TRAK® MACHINE TOOLS

SOUTHWESTERN INDUSTRIES, INC.

The TRAK TC820*si* & TC820LTY*si*

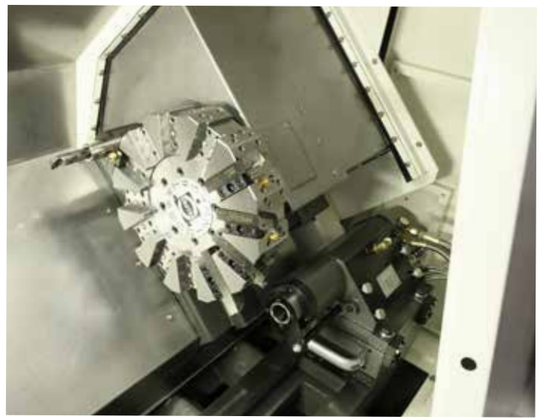
Production Turning Centers

Featuring the SINUMERIK ONE CNC by Siemens

TC820*si*

With features you need for Production Turning

- Precision Ground Ballscrews
- 4,000 RPM Spindle
- 7.88” Hydraulic 3 Jaw Chuck
- Tailstock w/ Hydraulic Quill
- 12 Station Bolt-On Turret
- Solid 8000lb Casting
- Coolant Through Turret
- Small Footprint
- Chip Conveyor
- Tool Setting Arm and Probe
- Hardened Box Ways on All Axis



TC820LTY*si*

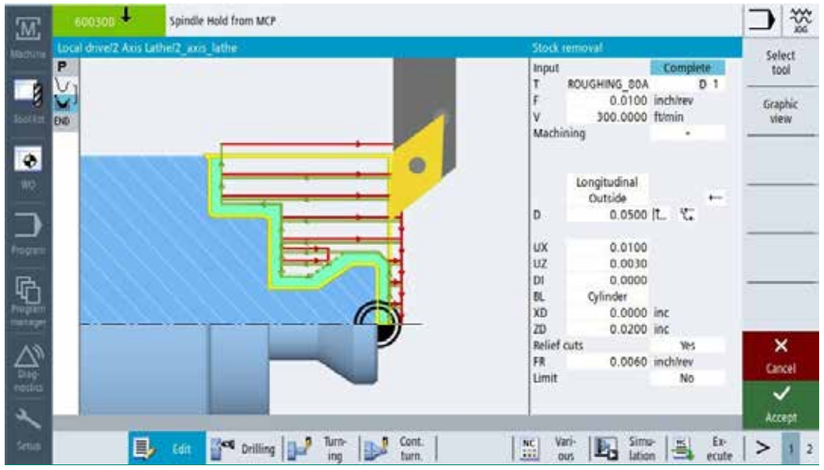
The TC820LTYsi adds:

- Programmable 4500 RPM Live Tool Spindle for Y and C axes
- Programmable Tailstock and Quill
- Automatic Tool Setting Arm and Probe
- Turret 1/2 Index to Expand From 12 to 24 Tools

Programming

The SINUMERIK ONE will run your program library now, but that is just the beginning

The SINUMERIK ONE gives you the opportunity to add powerful routines to your work. Tool setting probe cycles, sister tools, live tooling and more will allow you to increase throughput, improve part quality and reduce costs.



ShopTurn - 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.

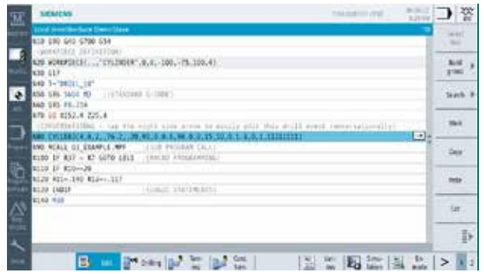
DIN G-code – Unleash the world's most powerful CNC

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

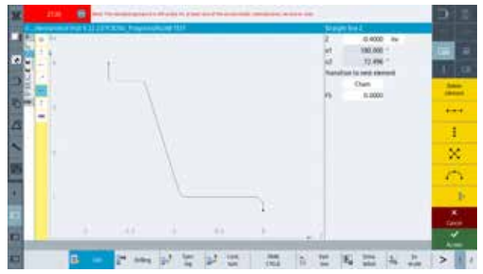
Some features are optional, see the control specifications

Advanced technology has never been so easy to use.

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.



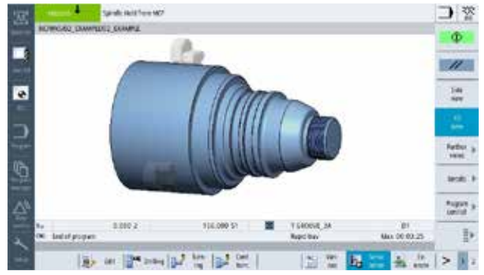
- Sub programs
- Workpiece definition
- Logic statements
- Conversational events
- Standard G Code
- Macros



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.

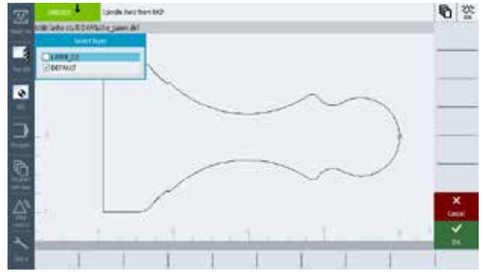
Also use Contour Editor to work with features in DXF files. Open the drawing data within the Contour Editor, then define tool path and even edit the geometry.



Powerful Program Simulations

Program more efficiently and with better results owing to the true representations of part and tool geometry. Simulate your part program at 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.

THE SINUMERIK ONE IS EASY TO USE,

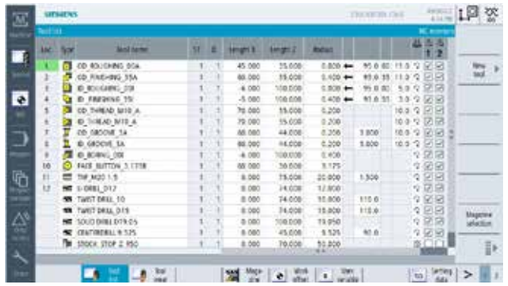
and that creates real opportunities for you:

- **Easy to train operators.**
- **Easy to transition from another CNC.**
- **Use powerful CNC features without 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.

ShopTurn = 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 or Turret Location 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.

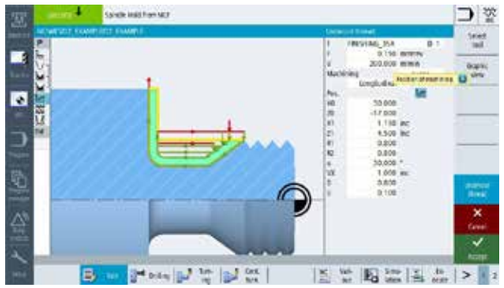
Math Calculations in data input fields.

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.

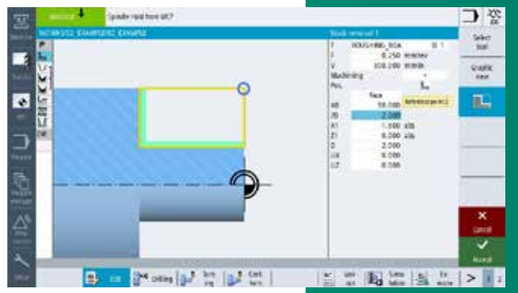
Powerful DRO (Manual) Routines enable you to set up your parts easily with access to powerful functions.



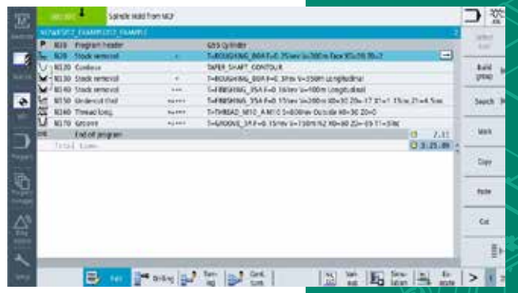
Animated Elements within programming show you how the feature works.

Some features are optional, see the control specifications

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.

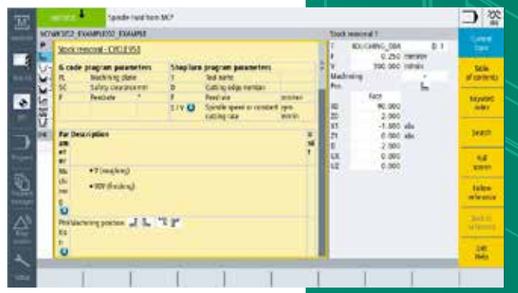


Advanced Program Summary, even your largest programs can be scanned with ease, with graphics for subprograms and other elements.

Handwheel Run takes the anxiety out of running that first part. Run the program with feedrate controlled by you turning the handwheel.

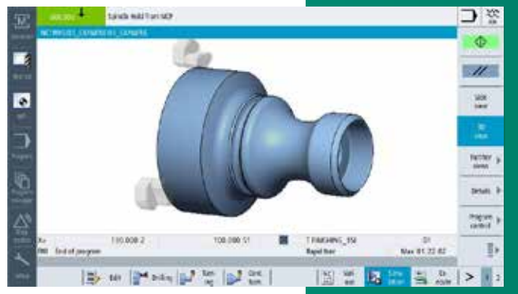
Softkeys guide you as you work.

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.

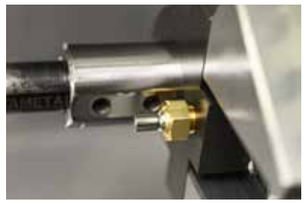
Machine Features

Hardened Box Way

on a solid casting. Higher rigidity, better damping and less vibrations make these precision ground hardened Box Ways superior for all purpose heavy duty cutting.

4,000 RPM Spindle with 2.56” bar capacity

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



Coolant Through Turret

delivered to efficiently dissipate chips and heat from pockets and holes during machining. This greatly enhances cutting performance, accuracy, surface finish and tool life.

Tailstock (TC820si)

Manual tailstock with hydraulic MT4 taper quill that can be manually positioned along the Z-axis travel and securely clamped in place.

Programmable Tailstock (TC820LTYsi)

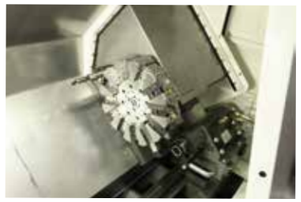
The hydraulically clamping tailstock can be automatically positioned along the Z-Axis travel and securely clamped in place using built-in subroutines.

Tool Setting Arm & Probe

The **TC820si** is equipped with manual Tool Setting Arm and Probe.

The **TC820LTYsi** is equipped with an automatic Tool Setting Arm and Probe. The arm is deployed into position and tools are touched off using the built-in conversational interface or via subroutines in the part program that check for tool wear and breakage and automatically update offsets.

12-station Turret (TC820si)



A 12-station bolt-on turret that uses block-style clamping to hold 0.75” shank tooling. Tools may be bolted to either side of the tool pocket to allow for right- or left-hand tools. Boring bar toolholders accommodate up to 1.5” shank diameter.

Live Tooling Turret (TC820LTYsi)

Industry standard BMT45 Turret with 12 stations at 4500 RPM. Allows for generous tool clearance, robust tool connection and a wide range of tools for optimal machining versatility, including secondary milling operations.

Machine Options

Bar Feeder
The LNS Quick Load Servo 80 S2 Bar Feeder allows for continuous machining. With quick changeovers from one part run to another and a library of up to 500-part programs this servo driven bar feed will drastically increase productivity.

Bar Puller
A low cost device to easily automate your machine. Simply mount on the turret and run bars .125” - 2.25” automatically.

Collet Chuck - Traditional pullback design utilizing Royal QG-65 collets.
Collet Chuck PS - Adjustable stop guarantees precise, consistent z-axis part positioning and enables very aggressive cutting.
Collet Chuck 5C - Traditional pullback design provides a simple, low-cost method for utilizing popular 5C collets

Part Catcher
The fully programmable TRAK Part Catcher is deployed to catch and store a finished part up to 2.3” diameter and 4.25” in length as it is cut off to aid with unattended machining.

Oil Skimmer
The TRAK Oil Skimmer is operated by a button on the control panel or may be integrated into your program.

Coolant HP
The TRAK high pressure coolant system allows coolant at 220 psi to be delivered directly through the turret and cutting tool efficiently dissipating chips and heat during machining.

Chip Cart
Chip cart that fits under the Chip Conveyor to collect chip remains. Wheels, coolant drain and dumping system for ease of use.

Tooling (TC820si)
Bolt-On Toolholder Kit (shown)

Tooling (TC820LTYsi)
Half index tool holder kit
Live tool holders ER20 and ER25
Static tool holder kit (not shown)

SINUMERIK ONE

Control Hardware Features

SINAMICS S120 Combi Drive

A power module with integrated infeed, motor modules for 5 axes (main spindle, live tooling spindle and 3 feed axes). The combi drive has integrated external fans inside the heat sink installed on the back of the drive. It has an integrated brake control function for the motor holding brake and temperature sensor that activates an alarm if the temperature goes above the set threshold.

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 conveyor, 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 program quickly and confidently.
- **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.
- **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)
- **Tool Probing**
  Probing is integrated into Jog Mode for you to easily and quickly find set up tools.
- **Tool Setups**
  Setting tools is simple due to the icons and Animated Elements that guide your selections.
- **Tool, Spindle, M-Code (TSM)**
  A single key gives you access to features such as loading tools, activating a work coordinate or turning on a spindle. Unlike the cumbersome MDI of other production controls, all operations are commanded by answering conversational prompts. This greatly simplifies setup.
- **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.
- **Dynamic Images** change with the selection of the field.
- **C-axis motion** fully synchronized precision for secondary milling operations with integrated hydraulic brake for lock spindle (TC820LTYsi).

Control Features (CONTINUED)

- **Hydraulic tailstock** quill with adjustable thrust pressure can be programmed throughout the travel vial M-codes or controlled via buttons on the Manual Control Panel.
- **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 exact location and proper speed to recover a tap stranded by an unplanned interruption.
- **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.
- **Familiar File Management** for storing and retrieving programs in familiar interface.
- **In-process Error Detection** explained in plain language.
- **ShopTurn** *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.
- **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.
- **Selectable Programming** for the style that fits your job and your shop: ISO, DIN, Shopmill/turn, Program Guide
- **Language Support** English, German, Spanish, Chinese and many more
- **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 the tool and part geometry.

Control Options

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.

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.

ShopTurn (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.

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. Seamlessly go between Handwheel Run and fully automatic CNC run. Great for setups and for confidence making that first part!

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

24 Station Half Indexing (TC820LTYsi)
Increase the number of available programable tool stations to 24 with half indexing turret positions. Have better flexibility and capacity with tool setups while still maintaining all 12 stations that accept live tools.

TRACYL-TRANSMIT (M27)
TRACYL enables wrapping a 2D shape around the diameter of your part. TRANSMIT enables you to mill in the face of the part.

Measuring Cycle for Auto Mode (P28)
Enables you to use a tool setter within the Auto Mode operation. Insert a probing canned cycle to measure tool wear for the SINUMERIK ONE to apply compensation.

OPC-UA Access My Machine (P67)
Enables access to control data from the control system. Users can leverage its secure data exchange to ensure robust monitoring, control and optimization of their operations. Utilizing historical data and complex event processing can help users enhance decision making, improve efficiency and facilitate predictive maintenance.

Machine Specifications

- **Hardened Box Ways** on all axes. Higher rigidity, better damping and less vibrations make Box Ways superior for all purpose heavy duty cutting.
- **Heavy Machine Tool Construction** provides mass for rigidity and heavy cuts.
- **Guarding on all axis** to protect the castings, precision ground ballscrews and drivetrain systems.
- **Direct Drive** on X and Z Axes (the TC820LTYsi add the Y) provide a rigid connection between the motor and the ballscrew for optimum servo control. This enhances accuracy and eliminates backlash.
- **Automatic Lubrication** controlled by the CNC system monitors and distributes oil to the box ways and ballscrews to ensure all critical components are lubricated with the correct amount of oil at all times.
- **Fine Chip Strainer** has a metal screen with 1.7 mm openings to prevent large chips from clogging the coolant pumps.
- **Chip Conveyor** features an internal collection and side discharge system with a high rate of material removal.
- **Tool Setting Arm and Probe** with user-friendly interface for fast and reliable tool setup.
- **Manual Tailstock** (for the TC820si), **Programmable Tailstock** (for the TC820LTYsi) and **Hydraulic Quill** provides additional support for longer workpieces. Quill stroke of 4.13” with an MT4 taper.
- **Large Single Front Door** with large viewing window for easy access and integration with automation.
- **4000 RPM Spindle** with generous 2.56” bar capacity. It uses four P4 bearings for optimal spindle support and rigidity.
- **14.75 HP Continuous spindle motor (see SINUMERIK ONE features).**
- **787 IPM Feedrate on Z-Axis and 590 IPM Feedrate on X-Axis** with aggressive acceleration and jerk control for ultra-fast positioning and reduced cycle times.
- **Absolute Position Encoders** to eliminate homing and enhance precision.
- **Y-Axis Travel** of 2.75” allows for fully synchronized multi-axis interpolation across X, Y, Z and C axis machining (TC820LTYsi)
- **Temperature Compensation** uses a preprogramed algorithm to compensate for the expansion and contraction of the headstock by adjusting the Y0 position.
- **33-gallon Tank and Pump** providing through tool coolant at 30 psi (TC820si).
- **50-gallon Tank and Pump** providing through tool coolant at 70 psi (TC820LTYsi).
- **Chip Wash** is delivered at 11.6 psi over axis guarding to help with chip evacuation and prevent swarf buildup. o eliminate homing and enhance precision.
- **Spindle motor brake (TC820LTYsi)** features holding torque of 220 ft-lbs, clamp force of 630 lbf and a positioning accuracy of 0.01°
- **Live Tool Stations (TC820LTYsi)** features BMT45 tooling with max speed of 4500 rpm, peak power at 5 HP and max torque of 38 ft-lbs.

Capacity	TC820*si*	TC820LTY*si*
Height of Centers	41.3”	47.3”
Maximum Swing	15.75”	
Swing Over Carriage Cover	11.81”	12.59”
Maximum Turned Length (Varies With Workholding)	20.00”	19.29”
Maximum Turned Diameter	8.66”	
Tool Section Max.	0.75”	
Rapid Speeds	787 ipm on Z axis / 590 ipm on X axis	787 ipm on Z & X axis / 590 ipm on Y axis
X-Axis Travel	6.90”	8.11”
Y-Axis Travel	N/A	2.75”
Z-Axis Travel	20.8”	19.69”
Headstock		
Spindle Nose Front	A2-6	
Chuck Diameter	7.88”	
Drawtube Thread	M74 X 2.0 X 35 mm	
Bar Capacity	2.56”	
Spindle Bore	3.00”	
Spindle Front Bearing Diameter (ID)	4.33”	
Number of Bearings	4	
Bearing Class (Radial Runout)	P4	
Drive System	Belt Drive	
Spindle Speed Range (RPM)	10 - 4,000 rpm	
Tailstock		
Quill Travel	4.13”	4.72”
Quill Diameter	2.36”	2.95”
Quill Taper	MT4	
Maximum Quill Thrust	691 lbf	1232.9 lbf
Spindle		
Motor Peak Power (480V)	38.00 HP	
Motor Continuous Power (480V)	14.75 HP	
Max Torque	100 ft-lbf @ 2000 RPM	
Spindle Motor Brake	N/A	Yes
Turret		
Number of Tools	12 Stations (Bolt-On)	12 Live Tooling (BMT45) Stations
Turning tool shank dimensions	0.75” x 0.75”	
Max. boring bar diameter	1.5”	1.25”
Machine Power Requirements		
Voltage	480 V, 208 V (with transformer option)	
Amps, Full Load	38 A (@480 V), 87A (@208V)	39A (@480v), 90A(@208v)
Phase, Hz	3, 60	
Dimensions		
Net Inches (L x W x H), lbs.	117” x 80” x 65”, 8000lbs	128” x 82” x 79”, 9,700lbs
Ship Inches (L x W x H), lbs.	120” x 90’ x 87”, 8,500lbs	138” x 90” x 89”, 10,700lbs
Other		
Coolant Reservoir Capacity	33 gal	50 gal
Coolant Pump Delivery and Pressure	5.3 GPM @ 30 psi	5.3 GPM @ 70 psi
Way Lubrication Capacity	3 l	
Way Lube Oil Type	ISO VG 68 or 20 W	
Hydraulic Oil Capacity	11 gal	
Hydraulic Pump Type	Combination Pump Vane	
Chip Conveyor Motor	200 W	
Way Surface Hardness	HRC 48~52	

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
- Tool measurement

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

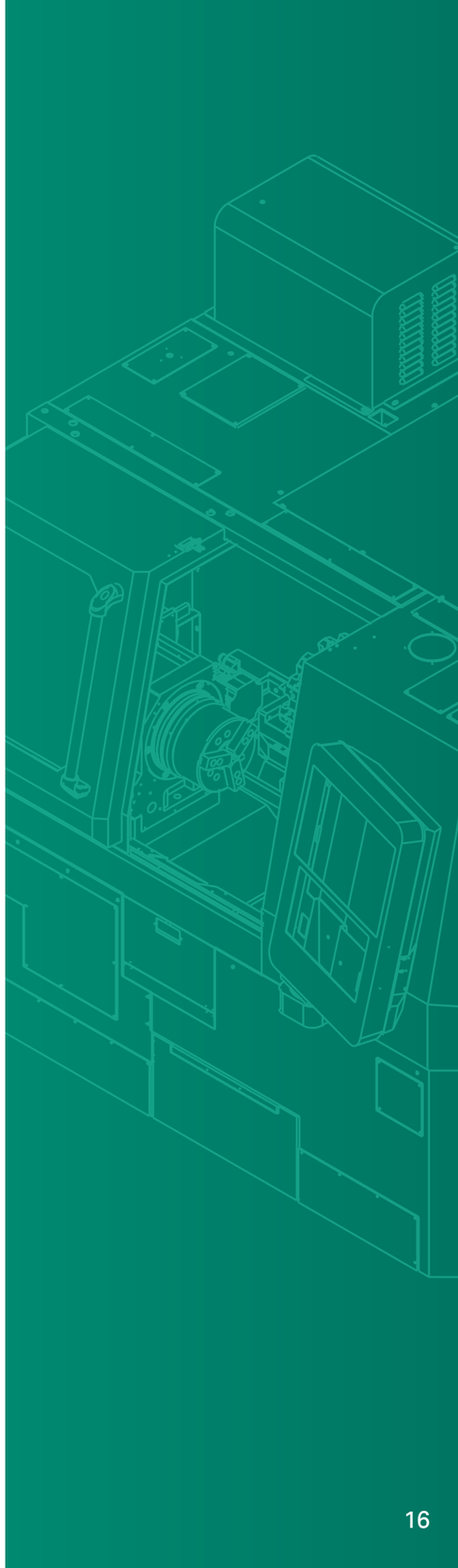
Compensations
- Backlash compensation
- Leadscrew error compensation
- Measuring system error compensation
- Feedforward control:
  Velocity-dependent
  Acceleration-dependent
- Weight counterbalance, electronic
- Quadrant error compensation
- Circularity test

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
- ProgramGUIDE in SINUMERIK Operate:
  - Programming support for cycles
  - Dynamic programming graphics
  - Animated elements
- ShopTurn: – O
  - Machining step programming – 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

Tools
- 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
- Turret index via T-number



Specifications (CONTINUED)

- 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
  - 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
  - Search using softkeys
  - Loading and unloading of tools
  - 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 measurement
  - Reference point approach automatic/via CNC program
  - Repositioning on the contour via operator action, semi-automatically 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.

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TRAK MACHINE TOOLS
SOUTHWESTERN INDUSTRIES, INC.

2615 Homestead Place
Rancho Dominguez, CA 90220

T | 310.608.4422
www.trakmt.com