

# DynaPath VKT KNEE MILLS

3-Axis CNC for Job Shops, Tool Rooms and Small Lot Production

Featuring Automatic Tool Changer + Rigid Tapping + Versatile Programming



# VKT Knee Mill

The VK-T Knee Mill is a **versatile CNC milling machine** for manual and semi-automatic jobs, while also **capable of fully automatic CNC operation**. It operates quietly with fully direct drive X, Y, Z, and spindle, while saving space with its knee mill frame. It is the ideal machine for **garage shops, tool rooms, design or prototyping operations, and light duty manufacturing**.

- **Featuring a 4-Way Tool Changer.**
- **Standard peck rigid tapping and peck drilling cycles.**
- **Standard 40-Taper, 6000 RPM direct-drive spindle with dual winding.**
- Standard direct-drive XYZ axis.
- Standard automatic lubrication and automatic coolant systems.
- Standard table-top enclosure, splash guard, and drip pan.
- Standard MPG Handwheel.
- Optional X, Y, and Z axis digital handwheels.
- Optional 4<sup>th</sup> Axis rotary axis capable of simultaneous motion.



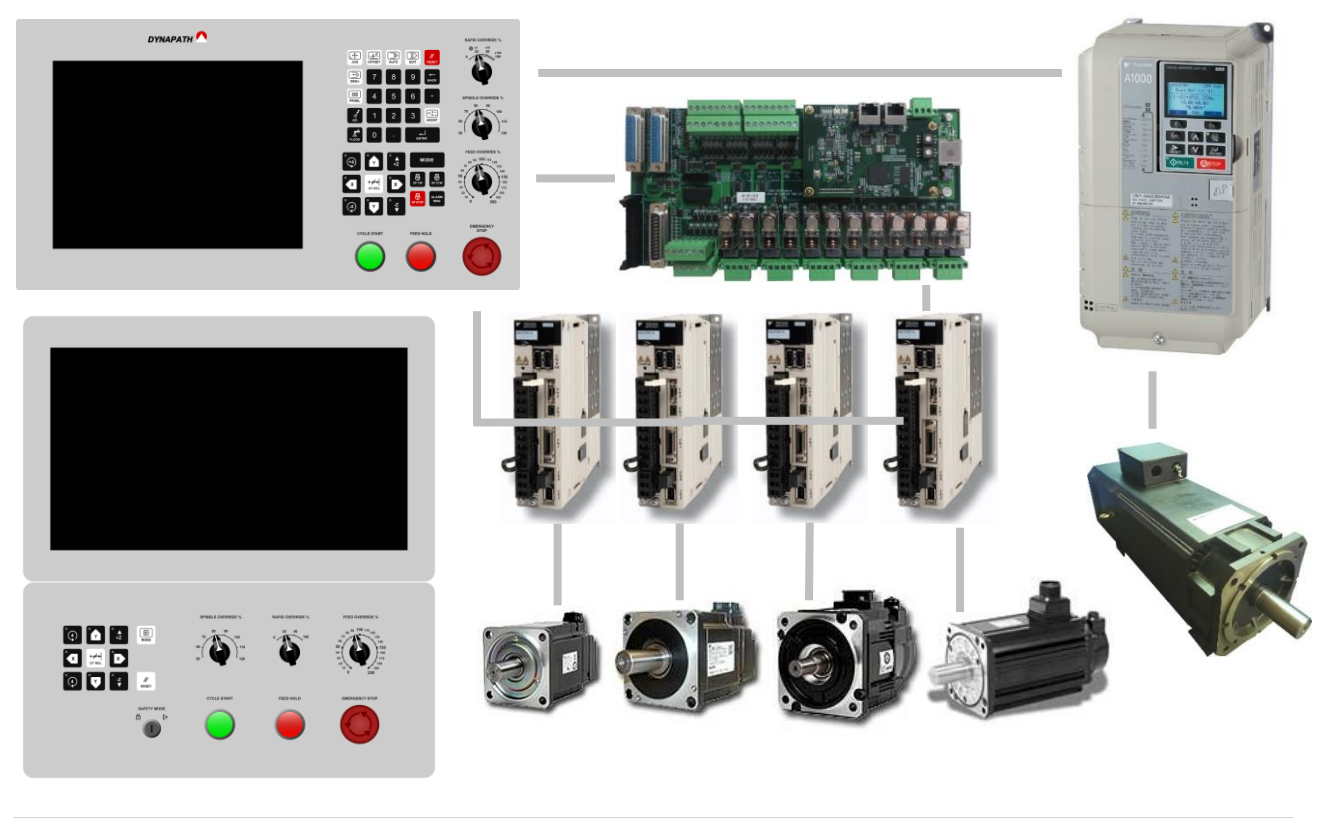
## DynaPath WinDelta CNC



- 12.1" LCD touchscreen display
- USB and Networked File Transfer
- Remote Diagnostics and Support

The **DynaPath WinDelta control system** enables the machine to be operated manually in **DRO Mode**, by teaching positions and commands in the **Semi-Auto Mode**, or by running **G-Code programs in full Auto Mode**. Programs can be created with the built-in **Conversational + DXF Editor**, or by direct **G-Code programming**.

# DynaPath WinDelta® Control System



## CNC Hardware Specifications

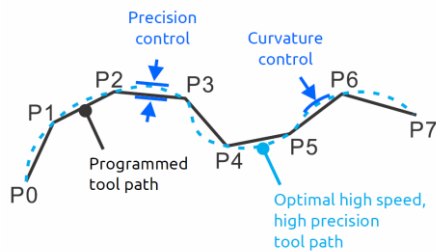
<b>Control</b>	• WinDelta-M CNC	<b>Handwheel</b>	• 8-Function Remote Jog Unit (MPG)
<b>Storage</b>	• 4 GB SSD	<b>Axis Control</b>	• 4-axis simultaneous
<b>Serial Ports</b>	• RS232, RS422/RS485	<b>Standard I/O</b>	• 32 DI/12RO/8SO
<b>Networking</b>	• T10/T100 Ethernet Port	<b>Expansion I/O</b>	• 8DI/20SO
<b>Device Inputs</b>	• 1x PS/2, 2x USB 2.0	<b>Power Input</b>	• 24 VDC
<b>Display</b>	• 12.1"/15.6" LCD Display		
	• Resistive Touch Display		
	• 400 cd/m <sup>2</sup> Luminance		
<b>Operating Panel</b>	• D1, D10 Type Console		

## Environmental Specifications

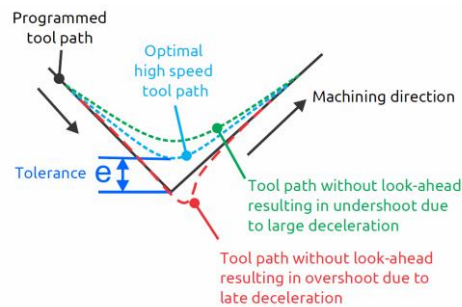
<b>Operating Temp</b>	• 0 to 50 °C (0 to 122 °F)	<b>Vibration</b>	• 16.7 Hz: acceleration of 1.5G
<b>Storage Temp</b>	• -20 to 60 °C (-4 to 140 °F)		• 10 to 57 Hz: amplitude of 0.075 mm
<b>Operating Humidity</b>	• 5% to 85% RH, non-condensing		• 57 to 150 Hz: acceleration of 1G
		<b>EMI/EMS</b>	• 1.5 kV CE certified

# Advanced Path Planning with Look Ahead and Feed Forward

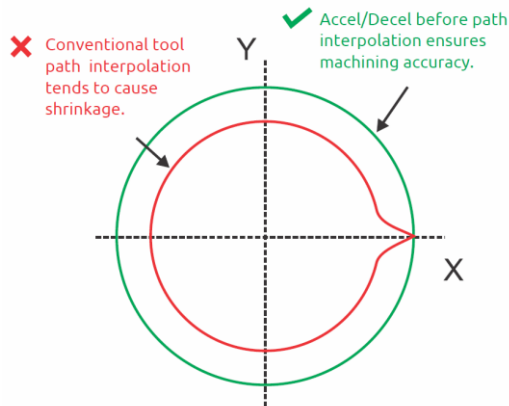
**Path Smoothing** algorithms provide precision control and curvature control. The result is the optimal tool path for speed and precision.



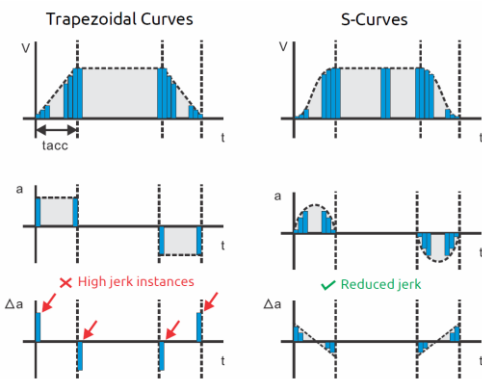
**Look Ahead** anticipates upcoming programmed motion, and plans the optimal trajectory in real time up to 1000 blocks.



**Smart Interpolation** ensures machining accuracy by performing acceleration and deceleration before path interpolation.

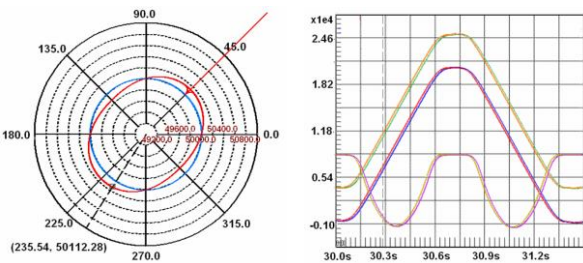


**Jerk Reduction** is performed by using trapezoidal or S-curve acceleration and deceleration, allowing smoother motion, higher machining speeds, and helps protect against machine wear.



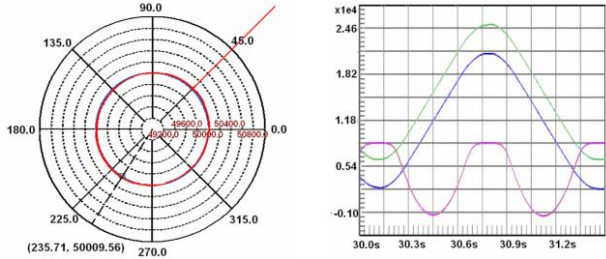
## Without Feed Forward and Friction Compensation

XY and Z axes motion accuracy is prone to in correctable position errors, as demonstrated in the following plots on a circular tool path of 28.3mm diameter, at 8 m/min feed rate. In this case the final trajectory has a maximum position error exceeding 20  $\mu\text{m}$  and more than 6  $\mu\text{m}$  reversal spikes are presented.



## With Feed Forward and Friction Compensation

XY and Z axes motion accuracy is greatly increased, as demonstrated in the following plots on a circular tool path of 28.3 mm diameter, at 8 m/min feed rate. The final trajectory has a maximum position error within 5  $\mu\text{m}$  and the reversal spikes are less than 2  $\mu\text{m}$ .



WinDelta® CNC is the most versatile control for all your many operations:

Semi-Automatic + Conversational Programming + G-Code

SEMI-AUTOMATIC OPERATION

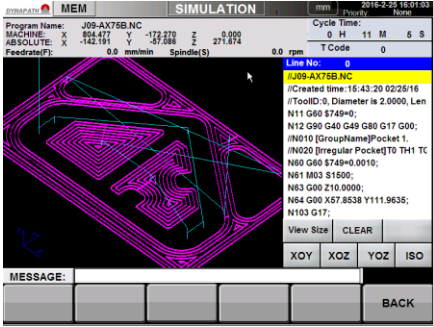
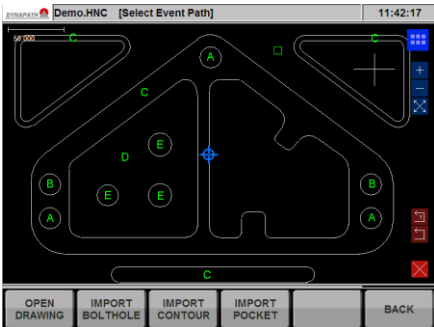
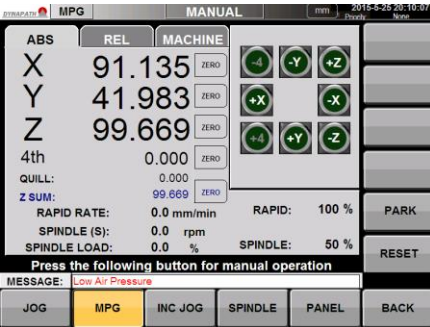
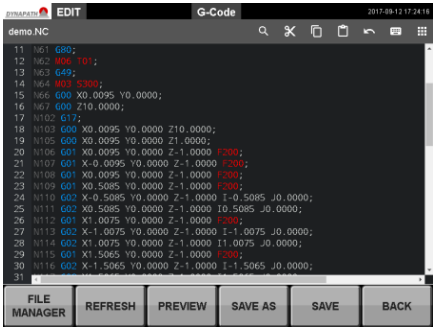
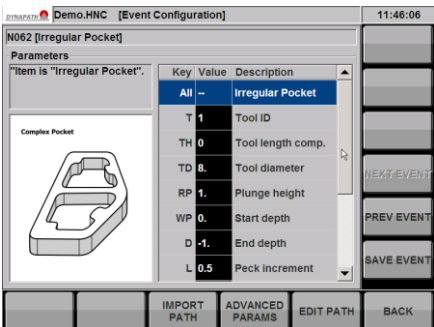
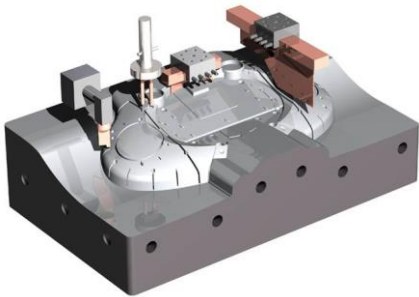
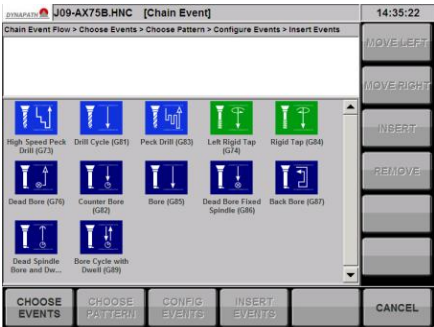
For quick and simple jobs, or work requiring the skilled hands of an experienced machinist, **Semi-Automatic Operation** functionality offers operators the most **friendly and familiar** way to do the job.

CONVERSATIONAL PROGRAMMING

For general parts and jobs, the **Conversational Editor with DXF Import** enables any operator to generate part programs without writing G-Code, oftentimes faster than it takes to set up for the part.

CAD/CAM G-CODE

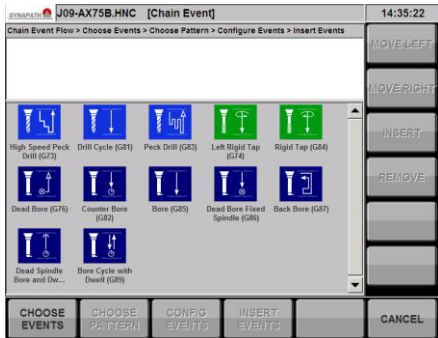
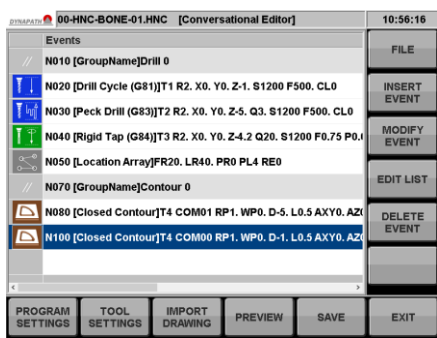
For CAD/CAM users, simply post-process to standard **ISO/EIA G-Code**, then send the program via **USB or networked file transfer** to the control, and fully leverage the power of CNC production.





# DynaPath WinDelta® Programming

## Conversational Programming + DXF Import + G-Code Editing

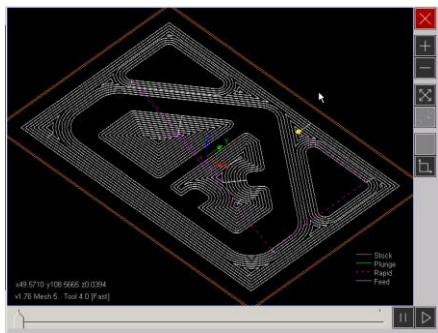
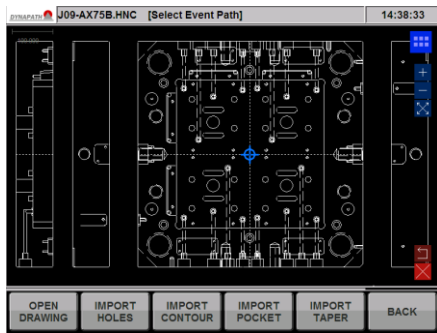
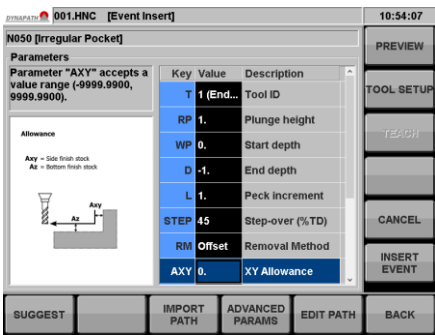
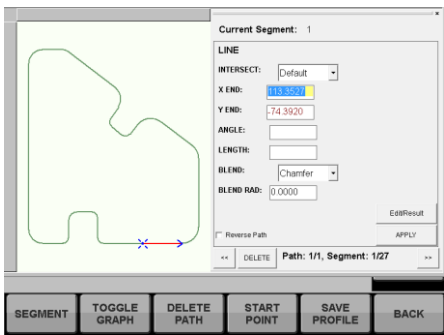


**Conversational Event Based Programming** allows making part programs by simply choosing machining events and configuring its parameters, without having to write G-Code.

**Built-in Events** include standard drill, bore, tap, contour, pocket, helix, pattern, setup, and auxiliary events.

**Smart Profile Editor** allows quick and easy path creation and assists with geometric calculations.

**Conversational Graphics** convey detailed information about event parameters using graphical illustrations to assist with data entry.

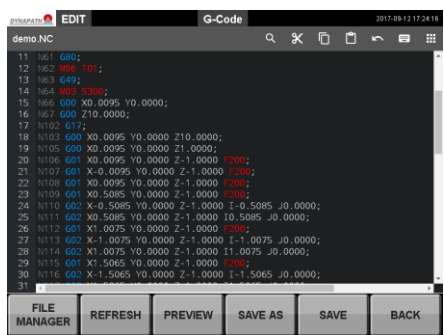


**DXF Drawing Import** allows direct geometry import from CAD drawings via an intuitive, touchscreen interface, saving programming time and reducing errors.

**Preview Simulation** allows visual inspection of generated tool paths and final dimensions.

**G-Code Editor** enables ISO/EIA G-Code editing for writing standard G-Code part programs or to fine tune CAD/CAM posts.

**File Manager and Server** allows USB file transfer and Networked FTP file management of all part programs and drawings on the control.



VKT KNEE MILL SPECIFICATIONS					
SPECIFICATION		VKT-3	VKT-3T	VKT-4	VKT-4T
AXES	XYZ TRAVEL	700 x 310 x 120 mm (27.5" x 12.2" x 4.7")	700 x 310 x 120 mm (27.5" x 12.2" x 4.7")	900 x 340 x 120 mm (35.4" x 13.3" x 4.7")	900 x 340 x 120 mm (35.4" x 13.3" x 4.7")
	AXES TYPE X/Y/Z	Dove / Dove / Quill	Dove / Dove / Linear	Dove / Dove / Quill	Dove / Dove / Linear
	KNEE TRAVEL (Z)	350 mm (13.7")			
	SPINDLE NOSE TO TABLE	100-400 mm (3.9-15.7")			
	TOOL TO COLUMN	360 mm (14")			
	MOTORS X/Y/Z	0.85 / 0.85 / 0.85 kW Direct Drive			
SPINDLE	DIAMETER	100 mm (3.94")	120 mm (4.72")	100 mm (3.94")	120 mm (4.72")
	RPM	50-4000 RPM	50-6000 RPM	50-4000 RPM	50-6000 RPM
	DRIVE METHOD	Belt	Direct	Belt	Direct
	TAPER	BT40 / CAT40			
	MOTOR	3.75 kW (5 HP) Rated			
	RATED TORQUE	24 N-m (17.7 ft-lb)			
ATC	TOOL CHANGER	---	4-Station Arm	---	4-Station Arm
MOTION	MAX RAPID SPEED X/Y/Z	6000 mm/min (230 IPM)	6000 mm/min (230 IPM)	6000 mm/min (230 IPM)	6000 mm/min (230 IPM)
	POSITIONING ACCURACY	±0.02 um (0.000787")			
	REPEAT ACCURACY	±0.01 um (0.000394")			
TABLE	TABLE SIZE	1270 x 320 mm (50" x 12")		1470 x 320 mm (57" x 12")	
	SLOTS x OFFSET x WIDTH	3 x 65.3 mm x 16 mm (3 x 2.57" x 0.63")		3 x 75 mm x 16 mm (3 x 2.95" x 0.63")	
	MAX TABLE LOAD	220 kg (480 lbs)			
SIZE	MACHINE L x W x H	1800 x 1600 x 2300 mm (71" x 63" x 91")	1800 x 1600 x 2300 mm (71" x 63" x 91")	2000 x 1800 x 2300 mm (79" x 71" x 91")	2000 x 1800 x 2300 mm (79" x 63" x 91")
	FOOTPRINT L x W x H	2400 x 1600 x 2650 mm (95" x 63" x 105")	2400 x 1600 x 2650 mm (95" x 63" x 105")	2600 x 1800 x 2650 mm (103" x 71" x 105")	2600 x 1800 x 2650 mm (103" x 71" x 105")
	MACHINE WEIGHT	1600 kg (3520 lbs)	1600 kg (3520 lbs)	1800 kg (3960 lbs)	1800 kg (3960 lbs)
INSTALL	AIR REQUIREMENTS	6 kg/cm² (90 psi)			
	POWER REQUIREMENTS	8 kVA, 3 Phase, 220V			

CONTROL SPECIFICATIONS	MACHINE FEATURES	ADDITIONAL OPTIONS
<ul style="list-style-type: none"> <li>12.1" Touchscreen LCD Display</li> <li>4 GB Program Storage</li> <li>2 USB, 1 LAN</li> <li>4-Axis Synchronous</li> <li>4th Axis Rotary Table Optional</li> <li>DRO Operation</li> <li>ISO G-Code Motion Interpreter Core</li> <li>Shop Floor Conversational Programming</li> <li>DXF Drawing Import via Touch</li> <li>File Send / Receive thru LAN / USB</li> <li>FTP Networked File Transfer</li> <li>Remote Diagnosis &amp; Support</li> <li>Remote Monitoring and Reporting</li> <li>500 Block Look Ahead</li> <li>Program Retrace, MPG Run</li> </ul>	<ul style="list-style-type: none"> <li>Automatic 4-Way Tool Changer</li> <li>CNC Rigid Tapping</li> <li>Z-Axis CNC Controlled Quill</li> <li>C3 Class Precision Ball Screws</li> <li>Manual Table Height Crank</li> <li>Auto Lubrication System</li> <li>Air/Flood Coolant System</li> <li>Table Top Enclosure</li> <li>Splash Guard</li> <li>Coolant Drip Pan</li> <li>Way Covers</li> <li>LED Work Light</li> <li>Power Tool Clamp Draw Bar</li> <li>Tools and Toolbox</li> <li>One Year Warranty on All Parts</li> </ul>	<ul style="list-style-type: none"> <li>Power Table Height Elevator</li> <li>4th Axis Rotary Table</li> <li>Independent X, Y axis digital handwheels.</li> </ul>



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