

**Excellent Machining Combined with Stable Accuracy Provide Our
Customers with the Perfect Automation Solution**

Solves Societal Issues with Superior Decarbonization Technology and DX

Highly Accurate 1-Saddle CNC Lathe

LB3000 EXIII

Okuma Corporation has developed the LB3000 EXIII, a high-precision, 1-saddle CNC lathe that is the latest model in the LB-EX series.

The LB-EX series is a best-seller with cumulative sales of over 18,000 units. It is one of our star series with high precision and high productivity and has been used on the production floors of our customers around the world.

The newly developed LB3000 EXIII further improves the high precision and high productivity of the LB-EX series and adds advanced decarbonization technology. It achieves decarbonization, high precision, and high productivity at a high level. Moreover, its innovative operation makes it possible for anyone to execute advanced machining simply and its front loading with a digital twin allows for even greater productivity.

This Green-Smart Machine uses the next-generation OSP-P500 CNC to help to solve the societal issues (decrease in the working population, transferring skills to the next generation of workers, and decarbonization) confronting the manufacturing industry.

Background

In recent years, there has been a higher demand for decarbonization in the entire manufacturing industry supply chain. Together with higher energy prices, the global movement toward decarbonization and energy conservation has grown stronger. Manufacturing companies have been searching for ways to achieve decarbonization while maintaining high productivity.

Additionally, the lack of labor has been accelerating and the retirement of skilled workers has had an adverse effect on the passing down of their skills. This has made it even more difficult to recruit human resources with the requisite skills. As a result, the need for reform in manufacturing shops through automation and DX solutions has become heightened even among small and medium-sized companies.

Because these societal issues are becoming more serious, there is a growing need for machine tools that can reduce the burden on workers and achieve both decarbonization and improve productivity while being able to handle a wide range of workpieces and machining.

Development goals

The newly developed LB3000 EXIII has taken our conventional machines to the next level. It is a high-precision, 1-saddle CNC lathe which further improves productivity through automation and process integration. Furthermore, it solves societal issues that are sure to become more serious in the future, such as decarbonization and the lack of labor. At the same time, it also achieves greater productivity.

The LB3000 EXIII has been developed on the following concepts to become the global standard of next-generation monozukuri.

- (1) Achieves even high accuracy and higher productivity. Superior basic performance.
- (2) Flexible automation that can fit any customer's production format.

- (3) A lineup with many different specifications helps to achieve highly accurate process-intensive machining
- (4) Green-Smart Machine that achieves both autonomous decarbonization and high precision.
- (5) The next-generation CNC, the OSP-P500, uses DX to maximize the operating rate of our customers' factories.

Features and New Technology

(1) Higher precision and higher productivity. Superior basic performance.

- Highly rigid “**slide guideways**” have been used for both the X and Z feed shafts to stably support heavy cutting.
- Productivity is improved with the highest machining capacity in its class.
Turning capacity: **4.4 mm²** (S45C)
Milling capacity: **200 cm³/min** (S45C)
- The Intelligent Technology “**Thermo-Friendly Concept**” allows machines to autonomously and stably maintain high accuracy.
machining dimensional change over time: **φ5 μm or less**
The “**slanted-box bed construction**” promotes simple thermal deformation so it can be predicted and accurately controlled.
- Highly accurate milling achieves “process intensive machining” at a higher level.
C-axis spindle orientation and positioning accuracy: **20 seconds (0.0056°) or less**
- A new design that achieves harmony between people and machines has been adopted.
A work area based on ergonomics makes this machine easier to use for customers.

(2) Flexible automation that fits a customer's production format

- No need for space to install a robot. **ARMROID** achieves automation with the minimum use of space.
The automation system does not require robot installation space because the robot is built into the machining chamber.
Compared with conventional free-standing articulated robots, the floor space required for peripheral automation equipment is **reduced by 80%**.
- The “**mobile collaborative robot**” automates the necessary machine tool at the necessary time with a single action to cope with changes in production volume.
A simple and safe automated cell can be constructed by moving a trolley that combines a collaborative robot and workpiece stocker next to a machine tool and connecting it.
- The “**smarTwinCELL**” smart machining cell controller makes it possible for anyone to easily operate a machining cell.
A machine operator can operate peripheral equipment, robots, and entire cells in the same way that they operate their machines.
- The “**chuck grasp pressure NC instruction** (special specification)” can be used to change the chuck grasping pressure without human intervention.
This minimized chucking distortion and achieves higher machining accuracy.
- The “**electric automatic front door** (special specification)” reduces power consumption during automation.
A servo drive opens and closes the door which **reduces** power consumption by **80%**

when compared with a compressed air system.

- The “**sludgeless tank** (special specification)” drastically reduces the coolant tank cleaning frequency.

The coolant flow in the tank is controlled by eliminating stagnation so that the sludge in the coolant is automatically and efficiently recovered. This dramatically reduces the manual labor needed to clean the tank.

Sludge recovery 99 % (Actual value for machined castings)

No coolant tank cleaning for 3 years, no coolant exchange for 3 years

(Actual value for in-house equipment)

(3) A lineup of solutions and specifications to meet high-precision process integration needs

- Turret lathes can integrate processes to meet the demand for gear machining that is increasing with the increase in EVs.
Gear skiving can integrate the gear machining processes that required specialized machine tools and gear machining can be improved over conventional machines by improving spindle indexing accuracy.
- Grinding processes are also integrated.
Because of the highly rigid and precise machine configuration, the hard-turning finish machining after heat treatment reduces grinding.
This also helps to reduce industrial waste produced by the grinding process.
- The double-tool holder that applies Y-axis functions helps to solve the problem of lack of turret lathe tools.
- The sub-spindle specification achieves front and back machining with one machine.

(4) Green-Smart Machine: A machine autonomously achieves both decarbonization and high precision

- The decarbonization effect of a Green-Smart Machine with OSP-P500.
Compared with a machine without any energy-saving technology, power consumption is **reduced by 14%**. (Okuma estimate)
- **Thermo-Friendly Concept**: Intelligent technology that allows a machine to autonomously maintain high precision and stability.
Because there is no need to maintain a room at a constant temperature, factory equipment expenses and power consumption are greatly reduced.
Operating time for warming up and correcting dimensions is greatly reduced so that power consumption is reduced.
- The “**ECO suite plus**” energy-saving system is standard
The “**ECO idling stop**” energy-saving function is an application of the Thermo-Friendly Concept. The machine itself decides if cooling is needed and it can maintain high accuracy while stopping cooling equipment from idling.

(5) The next-generation CNC OSP-P500 maximizes the operating rate at customer factories by using DX

- Digital twin is an innovative technology that greatly reduces machining preparation time.
“**Two digital twins**” can synchronize information and things; something that is only possible by Okuma which develops both machines and CNCs.
Ultra-high speed (**1/1000 of the actual machining time**) and ultra-high precision (**errors under 1%**) simulations can be achieved in both machining floor CNCs and office PCs. Highly accurate production plans can be made quickly.

“Digital Twin on Machine”

Ultra-high speed and ultra-high precision simulations can be executed on the CNCs on the actual machine tools to minimize the machining preparation time. Machining can start immediately, thereby machine operation rates and productivity are both improved greatly.

“Digital Twin on PC”

Because confirmation can be conducted on an office PC in the same way as on the machine CNC, further productivity increases are possible with accurate front loading.

Highly accurate pre-verification can minimize machine stoppage times without any trial and error.

- **“Smart OSP Operation”** allows even beginners who do not know anything about machining programs to **make a program and machine their first workpiece in a day.** We provide an innovative HMI (human-machine interface) that allows anyone to input the blueprint information according to the instructions and easily determine the machining process.
- **“Strong Security”** protects machine operation, programs, and other important assets from cyberattacks.
The digital twin environment that integrates the customer's know-how is securely and safely constructed from the points of view of defense, protection, and recovery.
- **“AI Machine Diagnosis”** grasps malfunction predictions from changes in machine status.

Machine status is visualized through simple operations to prevent unexpected production losses caused by machine errors.

Please use this information to introduce this new product.

[Specification Lineup]

Specification	Functions	DBC
L specification	Lathe specification	500, 1,000, 1,300
M specification	Attached milling spindle specification	
MY specification	Attached milling spindle specification + Y-axis function	450, 950, 1,250
W specification	Lathe specification + sub-spindle	500, 800
MW specification	Attached milling spindle specification + sub-spindle	
MYW specification	Attached milling spindle specification + Y-axis function, sub-spindle	

[Product Specifications] The figures in the square bracket are optional specifications.

Item		LB3000 EXIII L specification, DBC 500
Machining capacity	Maximum turning diameter	φ410 mm [M specification: φ340 mm]
	Maximum turning length	500 mm
Travel	X-axis travel	260 mm
	Z-axis travel	565 mm [DBC 1,000: 1,065 mm] [DBC 1,300: 1,380 mm]
	Y-axis travel	[MY specification: 120 mm] [MYW specification: 115 mm]
Lathe spindle	Maximum rotational speed	5,000 min ⁻¹
	Maximum output	22/15 kW (30 min/continuous)
	Maximum torque	427/346/281 N·m (10 min/20 min/continuous)
Turret	Turret model	V12
	No. of attached tools	12
Milling spindle	Maximum rotational speed	[6,000 min ⁻¹]
	Maximum output	[7.1/4.1 kW (25 min./continuous)]
Rapid traverse		X-axis: 30 m/min, Z-axis: 30 m/min [Y-axis: 15 m/min]
Tailstock	Tailstock tapered hole type	MT No.5 (rotating center)
	Maximum thrust	5 kN

Item		LB3000 EXIII L specification, DBC 500
Machine size	Machine height	1,770 mm
	Required floor space (length x width)	2,764 × 1,830 mm
	Machine mass	4,400 kg