TRAK Machine Tools
Southwestern Industries, Inc.

TRAK VMC7si Specifications
with Siemens SINUMERIK ONE Control

Machine Specifications

Table Size	35.43" x 19.69"
T-slots (number x width x pitch)	5 x .709" x 3.937"
Travel (X, Y, Z axis)	30" x 20" x 20"
Travel (X, Y, Z axis) w/ Soft Limits	30.16" x 20.24" x 20.24"
Spindle Taper	40 Taper
Spindle Speed Range (RPM)	10 – 12,000 RPM
Spindle Nose Diameter	3"
Diameter of Spindle	60 mm
Spindle Bearing Sizes	95 x 60 x 18 mm
Tool Clamping Force (90 psi)	1,500 lbs.
Tool Holder Type	CAT 40 Standard, BT 40 Optional (must change ATC arm)
ATC Tool Capacity	24 (30 Optional)
Maximum Tool Weight (incl. holder)	17.6 lbs (8 Kg)
Maximum Tool Diameter	3.07"
Maximum Tool Length	11.81"
Arm ATC Tool Change	2.5 seconds
Spindle Motor HP (peak)	41.5 HP (31 KW)
Spindle Motor HP (continuous)	20.1 HP (15 KW)
Power Requirements (480 volts, phase, current)	480V (456-504V is acceptable), 3P, 41A
Power Requirements w/ Transformer option (volts, phase, current)	208V with transformer (198-218V is acceptable), 3P, 94A
Maximum Weight of Workpiece	1,518 lbs.
Height of Table from Bottom of Floor***	38"
Min. Spindle Nose to Table Distance****	3.5"

Max. Spindle Nose to Table Distance****	23.5"
Distance of ATC Arm to Table	20"
Spindle Center to Spindle Head Casting Face	18.25"
Min. Machine Height***	93.5"
Max. Machine Height (head all the way up)***	108"
Overall Width of Machine (w/ side doors open, chip conveyor in place but no chip bin which adds width)	177"
Overall Length of Machine (w/ electrical cabinet fully open 180° and pendant enclosure rotated 90º)	150.25"
Footprint of Machine w/ Chip Conveyor/Coolant Tank in Place & Pendant Enclosure Not Rotated 90° (w x l)	144" x 112"
Weight Net	8,360 lbs.
Weight Ship	8,710 lbs.
Rapid Traverse X, Y, Z	1,000 ipm
Cutting Max Speed X, Y, Z	1,000 ipm
Coolant Capacity	60 gallons
Coolant & Coolant Wash Pump	750 watts
Air Pressure	90 psi 2.5 CFM or 18 psi SCFM
Air Quality	Air dried/water separator upstream of VMC
Lubrication Pump Capacity	2 liters

Note: Specifications subject to change.
*** Height changes slightly based on how machine is leveled on leveling screws.
**** Can vary slightly due to soft limit settings.

Options

VMCsi Hardware Options	SINUMERIK ONE Control Options
4th Axis 4th Axis Tailstock 4th Axis Ready Kit - BT 40 Tooling - Fixture Cart - Probe Kit - Probe Tool - Probe Part - Retention Knobs – Cat 40/ BT40 Tooling - Skimmer Option - Tailstock - Tool Measurement Cart - Transformer Option - TRAK USB Drive - Vise Kit	- ONE Dynamics – Job Shop (S41) - ONE Dynamics – Surfacing (S42) - Shopmill Option (P17) - DXF Reader (P56) - Residual Material (P13) 3D Simulation (P25) - Simultaneous Recording – 2/3D Simulation During Run (P22) - TRACYL – Cylinder Surface Transformation (M27) - Advanced Surface (S07) - Top Surface (S17) - Measuring Cycle for Auto Mode (P28) - CNC User Memory – 5.1GB (P12 & P17) - Execute from External Memory (P75) - Handwheel Run Option (M08) - Real Time Adaptive Feedrate Control (MCS2260) - APO – Auto Power Off - Access My Machine. OPC UA-P67 - Run My Virtual Machine – Operate - Run My Virtual Machine – Operate & 3D

Siemens SINUMERIK ONE System Specifications

Function Overview

Control Structure & Configuration

- 19" LED
- Multi-Touch Screen

- Maintenance Free Design, no battery, no fan

Spindle Functions

- Thread cutting with constant or variable pitch

- Tapping with compensating chuck and rigid tapping

Measuring

- Measuring cycles for drilling/milling – O
  - Calibrating workpiece probes – O
  - Workpiece measurement – O
  - Tool measurement – O

- Logging of measurement results

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
- Spline interpolation (A, B, C splines) – O
- Polynomial interpolation – O
- Involute interpolation – O
- Multi-axis interpolation – 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 the network drive
- Basic frames, maximum number: 16
- Settable offsets, maximum number: 100
- Work offsets, programmable (frames)
- Scratching, determining work offset

Simulation

- Quickview for mold-making programs
- 2D simulation (finished part)

- 3D simulation 1 (finished part) – O
- Real-time simulation of current machining operation – O

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

- Comparison operations and logic combinations
- Arithmetic and trigonometric functions
- Macro techniques
- Control structures: IF-ELSE-ENDIF
- Control structures: WHILE, FOR, REPEAT, LOOP
- STRING functions
- Program Functions:
  o Preprocessing memory, dynamic FIFO
  o Look Ahead, recorded part program blocks (MDynamics, Top Surface or COMPSURF active): 3000
  o Look Ahead, IPO blocks, buffered: 1000
  o Frame concept
  o Inclined-surface machining with frames
  o Axis/spindle interchange
  o Program preprocessing

Program Support

- Program editor in SINUMERIK Operate:
  o Text editor: selecting, copying, deleting
  o Dual editor
  o Multi-editor, maximum: 4
  o Write protection for lines
  o Suppression of lines in the display
- Technology cycles in SINUMERIK Operate:
  o Drilling
  o Milling
  o Pocket milling with free contour definition and islands

- programGUIDE in SINUMERIK Operate:
  o Programming support for cycles
  o Dynamic programming graphics
  o Animated elements
- 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

Compensations

- Backlash compensation
- Leadscrew error compensation
- Measuring system error compensation
- Circularity test
- Quadrant error compensation

- Feedforward control:
  o Velocity-dependent
  o Acceleration-dependent
- Weight counterbalance, electronic
- Temperature compensation

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
- 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

Operating Modes

- 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

- 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

Tools

- Tool Types:
  - Drilling/milling
  - Groove sawing
  - Turning Tools
  - 3D Probes
- 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 name
- 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 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

- Operation without tool management:
  - Editing of tool data
  - Tool offset selection via T and D names
  - Tools in the tool list: 600
  - Cutting edges in the tool list: 1500
- 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

Note: O = Optional Features