

# Nanotech 700UPF Specification Overview

April 1<sup>st</sup>, 2010

General	Description
System Configuration	Ultra-Precision two-axis CNC fly-cutting machine
Workpiece Capacity	300 mm X 610 mm (based on largest flycut tool holder with 350mm diameter tool swing)
Base Structure	Natural Black Granite – with integral slide channels and protective stainless steel apron
Vibration Isolation	Optimally located air isolation system with Self-Leveling
Control System	Delta Tau PC based CNC motion controller, operating in a Windows XP environment, with 19" color flat panel touch screen display. 1GB memory, AGP video 10/100 Base T Ethernet, CD-RW / DVD Drive, and 80GB hard drive. Total system mounted in NEMA 12 cabinet.
Programming Resolution	1 nanometer
<b>Functional Performance</b> (As measured on laser interferometer and white light interferometer)	Form Accuracy (P-V): $\leq 0.125\mu\text{m}$ – on a 75mm Diameter Test Part Surface Finish (Ra): $\leq 3.0$ nanometers on Electroless Nickel

Workholding Spindle	Heavy Duty (Standard)
Type	Fully constrained Professional Instruments groove compensated air bearing
Liquid Cooling (optional)	To maintain thermal stability, a closed loop chiller provides re-circulating 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 $\pm 0.5^\circ\text{F}$ . Flow is controlled by a solenoid integrated with the machine's CNC control.
Speed Range	50 to 10,000 rpm, bi-directional
Axial Stiffness	260 N/ $\mu\text{m}$ (1,500,000 lbs./in.) @ 145 psi
Radial Stiffness (at nose)	140 N/ $\mu\text{m}$ (800,000 lbs./in.) @ 145 psi
Drive System	Frameless, Brushless DC motor
Motion Accuracy	Axial: $\leq 25$ nanometers ( $1\mu\text{m}$ )      Radial: $\leq 25$ nanometers ( $1\mu\text{m}$ )

Linear Axes	X	Z (Vertical Axis)
Type	Fully constrained oil hydrostatic, box way slide	Fully constrained oil hydrostatic, box way slide
Travel	710mm (28")	300mm (12")
Drive System	Brushless DC Linear Motor	Brushless DC Servo Motor with a pre-loaded ballscrew and counterbalance
Feedback Type	Linear scale	Linear scale
Feedback Resolution	1 nanometer	1 nanometer
Feed Rate (maximum)	3000mm/min	1500mm/min
Straightness in critical direction	$\leq 0.1\mu\text{m} / 100\text{mm}$ (Vertical direction)	$\leq 0.3\mu\text{m}$ ( $12\mu\text{m}$ ) over full travel (Horizontal direction)
Hydrostatic Oil Supply	Compact, low flow, low pressure system with closed loop servo control and pressure accumulator to minimize pump pulsation.	

Available Options	Description
	Flycut Tool Holders (up to 350mm Tool Swing Diameter)
	Refrigerant chiller for work spindle
	Spray-mist coolant system
	Electronic Gage Head with Magnetic Stand
	On Screen Digital Gage Amplifier
	CNC Controlled Air Bearing A-axis for Polygon Indexing ( $< 1.0$ arc second positioning accuracy)
	Tip / Tilt Manual Adjustment Table for parts up to 12" diameter ( $\pm 3$ degrees of motion)
	Air Shower Temperature Control System
	Motorized B-axis for Tilt adjustment ( $+95 / -20$ degrees)

Utility Requirements	Air	Electrical	Floor Space
For optimal cutting results, facility thermal stability should be held within $\pm 0.5^\circ\text{C}$ ( $\pm 1.0^\circ\text{F}$ )	8 to 10 bar (115 - 145 psi) 280 liters/min (10 scfm) Dry to $10^\circ\text{C}$ pressure dew point and pre-filtered to $10\mu\text{m}$	230 VAC; 50/60hz; 3 Phase (35 amp)	1.75m wide x 1.75m deep x 1.60m high Approx. 2,650 Kg (Includes enclosure but not including peripheral equipment and control pendant)

<b>Warranty</b>	1 year full parts and labor warranty
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Note: In an effort to continually improve our product performance, specifications are subject to change without notice.