

Nanotech 250UPL Specification Overview

April 1st, 2010

General	Description
System Configuration	Ultra-Precision two, three, or four axis CNC contouring machine with "T" axis orientation.
Workpiece Capacity	250mm diameter x 200mm long (150mm diameter swing capability over the optional rotary B-Axis)
Base Structure	Natural Black Granite – with integral slide channels and protective stainless steel apron
Vibration Isolation	Optimally located passive air isolation system
Control System	Delta Tau PC based CNC motion controller, operating in a Windows environment, with 19" color flat panel touch screen display. 1 GB 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	0.01 nanometer linear / 0.0000001° rotary
Functional Performance (As measured with laser interferometer & white light interferometer on same part)	Material – High Purity Aluminum Alloy. Form Accuracy (P-V): ≤ 0.1µm / 75mm dia, 250mm convex sphere. Surface Finish (Ra): ≤ 2.0 nanometers (Note: Both accuracies measured on the same part.)

Workholding Spindle	Heavy Duty (Standard)
Type	Exclusive Professional Instruments axial & radial groove compensated air bearing spindle with a center mounted thrust plate.
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. Flow is controlled by a solenoid integrated with the machine's CNC control.
Speed Range	50 to 10,000 rpm, bi-directional
Load Capacity (Radial)	70Kg (154 lbs.) @ 100 psi. / 85Kg (187 lbs.) @ 145 psi.
Axial Stiffness	228 N/µm (1,300,000 lbs/in) @ 100 psi / 260 N/µm (1,500,000 lbs/in) @ 145 psi
Radial Stiffness (at nose)	98 N/µm (560,000 lbs/in) @ 100 psi / 140 N/µm (800,000 lbs/in) @ 145 psi
Drive System	Frameless, Brushless DC motor
Motion Accuracy	Axial: ≤ 12.5 nanometers (0.5µ") Radial: ≤ 12.5 nanometers (0.5µ")

Linear Axes	X	Z	Y (Vertical) – Option
Type	Fully constrained oil hydrostatic, box way slide	Fully constrained oil hydrostatic, box way slide	Fully constrained oil hydrostatic box way slide with adaptively controlled air bearing counterbalance to negate gravitational forces & varying loads.
Travel	200mm (8")	200mm (8")	100mm (4")
Drive System	Brushless DC Linear Motor	Brushless DC Linear Motor	Brushless DC Linear Motor
Feedback Type	Laser holographic linear scale (athermally mounted)	Laser holographic linear scale (athermally mounted)	Laser holographic linear scale (athermally mounted)
Feedback Resolution	0.034 nanometer	0.034 nanometer	0.034 nanometer
Feed Rate (maximum)	4500mm/min	4500mm/min	1500mm/min
Straightness in critical direction	0.2µm (8µ") over full travel	0.2µm (8µ") over full travel	0.2µm (8µ") over full travel
Hydrostatic Oil Supply	Compact, low flow, low pressure system with closed loop servo control and pressure accumulator to minimize pump pulsation.		

Optional Rotational Axes	B	C
Type	Groove Compensated Air Bearing (fully constrained)	Groove Compensated Air Bearing (liquid cooled)
Travel	360° (Bi-directional)	360° (Bi-directional)
Drive System	Brushless DC motor	Brushless DC motor
Axial Stiffness	280 N/µm (1,600,000 lbs./in.)	See Workholding Spindle Specifications Listed Above
Radial Stiffness (at nose)	100 N/µm (540,000 lbs./in.)	See Workholding Spindle Specifications Listed Above
Positioning Accuracy	± 1.0 arc seconds (compensated)	± 1.0 arc seconds (compensated) static
Feedback Resolution	0.02 arc seconds	0.07 arc seconds
Maximum Speed (Positioning Mode)	50 rpm	3,000 rpm
Motion accuracy	Axial: ≤ 0.05µm (2µ") Radial: ≤ 0.05µm (2µ")	Axial: ≤ 12.5nm (0.5µ") Radial: ≤ 12.5nm (0.5µ")

Utility Requirements	Air	Electrical	Floor Space
For optimal cutting results, facility thermal stability should be held within ±0.5°C (±1.0°F)	7 to 10 bar (100 – 145 psi) 280 liters/min (10 scfm) Dry to 10°C pressure dew point and pre-filtered to 10µm	230 VAC; 50/60hz; 3 Phase (35 amp)	1.30m wide x 1.30m deep x 1.60m high Approx. 1,360 Kg (Includes enclosure but not including peripheral equipment and control pendant)

Warranty	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.