

Southwestern Industries, Inc.

K3 Knee Mill Specifications with the ProtoTRAK RMX Control

Machine Specifications

- Table Size – 10" x 50"
- T-Slots – 3" x 5/8"
- Table Travel – 32"
- Saddle Travel – 16"
- Knee Travel – 16"
- Maximum Quill Travel – 5"
- Quill Diameter – 3 3/8"
- Spindle Taper – R8
- Spindle Speed Range – 60-4200 RPM
- Head Tilt – +/- 90°
- Spindle Motor Power – 3 HP
- Power Requirement Control – 110V; 1P; 8A
- Power requirements, machine - 208/480V;3P; 8.5/4.25A
- Maximum Weight on Table – 850 lbs.
- Machine Weight – 2816 lbs.
- Machine dims l,w,h, - 78" x 103" x 87"
- Maximum rapid feed – 100 IPM
- Precision 7207 CP4 spindle bearings
- Chrome hardened and ground quill
- Meehanite castings
- Slide ways are Turcite coated
- Wide way surfaces are hardened and ground

Machine Options

- Glass Scales on table and saddle
- Auxiliary Function hardware box
- TRAKing™/Electronic Handwheels
- Remote Stop/Go switch
- Power Drawbar
- Halogen Worklamp
- Chip Pan
- Knee Power Feed
- Riser Block
- Coolant Pump
- Spray Coolant
- Table Guard Enclosure
- Limit Switches
- Vise

ProtoTRAK RMX Control Specifications

Control Hardware

- Digital Servo Amplifiers – custom designed for ProtoTRAK operation
- D.C. Servo Motors – rated at 280 in-oz. continuous torque providing double the amount of torque required
- Precision Ball Screws – in the table and saddle
- Modular Design – simplifies service and maximized uptime
- 115V/60HZ/12 amps
- Polycarbonate Sealed Membrane Keypad to lock out contamination
- Rugged Industrial PC
- Glass Scale on quill for Z-axis readout
- 2 or 3-axis CNC, 3-axis DRO
- Real handwheels for manual operation
- 15.6" Touchscreen LCD
- Intel® 2.0 GHz processor
- 4 GB Ram
- At least 32 GB of mSATA SSD
- 5 USB connectors
- 2 Ethernet Ports (1 for user and 1 for motion control)
- Override of program Feedrate
- Override of spindle speed (Only applicable for Spindle Control machines)
- LED status lights built into run panel
- E-stop
- Feed STOP and GO
- Fine vs Course EHW resolution control
- Accessory button to control coolant and AUTO mode in RUN mode
- Headphone jack for video sound (headphone supplied)

Software Features – General Operation

- Clear, uncluttered screen display
- Fly out windows for instant access to features and information
- EPA (Enhanced ProtoTRAK Assistance) for system help
- Programming Defaults to simplify part programming
- Event Options to modify control behavior
- QWERTY touchscreen keyboard
- Calculator places data in program for you
- Prompted data inputs
- English language – no codes
- Soft keys - change within context
- Windows® operating system
- Selectable two or three-axis CNC
- Color graphics with adjustable views
- Gestures for pan, zoom, rotate
- Inch/mm selectable

- Convenient modes of operation
- Networking

Info Soft Keys

- Status shows current state of the ProtoTRAK RMX
- Tool Table for instant access to tool setups
- EPA (Enhanced ProtoTRAK Assistance) help information for ProtoTRAK RMX operation
- Math Help to easily calculate missing print data
- Options appear when available while programming
- Defaults to customize the programming style
- Key board to enter alphanumeric and special symbols
- Calculator for simple calculations
- Warnings appear when you must resolve a condition

Status Features

- IN/MM selection
- Check current program name
- Current User Profile name
- Check software and firmware versions
- Purchased Options status
- Turn on/off Control Options: Advanced Features, Networking, Electronic Handwheels, MTConnect and Auxiliary Functions

Tool Table Features

- Tool Library for using tools in multiple programs and DRO (O)
- Program Specific Library to manage tools in the current program
- Convenient tool length reference to Base tool
- Tool type reference
- Tool material reference
- # Flutes reference
- Tool Diameter set
- Diameter modifier set
- Z modifier set
- Z Offset set
- Ram Jog and manual quill enabled for quick tool height reference

EPA (Enhanced ProtoTRAK Assistance) Features

- Context sensitive topics for ProtoTRAK RMX control operations
- Keyword search
- Brief explanations of specific operations
- Screen shots for clarity
- Videos for more advanced explanations
- Updated with software release versions

Math Help Features

- 22 separate intuitive routines
- Calculate missing print data using data provided
- Screen Graphics to guide data inputs
- Feed – IPM / MPPM conversions

- Speed – RPM / SFPM conversions
- Cartesian / Polar conversions
- Right triangle calculations
- Load Beg – loads solution as X and Y Begin
- Load End – Loads solution as X and Y End
- Load Center – Loads solution as X and Y Center

Programming Defaults

- Instant access to all defaults via fly out window
- Feedrate per Minute or per Tooth
- Spindle speed RPM or Surface Speed (for spindle control machines)
- Finish Cut for Profile, Pocket, Island Events
- Step over percentages
- Face mill tool path
- Adaptive Tool Path selections (O)
- Numerous default parameters for Pocket, Island events
- Speed and feed overrides for subroutine and copy events
- Forward or Backward Mirror Direction
- Software X, Y limits
- Inch or MM
- Maximum rapid feedrates
- Accessory On hard key to control Coolant
- Cut Tolerances
- Tool Compensation

Keyboard Features

- QWERTY style
- Touchscreen operation
- Numbers
- Special characters: \$ @ # ? % () < = * + -
- Caps Lock

DRO Mode Features for Manual Machining

- Incremental and Absolute dimensions
- Virtual handwheels to control Override of Axis Feed and Spindle RPM
- Jog at rapid with override
- Powerfeed X, Y or Z
- Teach-in of manual moves
- Programmable Go To dimensions (O)
- Servo return to 0 absolute
- Tool offsets from Tool Library
- Line Center calculation
- Circle Center calculation

Program Mode Features

- Circular interpolation
- Linear interpolation
- Advanced Adaptive Tool Path (O)

- Geometry programming
- Toolpath programming
- Auto Geometry Engine – Built-in CAD to fill in missing print data for you while you program
- Alphanumeric program names
- Automatic Scaling of print data
- Nesting
- Multiple Fixtures (O)
- Incremental and absolute dimensions may even be mixed on a single point
- Automatic diameter cutter comp
- Look –graphics at all times
- List step – graphics with programmed events displayed
- Program data editing
- Part graphics update while programming
- Selectable display between size of drawing and number of events
- List Step graphics relate Events to Drawing
- Editing of programmed data
- Swipe to move through programmed Events
- Auxiliary functions: Coolant, Air/Mist, Pulse Indexer, Programmable Output signal (O)

Selectable within applicable Events:

- Spindle Speed RPM or SFPM (for spindle control machines)
- Feed rate per minute or tooth
- Event Comments on/off (O)
- Cutting method One Way or Zig-Zag
- Step-over %
- Machining Angle in XY (0 – 90 deg.)
- Tool path Pattern: Offset, Parallel
- Tool path Pattern: Adaptive (O)
- Insert Clipboard data
- Cut Tolerances

Canned Cycles (Event types):

- Position Drill
- Bolt Hole
- Mill
- Arc
- Circular profile
- Rectangular profile
- Irregular Profile (with Auto Geometry Engine)
- Face Mill
- Circle pocket
- Rectangular pocket
- Irregular Pocket (with Auto Geometry Engine)
- Islands including Pocket and Island shapes
- Subroutine Repeat
- Subroutine Mirror
- Subroutine Rotation

- Copy (O)
- Copy Mirror (O)
- Copy Rotate (O)
- Engrave (O)
- Engrave subroutines and copy (O)
- Aux Event

Edit Mode Features

- Group Delete of Events
- Search Edit to make changes to multiple events
- Erase current program
- G-Code Editor (O)
- Clipboard to copy events for insertion elsewhere

Set-up Mode Features

- Toolpath graphics with selectable views
- Estimated Run Time clock
- Step forward and backward through of Toolpath graphics
- XYZ tool position locations displayed in Step through mode
- Verify Make Part – solid model graphics of programmed toolpath (O)
- Verify View Part – solid model of finished part
- Fixture offsets – convenient table for managing fixtures with DRO and Jog
- Ref Position – convenient table for setting Retract, Homes and software limits
- Service Codes for infrequent machine and control settings

Run Mode Features

- 3D CAM file run
- 3D G code file run
- Override of Programmed Axis Feed and Spindle Speed from 0 – 150%
- Virtual handwheels to control Override
- Real time conversion of programmed RPM / SFM (Only applicable for Spindle Control machines)
- Real time conversion of programmed IPM / IPT
- Status display:
- Event #
- Fixture#
- Control system Ready
- Current Tool #
- Repeat #
- Countdown clock to next pause or tool change
- Event Comments
- Start at beginning
- Start at any Event
- Start at tool # for GCD programs
- Start at any finish cut for pockets and islands
- Show Absolute Dimensions during run
- Show Incremental Dimensions
- Show Tool Path – real time graphics with Tool icon

- Show Program
- TRAKing® - you control programmed X,Y and Z feeds with Electronic Handwheels(O)
- Chip Clear (O)

Program In/Out Mode features

- Program storage to USB device plugged into Control Pendant
- Program storage to Network via RJ45 Port
- Browse file locations
- Create New Folders
- CAM program converter
- Convert prior-generation ProtoTRAK programs to current (.PT10)
- Save Temp – saves all current programs, tools and other settings
- Open Temp – opens the data saved at last “Save Temp”
- Rename programs
- Cut, Copy, Delete, Paste of program(s)
- Look - Graphics preview without opening files

Advanced Features Option

- Adaptive Pocket Roughing
- Verify Make Part – solid model graphics of programmed toolpath
- Multiple Fixtures
- Event Comments
- G-code editor
- Engrave Event
- Copy Repeat
- Copy Mirror
- Copy Rotate
- Tool Library for using tools in multiple programs and DRO
- Chip Clear
- Rest Material

Auxiliary Functions Option

Enables programming and control of:

- Coolant
- Pulse Indexer

Clear Off Option (3 Axis Only)

- Easily rough and finish parts from the outside of the stock inwards towards center, while leaving any islands standing.
- A constant chip load is maintained while roughing, leading to longer tool life and rapid stock removal.
- Three different milling strategies are available; adaptive, offset, and parallel.

DXF File Converter Option

- Import and convert CAD data into ProtoTRAK programs
- DXF or DWG files
- Chaining
- Automatic Gap Closing

- Layer control
- Part alignment
- Feature analysis (circle/arc radius and position)
- Simple CAD construction/editing tools
- DXF-output capability
- Easy, prompted process you can do right at the machine

Parasolid File Converter Option

- Import and convert 3D CAD data into ProtoTRAK programs
- X_T files
- X, Y & Z dimensions are transferred into program events
- 2D and 3D views of part
- Add or remove geometry
- Chaining
- Part alignment
- Feature analysis (circle/arc radius and position)
- Simple CAD construction/editing tools
- Easy, prompted process you can do right at the machine

TRAKing® / Electronic Handwheels Option

- TRAKing® of programs during program run
- Go To Dimensions in DRO Mode
- Scalable Fine/Course handwheel resolution

Offline Programming Option

- ProtoTRAK RMX user interface for Windows PC
- Program parts and simulate CNC Run
- Modify files from current and former ProtoTRAK models

TRAK MTConnect (Optional)

- Machine networking through ProtoTRAK® ethernet connection or USB Wi-Fi adapter
- Collect machine data throughout shop
- Monitor machine status, receive notifications and analyze data throughout your machines' history