

CASE STUDY | MECHANICAL ENGINEERING

Automation in dental technology

Clever automation with IO-Link and RFID
offers maximum efficiency and quality

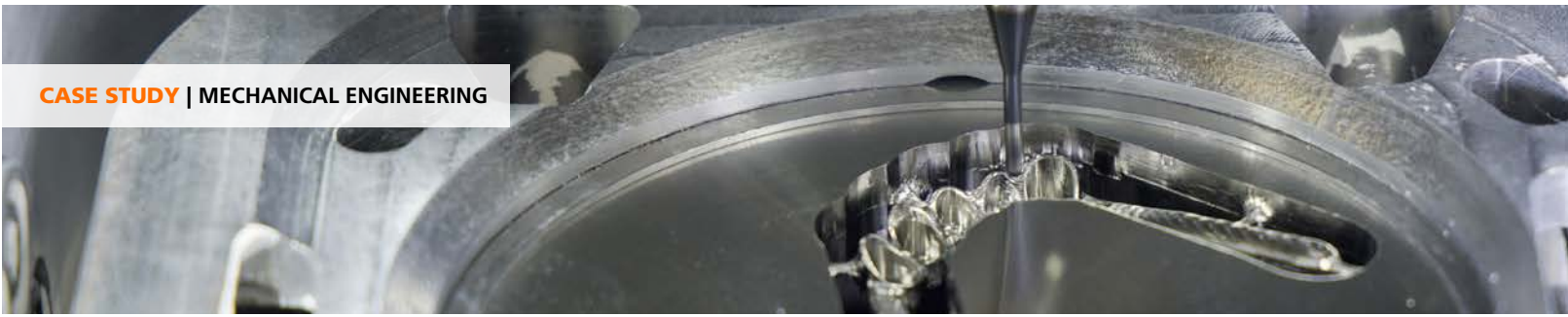


Our customer:

The company Cimt builds dental milling machines for dental laboratories and practice laboratories. What makes the machines special is the high quality and efficiency of the installed components. This enables customers, such as the Huck dental laboratory, to mill applications much faster, with significantly increased quality and process reliability. The machines comply with the industry standard in the dental sector.

It is as big as a refrigerator and often works 24 hours a day, seven days a week: The 5-axis CNC machine mills components for dental prostheses, for example crowns, bridges or implants, from special metal alloys. Clever automation solutions ensure fast set-up and reliable operation.

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The challenge:

When developing its new dental milling machine, Cimt aimed to increase the efficiency of dental laboratories. Since dental laboratories have to deliver end products of very high quality to achieve accuracy of fit, the challenge was to increase efficiency while optimising quality. Processing with conventional machines takes a lot of time and involves a lot of waiting time. Besides, a compact design is important because dental practices or dental laboratories are often located in residential buildings and thus do not offer very much space for the machine. In addition to the challenge of creating a compact machine design with components that meet all requirements, issues such as process reliability, ease of integration and connectivity between different manufacturers often play an important role.



example, the Huck dental laboratory, one of the first customers to use the milling machine, was able to significantly reduce processing times and further optimise quality. To make this work, Cimt relied on the interaction of a few selected manufacturers and high-quality industrial components. This also allows for optimum connectivity. Highest milling quality in the µm range is achieved by a powerful CNC system from Bosch Rexroth, a solid, low-vibration construction and precise measuring technology. In addition, the industrial components give the machines a long service life. By using only a small number of suppliers, Cimt has also been able to reduce acquisition costs and keep the machines low-maintenance.

Only components from ifm are used for sensors, IO-Link masters, IO-Link modules and their cabling. Through the use of digital network technology such as IO-Link, the machines offer smart functions and can be set up much faster, helping to save time and costs.

Cimt has been using IO-Link technology instead of conventional wiring in its measuring and bending machines for some time now and has been

able to reduce the implementation time of the components to the machine by 30 % while simplifying the installation concept. By integrating the IO-Link masters and modules, it was possible to make the machine very flexibly expandable and service-friendly. All sensors installed in the machine can be connected to the machine PLC thanks to plug & play M12 connection technology via IO-Link.

Thus, distance sensors, flow sensors, level sensors, cylinder sensors, inductive proximity switches, RFID read/write heads, electronic fuses and signal lamps help to expand the machine's range of functions and enable dental laboratories to gain insight into every production step of the machine. They also enable remote service in case of maintenance. Blanks and tools, which can be changed during machining, are automatically assigned via RFID technology, which enables smooth operation.

Further functions can be ordered as an option for the machine, such as a spindle monitoring system which is integrated via the Realtime Maintenance System from ifm.

Results:

- Reduction of installation and commissioning time by 30%
- Maximum process quality via IO-Link
- Sensor technology enables convenient operation and offers transparency of all production processes



30%

Reduced installation time thanks to IO-Link



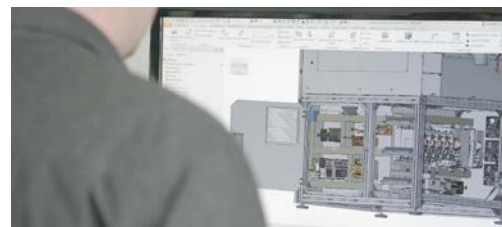
Remote service possible in case of maintenance



Costs and time are saved while product quality is improved



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The solution – why ifm?

What is special about the machine is its high accuracy, speed and reliability combined with its compactness. Machines from other manufacturers require considerably more floor space to achieve the same cutting performance. For