

Smart manufacturing for CNC production machines

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The future of manufacturing is 'smart'. The factories of tomorrow will use data-driven insights to create predictive cyber-physical systems, leading to more flexibility, higher efficiency and increased productivity. Mitsubishi demonstrates how this can be realised with two integrated software solutions that can maximise the performance of CNC machines.

The first step in the creation of smart metalworking applications is the adoption of advanced CNC machines. These generate and capture data on the processes performed, the status of the unit and its components, as well as overall equipment effectiveness (OEE). Future-oriented systems will then analyse and share this information across the enterprise. In particular, knowledge gained from operational technology (OT) will be shared with the IT domain to produce actionable business intelligence that can be fed back to the shop floor to improve operations.

Connecting the shop floor

Helping to create the foundation of an interconnected smart factory with minimal investment, the NC Machine Tool Connector from Mitsubishi Electric can gather data from any CNC, regardless of brand. This enables the effective transfer of information to higher-level systems, without the need to account for multiple vendor-specific communication protocols.

The software collects operational and PLC device data from the controllers of any CNC machine, including legacy solutions. It then works with umati (universal machine technology interface) to send these metrics to a broad range of systems via OPC UA communication protocol, in order to generate knowledge.

Analysing data to improve performance

One of the key platforms that can be easily coupled with this connector to enhance the efficiency of production facilities is Mitsubishi Electric's NC Machine Tool Optimizer. This can interpret information received from multiple machine tools equipped with any CNC unit and the NC Machine Tool Connector to provide an intuitive process visualisation and monitoring platform. As a result, it enables users to make data-driven decisions to improve production, while also maximising visibility and accessibility across the whole facility.

With ease of operation in mind, the NC Machine Tool Optimizer's configuration module allows users to set up data collection and diagnostic functions without requiring any specialised programming skills. The implementation and adjustment of the software is simplified and streamlined, quickly providing businesses with a tool to improve the efficiency of their production.

Connectivity within the wider plant

Moving higher up on the automation pyramid, the NC Machine Tool Connector can be used to create truly interconnected enterprises by enabling the exchange of information across a wide range of IT systems. These include MES, ERP and SCADA platforms. Information can also be shared between shop floor machines and with Edge solutions and the Industrial Internet of Things (IIoT).

Taking this a step further, it is then possible to predict and improve machine and process performance by implementing simulation tools to create cyber-physical systems, such as digital twins. Ultimately, the possibilities presented by smart manufacturing for CNC machines are endless. They can be realised with highly customised and cost-effective solutions to addresses the specific requirements of any application, ensuring optimised production.

Image captions:

Image 1: The factories of tomorrow will use data-driven insights to create predictive cyber-physical systems, leading to more flexibility, higher efficiency and increased productivity. [Source: Mitsubishi Electric Europe B.V.]



Image 2: Mitsubishi Electric's NC Machine Tool Optimizer can interpret information received from multiple machine tools to provide an intuitive process visualisation and monitoring platform. [Source: Mitsubishi Electric Europe B.V.]

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Embracing the spirit of its corporate statement, Changes for the Better, and its environmental statement, Eco Changes, Mitsubishi Electric endeavours to be a global, leading green company, enriching society with technology.

With around 146,500 employees the company recorded consolidated group sales of 40.9 billion US Dollar* in the fiscal year ended March 31, 2020.

Our sales offices, research & development centres and manufacturing plants are located in over 30 countries.

Since 1978, Mitsubishi Electric is represented in Germany as a branch of Mitsubishi Electric Europe. Mitsubishi Electric Europe is a wholly owned subsidiary of Mitsubishi Electric Corporation in Tokyo.

*At an exchange rate of 109 yen to the US dollar, the rate given by the Tokyo Foreign Exchange Market on March 31, 2020

For more information visit:

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