



ZPS-CNC USA, Inc.



# HSM-SERIES MILLS

3-Axis CNC Milling for Contouring and High Surface Finish Operations

Featuring High Speed Spindle + Standard G-Code + Advanced Path Planning



ZPS-CNC USA, Inc. Burlington, WI  
sales@zpsusa.com

The HSM-Series are production level machines specialized in the high speed machining of electrodes, molds, and general parts.

## DESIGNED FOR SPEED AND FINISH

Featuring a rigid fixed double column frame, linear rails, and a high speed spindle, the HSM-Series machines can produce excellent surface finishes for your parts with faster cycle times, while simultaneously reducing or eliminating subsequent grinding or polishing work.

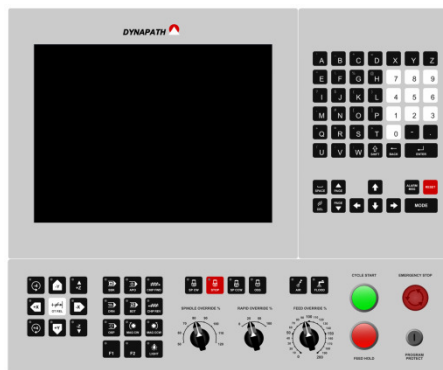


## POWERFUL, FRIENDLY CONTROL

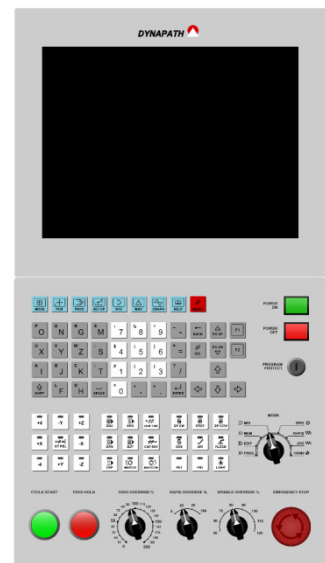
The DynaPath WinDelta Control offers high speed contouring features, such as program look-ahead, path smoothing, and vibration control, all designed specifically for a high quality surface finish.

A choice of operating panel style featuring a mode switch dial or a mode select button provides a friendly operating experience.

### D5 CONSOLE



### D2 CONSOLE



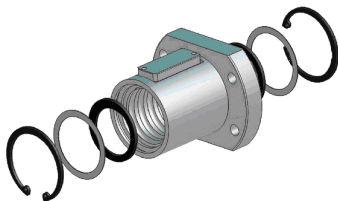
# The HSM Graphite Package enables the machining of graphite and metals.

## DESIGNED FOR GRAPHITE MACHINING

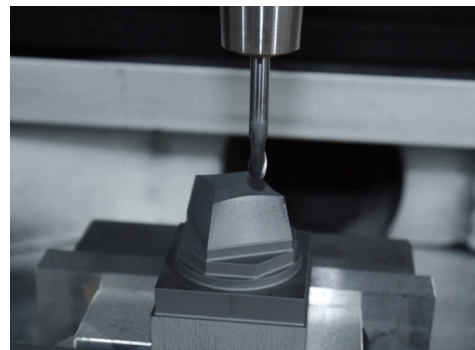
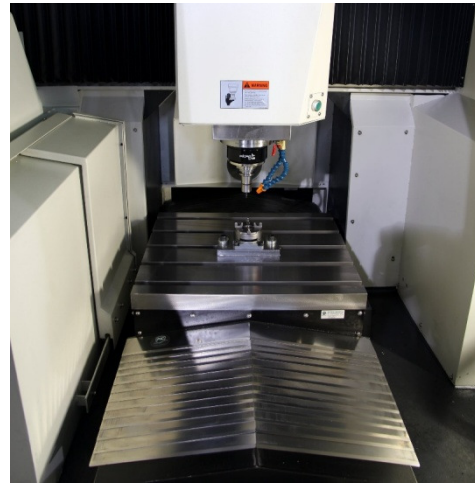
Graphite machining requires special consideration towards the protection of moving parts on the machine from abrasive graphite particles. The collection and filtering of airborne graphite dust is also crucial for safe operation. The HSM Graphite Package combines a redesign of critical components with an industrial filtration system specifically for graphite machining.



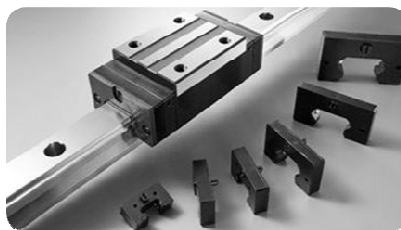
Redesigned ball screw holding assembly isolates the screws and motors.



The low vibration, high speed spindle is protected with a fully isolating air curtain and utilizes grease lubrication.



Specially designed way guides consisting of dual wipers and sealed coupling protect against abrasive dust.

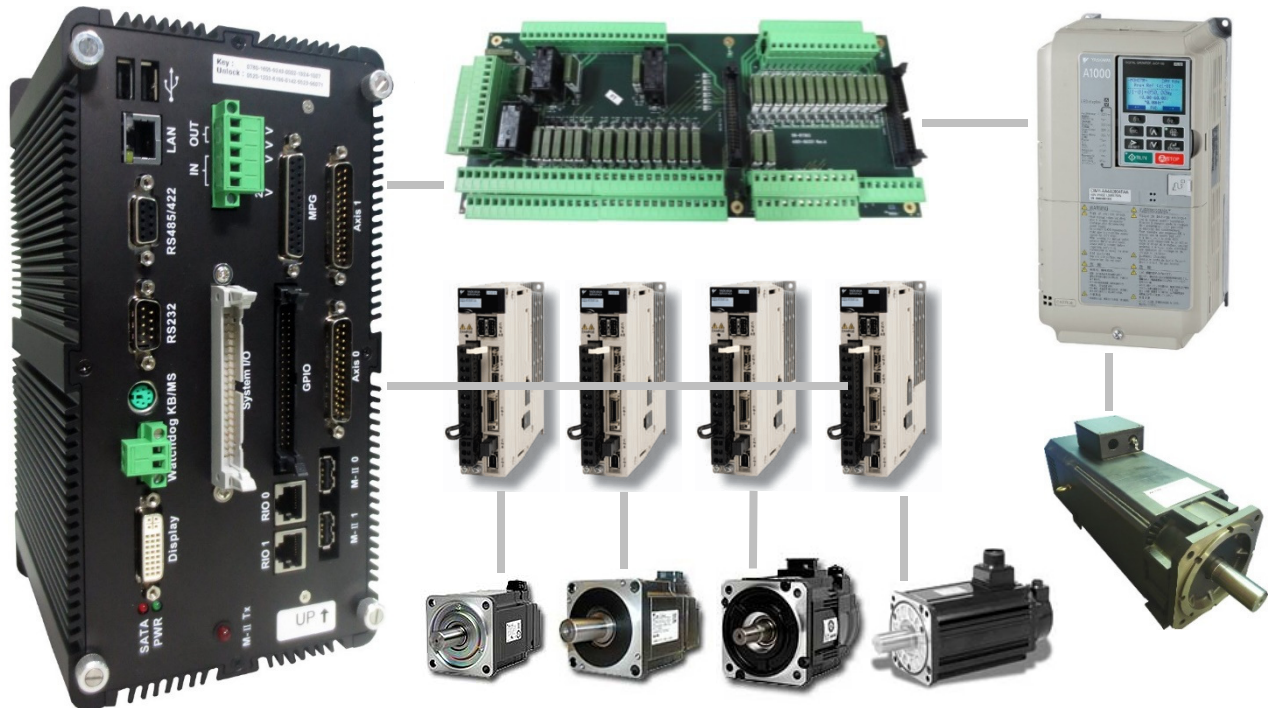


An industrial grade micron level filtration unit removes airborne dust and maintains a clean shop environment.





## DynaPath WinDelta Control System



## CNC Hardware Specifications

<b>CPU</b>	• Intel Atom D2550
<b>Memory</b>	• 2 GB DDR3
<b>Storage</b>	• 16 GB SSD/*64 GB SSD
<b>Serial Ports</b>	• RS232, RS422/RS485
<b>Networking</b>	• T10/T100 Ethernet Port
<b>Device Inputs</b>	• 1x PS/2, 2x USB 2.0
<b>Display</b>	• 10.4"/12.1" TFT LCD
	• Touch Display
	• 400 cd/m <sup>2</sup> Luminance
<b>Operating Panel</b>	• MDI 1 <sup>st</sup> Panel + 2 <sup>nd</sup> Panel

<b>Handwheel</b>	• 8-Function Remote Jog Unit (MPG)
<b>Axis Control</b>	• 5 axis at 0.5 ms servo update rate
	• 13 axes at 1 ms servo update rate
<b>Standard I/O</b>	• 59 DI/33 DO
	• 6-channel D/A
	• *5 Channel A/D Optional
<b>Expansion I/O</b>	• 2x Remote I/O ports (64I/64O each)
<b>Power Input</b>	• 24 VDC

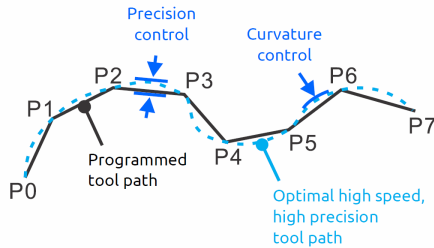
## Environmental Specifications

<b>Operating Temp</b>	• 0 to 50 °C (0 to 122 °F)
<b>Storage Temp</b>	• -20 to 60 °C (-4 to 140 °F)
<b>Operating Humidity</b>	• 5% to 85% RH, non-condensing

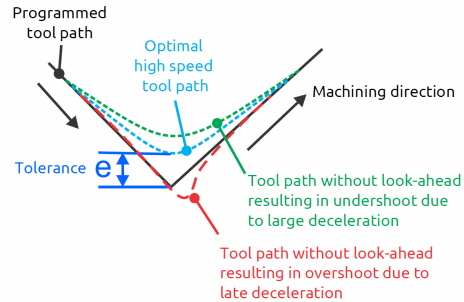
<b>Vibration</b>	• 16.7 Hz: acceleration of 1.5G
	• 10 to 57 Hz: amplitude of 0.075 mm
	• 57 to 150 Hz: acceleration of 1G
<b>EMI/EMS</b>	• 1.5 kV CE certified

# Advanced Path Planning with Look Ahead and Feed Forward

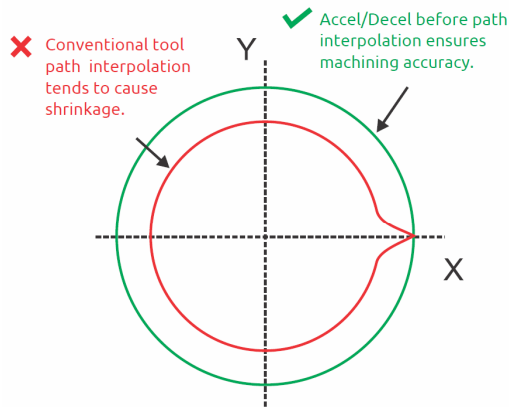
**Path Smoothing** algorithms provide precision control and curvature control. The result is the optimal tool path for speed and precision.



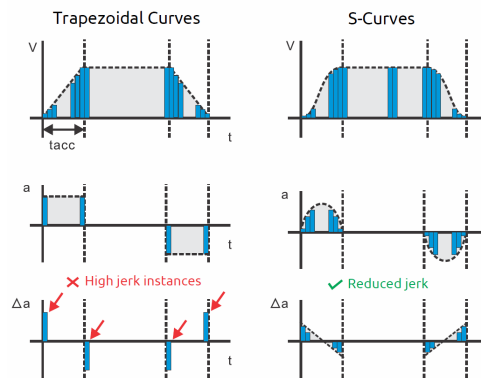
**Look Ahead** anticipates upcoming programmed motion, and plans the optimal trajectory in real time up to 1000 blocks.



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

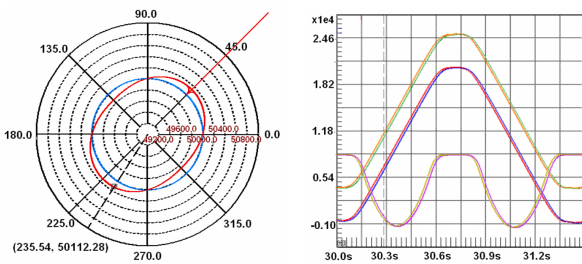


**Jerk Reduction** is performed by using trapezoidal or S-curve acceleration and deceleration, allowing smoother motion, higher machining speeds, and helps protect against machine wear.



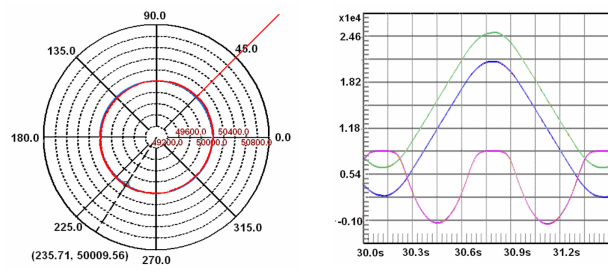
## Without Feed Forward and Friction Compensation

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:

## Quick Set Up + Standard G-Code Post + Quality Finish

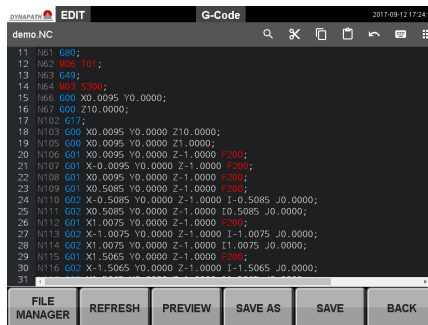
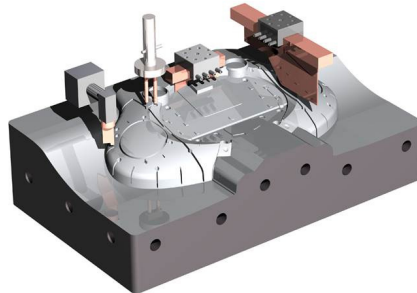
### QUICK, EASY, AND ACCURATE SETUP

Automatic tool setter and spindle probe options enable quick and accurate setting up of parts. **Special Center Finding** and **Tool Setting screens** make set up friendly and efficient, so you spend less time setting up and more time cutting.



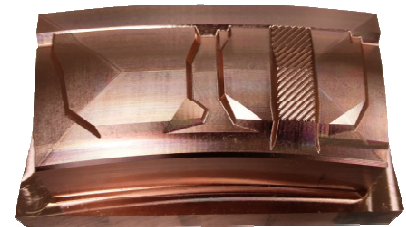
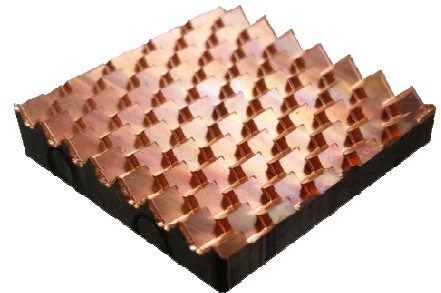
### STANDARD CAD/CAM G-CODE

Simply post-process to standard **ISO/EIA G-Code** in the CAD/CAM system of choice, then send the program via **USB, FTP, or networked file sharing** to the control, and fully leverage the power of CNC production.

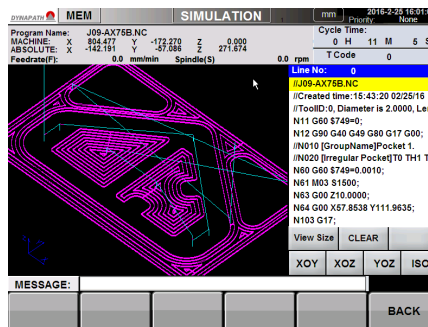


### HIGH SPEED QUALITY FINISH

With **advanced path planning** and **vibration control**, programs can be run with higher stable feed rates and thus **produce quality surface finishes at fast cycle times**. Eliminate or alleviate post machining work such as polishing, sanding, and grinding.



JOG		WORK OFFSET							
		G54 (REF A)	G55 (REF B)	G56 (REF C)	G57 (REF D)	G58 (REF E)	G59 (REF F)		
X	266.923	550.000	295.159	295.159	295.159	295.159	295.159	X AXIS	
Y	-233.813	-320.000	-129.728	-129.728	-129.728	-129.728	-129.728	Y AXIS	
Z	-133.120	-500.000	-65.044	-65.044	-65.044	-65.044	-65.044	Z AXIS	
4th	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
		EXOFS	MACHINE	RELATIVE	ABSOLUTE				
X	0.000	358.058	358.058	91.135					
Y	0.000	-191.830	-191.830	41.983					
Z	0.000	-33.451	-33.451	99.669					
4th	0.000	0.00	0.00	0.00					
		SPINDLE (S):	0.0 rpm						
		FEED RATE:	0.0 mm/min						
		SPINDLE LOAD:	0.0 %						
		G54	0.000	+ Enter					
MESSAGE:									
JOG	MPG	TOOL TABLE	ATC TABLE	ALIGN	BACK				



ZPS-CNC USA, Inc. Burlington, WI  
sales@zpsusa.com

HSM-SERIES MACHINES - SIZE AND SPECIFICATIONS			
	MODEL	HSM-430	HSM-650
TRAVEL	X-AXIS TRAVEL	400 mm (15.75")	600 mm (23.62")
	Y-AXIS TRAVEL	300 mm (11.81")	500 mm (19.69")
	Z-AXIS TRAVEL	220 mm (8.66")	270 mm (10.63")
	NOSE TO TABLE	60 - 290 mm (2.36" - 11.42")	130 - 400 mm (5.12" - 15.75")
SPINDLE	SPINDLE TAPER	ISO25	BT30
	SPINDLE RPM	24000 RPM	24000 RPM
	SPINDLE POWER	4.8 kW (7.5 HP)	7.5 kW (10 HP)
	SPINDLE TORQUE	2.6 Nm (3.53 lbs-ft)	6 Nm (8.13 lbs-ft)
	COOLING SYSTEM	Oil-Air	Oil-Air
ATC	ATC TYPE	Carousel	Carousel
	MAGAZINE SIZE	10 Tools	12 Tools
	MAX TOOL DIAMETER	12 mm (0.47")	16 mm (0.63")
	MAX TOOL LENGTH	100 mm (3.94")	110 mm (4.33")
TABLE	TABLE SIZE (W x H)	400 x 350 mm (15.75" x 13.78")	600 x 500 mm (23.62" x 19.69")
	TABLE SLOTS	4	5
	TABLE SLOT OFFSET	100 mm (3.94")	100 mm (3.94")
	TABLE SLOT WIDTH	14 mm (0.55")	16 mm (5/8")
	MAX TABLE LOAD	250 kg (550 lbs)	350 kg (770 lbs)
MOTION	AXIS X TYPE, POWER	Linear, 0.85 kW	Linear, 1.3 kW
	AXIS Y TYPE, POWER	Linear, 0.85 kW	Linear, 1.3 kW
	AXIS Z TYPE, POWER	Linear, 0.85 kW with brake	Linear, 2.0 kW with brake
	RAPID SPEED	15 m/min (590 IPM)	15 m/min (590 IPM)
	CUTTING FEED	7.5 m/min (295 IPM)	7.5 m/min (295 IPM)
MACHINE	MACHINE WEIGHT	2300 kg (5060 lbs)	3200 kg (7040 lbs)
	DIMENSIONS (L x W x H)	170 x 200 x 220 cm (67" x 79" x 87")	220 x 230 x 230 cm (87" x 91" x 91")
	POWER REQUIREMENTS	3 Phase, 208 to 230 V, 50 A	3 Phase, 208 to 230 V, 50 A

CONTROL SPECIFICATIONS	MACHINE FEATURES	ADDITIONAL OPTIONS
<ul style="list-style-type: none"> <li>• 10.4"/12.1" Touchscreen LCD Display</li> <li>• 4 GB Program Storage</li> <li>• 2 USB, 1 LAN</li> <li>• 3-Axis Synchronous</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> <li>• MPG Handwheel</li> </ul>	<ul style="list-style-type: none"> <li>• Electrical Cabinet Heat Exchanger</li> <li>• 24,000 RPM Spindle, BT30, Embedded Type</li> <li>• 10/12 Tool Carousel Type ATC</li> <li>• Spindle Chiller Unit</li> <li>• Coolant Pump</li> <li>• Work Light</li> <li>• Tri-Color Light Post</li> <li>• Auto-Lubrication System</li> <li>• Coolant and Chip Recovery System</li> <li>• One Year Warranty on all Parts</li> <li>• CE Certified (for CE Required Regions)</li> </ul>	<ul style="list-style-type: none"> <li>• Tool Setter for Length Measurement</li> <li>• Tool Length, Diameter Measurement System</li> <li>• Spindle Probe System</li> <li>• 4th Axis Rotary Table Optional</li> </ul>