

# Nanotech 100UPG<sup>v1</sup> Specification Overview

General	Description
System Configuration	Ultra-Precision two, three or four axis CNC aspheric grinding system
Workpiece Capacity	100mm dia. in either XZ or XZB configuration (Grinding); 250mm dia. (Diamond Turning)
Base Structure	Monolithic composite polymer granite with integral coolant troughs
Vibration Isolation	3 point optimally located shear damped air isolation system with self-leveling
Computer System Specifications	Intel i5 2.4 GHz processor running Windows 7 Professional 64-bit with 16GB DDR3 1600MHz memory, 10/100/1000 Base-T external customer Ethernet connection, DVD RW Drive, 500GB 7200 RPM removable Hard Drive. Pendant features a 22" wide projected capacitive multi-touch display. Customer USB ports provided on front of PC and also on operator pendant.
Control System	Delta Tau 1GHz PowerPMAC Embedded Real-time 64-bit Linux Motion Controller with Nanotech's NEW Windows 7 based HMI with a Touch / Swipe Gesture Interactive display.
Programming Resolution	0.01 nanometer linear / 0.0000001° rotary
<b>Functional Performance</b> (As measured with laser interferometer & white light interferometer on <u>same</u> part)	Material – Tungsten Carbide Form Accuracy (P-V): ≤ 0.15µm – 12.7mm Diameter, 25mm Radius convex sphere. Surface Finish (Ra): ≤ 5.0 nanometers <i>(Important Notice: Both Form and Surface Finish are measured on the same part, same surface!)</i>

Workholding Spindle	Heavy Duty (Standard)
Type	Exclusive HD impact resistant graphite air bearing with center mounted thrust face
Liquid Cooling (optional)	To maintain thermal stability and tool center repeatability, a closed loop chiller provides recirculating temperature controlled water to cooling channels located around the motor and bearing journals of the air bearing spindle. The chiller has an integral PID controller which maintains temperature control to ± 0.5°F.
Speed Range	50 to 10,000 rpm, bi-directional (Speeds over 2,000 rpm require liquid cooling option)
Swing Capacity	Up to 100mm diameter with XZ or XZB grinding configuration - Up to 250mm diameter diamond turning configuration
Working Load Capacity (Radial)	85 Kg @ 7bar (185 lbs @ 100psi.) / 102 Kg @ 10bar (225 lbs @ 145psi.) @ spindle nose
Working Load Capacity (Axial)	197 Kg @ 7bar (435 lbs @ 100psi.) @ spindle nose
Axial Stiffness	228 N/µm @ 7bar (1,300,000 lbs/in @ 100psi) / 260 N/µm @ 10bar (1,500,000 lbs/in @ 145psi)
Radial Stiffness (@ spindle nose)	98 N/µm @ 7bar (560,000 lbs/in @ 100psi) / 140 N/µm @ 10bar (800,000 lbs/in @ 145psi)
Drive System	Frameless, Brushless DC motor
Motion accuracy	Axial: ≤ 12.5 nanometers      Radial: ≤ 12.5 nanometers

C-Axis (Rotational) - Work Spindle Option	
Positioning Accuracy	± 1.0 arc seconds (compensated)
Feedback Resolution	0.01 arc seconds
Maximum Speed (Positioning Mode)	3,000 rpm
Motion Accuracy	Axial ≤ 12.5nm (0.5µ")      Radial ≤ 12.5nm (0.5µ")

Grinding Spindle	Description
Type	Air Bearing (Requires optional chiller for liquid cooling)
Spindle Speed Range	5000 - 45,000 RPM
Axial Stiffness	60 N/µm (340,000 lbs/in)
Radial Stiffness (at nose)	20 N/µm (114,000 lbs/in)
Drive System	Frameless, Brushless DC motor
Motion Accuracy	Axial: ≤ 50 nanometers      Radial: ≤ 50 nanometers

Axes	X	Z	B (Rotational) - Option
Type	Fully constrained oil hydrostatic, box way slide	Fully constrained oil hydrostatic, box way slide	Oil Hydrostatic
Travel	330mm (13")	150mm (6")	360° (Bi-directional)
Drive System	Brushless DC Linear Motor	Brushless DC Linear Motor	Brushless DC motor
Feedback Type	Laser holographic linear scale	Laser holographic linear scale	Encoder
Feedback Resolution	0.008 nanometer	0.008 nanometer	0.002 arc seconds
Feed Rate (maximum)	2000mm/min	2000mm/min	50 rpm
Straightness / Motion Accuracy	0.3µm (12µ") Horizontal Plane	0.3µm (12µ") Horizontal Plane	Axial ≤ 0.1µm (4µ"), Radial ≤ 0.1µm(4µ")
Hydrostatic Oil Supply	Thermally controlled hydrostatic oil system with closed loop servo control and pressure accumulator to minimize pulsations.		

Utility Requirements	Air	Electrical	Machine Footprint (includes electrical cabinet)
For optimal cutting results, facility thermal stability should be held within ±0.5°C (±1.0°F)	7 to 10 bar (100-145psi) 280 liters/min (10 scfm) Dry to 10°C pressure dew point and pre-filtered to 10µm	230 VAC; 3 Phase; 50/60hz (11kVA)	1.9m W x 1.8m D x 1.7m H; Approx. 4,260 Kg (Enclosure & Utilities Cabinet included, but not control pendant. Contact Nanotech for complete overall detailed layouts.)
<b>Warranty</b>	1 year full parts and labor warranty		

*Note: In an effort to continually improve our product performance, specifications are subject to change without notice (Please consult your Sales Representative for our latest specifications).*