

Nanotech 450UPL Specification Overview

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General	Description
System Configuration	Ultra-Precision two, three, or four axis CNC contouring machine with "T" axis orientation.
Workpiece Capacity	450mm diameter x 300mm long - (200mm diameter swing capability over the optional rotary B-Axis)
Base Structure	Monolithic cast epoxy-granite, with integral coolant troughs
Vibration Isolation	Optimally located three point passive air isolation system
Control System	Delta Tau PC based CNC motion controller, operating in a Windows environment, with color flat panel touch screen display and PC-Anywhere remote diagnostics software with modem. 256MB 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 linear / 0.00001° rotary
Functional Performance (As measured on laser interferometer and white light interferometer)	Material – High Purity Aluminum Alloy. Form Accuracy (P-V): ≤ 0.125µm / 75mm dia, 250mm convex sphere. Surface Finish (Ra): ≤ 2.0 nanometers

Workholding Spindle	Heavy Duty (Standard)
Type	Fully constrained Professional Instruments groove compensated air bearing
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	50 to 10,000 rpm, bi-directional
Load Capacity (Radial)	57Kg (125 lbs.) @ spindle nose
Axial Stiffness	140N/µm (800,000 lbs./in.) @ 8.3 bar (120 psi)
Radial Stiffness (at nose)	87N/µm (500,000 lbs./in.) @ 8.3 bar (120 psi)
Drive System	Frameless, Brushless DC motor
Motion accuracy	Axial: ≤ 25 nanometers (1µ") Radial: ≤ 25 nanometers (1µ")

Axes	X	Z
Type	Fully constrained oil hydrostatic, box way slide	Fully constrained oil hydrostatic, box way slide
Travel	350mm (14")	300mm (12")
Drive System	Brushless DC Linear Motor	Brushless DC Linear Motor
Feedback Type	Laser holographic linear scale (athermally mounted)	Laser holographic linear scale (athermally mounted)
Feedback Resolution	34 picometer (0.034 nanometer)	34 picometer (0.034 nanometer)
Feed Rate (maximum)	1500mm/min	1500mm/min
Straightness in critical direction	0.3µm (12µ") over full travel	0.3µm (12µ") 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	Oil Hydrostatic (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	875 N/µm (5,000,000 lbs./in.)	140 N/µm (800,000 lbs./in.) @ 8.3 bar(120 psi)
Radial Stiffness (at nose)	260 N/µm (1,500,000 lbs./in.)	87 N/µm (500,000 lbs./in.) @ 8.3 bar (120 psi)
Positioning Accuracy	≤ 2.0 arc seconds (compensated)	≤ ± 2.0 arc seconds (compensated) static
Feedback Resolution	0.02 arc seconds	0.06 arc seconds
Maximum Speed (Positioning Mode)	50 rpm	1,500 rpm
Motion accuracy	Axial: ≤ 0.1µm (4µ") Radial: ≤ 0.1µm (4µ")	Axial: ≤ 0.025µm (1µ") Radial: ≤ 0.025µm (1µ")

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 9 bar (100-130psi) 280 liters/min (10 scfm) Dry to 10°C pressure dew point and pre-filtered to 10µm	11kVA at the customer specified voltage from 220 - 480 VAC; 50 / 60hz; 3 Phase (26kVA with optional oil hydrostatic grinder)	1.93m wide x 1.80m deep x 2.06m high Approx. 2,650 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.