

CNC4you

The Shopfloor Magazine



Turning a chore into pleasure

Swiss contract manufacturer
produces complex turned
parts for alphorns

Screws made to measure

Individual solutions for industrial centrifuges

Learning from CNC professionals

Spinner AG technology workshop



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Dear readers,

Considering the development of machine tools in recent decades, we can see that CNC equipment is playing an ever-greater role in the overall productivity of a machine. Mechanical construction is certainly still the core discipline, but **intelligent CNC and drive control systems** increase the precision and speed of the machining process in areas where mechanical engineering reaches its limits. **Modern graphical, interactive operating concepts** shorten programming and running-in times. **Integrating the machine** into intelligent production networks helps increase the effectiveness of the entire plant. In this issue of *CNC4you*, we address **ways to increase productivity** with CNC equipment. In doing so, we offer some guidance on using or procuring machines. In addition, we focus on the broad range of applications for **turning**, as well as on **energy efficiency**, as reflected in the technological features of Sinumerik CNC equipment. We also have some interesting reports for you from the shopfloor, along with the usual news, tips and tricks for all things Sinumerik.

This year, we will once again be appearing at the **Turning Days** trade fair in Villingen-Schwenningen, Germany. Our Sinumerik User Support team will be there and will be happy to explain to you how you can increase your productivity with Sinumerik.

Andreas Grözing
Head of Sinumerik User Support Germany



Turning with Sinumerik

Maximum productivity in any application



As the demands placed on the performance of the machine increase, so too do the demands placed on the CNC. In addition to basic turning functions, Sinumerik CNCs therefore offer extensive technology functions and automation interfaces to facilitate the machining of complex individual workpieces as well as the mass production of simple parts.

Just a few CNC functions to master turning processes

Just a few specific CNC functions that go beyond the basic CNC functions for path control are enough to allow the user to master the turning process. These include, for example, adhering to a constant cutting rate, that is, adapting the spindle speed while turning along the diameter axis. A further core function for producing rotation-symmetrical components is tapping. For this function, the position-controlled

tables make it easy to input the thread pitch and depth. Further parameters control the linear or degressive feed to alternating thread flanks.

Programming time as an important factor

The choice of CNC programming method depends largely on the size of the production batch. In individual-part production, the programming time is the factor that determines productivity. ShopTurn work-step programming offers very intuitive graphical programming. In mass production, in contrast, the program runtime is decisive. Sinumerik CNCs can therefore also be programmed using DIN/ISO language commands. The cycle support (programGUIDE) forms a seamless transition between DIN/ISO and the fully graphical ShopTurn programming, making Sinumerik CNCs a versatile solution for any batch size.

calculator are transformed from a machining cycle into the desired motion sequences. In addition to the classic longitudinal or transverse stock removal, the Sinumerik stock removal cycle also offers contour grooving and plunge-turning options. In many cases, however, a machining profile cannot be produced with one sheet size or machining strategy. The Sinumerik cycle therefore offers the option to limit the machining segment, that is to say, to manufacture successively with the right machining strategy. The automatic detection of residual material transfers the adapted blank to each subsequent machining step.

Extended machining spectrum

With the use of driven tools, the machining spectrum of turning machines is extended to include drilling and milling operations. For the purposes of component accuracy, a machine with a y-axis is certainly the first choice. But with Transmit, which transforms the right-angled workpiece coordinate system to the machine x-axis and the position-controlled spindle, even machines without a y-axis offer the option of face machining. With Tracyl, any contour can be produced on the lateral surface of the turned workpiece. To do this, the y-axis in the workpiece coordinate system is mapped to the rotation of the position-controlled spindle. In both cases, the CNC programmer can program in a right-angled workpiece coordinate system. This means that all machining cycles developed for drilling and milling can be used on the face and lateral surfaces of turned workpieces.

A prerequisite for five-axis machining is met

A b-axis can bring about a quantum leap in the application flexibility of turning machines. This rotary axis can be used to orient the inclination of the

The term CNC turning refers to a wide variety of applications, ranging from the machining of complex individual parts to the mass production of simple parts. The complexity of the workpieces to be produced tends to decrease with the batch size, while the degree of automation tends to increase. All applications, therefore, place high demands on the machine tools used.

tool longitudinal axis must be synchronized with the speed-controlled spindle. In addition to the G33 DIN language command, Sinumerik CNCs offer a high-performance thread cycle. This cycle makes it possible to program any longitudinal, face, tapered or linked threads directly on the machine. Thread

Contour turning: the supreme challenge

One of the greatest challenges of a turning control system is machining freely defined machining profiles without a CAD/CAM system. Machining profiles created with an integrated contour





tool carrier. In conjunction with the position-controlled main spindle (c-axis), the prerequisite for five-axis machining is therefore met. As in milling machines, drilling and milling operations can be performed on workpiece planes swiveled at any angle. The Sinumerik swivel cycle thereby facilitates the easy programming of the plane swiveling. If all the machine axes have sufficient dynamics, free-form surfaces can also be machined with dynamic workpiece orientation. Sinumerik 840D sl provides the required five-axis transformation with tool-center-point programming. If there is a turning tool in the milling spindle, turning operations can also be considered five-axis machining. The main cutting angle can be set with the

orientation of the b-axis. In addition, the adjacent cutting angle, and thus the chip flow, is adjusted with the orientation of the turning tool in the position-controlled milling spindle. The tool length resulting from the two orientation angles is calculated automatically by the Sinumerik swivel cycle.

Greatly reduced machining time

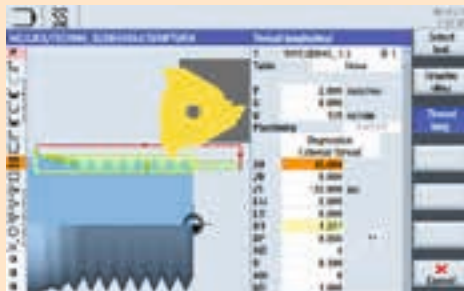
To increase productivity, turning machines are equipped with several independent tool carriers. In conjunction with a counter spindle, this leads to a huge reduction in the machining time. In the CNC, every tool carrier is assigned to its own CNC channel with a separate CNC program. The CNC pro-

grams working in parallel must be built and synchronized with each other in such a way as to minimize waiting periods. This CNC program optimization quickly becomes a never-ending task. This is precisely where the Sinumerik programSYNC function package comes in. A multi-channel editor with synchronous program representation makes it possible to set targeted synchronization marks. The automatic calculation of the machining times of individual program sequences facilitates time management. Furthermore, program-SYNC allows for the secure and user-friendly running in of individual tool carriers or machining spindles. On turning machines with two tool carriers, four-axis turning is also possible, that is,

TECHNOLOGY IN DETAIL

The Sinumerik thread cycle

... enables simple parametrization of various thread forms. The fully graphical ShopTurn work-step programming is intuitive and simple.



Siemens AG

DIN-ISO programming

... with programGUIDE offers maximum productivity with minimum machining times, thus meeting all production requirements.



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The Sinumerik contour cycle

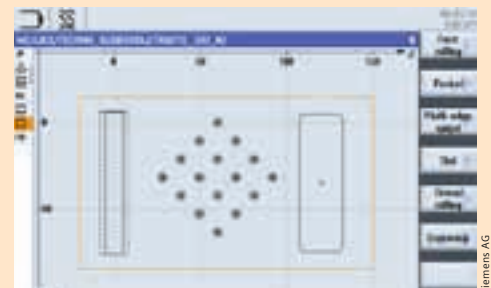
... provides three fundamentally different machining methods: traditional stock removal, grooving and, as shown here, plunge turning.



Siemens AG

Programming

... takes place in the Cartesian coordinate system. The Tracyl transformation generates movements from this in the machine coordinate system.



Siemens AG



machining two tools simultaneously on the same machining profile. In addition to an increase in the chip volume at a constant insert load, the balanced cutting serves to balance out the cutting forces for long workpieces. The Sinumerik stock removal cycle allows for four-axis turning of user-definable contours. The tool path guidance strategy can be set with just a few parameters thanks to the intuitive operator control.

Automated flow of parts

The final step in increasing productivity is automating the workpiece flow. In horizontal turning machines, bar loaders and parts catchers are used for

this purpose. A special cycle in the ShopTurn work-step programming organizes the flow of parts between the main spindle and counter spindle in coordination with the bar loader. In vertical turning centers, workpieces are fed in and removed automatically by a transport system already integrated by the machine manufacturer. A further possibility for automating the flow of parts is the use of a handling robot. Here, Sinumerik 840D sl offers the highest possible degree of system integration. Manage MyRobot makes it possible to move the robot axes and perform teaching processes using the Sinumerik control unit. The robot program sequence is also displayed in the CNC and can therefore be synchro-

nized optimally with the CNC program sequence.

The simple term turning thus encompasses a wide range of applications. With an equally wide range of technology functions and automation interfaces, Sinumerik CNCs are more than up to the challenge of controlling modern turning machines. <



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The Cycle800 swivel cycle

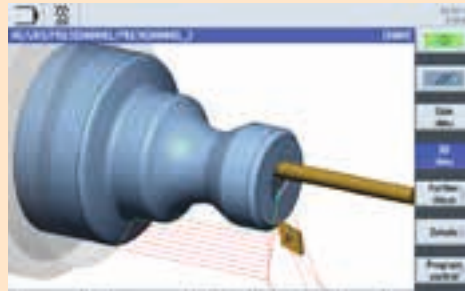
... allows for the static positioning of turning tools in machines with a b-axis, thus ensuring the universal use of cutting inserts.



Siemens AG

Sinumerik programSYNC

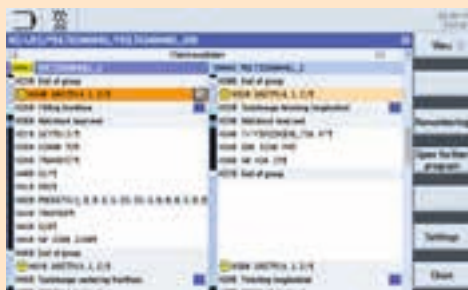
... enables the simultaneous and reliable simulation representation of machining operations in multiple CNC channels.



Siemens AG

Synchronous representation

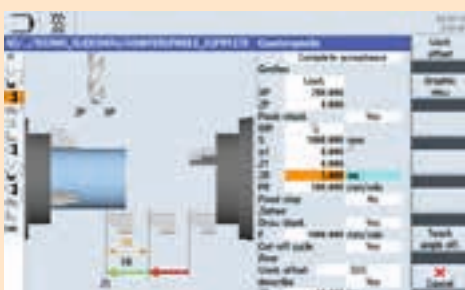
... of CNC programs for multi-channel machining operations is clear and facilitates the efficient programming of multi-channel applications.



Siemens AG

The counter spindle cycle

... in ShopTurn facilitates the graphical interactive programming of the counter spindle, from simple support to automated workpiece flow.



Siemens AG



The programming and production of individual parts

Turning a chore into a pleasure

A Swiss contract manufacturer's CNC machine tool can be equipped, operated and programmed especially quickly and easily thanks to Sinumerik 828D. The production of highly complex turned parts is now a regular part of the company's work.



A special tool from Kennametal is used for plunge turning at Wirox, replacing several standard turning tools

„With this control system, I am repeatedly made aware that real thought has gone into what the operator needs.“

Roman Willi, Managing Director, Wirox GmbH

Water pipes and alphorns have one thing in common: both require turned parts. Wirox GmbH in Meiringen, Switzerland, develops and produces such turned parts. However, in the past, the effort required to produce complex individual parts was so high that it was more of a chore than a pleasure for managing director Roman Willi and his team. Purchasing a Leadwell LTC-25 iLM equipped with the Sinumerik 828D CNC changed all that. "I now enjoy every challenging task. Thanks to this machine and its control system, I now no longer need to think about much of what used to

take up a huge amount of time," explains the plastic technologist and machine mechanic.

Faster programming

While some customers come to the machine shop with a finished construction drawing, others have only a vague idea in mind. These clients often do not know what information is required for the construction, which is why Willi must first ask the right questions. "I first had to find out for myself what is important in alphorn construction," says Willi. He creates many parts on the machine control

system directly during the programming, without going through a CAD/CAM system. This is where the advantages of the ShopTurn work-step programming and the extensive visual representation possibilities of the user interface Sinumerik Operate come into effect. If programming errors slip in, they are shown in the 3-D simulation and in the sectional drawings and can be eliminated in time. The Wirox managing director knows that it is quite unconventional to program his customers' ideas directly on the machine. On the Sinumerik CNC, however, this works flawlessly and also saves a great deal of time.



Helpful cycles

The machine control system provides standard cycles for many applications, such as plunge turning, for example. These cycles simplify the procedure and considerably reduce programming times. "Plunge turning is a technology that was previously used only rarely in practice, as there was a lack of functioning cycles. But since we have had the Sinumerik-controlled machine, we use this machining method regularly, because the cycle works perfectly," explains Willi. Tools designed especially

hand (G-code). As the programs for Wirox stock items now remain saved under the item number on the machine along with all the necessary information, Willi and his team have constant access to them without any need for an expensive IT solution. Once the item number is selected, the machine is ready. Using the Save Setup Data function, the offset data of various clamping tools and workpieces are also saved in the control system along with their various zero points. It is therefore possible to quickly equip the machine tool and clamp and change parts at any time.



for plunge turning have three cutters: one for grooving and two side cutters for longitudinal turning. For this reason, they replace several standard turning tools at once. Willi opted for a special tool from the A4 tool range from Kennametal.

Greatly reduced workload

Since the Leadwell turning machine has been in operation at Wirox, the production of various parts in no particular order has become very simple. The operators adopted a majority of the ISO programs that already existed before-

Purchasing a single machine made it possible to greatly simplify many processes on Willi's shopfloor. The straightforward machine operation is the most important change: "With this control system, I am repeatedly made aware that real thought has gone into what the operator needs," concludes Willi. <



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TECHNOLOGY IN DETAIL

Plunge turning in Sinumerik Operate

In addition to standard ISO turning, additional processes such as grooving and plunge turning have now become established. Previously, the productive use of this turning technology failed because of complicated programming, but Sinumerik Operate offers a plunge-turning cycle that greatly simplifies the programming. The tool used for plunge turning has three cutters: a main cutter for transverse machining (depth infeed) and two side cutters for longitudinal machining.

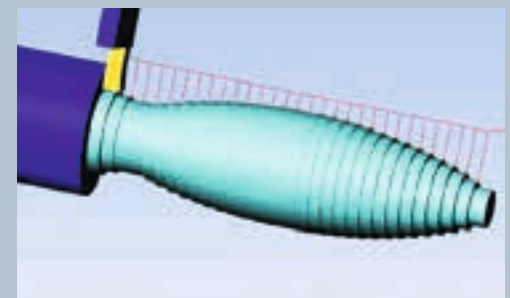
During roughing, the material is removed gradually in the depth and not in a sideways direction; this is gentle on the tool and very effective at removing the chip volume.

During smoothing, which can be performed with the same tool, the lateral load on the tool is naturally very low (depending on the selected allowance). As before, only the contour of the turned part needs to be traced.

By selecting parameters in the stock removal cycle, the user can specify whether a conventional method or plunge turning is used. Sinumerik Operate automatically calculates the tool's steps and movements in accordance with the cycle.

Plunge turning is available in both ShopTurn and programGUIDE.

The principle behind plunge turning: complete, gradual removal of the material along the whole length of the tool





Individual solutions for industrial centrifuges

Screws made to measure

Centrifuges separate substances of different densities, and, depending on the material, are constructed in different ways. Of a total of 9,000 machines manufactured by Flottweg SE, more than 5,000 differ in significant details. This places high demands on the manufacturing technology, in particular the centrifuge screws.

From sewage treatment to separation tasks in mining to sorting plastics in recycling, there are many applications for separation technologies and just as many different machines. Flottweg SE, a manufacturer of industrial centrifuges headquartered in the Upper Bavarian town of Vilsbiburg, customizes its machines to the requirements of the various separation tasks. These centrifuges function more smoothly and are more powerful than ready-made solutions.

The right screw for every task: the screw inside the centrifuge

During operation, the "screw" inside the centrifuge turns inside a cylindrical-conical drum, which also rotates. Almost every screw manufactured by Flottweg is unique. The right pitch, the optimal inlet location, the appropriate cone, and the correct gap between the screw and the rotor drum are all decisive factors in the system's performance. The screws are welded constructions that require numerous machining operations on the turning machine. They can weigh up to 1.5 tons and be several meters long.

"For the more than 9,000 centrifuges that we have produced, we have designed and manufactured around 3,500 different screws," explains Josef

Geltinger, production foreman at Flottweg. "This is because we often produce our systems for niche applications and make them out of many different high-alloyed steels, and also because we emphasize providing our customers with tailor-made solutions for all applications."

Machining a screw on a Seiger SLZ 1200E cycle turning machine with Sinumerik 840D sl

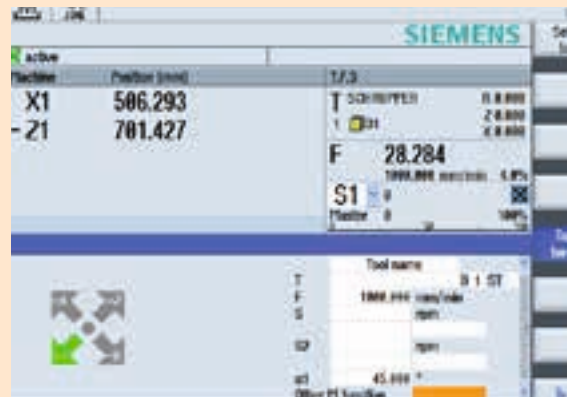




TECHNOLOGY IN DETAIL

The Manual Machine function

For cycle-controlled turning machines, the Manual Machine function is available on Sinumerik. This additional operating option allows for workpiece machining in manual operation – without having to write a parts program. The individual cycles are integrated in the bottom bar, are selectable and support the handwheels.



The right program for every screw

The turning machine operators work with around 2,000 CNC programs when producing the screws, all of which they have created themselves, and most of which have been further adapted in detail. The programming takes place directly on the machine with the drawing in hand, for example, on a Seiger SLZ 1200E cycle turning machine with Sinumerik 840D sl. The cycle or flatbed turning machines are used primarily in individual part and small-batch production. This type of machine places special demands on the CNC. The control system must automate the machining process, as in a normal CNC universal turning machine, but it must also guarantee that the operation and programming of the individual-part production is flexible and easy to understand. The shopfloor-oriented ShopTurn workstep programming is ideal for this approach, as all machining steps are stored as cycles. With the Manual Machine function, all the familiar standard cycles from ShopTurn, such as stock removal, grooving, undercut, thread and so on, can be parameterized and started in jog mode, without having to write a program. But the sky is the limit. If a complete NC program needs to be run automatically, the workpiece can be completely programmed in ShopTurn as usual.

The high level of accuracy and rigidity of the turning spindle and the torsion-resistant box bed create the required stability for this machine over the entire length of 5,000 mm and a swing diameter of up to 1,450 mm. Micrometer-level accuracy is required when producing the screws. For example, the outside contour must be exact along the entire length after the smoothing process, as the resulting gap between the screw and the rotor drum significantly affects the separation results.

High material requirements

The material requirements are very high, as centrifuges need to withstand extreme loads. When both the screw and the drum casing (rotor) are operating, the systems reach up to 5,000 rpm. The acceleration forces on the material to be separated can then increase to up to 10,000 times the acceleration of gravity. If there is a mixture of sandlike sediments, this is very similar to constant machining with sandpaper at extremely high pressure.

Wear materials for the screws are tungsten carbide, carbide metal and stellite. The screw body itself is made of hard chrome-nickel steel. "We know the machining parameters very well," says Geltinger. "There can't be any waste with these expensive materials." The easy parameterization of the ShopTurn cycles provides a great deal of security here. The screen masks are structured simply and clearly, and the cutting parameters that have already been entered remain in the cycle until the operator changes them. This is why the Flottweg factory works with tried-and-tested machine technology – and in the future the company will use exclusively Sinumerik-controlled turning machines. "The staff members are experienced with ShopTurn, and we are also satisfied with the service offered to us by the regional Siemens branch," stresses Geltinger.



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Lower cycle times thanks to the high-speed setting cycle

Turbocharged machining centers

Advanced technology requires qualified partners. Large premium automotive manufacturers and suppliers therefore often value collaboration with small, innovative toolmakers and mold makers such as BE Technologie GmbH. The company was recently able to reduce the cycle time of its Sinumerik-controlled Spinner machining centers by up to 30% when machining free-form surfaces. A key factor in this was the adjustment of the high-speed setting cycle.



The year 2008 was not the ideal time for Jens Biedermann and Jürgen Englert to establish their company, BE Technologie, in Bischbrunn, Germany. Within just a few months, what looked like an enormous economic boom at the start of the year had turned into a worldwide economic crisis. The automotive industry – the start-up company's primary target industry – was particularly affected by the crisis. "That dampened our initial euphoria somewhat," explains Biedermann. "But we realized that good work that ultimately saves automotive companies money is always in demand."

Extensive expertise in toolmaking

The toolmaker and mechanical engineer was to be proved right. What started as purely a construction service for the two owners has now evolved into a company with 14 employees and a turnover of around €1.8 million. With its high-performance construction department, in-house toolmaking, and the production of metal and plastic parts, BE Technologie offers a wide range of services, all of which are founded on the company's extensive expertise in toolmaking. The managing directors therefore attach great importance to highly qualified employees. "We expect all our technical employees to be trained toolmakers. Only then can they bring along the necessary basic understanding of the many important details in mold making," explains master toolmaker Englert.

Sinumerik impresses with its user-friendliness

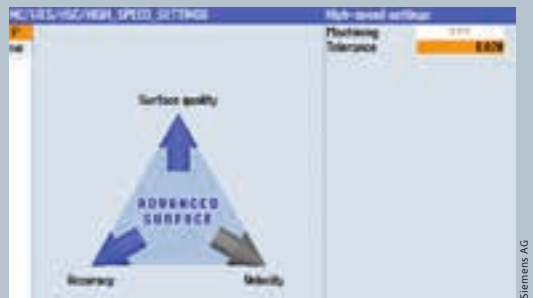
The BE bosses consider modern technical equipment to be just as important for lasting success and growth. The construction department therefore has several up-to-date CAD/CAM systems and the plastics manufacturing facilities have four modern injection-molding machines as well as a press. At the heart of the company's modern toolmaking facilities are three CNC machining centers from the Spinner three-axis VC series, all of which are equipped with the high-end Sinumerik 840D sl CNC. "User-friendliness was crucial in the choice of CNC," says Englert. He compared various control systems beforehand and found the user interface Sinumerik Operate to be the most suitable. "We are not cutting mechanics, but after just one day of training, we are nevertheless able to safely transfer the programs from our CAD/CAM systems, make the necessary adjustments and create simple programs directly on the machine using ShopMill if required."

Jens Biedermann (left) and Jürgen Englert, managing directors of BE Technologie GmbH, manufacture tools with complex free-form surfaces for the automotive industry, such as rear parts for sunroofs or various mechanical parts, for example. To do this, they use three CNC machining centers equipped with the high-end Sinumerik 840D sl CNC

TECHNOLOGY IN DETAIL

The high-speed setting cycle, CYCLE832

When executing CAM programs, the CNC needs to process the shortest NC sets in High-Speed Cutting (HSC). By means of various machining strategies, the program can be fine-tuned using CYCLE832, and the individual points shown can be adjusted so that the machine achieves an optimum balance between the parameters of surface quality, accuracy and speed. In roughing operations, for example, the emphasis is placed upon speed, whereas in finish machining the focus is on accuracy and surface quality.



Reduced cycle times for complex components

The BE managers have come to greatly appreciate another advantage of the CNC as well. Whereas customers used to require standard molds with flat surfaces and various drill holes, complex free-form surfaces are now being ordered more and more frequently. These can be produced with the Spinner VC750 machining center as well as with the VC1200. Such tasks are no problem at all for Sinumerik 840D sl. Thanks to the Sinumerik MDynamics technology package with Advanced Surface intelligent path control, the high-speed setting cycle, CYCLE832, could be optimized in such a way that BE Technologie was able to reduce the cycle times for complex components with free-form surfaces by up to 30%. <



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Sinumerik Ctrl-Energy in machine tools

Energy efficiency as a decisive factor

Due to rapidly growing international competition, constantly increasing energy costs and climate change, energy efficiency is becoming increasingly important in industrial production. This is particularly the case for machine tools – here too, energy efficiency is becoming a decisive factor in production.

What needs to be taken into account when purchasing and working with a machine tool in terms of its energy efficiency? In principle, the energy efficiency of a machine tool can be compared to that of a vehicle. In both cases, the energy consumption is determined by the quality of the technology, that is, the machine or the vehicle, as well as by the behavior of the operator or driver.

Highly efficient drive technology

With an efficiency of up to 45%, internal-combustion engines in vehicles still offer sufficient potential to increase efficiency. In contrast, the comparable main drive in a machine tool, that is, the spindle and feed motors with the associated converters, exhibits only minimal potential for optimization. The efficiency of Simotics synchronous and asynchronous motors is between 91% and 94%, and the efficiency of Sinamics drive modules is between 97% and 99%. Thanks to feedback-capable drive technology, the braking energy generated is fed back into the power grid with practically no loss.

Previous investigations into improving the energy efficiency of CNC machines were almost always performed on machining centers. These were usually medium-sized to very large machines with additional automation components such as large tool magazines, tool and plate changers, or hydraulic pumps. These machines appeared to offer the most starting points for seeking potential energy savings.

Efficient management of auxiliary units

The focus is on the drive technology for coolants, chip conveyors or hydraulics. These auxiliary units are responsible for up to 50% of the energy consumption of a typical machine tool. The intelligent, appropriate use of auxiliary units is therefore a central focus of machine manufacturers seeking to increase the efficiency of their machines. This is where the Sinumerik function Ctrl-E Profiles comes in, offering the machine manufacturer an easy-to-use project-planning interface for energy profiles. With the help of Ctrl-E Profiles, auxiliary units can be automatically switched off in an unused machine.

Rapid set-up and minimal machine downtime

An equally simple and effective approach is to keep the "chipless" utilization time of the machine to a minimum during set-up. Sinumerik Operate helps reduce the programming, set-up and program testing times. By using the SinuTrain programming and training software, which is identical to real control systems, programming and program testing can be partially shifted to the work preparation stage. With virtual machine simulations based on the Sinumerik CNC core, such as those offered by INDEX, for example, complete set-up and program testing processes can be carried out on a PC to save energy.

The machining performance in production is largely determined by the technological process as well as the machining strategy. Machining strategies with low downtimes – such as workpiece or tool change times – in turn lead to a minimization of the chipless utilization time. Tool sequence optimization in ShopMill multiple clamping and workpiece flow control in ShopTurn help increase the energy efficiency here.

The onboard computer for machine tools

Returning to the vehicle analogy: the onboard computer ensures transparency regarding the vehicle's consumption. In the machine tool, this transparency is provided by the Sinumerik function Ctrl-E Analysis. With the key combination Ctrl + E and a Sentron Pac power monitoring device, the energy consumption of the entire machine is visualized. This means that

„The Sinumerik function Ctrl-E Analysis serves as an ideal starting point for optimizing energy in the production process.“

Andreas Grözinger, Head of Sinumerik User Support Germany

the energy consumption of different production strategies can be compared. It is also possible to compare different measurements. Ctrl-E Analysis therefore offers an ideal basis for energy optimization in the production process.

Finally, it should be emphasized again that several parameters can help reduce energy consumption. In addition to the right choice of machine in terms of size, performance and degree of automation, these parameters also include the consumption-optimized parameterization of all drives as well as the use of energy-optimized components with feedback effects.



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Siemens supports job placement initiative in the Netherlands

CNC operator in eight weeks

Many Dutch companies in the metal-cutting industry are searching intensively for CNC operators. Siemens supports the “Verder in Techniek” (Forward with Technology) initiative, which is intended to train unemployed adults to perform this exciting task in just eight weeks.

Forward with Technology – that is the name of the initiative created by KIM Komeetstaal, a Dutch manufacturer of machine tools, together with the Match4U employment agency. “There are currently 6,500 unfilled positions for CNC operators in the Netherlands,” says Peter Holtslag, head of KIM Komeetstaal. “The current average age of skilled workers is rather high, and, unfortunately, not enough CNC operators are succeeding them. In the

Netherlands, we need more well-qualified skilled workers who can uphold our competitive position in the manufacturing industry in the future.”

Motivation as the most important prerequisite

This problem cannot be solved with the regular two-year vocational college training for milling and turning machine operators. To counteract the shortage of skilled workers, new and shorter training routes are required. This is precisely where the initiative organized by KIM Komeetstaal and Match4U comes in. They have jointly developed a program that allows job seekers aged 30 and over to become level 2-plus trained CNC turning and milling machine operators within eight weeks. The candidates do not need to have any prior knowledge of CNC production. “What’s far more important is the candidates’ motivation,” says Holtslag. “Accuracy and visual thinking are also important prerequisites.”

Tasks are becoming increasingly complex

The program managers have purchased two modern turning and milling machines from DMG Mori Seiki, equipped with Sinumerik CNCs from Siemens, especially for the training. These are available in the training center at KIM Komeetstaal in Doetinchem. Siemens contributes the teaching and learning material and also provides the SinuTrain training software. Production-related topics are the main focus of the course. The participants manufacture one turned workpiece and one milled workpiece per week, with the complexity of the tasks steadily increasing. The first graduates were placed in metal-working companies immediately after completing the training. In the medium term, the managers plan to train up to 80 candidates per year and expand the program to other regions. <



Two modern turning and milling machines with Sinumerik CNCs have been purchased especially for the training



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Theory is taught in the first weeks

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WIFI St. Pölten is a new Sinumerik CNC training partner

Successful partnership

The St. Pölten Wirtschaftsförderungsinstitut (WIFI, or Business Development Institute) has been an official Siemens CNC training partner since October 2014. The collaboration, which has already been successful at the Linz WIFI location since 2011, has now been expanded to the Lower Austria region.



Presenting the new CNC equipment (from left to right):
WIFI curator Gottfried Wieland, Klaus Ponweiser (Siemens Vienna)
and head of the WIFI institute Andreas Hartl

When constructing the Technology and Design Center in St. Pölten, the Lower Austria Chamber of Commerce also invested in the facilities of the existing CNC machine shops. New machines were purchased both for machining and for toolmaking. At the same time, the layout of the machining area was also redesigned and refitted. This created the best possible training conditions in the new space. In total, up to 100 individuals are trained in the CNC adult education sector every year in the new center. In addition to the basics of programming for turning and milling, the center also offers WIFI qualifications for CNC machine operators and CNC experts, which are recognized in the metalworking industry.

The best conditions and customized training courses

For companies in the metal sector that train apprentices and do not have their own CNC equipment, for example, WIFI St. Pölten offers customized training courses for up to 70 participants per year. Johann Kendler, head of the CNC machine shops at WIFI St. Pölten, says, "Thanks to the redesigned WIFI CNC area and the training partnership with Siemens, we can offer all the trainees the best training conditions in the fields of CNC turning/milling, CAD/CAM and 3-D measurement engineering."

As part of its training for CNC experts, WIFI St. Pölten also offers a module on CAM technology. In collaboration with Siemens, the center purchased an NX CAM license specially tailored to the needs of adult education. The course participants can therefore also master the complete process of CAM



The classrooms are each equipped with a universal turning machine from Spinner with the Sinumerik 840D sl CNC

machining, right through to milling on the Spinner U5-620 universal machining center. In total, the WIFI invested in four new machines from Spinner for the new CNC machine shops. The preferred CNC for the center is Sinumerik 840D sl.



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Spinner AG technology workshop

Learning from CNC professionals

Spinner opened its new demonstration center in the Swiss town of Kleinandelfingen in September 2014 with a technology workshop on plunge turning and turn-milling.

To show customers that Spinner not only sells machine tools but also provides technical support, the company invited visitors to a comprehensive technology workshop. Experienced specialists Guido Egger from Spinner and Hans-Peter Küng from Siemens Switzerland explained the Sinumerik plunge turning cycles and demonstrated the plunge turning process to the attendees using the example of a wine bottle cap. They demonstrated simple programming tasks and how to efficiently machine the contour of a wine bottle cap on a Spinner TC600-65-MCY universal turning machine with the Sinumerik 840D sl CNC and the straightforward Sinumerik Operate user interface. The participants learned about the advantages of plunge turning technology and found

out how to use it properly. Walter (Switzerland) AG from Solothurn contributed the required tool technology.

Innovative machining cycles

The second focus of the intensive half-day workshop was turn-milling. As a team, the experts introduced participants to face and lateral machining using the contour cycles in ShopTurn. There was a live demonstration of multi-edge milling with chamfers, thread milling (orbital machining with Walter tools), lateral machining with the y-axis and an engraving cycle. In the lively final discussion, the presenters answered important questions and helped further deepen the knowledge gained by the participants.

Positive conclusions

In the evening, the participants went home with their certificates and, more importantly, a wide range of new ideas. "This successful workshop showed me how I can shorten programming and machining times and extend the tool life thanks to the innovative solutions from Spinner and Siemens," confirmed one of the participants. "And ultimately, that reduces costs."



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The participants followed the experts' presentation with great interest





WorldSkills 2015 in Brazil

The world championship of the professions

The WorldSkills championship takes place every two years. Trainees, students and young professionals from all corners of the world compete. All of them qualify both regionally and nationally for this top competition beforehand in one of more than 40 different fields.

This year, WorldSkills is being held in South America for the first time. In São Paulo, Brazil, from August 11 to 16, the participants will once again be giving it their all to secure a gold medal. One of the sponsors of WorldSkills 2015 is the Brazilian machine manufacturer Indústrias Romi S.A. Twenty-seven of the approximately 50 machine tools that it has provided for the competition are Romi D 800 milling centers equipped with Sinumerik 828D.

Practice makes perfect

These Romi machines will be used for various competitions, including the disciplines of CNC milling and mold making. In these competitions, each of the participating application engineers must program and produce three parts. Three hours are allotted for the programming stage, and three and a half for the production on the machine. Karl-Heinz Engels, program manager for education at Siemens, who has served as a judge at WorldSkills competitions in Germany, knows that there is no room for error here: "It is a challenging task, and if the participants want to stay ahead, they'll have to do absolutely everything right, without exception." That is why training courses are provided beforehand for the participants, in which they can familiarize themselves with how to program and operate the machine. This also includes two multiple-day training courses on the competition machines, so Romi's involvement does not stop at providing the machines – the company is also organizing the training. Frank Jesberger, application engineer at Romi Europa GmbH, trains the WorldSkills participants from all over the world at the company's headquarters in Gross-Gerau, Germany, as well as in Asia. He explains: "The method used in competition is exactly the same as that used



Frank Jesberger, application engineer at Romi Europa, training WorldSkills participants and their supervisors on the competition machine, a Sinumerik 828D controlled Romi D 800

in real life in industry: maximum cutting parameters for the quickest possible machining, and making optimal use of the machine and the tools. The goal is perfect surface quality." He is looking forward to the competition. <



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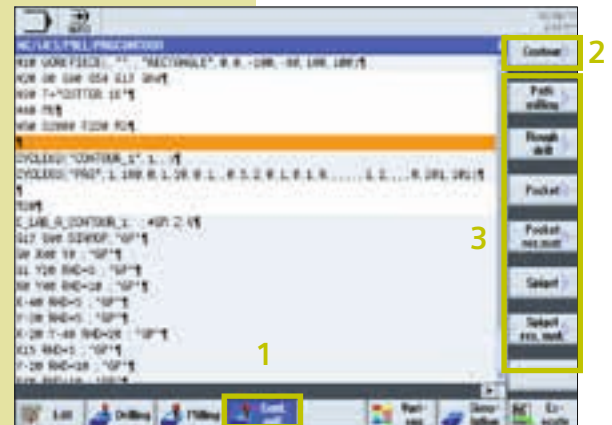
Contour programming in programGUIDE

Effectively program complex contours

Contour programming is the solution for effectively programming complex contours in turned and milled workpieces. With the aid of the integrated contour editor and the corresponding machining cycles in Sinumerik Operate, contours can be created and processed directly on the CNC control system. We briefly demonstrate the possibilities using the example of contour programming during milling in conjunction with programGUIDE. <

Contour milling

1. The contour definition and machining are available in the program editor via the "Contour Milling" soft key.
2. The "Contour" soft key defines the contour and programs the contour call-up.
3. The other soft keys represent the cycles for the defined contour, for example, the cycles for path milling and for pocket and stud machining.



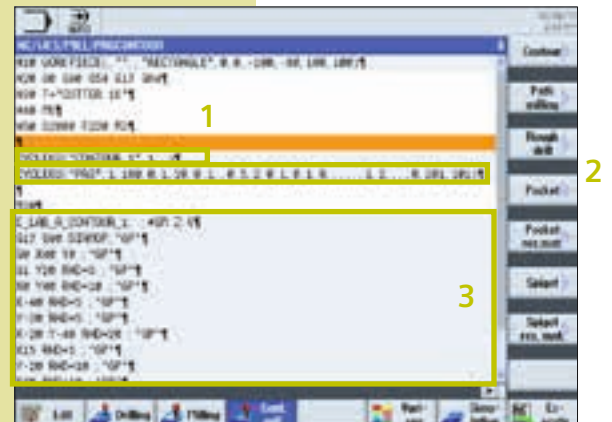
Contour definition and contour call-up in the program

Several options are available for contour definition. The contour is contained either in the main program or in the subprogram. The contour call-up also varies accordingly: a contour created in the main program is created in a label, whereas a contour in a subprogram is created within a label in the subprogram.



Call-up using contour name

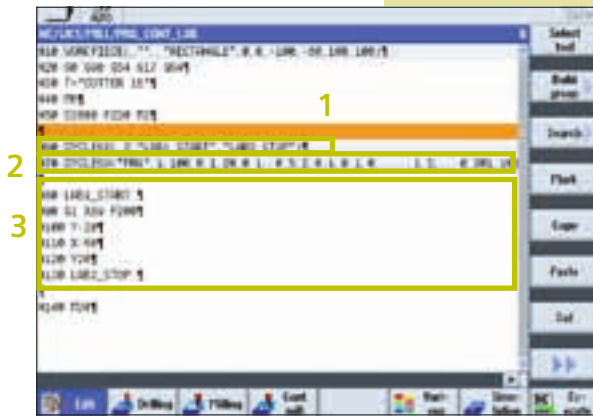
1. Call-up of the contour named "CONTOUR_1" using CYCLE62 (call-up cycle).
2. Machining cycle (e.g., CYCLE63 milling studs); this relates to the previous CYCLE62.
3. Contour defined using the contour editor; this may also be before M30.





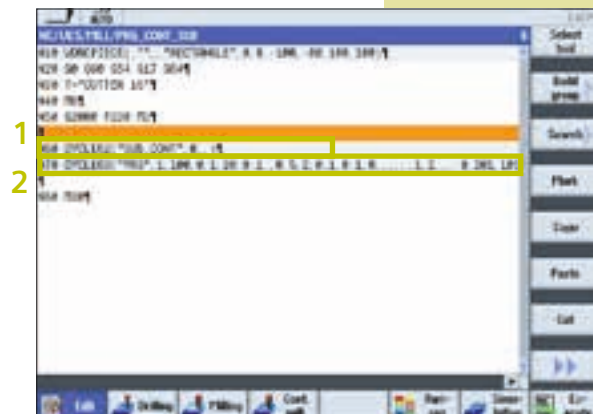
Call-up using label

1. Call-up of the program code in the label.
2. Machining cycle (e.g., CYCLE63 milling studs); this relates to the previous CYCLE62.
3. LAB1_START: and LAB2_STOP: form the start and end point of the contour.



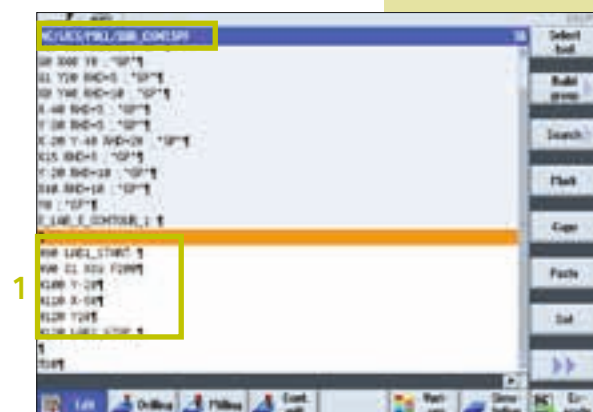
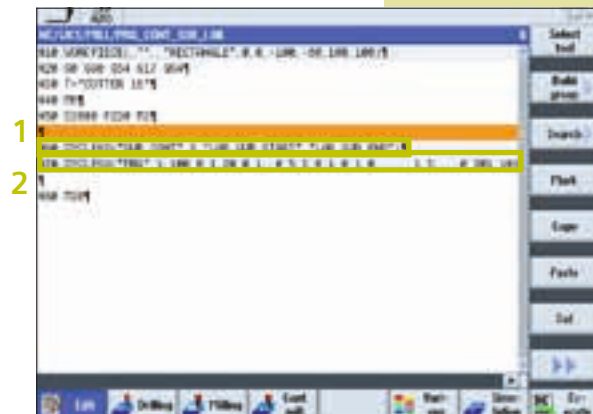
Call-up using subprogram

1. Call-up of the program code (or contour) contained in the subprogram "SUB_CONT".
2. Machining cycle (e.g., CYCLE63 milling studs); this relates to the previous CYCLE62.



Call-up using label in subprogram

1. Machining of the contour contained in the subprogram "SUB_CONT" between the two labels "LAB_SUB_START" and "LAB_SUB_END".
2. Machining cycle (e.g., CYCLE63 milling studs); this relates to the previous CYCLE62.



All pictures: Siemens AG



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Franz-Josef Genn is a new member of the Sinumerik trainer family

Siemens AG

Certified Sinumerik trainer

We are happy to welcome Franz-Josef Genn as a new member of the Sinumerik certified trainer family.

Genn already knows all about the benefits of CNC-controlled machines from his time at the master school in Essen, Germany. He attended his first CNC courses in 1986 as part of an advanced training program. He immediately understood how to make use of the connection between CAD and CNC and was able to successfully complete his training as a certified technician specializing in CNC system technology. Since then, he has been providing training courses in CAD and CNC on a freelance basis, primarily as part of the training of skilled workers and in continuing vocational training. But he also offers company training courses. Genn was able to gain further knowledge by

undertaking advanced training on five-axis milling and CAM, as well as more in-depth courses on Sinumerik control systems beginning with 810D. He also developed his own tasks for CNC training to more clearly teach trainees the skills they require, from simple DIN programming to five-sided machining and turning with driven tools. Whether milling or turning; Sinumerik Operate, Sinumerik 828D or Sinumerik 840D sl; or ShopMill or ShopTurn, Genn offers training courses on almost every topic.

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Training partnership established

The Metall-Ausbildungs-Zentrum (Metal Training Center, MAZ) of the Heidenheim Guild of Craftsmen is a new Siemens training partner in the worldwide network of Sinumerik CNC training programs. All training partners, including the Heidenheim MAZ, offer training courses on Sinumerik-controlled turning and milling machines, thus combining professional theoretical training with practical work on the machines. In preparation for the collaboration, application consultant Jürgen Klingler from Siemens in Stuttgart visited the MAZ. Together with managing director Klaus Liebhaber and training manager Willi Keller, they discussed the possibilities for mutual support. By the end of November, the time had come: at a CNC workshop, the coveted certified Siemens training partner certificate was officially presented. In the context of this partnership, Siemens will provide the MAZ with training documentation and



Handing over the certificate (from left to right): Andreas Grözinger (Siemens AG), Thomas Rüdiger (Kreishandwerkerschaft Heidenheim) and Jürgen Klingler (Siemens AG)

Siemens AG

a wide range of technical expertise. The partnership offers customers several benefits. First and foremost is the fact that training partners are always up-to-date on the latest know-how – so no question will remain unanswered. And the Heidenheim MAZ has another ace up its sleeve: it flexibly adapts itself to customers' needs and also offers

advanced training courses in the evenings and on weekends.

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New CNC4you app – now free for iOS and Android

With the CNC4you app, you will always have the most important Sinumerik information with you on your smartphone or tablet. Keep up-to-date with new developments in your CNC community: find out immediately when a new workpiece or a new test version of SinuTrain is available to download, or see what events are taking place in your area. And you can read technical articles and interesting CNC stories from the shopfloor. You can also download every edition of the CNC4you magazine directly onto your smartphone or tablet.

The new version of the CNC4you app, now available in the App Store or Google Play store, has been completely revamped. Along with a totally new and modern design, the app also offers several new features and additional content. For example, with just one click you can mark the date of your individual event or workshop in your calendar. If you are interested in our workpieces, you can now directly and easily download or e-mail a great deal of useful data.

Curious? Just scan the QR code for iOS or Android and download the new CNC4you app onto your mobile device!



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App Store



Google Play Store



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New “Training” portlet at siemens.com/cnc4you

There are many different players involved in basic and advanced CNC training, offering a wide variety of courses, training materials and accessories. To make these resources more accessible, we have completely redesigned the “Education and Training” portlet in our CNC4you portal and added some new and interesting content. Are you a teacher or instructor, a school pupil or student, or a CNC user, trainer or partner? We have just the right content for you, presented in a clearly structured way. Whether you are looking for appropriate training materials, new hardware or software, interesting web links, or suitable further training courses, you are sure to find the right information in the CNC4you portal. Just click!

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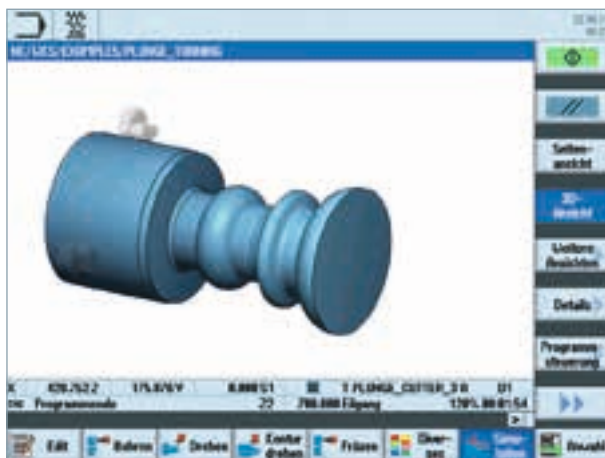
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The only address for cool CNC workpieces and useful tips

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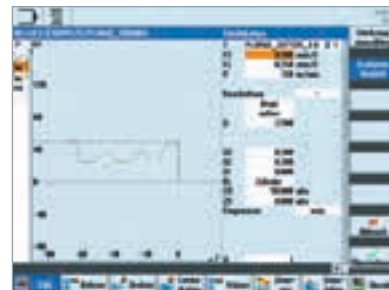
Plunge-turning with ShopTurn — machine turned parts even more efficiently.



With plunge-turning and ShopTurn, you can machine difficult contours with relief cuts — and multiple tool changes are no longer required. Contrary to standard ISO turning, a plunge-turning tool replaces normal turning tools and plunge tools with this highly productive technique.

Be practical — use cycles

Programming is supported by ShopTurn with practical cycles to remove stock and to machine residual material.



You only have to define the contour of the turned part. For the stock removal cycle, you have the choice — you can remove stock conventionally or through plunge-turning. Depending on

the cycle, ShopTurn automatically calculates the cuts and the traversing motion of the tool.

Make a precise cut



The huge advantage for you — empty cuts are avoided, and tool usage, tool change time and machine setup time are all reduced. This increased productivity gets you to market faster.

You can also find more useful tips and tricks online — visit siemens.com/cnc4you.