis
3. General HUB
4. CC-Link IE Field special-purpose HUB
5. Collection interface – panel internal storage
A. Protocol convertor
B. Remote analog I/O module

One system capable of monitoring up to **10 devices** simultaneously

CC-Link IE

Ethernet

(processing information, drive unit data collection)

Machine tool — CNC — Drive module

Machine tool — CNC — Drive module

Reducing tool costs Improving processing quality

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Building an engineering environment promoting DX

By linking the separately sold Advanced Data Science Tool and iQ Monozukuri Tool Wear Diagnosis for Machine Tools, we support the construction of engineering environments, such as tool diagnosis, machine maintenance, and statistical analysis using IoT data.

Detecting processing/equipment errors from big data

Correlation between the same processing feature amount and processing workmanship can be confirmed and any processing errors can be detected. In addition, processing features identical between devices are depicted in a histogram, which makes it possible to confirm differences between devices and aging deterioration tendencies in order to detect errors.

Accurately predicting processing workmanship through machine learning

Machine learning is used to grasp the relationship between measurement results and IoT data and automatically generate predictive models. Using the generated prediction model, workmanship is calculated immediately after processing, thus preventing outflow of defective products to downstream processes.

■ **Environment utilizing IoT data**

Big data management

- Trend display
- Histogram display
- Waveform superimpositio
- Chronological display
- Correlation analysis
- Machine learning

Maisart

Advanced Data Science Tool (sold separately)

Loading of inspection results

Confirmation of accumulated data

CSV

Transfer of collected data

Measurement data CSV

CSV

iQ Monozukuri — Tool Wear Diagnosis for Machine Tools

GOT2000 — Graphic Operation Terminal

MELSEC iQ-R

Diagnosis results display

Data collection Data diagnosis

Rough processing   Finishing

Vernier caliper, micrometer   CMM

Inspection process

Assembly process

When a problem arises, visualizes which of the processes, from rough processing to finishing, was the cause.

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