

**num**retrofit

## TOTAL SOLUTIONS FOR EXTENDING THE LIFE OF YOUR MACHINE



[www.num.com](http://www.num.com)

**NUM**   
CNC HighEnd Applications

# 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!**

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And 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 the most varied machinery. Our long, successful track record supports this finding in an impressive manner. We will continue to develop the readiness and flexibility of our systems in this direction and make the necessary investments in R&D 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 important flexibility and readiness of the systems to new market requirements even in the short-term.

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

# Customized Projects

**NUM supports you with your projects in the same way as it is ideal for your business and infrastructure. The goal of our cooperation, however, always remains the same: To find the most efficient solution for your project together with you.**



## 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 entire know-how in the 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**

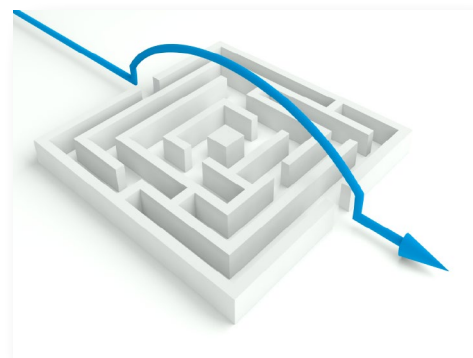
We assume the entire project management in the sense of a general contractor and are fully responsible for the successful implementation. Starting with the development of the requirements specification, over the development and commissioning, up to support and service.

# NUM Solutions and Systems

## Intelligent and Creative

**We have developed countless customer- and application-specific solutions for different industries and thus mapped out practical solutions for professional requirements. Based on this, our engineers have created groundbreaking total solutions for demanding applications.**

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

### **nummill**

**NUMmill** – flexible solution with a graphical interface for extensive milling cycles, including full 3D simulation

### **numwood**

**NUMwood** – long tradition with powerful complete solutions in woodworking

### **numretrofit**

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



# NUMretrofit – A Good Alternative to a New Acquisition

**Old machines do not necessarily have to be replaced by a new purchase. If the machines are mechanically still in good shape and function smoothly, a retrofit may be a good alternative to a new purchase. The term retrofit is generally taken to mean the modernization or expansion of existing, usually older, machines.**

## NUMretrofit–total solutions

For existing machines or machine parks, a retrofit can be more sensible than replacement by new machines. This is especially the case if most of the mechanics are still in a very good condition. By replacing obsolete or worn components and adding new, state-of-the-art components, the machine can be brought up to date. With old machines, however, it can also happen that spare parts are difficult to obtain or are no longer available.

NUM is able to provide spare parts for NUM control systems for at least 10 years. However, our goal is to achieve 20 and more years wherever possible. If necessary and possible we repair old NUM electronics, even on site. But good machines can get much older, or have to be partially adapted to new technologies, which then indicates the need for a retrofit. By retrofitting you can achieve an increase in productivity at significantly lower costs compared to the purchase of a corresponding new machine. The costs of a

retrofit for larger single machines are normally about 30% to 70% of a comparable new purchase.

However, the cost advantage over a new machine is by no means the only advantage of a retrofit. Thanks to retrofitting, employees in most cases do not have to get used to the new machine or participate in time-consuming and costly training. Conversions in the production hall, space problems and, in the case of large machines, the high replacement investments for the production of foundations, are completely eliminated. Everything remains as before, albeit with decisive improvements.



# NUMretrofit – A Good Alternative to a New Acquisition

Even the integration of the machine into an IT system can be easily accomplished with a retrofit. The networking of the machine is the basis for digitization. In some cases, this can also be realized with additional hardware, i.e. without an actual machine retrofit. But if you want to move towards a "Smart Factory" or the "Internet of Things", the data must also be recorded. Control systems that are 20 or more years old are not suitable for this. A retrofit with a modern NUM control system (CNC, drive, HMI, etc.) usually takes care of this issue without the need for additional sensors and hardware. All modern NUM CNC systems can easily be integrated into "Smart Factory" projects and all necessary data can be collected..

Despite the advantages, it is not possible to simply say in general terms that a machine retrofit is the right solution. Whether a retrofit is economically viable must be decided on a case-by-

case basis. For example, if the machine is unique and cannot be replaced by newer processes, a retrofit is mandatory. If a retrofit is indicated, our application engineers are available worldwide with their comprehensive know-how to provide advice and support. One aspect that requires special attention is the respective safety regulations, because the legal situation with regard to machine safety and employee protection can vary from country to country and can also be complex, especially in the case of retrofits.

If the machine is already equipped with a NUM CNC system (NUM7xx, NUM10xx, NUMPower, AxiomPower, Flexium), then the existing part programs can be taken over to a large extent without adaptation. We make every effort to make the new CNC control downward compatible and, if necessary, we also take over the adaptation of the CNC programs.



**With a retrofit project, as in all other areas, we work together with our partners (customers) as it best suits them. Also in the retrofit area, we offer three basic cooperation possibilities.**

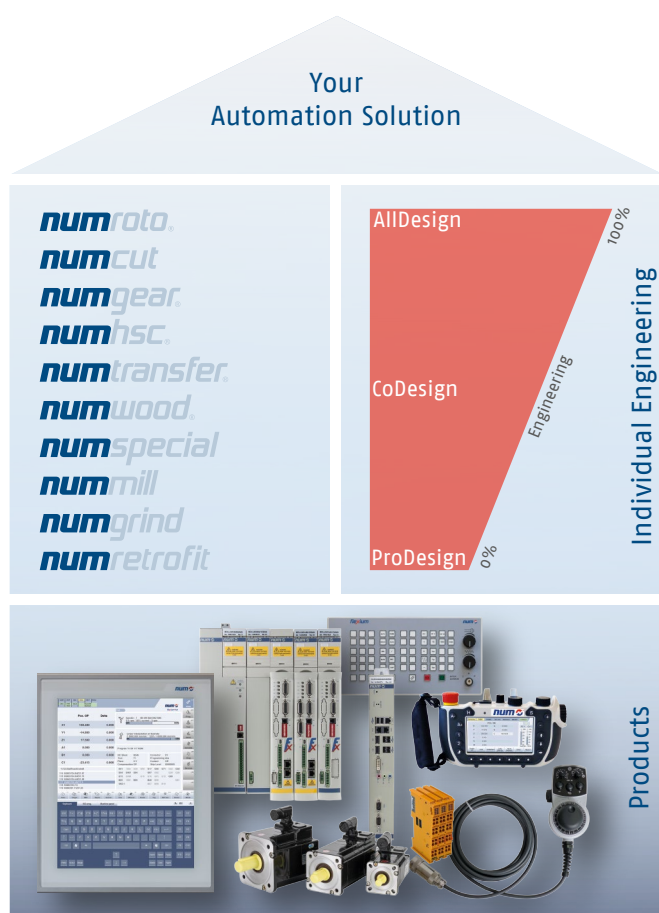
These are ProDesign, Codesign and AllDesign (see graphic). In ProDesign we advise the partners and in AllDesign we take responsibility for the whole retrofit. In most cases, however, we work together with our partners in CoDesign. Here, in the run-up to the retrofit project, we define who takes over which tasks.

If mechanical retrofits are necessary or desired on the machine, we always work with local specialists, as NUM does not have this special know-how. In the area of project management, the preparation of the specifications, the design of the control system (CNC, drives, HMI...), the creation of the necessary software, the creation of circuit diagrams and the construction of the switch cabinets, the commissioning of the machine, personnel training, etc. our application engineers help or take over the entire work.

Our scalable and flexible CNC systems are ideally suited for retrofitting. They can be perfectly tailored to your current needs, so you don't pay for more than you really need. Of course, the existing industry solutions such as NUMmill, NUMgrind, NUMgear etc. can also be adapted to customer requirements.

But of course they can also be taken over 1:1. If the control cabinet is to be retained, we also replace the necessary components on site. However, if so desired, all this work can be carried out by a partner.

Within the scope of retrofit projects, we also take back old NUM control components so that you do not have to worry about their disposal. During commissioning by our specialists, the machine is also simultaneously optimized or "tuned" so that maximum performance can be achieved. In the case of machines where downtime is very critical, there is also the possibility of a plug-compatible control exchange with "zero downtime".





# NUMretrofit – Let Us Extend the Life of Your Investment

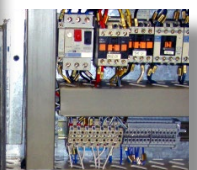
**Whether a retrofit pays off has to be decided from case to case. We are happy to support our partners in this decision with our know-how. We analyze the machine park to show the partner where, with which CNC control system measures, the service life of the machine can be extended.**

Once the decision for a retrofit has been made, we assume responsibility for whatever the partner wishes (Pro-, Co-, All-Design). Depending on the chosen solution, we take over the overall responsibility or part of the project. The project can also be implemented in two or more stages. For example, as a first step only the CNC control system need be replaced and then later, in a further step, the drive amplifiers.

## **Our offer in such a project includes:**

- Project management, so that you have only one contact person
- Creation of the specification sheet / list of requirements
- Preparation of circuit diagrams and construction of the control cabinet
- Organization of the mechanical retrofit
- Creation of the necessary software (SPS, CNC, HMI..)
- Creation of special software to increase production

- Integration of the machine into the company network (Smart Factory, Industry 4.0)
- Commissioning and optimization of the machine
- Training of staff on the new system



**We are flexible! Whatever you are planning, let us discuss and realize it together.**



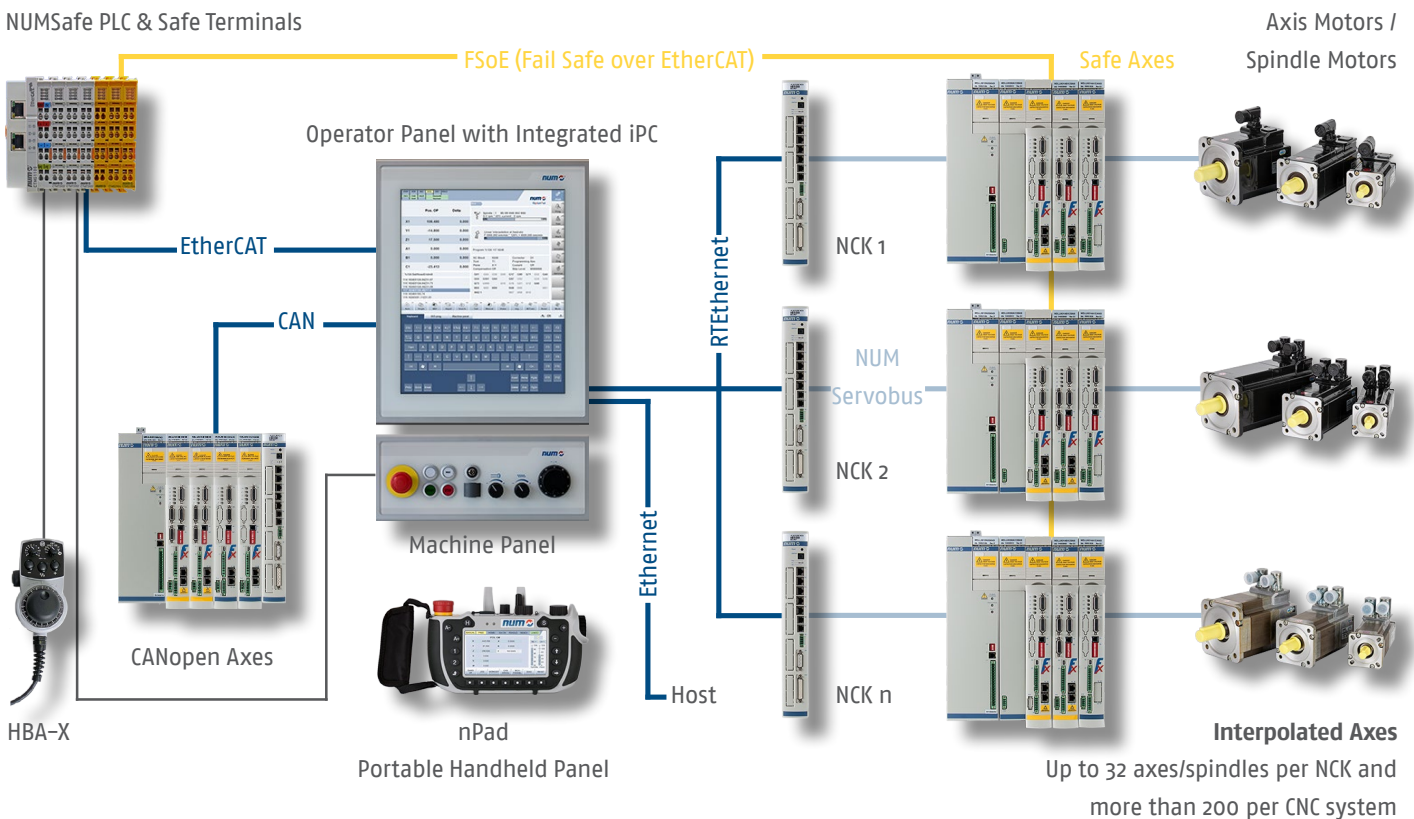
# Flexium+ CNC-System

## Flexibility, Productivity and Safety

### Flexium+ Extreme Scalability



NUM EtherCAT Terminals  
NUMSafe PLC & Safe Terminals



The control system is characterized by an extremely high scalability. It allows the perfect adaptation to the respective application solution. Thus, in a simple way, systems from 1 to over 200 CNC axes can be realized. The Flexium+ system has a secure PLC in addition to the normal PLC, which communicates via FSoE (Fail Safe over EtherCAT) with the secure inputs and outputs as well as with the NUMDrive X drive control systems. The system covers all necessary safety functions in a simple manner. The programming of the safety logic is carried out with the same software tool as the rest of the PLC. This same tool is also used for the entire system parameterization and commissioning of the machine.

The NUMDrive X drive solution is the result of more than 20 years of experience in the development of fully digital drive systems. It is available in different versions with different performance data. The wide range of drive amplifiers is available in single and dual axis versions and also in different performance levels (processing power). This allows a technical and financially optimum adaptation to every application. These modules are designed for rated currents of a few up to 200 amps. Another strength of the drive amplifier is its compactness and high energy efficiency.

# NUM Motors

## Perfect for all Applications

**Excellent volume/performance ratio and great dynamics, so that our motors can satisfy almost all applications.**

NUM has more than 50 years of experience developing servo and spindle motors. We pioneered the development and production of AC brushless servo motors, as well as synchronous spindle motors with flux weakening.

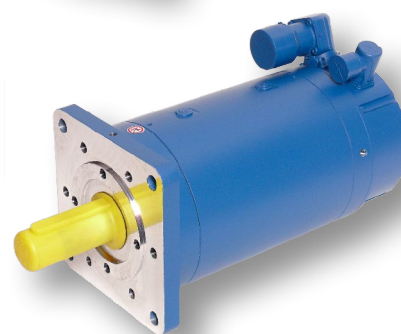
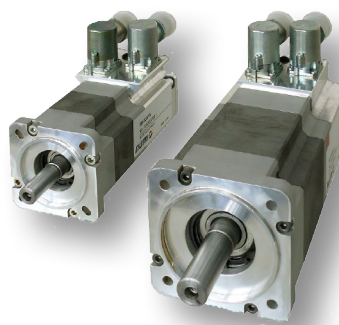
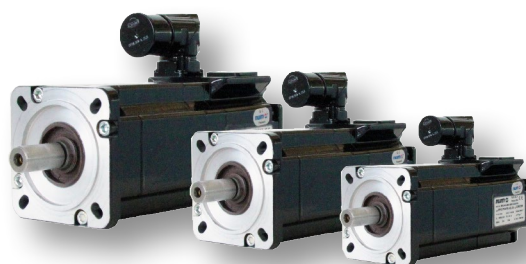
The comprehensive **servo-motor** series of NUM offer an excellent volume/output ratio, as well as first-class dynamic properties optimized for the machine tool industry. They, with perfect concentric run-out, satisfy even at very low speeds. The so-called "single cable" motors offer the advantage that the complete measuring system cable is eliminated. This simplifies the wiring of the machine significantly and thus saves money.

The **asynchronous motors** of the AMS series offer excellent quiet running at low speed, quick and accurate positioning and are ideally suited as a C-axis and for spindle indexing.

The TMX series **torque motors** have an extremely low cogging torque as well as a very high  $S_1$  torque density. They are ideal for applications that require very smooth and precise motion, especially at low speeds. Typical applications are direct drive rotary tables or workhead axes of machine tools. The TMX motors are complemented by an extensive range of torque motors from our partner company Schaeffler Industrial Drives (IDAM), who's customers include many well-known European machine builders.

Key data of the motor series:

- Servo-motors from 0.318 to 160 Nm (IP65, IP67)
- Rated speeds of the servo-motors up to 8000 rpm
- Spindle motors up to 55 kW
- Special kit motors
- Liquid-cooled spindle motors
- Liquid-cooled servo motors
- Asynchronous and synchronous motor spindles (motor spindle)
- "Single cable" motors
- Custom motors



**SCHAEFFLER**

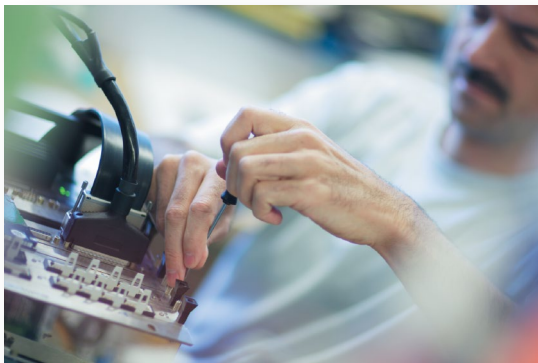
# NUM Services

## 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 via Internet. Of course, we will be happy to offer advice on site in your company.



### **Comprehensive training offer**

We orient our training to your individual needs – whether its operator training, maintenance, repair and service training, PLC programming, or adjustment of servo drives.

NUM provides a training offer matched to the customer needs:

- CNC operation
- CNC programming
- PLC programming
- Commissioning and servicing
- Preparation of custom surfaces
- 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, deployment on site, even for many years old installations. 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 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.

[www.num.com](http://www.num.com)



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