

TRAK LPM



More than just a VMC...
It's a machining system for
Low Volume / High Mix production.

TRAK MACHINE
TOOLS



SOUTHWESTERN INDUSTRIES, INC.

THE TRAK LPM

How You Compete in Low Volume / High Mix Production Jobs

The TRAK LPM is a machining system that integrates the control, machine, tooling and workholding. It gives ProtoTRAK machinists the tools they need to compete and win on the strength of their know-how and skill.

Do Job Change-Overs in Minutes

The TRAK LPM reduces the idle time to an absolute minimum so the machine can keep cutting chips. Other VMCs force you to leave the spindle idle while setting up tools and locating parts.

Reduce Labor Hours Spent in Setup

The TRAK LPM integrates practical tools to guide you through setups. Other VMCs require more labor-intensive, time-consuming setups.





THE TRAK LPM SYSTEM

The ProtoTRAK PMX is Always Easy to Use

Your ProtoTRAK machinists can program all but the most complex parts...right on the shop floor.

- Save the time and cost of routing through a CAD/CAM process
- Keep your skilled workers in control of how parts get made



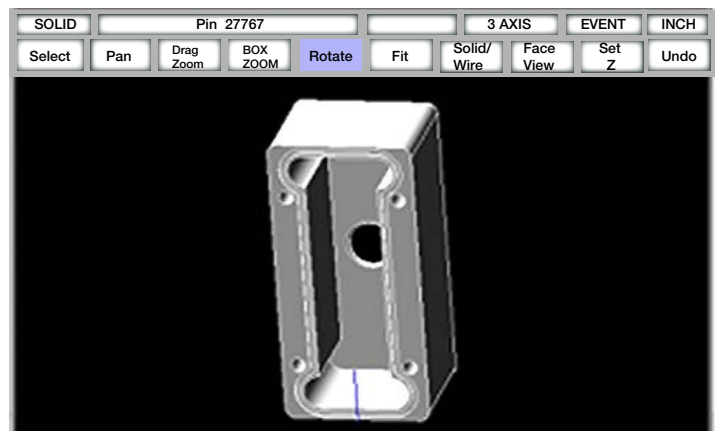
Staged View for Concurrent Programming and Setup

- Program a future job while you're tending a job that's already running
- Keep the spindle running while setting up almost every aspect of the next job



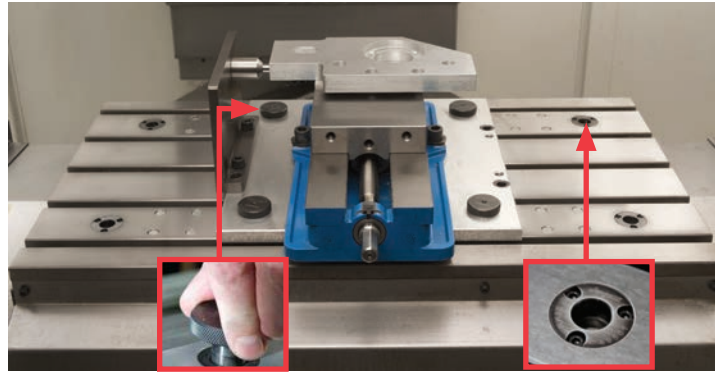
Convert DXF and Parasolid Files

- Make quick work of part programming in a process the machinist controls
- Assure accuracy by using blueprint data for dimensions



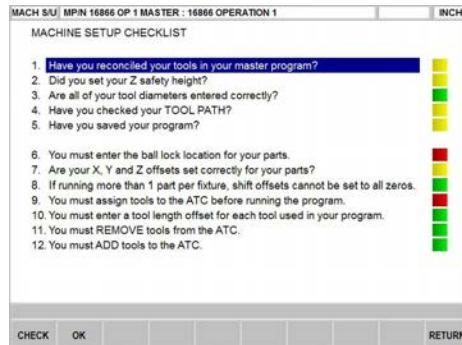
Jergens® Ball Lock System Installed for You

- Precise positioning in seconds
- Repeatable part locations eliminate touching off parts



Checklists Give You Feedback on Your Progress

- Focus your attention only on what needs doing next
- Work with confidence without worrying that you'll forget something important



Photos and Notes of Your Past Setups

- Saved with the programs so you have instant access when you need them
- Don't waste time reinventing what you've already done



TRAKing is the Fastest, Surest Way to Prove out a Setup

- Run the program with the control handwheel on your first part



ProtoTRAK PMX CNC

The ProtoTRAK that is completely dedicated to Low Volume / High Mix jobs

Programs just like a ProtoTRAK
(because it is)

EVENT 9			FACE MILL			EVENT 10			IRR PCKT		
X1	-1.5500	abs	X BEGIN	0.0000	abs						
Y1	-1.4000	abs	Y BEGIN	-1.2300	abs						
X3	1.5500	abs	Z RAPID	0.1000	abs						
Y3	0.7000	abs	Z END	-0.5090	abs						
Z RAPID	0.1000	abs	# PASSES	2							
Z END	0.0020	abs	ENTRY MODE	RAMP							
# PASSES	1		FIN CUT	0.0000							
Z FIN CUT	0.0000		RPM	5200.00							
RPM	7000.00		Z FEEDRATE	15.0							
Z FEEDRATE	50.0		XYZ FEEDRATE	30.0							
XYZ FEEDRATE	50.0		TOOL #	1							
TOOL #	1										

X BEGIN : 0.0000 abs

DATA BOTTOM INSERT EVENT DELETE EVENT

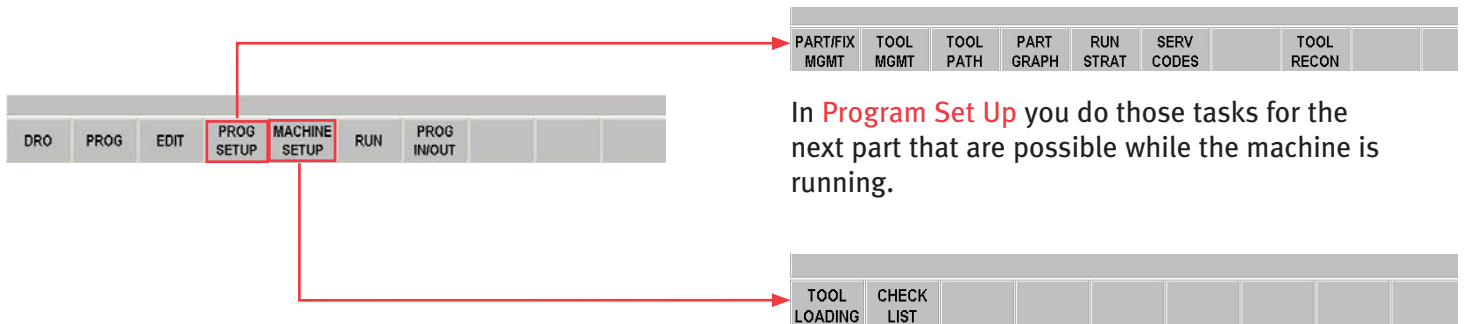
Staged View



A simple selection on the control and you'll be programming and setting up future jobs while a job is running.

Setup with a Difference

Not only does the ProtoTRAK PMX have the ability to work on two programs at once, it keeps the machine running for most of the setup of that future job.



In **Program Set Up** you do those tasks for the next part that are possible while the machine is running.

In **Machine Set Up** you do those few things that require the machine to be idle.

ProtoTRAK PMX Knows the Machine

Other manufacturers install a general purpose production CNC on a machine, load in a few parameters and leave it at that. The ProtoTRAK PMX goes beyond to reduce your work in setup.

Setup Checklist

The ProtoTRAK PMX keeps track of what you've done and what needs doing. You'll be able to focus on a couple of things when the machine is idled.

MACHINE SETUP CHECKLIST

1. Have you reconciled your tools in your master program?
2. Did you set your Z safety height?
3. Are all of your tool diameters entered correctly?
4. Have you checked your TOOL PATH?
5. Have you saved your program?
6. You must enter the ball lock location for your parts.
7. Are your X, Y and Z offsets set correctly for your parts?
8. If running more than 1 part per fixture, shift offsets cannot be set to all zeros.
9. You must assign tools to the ATC before running the program.
10. You must enter a tool length offset for each tool used in your program.
11. You must REMOVE tools from the ATC.
12. You must ADD tools to the ATC.

Reference Tool Preset

The ProtoTRAK PMX knows the reference tool so you can quickly set Z values for each tool.



Fixture Reference

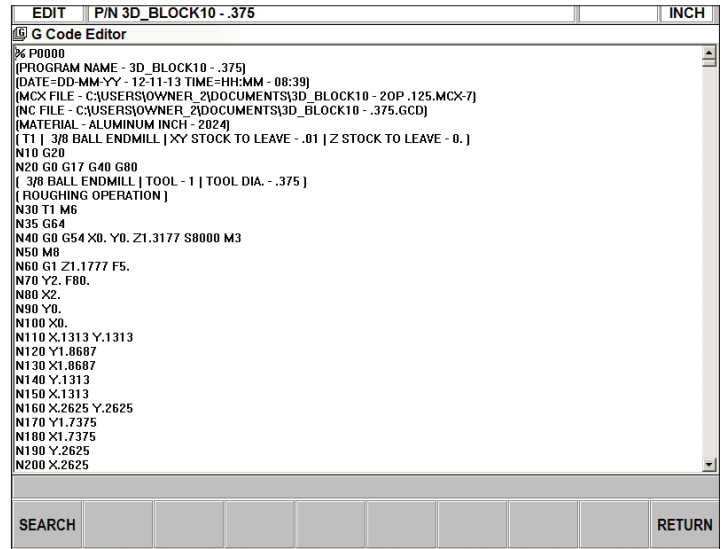
The ProtoTRAK PMX knows the positions for the Jergens® Ball Locks so you can locate the fixture and workplace quickly and precisely.

Loc	Dia	Type	Z Offset	Z Mod	Dia Mod	Tool No	Dia	Type	ATC Loc
1	0.7500	Fin EM	1.3200	0.0000	0.0000	1	0.3750	Ctr Drill	5
2	0.1000	Form	2.5670	0.0000	0.0000	2	0.4370	Drill	6
3	0.3120	Fin EM	0.7895	0.0000	0.0000	3	0.5000	Fin EM	7
4	0.1000	Drill	2.5460	0.0000	0.0000	4	0.7500	Cntrsink	8
5	0.3750	Ctr Drill	0.5630	0.0000	0.0000	5	2.0000	Face Mill	9
6	0.4370	Drill	1.9980	0.0000	0.0000	6	0.7500	Fin EM	1
7	0.5000	Fin EM	1.1220	0.0000	0.0000	7	0.1000	Form	2
8	0.7500	Cntrsink	2.3440	0.0000	0.0000	8	0.3120	Fin EM	3
9	2.0000	Face Mill	1.3345	0.0000	0.0000	9	0.1000	Drill	4
10	0.1250	Drill	2.5112	0.0000	0.0000	10	0.1250	Drill	10
11	0.1120	Tap	2.4450	0.0000	0.0000	11	0.1120	Tap	11
12	0.1660	Tap	2.5778	0.0000	0.0000	12	0.1660	Tap	12
13	0.1920	Drill	0.7980	0.0000	0.0000	13	0.1920	Drill	13
14	0.1250	Fin EM	1.8970	0.0000	0.0000	14	0.1250	Fin EM	14
15	0.2500	Fin EM	2.7750	0.0000	0.0000	15	0.2500	Fin EM	15
16	0.0000	None	0.0000	0.0000	0.0000				
17	0.0000	None	0.0000	0.0000	0.0000				
18	0.0000	None	0.0000	0.0000	0.0000				
19	0.0000	None	0.0000	0.0000	0.0000				
20	0.0000	None	0.0000	0.0000	0.0000				
21	0.0000	None	0.0000	0.0000	0.0000				

Advanced Capability Made Easy

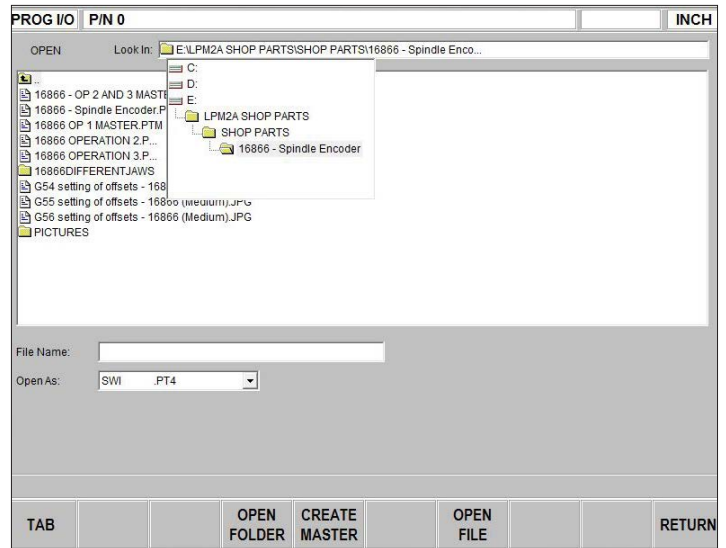
G-Code Editor

Make quick adjustments to **G-Code** right at the machine.



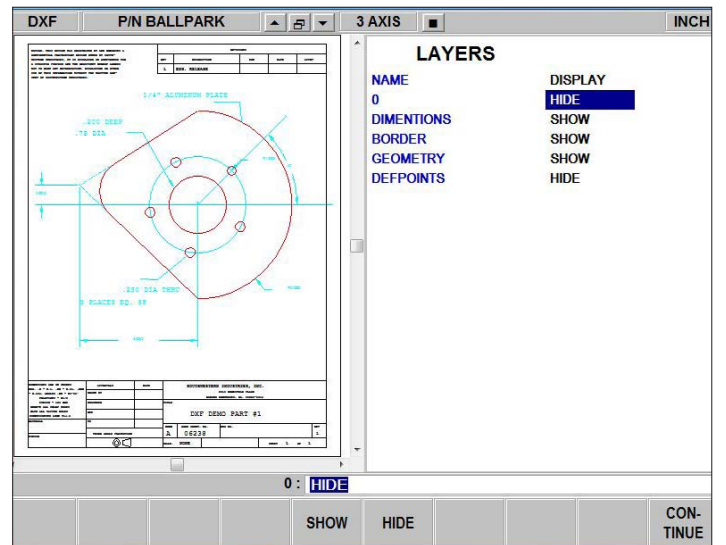
Networking

Assure print control by keeping programs in authorized file storage locations.



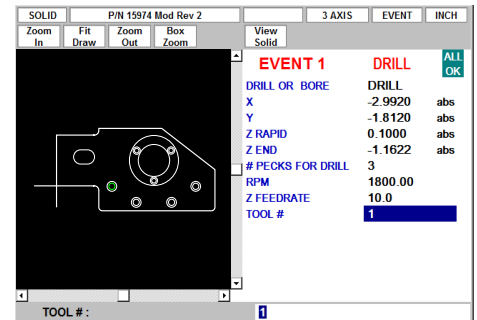
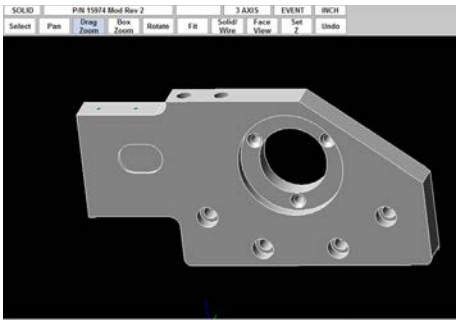
DXF File Conversion

Use the **print data** to make programming easier.



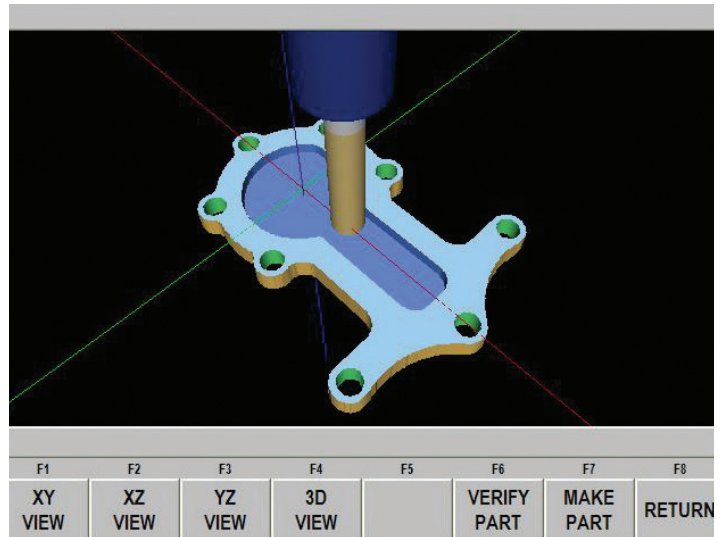
Parasolid File Conversion

Go right from solid file to part program in a process that is quick and easy.



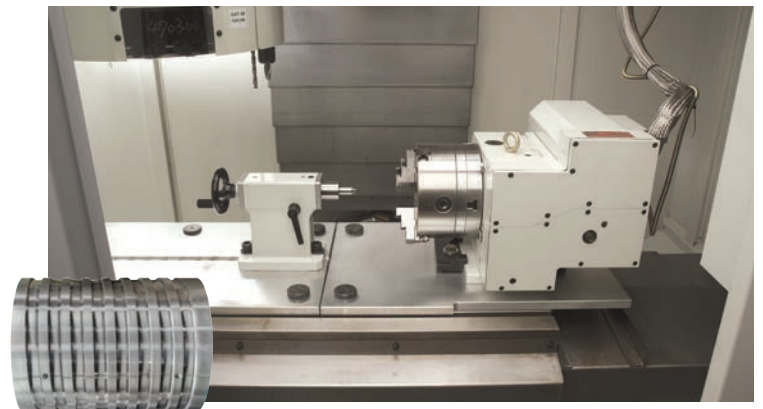
Graphical Tool Path Simulation

See the **entire tool path** to assure what you've programmed is what you'll cut.



4TH Axis Simultaneous

Even **complex geometries** are made easier to setup and run.



The Workholding System

Setups are faster and easier with the workholding system of the TRAK LPM. Changing from job to job does not require your machine to be idle during time-consuming fixture setups.

Receivers are precisely installed to allow multiple fixtures. You can locate your part on a fixture while another part is running on the machine.



Within seconds your fixture is positioned within 0.0002” and secured with 2250 lbs of clamping force.



The ProtoTRAK PMX knows the Ball Lock receiver locations. Simply reference the part to the fixture, and then load the offsets into the fixture management screen.

Part/Fixture Management

Part	1	2	3
P/N	16866 OPERATIO	16866 OPERATIO	16866 OPERATIO
Fixture Location	A	NONE	NONE
Fixture Number	1	1	1
X Offset	0.0000	0.0000	0.0000
Y Offset	0.0000	0.0000	0.0000
Z Offset	0.0000	0.0000	0.0000
Parts/Fixture	1	1	1
X Shift	0.0000	0.0000	0.0000
Y Shift	0.0000	0.0000	0.0000
Z Shift	0.0000	0.0000	0.0000

X	0.0000	A
Y	0.0000	A
Z	18.7340	A

1, SET for Fixture A
2, SET for Fixture B
3, SET for Fixture C

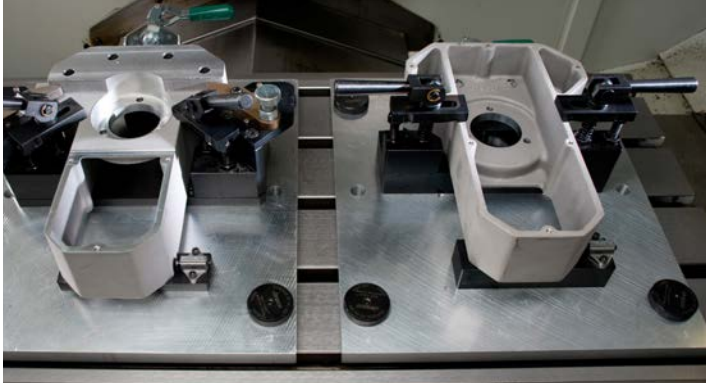
FIXTURE LOCATION : **A**

PICTURE	NOTES	GO TO	Z SAFETY			
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Follow this simple process and you never need to touch off a part in an idled machine!

Fixture Plates Bring It All Together

Buy them from us or use your own.



Multiple fixtures are referenced using the preset locations.



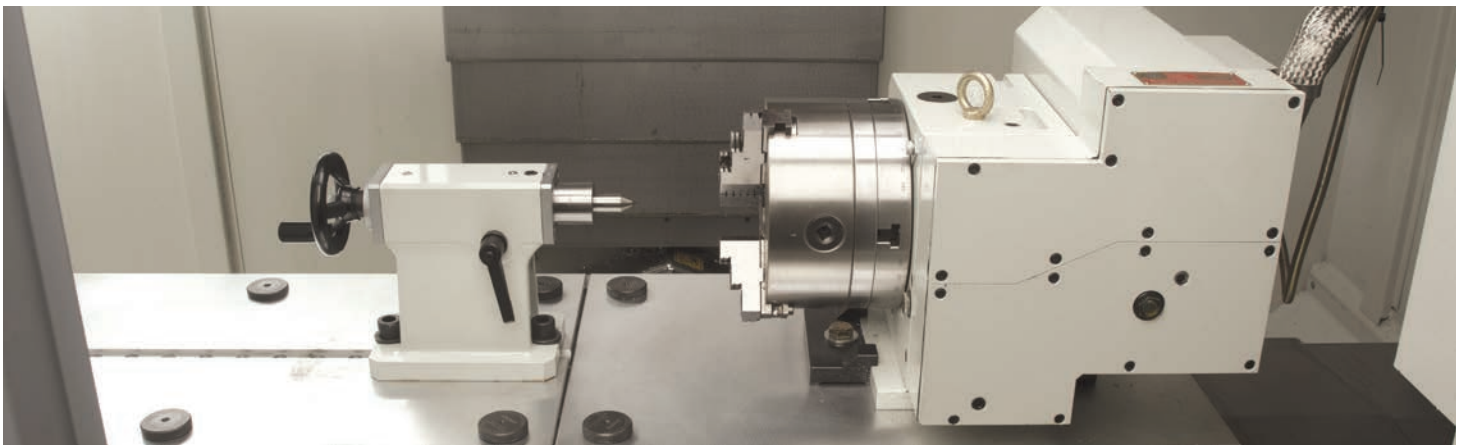
Optional Locating Guide Assembly allows you to easily reference your own features.



Fixture plate with integrated vice for quick setups.



Fence and precision standoffs for quick, repeatable changes.



The optional 4th axis is easily mounted with the **Ball Lock System**.

With a little ingenuity in fixtures, you will slash the time that's wasted in set up!

TRAK LPM Tool Setting System

The tooling cart comes standard with every TRAK LPM.



Each TRAK LPM comes with its own reference tool. The tool's Z dimension is loaded into the ProtoTRAK PMX for you at our factory.



Setting the Z Depths of each tool is simple. Just enter the offsets from the reference tool as you touch off.



J: PIN 218120PIA				PART PROGRAM TOOL TA			
Dia	Type	Z Offset	Z Mod	Dia Mod	Tool No.	Dia	Type
7500	Fin EM	1.3200	0.0000	0.0000	1	0.3750	Ctr Drill
1000	Form	2.5670	0.0000	0.0000	2	0.4370	Drill
3120	Fin EM	0.7895	0.0000	0.0000	3	0.5000	Fin EM
1000	Drill	2.5460	0.0000	0.0000	4	0.7500	Ctrsink
3750	Ctr Drill	0.5630	0.0000	0.0000	5	2.0000	Face Mill
4370	Drill	1.9980	0.0000	0.0000	6	0.7500	Fin EM
5000	Fin EM	1.1220	0.0000	0.0000	7	0.1000	Form
7500	Ctrsink	2.3440	0.0000	0.0000	8	0.3120	Fin EM
0000	Face Mill	1.3345	0.0000	0.0000	9	0.1000	Drill
1250	Drill	2.5112	0.0000	0.0000	10	0.1250	Drill
1120	Tap	2.4450	0.0000	0.0000	11	0.1120	Tap
1660	Tap	2.5778	0.0000	0.0000	12	0.1660	Tap
1920	Drill	0.7980	0.0000	0.0000	13	0.1920	Drill
1250	Fin EM	1.8970	0.0000	0.0000	14	0.1250	Fin EM
2500	Fin EM	2.7720	0.0000	0.0000	15	0.2500	Fin EM
0000	None	0.0000	0.0000	0.0000			
0000	None	0.0000	0.0000	0.0000			
0000	None	0.0000	0.0000	0.0000			
0000	None	0.0000	0.0000	0.0000			
0000	None	0.0000	0.0000	0.0000			
0000	None	0.0000	0.0000	0.0000			
TOOL Z OFFSET: 2.7720							
REMOVE TOOL	NOTES	DISABLE LOC					

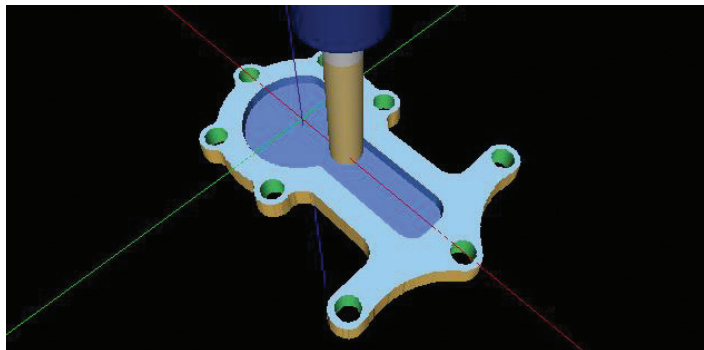
Follow this simple process and you will never have to touch off tools in an idled machine!

Under Your Control

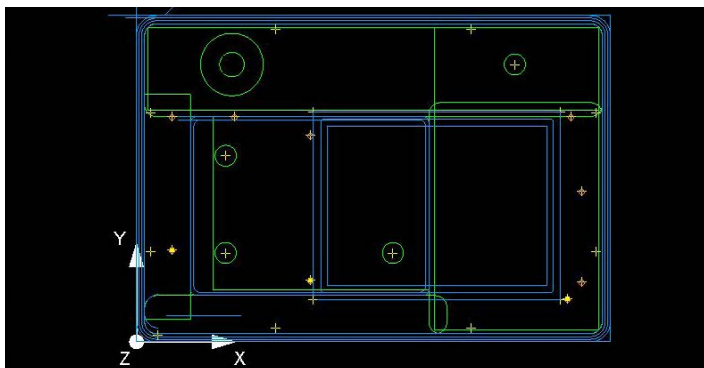
Unlike any other VMC, the TRAK LPM keeps you in control every step of the way. You can work fast, with confidence.

MACHINE SETUP CHECKLIST	
1. Have you reconciled your tools in your master program?	Yellow
2. Did you set your Z safety height?	Yellow
3. Are all of your tool diameters entered correctly?	Green
4. Have you checked your TOOL PATH?	Green
5. Have you saved your program?	Yellow
6. You must enter the ball lock location for your parts.	Red
7. Are your X, Y and Z offsets set correctly for your parts?	Yellow
8. If running more than 1 part per fixture, shift offsets cannot be set to all zeros.	Green
9. You must assign tools to the ATC before running the program.	Red
10. You must enter a tool length offset for each tool used in your program.	Green
11. You must REMOVE tools from the ATC.	Green
12. You must ADD tools to the ATC.	Green

The Checklist keeps track of what you've done and what remains.



Toolpath Verify exposes any problems in toolpath, including the non-programmed positioning and tool change moves.



Part graphics provide feedback as you program, bringing mistakes to your attention for immediate correction.

Give your skilled ProtoTRAK machinists the control they need, and your shop will produce Low Volume/High Mix parts faster and better than the shops that run a conventional VMC.

MACHINE SETUP CHECKLIST	
1. Not Applicable.	Green
2. Did you set your Z safety height?	Green
3. Are all of your tool diameters entered correctly?	Green
4. Have you checked your TOOL PATH?	Green
5. Have you saved your program?	Green
6. You must enter the ball lock location for your parts.	Green
7. Are your X, Y and Z offsets set correctly for your parts?	Green
8. If running more than 1 part per fixture, shift offsets cannot be set to all zeros.	Green
9. You must assign tools to the ATC before running the program.	Green
10. You must enter a tool length offset for each tool used in your program.	Green
11. You must REMOVE tools from the ATC.	Green
12. You must ADD tools to the ATC.	Green

All green, ready to go!



TRAKing allows you to run your parts at the speed in which you crank the convenient control handwheel. It is simply the purest way to make sure everything is correct before you press "GO."

Machine Construction

Stiff column and bed box construction

Box-shaped spindle head casting

5 tee slots
(instead of the usual 4)

Casting features heavy
internal ribbing

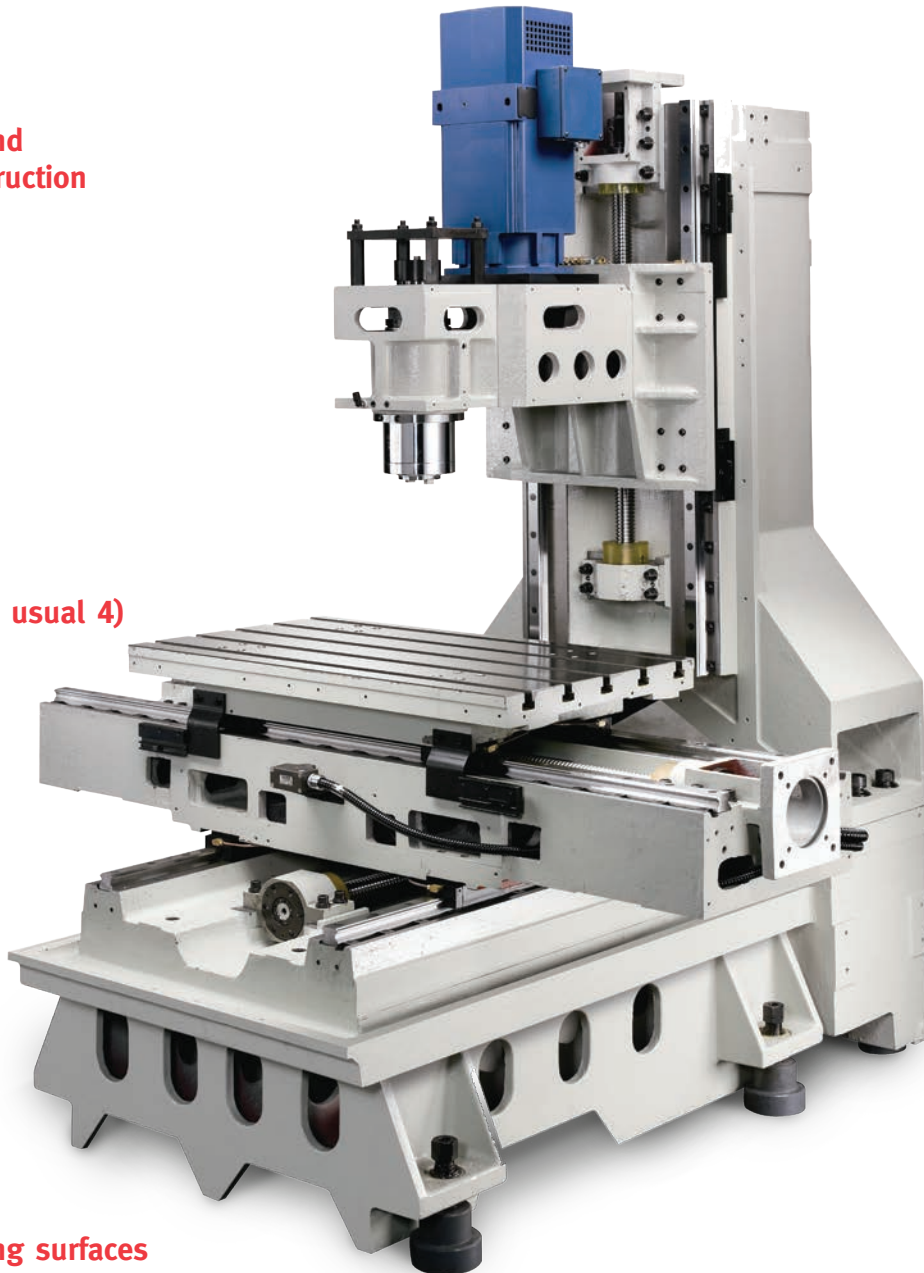
Class P
Linear Guides

Wide base footprint

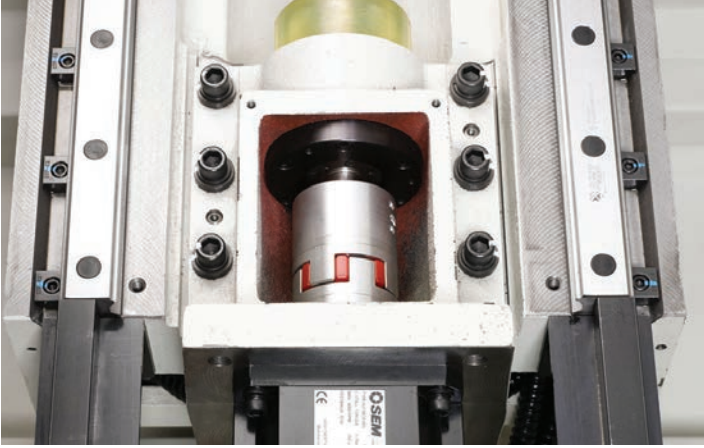
Extra wide
Y axis support

Large contacting surfaces

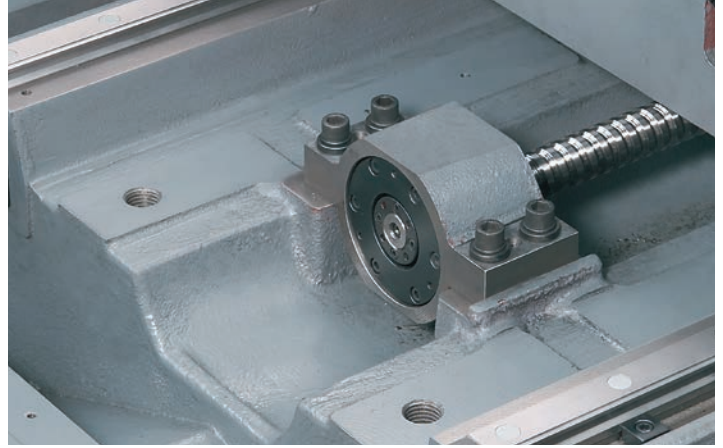
Strong and rigid



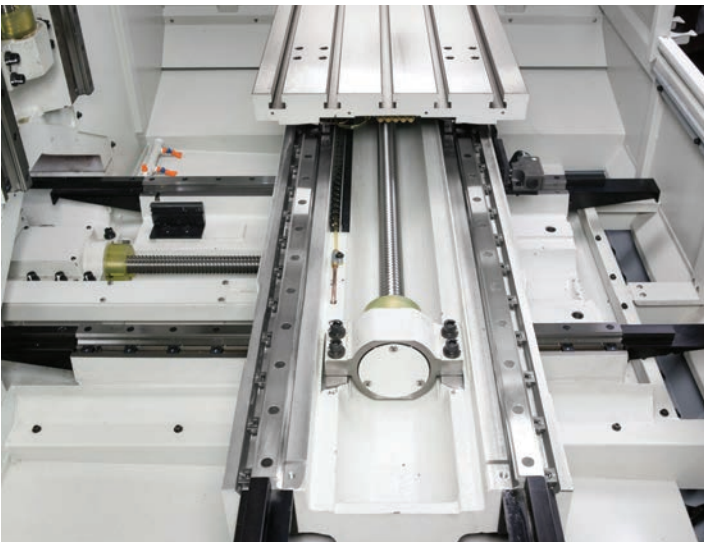
Features



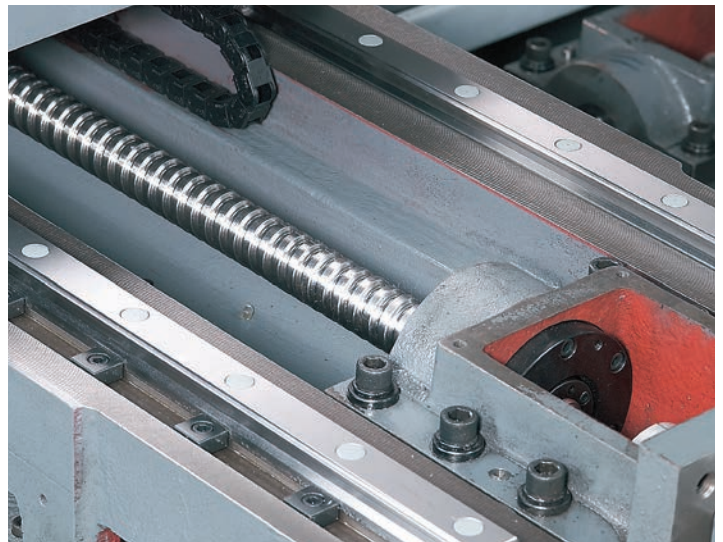
Direct coupled motors maximize efficiency and precision while minimizing elastic backlash



Dual angular contact bearings pretension the ballscrews to minimize thermal expansion



Linear guides provide smooth, accurate positioning



40mm diameter precision ground ballscrews



High-precision cartridge-type spindle

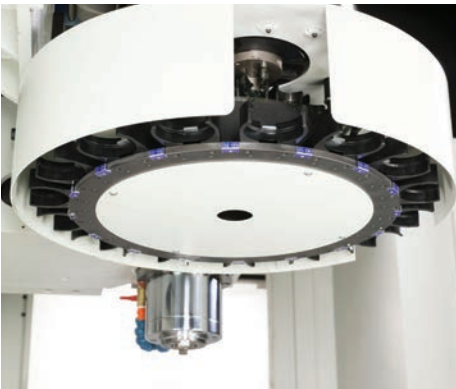
- Four precision angular contact bearings
- ABEC 9, P2 (radial run out)
- Permanently lubricated – requires no maintenance

Features



Telescoping Covers

Protects all linear guides, ballscrews and motors.



Tool Carousel

16-station carousel tool changer



Fluid Pumps

Dual 0.68 hp pumps provide coolant for machining and the built-in wash down nozzles.



Air and Spray Guns

Convenient built-in air and spray guns



NEMA 12

NEMA 12 (equivalent) houses the clean, well-organized control and machine electrical systems.



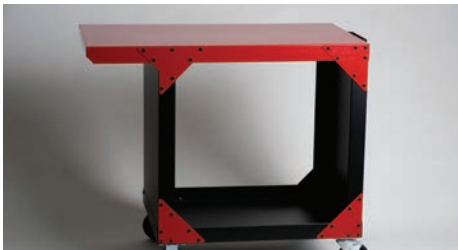
Chip Auger

System Options



4th Axis

The 4th axis hardware is mounted on fixture plates for easy setup.



Fixture Cart

High quality cart by Huot Manufacturing. Lip height and length matches TRAK LPM table position during fixture change.



Mobile Tool Setting Cart

One comes with every TRAK LPM, you would buy this only if you want an additional cart



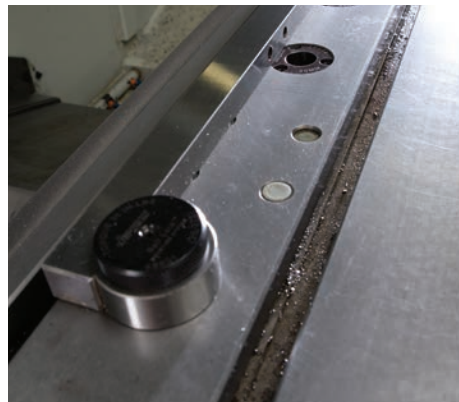
Vise Stop

Includes mag base and 1", 2" & 3" extensions



Ball Lock Liners (Set of Eight)

For fixture plates. High precision for Primary Locating and lower precision for secondary locations.



Ball Lock Locating Guide Assembly

For locating your current fixtures on the TRAK LPM table using the ball lock system and locating holes on the table. Includes three stops.



Ball Lock Clamping Device

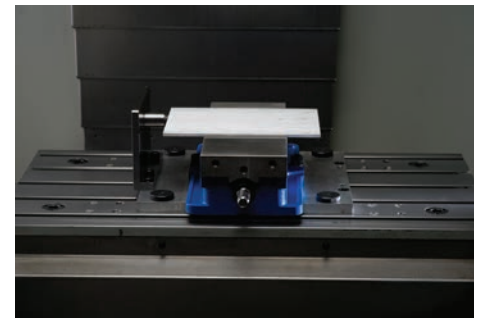
Set of 4 (4 also come standard)



Fixture Plate

Precision plate with primary liners. Comes in three sizes:

- Small (shown above) - 16" x 15.5"
- Medium - 16" x 24"
- Large - 16" x 32"



Fixture Plate Set Up For Kurt D675 Vise

Includes plate, fence, stop and hardware. Does not include vise.



Retention Knobs (Cat 40)

Set of 16 (Shown installed)

Features and Specifications

LPM Specifications

Overall L x W x H	13.1' X 7.4' X 8.6'
Table size	35 3/8" X 19 5/8"
Tee slots:	5 x .71" x 3.94"
no. x width x pitch	
Table max load	1000 lbs.
Travels: X x Y x Z	31" x 18.5" x 21"
Max spindle	24"
nose to table	
Min spindle	3 3/8"
nose to table	
Max clearance	19 1/4"
spindle center	
to column	
Max Rapid speed	800 x 800 x 700
X x Y x Z ipm	
Electrical	208-240V / 78 amps
requirements	or
	415-440V / 44 amps
	(requires optional
	transformer)
Tool holder type	CAT40
Max RPM	8000
Tool Capacity	16
Max tool weight	15 lbs
incl holder	
Max tool diameter	3.14
Tool clamping	1500 lbs
force (at 90psi)	
Tool carousel	18"
to table	
HP Peak	15
HP Continuous	10
Weight/Shipping Lbs.	7650 / 8000

Standard Features

- Internal wash down nozzles
- Air gun
- Wash down gun
- Halogen work lights
- Auto lube system
- Mobile Tool setting system (incl. cart)
- Belt drive spindle
- Coolant pump
- Wash down pump
- Fixture clamping devices – set of 4
- Status lights
- Rigid tapping
- Chip Auger (accommodates a third party 12" oil skimmer)
- Air blast to clear chips from spindle
- Coolant tank 45 gal.

Options

- Integrated 4th Axis
- Fixture Cart
- Fixture plates – small, medium and large
- Vise fixture kit – fixture plate, fence, stop
- Vise Stop Assembly – incl 1", 2", 3" extensions
- Fixture clamping devices – additional set of 4
- Sets of ball lock liners, primary and secondary
- Ball lock locating guide
- Retention knobs – CAT 40 – set of 16
- Offline programming
- DXF File converter
- Parasolid file converter
- Transformer 440 to 220
- BT40 ATC grippers

ProtoTRAK PMX Hardware Specifications

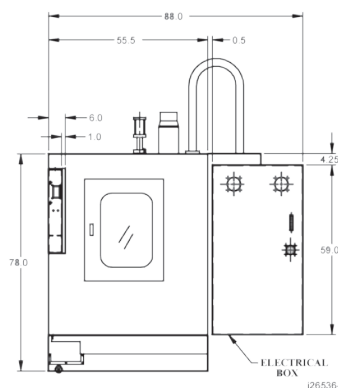
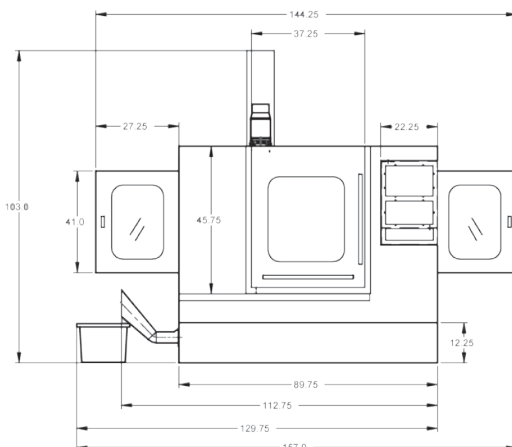


- Jog wheel for TRAKing and positioning
- 12.1" color active-matrix screen
- Industrial-grade Celeron® processor
- 512 MB Ram
- 4 User USB connectors
- Override of program feedrate
- LED status lights built into display
- RJ45 Port with 10/100 Ethernet
- Override of program spindle speed
- 4th axis interface

Software Features - General Operation

- Clear, uncluttered screen display
- Prompted data inputs
- English language – no codes
- Soft keys - change within context
- Windows® operating system
- Color graphics with adjustable views
- Inch/mm selectable
- Convenient modes of operation
- Absolute Home location
- Spindle load indicator
- Reference to ball lock locations on table
- Dimension reference indicator
- Selectable view between Current and Staged programs

Overall Dimensions



* Dimensions in inches

DRO Mode Features

- Incremental and absolute dimensions
- Jog with selectable feed rates
- Powerfeed X, Y or Z
- Servo return to 0 absolute
- Go To Dimensions from convenient reference
- Spindle speed setting with manual override
- Selectable handwheel resolution
- Convenient choice of dimensional references:
Machine Home, Part Zero, Abs Zero or Ball lock locations

Program Mode Features

- Auto Geometry Engine
- Geometry-based programming
- Tool Path programming
- Scaling of print data
- Multiple fixture offsets
- Programming of Auxiliary Functions
- Event Comments
- Three-axis Geometry conversational programming
- Incremental and absolute dimensions
- Automatic diameter cutter comp
- Circular interpolation
- Linear interpolation
- Look –graphics with a single button push
- List step – graphics with programmed events displayed
- Alphanumeric program names
- Program data editing
- Program pause
- Conrad – automatic corner radius
- Programmable spindle speeds
- Math helps with graphical interface
- Auto load of math solutions
- Tool step over adjustable for pocket routines
- Pocket bottom finish pass
- Selectable ramp or plunge cutter entry
- Subroutine repeat of programmed events
- Nesting
- Rotate about Z axis for skewing data
- Copy
- Copy rotate
- Copy mirror
- Tool data entry in event programming
- Selectable retract in Bore operations

Auxiliary Functions

- Coolant on/off
- Air on/off
- Pulse indexer (interface for a third party indexer)
- Part change table position

Canned Cycles

- Position
- Drill
- Bolt Hole
- Mill
- Arc
- Circle pocket
- Rectangular pocket
- Irregular Pocket
- Circular profile
- Rectangular profile
- Irregular Profile
- Circle Island
- Rectangular Island
- Irregular Island
- Helix
- Thread milling
- Engrave
- Tapping
- Face Mill

Edit Mode Features

- Delete events
- Erase program
- Spreadsheet editing
- Global data change
- G-Code editor
- Clipboard to copy events between programs
- Move between subprograms in a master program

Program Set Up Mode Features

- Verify Machining Simulation
- Advanced tool library
- Tool names
- Tool length offset with modifiers
- Tool path graphics with adjustable views
- Program run time estimation clock
- Convenient part/fixture management screen
- Fixture offsets
- Part offsets within fixture
- Convenient manual tool handling when tools required exceed ATC capacity
- Photo storage and display
- Notes
- Z Safety Dimension to prevent crashes
- Tool Crib
- Tool by Tool or Part by Part run strategy
- Convenient Tool Reconciliation between programs and ATC
- Convenient ATC capacity

Machine Set Up Mode Features

- Advanced diagnostic routines
- Software travel limits set in the factory
- Prompted Tool loading and ATC Management
- Checklist to assure nothing is forgotten

Run Mode Features

- TRAKing
- 3D G code file run with tool comp
- Real time run graphics with tool icon
- Countdown clock/run time estimator
- Error alarms prevent Run when set up steps are skipped
- Work on Staged programs while Current program runs

Program In/Out Mode Features

- CAM program converter
- Converter for prior-generation ProtoTRAK programs
- DXF/DWG file converter (Optional)
- Selection of file storage locations
- Automatic file back-up routine
- Preview graphics for unopened files
- Networking
- Create Master routine for combining programs
- Transfer of Staged program to Current
- Tool reconciliation for Master Programs
- Parasolid file converter (optional)

Control Options

Parasolid File Converter

- Import and convert 3D CAD data into ProtoTRAK programs
- Chaining

DXF File Converter

- Import and convert 2D CAD data into ProtoTRAK programs
- DXF or DWG files
- Chaining
- Automatic Gap Closing
- Layer control
- Easy, prompted process that can be done at the machine

CAM Out Converter

- Save ProtoTRAK files as CAM files for running on different controls

4th Axis Option

Hardware and software that allows true 4th axis interpolation. Includes indexer, tailstock and fixture plate.

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