SENSOR INTEGRATION AND SIGNAL ANALYSIS

By applying sensors close to the process area in combination with adapted monitoring and measuring systems, the manufacturing quality and the stability of the manufacturing process can be increased significantly.

Benefits of sensor integration and signal analysis

• Easy setup of tools even with complex geometries
• High-precision operator-independent tool probing by touching the workpiece possible (ingate detection)
• Recording of the process state for online control of manufacturing quality and for quality management documentation
• Machine diagnosis to avoid downtimes as well as to enable cost- and time-efficient servicing of your machine tool

Our services

• Recording of your machining process using state-of-the-art, high-precision measuring devices as basis for a detailed analysis
• Analysis of the recorded data and determination of measures to optimize and increase the efficiency of your machining process
• Development of customized measuring systems for monitoring your ultra-precision or special-purpose machine

Our skills

• 3-dimensional ingate detection for optimal setup of the workpiece in the machine
• Extensive experience with various measuring techniques (optical, inductive, capacitive)
• High degree of competency in the assembly of prototype measuring systems
• Development of analysis algorithms that are specially adapted to the hardware
INDIVIDUALIZED MECHANICS FOR INTEGRATION OF SENSORS

A wide range of sensor types can be used to develop measuring systems that are adapted specifically to the respective process or production machine. To achieve high signal quality with the utmost sensitivity, it is generally necessary to place the sensors as close as possible to the process area. This can be achieved through specific integration of miniaturized sensors into the relevant mechanical components. By applying an individually adapted measuring system with specially adjusted sensors, better monitoring of the process or machine can be achieved.

Benefits of the mechanical integration of sensors

• Individual measuring system for the respective process or machine
• Mounting of the sensors as close as possible to the process area to increase signal quality and sensitivity
• Combination of different sensors to record all relevant process parameters

Our services

• Development of mechatronic tool-clamping systems and machine components with integrated sensors
• Application of highly sensitive acoustic emission sensors to register signals with high bandwidths with optimal accuracy
• Dimensioning and design of mechanical components for the integration of sensors close to the process area

Our skills

• Application of various high-precision sensors (position measuring systems, force measuring systems, acoustic emission sensors, acceleration sensors, temperature sensors)
• Expertise in connecting sensors to different measuring systems
• Consideration of the entire signal transmission path as well as mechanical and electrical aspects of the sensor environment
• FEA-assisted dimensioning of mechanical structural components
SIGNAL ANALYSIS

To obtain meaningful results, data has to be recorded and evaluated in a suitable way. When high manufacturing speeds are involved, recording data with high signal quality is a challenging task for the user. This necessitates powerful hardware in combination with intelligent analysis algorithms for data acquisition. Through simultaneous recording of acoustic emission signals and the axis position of the machine tool, ingate detection can be performed over the entire surface of the workpiece.

Benefits of signal analysis

- Online monitoring of the process to achieve a fast assessment of the process state
- Filtering and smoothing of the signal as a basis for further signal processing
- Reduction of the signal to process-relevant parameters through adjusted algorithms

Our services

With the help of high-performance signal analysis devices and software, comprehensive characteristics can be extracted from the measured data. The software and the algorithms can be adjusted individually to perform powerful, optimal signal analyses.

- Visualizing of the measured results to enable user-friendly identification of process-relevant properties
- Plane ingate detection to determine the highest point on the surface during machine setup
- Evaluation of the signal in the time and frequency domain
- Application of powerful measuring systems for fast acquisition and evaluation of data in order to obtain a direct analysis of the measurement data

Our skills

- Exclusive provider of a method for three-dimensional ingate detection in the precision and ultra-precision fields as well as conventional machining processes
- Comprehensive knowledge of data acquisition with various types of machines and control systems
- Tracing of tool breakage to the corresponding location on the workpiece
- Specialized expertise in signal analysis of the respective measuring data
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