

The customer magazine of the INDEX Group

# TURNINGpoint

**08**  
2021



*better.parts.faster.*



## Highlights

### Productive manufacturing solutions

The up-and-coming trend: complete machining — high-performance turning and milling of medium-size components with the new INDEX G300/G320 04

Tool holders—Link between machine and cutting edge 14

A successful model that shows impressive continuity — The INDEX ABC CNC automatic lathe 22

### Innovative technologies

Intelligent workpiece handling — Automation solutions made by INDEX 24

The versatile world of gearing technology — The special challenges presented by drives for e-mobility 30

### Successful together

The Swiss machining service provider KNOEPFEL AG has upgraded its rotary production processes to the latest standards 08

Sophisticated components in very small batches — RENNSTEIG offers flexible manufacturing of tools 26

Engine of growth: E-mobility — E-bike drive components by hGears 32

Savings achieved: 50 percent — A visit to KONESKO, the leading Estonian manufacturer of electric motors 34



Dr. Dirk Prust, Reiner Hammerl and Harald Klaiber  
INDEX Group executive management (from left to right)

### Time to set a new course

Dear customers and friends of the company,

We finally have good cause to hope that the worst economic impacts of the coronavirus crisis may now be behind us. Many industries are beginning to show signs of renewed growth. And today—quite rightly—a focus on sustainability and the responsible use of resources is opening the door to new prospects, with technologies that offer a wide range of opportunities for manufacturing expertise “Made in Germany”.

In the coming years, industry will be driven by the demand for sustainability across the board. This is particularly true of the transformation in the automotive industry—regardless of the speed with which it happens—, but also applies to booming business with e-bikes and pedelecs, the resurgent medical technology industry, the expected recovery in the aviation industry, and, of course, to technologies for energy generation, storage, and transport.

This need presents both manufacturers and users of machine tools with challenges and opportunities. After all, higher productivity, more cutting edges in operation, better process integration and finishing in a single setup all mean a lower CO<sub>2</sub> footprint. Greater sustainability is therefore also more economical and will prove to be a key factor of future success.

Our new and updated products, which we will be showing at EMO 2021 in Milan, take full account of these requirements.

The new INDEX G320 turn-mill center offers unique cost-effectiveness for its performance

class, with three tools that can be used simultaneously and with great flexibility. Its ease of setup improves its range of potential applications, even with increasingly smaller batch sizes.

Now featuring integrated Y axis functions, we are expanding the possible uses of the INDEX ABC in a further evolutionary step. This opens up an extended range of workpieces for this automatic production lathe that has already sold over 3,000 units and is known worldwide for its reliability and speed.

In the field of automation solutions, the iXcenter XL, a robot cell that can be adapted to customer requirements, is now available for our largest turn-mill centers, the INDEX G420 and INDEX G520. In addition to workpiece handling, it can also perform post-machining or setup tasks on the machine.

The new TRAUB TNL12 sliding headstock automatic lathe, which is already in volume production, will also be shown to the public for the first time at EMO.

Our range of new products is completed by extended apps and functions for our iXworld digitalization platform. These applications are dedicated to increasing our customers' OEE.

There's plenty to read about over the following pages, and we do hope you will come and see our new products at EMO 2021 in Milan. We look forward to your visit. **X**



## The up-and-coming trend: complete machining

The INDEX G300/G320 turn-mill centers are a new addition to our product range. With a turning length of 1,400 mm, this size now completes our range for high-performance turning and milling of medium-size components.





## INDEX G300/G320 turn-mill centers

Complete machining is rapidly gaining popularity, especially on turn-mill centers that handle both technologies equally well. For our development department, this was one of the key reasons for launching the INDEX G420, a turn-mill center with a completely new design that was in a class of its own. That was in 2018, and it was not long before its success became evident. We expanded the series the following year with the larger, more powerful INDEX G520 variant and, as the logical next step, have now added the smaller G320 version.

### Successful machine design

The successful machine design remains unchanged. Based on a rigid, vibration-damping machine bed in mineral cast block design and generously dimensioned linear guides in the X and Z axes, the new INDEX G320 offers ideal stability and damping properties, as well as

dynamic values, thus guaranteeing outstanding machining results combined with high levels of productivity.

### Powerful motorized milling spindle

As with the INDEX G420 and G520 models, the motorized milling spindle arranged above the axis of rotation with the hydrodynamically mounted Y/B axis is a key element. Its powerful drives facilitate a wide range of drilling and milling operations, all the way to simultaneous five-axis machining. During machining, the motorized milling spindle operates with a tool magazine that provides space for up to 111 tools.

On the INDEX G320, the two tool turrets arranged at the bottom also help to ensure efficient machining. Each of their twelve stations can be continuously equipped with live tools. >

Thanks to the large working area and the distance between the main and counter spindles, simultaneous machining is possible with the motorized milling spindle and the tool turrets at the main and counter spindles with no risk of collision. The G320 is controlled via the user-friendly iXpanel platform.

The turrets are not only able to move in the X and Z directions, but also in the Y direction.

The maximum turning length on the INDEX G320 is 1,400 mm. The two identical work spindles (main and counter spindles) are fluid-cooled and provide a spindle clearance of 102 mm at 4,000 rpm. They are powerful and highly dynamic.

### Generous working area

Thanks to the large working area and the distance between the main and counter spindles, simultaneous machining is possible with the motorized milling spindle and the tool turrets at the main and counter spindles with no risk of collision. The option to lower the tool turrets also makes it possible to defuse situations without risk of collision.

The turn-mill center can also be automated: with an integrated handling unit and/or the iXcenter robot cell. The control system is a modified Siemens 840D sl, which is operated in the usual user-friendly manner via the INDEX iXpanel cockpit solution. X

### INDEX G300/G320 machine highlights

- ▶ Smart working area solution for turning lengths of up to 1,400 mm
- ▶ Identical main and counter spindles with a spindle clearance of  $\varnothing$  102 mm
- ▶ Max. chuck  $\varnothing$  315 mm
- ▶ Powerful motorized milling spindle with proven Y/B quill kinematics for complex 5-axis milling operations
- ▶ Tool magazine for 56 or 111 tools, HSK-T63 or Capto-C6
- ▶ Two lower tool carriers, each with 12 stations (VDI40) or 15 stations (VDI30)
- ▶ High thermal and mechanical stability

More online:

> [index-traub.com/g300-g320](https://index-traub.com/g300-g320)

info







## The basis for Swiss precision and quality

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 Appenzell 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  $\mu\text{m}$  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 m<sup>2</sup>. 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, >

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."

#### 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

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.



#### 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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# digital abwärt

Over the last year, a lot of things were turned upside down. After the great challenges that many companies faced over recent months, it is time to look ahead once more and take advantage of the opportunities. This is also a good occasion to take a look at the small and large changes to the different business areas at INDEX.



Our corporate strategy is the keystone of the **digital transformation** at INDEX. Above all other things, it demands the right mindset and globally integrated processes and systems. The use of new technologies to improve efficiency, our cloud-based iXworld customer platform, new employee skills, and last but not least, new business models are examples of key elements in what to date has been a successful transformation. Many things to which we've become accustomed are being called into question, and so we are working hard in all areas to ensure we continuously improve — to the benefit of our customers.

**Harald Klaiber // Commercial Managing Director**



**Field sales** is another area where we've greatly advanced digitalization. Our customers are increasingly using our digital information channels and therefore are well-informed. During the pandemic, our contact to our customers was almost entirely limited to e-mails, video conferences and phone calls. Internally, we regularly consult each other on new developments per video stream. In the future, I expect that we'll use a healthy mix of in-person and digital events.

**Frank Jankowski // Area Sales Manager**



The digitalization of INDEX's vocational training was advanced at top speed in various ways and in the future the trainees will continue to benefit from the resulting individualized, flexible and varied methods of teaching the curriculum. Not only the manifold possibilities within the **digital learning platform MLS** we've introduced, but also the first virtual Girls' Day, held via video conferencing, with live streams from the training areas, will serve as models for future projects.

**Simone Kuhn // Head of Vocational Training**



Measures introduced during the past year, such as the digital report book or the internal **online time management system**, have become part of our daily activities. The learning platform introduced right at the start of the pandemic enabled us to compensate the lost practical training time with meaningful learning assignments, doubled up with WebEx meetings with the training instructors. In hindsight, it was a very challenging, but interesting year. **Marie Rößler // 2nd year industrial mechanic trainee**



**Job interviews in virtual space—** Recently we also started to conduct job interviews online. This is very useful, as both INDEX and the applicant can mutually evaluate each other's expectations in advance and assess whether they are a match. Both parties most definitely get to save some time. And it is head and shoulders above voice-only telephone interviews. However, a personal meeting is still indispensable for the final decision.

**Mathias Peters // Human Resources Manager**



The situation in 2020 presented us with great challenges during the introduction of a new **CRM** process. On-site training with the users was out of the question. We therefore decided to find digital solutions, and, in looking back, are very pleased with how well it worked. In particular the flexibility and the speed with which we were able to plan training online with colleagues from around the world was a great advantage. This enabled us to significantly speed up internal processes.

**Alexander Fobke // Digital Marketing Manager**



In our private lives, online shopping has gained new significance. We are also noticing this trend in the B2B environment. Today, nearly a quarter of spare parts orders are placed on our **iXshop**. Our customers benefit from the easy quote process and fast order processing, and are constantly kept up to date, for example about the delivery status. The focus is on providing our customers with the best service—both online and offline.

**Katharina Piesche // Product Manager iXworld**



Travel and contact restrictions made us face the major challenge of rethinking machine acceptance testing, since personal visits on customer premises were generally impossible. **Digital machine acceptance testing** using video technology opened the possibility of letting our customers participate live in the acceptance process, presenting the machine and meeting our delivery dates. Considering the very positive feedback, we will retain this digital method as an option in the future.

**Sebastian Günther // Application Technician**



For the first time, we held our annual sales meeting with our Asian sales partners completely digitally. We were also able to very effectively conduct dealer training in this way. During this event, our **digital tutorials** and course material contributed to making communication clearer and easier. In the mean time, the quality of our digital communication has also greatly improved. Practice makes perfect.

**Dennis Gilg // Regional Sales Manager China**



We made use of the opportunity to further digitize **customer training**. Right from the start, our goal was to create online training that is of the same high standard as our in-person courses. Thanks to professional software solutions and our qualified personnel, we are now able to convey the content with the same efficiency as we do at the INDEX Training Center. The flexibility that this provides benefits not only our national customers, but also and in particular our international ones.

**Dieter Dohr // Organization and Delivery of Online Training**



In the **component assembly** facility for single-spindle machines in Reichenbach, each and every workstation has been connected to the corporate network since last year. Fast online access to instruction manuals, drawings and logs results in more structured work. The data is always up to date and can be quickly accessed at any time. The workflows and progress statuses have become clearer and more transparent. Mountains of paperwork and folders are a thing of the past.

**Tim Burkhardt // Industrial Mechanic, Component Assembly**



Last year, we held our first digital product presentation as part of our **iXperience Days**. All in all, a successful event. But after all the online trade fairs, exhibitions and online workshops resulting from the digital transformation in the field of event management, we are also looking forward to in-person events again. In the future, we will enhance these with digital content—direct contact with customers can scarcely be replaced.

**Rainer Gondek // Head of Global Marketing**



Unfortunately, we were unable to invite customers to our factory during the pandemic. In order for us to still be able to hold our sales presentations, we created the means for presenting our machines virtually, through **live streams** from our showroom in Noblesville, USA. For example, a customer in far-away California and the purchasing manager located in another state were able to virtually join the meeting in real time, leading to the successful result that the machine was actually ordered.

**Ed Weinberg // Regional Sales Manager West Coast, INDEX Corp., USA**



**Video conferences** are no longer exceptions to the rule, they have become commonplace in our interactions with each other. Technical and business meetings with colleagues, suppliers and customers, clarification of offers, project discussions, etc.—the possibilities are almost endless. We are particularly proud of the fact that we can now also perform machine pre-acceptance digitally. In the future, we will also offer online training to our French customers. **Sophie Penigot // Marketing Manager, INDEX France**



Several hundred machines have already been "connected" with the **iXworld**. The data and the various iX 4.0 apps provide our customers with excellent analysis tools to make more efficient use of their machines. We have a lot more data at our disposal for preventive and retroactive fault analysis. The iXworld, iX4.0, iXshop, and iXservices all help INDEX to provide its customers with the best possible support.

**iXworld Service Team**

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## Tool holders — Link between machine and cutting edge

Tool holders, as the connecting element between the machine and the cutting edge, are very important. We are convinced that such a system of tool and holder is an essential component for a high-quality machine. This is why we have been developing, producing and continuously improving our own INDEX tool holders for many years, to provide our customers with the optimum performance which they can expect.



## INDEX tool holders

Let's glance back to 2007. INDEX of course supplied its own tool holders with its lathes on request. Even back then, these were characterized by high quality and frequently were equipped with the patented W-serration. An easy yet effective solution for reliable and fast alignment of the tool holder on the turret.

In 2007, we didn't yet have an appropriate marketing form for our INDEX tool holders. We also lacked the organizational structure needed for selling tool holders as separate products, not to mention a fast, well-organized repair service. But 2007 was a year of change: After all, we had confidence in the strengths of our tool holders. We developed a separate business segment with a tailor-made structure that significantly differs from the machine tool business. It needed to account for the high dynamics in the sales and repair of tool holders and make use of the known strengths of INDEX to gain a competitive edge.

### The success shows: We did everything right!

Today, the tool holders are considered an important part of the product range at INDEX and save the users time and money. For this, we have a dedicated team to thank. "In the tool holder business segment, we are a small, flexi-

ble unit with around 50 employees who take care of all necessary consulting, sales, engineering, manufacturing and assembly work," explains Alexander Hoffmann, who was product manager for the tool holder segment since 2007 and became head of the Tooling & Refit division in 2017 (see interview).

What has happened in the past 14 years? INDEX designed its tool holder range as a modular system that currently allows for around 3,000 different variants. The basis is a comprehensive standard tool holder portfolio for different machine interfaces (VDI, compact shank, HSK, Capto) with different mounts (Capto, HSK, collets, Weldon, hydraulic expansion, WFB, etc.) for all INDEX and TRAUB single-spindle machines. The selection of tool holders for INDEX's multi-spindle machines is also extensive and includes alignment and quick-change systems, grooving tool holders, milling units and other accessories.

The highlights include tool holders for special applications such as power skiving and high-speed whirling — technologies in which INDEX has developed specialized expertise. Additionally, our tool holder engineers are able to develop special solutions for specific customer projects. >

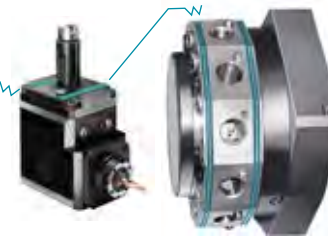
INDEX offers a variety of different tool holders for single and multi-spindle lathes.



## "Important component of the process chain, from the machine to the clamping"



With our patented **W-serration**, we offer a simple yet effective solution for reliable and fast alignment of the tool holder on the tool turret, with  $\mu$ -precision.



**Alexander Hoffmann** is Head of Tooling & Refit at INDEX

*Mr. Hoffmann, what drives a tool machine manufacturer such as INDEX to develop and manufacture the tool holders itself?*

In principle, there are three factors. Firstly, tool holders are an important component of the process chain, from the machine to the clamping. They are like the fingers on a hand that are responsible for the optimal machining result.

Secondly: No-one knows the requirements of the tool holders better than we do ourselves, because they are produced for our machines and result from our machining processes.

And thirdly, we — the entire INDEX Group — not only see ourselves as machine suppliers, but also as solution providers for the machining process. This includes the tool holders, as well as the automation, software, our digital developments and all the services we provide.

*What is so special about the INDEX tool holders?*

The know-how that we have gained from our many years as a leading machine tool manufacturer sets us apart from other providers. We combine this with our high level of expertise in tool holders, which we have acquired over several decades. This enables us to develop INDEX tool holders that are exactly matched to the workspaces, performance data, control data, etc.

Additionally, we manufacture the core elements of our holders in-house: housing, shank pieces, spindles and gears. This enables us to be highly flexible and provide short response times. Our assembly also meets the highest quality standards — our flow assembly line is equipped with state-of-the-art assembly stations where drawings, work plans and job sequences can be accessed digitally. Run-in stations and testing devices along with extensive documentation, guarantee that only tool holders that are in perfect working order leave our premises.

*What benefits do the customers have from using INDEX tool holders? What are the innovations behind them?*

Our tool holders feature a multitude of details that have a beneficial effect. These include the coated sealing surfaces of spindles and the polygon connections in the drive train. We make use of sealed spindle bearings and oil-air lubrication. All of this results in a long service life for our tool holders, which in turn means less machine downtime and higher productivity.

The latter can also be further improved with an optional inner cooling lubricant supply with up to 160 bar — which can also be retrofitted. Additionally, our products can be repaired repeatedly, which saves costs in the long term and increases sustainability.

*You advertise your products' high process reliability and short setup times. How do these come about?*

Here the interfaces play a decisive role. One example: Our patented W-serration, which we've been offering for many years, is a simple yet effective solution for reliable and fast alignment of the tool holder on the tool turret, with  $\mu$ -precision. The accurate form fit of the W-serration enables high repeatability and makes the entire system extremely rigid. This makes it possible to preset the tool holder outside the machine with high precision. We now also apply the W-serration principle to our multi-spindle machines.

The second interface between the tool and tool holder is another point where we pay a lot of attention to simplifying and accelerating the setup processes. With modular quick-change systems, like the INDEX TRAUB Capto interface, we can replace a worn tool without removing the entire tool holder. X





**Top:** Well-structured — The new tool holder assembly and repair department at the Esslingen site

**Bottom:** Our experts repair all tool holders that are compatible with INDEX and TRAUB machines, without exception. The repaired holders go through the same quality assurance process as each new one.

#### Easy shopping — in the iXshop

Back to the standard components and the comprehensive tool holder modular system. How do the customers know which is the ideal tool holder for their use and how can they order it? Qualified customer consultants assist the customers in selecting the tool holders, provide machine- and application-specific recommendations and compile cost-effective tool holder packages on request.

Customers that don't need a personal consultation can conveniently choose and order the tool holders in the iXshop, the online equipment and

procurement portal. Here our customers can find all accessories, tools, spare parts and materials for their lathes.

After the user has registered and logged in, the system provides intuitive help for configuring the tool holder. Targeted questions quickly and easily lead to selection of the optimal product. Additionally, the iXshop also provides data sheets, user manuals and 3D models. Prices and availability are available at the click of a button, as are quotes and orders. Thanks to shipment tracking, our customers always know where their product is. >



**Top:** The repair service for tool holders helps to save costs and can be ordered in the iXshop — at attractive fixed rates.

#### Sustainable thanks to first-class repair service

The repair service has developed into a model for success. In more ways than one: Thanks to the close cooperation between the repair team and engineering, the damage analyses are used for a continuous improvement process that takes the INDEX tool holders to a higher performance level. Furthermore, the users save costs and increase sustainability.

Ordering repairs is as easy as ordering a new product. This process is also triggered in the iXshop. After the customer has selected the appropriate tool holder, the system displays the new price, as well as a fixed price for a standard repair, which is sufficient in 90 percent of all cases. The repaired holders go through the same quality assurance process as each new one — including extensive documentation.

#### Further expansion in planning — also in the USA and China

INDEX repairs all tool holders that are compatible with INDEX and TRAUB machines, without exception — even those of other manufacturers. To offer our customers in the USA and China a fast, efficient repair service as well, we are currently working on setting up a comparable system at our local subsidiaries. X

#### INDEX tool holders

- ▶ Large variety of tool holders
- ▶ Solutions for special applications and customer projects
- ▶ Alignment system with patented W-serration
- ▶ Different quick-clamping systems
- ▶ Easy shopping in the iXshop
- ▶ Fast repair service
- ▶ Perfectly matched to all INDEX and TRAUB machines

> [index-traub.com/tool-holders](https://index-traub.com/tool-holders)

#### iXshop

- ▶ Over 130,000 quality items
- ▶ Find what you need quickly with intelligent search functions
- ▶ All information at a glance
- ▶ Procurement processes to match your needs
- ▶ Straightforward returns processing

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info



# We're here for you—with machine check and maintenance!

As part of our iXservices, we offer a range of services that help customers make the most of their machines throughout their useful life for a highly dependable, reliable and economic production.

Two INDEX service technicians talk about their experiences and explain what you as the customer can expect.

## Preventing downtimes with the machine check

Kemal Gümüşsoy is a service technician for INDEX multi-spindle automatic lathes and knows how unplanned downtimes can be prevented: "With our machine check, which can be adapted to individual needs, we offer a very effective tool for preventive maintenance aimed at ensuring machine availability."

The machine check puts INDEX's extensive know-how and service expertise at the customer's disposal. Various packages ensure that each customer can choose the offer that matches their needs best. "The basic package includes an extensive visual inspection and function check. Optionally, we also check the geometry, electronics, application or the alignment of the loading machine." The machine check should be performed at intervals of approximately one year. "The recorded data documented in reports can then be used to track how the machine has changed due to wear and other factors," explains Gümüşsoy. "This information helps to determine what action should be taken and to identify components that should be checked in the near future to prevent unplanned downtime." He further points out that constant contact with



## Important points during the machine check:

### Bearing condition check

An acceleration sensor records the vibrations at defined speeds. The results provide indications about the bearing condition.

### Clamping force check

An external sensor measures the clamping force. This allows for any loss in efficiency to be detected.

### Geometry check

The measuring method determines straightness, angles, alignment, and backlash of the machine kinematics and checks wear due to production use.

### Loading magazine check

The alignment of the loading magazine is recorded and corrected where necessary, as it can affect the smooth running, the service life of the spindle bearings and the quality of the entire process.

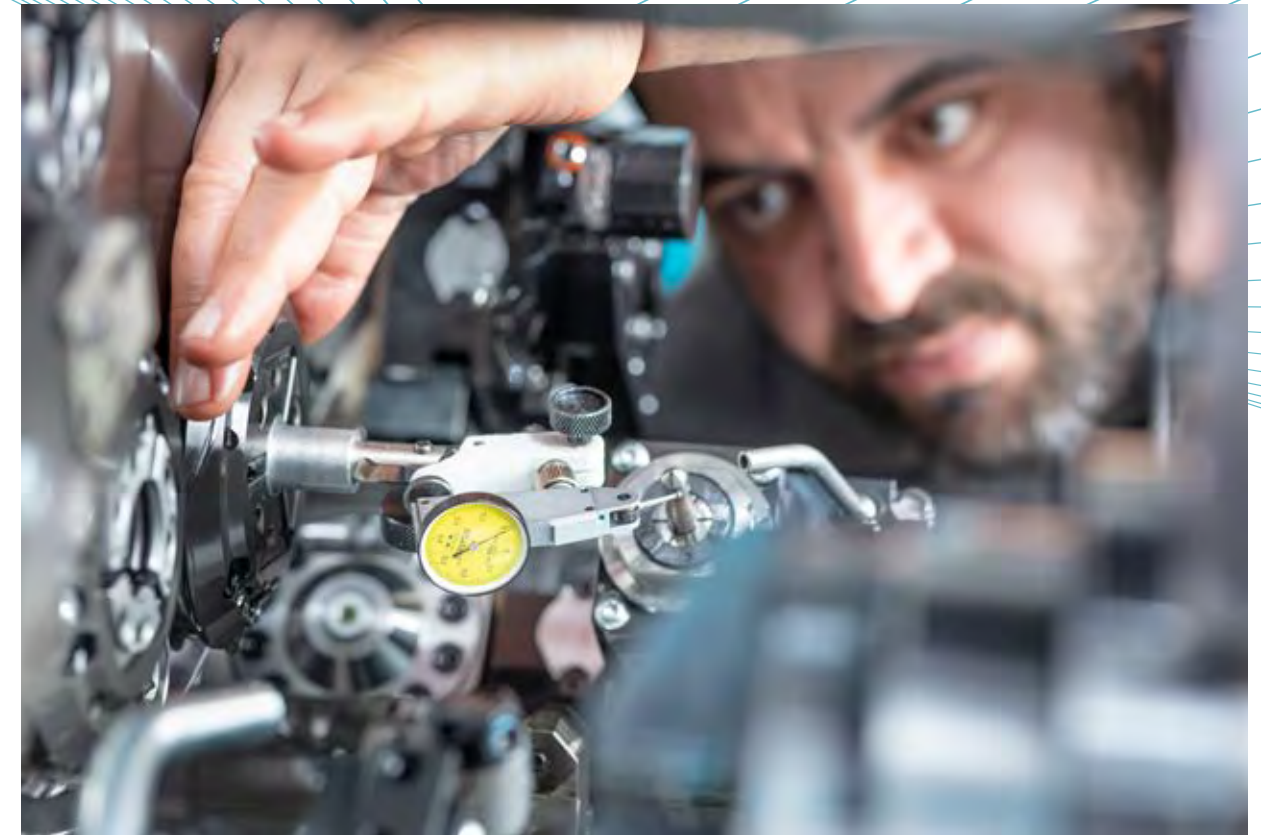
the customer's maintenance personnel and production supervisors is of great importance: "The supervisors know how their machines are used and which parts are particularly exposed. With the insights gained from the machine check and regular maintenance we can keep the machine in perfect working condition for a long time.

## Maintenance— Individually configurable

Maintenance is the be-all and end-all when it comes to the availability of your machine. Dimitris Ntinoudis, a service technician specialized in INDEX turn-mill centers, explains: "For us, cooperation with on-site maintenance engineers is of utmost importance. Therefore I like to include the responsible supervisor in the planning, discuss the work to be done and explain what matters to us during maintenance."

We start by checking the condition of the machine, make important adjustments and change filters. The customer then receives a maintenance log. "We discuss all recorded data and, on this basis, recommend an individual maintenance plan aimed at maximizing process reliability and availability," explains Ntinoudis. Various maintenance packages are offered at attractive fixed prices according to the machine type. The content of the packages can also be individually adapted and supplemented.

Maintenance by INDEX specialists means a lot more than just getting worn components replaced. Given their manufacturer expertise, they are able to detect errors even before these become noticeable. Dimitris Ntinoudis gives an example: "With a trace recording, we identify stiff bearings, guides or ball screws that have to be replaced soon. Together with the customer, >



we then attempt to schedule a suitable repair date."

## Ideal for new, existing and used machines

The machine check has many areas of application. It is even useful for new machines, as Gümüşsoy explains: "When customers invest in a multi-spindle machine for the first time, for example, they frequently have little experience with this technology. When we visit after one year to perform the machine check, we explain to the responsible persons on-site what tests and inspections are important, what conclusions can be drawn from it and what one should pay attention to throughout the year. When we do this together for several years, the customer gets to know every detail of their machine."

There is no doubt that a machine check is well worth it for machines that have been in use for several years, frequently running 24/7. Wear cannot be avoided, and even small operating errors can have lasting effects. Kemal Gümüşsoy explains: "Of course, in this case, we also recommend regular checks, whereas the customers can determine the interval and the scope themselves. At the very least, we should perform the check when the machine is converted for a new order after it has been in use for an extended period of time. We've seen cases where defects in components did not have any negative effects, but once these components were then

used for a new order, it was no longer possible to achieve the required tolerances and surface quality. Having us check the machine before it is set up for the new project saves money."

We also offer the machine check for used machines. Customers who wish to sell their INDEX or TRAUB machine and want an expert condition assessment to present to the buyer (including an estimate of the required repairs) are welcome to contact our service personnel. We provide objective condition reports that can be useful during sales. X

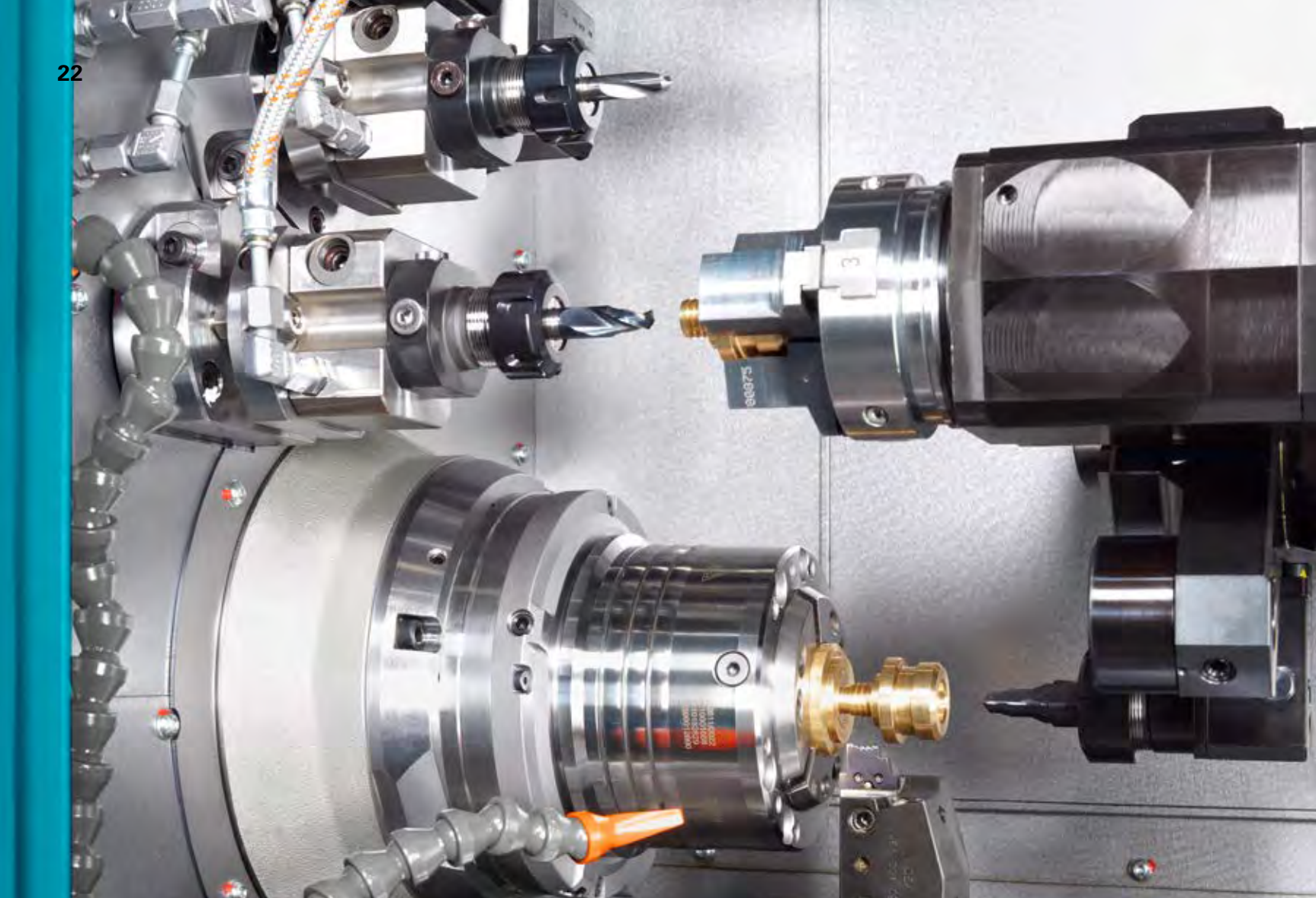
## INDEX machine check—your benefits

- ▶ Comprehensive inspection for ensuring technical availability
  - ▶ For all machines—with packages tailored to the customer's needs
  - ▶ Expertise and competence directly from the manufacturer
  - ▶ Attractive fixed prices with full cost control
- > [index-traub.com/machine-check](https://index-traub.com/machine-check)

## INDEX maintenance—your benefits

- ▶ Avoid unscheduled downtimes
  - ▶ Increase the service life of your machines
  - ▶ Custom maintenance agreements and intervals
  - ▶ Attractive fixed prices with full cost control
- > [index-traub.com/maintenance](https://index-traub.com/maintenance)





## Continuity—with fresh prospects

There's a new INDEX ABC CNC automatic lathe? Yes—but don't worry, dear ABC fans; despite major improvements in the upper turret such as an electronic indexing axis, Y functionality, height adjustment, and double tool holders, we have of course retained the valued features of the current model: the machine design, the working area, and the machine footprint are all still exactly the same. All existing part programs run as before, guaranteed without any loss in cycle times and machining quality.

The INDEX ABC CNC automatic lathe is a successful model that shows impressive continuity: Over a good 25 years, we have sold over 3,000 of the machines.

Evolving them into the new ABC version was therefore a task carried out with great care. "The INDEX ABC has greatly matured over the years," says Ulrich Baumann, head of development for single-spindle automatic lathes. "Again and again, we have increased its efficiency through improvements in the control and drive technology, as well as in the mechanical components. It was a major challenge, then, to main-

tain the enormously high level of the predecessor model and, on this basis, provide extended functions for even more efficient, versatile machining."

But the result is a resounding success: Beneath the updated, attractive INDEX design, users will find a machine that has remained unchanged in size and installation space. This was an important part of the new development work, which needed to take account of the numerous programs and workpiece-specific devices that are still running on machines out in the field today. ➤



A major challenge in the development of the new INDEX ABC was to maintain the enormously high level of the predecessor model and, on this basis, provide extended functions for even more efficient, versatile machining.

**Ulrich Baumann** is Head of Development and Design of Single-spindle Automatic Machines at INDEX



### Keeping the good

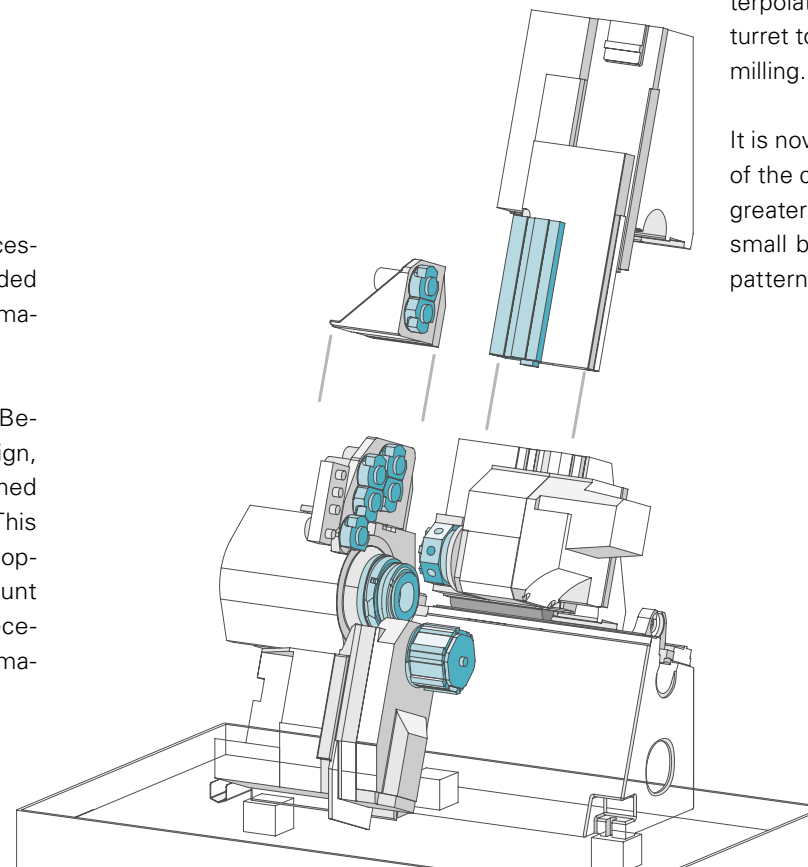
There was a second requirement: In terms of machining capabilities, cycle times, and dimensional accuracy, the new version must under no circumstances lag behind the previous one—not even if it features other, new functionalities. The developers provided proof of this by directly comparing the current-generation ABC and the modified machine, both of which were set up identically. The result: The new version performs slightly better in the comparison of cycle times and in dimensional accuracy over the machine duty cycle (thermal cycle). In the area of limit cutting (depth of cut during grooving), it achieved the usual high level.

This means that existing ABC users can perform any machining operation that has been extensively optimized in terms of tool and program technology at least as well on a newly acquired INDEX ABC—and will also see other gains elsewhere: For new machining tasks, extended functions are available that promise even greater efficiency and a wider range of components.

### Focus of optimization: the upper tool turret

The improvements are mainly concentrated on the upper turret, where a high-ratio, stepless gearbox replaces the stepped positioning previously realized via a Hirth serration. This allows the turret to assume any position, and opens up a wide range of possibilities, such as an interpolated Y axis that enables the upper ABC turret to perform off-center drilling and surface milling.

It is now also easier to adjust the center height of the cutting edges, which both enables even greater precision during internal machining of small bores and improves the surface or chip pattern.



The potential to use double tool holders offers a further benefit: With the same turret size and number of stations, it increases the number of tools from the previous seven to up to 14 fixed or live tools. This advantage can be used for sister tools or a larger machining spectrum. Another station is permanently preassigned by the synchronous spindle for rear-end machining.

### Equipped for future tasks

With the continuously indexable turret, its Y functionality, height adjustment, and multiple holders, we are convinced that the INDEX ABC will continue its success story. After all, this small, extremely fast CNC production lathe now also accords with the current market trend of smaller batches and more complex geometries. Its excellent value is also set to benefit parts that would previously have required a more expensive machine. X



### INDEX ABC machine highlights

- ▶ Footprint and working area unchanged from predecessor models
- ▶ Top values for cycle time, dimensional accuracy, and cutting limits
- ▶ Continuously indexable tool turret
- ▶ Tool turret equipped with Y axis, height adjustment, and double tool holders
- ▶ Automation through bar loading magazines and removal handling

More online:

➤ [index-traub.com/abc](https://index-traub.com/abc)

info



# Efficient manufacturing with intelligent automation

Automation solutions “Made by INDEX” ensure intelligent handling of your workpieces. We offer a wide range of options for our complete machine range, from bar loading magazines and machine-integrated or automated robot solutions to customized, application-specific solutions — everything from a single source.

## Bar loading magazines

INDEX bar loading magazines are ideally matched to our machines for single-spindle and multi-spindle turning. They feature short setup times, optimal speed utilization, fast bar changes and a low-vibration bar guide for first-rate surface qualities.

## Machine-integrated solutions

Our machines offer you a range of options for quick, safe and gentle workpiece feed and discharge, e.g.:

- Flexible feed and discharge by gantry-type loaders with single or double grippers
- Gantry systems with conveyor belt for workpiece discharge
- Flushing through the counter spindle

## Automated robot solutions

With the iXcenter robot cell, blanks and/or finished parts can be supplied and discharged quickly, safely and flexibly. Depending on the machine type, the robot cell is ergonomically integrated and/or can be flexibly expanded on a modular basis to meet your needs.

## Customized solutions

The right solution for your specific requirements—with years of experience in a wide range of sectors:

- Conveyor systems/circulating conveyors
- Gripper on turret
- Unloading systems
- Magazine rails
- Gantry loading systems
- Pallet stations
- Robot cells, and much more.

Do you want to find out more?

➤ [index-traub.com/automation](https://index-traub.com/automation)

## What could optimal automation of turned part manufacturing look like?



**Benjamin Baron**, Head of Automation at INDEX, is convinced that the modular iXcenters are the answer to this question. In a conversation with the editorial team of TURNINGpoint Baron reveals the strengths that characterize the robot cells and how they can be integrated into the manufacturing.

### Mr. Baron, to which customers would you recommend an iXcenter solution?

There isn't a specific customer profile for the iXcenter. The requirements and areas of application are very diverse. This includes, for example, running shifts in the evening or over weekends. The iXcenter in particular has a very attractive price-performance ratio and when the system is used for night shifts and weekend shifts, it quickly pays off. This makes it suitable for a wide range of customers. Small batch sizes with frequent tool setups is another area where a modular iXcenter provides excellent service, with advantages such as the automated gripper change. Other features are the integration of upstream or downstream processes, position-oriented feed and discharge, flexible setup options for new workpieces or complex feed processes, e.g. rotationally asymmetric workpieces in a special clamping device.

### Do you consider the jointed-arm robot to be the universally best automation option, or do you also recommend gantry solutions for some applications?

At INDEX, we always find the best possible solution for the customers and their applications. For each project inquiry, we review which automation solution would be best. Of course the jointed-arm robot is unmatched when it comes to flexibility and integration of downstream processes, but in some cases other requirements such as installation space, price or speed take priority and can be better fulfilled with other automation solutions, depending on the workpiece and machining process.

### What is behind the modular concept of the iXcenter robot solutions?

From the viewpoint of the customer, the situation is as follows: Depending on the workpiece and machining time, there are relatively long downtimes for workpiece handling—regardless of whether a gantry or robot solution is used. Using modular robot cells makes it possible to integrate downstream processes like cleaning, measuring or labeling. These times can thus be put to good use, which significantly increases the added value offered by the automation and the entire system. For INDEX, the iXcenter is an important component of the portfolio. The modular design enables us to create competitive solutions within the framework of a complete package, for a wide range of customer-specific requirements.

### What other downstream processes can be integrated into the cell?

With the iXcenter, we distinguish between machine-integratable and modular solutions. For the machine-integratable solutions, the focus is on the compact design and on loading and unloading the machine. Smaller special solutions such as blow-off stations or measuring devices are also possible. In the case of the modular iXcenter, we focus on flexibility and can integrate a multitude of upstream and downstream processes, such as various cleaning, measuring and testing procedures, deburring stations or marking systems.

### What feedback have you received from the customers so far?

All feedback from the field has been positive. We have hit the right spot with the iXcenter. In addition to the product being good from a technical viewpoint and featuring perfectly matched interfaces, it is also worth mentioning that INDEX acts as complete provider. This means that the customer gets the machine and robot cell from a single source. Whether the customer has a project inquiry or wants training, help with commissioning or service — they always have a central point of contact for all their needs. And the complete system is a visual highlight as well, as everything is harmonized.

### How can the iXcenter automation solutions be integrated into digital, networked manufacturing?

Via the machines' connections to our iXworld, our automation solutions are of course also connected to a digitally interlinked manufacturing line. X





## All-rounder for tool manufacturing

Two years ago, we introduced our new CNC universal lathes, INDEX B400 and TRAUB TNA400. In the meantime, they have proven themselves at many customers. For example, at Rennsteig Werkzeuge GmbH: Here the TRAUB TNA400 demonstrates its flexibility day after day in tool manufacturing. It is used to produce small, large and very complex parts, with mostly small batches.

RENNSTEIG hand-held tools are world famous for their high quality, as well as the ergonomic and practical functionality. The pliers and striking tools are frequently used for cabling work, but also in sanitary installation, metal processing, construction and assembly, as well as for special applications, on construction sites, in workshops or for repairs to vehicles and aircraft.

The spectrum ranges from standard products to customized special tools. One example: RENNSTEIG developed a special crimp tool for repairing cabling in aircraft. It handles crimping of insulation and conductor in a single work step — with a precision of two hundredths of a millimeter!

### Tool manufacturing produces sophisticated components in very small batches

The special features of the RENNSTEIG hand-held tools include innovative production processes, high-quality material, high precision manufacturing and a design that is focused on durability. Additionally, RENNSTEIG conducts intensive research and development and has its own tool manufacturing and prototyping department, headed by Gerhard König. He explains: "Our department has an extremely varied spectrum of tasks. It ranges from prototype parts for new developments through to fixtures, forging dies, cutting and injection molding tools as well as components for our in-house machine >

manufacturing." An essential characteristic of the components that need to be produced with high precision in every regard: They are only needed in very low production quantities.

The tool manufacturing and prototyping department has 22 employees. Steffen König is the son of the tool manufacturing head and will become his successor in the fall. He explains: "We need modern, versatile machinery that covers all important machining methods. Two years ago, our existing CNC lathe no longer met our requirements, and we set out to find a new one. In the end, we chose the TRAUB TNA400."

### CNC lathe retooled up to five times per day

The tool manufacturing requirements at RENNSTEIG are high. The diameters of the parts produced range from 2 mm to 250 mm. "I'd love to have a machine that can handle a workpiece length up to 1,000 mm," reveals Gerhard König. "But we couldn't find one that was suitable for us. However, we are very satisfied with the 750 mm turning length of the TNA400, since it covers more than 90 percent of our needs." Steffen König adds: "The lathe has to have a high stability, to ensure that even large parts can be manufactured with extreme precision in the range of one to two hundredths of a millimeter." >



What I value about my TRAUB TNA400 CNC lathe is its power, stability, user-friendly handling, and easy setup. The TRAUB WinFlex software, which runs on a separate PC, is of great help. It supports fast and secure programming of the TNA400, including simulations.

Christian Annemüller is the responsible machine operator at RENNSTEIG



In RENNSTEIG's tool manufacturing, the CNC lathe has to be extremely flexible. After all, it is retooled several times per day.

From right to left: Steffen and Gerhard König, the heads of tool manufacturing, Christian Annemüller, the machine operator, and Robin Gehrt, INDEX area sales manager



Other key aspects were good accessibility and easy setup, because in RENNSTEIG's tool manufacturing, the machine is retooled several times per day. "We have to keep the non-productive times short," says Steffen König. "To us, that is much more important than a program that has been optimized to the last millisecond."

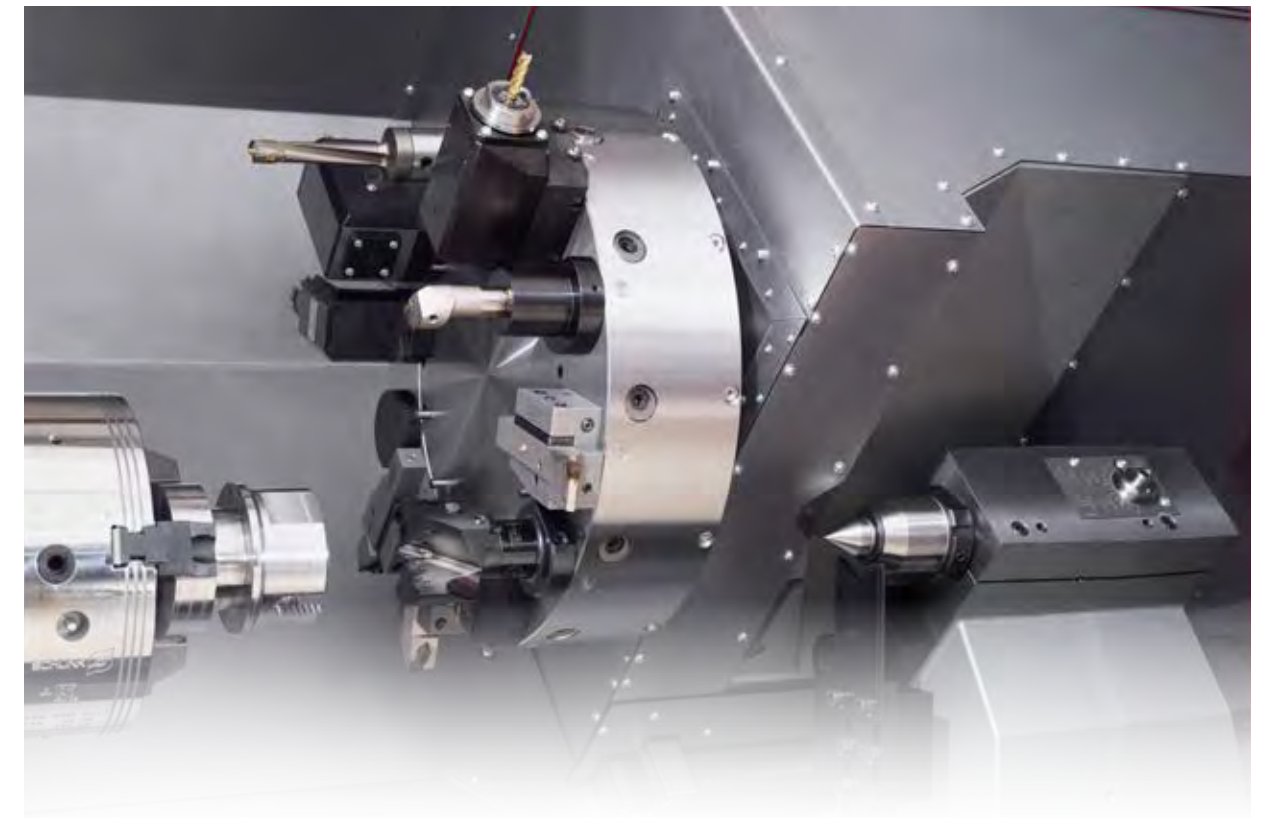
#### Universal, powerful, and flexible

"With the TRAUB TNA400, we have found a machine that meets the high demands of our tool manufacturing," agree Gerhard and Steffen König. "Our first impression of the machine, at EMO 2019, was confirmed during an on-site visit to INDEX's demonstration center, where we were able to examine the universal lathe in action." Since September 2020, the TRAUB TNA400 has been in use in RENNSTEIG's tool manufacturing department in Steinbach-Hallenberg—and it meets the high expectations of the decision-makers.

The mineral-cast machine bed with generously dimensioned guides ensures high rigidity and a low level of vibration. "This makes a decisive contribution to achieving the required precision," confirms Steffen König. The belt-driven main spindle with an A8 short taper and 24 kW of output ensures powerful machining. The opposite side features a tailstock that is mounted on generously dimensioned roller guides and can be freely positioned from within the NC program.

For the turret, the tool manufacturer chose TRAUB's renowned disk-type turret with twelve VDI40 mounts. Compared to the radial turret, which was also considered, it has advantages when using large solid drills/boring bars, as the forces are conducted directly into the turret. "For live tools, we use a supplementary quick-clamping system that further accelerates setup," mentions Gerhard König. The orthogonal, linear Y-axis provides an additional degree of freedom. It gives the tool manufacturer the required flexibility, which benefits the complexity of the parts that can be machined.

Steffen König points out the compact design and good accessibility of the TRAUB TNA400. This is convenient for the machine operator, who can perform all setup tasks in close proximity to the machine. The programming is done from a bit further away, at a PC workstation. To this end, the machine operator uses the TRAUB WinFlex software, with which 3D part data can be loaded and used for the NC programming. Steffen König explains: "WinFlex eliminates the need for a separate CAM system, because the software offers powerful functions for programming, optimization, and simulation. We can quickly and securely perform the programming while machining is in progress on the machine, and then transfer the completed, tested programs to the controller." X



#### What sets the TRAUB TNA400 apart:

- ▶ Rigid, low-vibration mineral cast bed in 45° block design
- ▶ A8 working spindle with belt drive for high torques
- ▶ Spindle clearance Ø 82 mm, chuck up to Ø 315 mm
- ▶ Generously designed bed guides
- ▶ Radial or disk-type turret for 12 tools
- ▶ Orthogonal, linear Y-axis
- ▶ Option of NC tailstock or counter spindle



#### Rennsteig Werkzeuge GmbH

Since 1959, RENNSTEIG has been producing professional hand-held tools for various sectors. The company became an independent subsidiary of the well-known tool maker KNIPEX-WERK C. Gustav Putsch KG in Wuppertal, Germany, in 1991. Today it is considered to be one of the world's leading tool manufacturers, with a global network of sales partners and an export share of more than 50 percent. RENNSTEIG has more than 350 employees at its headquarters in Steinbach-Hallenberg in Germany and its US subsidiary.

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## The versatile world of gearing technology

In the past, gears were largely produced on special gear-cutting machines. With the constant improvements to modern lathes and turn-mill centers, such as directly driven tools and motorized milling spindles, there also are more options for process integration. Over the course of time, INDEX has implemented a growing range of gear cutting methods on its machines. **Volker Sellmeier** provides an overview and explains the special challenges for e-mobility drive trains.

The world of gear cutting is very diverse. There are a multitude of different types of gear cutting and manufacturing processes. Important distinguishing features include external and internal gearing; running gears and splines; straight, helical or crowned gearings; spur, bevel, crown and beveloid gears worm and worm wheels etc. The gear cutting processes can be divided into single indexing or continuously indexing methods. Both of these categories can be further subdivided into rolling and non-rolling methods.

The best-known gear cutting procedure is probably **hobbing**, which can be used to manufacture straight and helical spur and beveloid gears. In turn-mill centers, the helical hob is fixed in the motorized milling spindle at one end, using the tool magazine. For turret lathes, there are special hob holders with adjustable angular heads in which the hobs are fixed on both sides. Our specific control cycle for hobbing, offers easy implementation and intuitive programming. This control cycle not only handles the required



The end users of pedelecs and e-bikes greatly value drives that are as silent as possible. This requires high precision, which can be reliably and economically achieved through process integration.

**Dr. Volker Sellmeier** is Head of Technology Development at INDEX



axis coupling, but also enables uniform tool utilization, by using different shift strategies.

A unique feature offered by INDEX is the ability to **cut spiral bevel gears** on turn-mill centers. Spiral bevel gears are among the most sophisticated gearing types, due to their complex shape and complex process kinematics. For a long time, cutting such gears required special bevel gear hobbing machines. Using INDEX turn-mill centers for complete machining of this kind of component provides several advantages. The bevel gears can be manufactured almost entirely in a single setup. This significantly improves the gear quality and dramatically reduces the cycle time. Flank modifications and the associated contact pattern corrections can also be quickly and easily implemented using the matching control cycle.

**Power skiving** is the tooth cutting procedure that currently has the highest growth potential. The reasons for this include the extremely high productivity of this cutting method and the possibility of creating gearing that tightly fits interference contours. This method is also very suitable for producing internal gearing. In the past, this required slotting machines. Power skiving can yield enormous productivity gains and cost savings. INDEX not only offers power skiving on

all turn-mill centers with directly driven motorized milling spindles, but also on the multi-spindle automatic lathes. The latter uses special directly driven power skiving units with flexible angle-adjustable base holders.

In the wake of growing electromobility, the topic of gear cutting is gaining increasing significance. The noise level inside electrically driven vehicles is much lower than in vehicles with combustion engines. This makes other sources of noise, for example from the power train and gears, more noticeable. This does not only apply to cars—end users of pedelecs and e-bikes also greatly value drives that are as silent as possible.

Thanks to process integration, INDEX customers have many new possibilities at their disposal. For example, clamping errors are a thing of the past when there is no need to reclamp between manufacturing the reference surfaces and the gear itself. In addition to the improved manufacturing quality, the reduced cycle times are also a great advantage, as gearing components can often be manufactured entirely from bar stock. This even includes deburring with integrated technologies such as chamfer cutting or radial tooth deburring during the continuous indexing process, or even just with brushes, which is a suitable method for small batch sizes. **X**



The current generation of e-bike motors contain a high number of gearing components. Running gears can be hobbled with INDEX C100/C200 automatic production lathes (left). The image on the right shows the INDEX MS40-6 multi-spindle automatic lathes during power skiving of external gearing by means of a directly driven motor spindle.



Watch the film now:  
[index-traub.com/e-mobility-video](https://www.index-traub.com/e-mobility-video)



# E-mobility drives growth

Our customer hGears AG has invited us to visit its factory in Schramberg, Germany. The company, which was founded in 1958, has long been specialized in the production and distribution of precision-turned parts, gear assemblies and system solutions. Today, e-mobility is its main area of focus. In this hGears division, the revenue has grown almost 60 percent in the past year and it is set to triple in the next few years.

Politics and environmental awareness drive the electromobility boom. The market researchers at *IHS Markit* have the figures to support this claim. According to a recent study, sales of electric and hybrid vehicles in Europe will grow around 43% per year between 2018 and 2025 (source: *IHS 2021*).

This information was provided by Managing Director Dr. Matthias Aust. He explains: "hGears AG has been listed on the Frankfurt Stock Exchange since May 2021. In the course of going public, we closely examined the e-mobility market and were pleased to see that our own forecasts were confirmed by an independent source."

## A promising basis for success: in-depth gear and toothing expertise

At hGears AG in Schramberg, the e-mobility division has the highest revenue. It produces thousands of gear assemblies daily—almost exclusively on INDEX multi-spindle automatic lathes. The set for e-bike drives consists of drive shaft and crankshaft as well as a crown gear.

These are high-precision components that can handle high torques, are lightweight, and have to be as silent as possible during operation.

This requires a lot of know-how and high-quality machinery, as Matthias Aust explains (see interview). His company is endowed with both, as the demand reflects: "According to the *Cycling Industries Europe (CIE)* trade association, an estimated 4.6 million e-bikes were sold in Europe in 2020. Based on our own calculations, our gear units can be found in approximately two million of these bikes."

## Excellent growth prospects

A decrease in order volume is not likely, since the market for e-bikes with mid-mounted motor and pedal support is expected to grow by approximately 22% annually between 2019 and 2025 (source: *Cycling Industries Europe*). "Additionally, the number of e-bikes with hub gears is increasing. This further expands the area of application for our high-precision components," adds Matthias Aust. ➤



hGears uses 38 INDEX multi-spindle automatic lathes to manufacture crown gears. Automation plays an important role: Every new machine is equipped accordingly.

## hGears AG

hGears is a global manufacturer of high-precision gear parts and components. Not only are the e-tools and conventional business areas growing, but so is the e-mobility sector. The headquarters of hGears AG are located in Schramberg, Germany, and the company has two additional (production) sites in Padua, Italy, and Suzhou, China. With 350 employees, the headquarters in Schramberg is the largest location. In 2020, hGears AG had a total of 862 employees and a revenue of 126 million euros.

hGears AG, Brambach 38, D-78713 Schramberg, Germany  
➤ [www.hgears.com](http://www.hgears.com)

## How does one become a leading provider of e-bike components?



**Dr. Matthias Aust** is the Managing Director of the hGears AG Schramberg site. With co-development services, extensive know-how in the fields of cutting machining and gear manufacturing, and a machinery pool with numerous INDEX multi-spindle automatic lathes, the Schramberg-based company has become a top supplier of high-precision e-bike gear components.

*Dr. Aust, what do you consider to be the biggest strength of your company, in particular in your e-mobility division?*

hGears AG has many years of experience in gear-cutting technology that we can bring to the table in our customer relations. This means that we ideally cooperate with our customers in a co-development process. Together we examine the components, optimize geometries and select the materials, so that the manufacturing process delivers the required precision, quality and economic efficiency. We are thus not simply a supplier, but also a development partner and service provider for prototype parts. This is very important for manufacturers of e-bikes and other electric and hybrid vehicles, as the requirements on function-critical parts are very high and frequently demand customized solutions.

*What kinds of e-mobility parts do you supply, and what aspects are particularly important with regard to these parts?*

While hGears in Padua also produces components for electric car drives, here in Schramberg we are first and foremost specialized in e-bike drives. For the current drive generation, for example, we supply a set that consists of drive shaft and crankshaft, as well as a crown gear. All three components are subject to very strict precision requirements, to allow transmission of the high torques while causing as little noise as possible. Keeping the weight as low as possible

is another challenge that we have to consider during the development process. We also still manufacture products for older drive generations, though in lower quantities.

*You almost exclusively use multi-spindle automatic lathes from INDEX to manufacture these parts.*

*Why did you choose this technology?*

That's correct. In Schramberg, we have a total of 40 multi-spindle machines—38 of these are INDEX machines, which in part are also used for our other two business areas. Compared to single-spindle automatic lathes, the technology is rather complex—but, once everything works, it is very successful. Setup, operation and maintenance requires qualified employees, which we thankfully have. For our large series, which are produced in three shifts on the multi-spindle machines all year round, the effort is certainly worth it.

In particular because the INDEX MS machines with six or eight spindles are particularly suitable for the complete machining of complex geometries for gear cutting. The parts come out of the machine completely finished and can immediately be transferred to quenching. Then they are ground and honed, if necessary.

*Why do you prefer the INDEX brand? What are the strengths of these machines, in your opinion?*

On the one hand, the technology is outstanding. Be it the compact spindle drum that forms the basis for high precision, the concept of having two tools working simultaneously on each spindle, or the synchronous spindle for reverse side machining—with INDEX machines, we know that everything will work as it should.

We have been working in close collaboration with INDEX almost ever since the company was established in 1958, therefore we know the machines inside and out and are able to make the most of them. The crown gear that enables free-wheeling in e-bikes is manufactured on the INDEX MS40-6, for example. ✕





## Manufacturing time of electric motors halved

Konesko AS, the leading Estonian manufacturer of electric motors, built a new logistics plant in Türi-Alliku in 2019. At the heart of the production facility are two INDEX G200 turn-mill centers. With these two machines, Konesko has succeeded in completely machining electric motor shafts in a single operation — including the grinding and measuring processes. Savings achieved: 50 percent on the previous manufacturing time.

By Petri Kulman / “Eurometalli” magazine, Finland

Konesko operates an engine plant and an electrical components plant in Koeru, as well as a factory in Põltsamaa, where large and heavy metal parts are produced.

The logistics center in Türi-Alliku, built in 2019, is the newest and most modern site. For its production there, the electric motor manufacturer invested in two INDEX G200 turn-mill centers. A 60-meter Fastems flexible manufacturing system (FMS) with 592 pallet positions complements the production there and further increases the efficiency of the new factory. Gert Marmor, technical manager at Konesko,

explains: “We have many years of experience in the production of electric motors and are technically a good way ahead of our competitors. To maintain this top position, our production environment must feature cutting-edge machinery. We need machines with the latest and best technology, or we won’t be able to keep up with our global rivals.”

### Grinding and measuring — key factors when selecting a machine

Before deciding to go with the INDEX G200 machines, Konesko shortlisted two other manufacturers. Gert Marmor explains why the choice



We need machines with the latest and best technology, or we won’t be able to keep up with our global rivals.

Gert Marmor is Technical Manager at Konesko AS

fell to INDEX: “For shaft machining, we need machines that can turn and mill. In this respect, the INDEX G200 machines were miles ahead of the competition. On top of that, INDEX has many years of experience in integrating the grinding process into the machines, which was also something we were looking for.” Another important point was the integrated mechanical measuring unit, as the technical manager says: “In our machining processes, a lot of cooling lubricant always adheres to the workpieces, which is why mechanical measurement is more accurate and reliable than with a laser.”

Extensive quality control takes place at Konesko. “All errors are immediately analyzed and fed back to production, where the cause is then eliminated. Since the new INDEX machines have extensive measuring functions, we immediately integrated them into our quality assurance processes.”

### INDEX G200 — ideal for flexible production of small batch sizes

The equipment installed on the two INDEX G200 machines at the logistics center in Türi-Alliku makes them extremely versatile. Each one features three tool carriers with a Y

axis that can act on the main and counter spindles. Two turrets are located underneath the workpiece, while the turret above is combined with a dynamic milling spindle. The B axis, which can be rotated through 360°, enables highly flexible use of this tool carrier. All three turrets feature 14 VDI25 tool stations, which can also be equipped with live tool holders. The powerful milling spindle with HSK-A40 tool holder in conjunction with the hydrodynamically mounted Y/B axis facilitates demanding drilling and milling operations. It is supplied from a magazine with six tool posts. >

One of the new INDEX G200 machines is equipped with a bar loader, the other with the WHU workpiece handling unit and a mechanical measuring device.



More customer success stories online:

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Gert Marmor, technical manager at Konesko AS and Sakari Palho, sales manager at INDEX-TRAUB Finland Oy, were jointly responsible for introducing the INDEX G200 flexible turn-mill centers into the new Türi-Alliku logistics center in Estonia.

In addition to turning and milling, the INDEX G200 is ideal for numerous other machining processes such as grinding, internal and external gear cutting, and deep-hole drilling. Even complex components that place extreme demands on machining precision can be produced on the INDEX G200 in a single setup. Non-productive times can thus be reduced to a minimum. The precision of the two INDEX G200 machines is due in part to the rigidity of the machine bed, thermal and dynamic stability, and very good vibration-damping properties.

#### Production capacity increased

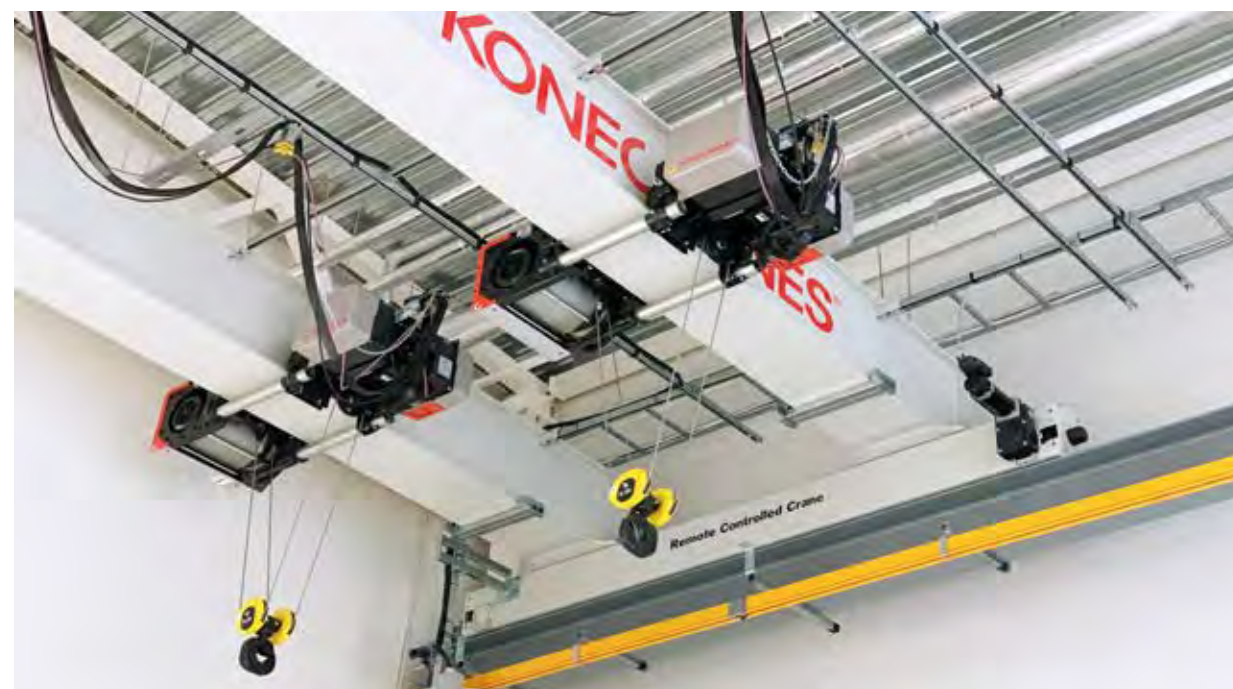
One of the new INDEX G200s is equipped with a bar feeder and a circulating pallet conveyor. The other one can be loaded and unloaded with the integrated workpiece handling system. The latter supplies the measuring device so that the workpieces can be measured immediately after cutting and the data is ready for the next work step.

The two INDEX G200 turn-mill centers have significantly increased Konesko's production capacity. Gert Marmor explains in more detail: "As machining times with the new INDEX machines are only half as long as with our previous manufacturing solution, we can now produce shafts for 100,000 electric motors per year. We

receive completely finished workpieces from the machine, where previously it was necessary to change machines. In addition, the automatic workpiece handling leaves the machine operators more time for other tasks."

Gert Marmor is also pleased with the services provided as part of the machine purchase: "INDEX fully met our requirements. Delivery of the machine, the related setup work, training — it all went perfectly. Customer support and service are also excellent." As a result, he is already working on new plans: "The next development project will see us upgrading our motor production in Koeru. There, too, we plan to purchase INDEX machines." X

Konesko has the capacity to manufacture 100,000 electric motors per year, which are delivered as ready-to-install components. The electric motor shown below is used as a traversing motor for an overhead crane.



#### Konesko AS

The Estonian company Konesko was founded in 1992 and originally produced mainly stator windings for electric motors. In 2003, long-time customer and partner Konecranes Oyj relocated its entire motor production from Finland to Estonia.

The Finnish group, which specializes in cranes and lifting equipment, also acquired a 49 percent stake in the business. In the following years, Konesko established new plants and increased its employee numbers to a present 385. In 2019, the company generated revenue of approximately 73 million euros.

Konesko AS  
Paide tee 26, Koeru, 73001 Järva maakond, Estonia  
➤ [www.konesko.ee](http://www.konesko.ee)



News ticker



**Additive metal manufacturing— as simple as possible**

In March 2021, INDEX took over TRUMPF's majority share in **One Click Metal GmbH**. This participation provides One Click Metal with additional know-how and capital to continue its growth trajectory in the very promising entry-level segment for 3D printers. TRUMPF remains involved as an active and strategic partner.

With a workforce of about 20 employees, One Click Metal develops comprehensive solutions in the field of metal 3D printing for small and medium-sized components. From programming to printing, to unpacking and the powder cycle, all process steps are geared towards the simplest and most convenient use. The startup is headquartered in Tamm, near Ludwigsburg.

One Click Metal's customers include businesses from the mechanical engineering, tool manufacturing, medical technology and automotive industries, as well as training centers. They use the systems not only for product development and prototyping, but also for industrial production of individual parts and small production runs.

➤ [www.oneclickmetal.com](http://www.oneclickmetal.com)



**Excellence recognized!**

We are happy to announce that we recently received no less than three innovation awards from China. Our new INDEX MS24-6 multi-spindle automatic lathes were twice awarded as highly innovative product by expert juries. Additionally, we received the "Innovator of the Year" award from the "International Metalworking News" trade magazine. Thank you to the respective juries—we are elated!



**Autonomous manufacturing**

The main components of our new turning centers (e.g. turret slide, spindle units, housing parts, etc.) were designed such that they can be manufactured with only a few setups and without interruptions for testing. This places the focus on the autonomous use of the manufacturing facilities in Deizisau and Esslingen. The machines are connected to a powerful flexible warehouse system, which currently has a capacity of 112 machine pallets. The pallets are loaded with raw parts, so that they can be machined without any operator supervision. The parts are then washed, deburred, checked, and transferred to the so-called "supermarkets" in the assembly areas. This procedure increases machine utilization and the internal production capacity. The production can now be better adapted to fluctuations in demand.



**Exhibition and event highlights 2022**

- NORTEC, Hamburg, DE ➤ 25 – 28 January 2022
- SIMODEC, La-Roche-Sur-Foron, FR ➤ 08 – 11 March 2022
- TECHNISHOW, Utrecht, NL ➤ 15 – 18 March 2022
- OPEN HOUSE 2022** ➤ 21 – 25 March 2022
- SIAMS, Moutier, CH ➤ 05 – 08 April 2022
- CCMT, Shanghai, CN ➤ 10 – 14 April 2022
- Intertool, Wels, AT ➤ 10 – 13 May 2022
- Global Industrie, Paris, FR ➤ 17 – 20 May 2022
- IMTS, Chicago, USA ➤ 12 – 17 September 2022
- AMB, Stuttgart, DE ➤ 13 – 17 September 2022
- MSV, Brünn, CZ ➤ 03 – 07 October 2022
- JIMTOF, Tokyo, JP ➤ 08 – 13 November 2022

**Welcome@INDEX**

On January 1, 2021, Mr. Crispin Taylor was appointed as President/CEO of INDEX Corp., Noblesville, USA. On the same date, Mr. Mathias Johansson took over management of INDEX-TRAUB Nordic AB located in Spånga, Sweden. Additionally, Mr. Sebastian Treuchtlinger was appointed as Managing Director of INDEX Slovakia as of April 1, 2021. We wish them all the best!



Mathias Johansson



Crispin Taylor



Sebastian Treuchtlinger



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TURNINGpoint 08.2021 // September 2021

**Publisher**

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**Printing**

Typodruck GmbH & Co.KG, Tuttlingen

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For reasons of better readability, the masculine form has been chosen in the text, the information refers of course to all genders.



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