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ACM – Adaptive Control & Monitoring

Adaptive feed rate control and monitoring

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ACM Technology

The adaptive feed rate control and feed rate monitoring is a technology based on the SINUMERIK machine tool system and is used in the machine tool sector to support digitalization in the production landscape.

ACM monitors the actual cutting conditions in realtime and automatically adapts the feed rate to achieve the optimum feed rate velocity.

When an overload condition is identified, ACM reduces the feed rate, and can output an alarm to stop the machine. ACM can also identify a broken tool, therefore avoiding any subsequent damage.

This realtime approach increases the productivity, extends the lifetimes of machines and tools – and ensures a reliable and safe production process.

ACM functions

- Realtime feed rate optimization
- Protection when the tool enters the material
- Protection against tool breakage as well as overload detection
- Detection of tool breakage and wear
- Process monitoring
- Process recording & visualization
- Tool performance statistics

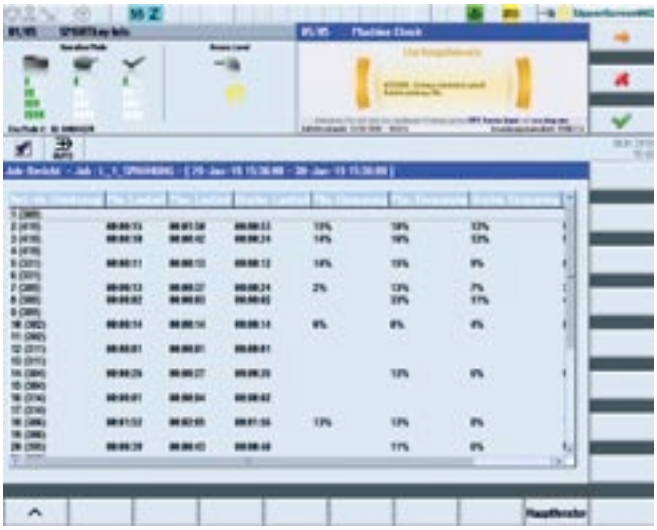
Product advantages

- Increased machine productivity by significantly reducing the cycle time
- Optimized tool lifetimes and increased tool utilization levels
- Higher part quality through constant load levels
- Increased process reliability, offline NC program optimization, manual feed rate adaptation and visual tool inspection are not required

Two operating modes

The ACM system individually adapts the machining to your requirements and production targets. Depending on the specific application, two operating modes can be used:

- **Adaptive feed rate control** – ACM optimizes the programmed feed rate. The stock removal process is accelerated if optimum cutting conditions exist – and is slowed down if workpiece geometry, material hardness and/or tool conditions demand it.
- **Monitoring** – tools, spindles and parts are permanently monitored for breakage, overload, missing tools, repeated machining runs on the same part and other deviations that occur in the machining process. As a consequence, ACM detects suboptimal states that can result in damage, therefore facilitating a timely intervention.



ACM reporting & analytics

Experts at the shop floor level benefit from informative reports that ACM generates. From the recorded data, you can obtain information that will help you to improve and optimize machining workflows. Reports on machine and tool utilization, actual feed rates, time savings, tool wear and tool life are available for every machine equipped with ACM.

Application areas for ACM software

- Aerospace
- Automotive industry
- Power generation
- Cutting tools
- Mold building

Can be used in almost all production technologies such as milling, turning, drilling and grinding.

Your benefit in your production landscape

- Regularly 10% – 30% shorter machining time
- Up to twice the tool life
- Higher process reliability and safety across all workflows

Based on the requirement-optimized feed rate adaptation, ACM helps to reduce energy costs.

Compatibility

The simple to install software solution is supported by the following CNC control systems:

- SINUMERIK 840D Solution Line and Powerline
- In conjunction with software and hardware, all other common control types are supported as well

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