

The smart spindle Reduce unexpected downtime

with spindle data analysis

WEISS Spindeltechnologie May 2024



WEISS Spindle with Sensor Module - SMI24



Current situation

When it comes to spindles in machine tools, only little information or none at all is currently available in most cases about the current operating conditions and previous operating indicators of the spindle in the machine. For this reason, it is difficult to determine parameters for wear rates that could be used to prevent unexpected machine downtime.

The following questions cannot currently be answered:

- What is the run time of the spindle under speed and under control?
- What are the speed and torque ranges during the duration of spindle use?
- How many clamping cycles have been performed until now?
- What are the operating conditions of the tool clamping system?

Aim

Integration of WEISS motor spindles – SINAMICS and SINUMERIK in one intelligent system.

This leads to a simplification of spindle commissioning and the integration of signals into the PLC. Collection, analysis and visualization of information and data during spindle run time. Evaluation of data to determine spindle states that could cause downtime. Increased duration of spindle use through better planning of preventive measures for spindle maintenance, thereby increasing machine productivity.





Solution

The WEISS Spindle Sensor Module SMI24 facilitates spindle commissioning, reduces the amount of hardware required for the integration of spindle signals into controls and displays spindle state information on the HMI. The SINUMERIK option "Integrated Spindle Monitor" ISM can be used to access additional information on spindle state and data on spindle use via HMI screens. Cycle-independent signal transmission for increased productivity Visualization of operating conditions for easier diagnosis. More control cabinet space thanks to fewer components.

Easy wiring with **only one Drive-CliQ cable** for the signals of encoder, motor temperature, clamping status query and piston query.



This means **fewer components** (cables, processing units) in the control cabinet for feeding of analog and digital spindle signals.

SMI24 enables **changing tools as fast as possible** thanks to its independence from the PLC cycle. Simple and fast configuration of the tool change without the need to involve the PLC. Quick access to spindle information thanks for example to the display of spindle designation and serial number.



Measured chip-to-chip times after performed tool changes.

Options:

Integrated Spindle Monitor ISM

- Clamping cycle counter tool
- Clamping time diagnosis tool
- Temperature monitoring motor/bearing
- Operating conditions in speed and torque histograms

Data-Export

Export a csv file with SMI24 data on a data recorder

SINUMERIK and WEISS Spindel with Sensor Modul - SMI24

Increasing the availability and productivity of machine tools - efficiency in maintenance and service!



Integrated Spindle Diagnosis - ISM:

Display of spindle status data on the HMI of the machine

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Visualization of current spindle information facilitates the diagnosis of faults and supports the planning of service intervals and preventive maintenance.

Manage MyMachines/Spindle-Monitor Provided by Siemens



Decentralized access to spindle data via cloud-based 回謎的母 application Siemens Insights Hub/ Manage MyMachines/ Spindle Monitor

Manage MyMachines/ Spindle Monitor is an extension of the Manage MyMachines cloud application to display specific data from main spindles. This requires the DriveQliq SMI24 module on the main spindle. This information about speed distribution, torque distribution, temperature distribution and tool clamping times are recorded and stored in the cloud application. The clear arranged dashboard then allows the visualization and analysis of the data.



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spindel											
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Feature

- Dashboard displays the information on the master data of the connected main spindle
- Statistics for operating points: speed / torque / temperature
- Statistics on tool clamping times
- Statistics on the clamping condition
- Selection and comparison of statistical data at different points in time
- Export of saved data in a standard CSV format

Benefit

og Scale Linear Scale

- Time-efficient access to required information in case of maintenance or service
- Information on possible power reserves and suitability of the design
- Evaluation of the clamping times in comparison to the reference value
- Detection of wear of the clamping system through change of the clamping times
- Recognition of changes in use
- Management and monitoring of globally distributed machine parks
- New service methods and business models

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