SINUMERIK

Intelligent solutions for machine tools

Edition 2021

usa.siemens.com/cnc
Increased productivity with SINUMERIK

SINUMERIK delivers the greatest return on CNC

Manufacturers have their own very individual requirements — whether standardized automation concepts for the automotive industry or special technologies such as automated tape laying used in aerospace. As a long-time and trusted partner of the machine tool industry, Siemens provides automation and digitalization solutions that will increase your manufacturing productivity and accelerate your business.

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From the idea of a new machine, to faster times to market—from greater flexibility to increased quality and efficiency—the machine tool industry demands leading-edge solutions from their suppliers.

To answer these challenges, Siemens offers you an integrated portfolio of automation and digitalization solutions, along with the technological expertise to support machine tool builders and end-users.

By choosing Siemens and SINUMERIK, you'll have a greater return on your machines, your operations and your people.
Your partner in the machine tool industry

Leading-edge solutions for digitalization and automation

Benchmark for productivity
SINUMERIK CNC is the first choice when new, revolutionary machine concepts must be implemented—and if the maximum productivity is required for a machine tool application. For more than 60 years, SINUMERIK CNCs have been setting standards in the machine tool industry. Siemens has an innovative, unique and experienced development team to ensure highly-productive machine concepts, based upon SINUMERIK controls, can be implemented now and well into the future.

Constantly striving for quality
We are continually improving our development, production and test processes in order to secure maximum availability of our hardware and software. This includes short response times to address customer requirements, testing to secure a high degree of ruggedness—as well as high-quality software. Through the use of the digital twin, machine builders and users can take their first steps towards increasing their manufacturing productivity and accelerating their businesses.

Your global partner
With a tightly meshed global network of sales, service and training centers, as well as international production facilities, Siemens is ideally structured to address the needs of the global machine tool market. Our expert know-how extends far beyond SINUMERIK CNCs—highly qualified machining specialists, located in our global Technology and Application Centers (TACs), have a wealth of application expertise.
SINUMERIK
The CNC portfolio for the machine tool industry

SINUMERIK controls offer the perfect solution for each and every machine design. No matter if you're manufacturing individual parts or mass producing, basic or complex workpieces — SINUMERIK delivers the greatest return on your CNC investment.

SINUMERIK 808
The entry-level CNC for basic machines
- Panel-based compact CNC
- Up to 6 axes/spindles
- 1 machining channel
- 8.4" color display
- SIMATIC S7-200-based PLC
- SINAMICS V70 drive, SIMOTICS S-1FL6 motor

SINUMERIK 828
The compact and advanced CNC for standard machines
- Panel-based compact CNC
- Up to 10 axes/spindles and 2 auxiliary axes
- Up to 2 machining channels T, M, G
- 10.4" display or 15.6" touch display
- SIMATIC S7-200 PLC
- SINAMICS S120, SINAMICS S120 Combi drives
SINUMERIK 840
The open CNC for modular machine tool designs
- Drive-based, modular controller
- Multi-technology CNC
- Up to 31 axes/spindles per NCU* and any number of PLC axes
- Up to 10 machining channels per NCU*
- Modular panel concept up to 24" color display
- SIMATIC S7-300 PLC
- SINAMICS S120 Booksize/Combi/Chassis drive, SIMOTICS motors

*S up to 3 NCUs can be connected via NCU-Link

SINUMERIK ONE
The first-ever digital-native CNC—the next level of digital transformation
- Digital twin as an integral component of the controller
- Drive- and panel-based modular CNC
- Multi-technology CNC
- Up to 31 axes/spindles and any number of PLC axes
- Up to 10 machining channels
- Modular panel concept up to 24" multitouch color display
- SIMATIC S7-1500F PLC
- SINAMICS S120 Booksize/Combi/Chassis drive, SIMOTICS motors

SINUMERIK MC
The CNC for special manufacturing technologies
- PC-based CNC
- Open user interface design based on WinCC or Run MyHMI/3GL
- Up to 8 axes/spindles
- Up to 4 machining channels
- Modular panel concept
- SIMATIC S7-1500F PLC
- SINAMICS S120 Booksize, SINAMICS S210 drives, SIMOTICS motors
SINUMERIK 808
The entry-level CNC for basic machines

With its revolutionary operating system and graphical user interface, along with easy operation, commissioning and maintenance, SINUMERIK 808D ADVANCED is the ideal control for basic milling and turning machines.

Compact and rugged
Thanks to its panel-based CNC design, very few interfaces and an operator panel with IP65 degree of protection, SINUMERIK 808D ADVANCED is the perfect answer every machine tool application. The small dimensions of these units allow them to be used in compact machines.

Optimized for basic milling and turning applications
As a result of its technology-specific versions, SINUMERIK 808D ADVANCED is pre-configured for milling and turning. The range of applications extends from basic, standard milling machines or simple machining centers, through cycle-controlled lathes, up to basic, full CNC lathes. Based upon its hardware and software expansions, SINUMERIK 808D ADVANCED offers you the right amount of performance for simple machining functions found in tool- and mold-making.

Ideal for entry-level machine tool operators
Based upon standard SINUMERIK operation and programming methods, the 808D ADVANCED is ideal for machine tool professionals entering the world of CNC. Commissioning is explained interactively in a graphical format, as well.
The unique performance of the SINUMERIK 828D control sets productivity benchmarks when it comes to milling and turning on standard machines, as well as functions that automate grinding machines.

Rugged and maintenance-free
With its die-cast magnesium operator panel front, plus its panel-based CNC design with just a few interfaces, as well as a high degree of protection, SINUMERIK 828 is the perfect CNC even in harsh environments.

With no fan and no hard disk, and an NV-RAM memory without a battery, SINUMERIK 828D is a completely maintenance-free CNC system.

User-friendly
SINUMERIK 828 is very easy to operate thanks to a full QWERTY CNC keyboard with short-stroke keys and a high-resolution 10.4" TFT color display or 15.6" touch-screen.

Equipped with USB, CF card (for 10.4") and RJ45 interfaces on the front of the operator panel, CNC data can be transferred quickly and easily.

Optimum scalability
In addition to the three high-performance versions of the CNC, SINUMERIK 828D represents an entry into not only favorably-priced job shop machines, but also more complex machine tools with additional axes/spindles and two machining channels.
SINUMERIK 840

The ultimate CNC in machine tool performance

SINUMERIK 840D sl is considered to be the standard in premium-class CNCs. Maximum machine tool performance, along with a high degree of flexibility and openness form the basis for almost any machine concept.

Benchmark for open architecture
The openness of the SINUMERIK 840D sl is second to none. The CNC can be adapted to the machine tool’s technology. For example, the operating system can be supplemented and adapted, or even robots and handling systems can be integrated. With the openness in the CNC kernel and in the drive, unique mechanical concepts can be implemented—such as adapted closed-loop control algorithms or specific kinematic transformations.

Communication at every level
Using PROFINET, the leading Industrial Ethernet standard, SINUMERIK 840D sl is perfectly embedded in the Siemens automation environment. Totally Integrated Automation guarantees that every component within the automation solution interacts perfectly with each other. This allows you to achieve maximum transparency and availability of your production process.

Scalable and modular
In addition to scalable NCU performance, SINUMERIK 840D sl has a high degree of component modularity. Any operator panel can be combined with the NCU, making the 840D sl the ideal solution for high-end CNC machines.

Intuitive operation and monitoring
SINUMERIK operator panels make programming and operation easy for machinists. Based upon an intuitive graphical user interface, multi-touch and gesture operation are possible on the manufacturing floor.

CNC users can also choose from various mobile handheld terminals—for example, the SINUMERIK HT 8, which combines the operator panel and machine control panel to make machine operation even easier.
Developed from the ground up, SINUMERIK ONE is the first CNC system to master the challenges of digital transformation in the machine tool industry. Real-world machining processes and machine tool behavior can now be simulated in the virtual world thanks to the digital twin of the control.
Maximize your productivity

SINUMERIK ONE is setting standards in machine productivity, flexibility, efficiency, speed and quality. This new CNC system maximizes machine tool productivity through state-of-the-art hardware and software—especially in applications like mold-making. Tasks such as collision monitoring that require heavy CPU resources can now be executed during machining without restriction. Speed is also a crucial factor throughout the lifecycle of a CNC machine. SINUMERIK ONE helps optimize engineering processes based upon consistent, end-to-end workflows, thanks to the complete integration in the TIA Portal.

Innovate faster

With SINUMERIK ONE, virtual processes and digital twins are crucial factors for the machine builder and the CNC machine user. Based upon the digital twin of the control, not only do machine development and commissioning achieve all new levels of quality and efficiency, but production planning, workpiece machining, machine expansions and services do, too.

Increase your productivity, accelerate your business

For the first time ever, SINUMERIK ONE offers machine users a true "Digital First" strategy. This means that central processes during production (such as programming, production planning and process optimization) are always simulated in the digital twin. This provides users with a detailed virtual image of the CNC system and machining process instead of performing them directly at the machine. And thanks to virtualization, work is performed offline and non-productive times are eliminated.

Discover a new way of thinking

Can a part be produced at all—and if so, how long will it take? The digital twin answers questions like these quickly. Using Run MyVirtual Machine, manufacturing engineers can check the suitability of the machine and the run-time of a part program can be precisely determined. These calculations are performed on the PC in the office—away from the production floor thanks to the digital twin. This means you can have faster communication with your customers about price, planning and production schedules—even with decreasing batch sizes or increasing ranges of variants to be produced.
SINUMERIK MC

Industrial PC-based control for special manufacturing technologies

Fabrication and manufacturing technologies
From basic grinding and wood, to stone- and sheet-metal cutting, to laser, water jet and additive manufacturing applications—SINUMERIK MC is the ideal control system for customized machine solutions.

Maximum openness
With the integrated Windows® operating system, it’s simple to create customized user interfaces. The open operating concept and extensive interfaces mean that SINUMERIK MC is a seamlessly integrated and open control system.

Excellent motion control and high automation performance
SINUERIK’s well-proven CNC technology facilitates the highest motion control precision, and thanks to G-code programming, a high degree of flexibility and versatility when it comes to open-loop machine control.

Simple engineering
Symbolic programming, state-of-the-art programming languages and comprehensive toolboxes to implement standard applications mean that engineering in the Siemens TIA Portal is both simple and efficient. Ultimately, this results in reduced machine commissioning time and reduced cost.
With its integrated CNC, PLC and Windows® 10 operating system, SINUMERIK MC is the new industrial PC-based solution for machine tools and fabrication machines that require a customizable user interface and powerful motion control.
Drives and motors

Everything from a single source

SINAMICS drives

SINAMICS V70 — small, yet powerful
SINAMICS V70 drives with SINUMERIK 808D is unbeatable when it comes to price-sensitive, simple machines. The compact design of the single-axis, fanless motor modules ensures the highest degree of ruggedness. The motor modules can be quickly adapted to the requirements of the feed axes by simply setting a few parameters.

SINAMICS S120 — providing the highest degree of flexibility
SINAMICS S120 is synonymous with performance and flexibility when it comes to equipping CNC machines. In addition to a wide range of motor modules, various infeed options are available with functions such as energy recovery and controlled DC link. This ensures the shortest spindle acceleration times and facilitates perfect reactive power compensation for the complete machine (cos φ = 1). S120 drives allow the power unit and control module to be mounted separately, which means that this system can be perfectly adapted to address the widest range of drive applications.

SINAMICS S120 Combi — the ideal drive for compact machine tools
SINAMICS S120 Combi (frame type A and B) combines the performance of the modular SINAMICS S120 in a compact, rugged design. One infeed and up to four motor modules are integrated into one housing. It's the ideal drive for compact, standard CNC machines with a spindle power of up to 15 kW and it can control up to five feed axes.

SINAMICS S120 Booksize — minimal footprint for the control cabinet
The new SINAMICS S120 Booksize drives have a 300 percent overload capability and combine compactness with power density. The width can be reduced for machine tool applications that are dimensioned for maximum current with high acceleration levels—or for positioning axes that call for high dynamic performance. The height needed in a control cabinet has also been reduced thanks a new motor connection/shield concept for the module.

SINAMICS S120 Chassis
SINAMICS S120 drives in the chassis format have been expanded to include power ratings up 300 kW and currents up to 490 A — allowing these devices to perfectly address applications with the highest demands relating to power and performance.

usa.siemens.com/sinamics-drives

This complete and integrated SINAMICS family of drives addresses all levels of performance and sets itself apart thanks to its highest degree of flexibility, functionality and efficiency.
SIMOTICS motion control motors

SIMOTICS servomotors  High stall torques, high encoder accuracy and perfect, smooth-running operation make SIMOTICS servomotors the optimum feed drive for CNC machine tools.

For price-sensitive, simple milling and turning machines equipped with SINUMERIK 808D, the SIMOTICS S-1FL6 motor with enclosure ensures a rugged solution.

For standard applications with the SINUMERIK 828D control system, the SIMOTICS S-1FK2 is the ideal servomotor. SIMOTICS S-1FK7 is synonymous for flexibility when it comes to equipping machine tools, and is available with various rated speeds, encoder types and moments of inertia. With 400 percent overload capability, SIMOTICS S-1FT7 motors offer the highest performance and are available with various cooling options.

Our portfolio of servomotors has also been expanded to include compact SIMOTICS S-1FG1 servo-geared motors.

usa.siemens.com/motion-control-motors

SIMOTICS linear and torque motors  Going beyond conventional rotary motor principles, the SIMOTICS range also encompasses linear and torque motors with a high dynamic performance. Using SIMOTICS L-1FN3 linear motors, elasticity, backlash and friction in the machine drive train can be almost completely eliminated—and along with mechanical transmission elements—allows the highest degree of precision to be achieved.

In addition to positioning tables with high dynamic performance, SIMOTICS T-1FW6 built-in torque motors can also be used for rotary and swiveling tables for precise 5-axis machining—as well as new machining technologies such as turning on milling machines with the SIMOTICS T-1FW6 High-Speed torque motor.

SIMOTICS main spindle motors  An outstanding portfolio is obtained by teaming up the expertise in spindle design and construction of Weiss Spindles with the long-standing tradition of building electric motors from Siemens.

This unique portfolio supports every type of spindle solution—from classic mechanical spindles with SIMOTICS M-1PH8, M-1PH3 or M-1PH1 mounted spindle motors; to SIMOTICS M-1FE1, M-1FE2 built-in synchronous spindle motors; to SIMOTICS M-1PH2 induction motors—up to hybrid and even high-performance motor spindles.

siemens.com/spindles

SIMOTICS motors for motion control applications are the driving force for the SINUMERIK CNC family, setting the standard for maximum precision and speed.
Every manufacturing industry has its own specific requirements—whether standardized automation concepts for the automotive sector or a holistic approach across every phase of the product and production lifecycle in aerospace—Siemens has been a leading partner to the machine tool industry for many years and offers industry-specific solutions that are deployed around the globe.
Solutions for every manufacturing industry that are fit for the future

Many years of industry expertise is convincing
Based upon our unique experience and the industry know-how that we have built over the years, we can provide the most ideal solutions for cost-effective production in the automotive, aerospace, power generation and electronics manufacturing industries.

We are your partner for machine tool automation
Throughout decades of direct contact with end-users in key manufacturing industries, we clearly understand the requirements that are placed upon current generations of machines—and those in the future. This know-how flows directly into our product development—which ensures that SINUMERIK CNC systems are closely aligned to address specific market requirements.

In addition to machine tool automation, Siemens can act as the general contractor for the automation of your entire manufacturing facility. Customers will also benefit from Siemens as their single-source supplier—ultimately helping you achieve a highly-productive manufacturing environment.

Setting trends in manufacturing
Siemens is viewed as an innovation leader in the machine tool industry. The development of cutting-edge automation is natural for us—and our digitalization solutions guarantee maximum productivity, efficiency, flexibility and availability.

usa.siemens.com/machine-tools
Leverage the bandwidth of machining technologies

With SINUMERIK, every manufacturing environment is optimally equipped to address technological challenges—today and in the future. SINUMERIK is powerful when it comes to turning, milling and grinding—as well as nibbling, laser machining and gear wheel machining. In addition, it’s open for new manufacturing technologies, such as multi-tasking, additive manufacturing and composites machining.

### Turning
Highest precision and productivity from cycle-controlled and standard CNC turning through milling on lathes up to multi-channel and multi-tasking machining.

### Milling
Superlative milling with SINUMERIK MDynamics, Advanced Surface and Top Surface along with Collision Avoidance. From 3-axis milling through 5-axis simultaneous machining, up to multi-tasking machining.

### Multi-tasking
Based upon SINUMERIK Operate, multi-tasking machining is seamlessly supported across every technology—whether in series production or in the job shop. Best for efficient and highly-productive CNC machining.

### Nibbling, laser, water jet and plasma machining
Going beyond standard technologies, the openness of the SINUMERIK CNC system allows nibbling, laser, water jet and plasma machining solutions to be engineered.

### Composites machining
When it comes to machining composites, the quality of the final product is absolutely decisive. Depending upon the particular material, production techniques such as laser machining, milling or grinding are used—all of which can be flexibly controlled by SINUMERIK.

### Additive manufacturing
In additive techniques, such as material extrusion or laser cladding, the 5-axis technology of our SINUMERIK 840D sl—in conjunction with the SINAMICS S120 drive system and SIMOTICS motors—results in precise and dynamic motion control.

### Grinding
SINUMERIK offers the ideal solution to increase machine productivity and reduce profiling times—from basic to high-end grinding applications.

### Gear machining
Machining gears is a complex process that demands the highest degree of precision. The advantages of SINUMERIK controls are fully leveraged when it comes to turning a gear wheel, cutting gears with a hobbing cutter—along with the final beveling and chamfering.

### Automated cell
Robots must be able to be simply integrated into CNC machines and production workflows. SINUMERIK Run MyRobot offers solutions that range from a simple connection via the user-friendly integration for handling tasks—up to high-precision motion control of machines using robot kinematics.
“My production? It's fit for the future.”

With SINUMERIK, you can use all machining technologies

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1)Option: CP-Comfort
Productivity, precision, availability, costs.

These are the decisive factors in the machine tool market. Packed with special functions, SINUMERIK controls precisely satisfy these requirements—helping to accomplish maximum CNC performance.
Always achieve maximum machine tool and CNC performance

Achieve high productivity through a wide range of possibilities

Robotic handling, intelligent motion control and continuous optimization are the relevant keywords when it comes to leveraging the wide-ranging possibilities of increasing your manufacturing productivity and accelerating your business.

Robotic integration
On the production floor, robots are increasingly being used for not only handling tasks, but also high-precision and complex machining. Thanks to SINUMERIK, you now have a CNC system that offers robotic integration—from a simple connection for handling, up to the complete integration of robotic kinematics. Idle times, especially where the machine is no longer productive, are a thing of the past.

Intelligent motion control
With its intelligent Advanced Surface and Top Surface motion control functions, the SINUMERIK CNC can achieve ideal workpiece surfaces with the highest machining speed.

Continuous optimization
Maximum dynamic performance and precision of machine axes are achieved using the Auto Servo Tuning (AST) functionality of SINUMERIK Operate, which allows control parameters to be optimized automatically. This simplifies commissioning of the machine, and during operation, the machine can be optimized on a regular basis. This ensures maximum machine tool precision over the complete lifecycle.
Precision during manufacturing

SINUMERIK is highly-precise thanks to the software used to compensate mechanical effects. These include functions such as nodding compensation, 80-bit NANO accuracy, as well as friction compensation.

Precision
SINUMERIK CNCs and SINAMICS drives compute with high-performance 80-bit NANO accuracy. This eliminates rounding errors and results in an extremely high internal computational accuracy in the complete controller circuit.

Nodding compensation
Nodding compensation is used to compensate dynamic position deviations that occur when machine axes accelerate. This improves machining quality, while simultaneously allowing higher jerk and acceleration values to be reached.

Friction compensation
Friction-related path errors are even more effectively eliminated by compensating the effects of friction as a function of velocity. This allows consistently high contour accuracy and workpiece precision.

Volumetric compensation (VCS)
VCS allows geometrical deviations of linear and rotary axes to be compensated regarding how they influence the tool center point—directly resulting in greater machining precision.
Increase the availability of your machines

High machine tool availability is achieved by quickly identifying faults and errors, and a simple and straightforward user interface. SINUMERIK provides functions such as collision avoidance and condition monitoring for exactly this purpose.

Collision avoidance

SINUMERIK collision avoidance functions offer extensive collision protection for the CNC machine, the workpiece, clamping equipment and the tool. Using SINUMERIK Edge, collision monitoring functionality can be shifted out, so that the full SINUMERIK system performance can be utilized.

Condition monitoring

SINUMERIK condition monitoring status information is captured using machine fingerprints and the machine condition is evaluated. This allows valid statements to be directly made about the machine quality and possible hidden problems and issues.

Increasing security

Protecting intellectual know-how in the part program and protecting against malware are two essential elements when it comes to the system integrity of the SINUMERIK control.

Know-how protection

Using the SINUMERIK Lock MyCycles function, user cycles are saved to the control system so they’re protected. Password-protected SIMATIC STEP 7 program blocks safeguard intellectual property and know-how.

Security

PC-based systems and the control-level must be protected against cyber attacks. Anti-virus and software whitelisting protect against manipulation and prevent PC-based systems from being infected by malware.

Optimizing processes using the digital twin

The digital twin plays a decisive role when it comes to optimizing the widest range of machining processes while the machine is operational. With different digital twin variants, a range of tasks can be shifted from the real world into the virtual world.

Run MyVirtual Machine, the digital twin for CNC users, optimizes machine utilization levels and significantly reduces unproductive times — paving the way for new business models.

usa.siemens.com/cnc-digital-twin
User-friendly operation and programming

Operation
A wealth of functionality in SINUMERIK Operate ensure a high degree of user-friendliness. This includes state-of-the-art touch and gesture control, as well as the ability to work in several panes and the use of animated elements.

Touch and gesture operation
The new generation of SINUMERIK touch-panels with projected capacitive touch technology offers you the highest degree of performance for demanding, PC-based visualization tasks. This comes along with an attractive front panel design. With its scratch-proof, non-reflecting surface and brilliant display, SINUMERIK-equipped machines can be operated even in harsh manufacturing environments.

Animated Elements
SINUMERIK Operate makes it very easy to enter parameters. With its unique moving image sequences, Animated Elements make machine operation even more user-friendly.

Display Manager
Using the Display Manager, the display area can be sub-divided into three or four panes—allowing large screens to be used effectively. Additional information can be selected and displayed making machine operation customized and flexible.
Machine tool setup

Based on an intelligent JOG mode and intuitive tool management found in SINUMERIK Operate, typical setup functions can be supported graphically and interactively. This keeps unproductive times to an absolute minimum.

Measurement

Measuring tools and workpieces is supported in the intelligent JOG mode. It’s sufficient to just probe an edge, corner or hole to determine the clamping position including the basic rotation of the tool—even in swiveled workpiece planes. By pressing just one key, the geometry is transferred into the CNC’s tool offset memory. Logging measurement results is simplified using standard or user logs.

Zero points

Integrated measuring cycles guarantee workpiece precision during the machining process. Tool geometries and work offsets are automatically corrected so that the required production tolerances are maintained, even for large-batch quantities.

Tool management

Tool data and magazine location information are clearly displayed on a screen. Selecting a suitable magazine location is fully automatic—simply select a tool, press a key and SINUMERIK CNC does the rest. It goes without saying that tool life is monitored, and when required, the appropriate replacement tool is loaded. This reduces the amount of time needed for machine tool setup.

Protection of your people

The intelligent SINUMERIK Safety Integrated system functions allow user-friendly operation, with the highest degree of safety for the operator and the machine itself— for example, when setting up the machine with the protective door opened. Users have an integrated Failsafe PLC at their disposal with SINUMERIK Safety Integrated plus. Safety-relevant logic is programmed in the TIA Portal.

When commissioning the SINUMERIK 840D sl, application engineers can use various innovative functions, such as the ability to graphically configure safety functions and the transparent diagnostic screen forms.

For Safety Integrated and Safety Integrated plus, as soon as commissioning is completed, a prompted, partially automated acceptance test can be performed in SINUMERIK Operate.
Diagnostics

Especially in large serial manufacturing, machine downtimes can result in an enormous loss of production. SINUMERIK Operate offers intelligent diagnostics if problems arise so that machine operation can be resumed as quickly as possible.

In addition to the bus diagnostic tools for drive, peripheral and network components, there is also a powerful trace function, which is used to trace and troubleshoot NC, PLC and drive signals.

Programming

SINUMERIK Operate offers the ideal programming for each and every task: DIN ISO for large-series production and the shortest cycle times—as well as graphical programming, so individual parts and components can be programmed even faster.

High-level CNC language

The SINUMERIK high-level language means that the variance associated with families of parts or special tools can be easily mastered. The SINUMERIK high-level language comes into play precisely where graphical programming, DIN ISO and cycle programming reach their limits. Quickly programming workpieces with a wide range of variance means that the complete range of workpieces can be flexibly addressed—which is what makes it so unique.

DXF reader

The DXF reader supports the display of the CAD data format and direct transfer into the CNC program. Programming times can be slashed by up to 90 percent as the CAD reader is used to transfer data. DXF files can be directly opened on the CNC, and transferred to the CNC program with a simple click of your mouse. The DFX reader can be called up in the contour editor, and for positions, it can also be called in programGUIDE as well as ShopMill/ShopTurn.

programGUIDE

Using programGUIDE, part programs can be easily combined with high-performance technology and measuring cycles. Even classic ISO codes can be programmed. As a result, SINUMERIK is especially attractive for CNC machinists who prefer this classical method of programming.

Machining step programming

Machining step programming (ShopMill/ShopTurn) ensures that demanding and complex parts and components can be quickly and simply programmed. Using the SINUMERIK contour computer, each contour can be entered and programmed directly at the machine. This results in maximum machine tool productivity when it comes to programming and operation.
“My workpieces? I program them myself.”
“My machine? It’s highly productive — thanks to the digital twin.”
On track to achieve increased productivity with CNC Shopfloor Management Software

Machine builders and machine users can respond more flexibly to changing market demands while simultaneously increasing their productivity thanks to digitalization. CNC Shopfloor Management Software addresses your specific machine requirements. It facilitates the management, analysis and optimization of your machine tools—
independent of the control system manufacturer being used.

Digitalization for machine builders

Higher productivity in engineering
There are two main objectives when it comes to machine building. On the one hand, a higher degree of efficiency and flexibility during development, e.g. with consequential virtualization in the development process. On the other hand, supplementing portfolios to digitalize the customer manufacturing environments—all the way up to new business models.

The digital twin—end-to-end development and new business models
Closed-loop engineering allows machine builders to create a seamless workflow from the original idea, through engineering, up to the virtual commissioning of the machine. As a potential business model, the virtual image of the machine can be made available to the machine builder’s end-customer for production planning purposes.

Digitalization for machine users

Increased productivity during production
Machine tools are integrated intelligently into production processes. The pre-condition is that production planning and production—along with the various machines—are networked on three different platforms depending upon the specific requirement. This allows part programs and data to be transferred error-free.

The digital twin in production
Programming and setting up operations are virtually shifted from the real production environment into the office. The machine doesn’t have to be at a standstill to identify whether components can be actually machined. Programs can be tested in advance for potential collision of the tool with clamping equipment or machine parts. CNC programs for new production orders can be run "off-line" while the machine is in operation. Additionally, new machinists can be trained without blocking the real machine. Unproductive times are also reduced to a minimum and shifted into production planning. This increases your manufacturing productivity and the availability of the real machine.

usa.siemens.com/machine-tool-digitalization
CNC Shopfloor Management Software—the eco-system

A leading-edge IT architecture is created and based upon CNC Shopfloor Management Software—and more specifically—at three levels: “In Cloud,” “In Line” and “In Machine.”

These levels correspond to the three platforms: MindSphere, SINUMERIK Integrate and SINUMERIK/SINUMERIK Edge with many customized functions that extend from the shopfloor up into the Cloud.

This is complemented by the opportunity of creating new business models, in service, for example. By leveraging digitalization, the potential for optimization not known until now can be tapped into so that productivity and competitiveness can be sustainably increased.
MindSphere

Digitalization with Cloud-based applications—optimally networked

Cloud-based applications offer all of the advantages when working with a common database. Intelligent tools are used for networking design, production planning and machine tools across various sites and locations to create seamless production processes with the highest degree of efficiency. Production and machines are continually analyzed. The captured data is evaluated, creating a high degree of transparency. This allows the possibility for optimization, unknown up until now, to be identified and fully utilized.

SINUMERIK Integrate

Wide-ranging applications to optimize machine availability and increase productivity

The advantages of a digital landscape can be utilized even without a connection to the Cloud. SINUMERIK Integrate hosts a wide range of applications that provide functions adapted to machine tool engineering and production—for example, tool and program management.

SINUMERIK Edge

Capturing, analyzing and processing high-frequency data close to the machine

SINUMERIK Edge is a reliable and high-performance hardware and software solution for machine-related use (Edge computing). This allows high-frequency data to be processed and analyzed essentially in real-time on the shopfloor while your production is running. Using customized Edge apps, processes are monitored and optimized.
Motion Control Services

Machine tool digitalizatin and production optimization

Digital services—the path to a digital production environment

Based upon CNC Shopfloor Management Software, Motion Control Services represents a partial or full digitalization of the mechanical production workflow. Siemens can offer you a complete solution from a single source—extending from the requirement analysis—through the installation with subsequent customer training—all the way up to the implementation of optimization measures to ensure continuous system availability.

Consulting
Analysis and development of a digitalization strategy tailored to address specific customer requirements within the scope of professional consulting services.

Digitalization check as a service
This local service provides concrete recommendations when it comes to networking machines in production IT systems. Machine data is continuously captured and evaluated in a standardized way while your machines remain operational.

Digitalization preparation
CNC machines are updated to state-of-the-art technology and prepared for digitalization. Irrespective of whether greenfield or brownfield systems, using Brownfield Connectivity Services, software updates, hardware upgrades or retrofits, fleets of machines are made fit for the future.

Implementation
Specialists from Siemens support you when configuring and commissioning the various software modules—making your production more efficient, more profitable while increasing the security of your investment. Training programs ensure that your personnel know how to use the application.

Data and process analysis
Individual measures and activities to optimize production are derived based on captured and analyzed data.

Optimization
Optimization measures are implemented to fully leverage the potential of machine fleets. In addition to productivity increasing measures, this also involves increasing the availability and leveraging cost-saving potential.

Maintenance
This service ensures that IT systems remain operational, to secure operating time, as well as resolve faults in the case of non-scheduled machine downtimes.

Siemens provides support to machine tool dealers, importers and end-users during the entire lifecycle of your production systems—for controls, drives and motors.

The emphasis is on increasing transparency so that every type of resource and machine can be used more efficiently, productively and flexibly—and of course increasing overall machine availability.
Classic services—the basis for continuous improvement

**Service contracts**
Harmonized and aligned to specific requirements and business objectives, our service contracts are modular and allow manufacturers to create a customized service plan to reduce their machine downtimes. Here, customers can integrate digital service options. These include remote access and the use of service applications to achieve even greater availability of their machines.

**Technical support**
In more than 25 regions around the world, our hotline experts answer every question related to the SINUMERIK control—in your time zone and in your language.

**Spare parts and repair services**
A closely meshed, flexible spare parts and repair service network ensures that spare parts are available quickly and at reasonable prices in over 150 service locations around the globe. For selected components, the Long-Life Repair option can extend service availability for up to 25 years.

**Upgrade services**
Component upgrades extend system and machine usage times to secure investments over the long term.

**Productivity Improvement**
Especially when it comes to machine tools that are used intensively with high utilization levels, fully leveraging the machine’s capacity to its maximum has significant economic benefits. With Productivity Improvement, we will optimize the production potential of your machines equipped with SINUMERIK 840D sl or SINUMERIK 840D powerline.

**Retrofit**
CNC retrofit is the cost-effective alternative to purchasing a new machine. This is the case if the mechanical system of a machine tool is still in a good condition—however, the control or drive system no longer represent state-of-the-art technology. As part of this service, we upgrade specific components to reflect latest state-of-the-art technology. Cycle times can be reduced significantly and quality optimized by just upgrading the control system.
Everything about SINUMERIK CNC can be found on the web
usa.siemens.com/cnc