

Custom-made coated tools within 5 days – no problem thanks to the power of NUMROTO



With the express offering of 'production of custom tools within 5 days', INOVATOOLS distinguishes itself from all the other tool grinders with a unique feature: within one working week, INOVATOOLS is able to deliver custom-made tools tailored to the individual requirements of the customer, including the coating. This includes special solid carbide cutters and drills with dimensions between 0.1 mm and 32 mm. In addition to custom-made tools, INOVATOOLS also develops and manufactures standard tools in batches as well as high-precision parts for mechanical engineering. The tools are used around the world by customers from a wide variety of industries, such as mechanical engineering, aeronautical engineering and the automotive industry as well as in the tool and mold making sector. There, these high-quality tools from INOVATOOLS contribute to effective business solutions for their customers.



For over 25 years, INOVATOOLS (Eckerle & Ertel GmbH), in the heart of Bavaria, has been known for providing the very best quality and service. Practically from the beginning, from the initial purchase of CNC tool grinders with NUMROTO, INOVATOOLS has been working with NUM. In the meantime, the number of CNC machines in INOVATOOLS's factory has increased to more than 90, most of which are equipped with NUMROTO. With their headquarters in Kinding/Haun Stetten and four other production facilities in Weimar, Austria, Portugal and Turkey, INOVATOOLS is relatively close to customers and ideally located from a logistics point of view. In these locations, INOVATOOLS is able to provide comprehensive service to their customers as well as on-site at the customer. A worldwide active sales network with offices in various countries is available for customers in Europe and Asia.

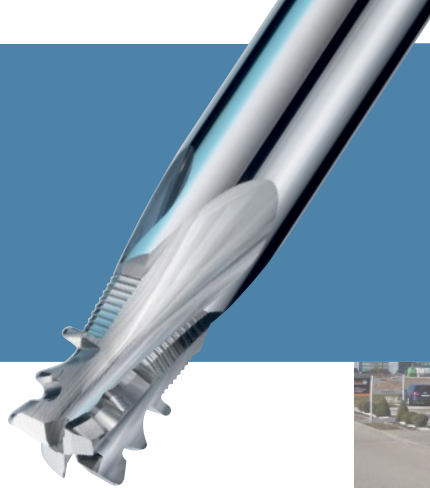
INOVATOOLS and NUMROTO are well aware that the demands of customers and markets are constantly changing. Because

Above: f.l.t.r. Mr. Jörg Federer, Head of Application Technology NUMROTO, Mr. Jochen Eckerle, Head of Production at INOVATOOLS and Mr. Dennis Marz, Development Manager at INOVATOOLS.

Right: INOVATOOLS uses tool grinding machines, equipped with NUMROTO, from various manufacturers.



for INOVATOOLS



Left: Drills and Cutters ready for delivery. INOVATOOLS has a production output of 30,000 tools per week.

Right: The new INOVATOOLS solid carbide HPC milling cutter, FIGHTMAX, with special enhanced durability and tenacity for the processing of steel.



of its experience in various industries and close cooperation with partners such as NUM, INOVATOOLS is able to give customers a key advantage in a very competitive market. For this reason, INOVATOOLS put its first coating plant into operation in 2002, and has subsequently acquired the ability to be involved in the entire value chain of the precision tool manufacturing process.

More than 200 employees produce over 2 million tools for customers annually. One of the specialties in the house of INOVATOOLS is the production of complex custom-made tools with the NUMROTO form-cutter software. In this regard, INOVATOOLS offers a unique express service of 5 days. This means that INOVATOOLS can manufacture and apply a coating to a custom-made tool within 5 days of the customer's request. This is a very impressive and unique service in the industry.

"Our in-house specialists are trained continually. NUMROTO is a very flexible software package that helps us a lot in this regard. Once an employee has been trained, they are able to operate, by means of the multi-user operating system, every machine that runs NUMROTO", says Mr. Jochen Eckerle, who also adds: "The master programs were created here in Kinding and subsequently adopted and used by the local branch offices in the production process". "A lot of time can be saved by means of this process and a seamless data backup process has also been established", Mr. Federer concludes.

FIGHTMAX – the solid carbide HPC milling cutter

With FIGHTMAX, INOVATOOLS is sending a well-trained HPC fighter into the ring. This powerful tool is especially useful when processing steel and hardly shows any signs of wear, even when used for longer time periods, while its endurance capacity is equally impressive. The solid carbide HPC milling cutter consists of tough micrograin carbide, which is able to successfully deal with the difficult loads that the tool is confronted with. The h5-quality shaft design with 0.005 mm rotation accuracy ensures quiet and vibration-free usage. The highly unequally split and unequally twisted geometry of the 4-edged tool in combination with reinforced cutting edges contribute to its vibration-free operation and enables high feed rates, even at high cutting depths. The large groove cross-sections with ultra-smooth finishings ensure optimum chip flow away from the contact zone. The special VAROCON PLUS smooth coating not only supports the quick removal of the splinters, but also makes the FIGHTMAX resistant to wear and extreme temperatures. The FIGHTMAX is available in a short and a long version in diameter ranges between 6 mm and 20 mm.

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NUM 
CNC HighEnd Applications



numroto® flash

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September 18 to 23, 2017,
Hanover, Germany



March 14 to 17, 2018,
Augsburg, Germany

Exhibitions in 2017 & 2018 – NUMROTO will be there

This year, NUM will be demonstrating NUMROTO at various trade fairs world-wide. We will show you the latest NUMROTO innovations and will be at your disposal for constructive dialog. Visit us at the above-mentioned trade fairs. Our team is looking forward to meeting you. Go to our website num.com to find our respective stand numbers before the start of the trade fairs.

And of course, there will also be many machine manufacturers on site with machines that are equipped with NUM CNC systems and NUMROTO.

Networking offers opportunities and security protection against hazards

Slowly but surely, everybody started to realize that networking in the future of production, i.e. Industrial Revolution 4.0, is indispensable. The development has been in progress for a long time, a name was given to it and thereby brought it to the foreground. Terms such as Industry 4.0 or Smart Factory etc. are on everybody's lips. As mentioned before, this digitalization of the production process has existed for a long time. The novelty is that the explicit naming of this development and the targeted promotion in the communication thereof has given special impetus to it. The NUM CNC control system and the NUMROTO software already have the necessary infrastructure to accommodate the needs of Smart Factory. Various solutions for tool production have already been successfully implemented. The specific requirements for the various projects are different and we will implement them according to existing knowledge. For example, on each tool grinding machine of NUMROTO job manager (NRControl), data such as order numbers, current workpiece number, process states (Start, Stop, Error), etc. can be made available for higher-level systems in real time. It also allows you to accept new tasks that need to be completed.

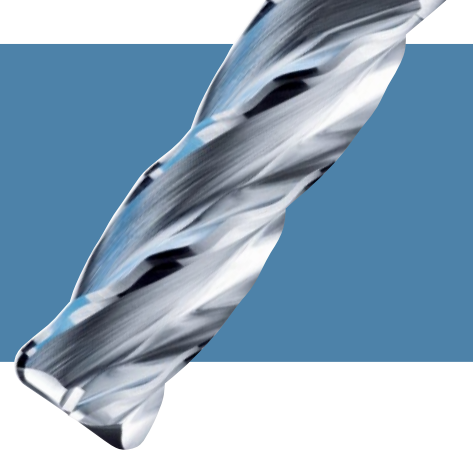
Although the machines are becoming more and more autonomous, and can also be operated without any employees, the set-up and other special situations require human intervention. Risks related to people operating the machines must be catered for in accordance with the applicable statutory provisions. First of all, this requires a risk analysis on which all of the following steps are based. Thanks to the modern and flexible Flexium+ control system, it is possible to safely operate a tool grinding machine in the most optimal way.

Visit us at this year's EMO trade fair in Hanover. Our stand will have our entire product range, and our service offering that is of particular importance will also be available. And, of course, NUMROTO will also be there. We would like to meet you personally at our stand. We would be happy to discuss your specific project solution with you.

Peter von Rüti, CEO NUM Group

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NUMROTO – Innovations



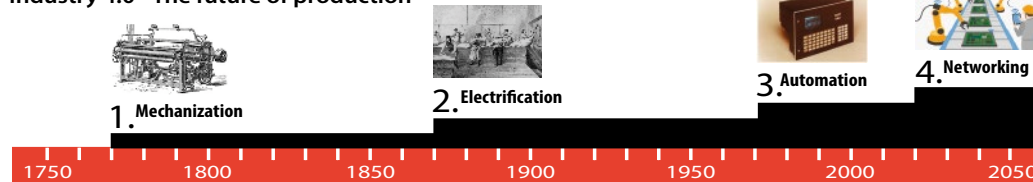
NUMROTO and Industry 4.0

The term "Industry 4.0" is on everybody's lips. It came about in 2012 in conjunction with a "Zukunftsprojekt (Future Project)" of the German Federal Government. "4.0" stands for the fourth industrial revolution.

The fourth industrial revolution is preceded by the following industrial revolutions:

- Mechanization with water and steam power (250 years ago)
- Mass production with the aid of conveyor belts and electrical energy (150 years ago)
- Automation with the use of electronics and computers (50 years ago)

Industry 4.0 - The future of production



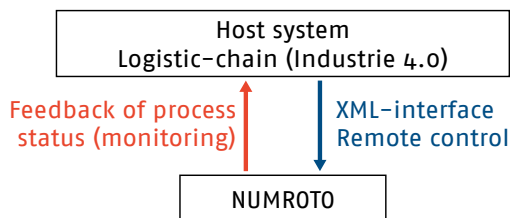
Digitization and networking really stands out when it comes to the fourth industrial revolution. Consequently Industry 4.0 covers the following areas:

- Networking of machines, devices, sensors (Internet of Things IoT: see blue info box)
- Transparency of information: A representation of the real world (sensors and process states) within digital virtual models
- Monitoring systems that support people
- Segmentation, decentralized decision making

Dynamic, real-time-optimized and self-organizing, cross-company value-added networks emerge through the combination of people, objects and systems.

Since the term "Industry 4.0" was only created about 5 years ago, much of it still remains in the design phase. The decades to come will show us how it can be implemented and which parts of it can be implemented. A similar pattern of events to that of "CIM" (Computer integrated Manufacturing) 40 years ago would not be surprising. This term motivated many companies at the time to find or develop computer-supported solutions for their products. There was barely a company which had implemented all the elements of the CIM approach completely at that time. It was much more common to search for pragmatic solutions that were customized for individual companies and resulted in a significant advantage for the relevant company.

NUMROTO already contains much of the Industry 4.0 infrastructure. Many solutions have already been implemented for end customers.



Internet of Things IoT

Refers to the networking of objects on the Internet so that these objects can communicate independently over the Internet and, in this way, complete various tasks for the Owner. The application possibilities vary from general information supply through automatic requests to warning and emergency functionality. Things (objects, tools, workpieces, components, etc.) have their own unique Internet address (IP) and can communicate via the Internet.

For example, on each tool grinding machine of the job manager (NRControl), it is currently possible to make data such as order numbers, current workpiece number, process states (Start, Stop, Error), available for higher-level systems in real time. Because the tool grinding machines in many manufacturing companies are currently networked, the data from all the machines can be collected and processed further in one central location. In addition, the results of measurements taken during the grinding process can be evaluated continuously by higher-level systems.

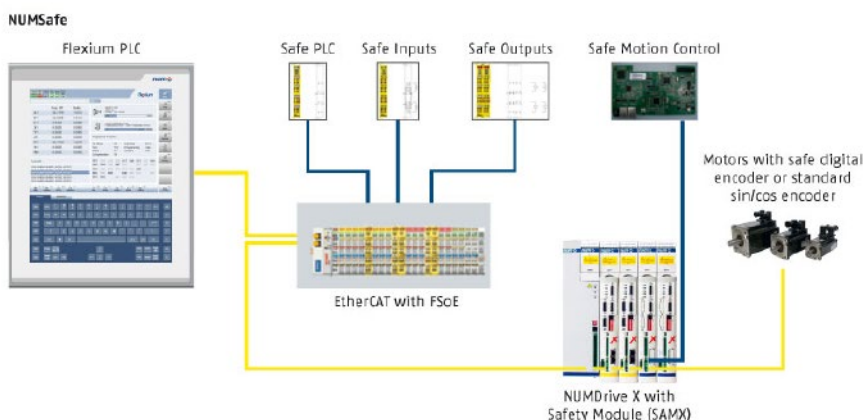
Among the other functions available for Industry 4.0 are greatly expanded XML data interfaces through which data is exchanged with the higher-level systems. Besides that, the remote operation of NUMROTO is also possible, i.e. the possibility to operate NUMROTO remotely through a higher-level system.

NUMROTO – NUM control system safety functions for tool grinding machines

Safety is very important, because tool grinding machines move sometimes at high speeds of up to 30m/min when you work with them. The grinding spindle is also very powerful, and the danger exists that textiles or hair can get caught in it. In addition, oil is mostly used to do polishing work, which in turn leads to a fire danger. The interior of the tool grinding machine must be 100% closed-off during the grinding process, and employees should not be allowed access to the interior under any circumstances. This should also be guaranteed in the case when the CNC control system has failed. It is always crucial that the CNC control system is equipped with appropriate safety features. In this regard, NUM offers a wide range of scalable safety components and other necessary means with approved safety features required by machine manufacturers or their authorized representatives in order to prove and guarantee that the machine's safety functions comply with the basic health and safety requirements of EN ISO 13849-1 (PLr) and EN IEC 62061 (SIL). These standards are directly linked to the Machinery Directive 2006/42/EC.

The relevant safety standards for tool-grinding machines regulate the following aspects. 13849, general safety-related components, including our control system components. The EN ISO 13849-1 (Machine safety – Safety-related parts of control systems) B-Standard (generic standard) contained in Part 1, general design principles. The EN ISO 13849-2 (Machine safety – Safety-related parts of control systems) B-Standard (generic standard) contained in Part 2, validation. EN 60204 specifies the general requirements for the electrical equipment. The EN ISO 60204-1 (Machine safety – Electrical equipment of machines) B-Standard (generic standard) contained in Part 1, general requirements. EN 13218 specifically deals with (tool) grinding machines. The EN 13218 (Tool machinery – Safety – fixed grinding machines) C-Standard (product standard) covers all important aspects, but only for grinding machines.

In order to make sure that the reliability of the safety functions is not compromised, the Flexium⁺ platform disposes of safety components with which the safety functions of each relevant control path can be configured up to Category 4, PLe and SIL 3.



When the NUMROTO tool grinding machines are used, this looks as follows. It must be possible to operate the axes of the tool grinding machines with both a closed protective door (automatic) and an open door. This is necessary, for example, when setting up, calibrating and manually releasing/using the grinding wheels. Some customers also require the ability to run automatic programs when the doors are open, in order to test processing and probing cycles. In accordance with ISO 13849-1, such operations with an open door are only allowed with additional protection, i.e. stricter monitoring and a limitation on the axes that can be used. Typically, when the door is open, a

complete standstill of the axes would be enforced without permission (SOS=Safe Operational Stop), although a reduced speed (SLS=Safe Limited Speed) may be allowed with the permission of the system. Usually, a safety button or mode selector switch is used to provide consent. The safety control system, NUMsafe, enables the safe programming and, where necessary, monitoring of these and other safety elements (emergency stop, protective door locking, light barriers, etc.), and it guarantees safe braking and stopping of axes when threshold values are exceeded.

Thanks to the modern control system of Flexium⁺, the safe operation of the tool grinding machine and the best possible protection to the employees during production time are always guaranteed.

The most important changes between Version 3.8.2a and 3.9.0



All significant extensions and improvements can be found at: www.numroto.com > Client section

Release Notes

General

Machining increments

The machining increments can now optionally be specified per processing category.

Vorschübe	Aufteilung/Zustellung	Inkremete
DXF-Geraden	2D-Sim: 0,0500 CNC/3D: 0,1000 mm	<input type="checkbox"/> A
DXF-Kreise	0,5000 0,5000 °	<input type="checkbox"/> A
Minimale Anzahl Punkte Geraden	10 10 Pie	<input type="checkbox"/> A
Minimale Anzahl Punkte pro Kreissegment	10 10 Pie	<input type="checkbox"/> A
Minimale Anzahl Punkte auf Vollkreis (360°)	20 100 Pie	<input type="checkbox"/> A

Probing

Measuring in progress - different weighting

When measuring is in progress, the weightings can each be recalculated separately for corrections relating to measuring results that are either too big or too small.

Quick-Edit

Additional parameters can be selected for the Quick-Edit page.

Measuring in progress - Target value

When measuring is in progress, the target value can also be redefined manually.

Milling cutter

Release angle

In order to reach the tangential diameter, the spherical- or flanging-radius-free-surface can now move into open space. In addition, a release angle can be programmed.

3D

Display of measuring results

The size of the display of the measuring results can be redefined individually. Likewise, the line thickness for the measuring lines can be defined.

Twisting progression within the radius area

With spherical- and flanging-radius-milling, the twisting progression in the radius area can also be redefined with a constant slope.

Export of bitmaps and DXF

Improved direct export of bitmaps and DXFs from NUMROTO-3D to NUMROTO.

NR-Draw

Repository

Bitmaps and DXF-profiles attached in NUMROTO will not be automatically displayed on the drawing and more. Instead, these can be retrieved from a separate area (repository) in the drawing.

Drill

Simple form levels

Create simple form levels directly via input parameters; it is not necessary to create a DXF profile.

Symbol for geometrical tolerance

A reference symbol can be added as reference for geometrical tolerance.

