



SIEMENS
Ingenuity for life

Retrofit for machine tools

Machine modernization directly from the
CNC manufacturer – increasing efficiency and
economic feasibility

[siemens.com/motioncontrolservices](https://www.siemens.com/motioncontrolservices)



Since its retrofit, this Ravensburg turning machine PKZ is again state-of-the-art – at half the cost of buying a new machine and with a much faster delivery time. What's even better is that Siemens delivered a complete solution consisting of both mechanical and electrical modernization.

Greater productivity – at half the cost

Machine retrofits: increasing productivity and efficiency

After ten or more years of operation, the mechanical components of machine tools are usually still in good condition. But control and drive technology has continued to advance steadily during this time – introducing new functions that make production more precise, more energy-efficient, and more economical. Retrofits are one way to give older machines access to these innovations by replacing old functions with new ones. The challenge lies not only in replacing a technical component but in exploiting the varied capabilities of modern control and drive systems, which offers the user new business opportunities. The main goal is to smoothly integrate the advantages of drive and/or controller upgrades into the existing machine concept so that the user works with a proven machine – one that is now state-of-the-art – without having to purchase a brand-new one.

Spare parts supply: ensuring machine availability

The main concern of machine tool users, however, is not the use of new capabilities of modern controllers but rather the certainty that by modernizing or upgrading their investment, they will ensure their productivity over the long term. This especially applies to spare parts availability, which is longer for modern components than for older ones. Electronic components are a good example of this, because their integrated circuitry is replaced by the next generation every few years.



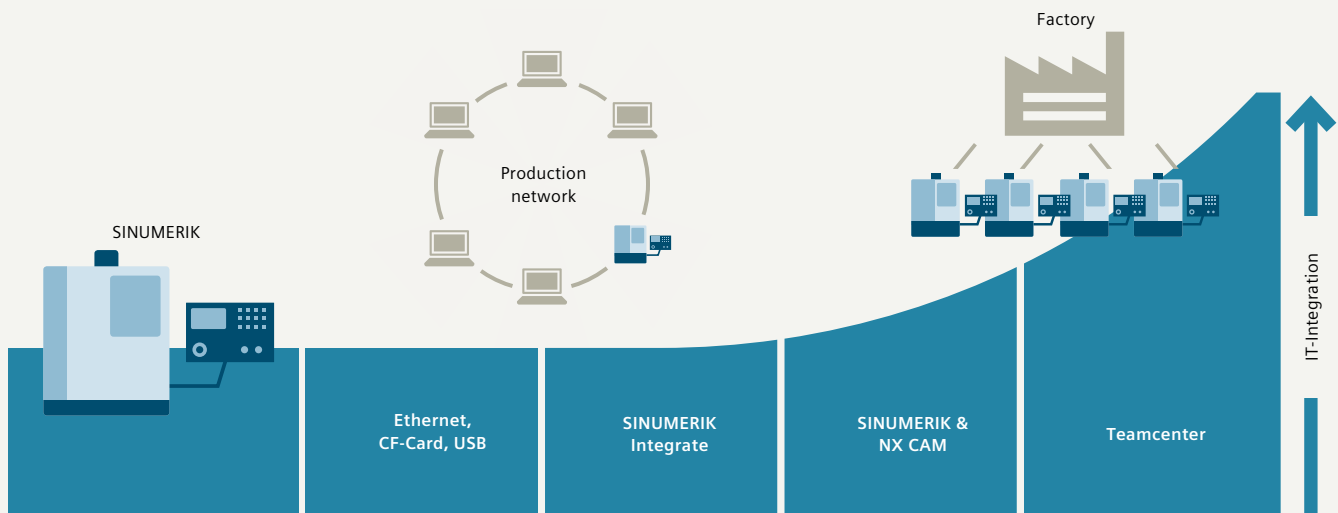
Customized retrofits – for better performance

Modernization made to measure

Each retrofit begins with a thorough assessment of the requirements to be met, along with an in-depth customer consultation. On this basis, Siemens develops the best possible solution concept with scalable system components, depending on the CNC machine's technology, functionality, and performance requirements. The Siemens specialists examine all the machine's components: the CNC controller, drives, motors, measuring systems, switchgear cabinet, and, if necessary, the machine integration into the production network. If needed, Siemens can also perform mechanical reconditioning or partial modernization by replacing CNC technology and reusing the machine's existing analog drive system. The goal is always to optimize machine productivity in line with the range of applications and the customer's goals.

Declared goal: maximum performance and flexibility

The retrofit service can be supplemented with numerous services beyond the use of cutting-edge SINUMERIK controllers, SINAMICS drive systems, and SIMOTICS motors. The goal is always to ensure the full benefits of the modernization work. The precise planning and careful preparation of the retrofit by our service technicians guarantee minimal downtimes in the case of individual production solutions. This includes a significant amount of added quality and flexibility thanks to the performance of cutting-edge components supported, for example, by geometric measurement and compensation of dimensional deviations in large machines. Through the use of Siemens' PLM software, customers gain greater transparency in production planning and the digitalization of their production process. Tools and NC programs are managed by NX-CAD / CAM, Teamcenter, and SINUMERIK Integrate with Manage MyTools and Manage MyPrograms, which optimally integrate them into the production process. Siemens Motion Control Services also offers training courses as well as repair and service contracts.



Siemens offers a comprehensive portfolio of control and drive solutions for a wide range of requirements – from standard turning and milling machines to systems in the upper performance range.



SINUMERIK 840D sl

The open CNC for individual retrofit solutions

The SINUMERIK 840D sl features maximum openness and flexibility, making it the optimal CNC for individual retrofit solutions.



SINUMERIK 828

The compact CNC for standard machines

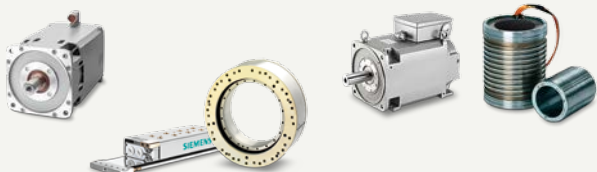
The SINUMERIK 828 controller is suitable for modernizing standard turning and milling machines for small and medium-sized applications.



SINAMICS S120

Drive with an extremely high degree of flexibility

The SINAMICS S120 is a high-performance, highly flexible drive for modernizing machine tools. Thanks to the wide range of motor modules, it can meet all drive requirements.



SIMOTICS motors

The powerful drive system

High static torque, high maximum rotation speed, and perfect concentricity combined with Weiss spindle technology make SIMOTICS the optimal drive system for retrofits.

Efficient operation – safety at work



SINUMERIK controllers are extremely user-friendly thanks to numerous functions in SINUMERIK Operate. These include modern touch and gesture control as well as work with animated elements.

Touch and gesture control

The SINUMERIK touch panel generation with projective-capacitive touch technology offers top-level performance for complex PC-based visualization tasks as well as an attractive front-end design. Thanks to the scratchproof, coated user interface with its brilliant display, it supports operation even in harsh environments.

Animated elements

With animated elements, SINUMERIK Operate makes entering parameters extraordinarily easy. A unique display with animated sequences renders operation even more convenient through the use of animated elements.

Side screen

The preconfigured side screen provides additional operating area with more functions in the HMI. For each operating situation, the user has all the information at a glance and can scroll both vertically and horizontally through the collapsible side screen.

All-around safety:
SINUMERIK Safety Integrated

SINUMERIK Safety Integrated is the safety package for controllers and drives. It combines protection of people and machines with high efficiency and profitability, because all functions can be integrated into the control and drive technology. This guarantees safe and practice-oriented operation under all operating conditions. The safety functions meet DIN EN 61508 requirements for applications up to and including safety integrity level SIL2 and category 3 as well as performance level PL d according to DIN EN ISO 13849-1.

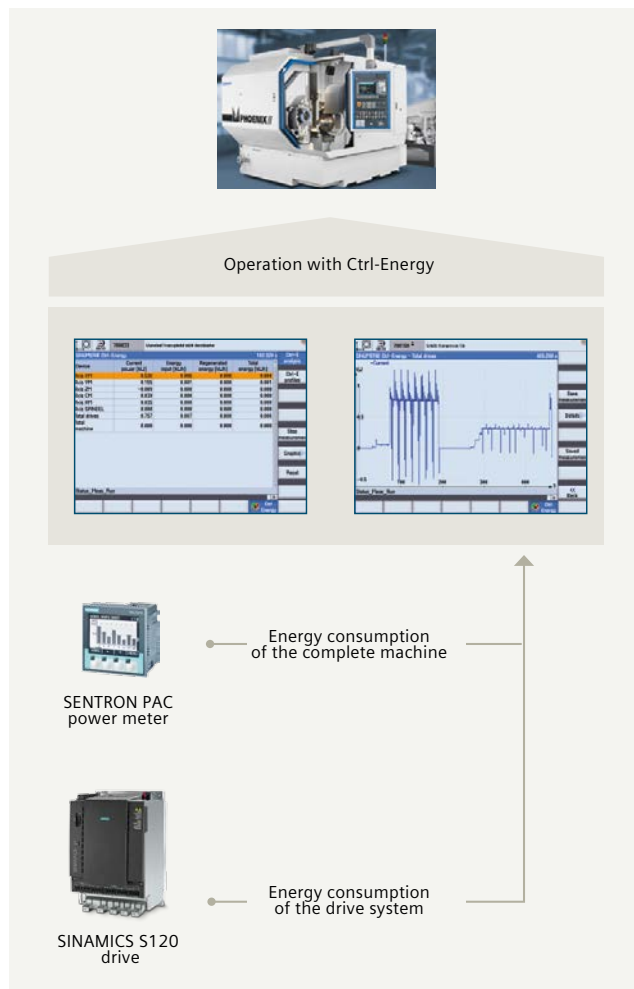
This means that functional safety requirements can be implemented easily and economically, including, for example:

- Functions for safe monitoring of speeds and downtimes
- Functions for safely separating working and protection space (SIDOOR automatic door controllers) and for detecting areas
- Direct connection of all safety-related signals and their internal logic operations.

The safety functions are available in all operating modes, can communicate with the process via safety-oriented input/output signals, and can be implemented for each individual axis and spindle.



Complete retrofit service package – from a single source



Ctrl-Energy gives you full control

SINUMERIK Ctrl-Energy builds on an extensive portfolio of SINUMERIK CNC controllers, SINAMICS drive systems, and motors; this allows you to optimize energy in your machining processes. You also save energy, for example, through power recovery, flow reduction during partial load operation, or reactive power compensation. Targeted documentation and evaluation of your energy consumption enable you to make improvements in operations as well as retrofits.



Efficient NC program conversion

Siemens offers a special service for upgrading older NC programs to the latest versions – an invaluable benefit for any user, because subprogram archives not only involve a great deal of work but recreating these programs would be extremely expensive. The NC program conversion service ensures that existing CNC subprograms can be used even after a controller retrofit.

Customized training

Siemens does not abandon users once their modernized machines are in place. Instead, experienced trainers provide users with the knowledge they need to operate and maintain their modernized equipment in customer-specific training courses. Siemens also provides technology training as well as courses in SINUMERIK and SINAMICS systems at its own training center. SinuTrain CNC training software also provides the option of training through self-study.

Failure tolerance and maximum availability

Regular maintenance is indispensable for maximizing system availability. That's why Siemens Motion Control Services offers customer-specific service contracts in addition to the retrofit. This modular approach allows users to put together a package of all the services they need to ensure smooth equipment operation. The scope of services under these optional service contracts ranges from after-sales service availability to maintenance and fault clearance, including fast spare parts service.

Financing advances

Siemens Financial Services also include attractive financing models that are tailored to the machine users individual operating needs – with customized installments and contract duration harmonized with the customer's intended machine utilization period. With this option, the customer is assured not only state-of-the-art technology but a lasting competitive edge as well.

Motion Control Services

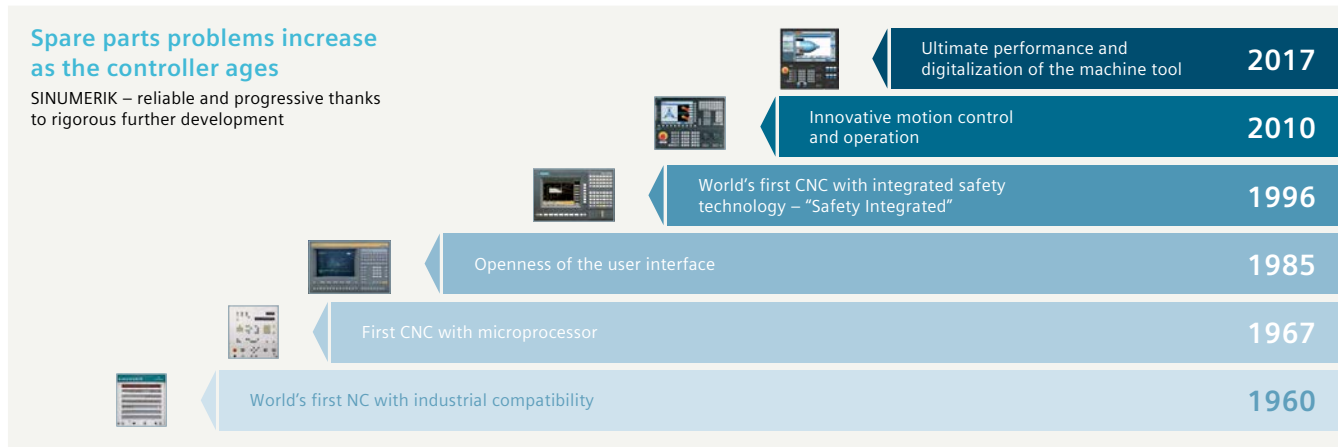
Whether as expert consultant, service specialist, or spare parts supplier: Siemens is the right partner in every phase of a machine's lifecycle. Siemens offers services that go beyond the retrofit to increase your equipment availability:

- **Online support**
Everything from product support to service and support activities – any-time, over the Internet.
- **Technical support**
Expert telephone consulting to resolve technical issues.
- **Repair and spare part services**
Faster spare parts availability and repairs reduce downtimes in the production process.
- **Service contracts**
High productivity thanks to short reaction times and the fastest possible fault clearance by qualified service specialists.



Ensuring availability – for more efficient production

Spare parts for older-generation machine tools are often no longer available – for example, the failure of one electric component can bring the entire machine to a standstill. The diagrams on this page provide an overview of CNC control and drive components and the time at which their spare parts will no longer be available.



Retrofits for machine tools – spare parts availability

Machine tool controller		Machine tool controller		Machine tool controller	
Old systems	End of spare parts supply	Other systems	End of spare parts supply	Other systems	End of spare parts supply
FANUC 0, 220 and 260 A/B	3/1984	SINUMERIK 840D MMC 100 / 101	9 / 2012	SINUMERIK 840D OP 010 FT	9 / 2017
FANUC 260 S	9/1982	SINUMERIK 840D MMC 100.2	9 / 2014	SINUMERIK 840D OP 012T	9 / 2021
Relais Numerik	7/1978	SINUMERIK 840D MMC 102	9 / 2013	SINUMERIK 840D OP 030 / OP 031 / OP 032	9 / 2018
SINUMERIK PRIMO S/SG	9/2003	SINUMERIK 840D MMC 103	9 / 2018	SINUMERIK 840D OP 032S (CNC full keyboard)	9 / 2019
SINUMERIK Sprint T (FANUC production)	3/1989	SINUMERIK 840D PCU 20 (333 MHz)	9 / 2024	SINUMERIK 840D HT 6	9 / 2020
SINUMERIK Sys 500 (520, 530, 540, 550)	6/1993	SINUMERIK 840D / 840Di PCU 50 (V1)	3 / 2008	SINUMERIK 840D PHG	9 / 2017
SINUMERIK System 520 K	6/1993	SINUMERIK 840D / 840Di PCU 50 (V2)	9 / 2018	SINUMERIK 840D PP 031 (Push Button Panel)	9 / 2015
SINUMERIK System 580/590	6/1993	SINUMERIK 840Di PCU 50 + MCI [(V2) WIN XP]	9 / 2018	SINUMERIK 840D PP 012 (Push Button Panel)	9 / 2021
SINUMERIK System 840	9/2003	SINUMERIK 840Di sI PCU 50 + MCI (V3)	9 / 2023	SINUMERIK 840D TP 012	9 / 2017
SINUMERIK 3, GA 0 to 3	9/1995	SINUMERIK 840D PCU 50.3-C / 50.3-P	9 / 2017	SINUMERIK 840D 19" Machine control panel	9 / 2019
SINUMERIK 3, GA 4	9/2007	SINUMERIK 840D PCU 50.3B-C / 50.3B-P	9 / 2018	SINUMERIK 802D	9 / 2019
SINUMERIK 5, 6, 10, 11, Mate (FANUC production)	6/1995	SINUMERIK 840D PCU 50.5-C/50.5-P WIN XP	9 / 2024	SINUMERIK 802S / C OP 020 / OP 021	9 / 2013
SINUMERIK 7, Sprint T	6/1995	SINUMERIK 840D PCU 70 (V1)	9 / 2012	SINUMERIK 802S / C MCP	9 / 2016
SINUMERIK 8	9/2004	SINUMERIK 840D PCU 70 (V3)	9 / 2023	SINUMERIK 828 PPU.1	9 / 2023

Be sure to speak with your partner at Siemens right away to learn more about the availability of spare parts as well as upgrade or repair possibilities for the electronic components of your machine tool.



Solutions from a single source – from an expert partner

With retrofits from Siemens, customers benefit from the strengths of an experienced modernization partner. The retrofit solution is adapted to the production process, making it more economical and flexible and reducing costs compared to a new investment. The latest standard products and preassembled replacement and hardware packages enable short project planning and commissioning times. Siemens Motion Control Services has the engineering capacities for smoothly integrating cutting-edge components into a system. This approach is based on a combination of decades of experience and expertise with CNC controllers, machine and plant modernization as well as industry knowledge and project management. This expertise helps customers take full advantage of the productivity potential of the retrofit solution.



At a glance:

The benefits of a retrofit with Siemens

- Comprehensive consulting and reliable execution by experienced specialists in the areas of modernization, control and drive technology, machine tool technologies, and production processes
- Customized modernization concepts for maintaining or increasing productivity
- Higher machine availability due to spare parts supply and services secured in the long term
- Greater operating and programming convenience
- Greater safety for users and machines through Safety Integrated
- Improved energy efficiency with SINUMERIK Ctrl-Energy
- More cost-effective than purchasing a new machine
- Complete modernization from a single source: from the CNC controller, drive, motors, and IT integration to mechanical reconditioning by Siemens partners

Motion Control Services: services designed with you in mind

We are there to support you, our customers, throughout the entire lifecycle of your production systems. Whether it's for drives, motors, or numerical controls, for machine manufacturers, dealers, or machine users, or for product development, production operation, or optimizations: We're where our customers are, all over the world. Our services put our customers in the position to improve transparency, use all kinds of resources and machines more efficiently, more productively, and more flexibly, and ensure availability. We're there for our customers as a skilled partner when it comes to developing new business models – to make the most of the vast opportunities offered by digitalization and secure a lasting competitive advantage. And we're still on hand to provide traditional services like repairs and spare parts for your maintenance needs, quickly and reliably.

Published by
Siemens AG 2017

Digital Factory
Motion Control Services
P.O. Box 31 80
91050 Erlangen, Germany

Article No. DFCS-B10139-00-7600
Printed in Germany
Dispo 21642
HL17073072 WS 09171.0

Subject to changes and errors. The information given in this document only contains general descriptions and/or performance features which may not always specifically reflect those described, or which may undergo modification in the course of further development of the products. The requested performance features are binding only when they are expressly agreed upon in the concluded contract.

