SIEMENS

SINUMERIK 840D sl

Open, flexible, powerful. The premium CNC for machine tools

siemens.com/sinumerik

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SINUMERIK 840D sl

With its SINUMERIK 840D sl, Siemens Machine Tool Systems is offering an open CNC for modular, premium machine concepts.
With its powerful and innovative system functions, SINUMERIK 840D sl addresses an inexhaustible range of technologies. SINUMERIK 840D sl sets the pace when it comes to complying with global machining trends – making it the preferred CNC to address the demands of the future.

SINUMERIK – a CNC portfolio for the global machine tool market

SINUMERIK 808D

- Panel-based compact CNC
- Technologies: Milling and turning
- Up to 5 axes/spindles
- 1 machining channel
- 7.5"/8.4" color display
- S7-200 PLC

SINAMICS V60 SIMOTICS S-1FL5	SINAMICS V70 SIMOTICS S-1FL6
SINUMERIK 808D	SINUMERIK 808D ADVANCED

Entry-level class

SINUMERIK 828D

- Panel-based compact CNC
- Technologies: Turning, milling, grinding functions
- Up to 10 axes/spindles and 2 auxiliary axes
- Up to 2 machining channels
- 8.4"/10.4" color display
- S7-200 PLC

SINAMICS S120

SINAMICS S120 Combi

SINUMERIK 828D BASIC	SINUMERIK 828D	SINUMERIK 828D ADVANCED

Compact class

SINUMERIK 840D sl

- Drive-based, modular CNC
- Multi-technology CNC
- Up to 93 axes/spindles and any number of PLC axes
- Up to 30 machining channels
- Modular panel concept up to 19" color display
- SIMATIC S7-300 PLC

SINAMICS S120 Combi	SINAMICS S120
SINUMERIK 840D sl BASIC	SINUMERIK 840D sl

Premium class

SINUMERIK 840D sl – open, flexible, powerful

Offering maximum CNC performance, as well as a degree of flexibility and openness that is absolutely unique in the market, the SINUMERIK 840D sl is the basis for almost any machine concept. A powerful hardware architecture and intelligent control algorithms – complemented by outstanding drive and motor technology – ensure machining with the highest dynamic performance and precision. The SINUMERIK 840D sl CNC is supplemented by an extensive range of solutions for IT integration. Based on these innovative, leading-edge solutions, Siemens Machine Tool Systems secures the highest machine availability and maximum productivity.

SINUMERIK 840D sl – the optimum solution for each and every technological challenge

With its premium SINUMERIK 840D sl CNC, Siemens Machine Tool Systems can confidently address every important technology in the machine tool market. At the same time, SINUMERIK 840D sl sets benchmarks when it comes to combining various technologies to create multitasking machines.

SINUMERIK 840D sl – ideally suited to address every application

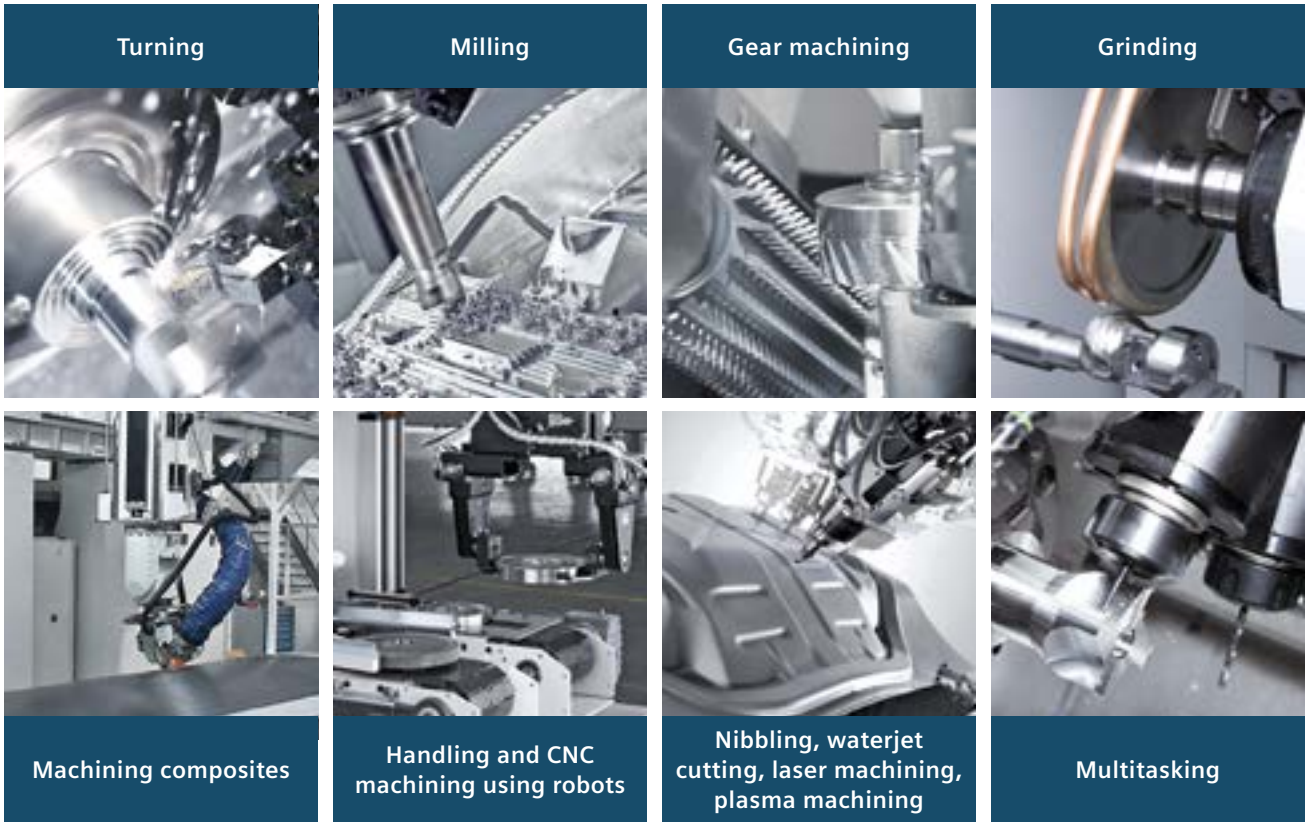
Over 50 years of experience in the development and production of CNCs is reflected in an almost inexhaustible range of CNC functionality: Kinematic transformations, compensations and generic couplings are standard SINUMERIK 840D sl functions. Together with a state-of-the-art and consistent user interface, as well as the ability to network from the field up to the enterprise level, a control system is created for a unique range of technological applications – from individual part production in job-shops, up to large serial production in industrial manufacturing environments.

Turning and milling – setting standards

Milling and turning at the limit is one of the strengths of SINUMERIK 840D sl. As standard, it has powerful drilling, milling, turning and measuring cycles, integrated setup functions, as well as specific CNC editors for turning and milling applications. Packed with this functionality, SINUMERIK 840D sl sets the pace in the market for high-speed 5-axis milling centers as well as for turning centers with B-axis and highly productive multi-spindle applications.

Technologies combined in one machine

Decades of experience with individual technologies combined in one CNC kernel and one user interface: the SINUMERIK 840D sl is the ideal CNC for state-of-the-art multitasking machine tools. It sets benchmarks for modern turn-milling and mill-turning applications. This is true today, and it will remain this way tomorrow.



A case for customized standard technologies

The skill sets of a particular machine tool OEM when machining certain types of components impact technologies such as grinding, gearwheel machining and laser machining. SINUMERIK 840D sl also fully leverages its expertise here. A wide range of basic CNC system functions in the background is perfectly adapted to the particular strengths of the machine through the open operating architecture.

Beyond the machine tool itself – special technologies and more

The range of applications that the SINUMERIK 840D sl addresses doesn't just stop where a classic machine tool ends: handling and machining with robots, transfer lines, rotary indexing machines, with or without tool. The SINUMERIK 840D sl clearly proves its performance wherever precise and dynamic path motion is required.

Open for new fields of technology

With compile cycles, an open feature platform in the CNC kernel, the SINUMERIK 840D sl offers an extremely high degree of flexibility that can be adapted to any technological requirement. With its outstanding system flexibility, SINUMERIK 840D sl is also the first choice when it comes to addressing completely new fields of technology. For example, the combination of erosive and additive production techniques or tape laying applications when handling composites in the aerospace industry.

SINUMERIK 840D sl – ultimate performance in the premium class

SINUMERIK 840D sl is considered to be the benchmark in the domain of premium class CNCs, which is certainly justified. Maximum CNC performance, along with a degree of flexibility and openness unknown until now, are the basis for almost any CNC machine.

Maximum CNC performance

SINUMERIK 840D sl offers an almost inexhaustible potential when it comes to CNC computational performance as a result of its drive-based, high-performance NCUs (Numerical Control Units), equipped with the latest multi-core processor technology. Performance means a high number of axes in highly modular machine concepts, such as transfer lines or rotary indexing machines. Performance also means the highest precision and dynamic machining performance for high-speed cutting in 5-axis machining centers for moldmaking. Regardless of which premium machine tool is involved, the SINUMERIK 840D sl always secures the highest degree of productivity of the machining process.

Scalable CNC performance

SINUMERIK 840D sl provides various machine tools with the optimum CNC performance. To achieve this, it is available in various performance versions: SINUMERIK 840D sl BASIC, a combination of NCU710 and SINAMICS S120 Combi, is the perfect entry solution for compact premium machines. Up to three NCU730s, coupled through the NCU link, provide the highest performance available. They can control up to 93 axes in 10 machining channels.

For every operating philosophy ...

SINUMERIK 840D sl offers a comprehensive range of operator components – from fixed and mobile operator panels, through machine control panels and handheld terminals, up to CNC keyboards and storage devices. This ensures that the machine operator always has the ideal interface available. With their touch screens, SINUMERIK blackline panels open up the way to create new machine operation philosophies.
In conjunction with the state-of-the-art SINUMERIK Operate user interface, touch and gesture operation are establishing themselves in the production domain.

... the optimum operating performance

Based on flexible hardware, the operating performance can be adapted to the application's particular requirements. The complete SINUMERIK Operate graphic user interface runs in one core of the NCU processor – a rugged solution and optimized from a cost perspective. Alternatively, SINUMERIK Operate can be installed on a separate Panel Control Unit (PCU50) under Windows®. This results in a unique level of operating performance and flexibility for customized applications, including the installation of Windows®-based software add-ons.

M:N – the magic word when it comes to flexible machine operation

The SINUMERIK 840D sl is flexible in every regard, and the operating components have a high degree of modularity. With flexible M:N operation, the ability to combine any operator panel with any NCU means that the SINUMERIK 840D sl is the perfect fit for state-of-the-art premium machine concepts. This also means that in rotary indexing machines or transfer lines, it offers an optimum level of user-friendliness and process reliability.

SINUMERIK 840D sl – the benchmark for open architecture

With a system openness that is unique in the market, SINUMERIK 840D sl optimally fits the machine technology, ultimately creating that all-decisive productivity boost.

Maximum machine technology

The high level of system openness of SINUMERIK 840D sl gives machine builders the possibility to adapt the control to precisely address their particular machine technology – from industry-specific HMIs such as Transline, through completely dedicated user interfaces, up to compile cycles. This architecture has a unique level of openness in the market, in the CNC kernel and in the drive. As a consequence, SINUMERIK 840D sl can guarantee the highest degree of technological expertise in a machine tool.

Highest level of production automation

A high degree of system openness offers a high level of flexibility for production automation. On one hand, machine builders can pack a maximum amount of technology into the machine, and on the other hand, they can upgrade machines to become fully automated production cells. By integrating any handling system or robot, a completely automated workpiece flow is created with a high degree of user-friendliness and standard operation.

Comprehensive solutions through Solution Partners

As a result of the system openness of SINUMERIK 840D sl, SINUMERIK Solution Partners can expand the CNC to include a wide range of additional solutions, products and services. This means that machine tool builders have the possibility to supplement their SINUMERIK applications with additional ones from third-party suppliers, such as tool and process monitoring systems, measurement systems, as well as tele-service and video monitoring systems.

www.siemens.com/solution-partner

SINUMERIK 840D sl – networking in production

Siemens provides the complete spectrum of IT integration and networking for production to supplement its SINUMERIK 840D sl CNC technology.

Automation from a single source

Based on perfectly coordinated products, systems and solutions, Siemens offers a unique automation portfolio – from SINUMERIK for machine tools, through SIMOTION for production machines, up to SIMATIC for general automation and process control technology. Beyond machine tool automation, Siemens can completely supply the automation technology and production automation for complete plants and systems.
Customers benefit from seamlessly integrated automation solutions from a single source to achieve highly productive production environments.

Continuity from the control up to the enterprise level

SINUMERIK Integrate allows machine tools to be networked in higher-level IT systems of the production environment. The software runs directly on the CNC, acquires all data from the CNC and PLC and provides this data for use in other systems. A central server provides various applications.

If machines are connected with the server, then the new functions can be simply loaded into them. This is where the level of integration and seamlessness of the Siemens portfolio pays off, as PLM and MES systems can also be easily connected to improve productivity even more.

SINUMERIK Integrate – one platform with many advantages

SINUMERIK Integrate is a central platform that can be used to increase the productivity of end users or increase the service efficiency of machine tool manufacturers. Further, the automation level of the production environment can be expanded. Through optimized production, more parts can be produced, and also mistakes reduced – for example, as a result of missing tools, incorrect CNC programs, high energy usage along with inventory levels of material and tools.

SINAMICS – the powerhouse in the background

SINAMICS S120 Combi

SINAMICS S120 Booksize

Siemens is simply world-class when it comes to drive technology – and therefore has outstanding drive solutions for machine tools.

SINAMICS S120 – the highest degree of flexibility

SINAMICS S120 is synonymous with performance and flexibility when it comes to equipping machine tools. In addition to a wide range of motor modules up to a power rating of 300 kW, there is also an infeed unit with a controlled DC link. This ensures the shortest spindle acceleration times and facilitates perfect reactive power compensation for the complete machine ($\cos \varphi = 1$). This is complemented by DSC (Dynamic Servo Control), which represents a unique position control technique to achieve the highest dynamic performance of feed and spindle motors. The SINAMICS S120 high-performance drive system can also be used in decentralized solutions with the S120M variant.

SINAMICS S120 Combi – the ideal drive for compact machines

SINAMICS S120 Combi combines the performance of the modular SINAMICS S120 Combi in a compact, rugged design. Here, an infeed and up to four motor modules are integrated in one housing. By intelligently expanding the system to include two more motor modules, the SINAMICS S120 Combi is the ideal drive for compact, standard CNC machines with a spindle power of up to 15 kW and can control up to five feed axes.

SINAMICS S120 Hydraulic Drive with integrated safety functionality

SINAMICS S120 Hydraulic Drive facilitates high forces in the smallest space. It comprises a high-performance hydraulic control and the compact, space-saving SINAMICS S120 HLA interface module. The hydraulic system is simply commissioned, operated, diagnosed and serviced through SINUMERIK Operate. Further, SINAMICS S120 Hydraulic Drive has Safety Integrated functionality.

www.siemens.com/sinamics

SIMOTICS – for the highest degree of precision and perfect dynamic performance

SIMOTICS motors represent the driving force for SINUMERIK CNCs and the SINAMICS drive in the machine with the highest precision and dynamic performance.

SIMOTICS servomotors

High standstill torques, the fastest speeds and smooth-running characteristics make SIMOTICS servomotors the optimal feed drive for CNC machines. A high degree of protection, strong bearings and rugged design mean that these synchronous servomotors have outstanding reliability. High-quality magnetic materials result in a very high power density – and therefore very small motor dimensions. This allows these motors to be installed in extremely tight spaces.

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. Elasticity, backlash and friction as well as mechanical transmission elements of the machine drivetrain can be almost completely eliminated when using SIMOTICS 1FN3 linear motors. Further, using SIMOTICS 1FW6 torque motors, completely new technological domains can be addressed, for example, turning on milling machines (multitasking).

SIMOTICS geared motors

With the SIMOTICS 1FG1 geared motor, Siemens is offering the complete range of motors, including integrated gearbox for machine tools from a single source. With its high energy efficiency, very flexible torque ratio and output direction, it is ideally suited for auxiliary equipment such as pallet changers, chip conveyors and feeding units.

www.siemens.com/simotics

Spindle solutions from Siemens

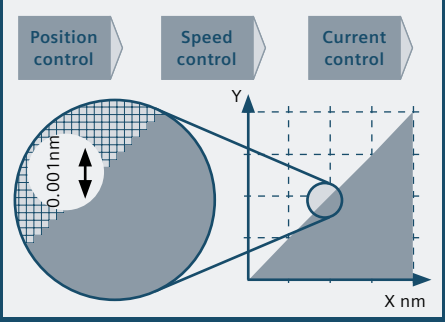
Siemens has a long tradition in the design and construction of electric motors – and Weiss Spindeltechnologie GmbH has a wealth of knowledge and competence when it comes to designing and building spindles. These two experts ideally complement one another: This means that Siemens Machine Tool Systems can offer a wide range of spindle solutions from a single source. The result is a portfolio that ideally supports each spindle solution type. This portfolio starts with the classic 1PH8 mounted spindle motors and 1FE1 and 1FE2 synchronous built-in spindle motors, through mechanical spindles up to hybrid and 2SP1 motor spindles.

www.siemens.com/spindles

SINUMERIK CNC performance – the machining standard

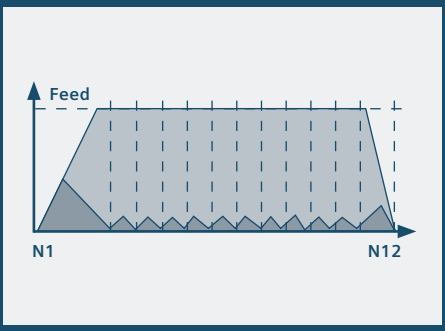
SINUMERIK CNC controls set standards relating to every aspect of machining performance.

SINUMERIK sets the pace – whether precision and speed, energy efficiency and safety or reducing cycle times.



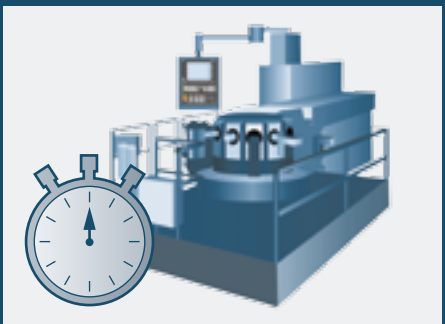
Highest precision

SINUMERIK CNC and SINAMICS drives compute with high-performance 80-bit NANO^{FP} accuracy. This eliminates rounding errors and results in an extremely high internal computational accuracy in the complete controller cascade. Further, a dynamic feed forward control ensures that the following error is almost completely compensated. While accelerating, jerk limiting reduces the stress on the mechanical system. Using its Dynamic Servo Control, SINAMICS control technology provides additional position control in the drive – representing an additional advantage by achieving an increased level of disturbance resistance of the machine control.



Maximum speed

When machining many CNC blocks in the shortest time, for example, free-form surfaces, the machining process itself no longer defines the speed, but the performance of the CNC system. Here, with its Advanced Surface and Top Surface features, SINUMERIK offers you the ideal solution. Advanced Surface stands for state-of-the-art control algorithms, such as Look Ahead or the dynamic compression of linear and circular blocks in 5th degree polynomial (NURBS). With Advanced Surface and Top Surface, machines can be operated at their physical limits.



The shortest idle times

Especially in large series production, idle times, where the machine is no longer productive, represent a critical productivity-inhibiting factor. Here, SINUMERIK provides the optimum solution with its synchronous architecture and intelligent functions, such as synchronized actions and asynchronous subprograms. For example, loading equipment can be implemented without having to make time-consuming interventions in the PLC.

Kinematic transformations

SINUMERIK CNC is in its element when it comes to handling complex machine kinematics – from the classic face/peripheral surface transformation for turning machines through multi-side machining in swiveled planes, up to dynamic 5-axis transformation in tool- and moldmaking as well as in the aerospace industry. Further, SINUMERIK 840D sl supports every type of special transformation up to milling with robot kinematics – therefore paving the way for advanced machine tool applications.

Energy efficiency with SINUMERIK Ctrl-Energy

Siemens Machine Tool Systems sets the standard when it comes to energy efficiency in machine tools: SINUMERIK Ctrl-Energy encompasses a wide range of high-efficiency drive and motor components, CNC/drive functions, software solutions and services. SINUMERIK Ctrl-Energy offers energy-efficient solutions over the machine's entire lifecycle – from design to the operation of the machine. Users have intelligent functions at their fingertips, such as the ability to analyze the energy costs associated with a specific workpiece. SINUMERIK helps you to save energy by simply pressing the Ctrl + E shortcut key.

SINUMERIK Safety Integrated to protect personnel and machines

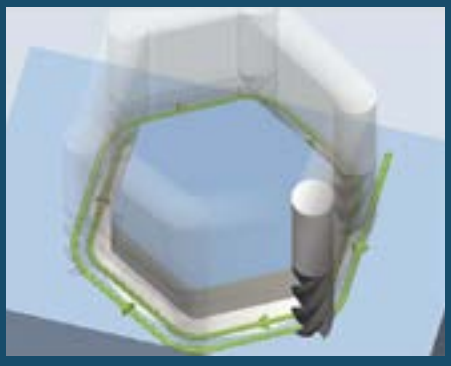
Siemens Machine Tool Systems is the leader when it comes to protecting personnel and machines. For almost two decades now, SINUMERIK Safety Integrated has been setting the benchmark for machine tool safety technology. Here, intelligent system functions permit user-friendly operation of the machine – for example, machines can be set up with the protective doors open. This provides the highest degree of safety for machine operators and the machine itself.

SINUMERIK Operate – the state-of-the-art operating concept for the 21st century

SINUMERIK Operate provides the highest degree of operator convenience at the machine tool.

As a consequence, SINUMERIK Operate sets the standard for efficient machine tool operation.

www.siemens.com/sinumerik-operate

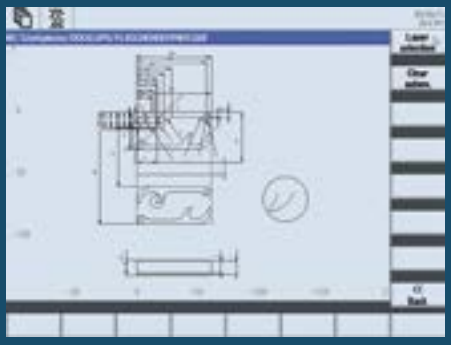


Innovative details for user-friendly operation

With Animated Elements, SINUMERIK Operate makes it very easy to enter parameters. Animated Elements completely redefine what graphic programming and operation really mean – using a unique display with moving image sequences.
Shortcuts in SINUMERIK Operate allow data to be quickly entered at the operator panel – saving operators a lot of time.

Intelligent JOG mode

In SINUMERIK Operate, the intelligent JOG mode provides graphic, interactive support for all typical setup functions for turning and milling machines. This means that a probe can be simply loaded with just three clicks. On lathes, face turning of a blank or boring soft clamping jaws is also directly realized in the intelligent JOG mode – without having to generate a part program.
The extended retract function allows a tool to be retracted after a power failure, and to be returned to the precise point of interruption after power has been restored. Whether turning, milling or multitasking: The retract function is available for all machining technologies – this saves a lot of time.

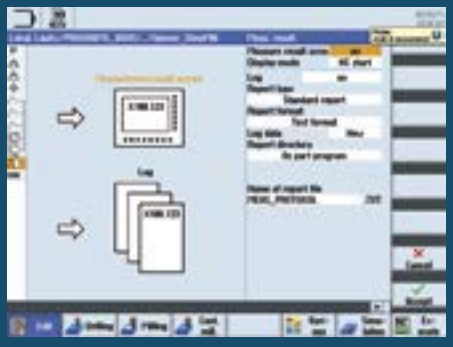


Simple data transfer using an integrated DXF reader

The new DXF reader option is an important factor when it comes to paperless production environments. The DXF reader supports the display of this CAD data format, and direct transfer into the CNC program. Programming times can be slashed by up to 90% if, at the CNC, the contour positions for the drilling template no longer have to be completely programmed, but data can be transferred using the CAD reader. This means that DXF files can be directly opened on the CNC, and data transferred to the CNC program with a mouse click!

Logging function for the highest process conformity

Logging in JOG as well as in the automatic mode is an important component for quality assurance. In the setup mode on general-purpose machines, data logging ensures that machining is even more precise and machining results are simpler to reproduce. The log is generated in all of the usual office formats, so that it is available on the PC for downstream processing.



Optimization and diagnostics onboard

Auto Servo Tuning (AST) functionality permits machine axes to be optimized automatically with just one click. This ensures maximum machining precision over the entire life of the machine. To ensure that machine failures do not result in enormous production losses, onboard bus diagnostic tools are available for drive, peripheral and network components, as well as a high-performance trace function to record and diagnose NC, PLC and drive signals.

SinuTrain for SINUMERIK Operate

The SinuTrain NC programming station, which is identical to the control system, brings SINUMERIK Operate – including animated machine operator panel – to the PC. This facilitates convenient job preparation in a familiar work environment. NC programs can be directly generated here, and as a result of the original SINUMERIK CNC kernel, can be verified before they are transferred to the real machine. Users profit from a higher machine availability and reliability. Further, SinuTrain can be ideally used for training machine operators on how to operate and program SINUMERIK – as well as for presenting and testing new SINUMERIK functions.

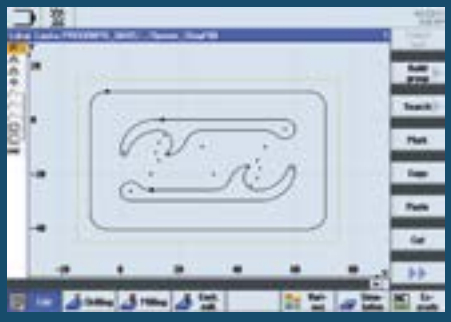
www.siemens.com/sinutrain

SINUMERIK Operate – perfect for all programming tasks

With a powerful technology cycle package for turning and milling, Siemens Machine Tool Systems once again proves its technological leadership in CNC technology.

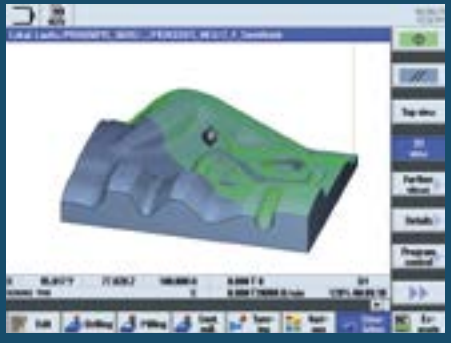
For large series ...

Shortest machining times for large serial production and with the highest flexibility for special applications: SINUMERIK CNC controls make this possible with advanced CNC programming based on high-level language elements. Using programGUIDE, SINUMERIK CNC 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 machine operators who prefer this classic programming method.



... and small series

The programming time is a decisive productivity factor for small serial production and individual parts. ShopMill and ShopTurn machining step programming methods are simply unbeatable in this discipline. Machining operations such as drilling, centering, plunging and pocket milling are shown in the form of machining steps. Even for complicated machining operations, CNC programs are extremely compact and easy to read. Using dynamic broken-line graphics, which are absolutely unique in the market, all of the geometrical elements can be displayed to scale in the CNC program.

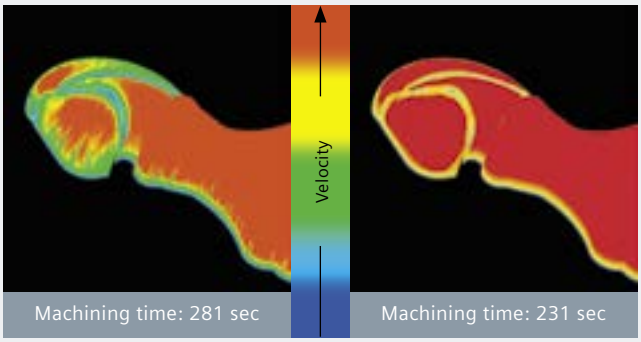


CNC simulation for reliable and safe processes

SINUMERIK CNC simulation guarantees maximum process reliability and safety as the real geometries of the tools are always used. It goes without saying that the simulation shows the precise image of the required machining operation – not just bright, colorful graphics. Whether face or peripheral surfaces, swiveled workpiece planes or even machining in several channels, SINUMERIK CNC simulation simulates every machining type. With the moldmaking quick view, even very large part programs can be displayed on the screen within seconds.

SINUMERIK MDynamics – synonymous with outstanding milling results

Cutting-edge operation, unique technology cycles, ultimate shopfloor programming and high-quality CNC simulation – together with premium motion control – combined in one package: This is the outstanding SINUMERIK MDynamics milling package.



Advanced Surface and Top Surface to achieve maximum machine performance

Advanced Surface and Top Surface are synonymous for milling at physical machine limits – with the highest velocity and precision, the best surface quality – and not only for moldmaking.

5-axis machining at the highest level

SINUMERIK CNCs offer the optimum kinematic transformations for modern milling machines – from peripheral surface transformation with slot wall correction for cylindrical workpieces, through statically-swiveled planes for multi-side machining, up to dynamic 5-axis transformations (TRAORI) for demanding toolmaking, moldmaking and aerospace applications.

High-speed settings

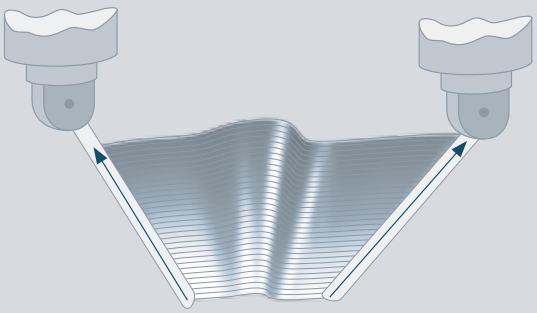
The user-friendly high-speed settings cycle simplifies parameterizing moldmaking applications. With just a few parameters, SINUMERIK is set to the machining task – roughing, finishing or pre-finishing – as well as the required machining tolerance.

The sum makes the difference

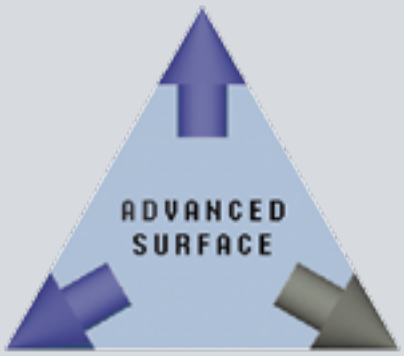
Advanced Surface and Top Surface, high-speed settings, kinematic transformations, SINUMERIK Operate for efficient operating and programming as well as a comprehensive portfolio of technology and measuring cycles create a unique set of highlights for demanding and sophisticated milling machines. And top-class milling has a name: SINUMERIK MDynamics.

www.siemens.com/sinumerik-mdynamics

5-axis machining with TRAORI



Surface quality

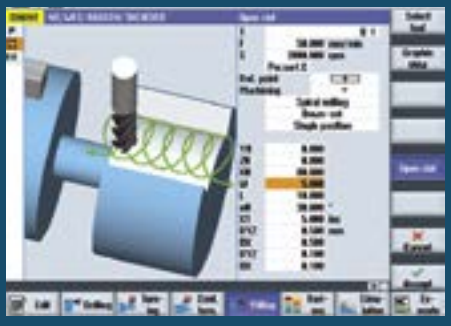


Multitasking with SINUMERIK – consistent down to the finest detail

Multitasking made easy: Maximum CNC performance and operator-friendliness for multitasking turning and milling applications is obtained as a result of the standard and seamlessly integrated CNC functions in SINUMERIK, complemented by the standard look & feel when it comes to operating and programming with SINUMERIK Operate.

Powerful CNC functions

With just a few parameter entries, intelligent kinematic transformations transform milling machines into turning machines – and turning machines into milling machines. In conjunction with additional CNC features, such as cross-technology tool management and state-of-the-art velocity control, completely new CNC applications are opened up – from turning on milling machines, up to machining free-form surfaces on turning machines.



Standard operation

The standard look & feel of SINUMERIK Operate for every machining technology allows several technologies to be combined on one machine – and of course, with the highest degree of standardization when it comes to operation and programming that is expected from SINUMERIK. Further, SINUMERIK technology cycles for drilling, milling, turning and measuring are adapted to the particular multitasking machine. This results in a maximum degree of standardization and seamless integration for all multitasking operations on a machine.

Universal CNC programming

Comprehensive CNC programming tools that go beyond technology limits ensure that CNC systems are efficiently programmed for multitasking machines – from machining step programming for individual parts, up to multi-channel programming in large serial production environments. Powerful CNC simulation permits part visualization across every technology and offers the highest degree of process reliability and safety for all kinematic versions of state-of-the-art multitasking machines.

smart operation –
new concepts in machine operation

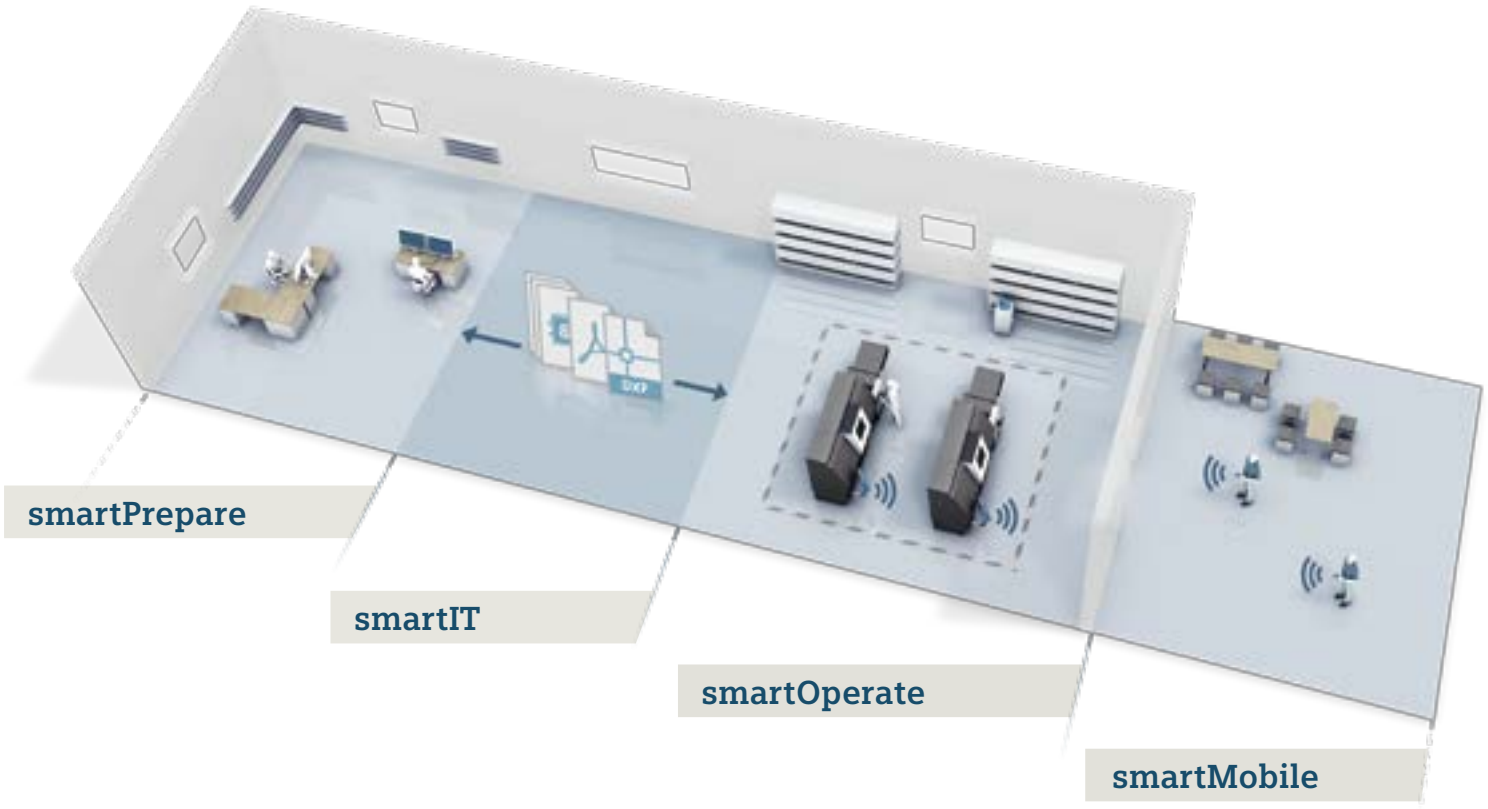
It was never so simple as now to integrate a machine tool into the overall production workflow. With smart operation, we facilitate state-of-the-art work methods to be used in production without incurring high associated costs. This is especially true for small and medium-sized companies.

smartPrepare
Identical with the machine itself, at the PC the next order can already be programmed 1:1 offline and simulated. This maximizes machine utilization times.

smartIT
Never again have to look for the documentation, never again have memory limitations. All order documentation – such as part programs, DXF drawings and diagrams – are transparently available at the operator panel through the network. It is no longer necessary to search for documentation.

smartOperate
State-of-the-art touch screen technologies facilitate simple and efficient working at the machine.

smartMobile
Even if he is not at the machine, with smartMobile the machine operator always knows what is going on:
He always has the information on his own smartphone, tablet or PC, whether it be job status, part inventory, etc.



Always a reliable overview of the entire process chain

Machining complex workpieces always represents special challenges when it comes to precise machining, perfect surfaces and high process reliability. With SINUMERIK, Siemens offers the complete range of innovative, seamless solutions across the complete process – from job preparation with CAD/CAM systems through control-specific simulation up to CNC machining.

Efficient processes with SINUMERIK

In CNC production landscapes, the focus is especially on the process between the original product idea and the machined part. This process encompasses:

- Computer-supported product development at the CAD/CAM level
- NC program generation with optimum postprocessors
- Simulation to check and optimize the manufacturing process at the PC
- Optimized efficient workpiece machining at the machine tool

Computer-supported NC programming is based on NX CAM from Siemens PLM, for example.
This offers extended programming functions to support the already powerful SINUMERIK functions. Already at the CAM level, the functions, cycles and options available with SINUMERIK are parameterized for the particular machining step. In addition to the portfolio of flexible NC programming methods, NX CAM also provides the possibility of managing data and establishing a data coupling to the shopfloor.

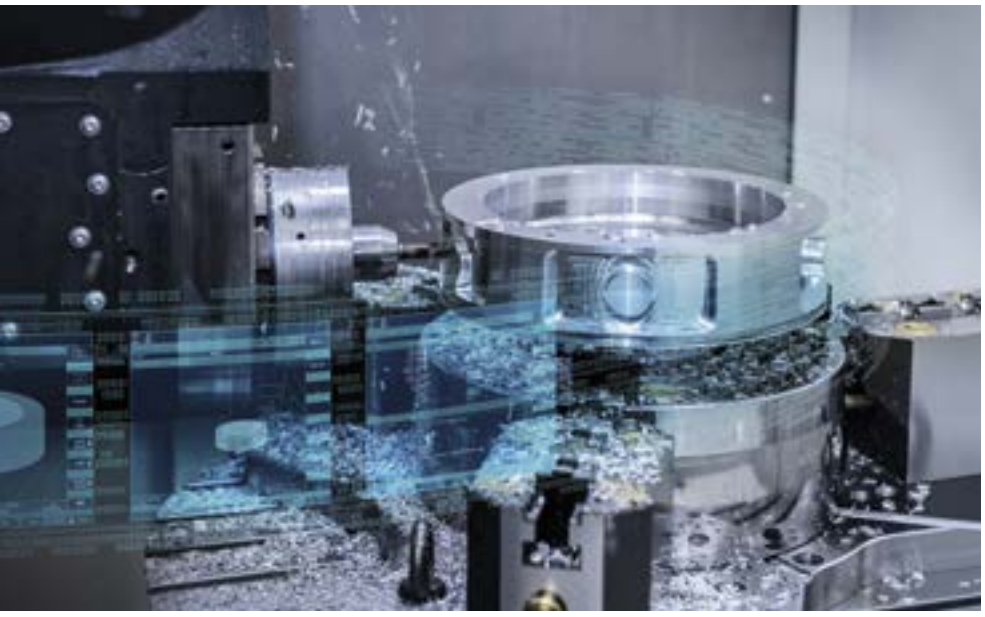
Manage MyPrograms and Manage MyTools, modules of the software suite SINUMERIK Integrate for production, facilitate efficient program and tool management across the complete production environment. This increases production efficiency:

- Operators can load changes to NC programs or tool lists to the server
- The changes are compared and released at the job preparation

Central production data management:

This saves time and increases the reliability of the interaction between operators and job planners.

This process chain can even be implemented up to higher-level IT systems: This means that tools, their associated components, holders and cutting edges can be intelligently managed and organized with an additional availability analysis.



VNCK simulation for an optimum final result

Even before the actual production at the machine, the production sequences can be simulated – based on the integrated SINUMERIK virtual NC kernel – and finally also optimized. With Run MyVNCK, Siemens makes it possible to set up a virtual machine: The new workpiece can already be run in at the virtual machine on the PC, while the real machine produces another part.

The machine operator can increase the cycle times and does not have to wait for machines to become available in order to test the new workpieces. As a consequence, he can optimize the production planning and utilization of his machines. The workpiece costs can be reliably calculated using the machining times calculated within the VNCK.

Higher production efficiency

- The optimized process chain – from designing a workpiece in the CAD system up to CNC production – increases flexibility and productivity
- 100% offline verification/evaluation of NC programs is possible as a result of the original CNC kernel
- Production resources can be networked with SINUMERIK Integrate
- Production processes can be optimized through centralized production data management

Solutions for every industry that are fit for the future

Siemens knows where machine tools will be needed in the future,

so we leverage our industry expertise to support our customers

to make certain that their businesses will remain successful

in the future, as well.

www.siemens.com/machinetools

Electronics

Many years of industry expertise is convincing

As a long-time partner to the machine tool industry, Siemens Machine Tool Systems is in the position to address the needs of companies that are operating CNC machines. Based upon our many years of outstanding industry expertise, SINUMERIK controls can always provide the ideal solution for cost-effective manufacturing – for example in automotive, aerospace, power generation, electronics and medical part production. We are certain that our focus on end-user industries will be proven in the future, as well. Global trends, such as the continuous population growth and the rising demand for communication resources, are leading to an ever-increasing demand for highly-productive and innovative CNC machines.

We are your partner for machine tool automation – including complete manufacturing automation

We have been maintaining direct contact with end-users in our core industries for decades. We know the challenges that they face and the requirements that they place on current and future machines. This expertise flows directly into our product development and guarantees that SINUMERIK controls are closely-aligned to addressing market requirements. In addition to machine tool automation, Siemens can act as the general contractor for the manufacturing automation of your entire plant. Customers will also benefit from this as a result of integrated and seamless automation solutions from a single source – ultimately helping you to achieve a highly-productive manufacturing environment.

Aerospace

Automotive

Medical

Power generation

Key industries

The ideal solution for each and every industry

Every industry has its own specific requirements. Siemens Machine Tool Systems can offer the appropriate solutions – whether standard automation for the automotive industry or special technologies such as tapelaying for aerospace – we have the ideal solution. This is supplemented by an industry-specific portfolio of support services with training and hot line, as well as local service, spare parts and repair. This allows us to ensure maximum productivity in manufacturing, service and maintenance.

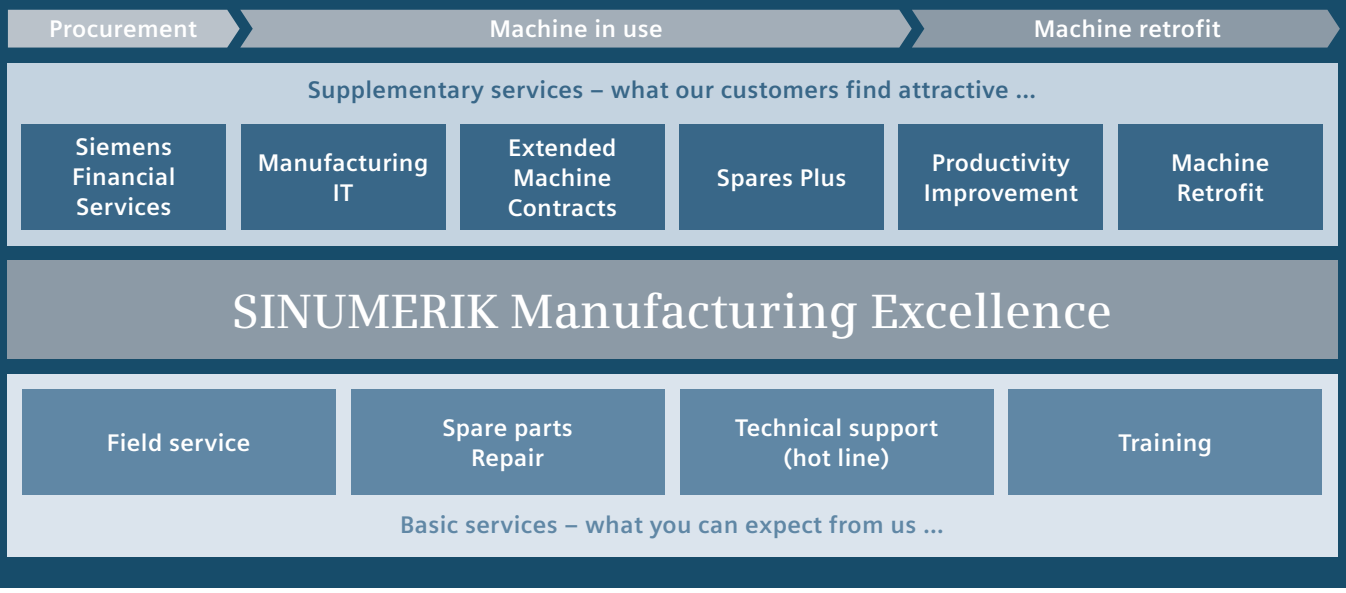
Outstanding international support

Our industry solutions are used around the globe and our international organization ensures that we can optimally support machine tool end-users around the world.

We set the trends in manufacturing

Siemens Machine Tool Systems is an innovation leader in the machine tool market. The development of innovative, cutting-edge solutions is a given for us. This is reflected in our leading IT integration and simulation solutions to easily network manufacturing IT, while securing maximum machine tool productivity and availability.

SINUMERIK Manufacturing Excellence – service and support at the highest level



Basic services – what you can expect from Siemens

Field service
As a global company, Siemens Machine Tool Systems also has a global service team to provide fast and expert service, repair and maintenance around the world in more than 60 regions.

Technical support (hot line)
In more than 25 regions around the world, our hot line experts answer every question related to SINUMERIK CNC – and of course, in your local time zone and in your local language.

www.siemens.com/industry/onlinesupport

Spare parts and repair
A tight-knit, flexible and responsive spare parts and repair network in more than 70 regions around the world ensures that replacement parts are quickly available – and at reasonable prices.

SINUMERIK training
SITRAIN offers professional training for the operation, programming, commissioning and maintenance of SINUMERIK controls in more than 30 countries around the world.

www.siemens.com/sitrain

Field service, spare parts, technical hot line support and training form the basis of our service and support portfolio. SINUMERIK Manufacturing Excellence, with intelligent services, addresses every machine tool need.

www.siemens.com/sinumerik/manufacturingexcellence

Additional services – what our customers find attractive

With a wide range of additional services, SINUMERIK Manufacturing Excellence increases your machine tool productivity – from the initial design, through use, up to machine retrofit and even modernization.

- Siemens Financial Services – financial solutions that perfectly fit your needs
  www.siemens.com/sfs
- Manufacturing IT – process optimization through the implementation of the SINUMERIK Integrate product suite
- Extended Machine Contracts – tailored machine tool service contracts that fit your budget
- Spares Plus – preventive spare parts management
- Productivity Improvement – reduce the cycle times of your existing machines
- Machine Retrofit – general overhaul of CNC machine tools that gives new life to old iron

Technical data

	NCU710	NCU720 / 730
Configuration		
Mechanical design	Drive-based	
Operation with SINAMICS S120 Combi	● (840D sl BASIC)	–
Operation with SINAMICS S120 Booksize	●	●
Maximum number of axes / spindles	6 (840D sl BASIC) / 8	31
Maximum number of machining channels / mode groups	4	10
Maximum number of NCUs in the NCU Link	3	3
CNC user memory, up to	16 Mbyte	22 Mbyte
Extended CNC user memory	100 MB	
Additional CNC user memory on hard disk (PCU50)	12 Gbyte	
Minimum block change time	~ 1.5 ms	~ 0.6 ms / ~ 0.4 ms
Minimum current / speed controller cycle	31.25 µs	
Display size (TFT color displays)	7.5"/10"/12"/15"/19"	
Maximum number of operator panels per NCU	2	4
PLC adaptation control	SIMATIC S7-300	
PLC I/O interface	PROFIBUS/PROFINET	
OPC UA	●	
Standard data transfer	RS232C/USB/Ethernet	
Axis functions		
Travel to fixed stop with Force Control	●	
Acceleration with jerk limiting	●	
Dynamic feed forward control	●	
Advanced Position Control	●	
Dynamic Servo Control in the drive	●	
Interpolation		
Interpolating axes, up to	6 (840D sl BASIC) / 8	20
Linear, circle, helix	●	
Splines, polynomials, involutes	●	
Advanced Surface	●	
Top Surface	●	
Look Ahead	●	
Compressor	●	
Couplings		
Synchronous axis pair (gantry axes)	●	
Synchronous spindle/multi-edge turning	●	
Master value coupling / cam table interpolation	●	
Electronic gearbox	●	
Additional machine-specific couplings	●	
Transformations		
Face / peripheral surface transformation	●	
Multi-side machining (3+2-axis machining)	●	
Dynamic 5-axis machining (TRAORI)	●	
Additional machine-specific kinematic transformations	●	
SINUMERIK synchronous architecture		
Synchronized actions	●	
Asynchronous subprograms	●	

	NCU710	NCU720 / 730
Compensations		
Measuring system and spindle pitch compensation	●	
Temperature compensation	●	
Sag	●	
Additional compensations (volumetric, cogging torques etc.)	●	
Tools / tool management		
Number of tools / cutting edges in the tool list, up to	600/1500	600/1500 (720)/ 1500/3000 (730)
3-D tool radius compensation	●	
Unit quantity / tool life monitoring with management of replacement tools	●	
CNC operation		
SINUMERIK Operate	●	
Animated Elements	●	
User interface on NCU (Linux)	●	
User interface on PCU50 (Windows®)	●	
SinuTrain training and offline programming tool	●	
CNC programming		
SINUMERIK CNC programming language with high-level language elements	●	
Online ISO dialect interpreter	●	
programGUIDE	●	
DXF reader	●	
Technology cycles for drilling, milling and turning	●	
Technology cycles for grinding	●	
Cycles for process measurements	●	
Balance Cutting	●	
ShopMill / ShopTurn machining step programming	●	
programSYNC (multi-channel operation and programming)	●	
3-D CNC simulation for turning / milling	●	
Channels that can be simulated, up to	4	
Simulation in parallel to the main machining time	–	●
Onboard optimization and diagnostics		
Context-sensitive onboard help system	●	
Onboard in the PLC servo and drive optimization (AST)	●	
Onboard signal, bus and network diagnostics	●	
Safety functions		
SINUMERIK Safety Integrated	●	
Open Architecture		
Open user interface	●	
Openness	●	
SINUMERIK Ctrl-Energy		
Ctrl-E analysis (determining the energy usage of the machine)	●	
Ctrl-E profile (machine energy management during non-productive times)	●	
Automatic reactive current compensation	●	
Automatic flux reduction for induction spindle motors	●	

– not available
● available (certain functions are available as CNC option, please ask your machine tool manufacturer)

Everything about SINUMERIK CNC can be found at:

siemens.com/sinumerik

Learn more about our machine tool solutions:

› Detailed information and videos about our products and services

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Helpful tips and tricks for SINUMERIK users, SinuTrain downloads, tutorials and more:
www.siemens.com/CNC4you

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SINUMERIK playlist on YouTube:
www.siemens.com/sinumerik-youtube

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