

TECHNICAL PRODUCT SPECIFICATIONS

IL500

MADE
IN
GERMANY



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Machine	General Description
System Configuration Machine Base	Ultra precision 3-5 axes (XZC;B;W) CNC high dynamic machining center Natural granite base for excellent accuracy
Vibration Isolation	Self leveling pneumatic isolation system (option: passive or electronically controlled active leveling)
Control System	Beckhoff TwinCAT 3 CNC high performance machine controller; Intel® Core™ i5 CPU, 4 Cores; operating system Windows 10; 21.5" color flat panel touch screen display and 22" color flat panel display; EtherCAT bus communication technology; Digital Servo drives with 100 kHz current & position control loop frequency
Programming Resolution	1 nm linear (0.01 nm optional), 0.0000001° rotary
Set Points (pts/sec)	Up to 2,000 in CNC mode; 10,000 in DirectDrive3D
File Transfer	USB, Ethernet
Requirements	Air: 7-10 bars, 300 l/min, 10 µm prefiltered; Electrical: 400 V, 16 A, 50/60 Hz; Water: 8-10 °C, 30 l / min; Connectivity: Ethernet
Machine Size	1850 * 3500 * 2400 mm (D * W * H)
Standalone Panel Size	610 * 610 mm (D * W)

Linear Axes	X-Axis	Z-Axis
Travel	600 mm	400 mm
Feedback Type	Noncontact Linear Encoder	Noncontact Linear Encoder
Resolution	0.03125 nm	0.03125 nm
Straightness	< +/- 0.2 µm	< +/- 0.2 µm
Pitch, Roll, Yaw	< +/- 2 arcsec for all	< +/- 2 arcsec for all
Max. Speed	3,000 mm/min	4,000 mm/min
Drive System	Brushless linear motor	Brushless linear motor
Static Stiffness	420 N / µm vertical	420 N / µm vertical
Media Supply	Compact integrated hydrostatic supply unit, low pulsation	

Rotary Axes	C-Axis	B-Axis (Option)	Milling Spindle (Option)
Type	Workholding Spindle; groove compensated air bearing	Oil hydrostatic axis, 360° continuous	Air bearing
Load Capacity	70 kg at 6.9 bar (radial)	< 300 kg (axial)	< 30 kg (radial)
Axial Stiffness	228 N/µm	370 N/µm	65 N/µm
Radial Stiffness	98 N/µm at 6.9 bar	125 N/µm	40 N/µm
Motion Accuracy Axial	< 15 nm	< 50 nm	-
Motion Accuracy Radial	< 15 nm	< 80 nm	< 30 nm
Velocity Control	< 10,000 rpm	-	60,000; 80,000; 90,000 rpm
Position Control	0-3,000 rpm	20 rpm	-
Feedback Resolution	0.008 arcsec	0.005 arcsec	-
Thermal Control	Integrated cooling	Integrated cooling	Integrated cooling
Interface	NanoGrip	NanoGrip	HSK 25

Metrology LVDT (Option)		Metrology Confocal Probe (Option)	
2D Surface Line Scan	Air bearing LVDT probe for compensation	Measurement of Optical Surface	Scanning chromatic confocal probe
Working Distance / Range	0.5 mm	Working Distance / Range	6 mm / 0.3 mm
Resolution	< 10 nm	Resolution of Sensor	< 10 nm
Stylus Tip	Ruby, diamond	Data Acquisition	1,000 pts/sec in spiral or orbit scan, full surface

Automation NanoGrip Interface	Automation 3D Tactile Probe (Option)
Ultra-precise clamping system for workpiece & tool Clamping mechanism: Spring loaded mechanical clamping, pneumatic unclamping Repeatability / Accuracy: < 0.5 µm radial & axial Clamping force: > 20,000 N for excellent stiffness and accuracy Interfaces for workpiece: Vacuum chuck, three jaw chuck, individual mounting or blocking	X, Y, Z tactile probe system with strain gauge technology Stylus: Length up to 100 mm, ruby and diamond tips, fast exchange Tactile Force: XY plane: 0.02 N; Z: 0.07 N Unidirectional Repeatability: Trigger level 1: 0.40 µm Form Measurement Deviation: Trigger level 1: ± 0.80 µm

ILSONIC (Option)	Overdrive (Option)	Circulating Air Shower (Option)
Transversal ultrasonic unit for diamond turning of steel Working Frequency: 100 kHz Max. Depth for Concave Parts: 70 mm NanoGrip Interface to Machine 55° Insert tool, monocrystalline diamond	High dynamic axis for freeform generation, hydrostatic bearing Total travel: 50 mm Max. acceleration: 10 G Drive: Linear Motor Feedback: encoder resolution 0.03125 nm CNC Standard Integration DirectDrive3D	Air conditioning unit with filtration system Air Flow Rate: 400 l/min Temperature Constancy < 0.1 °C Required Room Temperature < 3 °C Machine external setup, integrated control

Part	General Description
Size	Ø < 600 mm; length < 250 mm; possible by crane
Turning Performance	Form accuracy (PV) < 0.1 µm; Surface roughness (Ra) < 1 nm
Overdrive Tilted Plane	Ø < 100 mm; angle 3°; form accuracy (PV) < 0.2 µm
Overdrive Freeform HUD	250 * 200 mm; total stroke 2.1 mm; form accuracy (PV) < 0.5 µm; machining time 3.5 h