Introducing the

TRAK® MACHINE TOOLS

SOUTHWESTERN INDUSTRIES, INC.

VMCsi

**Featuring the
SINUMERIK ONE**

VMC12si

TRAK VMC*si*

Value Today

Machine Specs...Standard

The heavy machine tool construction provides mass for heavy cuts with solid Meehanite ribbed casting for vibration absorption and rigidity. It all adds up to a machine that complements the powerful SINUMERIK ONE CNC for fast feeds and superior finishes.

The features you need for production work are there, standard: Coolant Through Spindle, Chip Conveyor, Advanced 12,000 RPM Royal Spindle, Dual Arm Tool Changer...all at no extra cost.

Easy Transition

The all-new SINUMERIK ONE CNC has been meticulously crafted to connect the user to the control. Features such as the wide 19" touchscreen interface, integrated field descriptions, instructive animations and amazing graphics make the control easy to learn for users of any background.

Amazing Capability

With the VMCsi, probing is easily mastered, as are advanced tool management, 4-axis simultaneous machining, incredible surfacing and dozens more advanced capabilities. You will be able to attain ever-higher productivity with a minimum investment of time and effort.

Pathway to Industry 4.0

Siemens has a long history as a world leader in technology and will continue to shape the future of manufacturing. TRAK Machine Tools excels in delivering technology-driven tools that fit the way our customers work.

Our partnership will yield amazing things as Industry 4.0 unfolds:

Unattended Machining to slash your labor expense.

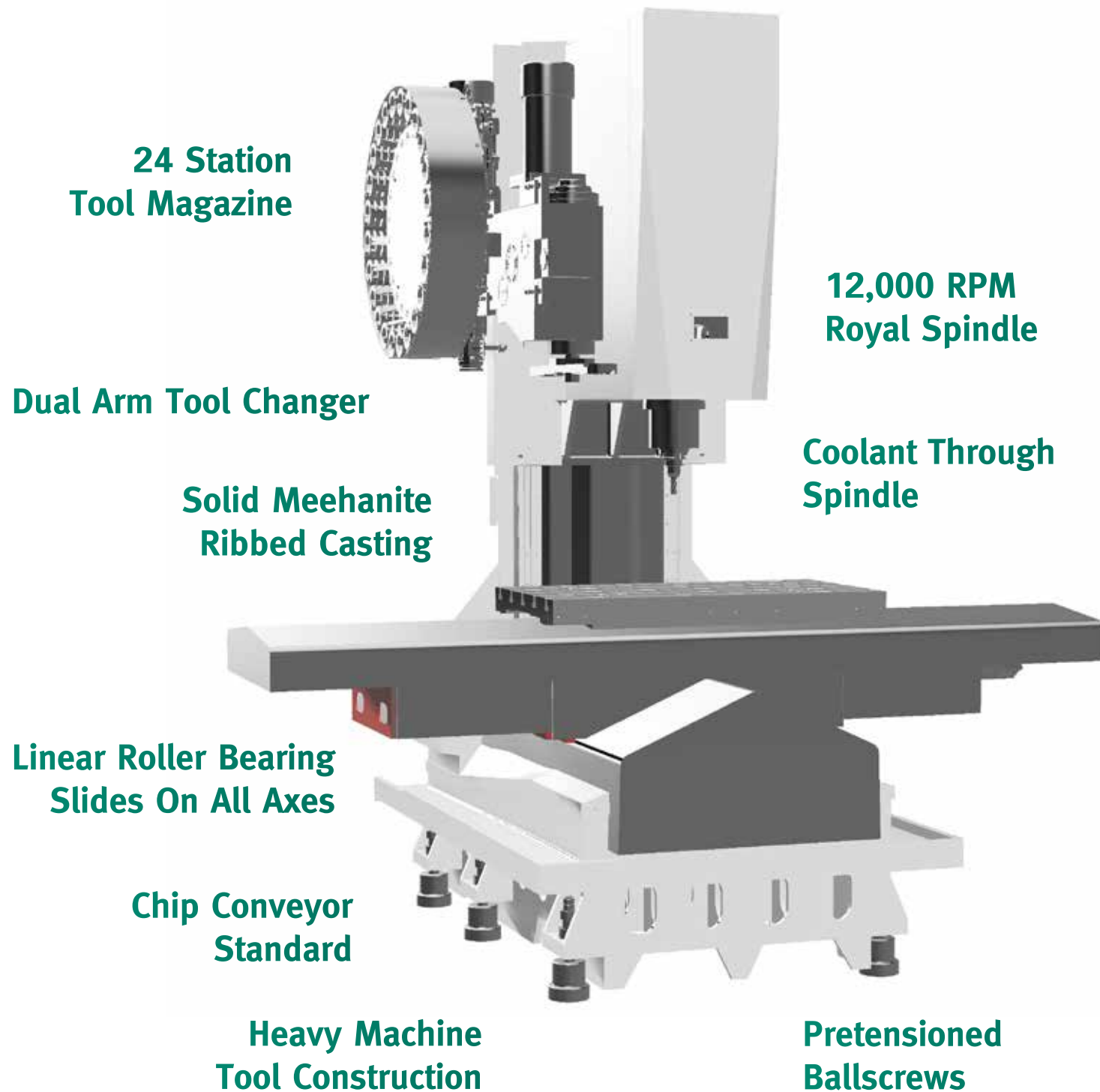**Connected Machines** for advanced management of jobs and entire shops.

Digital Twin for realistic simulations you can use to optimize your spindle uptime.

Artificial Intelligence and Machine Learning that performs magic such as adapting feed rates based on experience.

Automation Solutions such as robotics and integrated part conveyors, controlled by a single, convenient interface.

STRONG RIGID ACCURATE

With features you need for production, standard.

24 Station Tool Magazine

Dual Arm Tool Changer

Solid Meehanite Ribbed Casting

Linear Roller Bearing Slides On All Axes

Chip Conveyor Standard

Heavy Machine Tool Construction

12,000 RPM Royal Spindle

Coolant Through Spindle

Pretensioned Ballscrews

Linear Roller Bearing Slides

on all axes. Enhanced slideway stiffness and large bearing contact area make Roller Bearing Slides superior for high-precision, high-performance applications.
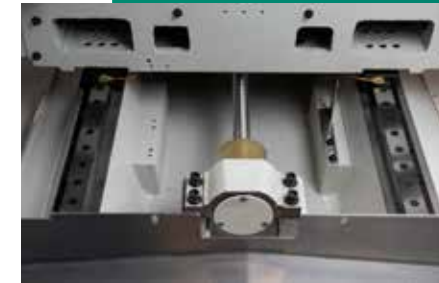
High Performance Servo Motors

with excellent positioning accuracy.

Dual Arm Style Automatic Tool Changer

pre-stages the next tool for a 2.5 seconds tool-to-tool change.
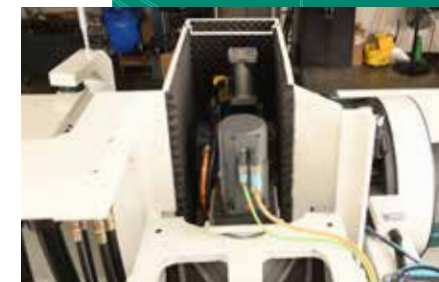
24-Station Tool Magazine

features bi-directional tool changes and will accommodate tools up to 11.8" in length.

Advanced 12,000 RPM Royal® Spindle

provides high axial thrust and generates minimum heat. It uses four P4 class angular contact bearings for optimal spindle support and rigidity.

Coolant Through Spindle

delivered at high pressure efficiently dissipates chips and heat from pockets and holes during machining. This greatly enhances cutting performance, accuracy, surface finish and tool life.
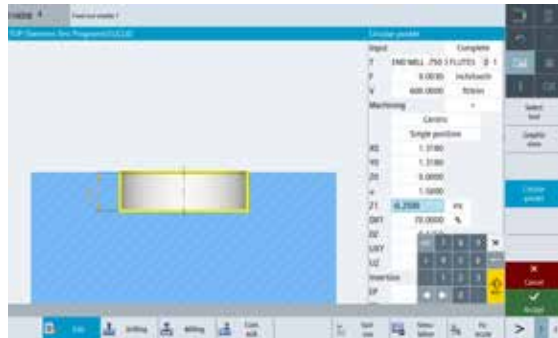
Programming

Selectable programming for the style that fits your job and your shop

Shopmill - apply your ProtoTRAK (or Brand X) conversational skills and start making parts right away.

- Conversational format makes it easy to compose complete or partial part programs
- Canned cycles with Graphical elements that make defining features easy.
- Animated elements – short videos that show you what the feature does
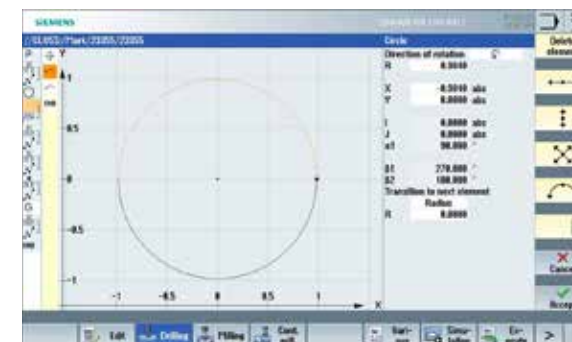- No CAM required – work right from the print

ProgramGuide – program in G-code, even with limited experience.

- G-code assist that helps you create even complex programs with ease.
- Canned cycles with Graphical elements that make defining features easy.

G291 ISO Mode (ISO G-code) – your library of programs can be put to work right away, no matter which control they were programmed on

- Open and adjust programs that originated on other CNCs
- ProtoTRAK®, Haas®, Fanuc® (and more) programs supported.
- Fully editable, including adding new canned cycles conversationally.
- No need to modify the program on the CAM system, do it right on the control.

DIN G-code – Unleash the world's most powerful CNC

- Write programs using Siemens high-level programming language.
- Open and run CAM programs.
- Takes full advantage of the SINUMERIK ONE's more powerful features.

Use Different Elements and the SINUMERIK ONE runs them as a single program. The diverse formats such as those shown below are processed by the SINUMERIK ONE for you, eliminating the need for you to convert everything into the same format.

- Sub programs
- Workpiece definition
- Probing cycles
- Logic statements
- Conversational events
- Standard G Code
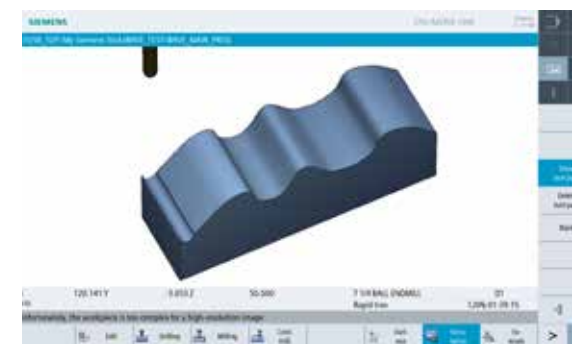- Macros

Contour Editor
The powerful Contour Editor works within all the programming methods of the SINUMERIK ONE. Use graphical elements to create even complex shapes. Automatically calculates intersections and points of tangency.

Also use Contour Editor to work with features in DXF files. Open the drawing data within the Contour Editor, then define tool path and even edit the geometry. Easily link together multiple contours to do complex islands and clear off routines.

Powerful Program Simulations
Program more efficiently and with better results owing to the true representations of part and tool geometry. Simulate your part program with high fidelity with controls for program speed, single block operation and stop/start.

Calculations for machining time will help you see the effect of different strategies. You can even run simulations of different programs as a job is being run.

DXF Reader
Open DXF files on the SINUMERIK ONE to easily transfer data into your program. Program faster and reduce errors on programming dimensions.

Open and use elements of multiple DXF files in the same program.

Works within all the programming methods!
Easily command specific features from drawing elements. Set your own part reference independent of the drawing origin.

Some features are optional, see the control specifications

THE SINUMERIK ONE IS EASY TO USE,

## and that creates real opportunities for you:

- **Easy to train operators.**
- **Easy to transition from another CNC.**
- **Master complexity that previously required extensive training.**

The SINUMERIK ONE touchscreen uses the same gestures as most popular smart phones.

No matter what programming style you find comfortable, you can use it on the SINUMERIK ONE.

Shopmill = True conversational programming that uses shop language to define your entire part. Edit in the same conversational format that you programmed in. **Canned Cycles** make programming fill-in-the-blanks easy.
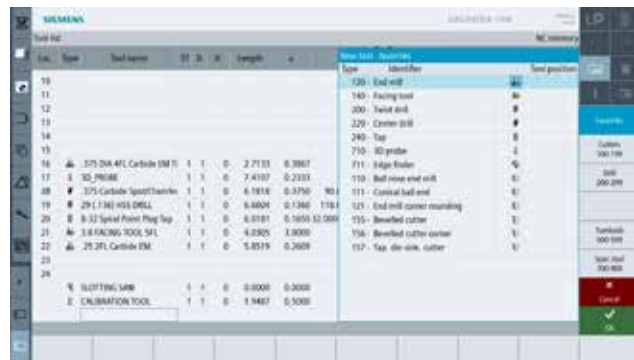
Tool Names make it easy to recognize tools available and assign sister tools.

PC File Management for storing and retrieving programs in a familiar interface.

In-process Error Detection explained in plain language helps you see and correct problems as soon as they occur.

Math Calculations in data input fields.

Font Colors organize G codes for quick inspection.

Easy Transition between programming, manual and automatic CNC operation screens.

**Easy Program Restart** even if the stop is unplanned, like the press of an e-stop or a power outage.

Powerful DRO (Manual) Routines enable you to set up your parts easily with access to powerful functions:

- Part set up manual or with a probe
- Apply a skew value
- Set work coordinate system
- Apply and setup tools
- Face mill (in DRO)
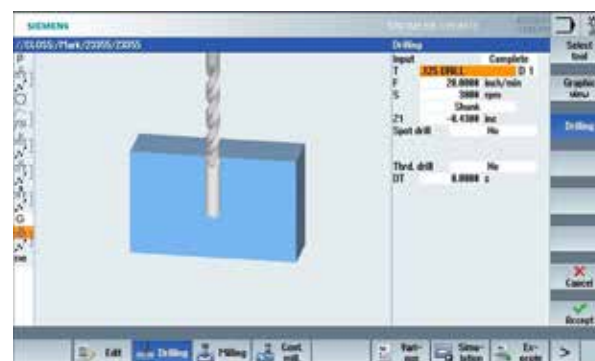
Animated Elements within programming show you how the feature works.

Tool Tips as you hover over a field give you a quick description of what goes there.
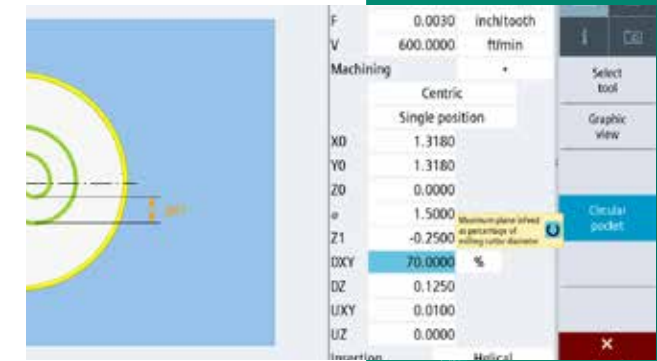
Easy Building of Programs allows you to combine G-code and conversational programming in the same program.

Advanced Program Summary, even your largest programs can be scanned with ease, with graphics for subprograms and other elements.
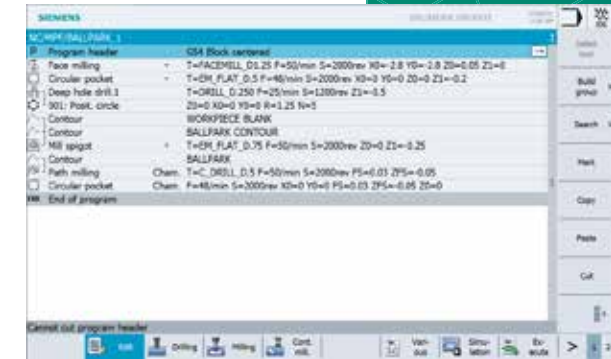
Handwheel Run takes the anxiety out of running that first part. Run the program with feedrate controlled by you turning the handwheel.

Softkeys guide you as you work.

Consistent Soft Key Placement and Screen Organization eliminates confusion as you navigate between screen operations.

Information Key displays instructions for the operation you are on.

Dynamic images change with the selection of the field.
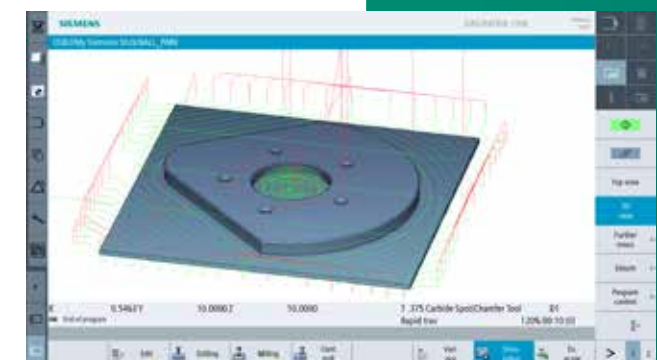
Instant simulations as you program alerts you to problems while the inputs are still fresh on mind.

Some features are optional, see the control specifications

Within Your Grasp

From the moment the TRAK VMCsi arrives in your shop, you are within a short time of mastering very powerful productivity.

Integrated Probing Cycles
Quick Set-ups
Enhanced Precision

The native cycles of the SINUMERIK ONE work with many brands of probe, or even with a manual edge finder!

Part Measurement routines for part alignments in set-up and in-process measurement to check part dimensions.

Part probes for quick, accurate set ups loads the tool data directly into the Tool Table.

Run Unattended

Nothing is more productive than running unattended – as long as the set ups are not excessive and the parts come out good. The SINUMERIK ONE has the features you need for both.

Simulations that help you visualize and adjust your programs precisely before you set up.

Integrated Measurement Cycles that check the parts as the program is running.

Sister Tools that will automatically replace a cutter according to your instructions.

...and more!

Within Days

Superior Finishes

With the TRAK VMCsi you can achieve amazing finishes with a minimal amount of set up and programming.

Optional **Advanced Surface** and **Top Surface** are both advanced algorithms that analyze the program and converts points to splines. This enables the SINUMERIK ONE CNC to create a superior toolpath that is processed smoothly through its run engine.

Competitive Cycle Times

The rigid construction of the VMCsi makes it a machine you can really push and the responsive servo motors and advanced motion control of the SINUMERIK ONE provides excellent acceleration and control of jerk.

Top Surface algorithm puts the trade-off in your hands. Turn on Smoothing for better surfaces.
Leave it off for extra speed.
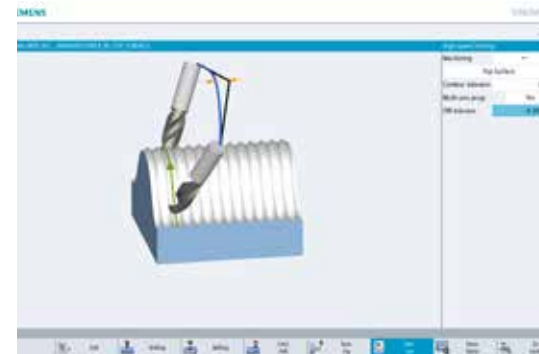
Multiple Clamping of Workpieces

When running multiple fixtures the SINUMERIK ONE will optimize your tool configurations for productivity by using the same tools and operations on different fixtures, even when different part programs are being machined at the same time! Ideal for production machining of identical or even different parts.

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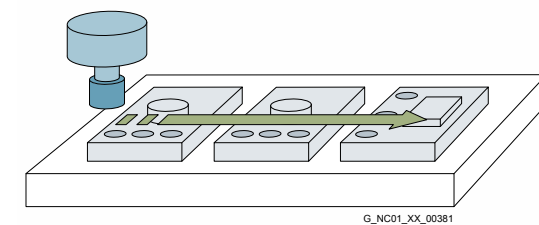
RTAC (Real Time Adaptive Feedrate Control) is Artificial Intelligence working for you!
With RTAC the SINUMERIK ONE monitors the spindle load of the machine and automatically adjusts the feedrate to its optimal level during each operation. The SINUMERIK ONE makes adjustments as it "learns" the part – resulting in more parts with shorter machining time and improved tool life.

4th Axis machining

The TRAK 4th axis system provides full control of 4th axis machining through the Siemens SINUMERIK ONE CNC. The system can also be used as an indexer.
The powerful TRACYL software of the SINUMERIK ONE wraps a 2D shape around a cylinder, enabling you to program features onto a cylinder such as pockets and engraving.

DIGITALIZATION

Because the future demands new thinking.

One Control

What your shop learns on the SINUMERIK ONE CNC will be a knowledge platform that applies to the next steps you take.

- Mill
- Lathe
- HMC
- 5-axis
- Robot
- Additive

Learning the VMCsi gives you a head start on 5-axis machining.

Connectivity

Mindsphere is the Siemens portal to applications that will become key assets for your shop. It is akin to the App Stores that provide the many useful functions on your smart phone. With MindSphere, the apps are developed for manufacturers like you, providing you with the powerful tools that amplify your skills.

Full Integration of The Digital Twin

The powerful Digital Twin concept is developing rapidly, unlocking the future of manufacturing by enabling the IoT and Automation applications that work for your shop.

Advanced Simulations – useful now and as the future unfolds will become even more vital. Faithful simulations of your machine, the SINUMERIK ONE CNC, your programs, tools, workpieces and automation will enable you to:

Quote with confidence.
Model the Optimal Flow of work through your shop.
Integrate Automation rapidly with a reduced risk of failure and cost of trial-and-error

TRAK Connect

is an emerging set of IoT solutions for getting your machines connected to a secure network. Bring your assets into a software-enabled management space so your knowledgeable people can direct activities with the benefit of good information.

Make It Work For You
The open architecture of the SINUMERIK ONE ensures you will be able to make use of the latest applications developed as you progress through your journey to higher and higher productivity.

Run MyVirtual Machine gives you rich simulations offline. You can program and optimize your jobs while the VMCsi is running a different job.

Automation

The partnership of TRAK Machine Tools and Siemens is dedicated to automation solutions that work with minimal dependence on expensive outsiders to implement.

Some features are optional, see the control specifications

Machine Features

- **Linear Roller Bearing Slides** on all axes.
  Due to their enhanced slideway stiffness and large bearing contact area Roller Bearing slides are proven superior for high-precision, high-performance applications.

- **Heavy Machine Tool Construction** provides mass for rigidity and heavy cuts.

- **Solid Meehanite Ribbed Casting** for vibration absorption and rigidity.

- **Steel Concertina Guards** on all axes to protect the castings, slides and precision ground ballscrews.

- **Direct Drive on Three Axes** provides a rigid connection between the motor and the ballscrew for optimum servo control. This enhances accuracy and eliminates backlash.

- **High Performance Servo Motors** with high positioning accuracy.

- **Pretensioned Ballscrews** to compensate for thermal expansion.

- **Automatic Lubrication** controlled by the CNC system that monitors and distributes oil to the slideways and ballscrews to ensure all critical components are lubricated with the correct amount of oil at all times.

- **Coolant System** features two 1HP pumps one each for chip washdown and spindle coolant; and one 4HP pump for the Coolant Through Spindle feature.

- **High-Capacity Coolant Tanks.**

- **Fine Chip Strainer** has a stainless steel metal screen with 0.7 mm x 0.7 mm openings to prevent large chips from clogging the coolant pumps.

- **Chip Conveyor** features a rear collection and side discharge system with a high rate of material removal.

- **Dual Arm Style Automatic Tool Changer** pre-stages the next tool for a 3.5 seconds tool-to-tool change.

- **24-station Tool Magazine** features bi-directional, preselecting random tool changes and will accommodate tools up to 11.8" in length.

- **Spindle Air Blast** to remove contamination from the spindle and tooling during tool changes.

- **Spindle Oil Cooler** an independent system to minimize temperature rise in the spindle by maintaining optimal temperature.

- **Large Single Front Door** and large side doors for easy access and integration with automation.

- **Advanced 12,000 RPM Royal® Spindle** provides high axial thrust and generates minimum heat. It uses four P4 class angular contact bearings for optimal spindle support and rigidity. The labyrinth sealed design on the spindle nose prevents fine particle contamination during machining and being pressurized to 1 bar it also stops coolant ingress.

- **Hybrid Ceramic Bearings** in the spindle are smoother and more precise than steel bearings, generating less friction and heat. These bearings require 40% less lubrication and have a longer life because they do not corrode or conduct electricity – a common cause of pitting and failure in steel bearings.

- **Coolant Through Spindle** delivered at 319psi efficiently removes chips and dissipates heat from pockets and holes during machining. This greatly enhances cutting performance, accuracy, surface finish and tool life.

- **20.1 - 26.8 HP Continuous** SIMOTICS M-1PH8 spindle motor (see SINUMERIK ONE features).

- **1,000 IPM Feedrate** with aggressive acceleration and jerk control for ultra-fast positioning and reduced cycle times.

- **Absolute Position Encoders** to eliminate homing and enhance precision.

Machine Options

Vise 6" Kurt vise and mounting hardware - model DX6. Opens to 9".

BT 40 ATC arm is adapted to accept your BT-style Tools.

Probe – Tool Only
Renishaw OTS Toolsetter
The OTS 3D touch-trigger tool setter for automated tool length and diameter measurement can be used out of the box with the native cycles of the SINUMERIK ONE CNC. The kinematic mechanism is capable of achieving a repeatability of 1µm and the use of optical transmission provides a cable-free environment for unrestricted worry-free machine movement. Includes the OMI-2T Optical Receiver.

This option is highly recommended to reduce the amount of time in tool set-up, increase the accuracy of tool table data and enable you to make full use of the powerful tool management capabilities of the SINUMERIK ONE CNC. The OTS Tool setter may also be used within the Auto cycles for in-process tool breakage detection.

4ᵗʰ Axis The TRAK 4th axis system for vertical machining centers provides full control of 4th axis machining through the Siemens SINUMERIK ONE CNC. It includes a 8" 3-jaw chuck. The system can also be used as an indexer.

4ᵗʰ Axis Tailstock Support for longer workpieces.

Probe – Part Only
Renishaw OMP40-2 Inspection Probe
The OMP40-2 3D touch-trigger inspection probe is a compact touch probing solution that can be used out-of-the box with the native probing cycles of the SINUMERIK ONE CNC. Using a kinematic mechanism, the OMP40-2 probe is able to achieve a repeatability of 1µm. Optical transmission sends the data to the control without the use of cables. Includes the OMI-2T Optical Receiver

This option is highly recommended to replace manual edge finders to decrease the amount of time in set-up. The probe may also be integrated into Auto cycles to decrease errors, downtime and scrap.

OMI-2T Optical Receiver
The OMI-2T is a combined optical receiver and machine interface that mounts within the machine's working envelope and provides a fixed reliable system for the machine control to communicate with multiple probes.

The OMI-2T is included with the probing options above.

Probe – Tool and Part Probes
Includes both options described above. We think it is such a good idea for you to have both that we have a savings of $500 for you to buy them as a combination. Only one OMI-2T Optical Receiver comes with this combination.

Retention Knobs
Set of 24 - For CAT 40 tooling and CTS (Coolant Through Spindle).

4ᵗʰ Axis Ready
The electronics cabinet is pre-wired for the optional 4th axis rotary unit. You would want this to have each machine in your shop be able to run the 4th axis and then swap the actual rotary unit between them. It also simplifies the installation of the option on the machine later without a lot of downtime or expense.

Oil Skimmer
Operated by a button on the control panel or may be programmed.

Transformer
Transforms from S/B 208v to 408v, only VMC7si and VMC10si, factory mounted in an enclosure on the side of the column.

Tooling Cart & Preset Measurement Tool
Huot® ToolScoot cart and preset tool. Tools not included.

Fixture Cart
Heavy-duty cart for the set up and transportation of fixtures.

SINUMERIK ONE

Control Hardware Features

Siemens S120 Booksize Drive

Advanced S120 Booksize multiple axis drives convert 3-phase line supply to DC link voltage and one or several motor modules control the motors. Drive system has integrated web server which can be used to download configuration, firmware update, status reporting, alarm and fault evaluation from a remote PC.

SINUMERIK ONE PPU 1740-1900

SINUMERIK ONE offers modularity, openness, flexibility and uniform structures for operation, programming and visualization. It has integrated drive system SINAMICS S120 and S7-1500 PLC for medium and high-performance application. It offers high flexibility, excellent dynamic response, precision and optimum integration into networks.

Machine Control Panel MCP398C

The elegant, minimalist MCP-398C has the buttons to control machine operation. Well-positioned and clearly marked keys enable you to select X, Y, Z or spindle, select operating modes such as Jog, Auto, Manual Data Automatic (MDA), and activate various motors including chip conveyer, coolant, washdown, oil skimmer and spindle cooler, etc.
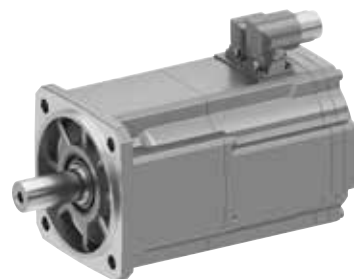
Axis Motor SIMOTICS S-1FK2

SIMOTICS S-1FK2 are permanent magnet synchronous motors with high overload capability and integrated encoder system for speed and position control. It uses separate power and feedback cables to connect to SINAMICS S120 servo system. The motor has a 22-bit absolute encoder and connects to drive using the advanced DRIVE-CLIQ interface.

Spindle Motor SIMOTICS M-1PH8

SIMOTICS M-1PH8 is a compact induction asynchronous spindle motor capable of handling extreme duty cycles and short rise times. It is exceptionally precise in terms of speed, torque and positioning. It uses separate power and feedback cables to connect to SINAMICS S120 servo system. The motor has a 22-bit incremental encoder and connects to the drive using the advanced DRIVE-CLIQ interface.

Control Features

- **Touchscreen Operations -**
  Pan, zoom, pinch, two-finger rotate and scan,
  Two-finger swipe page up/down, Three-finger swipe to top/bottom.

- **Soft Keys** intuitively guide you as you work.

- **Built-in Keyboard and Calculator** that appears automatically when needed.

- **Hard Keys** mapped to machine functions.

- **Animated Elements**
  Throughout the operation of the SINUMERIK ONE, you will encounter Animated Elements. These clever mini-videos help you instantly grasp the underlying issue, enabling you to respond quickly and confidently.

- **Multiple Clamping of Workpieces**
  Runs the same tools and operations on different fixtures, even when different part programs are being machined at the same time! Ideal for production machining of identical or even different parts. Mix different programming sources and styles within fixtures.

- **Contour Editor**
  This powerful tool works within all the programming methods of the SINUMERIK ONE. Use graphical elements to create even complex shapes. Automatically calculates intersections and points of tangency. Also use Contour Editor to work with elements in DXF files. Open the drawing data within the Contour Editor, then define tool path and even edit the geometry. Easily link multiple contours together to do complex islands and clear off routines.

- **Powerful Program Simulations**
  True representations of part and tool geometry.
  3D graphics with zoom and rotation of viewing angle. (O)
  Controls for program speed, single block operation and stop/start.
  Calculations for machining time.
  Run simulations of different programs as a job is being run.
  Use Simulations:
  As you program to verify the program accuracy.
  Before you run to calculate cycle times and check for crashes.
  During run so you can see the program progress if coolant keeps you from seeing the actual part and tool (O)

- **Native Part Probing Cycles**
  Probing cycles are integrated into:
  The Jog Mode for you to easily and quickly find part dimensions and tool touch off points.
  Programs for inserting probing operations in Auto Mode.
  The cycles automatically apply fixture offsets and the measurements may be output to a report.
  The cycles will work with many brands of probe or even a manual edge finder.

Control Features (CONTINUED)

- **Tool Setups**
  Setting tools is simple due to the icons and Animated Elements that guide your selections. You define number of flutes, tip angle, cutting edges, holder angle, tool type and even tool life. A Magazine view shows which tools are in the magazine.

- **Tool, Spindle, M-Code (TSM)**
  A single key give you access to features such as loading tools, activating a work coordinate or turning on a spindle. All operations are commanded by answering conversational prompts, without any G-codes.

- **Return from Jog (REPOS)** while running programs, the SINUMERIK ONE can halt the current operation and the tool tip can be jogged away from the part surface, allowing you to inspect the tool or part. The REPOS feature lets you return to the part where the machining was stopped.

- **Mid-Program Start**
  Stuff happens, power outages, tool breakage, unanticipated moves. The SINUMERIK ONE gives you unprecedented ability to get back to where you were in the part with a high degree of confidence and with minimal work. Powerful Block search and Interrupt point combine to get you started exactly where you left off or at a point before...just to make sure. This powerful routine even enables a tool retract/recover that is able to define the proper place and speed to recover a tap stranded by an unplanned interruption.

- **Dynamic Images** change with the selection of the field.

- **Context Sensitive Help Key** you press for thorough explanations.

- **Tool Tips** pop-up descriptions within programming that automatically appear.

- **Canned Cycles** make programming fill-in-the-blanks easy.

- **Tool Names** make it easy to recognize tools available and assign sister tools.

- **Windows File Management** for storing and retrieving programs in familiar interface.

- **In-process Error Detection** explained in plain language.

- **Shopmill** *fully* conversational programming.

- **Math Calculations** in data input fields.

- **Easy in/mm Conversions**

- **Font Colors** organize G codes for quick inspection.

- **Easy Transition** between programming, manual and automatic CNC operation screens.

- **Selectable Views** wireframe or model.

- **Program Summary,** easily inspect even your largest programs with ease.

- **Easy Program Restart** from stopping point.

- **Powerful DRO (manual mode) Routines**
  Part set up manual or with a probe, Apply a skew value, Set work coordinate system, Apply and setup tools, Face mill (in DRO)

- **Integrated Probing Cycles** for part and tool measurement

- **Native Measurement Routines**
  Part alignment and set up, part measurement and in-process inspection, tool measurement / set up may be used with manual edge finder or optional (Renishaw) probe.

- **Easy Building of Programs** combine G-code and conversational programming in the same program.

- **Fast Block Processing Time**

- **Run Time Clock**

- **Show G-code** during program run.

- **Soft Limits** for collision avoidance.

- **Mold Maker View**

- **Selectable Programming** for the style that fits your job and your shop: ISO, DIN, Shopmill/turn, Program Guide

- **Multiple Channels**
  4 channels, 6 axes of control standard, (12 axes requires additional hardware)

- **Multiple Clamping**
  Multiple programs – tool by tool operation, including sub programs

- **Language Support**
  English, German, Spanish, Chinese and many more

- **Automatic Staging (pre-fetch)** of next tool in Shopmill conversational.

- **Dynamic Fixture Offsets** cycle 800, Swivel cycle.

- **Auto Servo Tuning** during part run, senses load on table and adjusts feeds.

- **Open Architecture**
  Add apps, refine canned cycles

- **Macro Programming**
  Calling and running, master programs and subprograms

- **Linux** based operating language

- **Residual Machining** detects and machines material left over from programmed features.

SINUMERIK ONE

Control Options

Auto Power Off (APO)

Auto Power Off will command the SINUMERIK ONE to shut down power at the end of a program run. This option is great for untended machining so the machine will shut down after the last part is run. Simply press the APO button on the control panel after the run is initiated.

3D Simulation (P25)

3D Solid digital twin of your part, faithful in every programmed detail. You can check your program by close inspection of each detail using the touchscreen operation of the 19" screen of the SINUMERIK ONE on the VMCsi.

Advanced Surface (S07) & Top Surface – Cycle 832 (S17)
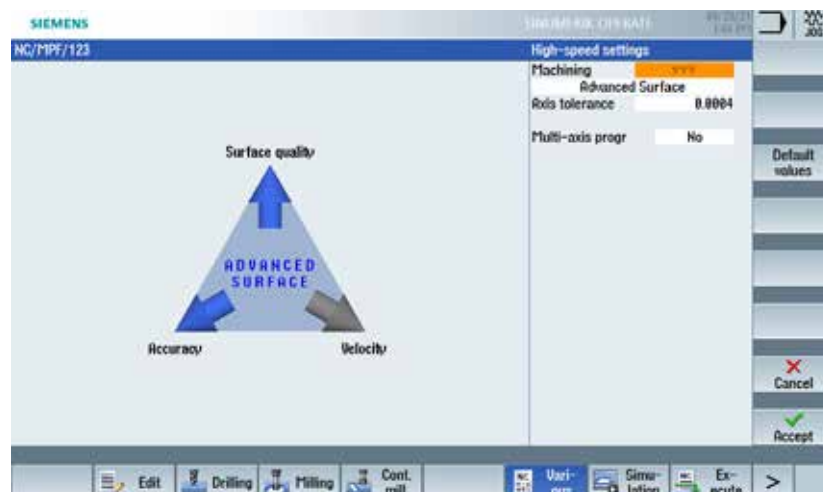
Advanced Surface and **Top Surface** are both advanced algorithms that analyze look ahead and velocity. The software analyses the program and converts points to splines to create a superior toolpath that is processed smoothly through the SINUMERIK ONE run engine.

You are able to choose between maximizing Machining Velocity, Surface Quality and Dimensional Accuracy. For example, turning on the "Smoothing" function (in Top Surface) will greatly increase part surface quality but may possibly slow the machining. This advanced software puts the trade-offs into your hands – where it belongs.

- Advanced Surface – Best for high-speed roughing applications, but also great for achieving optimal results for general milling. Highly recommended, and part of the One Dynamics Options Package for Job Shops.
- Top Surface – The newer of the algorithms, this advanced software will actually fix problems with the imported CAM data, detecting gaps in the points distribution that will result in jerking or hesitations as the program runs. This option is best for high-speed finishing in mold making where the very best surface quality is required. Part of the One Dynamics Options Package for Surfacing.

CNC Memory, 5.1 Gigabytes (P12 & P77)

A combination of Siemens options that, together, adds internal memory to the SINUMERIK ONE to bring in and integrate large files (such as CAD and CAM). Extends the internal CNC memory by 5.1 GB.

DXF Reader (P56)

Open DXF files on the SINUMERIK ONE to easily transfer data into your program.

Program faster and reduce errors on programming dimensions.

Open and use elements of multiple DXF files in the same program.

Works within all the programming methods!

Easily command specific features from drawing elements. Set your own part reference independent of the drawing origin.

Measuring Cycle for Auto Mode (P28)

Enables you to use a probe within the Auto Mode operation.

Insert a probing canned cycle to measure tool wear for the SINUMERIK ONE to apply compensation.

You can also measure part features and apply adjustments to either work offsets or tool compensation.
The cycle can be programmed to command the control to re-machine features based on the result of the measurement. The probing cycle may be combined with a series of logic statements to give you even more flexibility.

Use this powerful feature to:
- Measure your casting before machining and overcome variations by applying offsets to each part.
- Run lights out – even when parts vary.
- Output an inspection report after each machined part.
- Detect tool breakage and switch to sister tool.

Control Options (CONTINUED)

Execute from External Memory (P75)

Enables the use of an external memory device for running and editing programs. Ideal for optimizers of large programs, it allows your memory device to function like an expansion of your internal SINUMERIK ONE memory buffer without any cache restrictions on programs, subprograms, commands or even transferring to another machine.

Pre-machining with large cutter
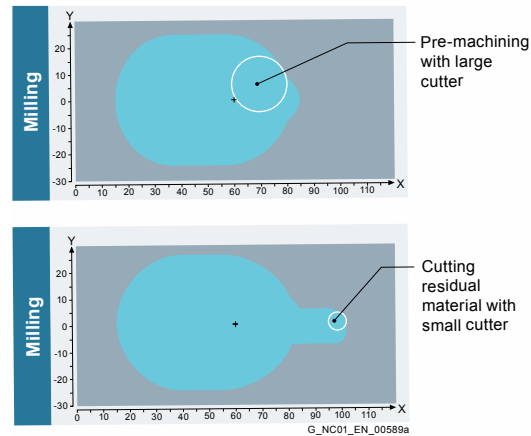
Residual Material (P13)

The SINUMERIK ONE automatically recognizes Rest Machining situations, simply call up the Residual Machining canned cycle, enter a few simple inputs and the control does the rest!

Match the tool to the operation for fastest machining: large tool for hogging, smaller tool for regions the large tool won't reach. Multiple Residual Machining cycles in the same feature gives you the flexibility to minimize cycle times.

Cutting residual material with small cutter

G_NC01_EN_00589a

Shopmill (P17)

True conversational programming you can do right on the shop floor. Write complete part programs or insert a feature within another program. With guidance from Animated Elements, Tool Tips, Dynamic Graphics, Canned Cycles and Context-Sensitive Help to guide you can create programs with ease. You won't have to go back to the person who programmed the part to fix or add to your program.

Simulation Run During Machining (P22)

3D solid model graphics real time while running a program. It is a great way to check the progress of your job, especially when you are running a lot of coolant.

TRACYL (M27)

Wraps a 2D shape around a cylinder, enabling you to program features onto a cylinder using the 4th Axis option of your VMCsi machine.

RTAC – Real Time Adaptive Feedrate Control

Optimize MyMachining / RTAC (Real Time Adaptive Feedrate Control) is a real-time adaptive control application. RTAC monitors the spindle load of the machine and automatically adjusts the feedrate to its optimal level during each operation. This allows you to manufacture more parts with shorter machining time and achieve higher process stability with tool breakage prevention.

Handwheel Run (M08)

Run the programmed moves by turning the handwheel. You control the feedrate by moving the Manual Pulse Generator on the control panel and the actual programmed path is moved. Adjust the relationship between the handwheel turns and the feedrate with 4 different resolution settings. Seamlessly go between Handwheel Run and fully automatic CNC run.

Great for setups and for confidence making that first part!

Options Packages

TREMENDOUS VALUE COMPARED TO A LA CARTE

Job Shop (S41)

- ShopMill (P17)
- DXF Reader (P56)
- Residual Material Detection (P13)
- 3D Simulation 1 (P25)
- Simultaneous 3D Run (P22)
- TRACYL/Cylinder Surface Transformation (M27)
- Execution from External Storage (P75)
- Advanced Surface Motion Control (S07)

Surfacing (S42)

- Job Shop (S41)
- Top Surface (S17)
- Measuring Cycles for Drilling/Milling (P28)
- User program memory 5.1 GB* (P12)

You do not need to buy the MEM-External option if you buy either package.

Machine Specifications

Machine Specs	VMC7*si*	VMC10*si*	VMC12*si*	VMC14*si*
Table size	35.43 x 19.69"	44.09 x 19.69"	51.18 x 23.62"	62.99 x 23.62"
Travel (X, Y, Z axis)	30 x 20 x 20"	40 x 20 x 20"	50 x 27.5 x 25"	60 x 27.5 x 25"
Rapid traverse X, Y, Z	1,000 IPM			
Cutting max. speed X, Y, Z	1,000 IPM			
T-slots (number x width x pitch)	5 x .709 x 3.937		5 x .709 x 4.921	
Maximum weight of workpiece	1,230 lbs	1,760 lbs	2,200 lbs	2,640 lbs
Height of table from bottom of floor	38"		42"	
Min. spindle nose to table distance	3.5"		3"	
Max. spindle nose to table distance	23.50"		28"	
Distance of ATC arm to table	20"		25.75"	
Min. machine height	93.5"		106"	
Max. machine height (head all the way up)	108"		119.25"	
Overall width of machine (side doors open + chip conveyor)	177"		202.63"	
Overall length of machine (electrical cabinet fully open)	150.25"		156.63"	
Footprint of machine (chip conveyor & coolant tank)	144 x 112"		168.25 x 126.50"	180 x 126.50"
Weight net / shipping (lbs)	8,360 / 8,710	9,900 / 10,250	15,400 / 15,900	17,600 / 18,100
Spindle Specs				
Spindle taper	40 Taper			
Spindle speed range	10 - 12,000 RPM			
Spindle nose diameter	3		3.75	
Tool clamping force (90 psi)	1,500 lbs		2,200 lbs	
Tool holder type	CAT 40 standard			
ATC tool capacity	24			
Maximum tool weight (incl. holder)	17.6 lbs			
Maximum tool diameter	3.07			
ATC arm tool change time	2.5 seconds			
Spindle motor HP - peak	41.5 HP		67 HP	
Spindle motor HP - continuous	20.1 HP		26.8 HP	
Spindle center to spindle head	18.25		26.75	
Spindle cooler oil capacity	~1 gallon		~4.25 gallon	
Power Requirements				
Power requirements - standard	480V (432-528V is okay), 3P, 41A		480V (432-528V is okay), 3P, 69A	
Power requirements - optional	208V with transformer option (200-240V is acceptable), 3P, 94A		n/a	
Coolant System				
Tank capacity	60 gallons		78 gallons	
Pressure and volume	8.7 gpm @ 42 psi			
Pump and wash power	750 watts			
Coolant wash pump	750 watts		1,290 watts	
CTS pump (Coolant Through Spindle)	3 KW / 4 HP			
CTS pressure	319 psi			
Air Requirements				
Air - CFM, SCFM (at 90 PSI)	2.5 CFM, 18 SCFM			
Air quality	Air dried/water separator upstream of VMC			
Lubrication Requirements				
Lubrication pump capacity	2 liters			
Lube Oil Type	ISO 32 or 10 W			

SINUMERIK One Specifications

Control Structure & Configuration
- 19" LED
- Multi-Touch Screen
- Maintenance Free Design

Spindle Functions
- Thread cutting with constant or variable pitch
- Tapping with compensating chuck and rigid tapping

Interpolations
- Typical block change times (block processing time) 0.7 ms
- Floating point accuracy 80 bits
- Max number linear interpolating axes: 12
- Circle via center point and end point
- Circle via interpolation point
- Helical interpolation (2D+6)
- Universal interpolator NURBS (non-uniform rational B splines)
- Continuous-path mode with programmable rounding clearance
- Continue machining at the contour (retrace support) – **O**

Measuring
- Logging of measurement results in automatic mode
- Measuring cycles for drilling/milling – **O**
  - Calibrating workpiece probes – **O**
  - Workpiece measurement – **O**
  - Tool measurement – **O**

Program/Workpiece Management
- Part programs, maximum: 1000
- Program/workpiece management: 250
- Templates for programs and workpieces
- Job lists
- Program/workpiece management on additional HMI user memory
- Program/workpiece management on USB storage
- Program/workpiece management on network drive
- Basic frames, maximum number: 16
- Settable offsets, maximum number: 100
- Work offsets, programmable (frames)
- Scratching, determining work offset

Compensations
- Backlash compensation
- Leadscrew error compensation
- Measuring system error compensation
- Feedforward control: Velocity-dependent Acceleration-dependent
- Weight counterbalance, electronic
- Temperature compensation
- Quadrant error compensation
- Circularity test

CNC Programming Language
- Programming language DIN 66025 and high-level language expansion
- Main program call from main program and subprogram
- Subroutine levels, maximum: 16
- Interrupt routines, maximum: 2
- Number of subprogram passes: 9999
- Number of levels for skip blocks: 0…8
- Polar coordinates
- 1/2/3-point contours
- Dimensions metric/inch, changeover via operator action or program
- Inverse-time feedrate
- User variables, configurable
- Predefined user variables (arithmetic parameters)
- Read/write system variables
- Program jumps and branches
- Arithmetic and trigonometric functions
- Comparison operations and logic combinations
- Macro techniques
- Control structures: IF-ELSE-ENDIF
- Control structures: WHILE, FOR, REPEAT, LOOP
- STRING functions
- Program Functions:
  - Preprocessing memory, dynamic FIFO
  - Look Ahead, recorded part program blocks
  - (MDynamics, Top Surface or COMPSURF active): 3000
  - Look Ahead, IPO blocks, buffered: 1000
  - Frame concept
  - Inclined-surface machining with frames
  - Axis/spindle interchange
  - Program preprocessing

Programming Support
- Program editor in SINUMERIK Operate:
  - Text editor: selecting, copying, deleting
  - Dual editor
  - Multi-editor, maximum: 4
  - Write protection for lines
  - Suppression of lines in the display
- Technology cycles in SINUMERIK Operate:
  - Drilling
  - Milling
  - Pocket milling with free contour definition and islands
- ProgramGUIDE in SINUMERIK Operate:
  - Programming support for cycles
  - Dynamic programming graphics
  - Animated elements
- ShopMill: – **O**
  - Machining step programming – **O**
  - Multiple clamping of identical/different workpieces – **O**
  - Manual machine – **O**
- DXF Reader – **O**
  - Accepting contours – **O**
  - Accepting point patterns – **O**
- Residual material detection and machining for contour pockets and stock removal – **O**
- Access protection for cycles – **O**

Communication / Data Management
- CNC user memory for programs and OEM cycles, buffered internally on NCU/PPU: 10 MB
- Manage additional drives via:
  - Ethernet: 4
  - USB - read/write
- Data backup:
  - SD card of the NCU/PPU (backup/restore) on flash drive or on network
  - With Ghost (backup/restore) on network
- IT security:
  - Secure and unique identification by means of device certificate
  - Software integrity thanks to signed software and Secure Boot
  - Secure protection of access data thanks to hardware-supported Security Controller
  - Program block and cycle encryption
  - Encrypted communication with OPC UA

Specifications (CONTINUED)

Tools
- Tool Types:
  - Drilling/milling
  - Groove sawing
- Tool radius compensations in plane with:
  - Approach and retract strategies
  - Transition circle or transition ellipse at outside corners
- Configurable intermediate blocks with tool radius compensation active
- Tool change via T number
- Tool carrier with orientation capability
- Look-ahead detection of contour violations
- Wheel peripheral speed, programmable
- Tool length compensation, online
- Identify tools with meaningful tool names
- Operation without tool management:
  - Editing of tool data
  - Tool offset selection via T and D numbers
  - Tools in the tool list: 600
  - Cutting edges in the tool list: 1500
- Operation with tool management:
  - Operation with tool management, up to 4 magazines
  - Operation with tool management, with more than 4 magazines – **O**
  - Monitoring for maximum tool speed/acceleration – **O**
  - System displays in standard software
  - User-friendly commissioning via system displays
  - Tool list
  - Configurable tool list
- Quantity:
  - Tools in the tool list: 600
  - Cutting edges in the tool list: 1500
  - Magazine list
  - Configurable magazine list
  - Empty location search and place positioning
  - Easy empty location search using softkeys
  - Loading and unloading of tools
  - More than one loading and unloading point per magazine
  - Tool life monitoring and workpiece count
  - Multi-tool with tools, maximum: 64
  - Adapter data
  - Location-dependent offsets

Operating Modes
- JOG CNC operating mode:
  - Handwheel selection
  - Inch/metric changeover
  - Manual measurement of work offset
  - Manual measurement of tool offset
  - Automatic tool/workpiece measurement
  - Reference point approach automatic/via CNC program
  - Repositioning on the contour via operator action, semiautomatically and via program
- MDI CNC (Manual Data Automatic/Input) operating mode:
  - Input in text editor
  - Save MDI program
  - Teach positions in MDI buffer
  - Teach-in function handling
- AUTO CNC operating mode:
  - Execute directly:
    - From real CNC user memory: 10 MB
    - From CNC user memory, expanded – **O**
    - From CNC user memory on SD card of the NCU – **O**
  - Process from external source (EXTCALL):
    - Data storage medium on USB interface
    - From a network drive
  - Execution from External Storage (EES): – **O**
    - Execution from external drives and memories – **O**
    - One part program memory for several NCUs – **O**
    - Backward jumps, far jumps, long program loops (GOTOF/GOTOB) – **O**
  - DRF offset
  - Program control
  - Program editing
  - Block search with/without calculation
  - Overstore
  - Configured Stop – **O**

Simulation
- Quickview for mold-making programs
- 2D simulation 1 (finished part)
- 3D simulation 1 (finished part) – **O**
- Real-time simulation of current machining operation

Note: **O = Optional Feature**

Warranty

TRAK products are warranted to the original purchaser to be free from defects in workmanship and materials for the following periods:

Product	Warranty Period	
	Materials	Factory Labor
New TRAK/ProtoTRAK	1 Year	1 Year
Any EXCHANGE Unit	90 Days	90 Days

The warranty period starts on the date of the invoice to the original purchaser from Southwestern Industries, Inc. (SWI) or their authorized distributor.

If a product, subsystem or component proves to be defective in workmanship and fails within the warranty period, it will be repaired or exchanged at our option for a properly functioning unit in similar or better condition. Such repairs or exchanges will be made FOB Factory/Los Angeles or the location of our nearest factory representative or authorized distributor.

Warranty Disclaimers

- This warranty is expressly in lieu of any other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular purpose, and of any other obligations or liability on the part of SWI (or any producing entity, if different).
- Warranty repairs/exchanges do not cover incidental costs such as installation, labor, freight, etc.
- SWI is not responsible for consequential damages from use or misuse of any of its products.
- TRAK products are precision mechanical/electromechanical/electronic systems and must be given the reasonable care that these types of products require. Evidence that the product does not receive adequate Preventative Maintenance may invalidate the warranty. Excessive chips built up around ballscrews and way surfaces is an example of this evidence.
- Accidental damage, beyond the control of SWI, is not covered by the warranty. Thus, the warranty does not apply if a product has been abused, dropped, hit or disassembled.
- Improper installation by or at the direction of the customer in such a way that the product consequently fails, is considered to be beyond the control of the manufacturer and outside the scope of the warranty.

Warranty does not cover wear items that are consumed under normal use of the product. These items include, but are not limited to: windows, bellows, wipers, filters and belts.
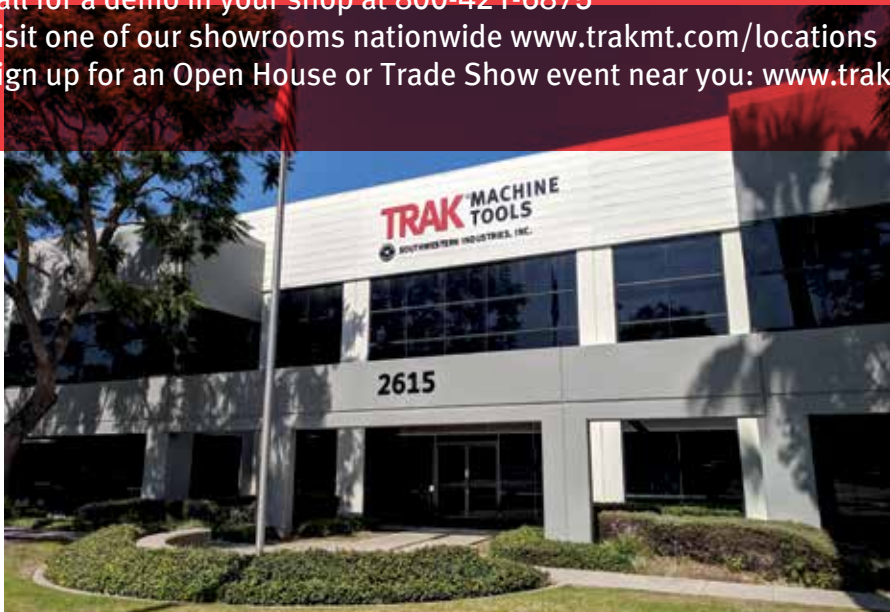
Get to know the new TRAK VMCsi featuring the SINUMERIK ONE today!
Visit www.trakmt.com/VMC
Call for a demo in your shop at 800-421-6875
Visit one of our showrooms nationwide www.trakmt.com/locations
Sign up for an Open House or Trade Show event near you: www.trakmt.com/events

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