

700

precitech

Nanoform® 700 ultra Ultra Precision Machining System

This Ultra Precision Diamond Turning Lathe is designed for the production of optical lenses, optical mold inserts, mirrors & mechanical components. The machine can be configured from 2 to 4-axes to produce spherical, aspheric and freeform surfaces.



Overview

Slide Travel: X - 350 mm Z - 300 mm
Max. Feedrate: 4,000 mm/min
Swing Capacity: 700 mm
350 mm over optional B-axis
Load Capacity: SP- 150 = 85 Kg
HD-160 = 102 Kg
Spindle Speed: SP-150 = 7,000 RPM
HD-160 = 5,000 RPM

Process Capability

2-axes X-Z contouring
3-axes X-Z-B Tool-Normal contouring
High Speed Finishing (Infrared Lenses)
3-axes Freeform X-Z-C Slow Tool Servo contouring
Micro-Milling

Machine Options

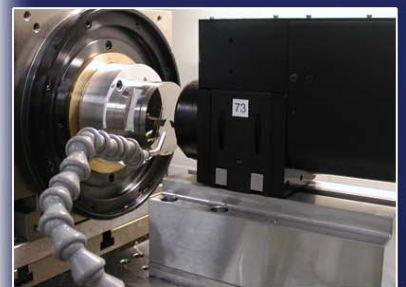
Advanced temperature control systems
Aspheric grinding systems 50,000/15,000 rpm
Fast Tool Servo Freeform® capability
CAM software
HydroRound rotary B-axis
• Virtual Center
• Error Mapping
Heavy duty HD-160 spindle 102kg
On-machine gage & amplifier
Slow Tool Servo/Positioning C-axis
• Adaptive Control Technology
UltraComp™ on machine metrology
UltraSet optical tool setting system
Video observation camera

Design Features

QNX real time Operating System with industry leading 0.01 nanometer programming resolution
Linear holographic glass scales with 32 picometer feedback resolution
Sealed natural granite base provides exceptional long term machine tool stability
Self leveling dual chamber pneumatic isolation system
Linear motors coupled to true analog linear amplifiers
Modular design for future capability upgrades
On-machine workpiece balancing system
Elevated X-axis provides increased swing capacity
Solid way cover under the spindle

MAJOR COMPONENTS DESIGNED AND MANUFACTURED BY PRECITECH INC.

- Hydrostatic oil bearing slideways with optimized stiffness and damping characteristics
- Liquid cooled slides for thermal stability
- Motorized air bearing spindles



AMETEK®
ULTRA PRECISION TECHNOLOGIES

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Technical Product Specification Nanoform® 700 ultra

Machine Base and Control	Description
Machine Base	Sealed natural granite base provides exceptional long term machine tool stability
Machine Type	Ultra precision, two, three or four axes CNC contouring machine
Vibration Isolation	Self leveling dual chamber pneumatic isolation system
Control System	UPx™ Control System with optional Adaptive Control Technology
Operating System	QNX real time operating system
Programming Resolution	0.01 nanometer linear / 0.0000001° Rotary
File Transfer	USB, CD-RW, Ethernet
Performance	Surface Finish (Ra) < 1.0nm, Form Accuracy (P-V) < 0.125µm

Linear Hydrostatic Slideways	Description
Type	Hydrostatic oil bearing slideways with symmetrical linear motor placement
Travel	X: 350mm (13.8") Z: 300mm (11.8")
Maximum Feedrate	4,000mm/min. (157"/min)
Drive System	AC linear motor
Position Feedback Resolution	32 picometers (0.032 nanometers)
X-axis Straightness	Horizontal: 0.30µm (12µ") full travel 0.05µm/25mm (2µ")
Z-axis Straightness	Horizontal: 0.40µm (16µ") full travel 0.05µm/25mm (2µ")
Vertical Straightness	X: 0.75µm (30µ") Z: 0.75µm (30µ")

Workholding/Positioning Spindle	High Performance SP150 Spindle	Heavy Duty HD-160 Spindle
Air Bearing Type	Slot-type thrust bearing	Slot-type thrust bearing
Material	Steel shaft/Bronze journal	Steel shaft/Bronze journal
Standard Swing Capacity	700mm (27.5") diameter	700mm (27.5") diameter
Motor	Integral brushless motor	Integral brushless motor
Load Capacity	85Kg (187 lbs.) @ 100 PSI	102Kg (225 lbs.) @ 100 PSI
Axial Stiffness	230 N/µm (1,314,000 lbs./in.)	350 N/µm (2,000,000 lbs./in.)
Radial Stiffness	130 N/µm (743,600 lbs./in.)	175 N/µm (1,000,000 lbs./in.)
Motion Accuracy	Axial/Radial ≤ 15nm (0.6µ")	Axial/Radial ≤ 50nm (2µ")
Thermal Control	Liquid cooled chiller +/- 0.1C Accuracy	Liquid cooled chiller +/- 0.1C Accuracy
C-axis Feedback Resolution	0.026 arc-sec	0.026 arc-sec
C-axis Position Accuracy	+/- 2 arc-sec	+/- 2 arc-sec
C-axis Max Speed	3,000 RPM	3,000 RPM
Work Holding Spindle Max Speed	7,000 RPM	5,000 RPM

Rotary B-axis	HydroRound Rotary B-axis
Type	Bi-conical, self compensated, Oil hydrostatic bearing. DC Brushless direct drive motor.
Material	High-alloy steel
Tabletop size	380mm (15")
Standard swing capacity	350mm (13.8") diameter
Load Capacity	454 Kg (1000 lbs.)
Maximum Speed	10 RPM
Motor Torque	72inch-lbs. 8.1N/µm
Position Feedback Resolution	0.003 arc-sec
Radial Error Motion	0.10µm (4µ") @ 1" above table and can be improved with optional error mapping.
Axial Error Motion	0.10µm (4µ")
Coning Error	1.0nm/mm (1.0µ"/in.)
Radial Stiffness	525N/µm (3,000,000 lbs./in.)
Axial Stiffness	875N/µm (5,000,000 lbs./in.)
Moment Stiffness	17N-m/µrad (150 lbs-in/µrad.)

High Speed Milling/Grinding Spindle	High Speed SP75FF Spindle	High Speed PI ISO 2.25 Spindle
Air Supply Pressure	690 KPA (100 PSI)	690 KPA (100 PSI)
Air Consumption	2.8 l/s (6.0 SCFM)	0.9 l/s (2.0 SCFM)
Radial Load Capacity	20.5 Kg (45 lbs)	10 Kg (20 lbs)
Axial Stiffness	70N/µm (400,000 lbs/in.)	69N/µm (392,000 lbs/in.)
Radial Stiffness	22N/µm (125,000 lbs/in.)	23N/µm (130,000 lbs/in.)
Axial Error Motion	< 0.05µm (2µ")	< 0.05µm (2µ")
Radial Error Motion	< 0.05µm (2µ")	< 0.05µm (2µ")
Maximum Speed	15,000 RPM	50,000 RPM

Facility Requirements	Nanoform® 700 ultra
Power	208 +/-10% or 230 +/-10% VAC - 3.0 KVA 1 phase - 50/60Hz
Air Supply	Typical: 12 SCFM @100 PSIG
Floor Space	1437mm x 1930mm x 2043mm (57" x 76" x 80")



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Thermal Control	Liquid cooled chiller +/- 0.1C Accuracy	Liquid cooled chiller +/- 0.1C Accuracy
C-axis Feedback Resolution	0.019 arc-sec	0.053 arc-sec
C-axis Position Accuracy	+/- 2 arc-sec	+/- 2 arc-sec
C-axis Max Speed	1,500 RPM	3,000 RPM
Work Holding Spindle Max Speed	7,000 RPM	5,000 RPM

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Rev6-June. 2011
specifications are subject to change without notice