numstone

TOTAL SOLUTION FOR STONE AND MARBLE

www.num.com

num
CNC Solutions

NUM Solutions and Systems
Established Worldwide

Outstanding solutions in machine automation have one thing in common: They are always the product of outstanding performance, exceptional technologies and a high degree of creativity!

NUM has earned its exceptional reputation in the machinery and tools industry exactly with that. We develop **customized automation solutions** that ensure a high degree of added value both to the machine manufacturer and the user. With our expertise that we have developed over decades, we put our motto "NUM automation solutions provide machine builders with a competitive advantage" into practice. NUM had already developed the first CNC controller in 1961, i.e. 10 years before CNC- or NC control systems found a wide acceptance among users. With the launch in 1964, **NUM was one of the first CNC providers in the world.** Since then, we have maintained our position as a technology leader in this segment and are eager to expand it further. Today's systems, with their flexibility and our expertise, enable us to automate a large variety of machinery. Our long, successful track record supports this finding in an impressive manner. We will continue to develop the **performance, functionalities and flexibility** of our systems in this direction and make the necessary investments in our products, our research & development, as well as in our staff

As an **international company** headquartered in Switzerland; we have sales, application development and service locations all over the world (see back cover) from which we operate worldwide. Our research and development departments are located in Switzerland, Italy and France. Our main production facility is located in Italy.

It is our clearly defined **vision** that we keep the **development and manufacture** of the core products in the CNC system, including the drives and motors, **under our control**. This enables us to adjust the performance, functionalities and flexibility of our systems to new market requirements very quickly and without delays.

The ready and flexible NUM automation systems combined with our locally available engineering expertise and the machine manufacturer, results in a uniquely flexible and powerful team.

Customized Projects

NUM tailors its support to your projects, ensuring it aligns perfectly with your business and infrastructure needs. Regardless of the specifics, our ultimate goal remains unchanged: collaboratively finding the most efficient solution for your project.

Project facilitation PRODESIGN

Efficient consulting for optimal application solutions
This model is ideal for companies with their own development teams and automation specialists. As an external partner, we provide our expertise and resources in field of CNC automation and take on an advisory role.

Project cooperation CODESIGN

Merging knowledge – potentiating results
Your development team will be combined with our team of specialists. Together we will realize the automation of your machine with clearly defined responsibilities. This form of cooperation has proven to be extremely efficient in many projects.

Total solutions ALLDESIGN

Delegating responsibility – controlling result
We assume the entire project management in the sense of a general contractor and are fully responsible for the successful implementation. Starting with the development of the requirements specification, over the development and commissioning, up to the support and service of the machine, and beyond

NUM Solutions and Systems
Intelligent and Creative

We have developed countless customer- and application-specific solutions for different industries as well as pioneering complete solutions for various industries, thus creating practical solutions for challenging applications and professional requirements.

All of our solutions are based on a wide range of perfectly matched proprietary products such as CNC, drive amplifiers and motors. The partnership with our customers in the evaluation, project and installation phase is further maintained by our training, support and other services even after commissioning. We attach importance to ensuring that our customers are served by our professionals with specific knowledge.

numroto

NUMROTO – successful trendsetter in high-precision tool grinding for many years

numspecial

NUMspecial – creative and practical solutions for your specific applications

numcut

NUMcut – a complete solution for advanced cutting machines

numgear

NUMgear – intelligent total solutions for new machines or as a retrofit in the field of gear machining

numtransfer

NUMtransfer – economical and flexible for all lot sizes for transfer, rotary transfer and multi-spindle machines

numhsc

NUMhsc – excellent quality at the highest speeds on machines with 5 or more axes

numgrind

NUMgrind – grinding and dressing cycles, with intuitive shop floor entry screens and 3D visual validation

numstone

NUMstone – a complete CNC solution for stone and marble

numwood

NUMwood – long tradition with powerful complete solutions in woodworking

numretrofit

NUMretrofit – rational extension of the service life of your machine by years

NUMstone – a Complete CNC Solution For Stone and Marble

The versatility of NUMstone

NUMstone offers intelligent and flexible CNC solutions for machining stone, marble, and other mineral-based materials. The system supports both milling and turning kinematics.

It is a modular solution capable of controlling everything from simple 3-axis machines to complex 5-axis interpolated systems, with multi-channel capabilities for advanced applications. The NUM platform is designed to support both standard and highly customized applications.

Whether it's kitchen countertops, facades, flooring, sculptures, or architectural elements, NUMstone automates the entire production process – from standalone machines to fully integrated production lines. Key parameters such as spindle speed, feed rates, and machining paths are easily configured and adjusted directly from the CNC system.

NUMstone includes intelligent features like automatic cutting angle compensation and 3D head control, ensuring maximum precision, ease of use, and smooth motion – even in the most complex and dynamic machining operations.

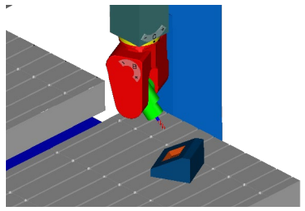
Intelligent algorithms for the highest quality

RTCP

Together with the RTCP, NUM has developed a dedicated function to make the machining process more flexible. When machining complex workpieces, it is common to divide the cycle into two stages: a first roughing stage and a subsequent finishing stage.

The macro developed by NUM automatically optimizes axis parameters in both phases, giving the operator the option of choosing the approach best suited to the specific needs of the part. The goal is to reduce cycle times while maintaining high standards of quality and precision.

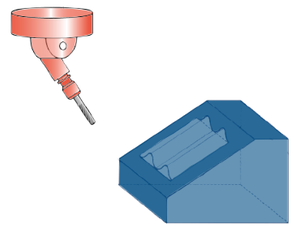
Inclined plane



The inclined plane function significantly simplifies and shortens the programming of complex forms. In addition to the six standard levels in the XYZ coordinate system, an inclined plane can be generated at any rotation angle. This allows the programming of the workpiece contour in a manner similar to a normal level, eliminating the need for complex spatial thought processes by the programmer. If the program is interrupted during production, the "Inclined plane" function remains active, enabling the user to manually move the tool out of a drill hole, for instance, in case of a break. It is also possible to use the RTCP function within the "Inclined plane."

Tool vector programming

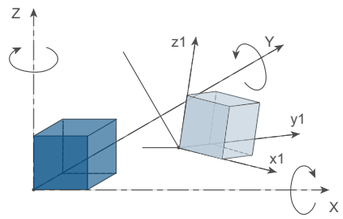
A part program written using tool vector orientation can run on machines with different kinematics. In fact, a CNC system that is aware of the kinematics of a particular machine can calculate the angles of the machine's rotary axes and the associated linear transformations. The advantage is that a part program can be generated without



NUMstone – a Complete CNC Solution For Stone and Marble

needing to know the specific kinematics of the machine on which it will be executed.

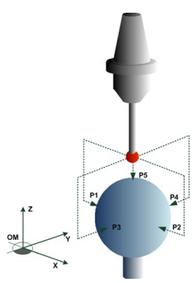
Automatic compensation of workpiece positioning



When positioning a part on a machine achieving perfect alignment can be difficult due to factors such as weight, structure, previous machining or other reasons. Moving parallel to the main axes is manageable and requires a simple offset adjustment. However, dealing with a tilt can be more complex, as it involves tool orientation compensation. Traditionally, after identifying offsets and tilt angles, a common solution is to rework the program, but this takes time. NUM offers cycles and parameters specifically designed to facilitate part alignment. The HMI includes a dedicated page to help the end user verify settings. The advantage is that it does not change the part program; instead, the CNC automatically compensates for misalignment by rotating the tool vector.

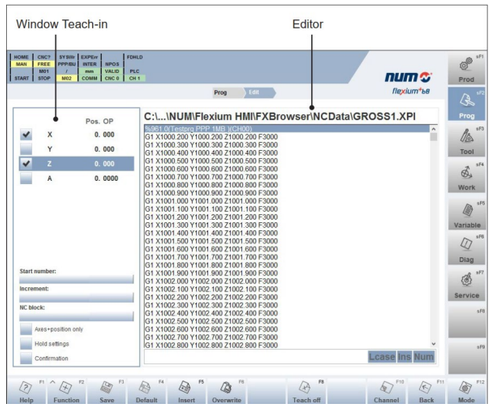
Automatic 5-axis head calibration

The kinematic measurement cycle (G248) is used to measure and subsequently compensate the geometric deviations of a rotary head. This cycle is typically used during machine commissioning or following a machine collision to ensure accurate and precise corrections.



Self-learning functions and programming aid

Programming the part directly on the operating surface can be very useful when single parts or small production batches are to be made. Cutting machines are not always equipped with specific software suites, so ease of use and standard cnc equipment become critical. NUM offers a specific self-learning function: by opening the HMI's Programming context, the operator can position axes at a specific point and insert new blocks within the selected program or simply replace axis positions within existing blocks. He can also integrate cnc functions such as G/M codes and machining parameters such as feeds F, cutting speed S into the program blocks.



Integrated reading of physical quantities Spindle power, axis absorption

NUM's integrated CNC solution offers many advantages, including the ability to monitor all physical quantities of the system in real time. In particular, it enables the continuous reading of critical parameters, which can be simply displayed or used in a more advanced way to support the operator or builder in managing the machine.

For example, the percentage of spindle load during machining can be monitored, allowing the operator to optimize the production cycle. In addition, thanks to dedicated algorithms, this information can be used to automatically adjust the machining speed according to the "hardness" of the material. In addition to operational benefits, the availability of this data is crucial for the implementation of predictive maintenance strategies. Indeed, the monitoring of physical quantities makes it possible to detect abnormal conditions in the mechanical components of kinematic chains in advance, helping to avoid unexpected downtime and improving overall plant reliability.

Automatic tool wear compensation: constant precision in marble and glass machining

In marble and glass processing, production efficiency must coexist with maximum precision. In these notoriously abrasive materials, tool wear is rapid and unavoidable, directly affecting finished part quality and cycle times. To meet this need, NUM has integrated advanced functionality for automatic tool wear management into its CNC systems, designed specifically for this type of application. Geometry always under control

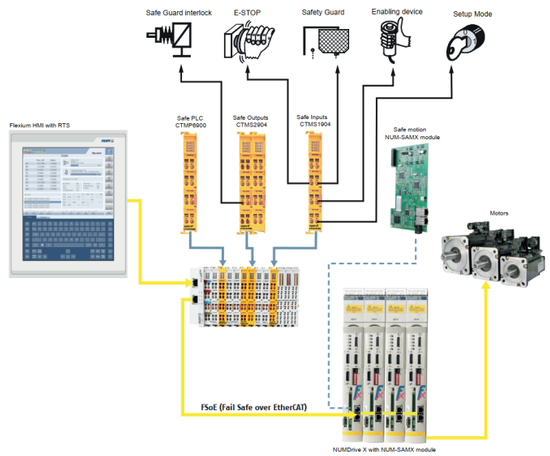
Our solution makes it possible to constantly monitor the current condition of the tool and automatically compensate for wear during the machining cycle. The system is able to apply geometric corrections in real time in order to keep the dimensional accuracy of the part unchanged, avoiding scrap and rework.

Thanks to this feature, the NUM control not only manages machine movement but also offers significant technological support in the machining of these materials.

NUMSafe: integrated safety for personnel protection

In today's landscape where machines are increasingly complex, ensuring the safety of people is a top priority. NUMSafe is NUM's integrated system solution that addresses this need, offering a comprehensive and easy-to-use platform for the protection of personnel working on machines.

Thanks to the ability to manage signals from safety devices such as light curtains, sensitive mats, protected doors, emergency



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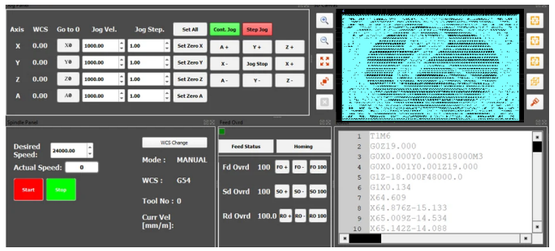
stop switches and more, NUMSafe enables the implementation of effective protection systems that comply with regulations and are seamlessly integrated into machine control.

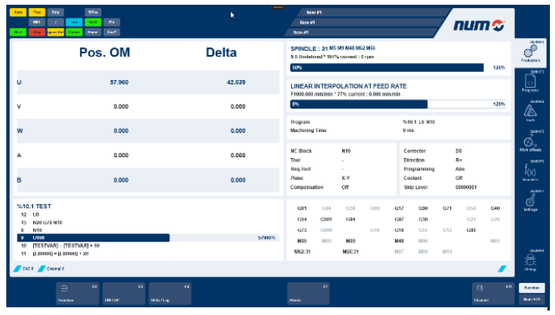
As a software-based solution, NUMSafe provides a high degree of flexibility. For example, the machine can be configured to operate safely at reduced speed when an operator needs to access potentially hazardous areas to perform setup or adjustment operations.

Another major advantage of the software-based solution is the simplification of the control cabinet, provided by the elimination of safety control units and associated wiring.

HMI: customizations for all needs

Depending on your needs, you can customize the standard Hmi or create a completely new one. Thanks to the object-oriented programming built into the development tool, even users without in-depth technical knowledge can create graphical pages easily and intuitively. For more complex needs NUM offers a complete suite of libraries and software functions for creating Hmi completely independent of the standard Hmi, using the most powerful languages such as C#, C++, Java, HTML, Visual Basic, and Phyton.





Multi-channel system

Many machines require processes to be executed in parallel and independently. With the multi-channel function, the NUM control optimally supports this requirement. A Flexium+ NCK can easily execute up to 8 CNC programs in parallel. If more CNC programs are to be executed, an additional Flexium+ NCK can easily be added for this purpose. A FlexiumPro RTK has even more computing power and can run 32 CNC programs in parallel.

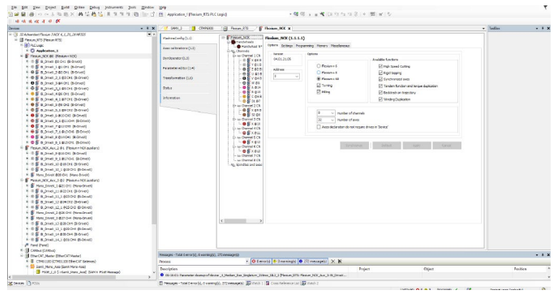
Simple axis change between channels

Axes may change their assignment to a channel, e.g. if they are mounted on a rotary table. This axis transition is a standard function of the Flexium controllers that can be executed via a single command. The scenario of a Flexium+ system with more than 8 stations was also taken into account. A special control function enables the seamless transfer of axes to other NCKs in such cases.

Helpful Tools and Functions

One program for complete control system commissioning

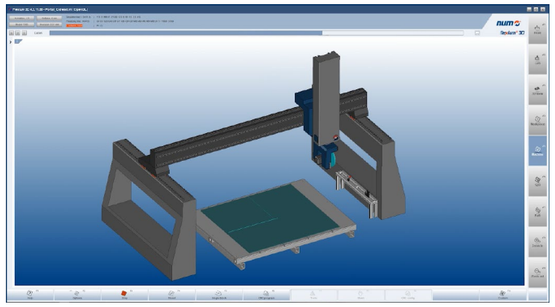
The definition of the control system and its commissioning is carried out by means of the Flexium Tools software. The corresponding project contains all information on all devices involved, as well as the PLC programs and the definition of the safety functions.



3D simulation and 3D collision monitoring

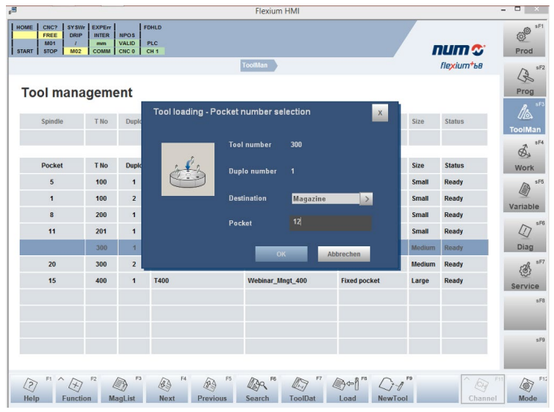
In addition to providing a perfect simulation of the complete workpiece, the software offers versatile functionalities such as measuring geometric features, creating cross-sections of the workpiece, and analyzing the volume of material removal for each machining process. The 3D collision monitoring function is a valuable tool that examines the entire machining process for collisions either upon command, through fully automatic operation, or in parallel with CNC file transfer. Even with normal workpieces, the collision check only takes a few seconds.

In manual operating mode, online collision monitoring proves to be a crucial tool in preventing machine damage, especially when inclined plane or RTCP is active, where some axis movements might be unexpected. The "online collision monitoring" function continuously supervises the axes' movements in manual mode. In the event of a potential collision, it proactively stops the axes' movement, helping the end-user avoid costly mishaps.



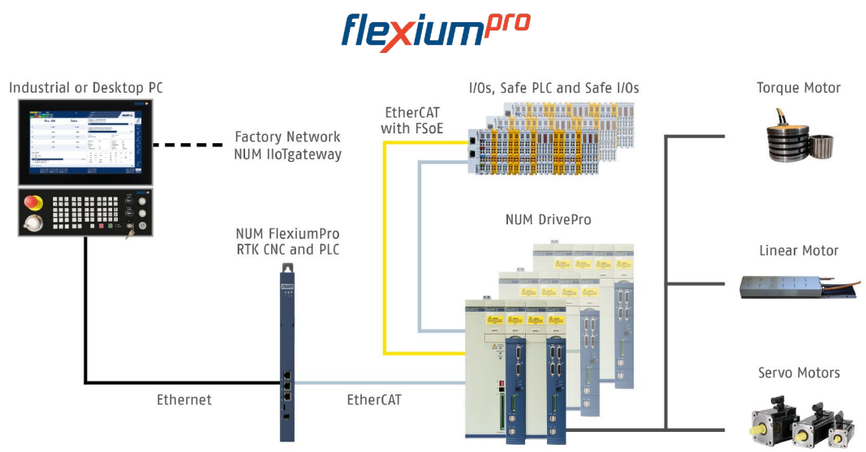
Integrated tool management

The tool management integrated in the control system also covers the requirements of transfer machine applications. The tools can be assigned to an axis channel. The tools per channel are displayed on a special page.



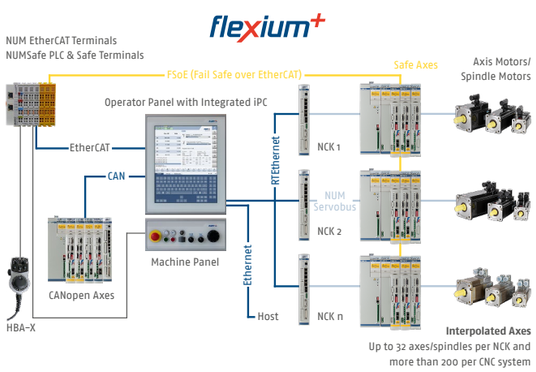
CNC-Systems
Flexibility, Productivity and Safety

Flexium+ and FlexiumPro – Extreme Scalability



NUM control systems offer remarkable scalability, enabling a precise fit for each specific application. As a result, systems ranging from 1 to more than 200 CNC axes can be effortlessly implemented. In addition to the normal PLC, both the existing Flexium+ and new FlexiumPro systems have a safe PLC which communicates via FSoE (Fail Safe over EtherCAT) with the safe inputs and outputs as well as with the NUMDrive X or NUM DrivePro drive controllers. The systems cover all necessary safety functions in a simple way. The safety logic is programmed with the same software tool as the rest of the PLC. The same tool is also used for all system parameterization and machine commissioning.

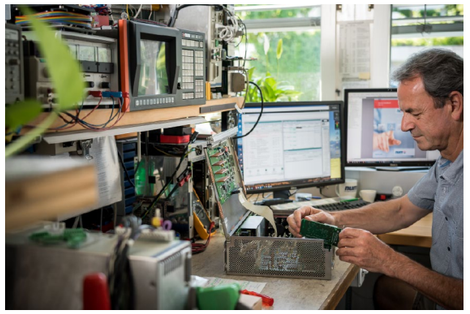
The NUMDrive X and NUM DrivePro drive solutions are the result of more than 30 years of experience in the development of fully digital drive systems. The drive amplifiers are available in various versions with different performance data. The wide range of drive amplifiers is available in single-, dual- and quad-axis versions, with different computing power and supports rated currents from a few up to 200 amps. Another strength of the drive amplifiers is their compactness and high energy efficiency. Our experts will be happy to help you make a technically and financially optimal selection from the wide range of products, in coordination with your application.



NUM Services
Worldwide at your Service

The decision for NUM is also the decision for a customer service that will support you long after the initial investment as on the first day – even after 20 years and on-site. Our specialists can ensure an extended life for your good (but old) machinery with NUM retrofits.

Worldwide support by experts
For professional analysis and trainings, a perfect infrastructure is available to our experts in all centers of excellence. So that we can assist you quickly and efficiently around the world, we also rely on the advantages of the most modern communication technologies, e.g. for remote maintenance. We can also offer on-site support and consultation services out of our regional branches



Comprehensive training offer
We orient our training to your indivual needs – whether its operator training, maintenance, repair and service training, HMI; CNC or PLC programming, or adjustment of servo drives etc.

NUM provides a training offer matched to the customer needs:

- CNC operation
- CNC programming
- PLC programming
- Commissioning and servicing
- Creation of a custom HMI
- Customized customer training

Technically always up to date
Our team of specialists will actively inform you on the latest hardware- and software developments and provide you with useful technical information.

Repair- and spare parts service
If an error unexpectedly occurs in your CNC system in spite of proper maintenance, you can trust that this will be fixed by dedicated service employees of our global network.

Customer service
For you and your markets, we have a worldwide service organization. The International customer service provides telephone consultation and deployment on site, even for machine installations that are many years old. With a retrofit from NUM, the operating time of an excellent machine can be extended by many years.

Our customer service is available and responsive to help even with cutting edge products and custom developments. We carry local inventory and have your materials and components in stock ready to meet your requirements for quality and delivery times.

Complete CNC Solutions Worldwide

num
CNC Solutions

NUM systems and solutions are used worldwide.

Our global network of sales and service locations guarantees professional service from the beginning of a project to its execution and for the complete life cycle of the machine.

NUM has service centers around the world. Visit our website for the current list of locations.

Follow us on our social media channels for the latest information on NUM CNC Applications.

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