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INDEX G420

The basis for Swiss precision and quality

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The Swiss machining service provider KNOEPFEL AG has upgraded its rotary production processes to the very latest standards — with the new INDEX G420 turn-mill center. Complete machining, consisting of turning, milling, drilling, grinding, and gear cutting, allows the manufacturing specialists to increase their already high quality and precision and maximize their machining efficiency potential.

The highlight in rotary production at KNOEPFEL: the new INDEX G420 turn-mill center. The people who are now responsible for programming, setting up, and operating the center were also involved in its selection: on the right, team leader Esedin Rahmanovic; on the left, CNC mechanic Besar Selimi.

The Swiss canton of Appenzel in the Walzenhausen municipality is home to KNOEPFEL AG, a familiar name among many leading companies in the machinery engineering, process engineering, aerospace, and energy technology sectors. The machining service provider is a primary port of call when it comes to manufacturing exceptionally demanding components. These range from relatively small parts for PET injection molds to large, high-precision bearing housings for marine diesel engines. For many years, KNOEPFEL has also been manufacturing swivel bridges for 5-axis machining centers and numerous key components for the aerospace industry, made of steel, titanium and difficult-to-machine aluminum alloys.

Cutting-edge infrastructure

Since it was founded by Hugo Knoepfel in 1962, the company has aspired to achieve the highest level of expertise in metalworking. Today's

family-owned company is therefore committed to investing in high-quality, efficient production, which not least offers employees an ideal working environment. As far as equipment is concerned, KNOEPFEL prioritizes quality over anything else.

INDEX — because quality and precision are indispensable

KNOEPFEL performs most of its rotary production processes on eight INDEX GU CNC turning centers. Anton Rechsteiner, the member of management responsible for technology, says: "These machines are no longer of the latest design, but their ingenious engineering, rigidity, and achievable precision are hard to beat, even by new machines. On our two INDEX GU2000 machines, for example, we can achieve a roundness of under 2 μm with a turning diameter of 600 mm." However, being at the technological forefront of machining also means keeping an





Extremely satisfied with their latest investment: (from left to right) CEO Anton Bischofberger, director Urs Knoepfel, and operations manager Anton Rechsteiner

In total, KNOEPFEL AG's manufacturing covers an area of 4,000 m². INDEX machines dominate the field in rotary production.

eye on important new developments and integrating new solutions into production processes. "Turn-mill centers are undoubtedly part of this," says Rechsteiner.

Long-standing partnership

"We first invested in an INDEX machine in 1983," recalls Urs Knoepfel. "Since then, we have stayed in close contact with Esslingen. With the new G420, INDEX have succeeded in convincing us that this turn-mill center is absolutely top-notch in terms of its design and engineering."

After spending years searching for a suitable turn-mill center, the new INDEX G420 now meets the KNOEPFEL machining specialists' requirements perfectly. "The motorized milling spindle is so powerful that it is basically a milling machine in its own right," says Rechsteiner. "With its Y stroke of +/-170 mm, a B axis swivel range of +/- 115 degrees, and a large X travel of 750 mm, we can carry out even complex five-axis machining processes easily and productively."

Rechsteiner also highlights the generous working space as well as the arrangement of the two lower turrets: "It's an ingenious solution. With the new concept, the motorized milling spindle and tool turret can work simultaneously on the main and counter spindles without risk of collision. On the other hand, by lowering the tool turrets under the turning spindles, each tool carrier can be used sequentially on both turning spindles."

The engineers from Esslingen even provided their Swiss customers with a 320 mm turret steady rest. "This is really important to us," says Anton Bischofberger, CEO of KNOEPFEL AG. "Because unlike many of our rival companies, we possess a great of expertise in machining large, complex, tubular components that need to be supported. The additional steady rest also opens up completely new manufacturing possibilities."

Large fan community at KNOEPFEL: from operator to CEO

The turning team, which is now responsible for programming, setting up, and operating the INDEX G420, was also involved in the selection of the turn-mill center. Esedin Rahmanovic, team leader for rotary production, has become the biggest fan of "his" machine: "At the beginning, we were not sure what to expect from the new technology, as it's a huge leap from the INDEX GU series to the G420 turn-mill center. But we now know the machine so well that the work is really fun."

CNC mechanic Besar Selimi is also part of the G420 team at KNOEPFEL. He has words of praise for the on-site training: "The INDEX instructor not only knew a great deal about the technology; he was also great at explaining it. Together, we got to grips with the machine such that we were able to achieve maximum precision, i.e., roundness and position values of under 2 µm and diameter tolerances in the 2 µm range (!), and maintain concentricity, >



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coaxiality, and lateral runout tolerances of 0.02 mm during a workpiece transfer from the main to the counter spindle."

The complexity arising from the interaction of the three machining units can be mastered with state-of-the-art control technology and both programming and simulation support. For Esedin Rahmanovic, one thing is certain: "To ensure efficient, safe machining, we need the INDEX programming station. Other external programming systems are unable to meet our requirements. Without the "Virtual Machine" simulation software from INDEX, I would not be able to control this machine and the machining processes so well. Simulation with the VM is a tremendous aid, especially for collision-free execution of new programs."

Besar Selimi is also enthusiastic about the INDEX iXpanel operating system: "I have never experienced such easy setup and operation. Its performance—simply amazing."

options: "They open up interesting prospects. Just a short time after commissioning, first inquiries were received from customers regarding integrated grinding and gear cutting. This opens up further market potential that we would otherwise not be able to exploit with such efficiency."

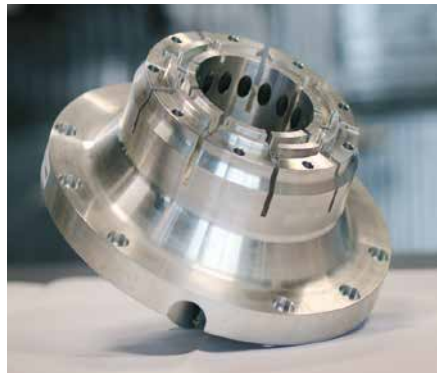
The KNOEPFEL team's confidence in its latest investment is also reflected in the fact that space for a second INDEX turn-mill center has already been planned. The CEO explains: "We have almost all of our machine tools in duplicate. This allows for easy multiple-machine operation and provides us with important redundancy." There are also already plans to automate the then-two turn-mill centers in future. The preferred candidate is the robot-assisted INDEX iXcenter solution, whose modular design is entirely to the Swiss contract manufacturer's liking. It makes it possible not only to automate loading and unloading, but also to integrate various upstream and downstream units for measuring, cleaning, etc. **X**

KNOEPFEL also manufactures key components for helicopters. KNOEPFEL has particular expertise when it comes to demanding large, tubular components.

Prepared for the future

Since KNOEPFEL AG, as a subcontractor, never knows exactly what orders will be coming in the future, the management chose to acquire the INDEX G420 fully equipped. CEO Bischofberger also has warm words for the integrated

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KNOEPFEL AG

KNOEPFEL AG is a machining service provider that specializes in both rotary and cubic manufacturing and the production of free-form geometries to the highest degree of perfection.

The company has been ISO 9001 certified for more than 25 years and has complied with the "aviation standard" EN 9100 since 2016. Around 50 employees generate annual revenue between 12 and 15 million CHF.

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