OKUMA

OPEN POSSIBILITIES

LB EX III Series

LB3000 EX III / LB4000 EX III

1-Saddle CNC Lathes

LB EX Ⅲ Series

LB3000 EX Ⅲ / LB4000 EX Ⅲ

1-Saddle CNC Lathes

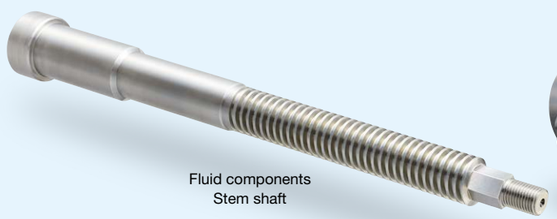
Long-selling brand that is loved and evolving

Released in 2007
More than
19,000 units
were sold in total
in the series

Selling a total of more than 19,000 units, the LB-EX series
has continuously evolved and supported the shop floor around the world
for more than 15 years as Okuma's flagship models featuring high accuracy and high productivity.
LB EX Ⅲ series has enhanced the basic performance of the LB-EX series to "cut well," "cut accurately,"
and "be reliable in use" and has also increased flexibility to adapt to advanced energy-saving solutions,
manpower saving, and automation for further evolution.
It realizes both energy saving and high accuracy/productivity at a high level.
In addition, equipped with OSP-P500, a next-generation CNC that maximizes the factory utilization rate,
the machine helps solve problems on the shop floor and social challenges faced by the manufacturing industry.

LB3000 EX Ⅲ

LB4000 EX Ⅲ



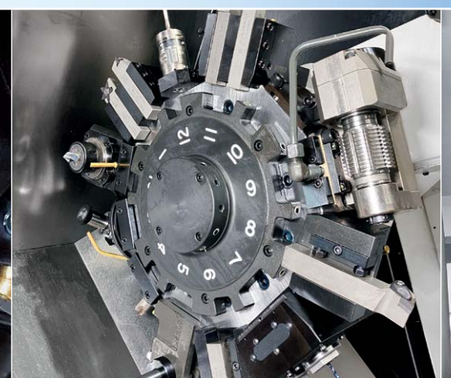
Fluid components
Stem shaft

Automotive parts
Wheel hub

Parts for electric vehicles
Motor shaft

Photographs and images used in this brochure may include optional equipment.

LB3000 EX Ⅲ Special Website
"Tomorrow's Manufacturing" as talked about by developers



OKUMA'S PURPOSE (the reason Okuma exists)

Contributing to society with the power of manufacturing services

Based on the concept of "total responsibility," which means providing everything related to machine tools, from products to machining technology, Okuma takes advantage of our strengths as a manufacturer that develops NC controllers in-house. Okuma develops comprehensive manufacturing services to solve challenges and provide value creation in the manufacturing life cycle of individual customers.
Then, we aim to be a company that **solves social challenges** in the global manufacturing industry, such as the declining working demographic and the realization of a carbon-free society, with the power of manufacturing services.

Total responsibility

We have a wide range of products and provide everything from machine technology to control technology, from hardware to software, from products to machining technology, and from before-sales services to after-sales services.

M-E-I-K
(Mechanics - Electronics - IT - Knowledge) merging technologies

Products for total responsibility

Smart machine | NC controller | FA system

Okuma's comprehensive manufacturing services

Technologies and products we provide

Solutions for manufacturing DX (digital transformation)
- Production management and operation monitoring using digital technology

Factory visualization to help increase the operating rate

In Okuma's next-generation automated factories "Dream Sites," all machines are connected via a network to visualize information about the factory such as the operation status, performance, and machining records. Digital technology is used to help increase productivity.

Provision of solutions for smart factories
- Smart manufacturing
- Automation that can be realized easily

Helping customers reinforce their manufacturing

While Okuma has provided products and services customized to individual customers over many years, mass customization*, which is Okuma's strength, is demonstrated in the Dream Sites and will be provided as a solution for smart factories.

* Concept/mechanism to achieve customized products with productivity that is similar to that of mass production

Supply of smart machines
- Autonomous machine tool featuring both usability and high productivity

Providing the most suitable machines, machining methods, and production methods

Using our advantage of developing NC controllers in-house, as well as the performance of machines with extremely high-accuracy stability and machining capabilities, we provide the most suitable machines, machining methods, and production methods flexibly and quickly for a wide range of industries and applications.

Offering comprehensive manufacturing services to help customers create value

LB EX Ⅲ Series

For the realization of a sustainable society

More powerful solutions for addressing societal challenges

Decrease in skilled workers and transmission of skills

Thermo-Friendly Concept P9
The Okuma Intelligent Technology that enables machines to autonomously maintain high accuracy stability

Machining Navi P12
Cutting condition search

AI Machine Diagnosis P20
Detects signs of failure

Collision Avoidance System P16
Collision prevention

Smart OSP Operation P30
Very easy for even a beginner to use

Increase in cyber-attacks

OSP-VPSⅡ P30
Robust security

Achievement of high accuracy and high productivity with emissions reduction and energy saving

Green-Smart Machine

+

OSP-P500

Realization of manufacturing DX (digital transformation)

Decrease in the working population

Sludgeless Tank P20
Reduction of the burden of tank cleaning

Automated system P21
Solution to labor shortage and increase in productivity

Climate change mitigation

Thermo-Friendly Concept P9
The Okuma Intelligent Technology that enables machines to autonomously maintain high accuracy stability

Sludgeless Tank P20
Reduction of coolant needing disposal

ECO suite plus P31
A system for an energy-saving society

Responding to the diversification of needs and improving operating rates

Automated system P21
Useful for a wider range of workpieces

Digital twin P29
Faithful digital reproduction of machines and processes

Achieving high accuracy and high productivity while achieving decarbonization and energy saving

Green-Smart Machine
Powered by Intelligent Technology

Reducing energy consumption while maintaining stable high accuracy and high productivity

To work toward the realization of a carbon-free society, the industrial world is required to consider resources and the environment, and strengthen efforts to reduce emission. Okuma will contribute to the realization of a carbon-free society and help make society sustainable by working to improve the basic performance of machine tools, such as high accuracy and high productivity, as well as energy efficiency. We chose the name “Green-Smart Machine” for our machine tool that achieves high accuracy and reduced energy consumption autonomously and realizes high productivity. With Green-Smart Machines, we will contribute to the solution of social issues faced by the global manufacturing industry, together with our customers.

Green-Smart Machine

High accuracy and high productivity

+

Decarbonization and energy saving

Thermo-Friendly Concept
The Okuma Intelligent Technology that enables machines to autonomously maintain high accuracy stability

ECO suite plus
A system for an energy-saving society

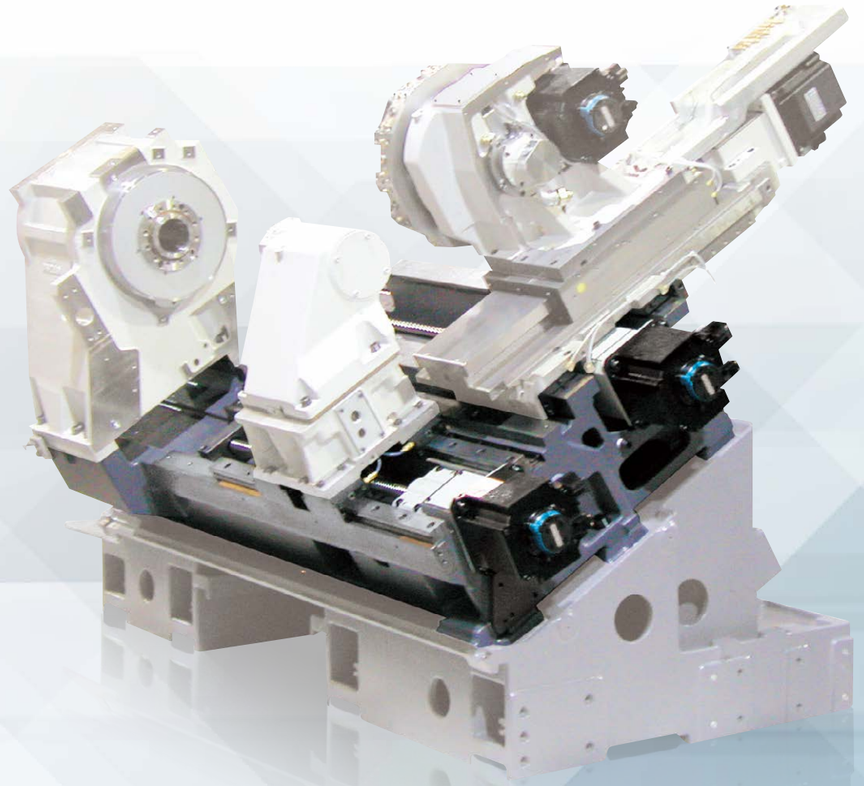
The innovation that accepts temperature changes

Thermo-Friendly Concept

The Okuma Intelligent Technology that enables machines to autonomously maintain high accuracy stability

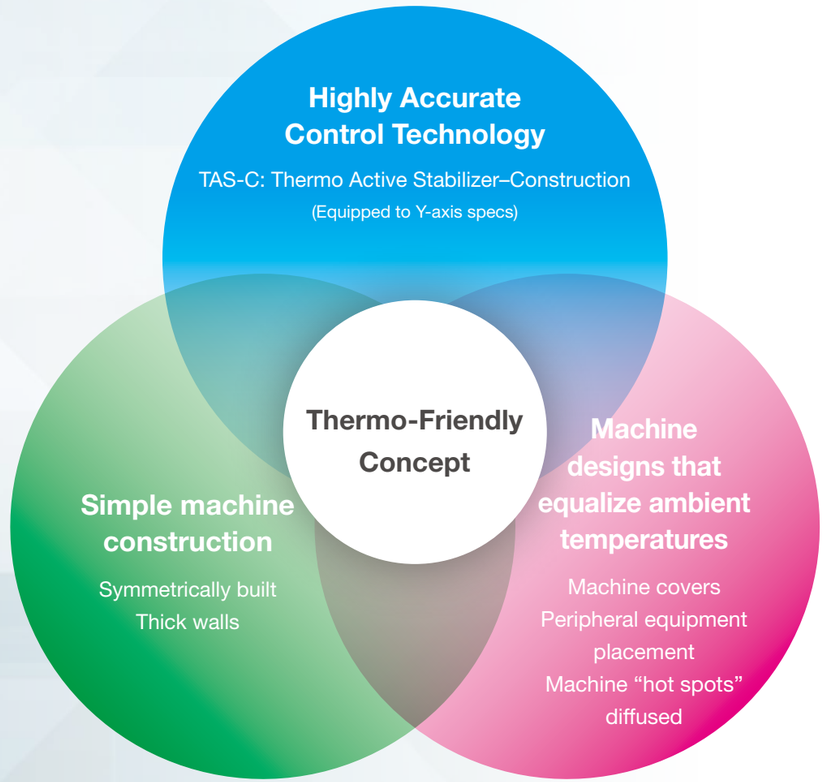
High accuracy can be achieved in normal factory environments

The machining accuracy of workpieces changes significantly due to the ambient temperature around the machine, heat generated by the machine, and heat generated in machining. The Thermo-Friendly Concept is a unique concept to “accept” such temperature changes so that high accuracy stability can be achieved in normal factory environments with no special measures taken by the user.



Integrated machine design and control technology

In the Thermo-Friendly Concept, machine designs play the principal role. With simple machine construction and machine designs that equalize ambient temperatures, the machine deforms in a manageable manner and complex torsion or tilting is controlled to make the deformation predictable. Moreover, thermal deformation caused by changes in the room temperature, frequent spindle speed changes, and the temperature of the coolant are all controlled precisely with the highly accurate control technology by OSP, a controller developed by Okuma in-house. With the Thermo-Friendly Concept, manageable thermal deformation is accurately controlled to limit the behavior of dimensional changes, behavior which also matches the intuition of skilled workers, within a stable range with high accuracy.



We pursue our goal of seeing how much benefit we can bring to machine shops

With the aim of creating products that satisfy our customers worldwide, over more than 30 years Okuma has conducted a wide variety of testing in environmental test rooms, which can accommodate not only small machines but also large double-column machining centers. The massive amount of test data accumulated in those rooms served as the foundation of the Thermo-Friendly Concept, which has been applied to more than 62,000 machines. We will continue to pursue our goal of seeing how much benefit we can bring to machine shops, and work to develop products that can achieve high machining accuracy in all kinds of usage environments.

High accuracy

Secured accuracy enables to reduce workload in controlling dimensions and realize stable machining over long hours

The whole machine is designed to achieve high accuracy. Outstanding dimensional stability enables stable machining of high-accuracy parts and stable operation over long hours

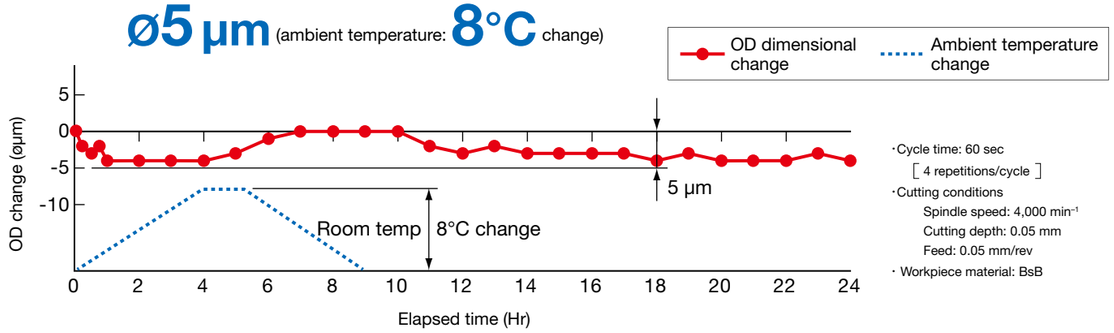
Unparalleled outstanding dimensional stability

The Thermo-Friendly Concept is Okuma Intelligent Technology intended to achieve amazing machining accuracy with unique structural design and thermal deformation control technology. It eliminates the need for cumbersome dimensional compensation and warm-up and demonstrates outstanding dimensional stability in long-term continuous machining, multitasking machining, front and back side machining with a sub spindle, and Y-axis machining.

Thermo-Friendly Concept
The Okuma Intelligent Technology that enables machines to autonomously maintain high accuracy stability

Machining dimensional change over time (actual data)

LB3000 EX Ⅲ (L) turning



- Cycle time: 60 sec [4 repetitions/cycle]
- Cutting conditions
  Spindle speed: 4,000 min⁻¹
  Cutting depth: 0.05 mm
  Feed: 0.05 mm/rev
- Workpiece material: BsB

Note: The “actual data” referred to above for this brochure represent examples, and may not be obtained due to differences in specifications, tooling, cutting and other conditions.

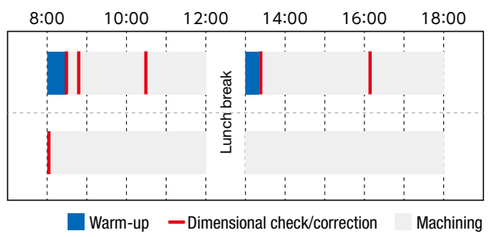
Significant reduction of the need for warm-up and dimensional compensation

Due to outstanding dimensional stability, warm-up is not required and, if the dimensions are checked in the morning before operation, it is not necessary to compensate later, even when the ambient temperature has changed or the machine has been temporarily stopped.

Effect of the Thermo-Friendly Concept

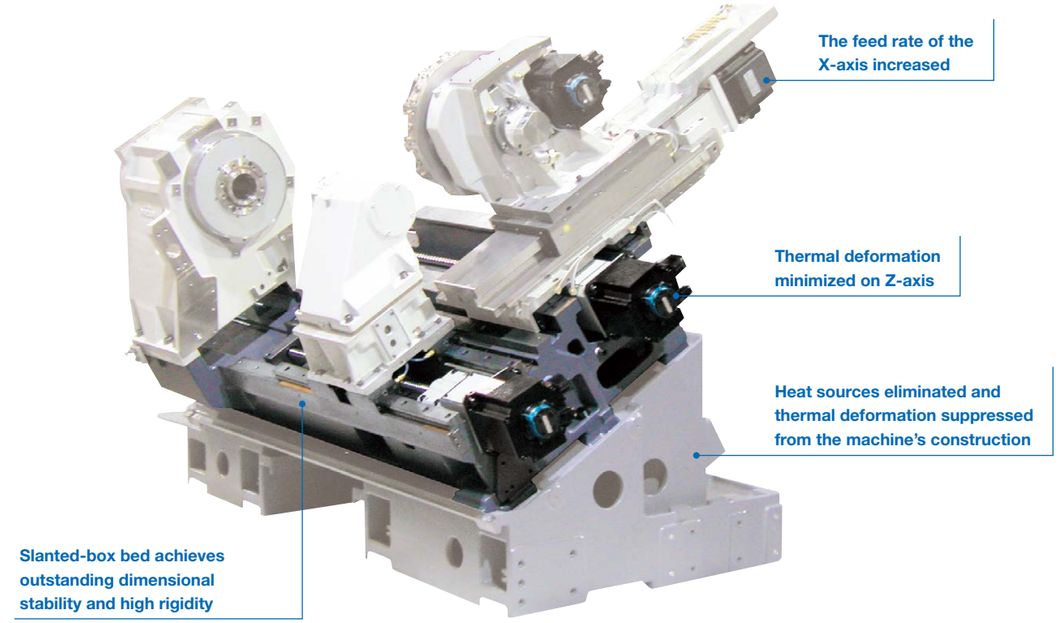
	Ordinary lathe		Lathe to which the Thermo-Friendly Concept is applied
Time of warm-up and dimensional compensation in a day	68 min	→	3 min
Finished goods	226 workpieces	→	260 workpieces 15% UP

A daily schedule of machining



Superior construction and rigidity—slanted-box bed configuration

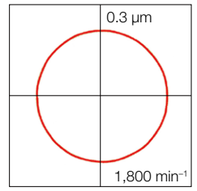
The slanted-box bed construction is used in the machine. In this structure, which is highly praised as a robust construction unique to Okuma, the primary units of headstock and turret on a box bed are optimally placed for outstanding dimensional stability and high rigidity. It provides stable machining accuracy even in heavy-duty cutting.



Achieving high-accuracy machining

Roundness [Actual data]

LB3000 EX Ⅲ Standard spindle
0.3 µm/1,800 min⁻¹

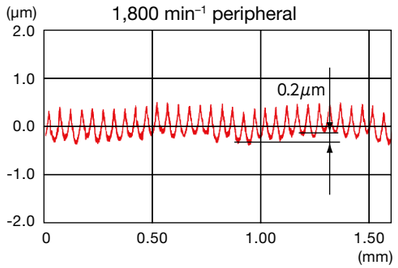


Standard spindle
Material: BsB

LB4000 EX Ⅲ Standard spindle
0.3 µm/2,000 min⁻¹

Tool nose uniformity (for better surface roughness) [Actual data]

LB3000 EX Ⅲ Standard spindle
0.2 µm/1,800 min⁻¹



Material: BsB

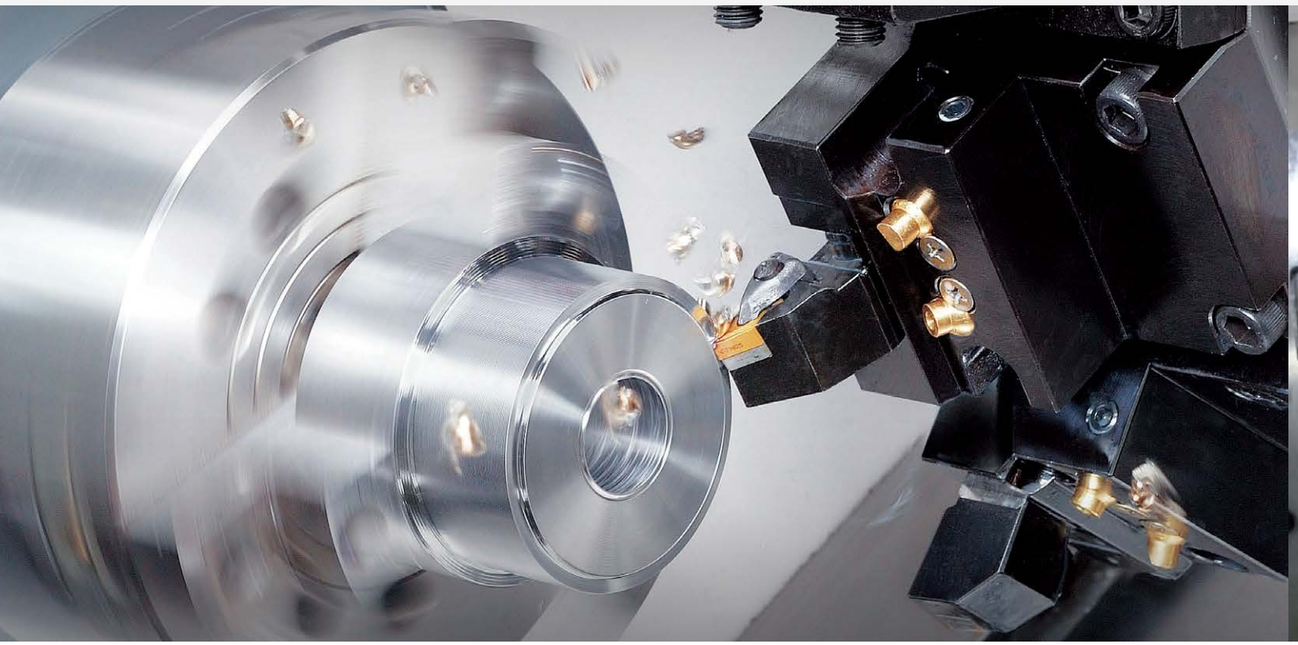
LB4000 EX Ⅲ Standard spindle
0.3 µm/2,000 min⁻¹

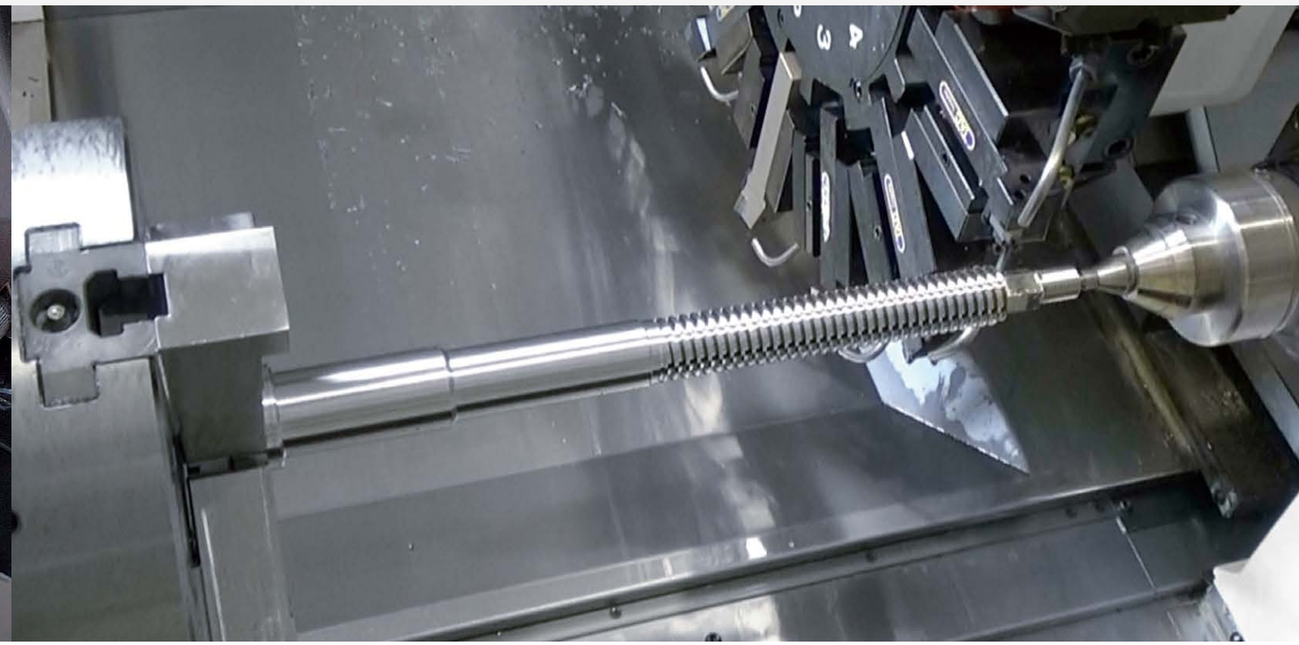
Note: The “actual data” referred to above for this brochure represent examples, and may not be obtained due to differences in specifications, tooling, cutting and other conditions.

High productivity

Increase productivity by shortening machining time with highly efficient machining

Productivity is increased with powerful machining and quick machine movements





Turning (Workpiece material: S45C)

4.4 mm² (0.007 in²)

LB3000 EX Ⅲ [Actual data]

Heavy-duty cutting

4.4 mm²
Cutting speed V: 150 m/min
Cutting depth t: 8.0 mm
Feed rate: f: 0.55 mm/rev

Drilling

ø63 carbide insert drill
Cutting speed V: 150 m/min
Feed rate f: 0.25 mm/rev

6.3 mm² (0.010 in²)

LB4000 EX Ⅲ [Actual data]

Heavy-duty cutting

6.3 mm²
Cutting speed V: 150 m/min
Cutting depth t: 10.0 mm
Feed rate: f: 0.63 mm/rev

Drilling

ø63 carbide insert drill
Cutting speed V: 179 m/min
Feed rate f: 0.25 mm/rev

Note: The "actual data" referred to above for this brochure represent examples, and may not be obtained due to differences in specifications, tooling, cutting and other conditions.

Non-cutting time is shortened with high-speed movements, resulting in increased productivity

	LB3000 EX Ⅲ	LB4000 EX Ⅲ
Rapid traverse:	X: 30 m/min (1,181 ipm)	
	20% shorter cycle time*	
	Z: 30 m/min (1,181 ipm)	
Spindle start/stop:	3.0 sec (5,000 min⁻¹)	4.4 sec (4,200 min⁻¹)
Turret rotate:	0.1 sec/1 index	0.2 sec/1 index
NC tailstock rapids:	12 m/min	

* Previous machine comparison

A powerful motor is used to achieve high productivity

Equipped with a high-speed, wide-area, full-power integral motor, this machine can achieve stable, high-quality machining for both heavy-duty and high-speed cutting.

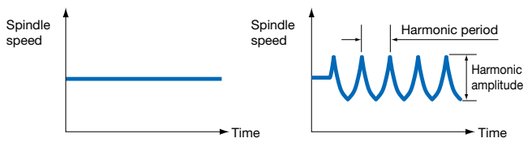
	LB3000 EX Ⅲ	LB4000 EX Ⅲ
Spindle size: Bearing ID	ø120 mm (ø4.72 in) (bore ø80 mm (ø3.15 in))	ø140 mm (ø5.51 in) (bore ø91 mm (ø3.58 in))
Spindle speed:	5,000 min⁻¹	4,200 min⁻¹
Max output:	22 kW (30 hp)	30 kW (40 hp)
Max torque:	427 N-m (314 ft-lbf)	700 N-m (515 ft-lbf)

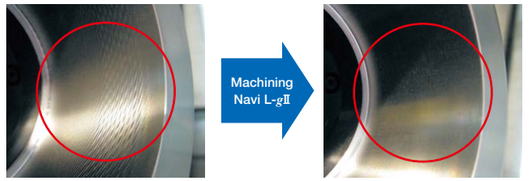
Suppressing chatter during turning

Machining Navi L-*g*Ⅱ — option
Cutting condition search function for turning

Varying the spindle speed in accordance with the best amplitude and period makes it possible to suppress chatter during turning. The use of optimum cutting conditions can extend the tool life and shorten the machining time, which is effective for deep hole boring bars and grooving.

Without Machining Navi | **With Machining Navi**





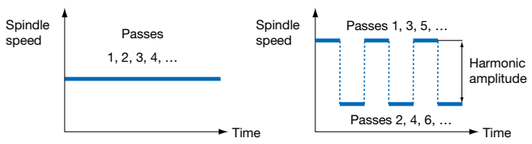
Chatter marks — Smooth surface, clean finished threads

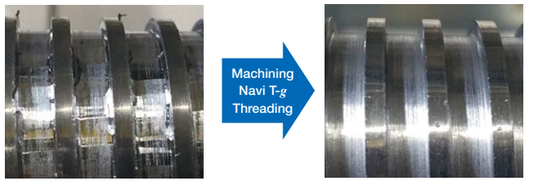
Suppressing chatter during threading

Machining Navi T-*g* Threading — option
Cutting condition search function for threading

The spindle speed is changed for each threading pass to interrupt the vibration periodicity and make it possible to suppress chatter during threading.

Without Machining Navi | **With Machining Navi**

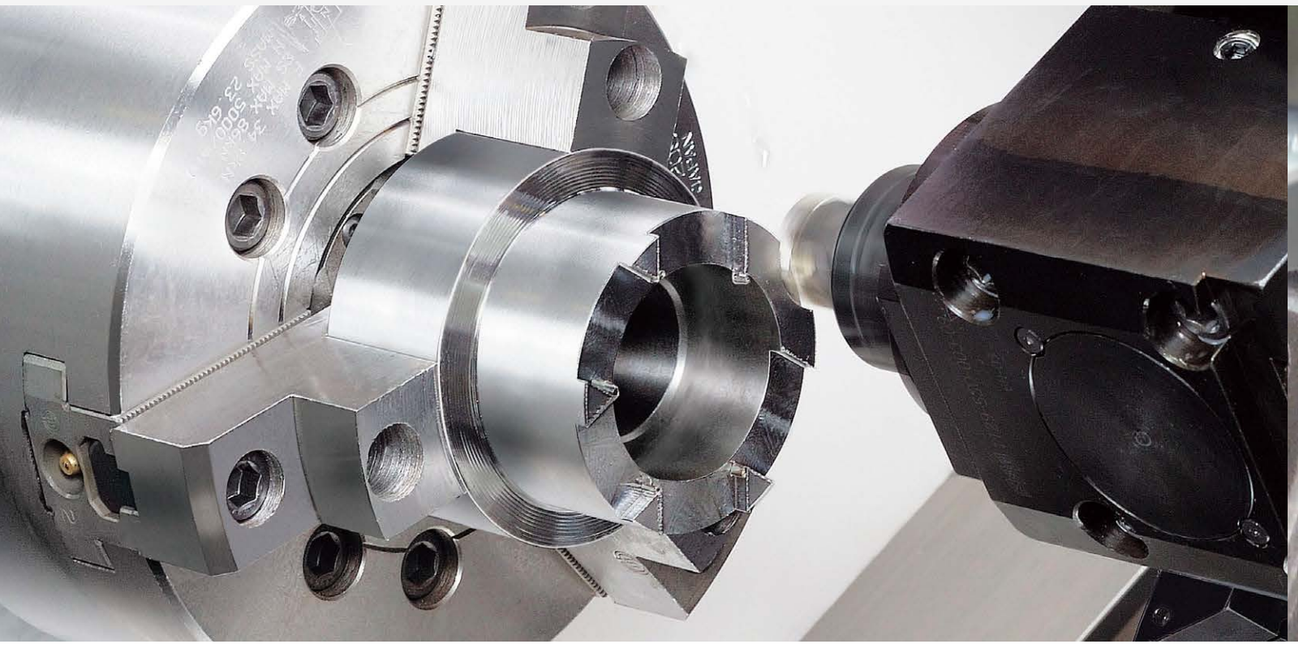


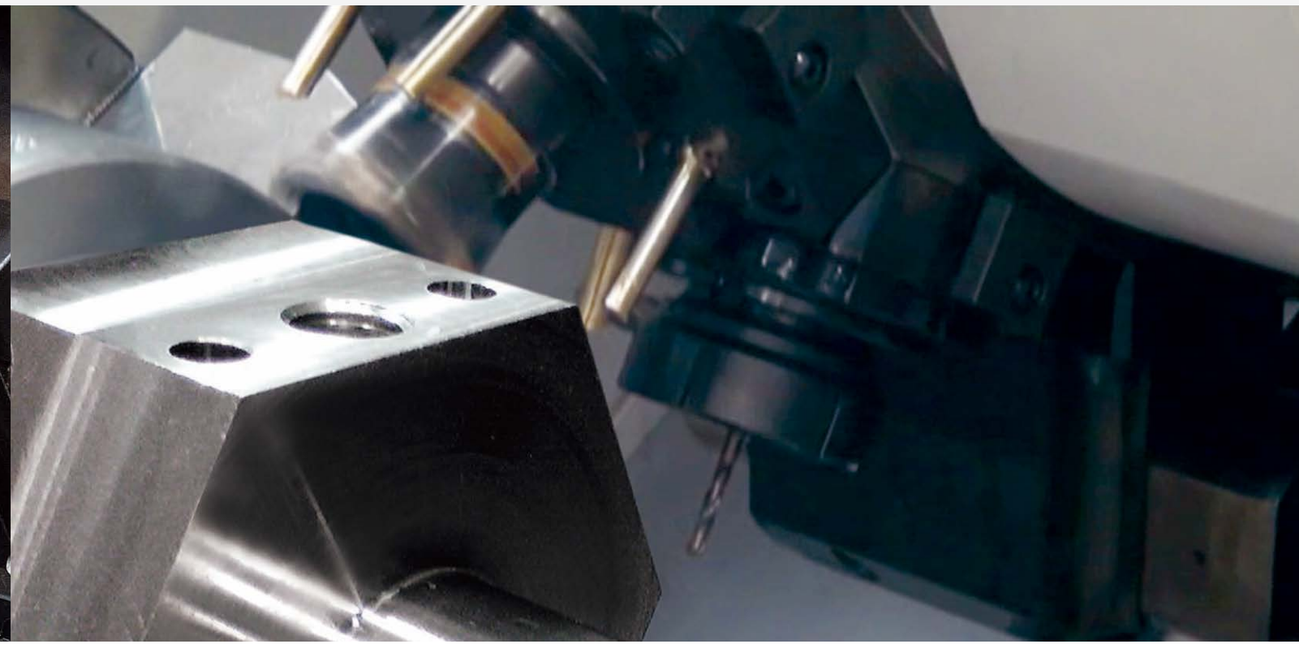


Chatter marks — Smooth surface, clean finished threads

High productivity Achievement of both accurate process-intensive machin ing and high productivity

Highest milling performance in the class with high-speed movements and high accuracy





Milling capacity (Workpiece material: S45C)

200 cm³/min (12.2 in³/min)

LB3000 EX Ⅲ [Actual data]

End milling

Chip volume 200 cm³/min
ø20 7-flute carbide
Cutting speed V: 200 m/min
Cutting depth t: 20 × 2.5 mm
Feed rate f: 1.26 mm/rev

Drilling

ø20 carbide solid drill
Cutting speed V: 135 m/min
Feed rate f: 0.3 mm/rev

Tapping

M20 P2.5 (Synchronized tapping)

LB4000 EX Ⅲ [Actual data]

End milling

Chip volume 200 cm³/min
ø20 7-flute carbide
Cutting speed V: 200 m/min
Cutting depth t: 20 × 2.5 mm
Feed rate f: 1.26 mm/rev

Drilling

ø28 carbide insert drill
Cutting speed V: 90 m/min
Feed rate f: 0.2 mm/rev

Tapping

M24 P3 (Synchronized tapping)

Note: The "actual data" referred to above for this brochure represent examples, and may not be obtained due to differences in specifications, tooling, cutting and other conditions.

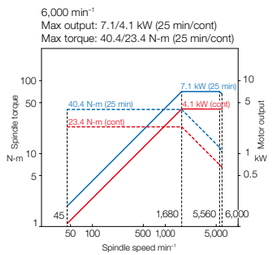
Compact PREX motor that realizes high productivity

Compact, high-power, high-torque PREX motor also used for milling spindle of the multitasking V12 radial turret. This combined with a powerful, highly rigid bolt clamp system greatly increases multitasking speed.

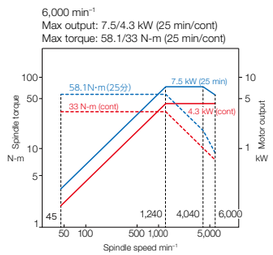
	LB3000 EX Ⅲ	LB4000 EX Ⅲ
M-spindle speed:	**6,000 min⁻¹**	**6,000 min⁻¹**
Max output:	**7.1 kW (9.5 hp)**	**7.5 kW (10 hp)**
Max torque:	**40.4 N-m (29.7 ft-lbf)**	**58.1 N-m (42.7 ft-lbf)**

The spindle lineup

LB3000 EX Ⅲ

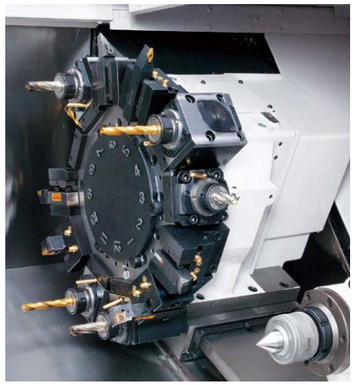


LB4000 EX Ⅲ



Non-cutting time is shortened with high-speed movements, resulting in increased productivity

	LB3000 EX Ⅲ	LB4000 EX Ⅲ
Turret rotate:	**0.1 sec/1 index**	**0.2 sec/1 index**
M-spindle start/stop:	**0.3 sec (6,000 min⁻¹)**	**0.4 sec (6,000 min⁻¹)**
M-M switch:	**0.7 sec**	**1.5 sec**



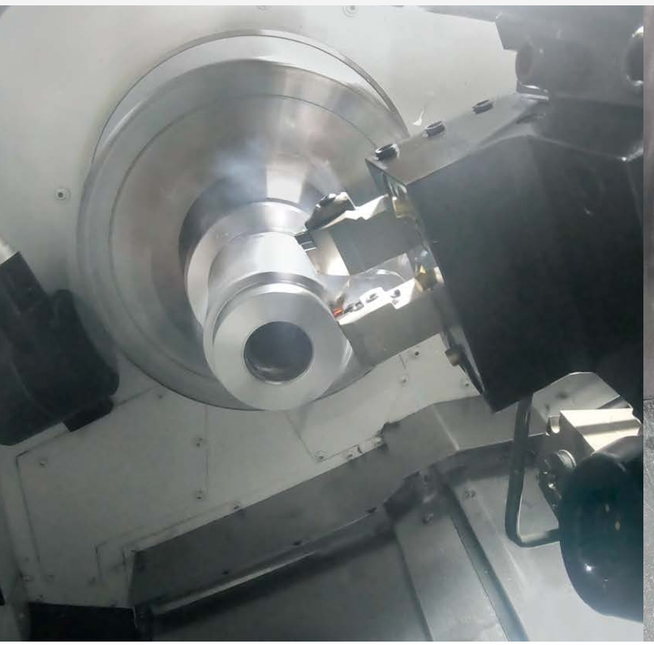
The main spindle (C-axis) positioning accuracy is further improved to 20 seconds (0.0056 degrees) or less

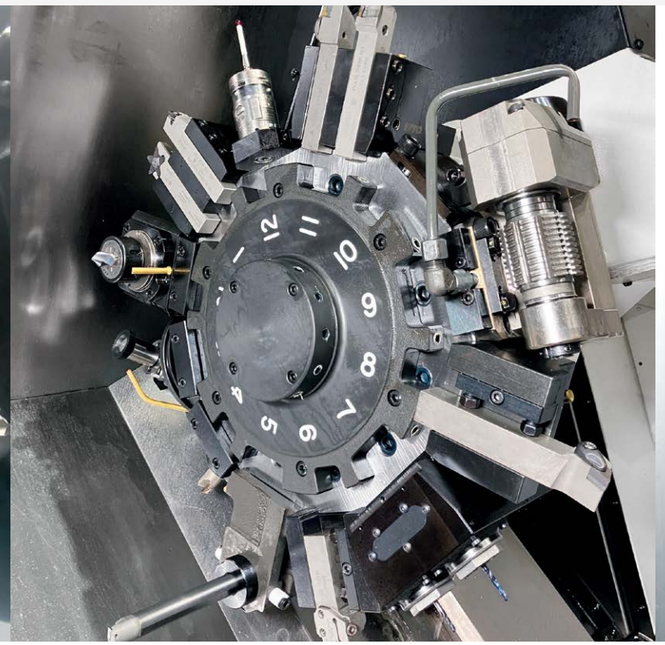
The C-axis indexing accuracy is significantly improved to respond to workpieces with higher accuracy. The accuracy of milling and gear cutting will be further increased.

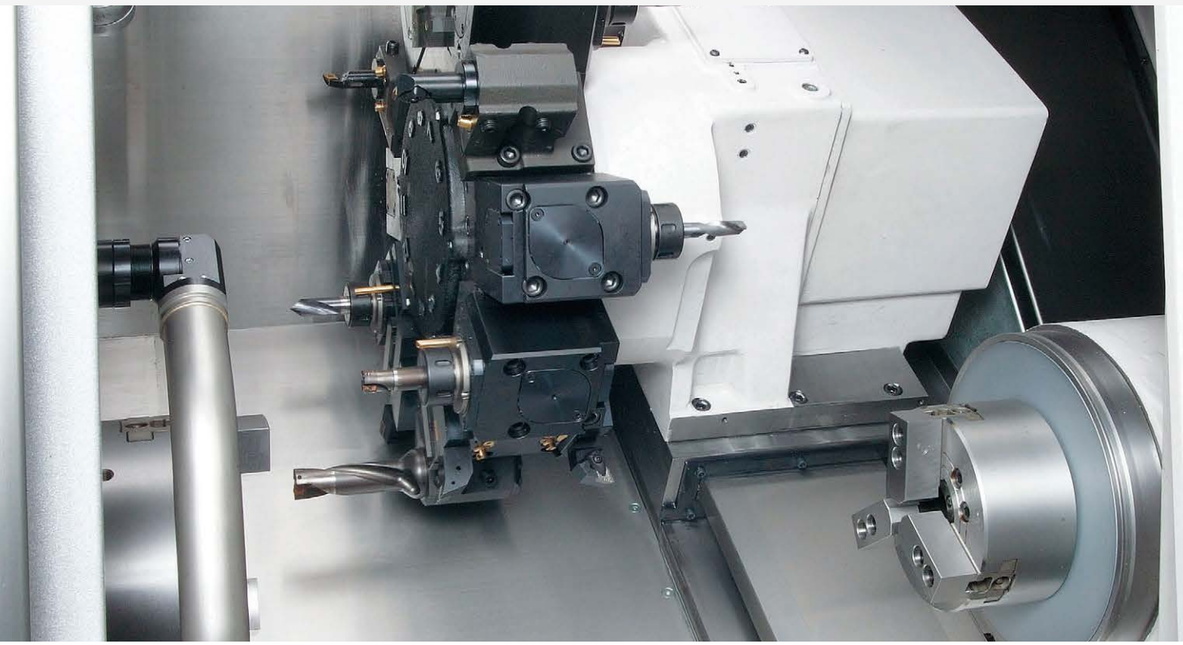
Note: The actual data above are values obtained by testing methods in accordance with ISO230-2 in our factories. Their accuracy is not guaranteed.

High productivity Increase productivity with the consolidation of various machining operations

The introduction cost is reduced and productivity is increased







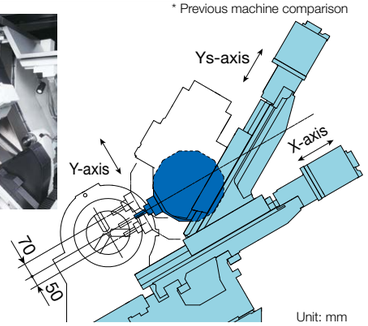
Using the Y-axis function, machining processes conventionally done on a machining center can be performed on a lathe

(Y-axis specs)

A variety of milling operations can be accommodated with high-accuracy, wide-range Y-axis travel using a double slide system. Process-intensive machining in a lathe/machining center is achieved with a single chucking.

		LB3000 EX Ⅲ	LB4000 EX Ⅲ
Y-axis travel	MY specs	120 mm (+70 to –50) (4.72 in (+2.76 to –1.97))	—
	MYW specs	115 mm (+70 to –45) (4.53 in (+2.76 to –1.77))	140 mm (+70 to –70) (5.51 in (+2.76 to –2.76))
Y-axis rapid traverse		15 m/min (591 ipm) 20% shorter cycle time*	

* Previous machine comparison



Unit: mm

Image shows the LB3000 EX Ⅲ (MY)

Gear cutting and hobbing, each of which requires a special-purpose machine, are also consolidated

With high-accuracy synchronous control of the workpiece spindle and the tool spindle, gear cutting, which is conventionally handled with a special-purpose machine, is consolidated.

Plate cam

Size	ø215 × 30 mm
Material	SCM440
Modules	2.5

Consolidation of grinding achieved with high-rigidity Y-axis functions

Hard skiving achieves excellent surface roughness by high-speed feeding of flat cutting edges, and consolidates grinding processes with high efficiency. The high-rigidity Y-axis functions also enable hard skiving with large cutting resistance.

Shaft

Size	ø46 × 150 mm
Material	SCM440 hardened steel
Surface roughness	Rz1.0

Cutting conditions	Cutting speed	V: 300 m/min
	Cutting depth	t: 0.1 mm
	Feed rate	f: 0.2 mm/rev

Process-intensive machining with a sub spindle Front and back side machining can be completed with one machine

(W-axis specs)

While front and back side machining conventionally needs two machines, a machine with a sub spindle can complete it alone. The spindles deliver workpieces to each other automatically to enable continuous machining of the front and back sides. Space is saved with a machine that can handle the jobs of two machines.

First operation (main spindle)

Second operation (sub spindle)

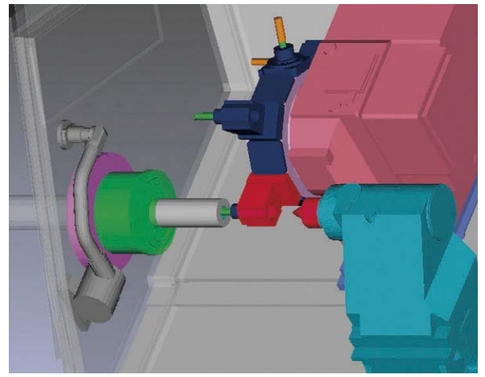
Wheel hub

Size	ø100 × 90 mm	**Material**	S45C

Allowing operators to focus on making parts

Collision Avoidance System option
Collision prevention

NC controller (OSP) with 3D model data of workpiece, tool, chuck, fixture and machine components such as headstock, turret, tailstock performs real time simulation just ahead of actual machine movements. It checks for interference or collisions, and stops the machine movement immediately before collision. Operators (novice or pro) will benefit from reduced setup and first-part cycle time, and the confidence to focus on manufacturing parts.

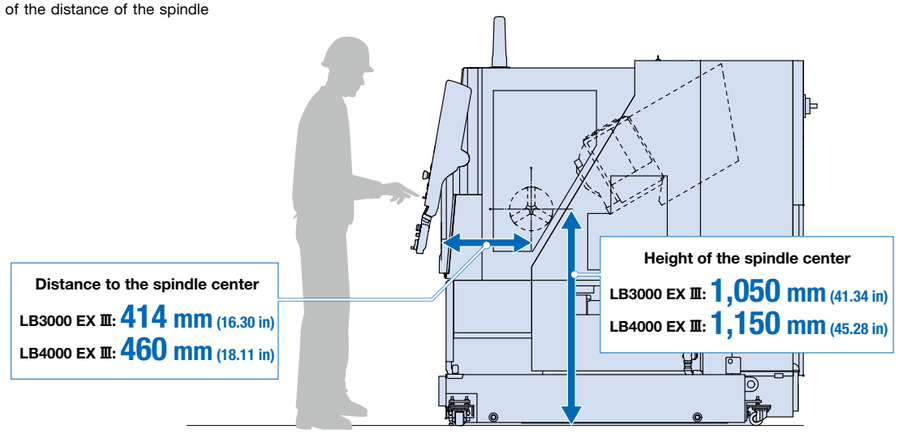


Ease of use Smooth and simple machine operation to reduce operator workload

Ease of use with consideration of harmony between people and machines

Ease of operation with the spindle positioned at an appropriate height and good accessibility to the machine

The operator's setup workload is reduced thanks to the easy-to-operate height of the spindle center and good machine accessibility because of the distance of the spindle center from the machine front.



The opening is wide for easy operation. Heavy workpieces and chucks can be delivered with a crane

Even workpieces of the maximum work length can be loaded and unloaded without tilting. With easy access to the inside of the machine, operators can easily perform setup changes and similar tasks. Heavy workpieces and chuck replacement can be handled with a crane from above.

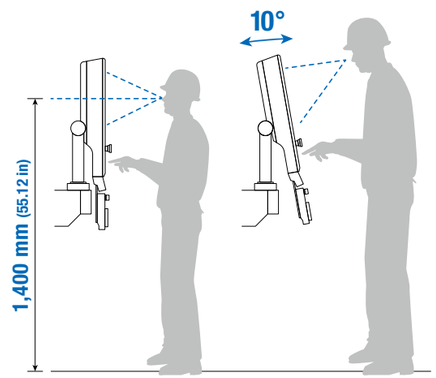
Photo shows the LB3000 EX Ⅲ
* May vary according to the specifications.

Easy-to-use operation panel with tilt mechanism

A swivel 15-inch operation panel that can be tilted is adopted as a standard to allow it to be operated smoothly according to the body height of the operator.

15-inch operation panel

The panel swivels for an easy visual check of the inside of the machine



The angle can be adjusted to suit the body height of the operator

Good maintainability to make daily operations easier while also considering the environment

The oil inlet is positioned on the front of the machine for easy lubrication during daily maintenance

The lubricating oil tank is positioned on the front of the machine to make it easy to lubricate during daily maintenance.

Maintainability is improved while also considering the environment Collection of slideway lubricant (Z-axis)

Z-axis slideway lubricant is collected in a slush tank, which reduces mixed flow into the coolant tank to improve maintainability while also considering the environment.

Note: The photo shows the position applicable to a rear-discharge chip conveyor. The slush tank is placed on the right side of the machine for a side-discharge chip conveyor.

Manpower saving　Manpower-saving solutions to labor shortages

Various solutions are offered to reduce the operator's workload

Shortened setup and automation of center workpieces

NC tailstock

Up to 10 pairs of tailstock positions can be set, enabling continuous machining of workpieces with 10 different lengths without setup. In addition, thrust can be switched between high and low without resetting the workpiece. (Tailstock thrust high/low switch: Optional) High accuracy positioning is also possible with a high speed linear guide employing a ball-screw drive.

	LB3000 EX Ⅲ	LB4000 EX Ⅲ
Tailstock thrust	**0.5 to 5 kN** (option: 1 to 7.5 kN)	**1 to 7.5 kN** (option: 1.5 to 10 kN)
Rapid traverse	**12 m/min (472 ipm)**	
Approach	**10 m/min (394 ipm)**	
Retract	**12 m/min (472 ipm)**	

Note: Please select a hydraulic quill for face driver machining applications.

Chucking warp is minimized

NC command for chuck clamp pressure option

Chuck clamp pressure can be changed by NC command. If the command is given in the program, machining can be performed with the optimum chuck pressure even during automatic operation, which minimizes chucking warp and achieves high-accuracy machining and high-efficiency production.

Power consumption of the automatic doors is reduced to one-fifth

Automatic open/close electric doors on the front option

A servo drive is adopted to reduce the power consumption to one-fifth in comparison with air-driven doors.

Carbon dioxide emissions	**47 kg-CO_2/year**
Power consumption	**80% Less**

Conditions: Opened/closed 150,000 times a year (operated 24 hours for 300 days a year, operating rate 70%, opening/closing interval 2 minutes)

Stable machining is maintained over many hours

In-process gauging option

The in-process gauging device automates the measurement and compensation of workpiece dimensions to achieve long-term stable machining.

This photo shows measurements taken along the Y-axis by an LB3000 EX Ⅲ with Y-axis specs.

Detect signs of ball-screw failure, and reduce downtime

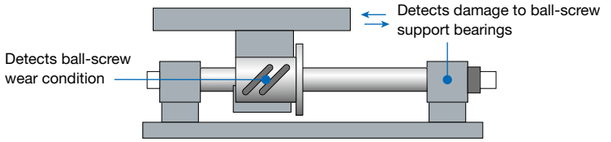
AI Machine Diagnosis Function option
Detects signs of failure

Machine tool self-diagnosis technology "AI machine diagnosis function" can detect signs of failure. Machine downtime can be reduced by preventing machine shutdown. The OSP-AI installed in the CNC identifies the presence or absence of any abnormality in the feed axis and the location of the abnormality and detects damage to the ball-screw support bearing and wear of the ball-screw*.

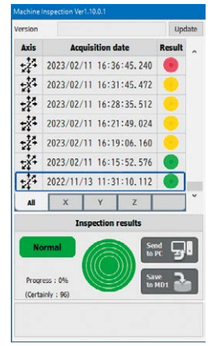
* Ball-screw wear can be detected in the case of AbsoScale detection specification.

Notes: AI diagnostic models are already installed, and diagnoses can be performed by the machine itself.
AI diagnostic models can be updated through Okuma's Connect Plan.

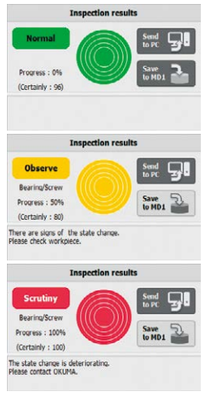
Execute diagnostic tests from the screen guidelines



Diagnosis by OSP-AI



Diagnostic results per lamp color



Troublesome coolant tank cleaning work is reduced dramatically to increase productivity. In addition, the environmental impact caused by the disposal of coolant is reduced

Sludgeless Tank option

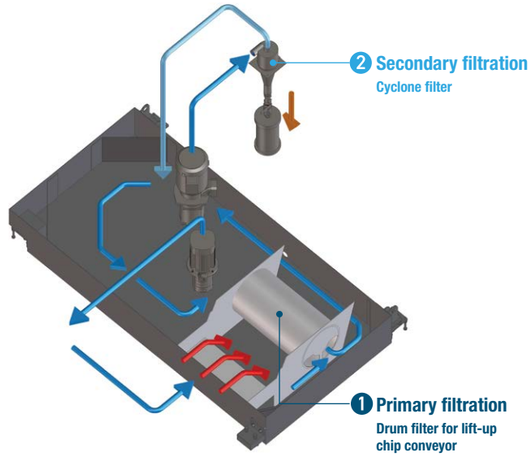
It is important to remove impurities (sludge) contained in the coolant for the stable operation of the machine, and coolant tank cleaning is indispensable. The Sludgeless Tank (option) circulates coolant at a constant speed in the tank to effectively collect sludge even during non-machining while reducing defects caused by the sludge contained in the coolant, such as scratches on machined surfaces and troubles of cutters, as well. Sludge accumulation in the tank is suppressed, which also drastically reduces the frequency of troublesome tank cleaning and enables stable operation over long hours. In addition, the frequency of coolant replacement can be greatly reduced, which also reduces the environmental impact of coolant disposal.

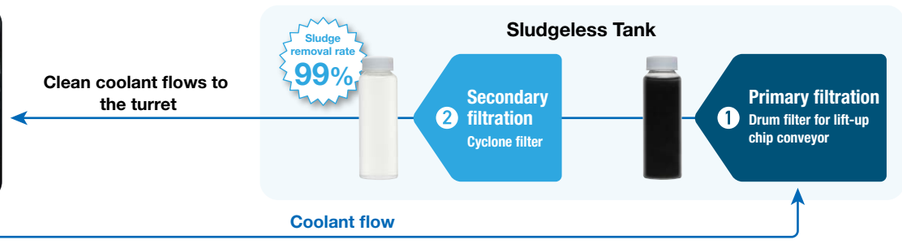
Sludge removal rate	**99%** (when the material is casting and aluminum) Notes: After secondary filtration (cyclone filter) permeation Okuma evaluated removal rate

No tank cleaning for 3 years (Okuma equipment actual data)

No coolant replacement for 3 years (Okuma equipment actual data)

Note: It is necessary to select a chip conveyor with hinges + scraper (with drum filter) if the Sludgeless Tank option is chosen.





Automation Automated system that can be easily operated by anyone

Stable dimensional accuracy increases the productivity of the automated system

Thermo-Friendly Concept
The Okuma Intelligent Technology that enables machines to autonomously maintain high accuracy stability

The Thermo-Friendly Concept is applied to LB EX Ⅲ Series for outstanding accuracy stability, and also enables the machine to achieve stable dimensional accuracy in long continuous machining. Even in an automated system composed of multiple machines, dimensional variation between the machines is small, saving labor for dimensional management and helping increase productivity.

Advantages of automation

It increases the operating rate of machines for higher productivity, stabilizes quality, and saves manpower.

Optimal cell for mass-production machining of similar parts

Loader

- It is effective for mass-production machining of similar parts
- The workflow line in front of the machine is secured by using the space above it
- It is possible to load/unload in a short time and achieve machining with a short takt time

Compact, flexible, and manpower-saving cell

LB3000 EX Ⅲ ARMROID

- Automation is possible in existing spaces
- Ability to switch between automatic and manual operations depending on the production situation

Highly versatile and applicable to irregularly shaped parts and high-mix workpieces

Stand-alone articulated robot

- Highly versatile and applicable to irregularly shaped parts and high-mix workpieces
- Layout of peripheral devices is freely configurable
- Transfer between different machines, such as a lathe and a machining center, is possible

Photo shows the LB3000 EX Ⅲ

Workpiece transfer and load/unload are automated. Combined with standardized peripheral devices, the machine can be operated automatically over many hours.

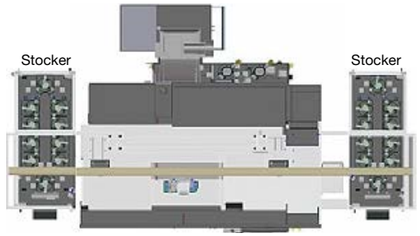
Loader option

Workpiece transfer and load/unload are automated. The workpiece transfer and load/unload device is suitable for medium to mass production of workpieces with similar shapes. By effectively utilizing the space above the machine, the workflow line in front of the machine is secured. Combined with standardized peripheral devices, the machine can be operated automatically over many hours.

Examples of a loader system

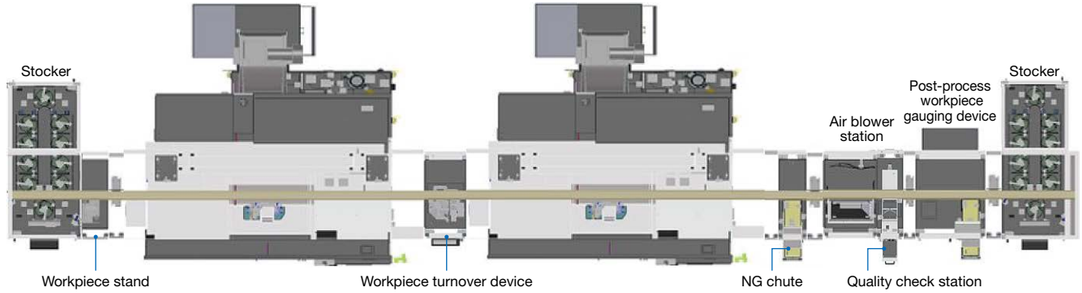
We propose line configurations that meet customer needs, from one machine with one loader to multi-machine lines.

Automated material supply and product discharge



Onboard loader			LB3000 EX Ⅲ OGL5-OⅡ	LB4000 EX Ⅲ OGL10-O
Max workpiece size			ø150 × L100 mm (ø5.91 × L3.94 in)	ø250 × L150 mm (ø9.84 × L5.91 in)
Max carrying load			3 kg (6.6 lb) × 2 pts	5 kg (11.0 lb) × 2 pts
Axis movement	Carrier traveling	Z-axis NC	180 m/min (7,087 ipm)	120 m/min (4,724 ipm)
	Arm vertical	Y-axis NC	100 m/min (3,937 ipm)	80 m/min (3,150 ipm)
Hand type			Vertical drop double gripper, 3-jaw air chuck	Rotary-swivel double hand, 3-jaw air chuck
Gripper open/close travel			ø20 mm (ø0.79 in) (effective travel: ø14 mm (ø0.55 in))	ø20 mm (ø0.79 in) (effective travel: ø14 mm (ø0.55 in))

Automation with peripheral devices such as washing and gauging devices



Examples of a loader gripper

Vertical drop double gripper (OGL5-OⅡ standard)
Rotary-swivel double hand (OGL10-O standard)
Vertical slide double gripper (option)
Swing double gripper (option)

Examples of a workpiece stocker

	Elevating worktable (standard)	Pitch-feed conveyor
Drawings		
Applicable workpieces	For flange	For shaft
Blanks and/or finished parts	Combinable	Dedicated
Variations	3 types of station ・6 stations ・10 stations ・20 stations	Conveyor length 2 types ・1. 5 m (59.06 in) ・2 m (78.74 in)

Automation Automated system that can be easily operated by anyone

No space to install the robot is needed. Automation can be achieved with minimal space

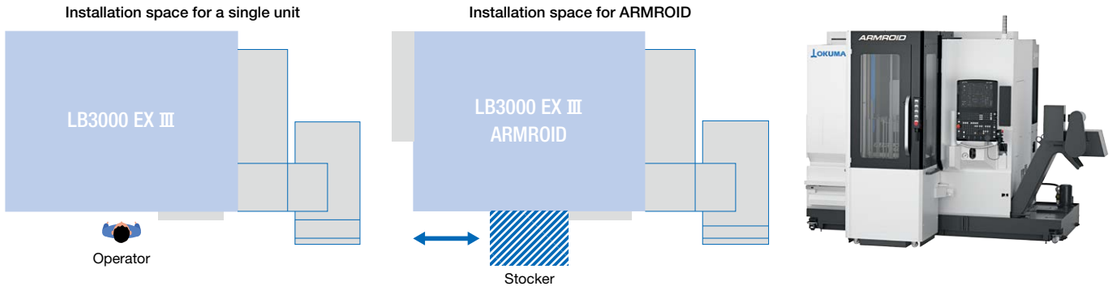
Automation systems that are easy to operate and easy to install

LB3000 EX Ⅲ ARMROID

This articulated robot is “built-in” to the workspace area. ROID Navi (interactive robot programming tool) provides in-machine processing support that cannot be achieved with externally installed robots. The operating tools of ARMROID have been developed on the premise that they will be used by machine tool operators, and do not require complicated robot programming. The switch from a single machine to an automated cell is easy by simply attaching the mobile workpiece stocker in front of the machine. Customers can perform production flexibly according to their production plans and work styles. For example, during the daytime they can remove the workpiece stocker and have operators manually loading/unloading for small lot machining, and at night they can use robots to operate automatically.

Additional robot floor space not required

With built-in robot arms, ARMROID requires only the space for the workpiece stocker for automation, which enables the factory space to be used effectively. It is also easy to relocate.



Enabling work sharing by humans and robots

With the built-in robot and a mobile stocker, the human and robot can work with the machine and share their tasks. A variety of production applications can be configured.

Human and robot work sharing

Day: Small lot parts machining by operators
Night: Mass-production machining by robots

Small lot parts machining	Mass production
8:00	17:00
	8:00 the following morning

Operation with robots only

Mass-production machining by robots both night and day

Mass production	Mass production
8:00	17:00
	8:00 the following morning

Built-in robots are moved out of the machining area when the machine is used as a single machine.

Excellent operability and cost effectiveness

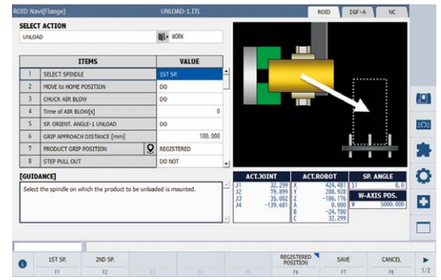
Since machine and robot are controlled by one operation panel, they can be easily handled with similar operations. Once the movements are set according to the guidance of ROID Navi (interactive robot programming tool), the robot automatically generates the optimal movement path. As the machine operator controls the robot, the cost and time for introduction and startup can be reduced dramatically. Setup changes can also be handled in-house, meaning less downtime and lower costs.

Easy machine tool or robot operation by any operator

ROID Navi and the collision avoidance system allow machining to resume easily even after a setup change or item change, which is especially suitable for flexible high-mix, low-volume production.

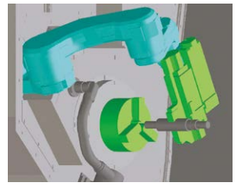
ROID Navi (interactive robot programming tool)

The robot’s motion program automatically generates an optimal motion path that does not collide, simply by displaying the input start and end points and the parameters according to guidance prompts. Even beginners in robotics can learn the ropes to operate from day one.



Collision Avoidance System
Collision prevention

The NC controller (OSP) with 3D model data of mechanical structures performs simulation in real-time prior to actual machine operation. Regardless of automatic or manual operation, it is possible to check in advance whether there is any interference due to robot operation.


Interference check with 3D simulation

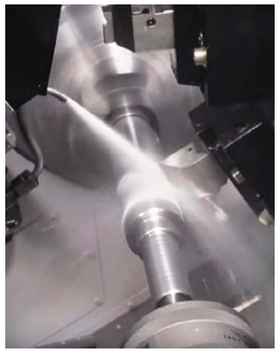

Operation stops before collision, regardless of automatic or manual operation

Achieve high-level processing support possible only with built-in robots

Providing in-process support in the machining chamber that is impossible with conventional robots.

Chip removal/In-machine cleaning

Mixed blasting nozzles



Chatter suppression

Workpiece support rollers

Part load/unload

2-finger parallel gripper
Shaft part loading

3-finger gripper
Flange part loading

Automation Flexible automation that matches the customer's production form

Automated system that meets various needs

Highly versatile and applicable to irregularly shaped parts and high-mix workpieces

Stand-alone articulated robot option

This stand-alone articulated robot meets the needs of customers who want to automate work, even high-mix, low-volume production, or want to automate measurement, cleaning, and other tasks in addition to workpiece loading and unloading. With high versatility, the robot is widely applicable to odd-shaped or high-mix workpieces. The layout of peripheral devices can be set freely, and it is possible to transfer workpieces between different types of machines such as a lathe and a machining center. An automated cell with a high degree of freedom can be configured according to the customer's production operation.

Photo shows the LB3000 EX Ⅲ

Example of connecting multiple machines using a robot with a traveling axis (parallel)

Photo shows the LB3000 EX Ⅲ

Notes: The images in the catalog are for illustrative purposes.
The design and specifications may differ from the actual products.

A wide range of peripheral devices (option) can be included in the automated system to achieve flexible production

The automation and manpower saving of production lines is supported by workpiece turnover and other devices that are indispensable for connecting processes. An optimal system can be configured with a wide variety of peripheral devices according to the customer's needs.

Devices on the IN side

Workpiece stand

The stand is used to adjust the posture of the material to be grasped by the hand. Re-grasping workpieces that tilt during stacking enables workpieces to be transported in a stable posture.

NG chute

This device discharges materials and unmachined workpieces judged to be NG by chucking error detection. Each NG item is carried off on the inclined chute and its own weight causes it to be ejected.

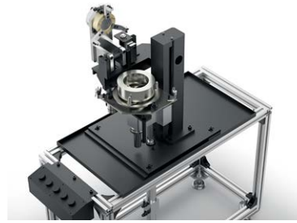
Phase determination device

This device detects the phase reference parts (spikes, notches, holes, grooves, etc.) on the outer periphery of workpieces, and stabilizes the workpiece supply phase to the machine.
It is used for avoiding interference of the jaw part stop during chucking and for workpieces that require phasing during milling and other operations.

Devices on the OUT side

Workpiece turnover device

This device turns workpieces over onto the reverse side. The gripper rotates 90 degrees and the table moves up and down to transfer workpieces. Reversing workpieces allows both sides to be machined.



Air blower station

This device performs air-blowing cleaning of machined products. It cleans workpieces inside the device while gripping them with air-blowing to remove coolant and chips adhering to machined items.

Quality check station

This device discharges machined products for quality check.

Material supply is automated

Bar feeder option

Bar materials are supplied into the spindle.

Photo shows the LB3000 EX Ⅲ

The discharge of machined workpieces is automated

Parts catcher option

This device discharges workpieces automatically with a simple mechanism.

A next-generation CNC that makes customer manufacturing DX (digital transformation) a reality

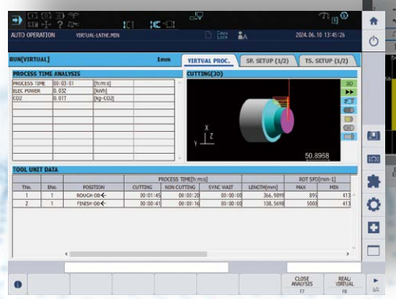
OSP-P500

Improved productivity and stable production

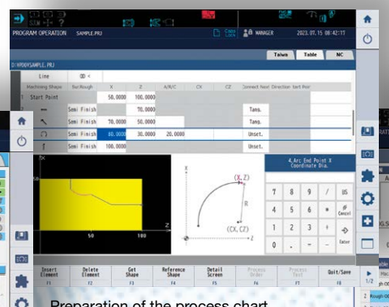
As Your Single Source for M-E-I-K (Mechanics - Electronics - IT - Knowledge) merging technologies, Okuma offers this CNC to build an advanced “digital twin” that faithfully reproduces machine control and machining operations and creates new value. In addition, the product helps improve productivity and realize stable production, featuring ease of use that allows customers to use their machining know-how. Additional features are: control technology that achieves high-speed and high-accuracy machining, energy-saving solutions that achieve both high accuracy/productivity and eco-friendliness, and robust security functions to protect against the increasing threat of cyber attacks.

15-inch operation panel

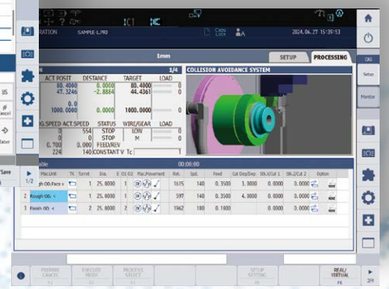
Home screen



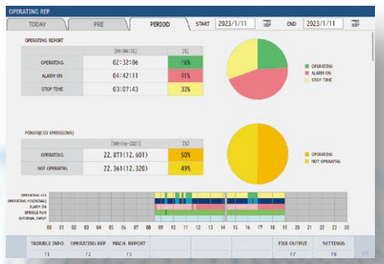
Virtual machining



Preparation of the process chart



Operation with the process chart



MacMan plus

❶ Faithful digital reproduction of machines and processes

Ground-breaking concept of a digital twin

❷ Realizing high-speed and high-accuracy machining

Revolutionary control technology

❸ Reducing environmental impact Energy-saving solutions

ECO suite plus

❹ Novice-friendly smart operation

Innovative operability

❺ Increasing cyber resilience

Robust security

CNC Significant increase in productivity are achieved through advance machining simulations (front loading) in order to reduce machinery downtime

OSP-P500 A next-generation CNC that makes customer manufacturing DX (digital transformation) a reality

❶ Faithful digital reproduction of machines and processes

Digital twin option

Ground-breaking concept of a digital twin

The digital twin calculates cycle time, machining shape, and electricity consumption through super high-speed and high-accuracy simulation.
It supports accurate estimates of cycle time, development of the machining schedule, and quick and accurate estimates of delivery time and costs when an order is received.

Simulation using the latest machine information can be achieved even with an office PC or with the built-in OSP-P500.
This enables preparation for machining in advance in the office environment (front loading).
Physical machine preparation time can be reduced by using digital twin preparation results to prepare for machining the next parts while machining continues.
When a problem occurs on the shop floor, it can be solved quickly on site without going back to the office.

Okuma's 2 digital twin systems

Digital Twin On PC
Simulate shop machines in the office

Front loading is performed with the actual status matched with the data on the office PC to further improve productivity. Highly accurate pre-verification minimizes trial and error in first part machining, and reduces machine downtime to the minimum.

Digital Twin On Machine
Simulating the CNC of a real machine

Super-fast and super-accurate machining simulations are performed with the CNC of a real machine on-site to minimize machining preparation work. Actual machining can be started immediately, greatly improving the operating rate of the machine.

Note: The screens above are examples of the Collision Avoidance System (option).

❷ Realizing high-speed and high-accuracy machining

Revolutionary control technology

CNC operation performance has been doubled compared to the conventional model (OSP-P300A). The processing capacity and the response speed between control modules have been improved to shorten the machining time. The time for machining general parts can be shortened if the machining program and machining conditions are the same as before.

❸ Reducing environmental impact Energy-saving solutions

ECO suite plus

"ECO suite plus" features the functions ECO Idling Stop, which allows the device to autonomously judge and shut down unnecessary auxiliary equipment, ECO Power Monitor, which gives visibility to carbon dioxide emissions, enabling these to be recorded and analyzed, and ECO Operation, which enables the optimized operation of peripheral equipment during machining. This is an energy-saving system that achieves both high accuracy, high productivity, and environmental friendliness to support improvement cycles for decarbonization.

For details, please refer to P31.

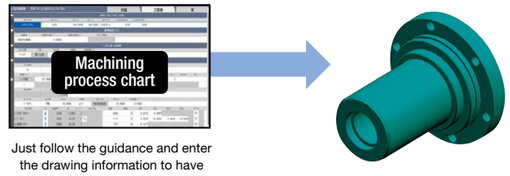
❹ Novice-friendly smart operation

Smart OSP Operation option

Innovative operability

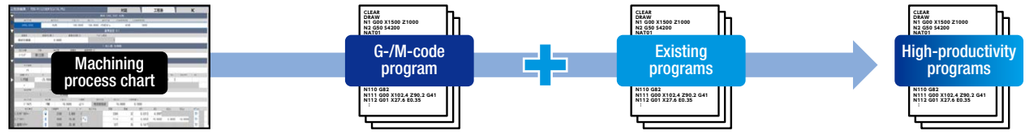
Conventionally, machining operations are programmed with G-/M-code based on drawings. With OSP-P500, however, you only have to follow the guidance to enter drawing information. So you can prepare for machining quickly, even if you have no familiarity at all with the NC program language.

Operation without reliance on G-/M-codes enables easy, quick machining by anyone



Just follow the guidance and enter the drawing information to have the machining process be determined automatically

High-productivity programs are easy to create



The process chart with the automatically determined machining process

The machining process chart is converted to a G-/M-code program

Programs containing the customer's expertise are added

High-productivity programs are easy to create

❺ Protecting the operation of machines and precious assets such as part programs from cyber attacks

Robust security that increases cyber resilience

As digital networks develop and servers are increasingly connected to factory machines, the threat of cyber attacks increases, making it ever more important to protect against them. OSP-P500 is equipped with robust security functions for defense against and protection from cyber attacks, along with data restoration, to protect the operation of machines and precious assets such as part programs in the event of a cyber attack.

Defense	Prevent unauthorized access and connection	Identification of operators and communications, authentication function, etc.
Protection	Control damage	Anti-virus measures based on the allowlist, functions to prevent falsification and detect abnormalities, etc.
Data restoration	Preparation for emergencies	Control software and data backup function, etc.

OSP-VPSⅡ (Virus Protection System Ⅱ)

OSP-VPSⅡ (Virus Protection System Ⅱ) incorporates allowlisting*1 antivirus functions into the Okuma CNC (OSP) to prevent infection by viruses via networks and USB devices.

OSP-VPSⅡ-STD

OSP-VPSⅡ-STD [Standard] includes antivirus functions developed exclusively for Okuma's numerically controlled machines. Machines can be used safely, as only software tested by Okuma can be run.

Note: Because the allowlist is locked, only Okuma software can be run.

OSP-VPSⅡ-EX (option)

OSP-VPSⅡ-EX [Expert] includes antivirus functions made by Trend Micro*2. The allowlist can be edited by the customer, so any software can be installed*3.

Note: Incorrectly editing the allowlist may prevent OSP from operating normally, so specialized knowledge of allowlisting antivirus functions is required.

*1. Allowlisting is a method in which safe software is listed and software not included in the list is prevented from running.
*2. Trend Micro is a registered trademark of Trend Micro Inc.
*3. This does not guarantee the operation of any software on OSP. Note that installed software may prevent OSP from operating properly.

Energy-saving technology

Energy-saving solutions that reduce environmental impact

ECO suite plus A system for an energy-saving society

The “ECO suite plus” retains the concept of achieving both high machining accuracy stability and energy savings (less carbon dioxide emissions) achieved by the Thermo-Friendly Concept and the “ECO suite” that was put into practical use in 2014. It is an energy-saving system with enhanced high-accuracy/-productive functionality and advanced eco-friendly support.

Ensure accuracy and actively turn off unnecessary peripherals

ECO Idling Stop

All auxiliary equipment when not needed (most of factory power consumption), can be turned off. The ECO Idling Stop button enables diligent idle stop operations even during machining and maintenance work. With ECO suite plus, the machine automatically detects the operating status, eliminating the need to push buttons while reducing carbon dioxide emission as much as possible without operator awareness.

Peripheral equipment runs only when needed

ECO Operation

By using only the required peripherals (chip conveyor, mist collector), energy-saving operations that also maintain high productivity are possible.
ECO suite plus enables more detailed tuning of operations to thoroughly support carbon dioxide emission reduction activities that do not reduce productivity.

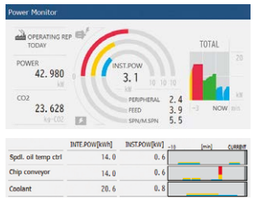
Confirming energy savings and analyzing reductions

ECO Power Monitor

Making it possible for the OSP control to analyze the operating status of each device.
The decarbonization cycle on the shop floor is supported through the three phases, 1. View, 2. Record, and 3. Analyze.

1 Check carbon dioxide emissions on the spot

With ECO suite plus, you can also check the power consumption of each device.



2 Simultaneously records operating status and carbon dioxide emissions

With ECO suite plus, recording carbon dioxide emissions for each device, and data output is possible.

3 Analyze carbon dioxide emissions and improve machine tool operation

With ECO suite plus, not only the display on the machine but data analysis for each device is also possible on a PC, to see a more detailed carbon dioxide emission analysis.

Example of utilizing One-Touch Spreadsheet (option) to creative visual feedback of machine's power consumption and carbon dioxide emissions.

Environmental effects

The product has excellent environmental performance to reduce power consumption and help mitigate climate change (decarbonization)

Green-Smart Machine Powered by Intelligent Technology

Achievement of high accuracy and high productivity with emissions reduction and energy saving

Shortening machine operation time to minimize power consumption while maintaining machining accuracy

High accuracy and high productivity

Thermo-Friendly Concept

The Okuma Intelligent Technology that enables machines to autonomously maintain high accuracy stability

Daily warm-ups, dimensional compensations

68 min → 3 min

LB3000 EX Ⅲ	LB4000 EX Ⅲ
Yearly: **0.6** t-CO_2/unit **Less**	Yearly: **0.7** t-CO_2/unit **Less**

Shorter warm-up and dimensional compensation times.
Note: Comparing a conventional machine with a lathe of the same size

Emissions reduction and energy saving

ECO suite plus

A system for an energy-saving society

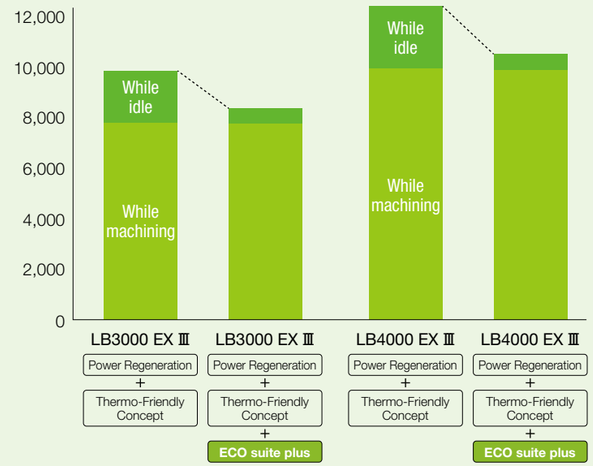
Further reductions in carbon dioxide emissions from energy-saving machine tools

LB3000 EX Ⅲ / LB4000 EX Ⅲ

15% Less

[Calculations]
60% utilization (8 hours per day, 220 days per year)
Assuming 68% of non-operation time used ECO Idling Stop

Power consumption [kW-h/yr]



Machine Specifications

			LB3000 EX Ⅲ (L)				LB3000 EX Ⅲ (M)			
			T	C × 500	C × 1000	C × 1300	T	C × 500	C × 1000	C × 1300
Capacity	Swing over bed	mm (in)	ø580 (ø22.83)							
	Swing over saddle	mm (in)	ø470 (ø18.50)							
	Distance between centers (W specs: DBN)	mm (in)	—	520 (20.47)	1,020 (40.16)	1,335 (52.56)	—	520 (20.47)	1,020 (40.16)	1,335 (52.56)
	Max turning dia	mm (in)	ø410 (ø16.14)				ø340 (ø13.39)			
	Max work length	mm (in)	250 (9.84)	500 (19.69)	1,000 (39.37)	1,300 (51.18)	250 (9.84)	500 (19.69)	1,000 (39.37)	1,300 (51.18)
Travels	X-axis	mm (in)	260 (10.24)							
	Z-axis	mm (in)	565 (22.24)		1,065 (41.93)	1,380 (54.33)	565 (22.24)		1,065 (41.93)	1,380 (54.33)
	Y-axis	mm (in)	—							
	W-axis	mm (in)	—							
	C-axis (minimum control angle)	deg	—				360 (0.001)			
Spindle	Speed	min⁻¹	45 to 5,000 {42 to 4,200} 〈30 to 3,000〉							
	Speed ranges		2 auto ranges (2 range motor coil switching)							
	Nose		JIS A2-6 {JIS A2-8} 〈JIS A2-11〉							
	Bore dia	mm (in)	ø80 {ø91} 〈ø112〉 (ø3.15 {ø3.58} 〈ø4.41〉)							
	Front bearing dia	mm (in)	ø120 {ø140} 〈ø160〉 (ø4.72 {ø5.51} 〈ø6.30〉)							
Sub spindle	Speed	min⁻¹	—							
	Speed ranges		—							
	Nose		—							
	Bore dia	mm (in)	—							
	Front bearing dia	mm (in)	—							
Turret	Type		V12				M-V12			
	No. of tools		L: 12				L / M: 12			
	OD tool shank	mm (in)	□25 (1 × 1)							
	ID tool shank dia	mm (in)	ø40 (ø1-1/2)							
	Turret rotation	sec/index	0.1							
Milling tool	Spindle speed	min⁻¹	—				45 to 6,000			
	Speed range		—				Infinitely variable			
Feed rates	Rapid traverse	m/min (ipm)	X: 30, Z: 30 (1,181, 1,181)							
	Tailstock rapids	m/min (ipm)	—	12 (472)			—	12 (472)		
	Rapid traverse (W)	m/min (ipm)	—				—			
	Rapid traverse (C)	min⁻¹	—				200			
Tailstock	Tapered bore type		—	MT No. 5 (revolving center)			—	MT No. 5 (revolving center)		
	Travels	mm (in)	—	515 (20.28)	1,015 (39.96)	1,330 (52.36)	—	515 (20.28)	1,015 (39.96)	1,330 (52.36)
Motors	Main spindle (30 min/cont)	kW (hp)	22/15 (30/20) [30/22 (40/30)] {30/22 (40/30)} 〈22/15 (30/20)〉							
	Sub-spindle	kW (hp)	—							
	Milling tool spindle	kW (hp)	—				7.1/4.1 (9.5/5.5) (25 min/cont)			
	Axis drive	kW (hp)	X: 2.8, Z: 3.5 (3.7, 4.7)							
	Tailstock travel	kW (hp)	—	2.9 (3.87)			—	2.9 (3.87)		
	Sub-spindle travel	kW (hp)	—							
	Coolant pump (50/60 Hz)	kW (hp)	SD: 0.25/0.25 (0.33/0.33) RD: 0.55/0.75 (0.73/1.00)			SD: 0.55/0.75 (0.73/1.00)	SD: 0.25/0.25 (0.33/0.33) RD: 0.55/0.75 (0.73/1.00)			SD: 0.55/0.75 (0.73/1.00)
Machine size	Height	mm (in)	1,770 (69.69)		1,820 (71.65)		1,770 (69.69)		1,820 (71.65)	
	Floor space*1 (side discharge L type tank)	mm (in)	2,764 × 1,899 (108.82 × 74.76)		3,844 × 2,083 (151.34 × 82.01)	4,344 × 2,083 (171.02 × 82.01)	2,764 × 1,899 (108.82 × 74.76)		3,844 × 2,083 (151.34 × 82.01)	4,344 × 2,083 (171.02 × 82.01)
	Floor space*1 (side discharge I type tank)	mm (in)	2,340 × 1,899 (92.13 × 74.76)		3,420 × 2,083 (134.65 × 82.01)	—	2,340 × 1,899 (92.13 × 74.76)		3,420 × 2,083 (134.65 × 82.01)	—
	Mass (w/ CNC)	kg (lb)	4,250 (9,350)	4,400 (9,680)	6,000 (13,200)	6,700 (14,740)	4,350 (9,570)	4,500 (9,900)	6,100 (13,420)	6,800 (14,960)
CNC			OSP-P500L							

SD: side discharge, RD: rear discharge, DBN: Distance between noses

			LB3000 EX Ⅲ (MY)				LB3000 EX Ⅲ (W)		LB3000 EX Ⅲ (MW)		LB3000 EX Ⅲ (MYW)	
			T	C × 450	C × 950	C × 1200	W × 500	W × 800	W × 500	W × 800	W × 450	W × 800
Capacity	Swing over bed	mm (in)	ø580 (ø22.83)									
	Swing over saddle	mm (in)	ø470 (ø18.50)									
	Distance between centers (W specs: DBN)	mm (in)	—	470 (18.50)	970 (38.19)	1,220 (48.03)	785 (30.91)	1,085 (42.72)	785 (30.91)	1,085 (42.72)	785 (30.91)	1,085 (42.72)
	Max turning dia	mm (in)	ø340 (ø13.39)				ø410 (ø16.14)		ø340 (ø13.39)			
	Max work length	mm (in)	250 (9.84)	450 (17.72)	950 (37.40)	1,200 (47.24)	—					
Travels	X-axis	mm (in)	260 (10.24)									
	Z-axis	mm (in)	510 (20.08)		1,010 (39.76)	1,255 (49.41)	565 (22.24)	1,065 (41.93)	550 (21.65)	995 (39.17)	510 (20.08)	1,010 (39.76)
	Y-axis	mm (in)	120 (+70 to –50) (4.72 (+2.76 to –1.97))				—				115 (+70 to –45) (4.53 (+2.76 to –1.77))	
	W-axis	mm (in)	—				595 (23.43)	825 (32.48)	595 (23.43)	825 (32.48)	595 (23.43)	825 (32.48)
	C-axis (minimum control angle)	deg	360 (0.001)				—		360 (0.001)			
Spindle	Speed	min⁻¹	45 to 5,000 {42 to 4,200} 〈30 to 3,000〉									
	Speed ranges		2 auto ranges (2 range motor coil switching)									
	Nose		JIS A2-6 {JIS A2-8} 〈JIS A2-11〉									
	Bore dia	mm (in)	ø80 {ø91} 〈ø112〉 (ø3.15 {ø3.58} 〈ø4.41〉)									
	Front bearing dia	mm (in)	ø120 {ø140} 〈ø160〉 ((ø4.72 {ø5.51} 〈ø6.30〉)									
Sub spindle	Speed	min⁻¹	—				50 to 6,000					
	Speed ranges		—				2 auto ranges (2 range motor coil switching)					
	Nose		—				ø140 flat					
	Bore dia	mm (in)	—				ø62 (ø2.44)					
	Front bearing dia	mm (in)	—				ø100 (ø3.94)					
Turret	Type		M-V12				V12		M-V12			
	No. of tools		L / M: 12				L: 12		L / M: 12			
	OD tool shank	mm (in)	□25 (1 × 1)									
	ID tool shank dia	mm (in)	ø40 (ø1-1/2)									
	Turret rotation	sec/index	0.1									
Milling tool	Spindle speed	min⁻¹	45 to 6,000				—		45 to 6,000			
	Speed range		Infinitely variable				—		Infinitely variable			
Feed rates	Rapid traverse	m/min (ipm)	X: 30, Z: 30, Y:15 (1,181, 1,181,591)				X: 30, Z: 30 (1,181, 1,181)				X: 30, Z: 30, Y:15 (1,181, 1,181, 591)	
	Tailstock rapids	m/min (ipm)	—	12 (472)			—					
	Rapid traverse (W)	m/min (ipm)	—				30 (1,181)					
	Rapid traverse (C)	min⁻¹	200				—		200			
Tailstock	Tapered bore type		—	MT No. 5 (revolving center)			—					
	Travels	mm (in)	—	515 (20.28)	1,015 (39.96)	1,330 (52.36)	—					
Motors	Main spindle (30 min/cont)	kW (hp)	22/15 (30/20) [30/22 (40/30)] {30/22 (40/30)} 〈22/15 (30/20)〉									
	Sub-spindle	kW (hp)	—				11/7.5 (15/10) (20 min/cont)					
	Milling tool spindle	kW (hp)	7.1/4.1 (9.5/5.5) (25 min/cont)				—		7.1/4.1 (9.5/5.5) (25 min/cont)			
	Axis drive	kW (hp)	X: 3.5, Z: 4.6, Y: 3.5 (4.7, 6.1, 4.7)				X: 2.8, Z: 3.5 (3.7, 4.7)				X: 3.5, Z: 4.6, Y: 3.5 (4.7, 6.1, 4.7)	
	Tailstock travel	kW (hp)	—	2.9 (3.87)			—					
	Sub-spindle travel	kW (hp)	—				2.8 (3.73)					
	Coolant pump (50/60 Hz)	kW (hp)	SD: 0.25/0.25 (0.33/0.33) RD: 0.55/0.75 (0.73/1.00)			SD: 0.55/0.75 (0.73/1.00)	SD: 0.25/0.25 (0.33/0.33) RD: 0.55/0.75 (0.73/1.00)					
Machine size	Height	mm (in)	2,250 (88.58)		2,300 (90.55)		1,770 (69.69)	1,820 (71.65)	1,770 (69.69)	1,820 (71.65)	2,250 (88.58)	2,300 (90.55)
	Floor space*1 (side discharge L type tank)	mm (in)	2,764 × 1,899 (108.82 × 74.76)		3,844 × 2,083 (151.34 × 82.01)	4,344 × 2,083 (171.02 × 82.01)	3,164 × 1,959 (124.57 × 77.13)	3,844 × 2,083 (151.34 × 82.01)	3,164 × 1,959 (124.57 × 77.13)	3,844 × 2,083 (151.34 × 82.01)	3,274 × 1,959 (128.90 × 77.13)	3,844 × 2,083 (151.34 × 82.01)
	Floor space*1 (side discharge I type tank)	mm (in)	2,340 × 1,899 (92.13 × 74.76)		3,420 × 2,083 (134.65 × 82.01)	—	2,740 × 1,959 (107.87 × 77.13)	3,420 × 2,083 (134.65 × 82.01)	2,740 × 1,959 (107.87 × 77.13)	3,420 × 2,083 (134.65 × 82.01)	2,850 × 1,959 (112.20 × 77.13)	3,420 × 2,083 (134.65 × 82.01)
	Mass (w/ CNC)	kg (lb)	4,850 (10,670)	5,000 (11,000)	6,600 (14,520)	7,400 (16,280)	4,650 (10,230)	6,250 (13,750)	4,750 (10,450)	6,350 (13,970)	5,250 (11,550)	6,850 (15,070)
CNC			OSP-P500L									

[ ]: High power spindle specs { }: Big-Bore spindle specs < >: Super Big-Bore spindle specs
*1. Standard spindle, chip conveyor side discharge specs; including tank.

Machine Specifications

			LB4000 EX Ⅲ (L)				LB4000 EX Ⅲ (M)			
			T	C × 750	C × 1500	C × 2000	T	C × 750	C × 1500	C × 2000
Capacity	Swing over bed	mm (in)	ø670 (ø26.38)							
	Swing over saddle	mm (in)	ø480 (ø18.90)							
	Distance between centers (W specs: DBN)	mm (in)	—	770 (30.31)	1,520 (59.84)	2,170 (85.43)	—	770 (30.31)	1,520 (59.84)	2,170 (85.43)
	Max turning dia	mm (in)	ø480 (ø18.90)				ø430 (ø16.93)			
	Max work length	mm (in)	380 (14.96)	750 (29.53)	1,500 (59.06)	2,150 (84.65)	380 (14.96)	750 (29.53)	1,500 (59.06)	2,150 (84.65)
Travels	X-axis	mm (in)	300 (11.81)							
	Z-axis	mm (in)	840 (33.07)		1,590 (62.60)	2,240 (88.19)	840 (33.07)		1,590 (62.60)	2,240 (88.19)
	Y-axis	mm (in)	—							
	W-axis	mm (in)	—							
	C-axis (minimum control angle)	deg	—				360 (0.001)			
Spindle	Speed	min^{-1}	42 to 4,200 {30 to 3,000} ⟨12 to 1,400⟩							
	Speed ranges		2 auto ranges (2 range motor coil switching) ⟨Infinitely variable⟩							
	Nose		JIS A2-8 {JIS A2-11} ⟨JIS A2-15⟩							
	Bore dia	mm (in)	ø91 {ø112} ⟨ø185⟩ (ø3.58 {ø4.41} ⟨ø7.28⟩)							
	Front bearing dia	mm (in)	ø140 {ø160} ⟨ø240⟩ (ø5.51 {ø6.30} ⟨ø9.45⟩)							
Sub spindle	Speed	min^{-1}	—							
	Speed ranges		—							
	Nose		—							
	Bore dia	mm (in)	—							
	Front bearing dia	mm (in)	—							
Turret	Type		V12				M-V12			
	No. of tools		L: 12				L / M: 12			
	OD tool shank	mm (in)	□25 (1 × 1)							
	ID tool shank dia	mm (in)	ø40 (ø1-1/2)							
	Turret rotation	sec/index	0.2							
Milling tool	Spindle speed	min^{-1}	—				45 to 6,000			
	Speed range		—				Infinitely variable			
Feed rates	Rapid traverse	m/min (ipm)	X: 30, Z: 30 (1,181, 1,181)							
	Tailstock rapids	m/min (ipm)	—	12 (472)			—	12 (472)		
	Rapid traverse (W)	m/min (ipm)	—							
	Rapid traverse (C)	min^{-1}	—				200			
Tailstock	Tapered bore type		—	MT No. 5 (revolving center)			—	MT No. 5 (revolving center)		
	Travels	mm (in)	—	780 (30.71)	1,530 (60.24)	2,180 (85.83)	—	780 (30.71)	1,530 (60.24)	2,180 (85.83)
Motors	Main spindle (30 min/cont)	kW (hp)	30/22 (40/30) {37/30 (50/40)}⟨37/30 (50/40)⟩							
	Sub-spindle	kW (hp)	—							
	Milling tool spindle	kW (hp)	—				7.5/4.3 (10/5.7) (25 min/cont)			
	Axis drive	kW (hp)	X: 3.5, Z: 4.6 (4.7, 6.1)							
	Tailstock travel	kW (hp)	—	2.9 (3.87)			—	2.9 (3.87)		
	Sub-spindle travel	kW (hp)	—							
	Coolant pump (50/60 Hz)	kW (hp)	SD: 0.25/0.25 (0.33/0.33) RD: 0.55/0.75 (0.73/1.00)		SD: 0.25/0.25 (0.33/0.33)	SD: 0.55/0.75 (0.73/1.00)	SD: 0.25/0.25 (0.33/0.33) RD: 0.55/0.75 (0.73/1.00)		SD: 0.25/0.25 (0.33/0.33)	SD: 0.55/0.75 (0.73/1.00)
Machine size	Height	mm (in)	1,955 (76.97)		*1		1,955 (76.97)		*1	
	Floor space*2 (side discharge L type tank)	mm (in)	3,534 × 2,059 (139.13 × 81.06)		*1		3,534 × 2,059 (139.13 × 81.06)		*1	
	Floor space*2 (side discharge I type tank)	mm (in)	3,100 × 2,059 (122.05 × 81.06)		*1		3,100 × 2,059 (122.05 × 81.06)		*1	
	Mass (w/ CNC)	kg (lb)	6,000 (13,200)	6,300 (13,860)	*1		6,100 (13,420)	6,400 (14,080)	*1	
CNC			OSP-P500L							

SD: side discharge, RD: rear discharge, DBN: Distance between noses

LB4000 EX Ⅲ (MY)				LB4000 EX Ⅲ (MW)	LB4000 EX Ⅲ (MYW)
T	C × 750	C × 1500	C × 2000	W × 720	W × 720
ø670 (ø26.38)					
ø480 (ø18.90)					
—	770 (30.31)	1,520 (59.84)	2,170 (85.43)	1,098 (43.23)	
ø430 (ø16.93)					
380 (14.96)	750 (29.53)	1,500 (59.06)	2,150 (84.65)	—	
300 (11.81)					
840 (33.07)		1,590 (62.60)	2,240 (88.19)	840 (33.07)	
140 (±70) (5.51 (±2.76))				—	140 (±70) (5.51 (±2.76))
—				800 (31.50)	
360 (0.001)					
42 to 4,200 {30 to 3,000} ⟨12 to 1,400⟩					
2 auto ranges (2 range motor coil switching) ⟨Infinitely variable⟩					
JIS A2-8 {JIS A2-11} ⟨JIS A2-15⟩					
ø91 {ø112} ⟨ø185⟩ (ø3.58 {ø4.41} ⟨ø7.28⟩)					
ø140 {ø160} ⟨ø240⟩ (ø5.51 {ø6.30} ⟨ø9.45⟩)					
—				50 to 5,000	
—				2 auto ranges (2 range motor coil switching)	
—				JIS A2-6	
—				ø80 (ø3.15)	
—				ø120 (ø4.72)	
M-V12					
L / M: 12					
□25 (1 × 1)					
ø40 (ø1-1/2)					
0.2					
45 to 6,000					
Infinitely variable					
X: 30, Z: 30, Y: 15 (1,181, 1,181 , 591)				X: 30, Z: 30 (1,181, 1,181)	X: 30, Z: 30, Y: 15 (1,181, 1,181 , 591)
—	12 (472)			—	
—				30 (1,181)	
200					
—	MT No. 5 (revolving center)			—	
—	780 (30.71)	1,530 (60.24)	2,180 (85.83)	—	
30/22 (40/30) {37/30 (50/40)}⟨37/30 (50/40)⟩					
—				22/15 (30/20) (5 min/cont)	
7.5/4.3 (10/5.7) (25 min/cont)					
X: 3.5, Z: 4.6, Y: 3.5 (4.7, 6.1, 4.7)				X: 3.5, Z: 4.6 (4.7, 6.1)	X: 3.5, Z: 4.6, Y: 3.5 (4.7, 6.1, 4.7)
—	2.9 (3.87)			—	
—				3.5 (4.7)	
SD: 0.25/0.25 (0.33/0.33) RD: 0.55/0.75 (0.73/1.00)		SD: 0.25/0.25 (0.33/0.33)	SD: 0.55/0.75 (0.73/1.00)	SD: 0.25/0.25 (0.33/0.33) RD: 0.55/0.75 (0.73/1.00)	
2,320 (91.34)		2,390 (94.09)	*1	*1	2,320 (91.34)
3,534 × 2,059 (139.13 × 81.06)		4,549 × 2,249 (179.09 × 88.54)	*1	*1	*1
3,100 × 2,059 (122.05 × 81.06)		*1	*1	*1	3,700 × 2,119 (145.67 × 83.43)
6,400 (14,080)	6,700 (14,740)	8,600 (18,920)	*1	*1	7,100 (15,620)
OSP-P500L					

{ }: Big-Bore spindle specs < >: Super Big-Bore spindle specs

*1. Details are currently under consideration.

*2. Standard spindle, chip conveyor side discharge specs; including tank.

LB EX Ⅲ Series Standard Specifications & Accessories

Specifications	LB3000 EX Ⅲ								
	L		M		MY		W	MW	MYW
	T	C	T	C	T	C			
Spindle	A2-6 45 to 5,000 min^{-1} 22/15 kW (30 min/cont)								
Sub spindle	—						ø140 flat, 50 to 6,000 min^{-1} 11/7.5 kW (20 min/cont)		
Turret	NC indexing								
	V12 bolt clamp		M-V12 radial				V12 bolt clamp	M-V12 radial	
Milling tool	—		45 to 6,000 min^{-1} 7.1/4.1 kW (25 min/cont)				—	45 to 6,000 min^{-1} 7.1/4.1 kW (25 min/cont)	
Tailstock	—	NC travel MT No. 5	—	NC travel MT No. 5	—	NC travel MT No. 5	—		
Standard accessories	Coolant system (water soluble), Work lamp, Full enclosure shielding, Jack screws, foundation washers, Hand tools								
Standard Specifications	Door interlock, Lube monitor (A-1) + hydraulic source pressure detector								
	Chuck auto open/close confirm						Chuck auto open/close confirm (main/sub) Chuck air blow (main/sub) Chuck open/close during spindle rotation		
CNC	OSP-P500L								

Specifications	LB4000 EX Ⅲ							
	L		M		MY		MW	MYW
	T	C	T	C	T	C		
Spindle	A2-8 42 to 4,200 min^{-1} 30/22 kW (30 min/cont)							
Sub spindle	—						A2-6 50 to 5,000 min^{-1} 22/15 kW (5 min/cont)	
Turret	NC indexing							
	V12 bolt clamp		M-V12 radial					
Milling tool	—		45 to 6,000 min^{-1} 7.5/4.3 kW (25 min/cont)					
Tailstock	—	NC travel MT No. 5	—	NC travel MT No. 5	—	NC travel MT No. 5	—	
Standard accessories	Coolant system (water soluble), Work lamp, Full enclosure shielding, Jack screws, foundation washers, Hand tools							
Standard Specifications	Door interlock, Lube monitor (A-1) + hydraulic source pressure detector							
	Chuck auto open/close confirm						Chuck auto open/close confirm (main/sub) Chuck air blow (main/sub) Chuck open/close during spindle rotation	
CNC	OSP-P500L							

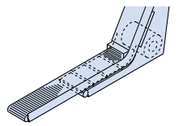
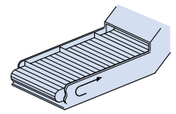
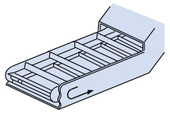
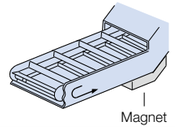
LB EX Ⅲ Series Optional Specs & Accessories

	LB3000 EX Ⅲ	LB4000 EX Ⅲ
Spindle	Big-Bore spindle specs Bore diameter ø91 mm JIS A2-8 42 to 4,200 min^{-1} 30/22 kW (30 min/cont) Super Big-Bore spindle specs Bore diameter ø112 mm JIS A2-11 30 to 3,000 min^{-1} 22/15 kW (30 min/cont) High power spindle specs: 30/22 kW (30 min/cont)	Big-Bore spindle specs Bore diameter ø112 mm JIS A2-11 30 to 3,000 min^{-1} 37/30 kW (30 min/cont) Super Big-Bore spindle specs Bore diameter ø185 mm JIS A2-15 12 to 1,400 min^{-1} 37/30 kW (30 min/cont)
Turret	V12 turret (VDI), M-12 turret (VDI)	
Chucking	Chuck high/low pressure switch, Chucking miss detection, Work stopper in spindle, NC command for chuck clamp pressure	
Gauges	In-process workpiece gauging, Touch Setter M (manual), A (auto)	
Tailstock	Revolving center: MT No. 5, Self-traveling (hydraulic quill) tailstock High thrust specs, Tailstock thrust high/low switch Tailstock taper: Built-in center MT No. 4 / Threaded center MT No. 4	Tailstock taper: Built-in center MT No. 5 / Threaded center MT No. 5
Kit specs	Chucking Kit, Tooling Kit	
Steady rests	Rollers (fixed position), Auto steady rest (self-centering)	
Lubrication	Lube monitor B-2, C-1, C-2	
Hydraulic unit	Inverter	
Coolant	Shower coolant A,B, Spindle ID coolant A,B, Special coolant pump High/low coolant pressure switch, Sludge control, Flow / Level detection, Mist collector, Workpiece wash gun High pressure coolant 4 MPa, 7 MPa, Sludgeless Tank	
Air	Air blow (blast; chuck*1, tailstock, spindle ID, turret), Air gun mounted	
Cover	Auto open/close of the door on the front (air-driven door, electric door)	Front door with large window
Chip handling	Chip pan side or rear, Chip conveyor*2 side or rear discharge L / H, Chip bucket L / H	
Dustproofing	Air purge, double wiper	
Automation	Bar feeder, Parts catcher, workrest, Robots, NC loaders	
	ARMROID	
High accuracy specifications	AbsoScale, Turcite® lining, Temperature regulators (spindle, hydraulic oil, coolant), Z-axis pre-tensioned ball-screw, TAS-C*3 (Thermo Active Stabilizer–Construction)	

*1. Mounted as a standard on Sub-spindle specs
*2. Rear discharge is not available with the LB3000 EX Ⅲ C × 1200 and C × 1300 specifications and the LB4000 EX Ⅲ C × 1500 and C × 2000 specifications.
*3. Mounted as a standard on Y-axis specs
It is recommended to select this when coolant temperature changes substantially due to the selection of a high pressure coolant unit and other reasons.

Various chip conveyors

Chip conveyor types and application

Type	Hinge + Scraper with drum filter	Hinge	Scraper	Magnet scraper
Application	For steel, castings, nonferrous metal	For steel	For castings	For castings
Features	Filtration of long and short chips and coolant	General use	Magnet scraper more effective for sludge disposal Easy maintenance Blade scraper	Effective with sludge Not suited for nonferrous metals
Shape				

Note: The machine may need to be raised (platform) depending on the type of chip conveyor. Becomes hinge + scraper (with drum filter) if Sludgeless Tank (option) is selected.

Chucking Kit / Tooling Kit

Specifications	LB3000 EX Ⅲ												
	Std Chucking Kit	L Std Tooling Kit	L Chucking Kit BR Kit	L Chucking Kit E Kit	L Chucking Kit D Kit	M Chucking Kit BR Kit	M Chucking Kit E Kit	M Chucking Kit D Kit	MY Chucking Kit BR Kit	MY Chucking Kit E Kit	MY Chucking Kit D Kit	Std Chucking Kit	LW Std Sub Chucking Kit	Std Tooling Kit	MW Tooling Kit
Chuck	Solid 8-in N-08A6		*1	*2	*3	*1	*2	*3	*1	*2	*3	Solid 8-in N-08A6			
Sub-spindle chuck													Hollow 6-in B206		
Soft jaws, A				5			5			5					
Soft jaws, B				3			3			3					
Convex hard jaws			1			1			1						
Three-step hard jaws				1			1			1					
Two-step hard jaws					1			1			1				
OD-Ⅰ		4		6			6			4 (T specs: 3)					
OD-Ⅱ		2		3			2			2					
OD-Ⅰ-S														2	3
OD-Ⅱ-S														2	1
OD-Ⅲ-S														2	
ID-H40		6		6			3			3					
ID-Ⅰ-S														4	
ID-Ⅱ-S														2	
ID-Ⅲ-S														1	
ID-H40-S (main)															3
ID-Ⅰ-S (H40) (sub)															2
DS MT No. 1-H40				1											
DS MT No. 2-H40				1											
DS MT No. 3-H40		1		1			1			1				1	
DS MT No. 4-H40				1											
BS 10-H40				2			2			2					
BS 12-H40				2			2			2					1
BS 16-H40				2			2			2					2
BS 20-H40		2		2			2			2					2
BS 25-H40		2		2			2			2				2	2
BS 32-H40				2			2			2				2	
BS 12-H20														1	
BS 16-H20														2	
Axial mill/drill unit							2			2					2
Radial mill/drill unit							2			2					2
Dummy holder							3			3					3
Revolving center*4 MT No. 5							1			1					

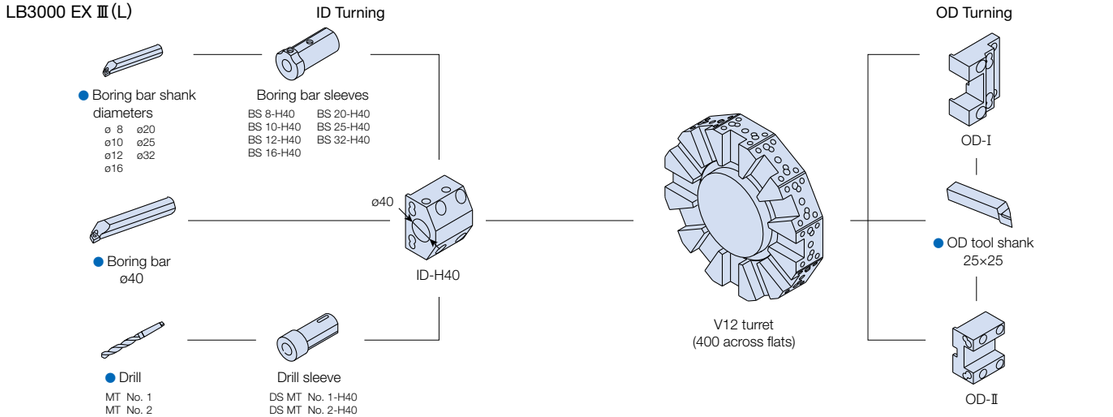
*1. Hollow 8-in BR08A6
*2. Hollow 8-in B-208A6
*3. Hollow 10-in B-210A6
*4. Tailstock, MT No. 5; not for T specs
Note: For BR chucks, it is possible to select Tnut-Plus, a special T nut that can improve the mounting accuracy at the time of attaching and detaching the jaw in comparison with the standard T nut. (option) (Note that Tnut-Plus does not improve workpiece gripping accuracy.)

Specifications	LB4000 EX Ⅲ											
	Std Chucking Kit	L Std Tooling Kit	Chucking Kit BR Kit	Chucking Kit E Kit	Chucking Kit D Kit	M Chucking Kit BR Kit	M Chucking Kit E Kit	M Chucking Kit D Kit	MY Chucking Kit BR Kit	MY Chucking Kit E Kit	MY Chucking Kit D Kit	MW Tooling Kit
Chuck	Solid 10-in N-10A8		*1	*2	*3	*1	*2	*3	*1	*2	*3	
Soft jaws, A				5			5			5		
Soft jaws, B				3			3			3		
Three-step hard jaws			1			1			1			
Two-step hard jaws				1	1		1	1		1	1	
OD-Ⅰ		4		6			6			6		
OD-Ⅱ		2		3			2			2		
OD-Ⅰ-S												3
OD-Ⅱ-S												1
ID-H40		6		6			4			4		
ID-H40-S (main)												4
ID-Ⅰ-S (H40) (sub)												2
DS MT No. 1-H40				1								
DS MT No. 2-H40				1								
DS MT No. 3-H40		1		1			1			1		
DS MT No. 4-H40				1								
BS 10-H40				2			2			2		2
BS 12-H40				2			2			2		2
BS 16-H40				2			2			2		2
BS 20-H40		2		2			2			2		2
BS 25-H40		2		2			2			2		2
BS 32-H40				2			2			2		2
Axial mill/drill unit							2			2		2
Radial mill/drill unit							2			2		2
Dummy holder							3			3		3
Revolving center*4 MT No. 5							1			1		

*1. Hollow 10-in BR10A8
*2. Hollow 10-in B-210A8
*3. Hollow 12-in B-212A8
*4. Tailstock, MT No. 5; not for T specs
Note: For BR chucks, it is possible to select Tnut-Plus, a special T nut that can improve the mounting accuracy at the time of attaching and detaching the jaw in comparison with the standard T nut. (option) (Note that Tnut-Plus does not improve workpiece gripping accuracy.)

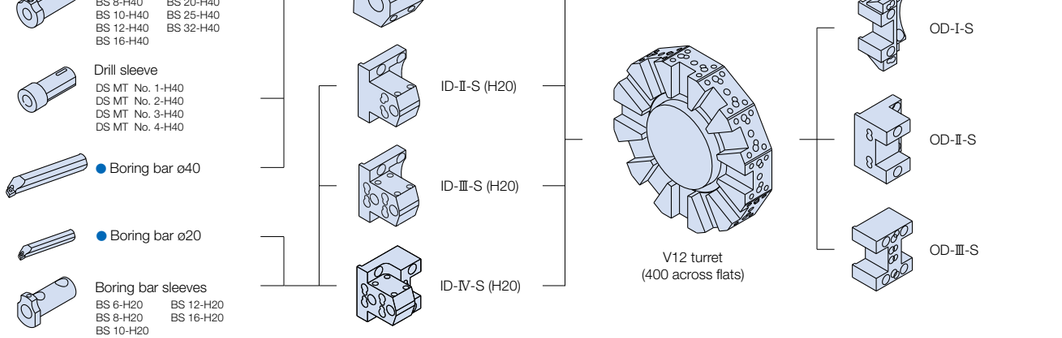
Tooling System Unit: mm

LB3000 EX Ⅲ(L)



Notes: Select an ID oil-hole toolholder base (option) for oil-hole drills and boring bars.
LB300 shares the same tooling
● Commercially available items

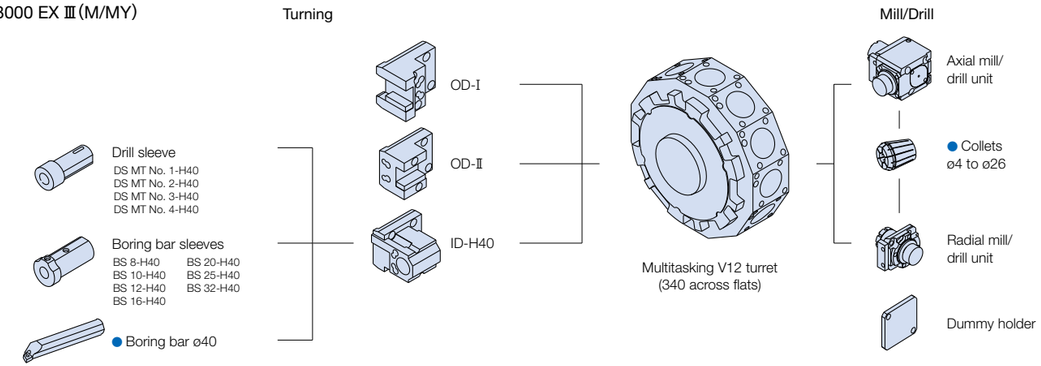
LB3000 EX Ⅲ(W)



Notes: Select an ID oil-hole toolholder base (option) for oil-hole drills and boring bars.
LB300-W shares the same tooling
● Commercially available items

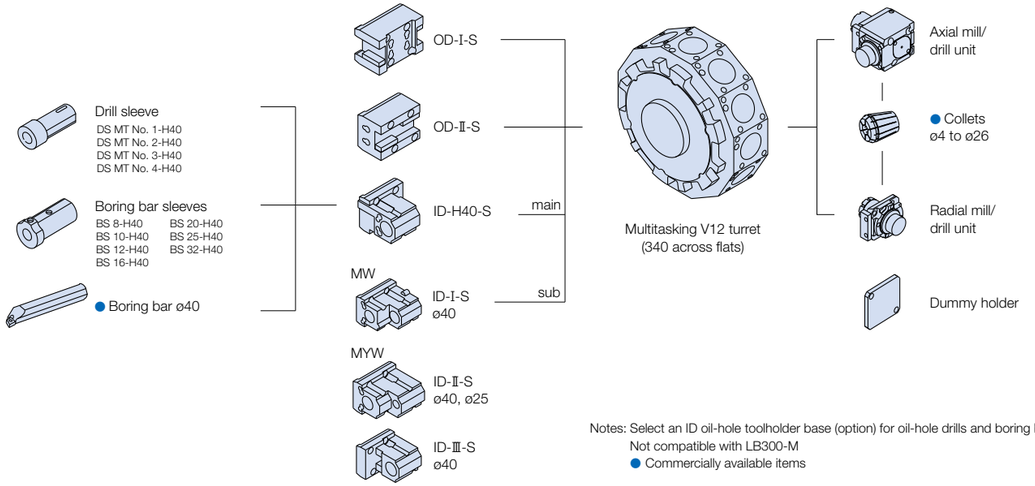
Tooling System Unit: mm

LB3000 EX Ⅲ(M/MY)



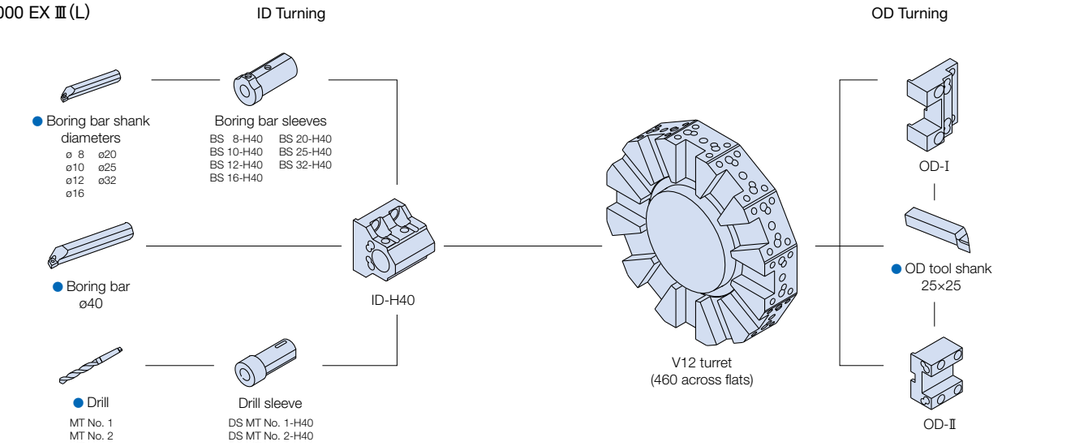
Notes: Select an ID oil-hole toolholder base (option) for oil-hole drills and boring bars.
Not compatible with LB300-M
● Commercially available items

LB3000 EX Ⅲ(MW/MYW)



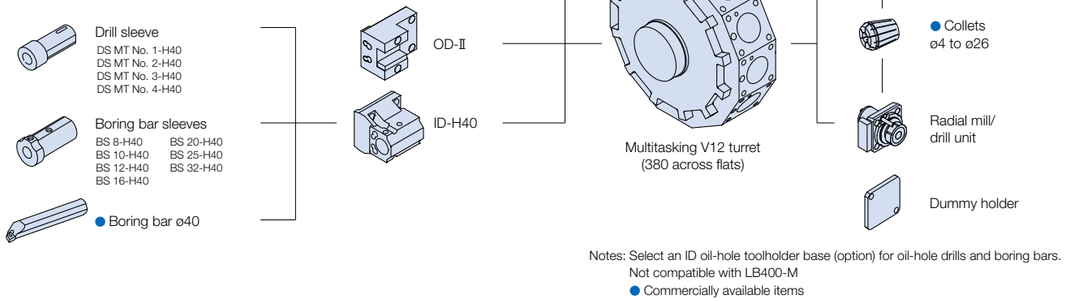
Notes: Select an ID oil-hole toolholder base (option) for oil-hole drills and boring bars.
Not compatible with LB300-M
● Commercially available items

LB4000 EX Ⅲ(L)



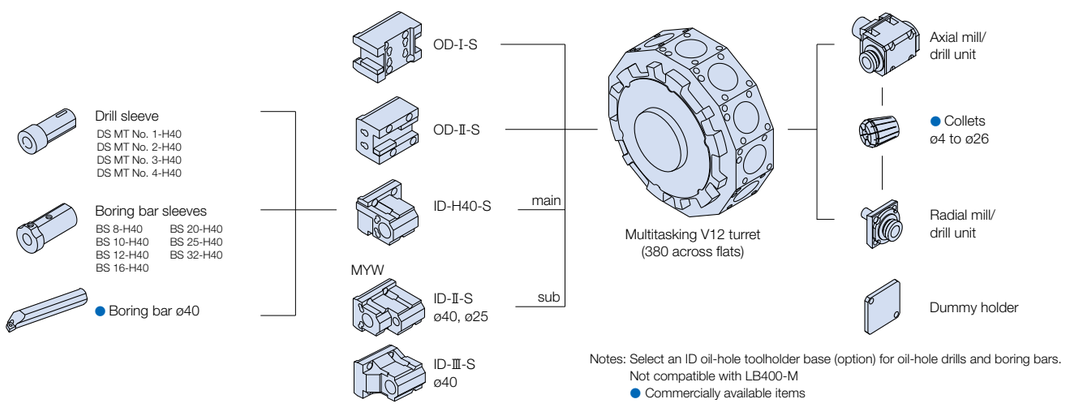
Notes: Select an ID oil-hole toolholder base (option) for oil-hole drills and boring bars.
LB400 same tooling, except for ID-H40.
● Commercially available items

LB4000 EX Ⅲ(M/MY)



Notes: Select an ID oil-hole toolholder base (option) for oil-hole drills and boring bars.
Not compatible with LB400-M
● Commercially available items

LB4000 EX Ⅲ(MYW)



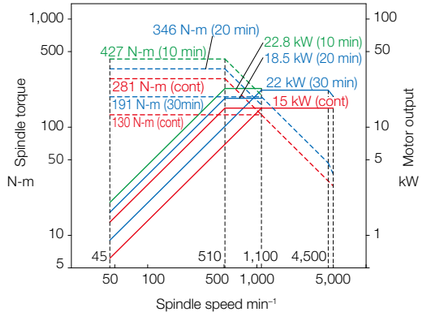
Notes: Select an ID oil-hole toolholder base (option) for oil-hole drills and boring bars.
Not compatible with LB400-M
● Commercially available items

The spindle lineup

LB3000 EX Ⅲ

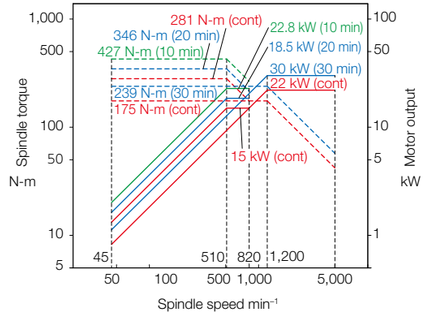
Standard spindle

ø120 5,000 min⁻¹
Max output: 22/15 kW (30 min/cont)
Max torque: 427/346/281 N-m (10 min/20 min/cont)



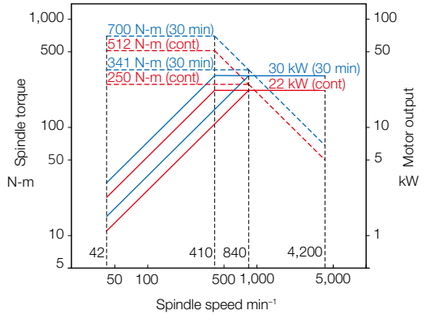
High power spindle (option)

ø120 5,000 min⁻¹
Max output: 30/22 kW (30 min/cont)
Max torque: 427/346/281 N-m (10 min/20 min/cont)



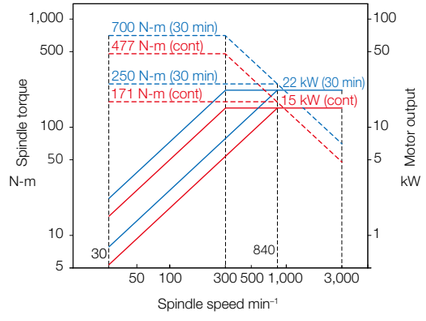
Big-Bore spindle (option)

ø140 4,200min⁻¹
Max output: 30/22 kW (30 min/cont)
Max torque: 700/512 N-m (30 min/cont)



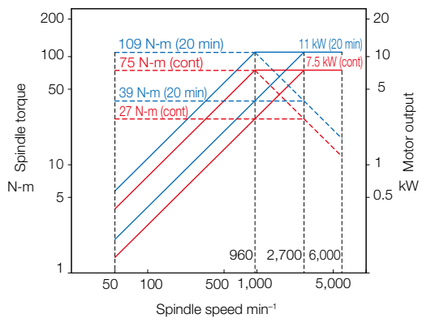
Super Big-Bore spindle (option)

ø160 3,000 min⁻¹
Max output: 22/15 kW (30 min/cont)
Max torque: 700/477 N-m (30 min/cont)



Sub spindle

ø100 6,000 min⁻¹
Max output: 11/7.5 kW (20 min/cont)
Max torque: 109/75 N-m (20 min/cont)

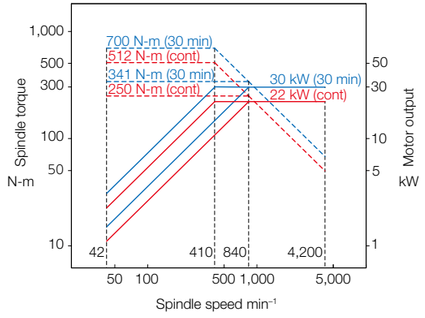


The spindle lineup

LB4000 EX Ⅲ

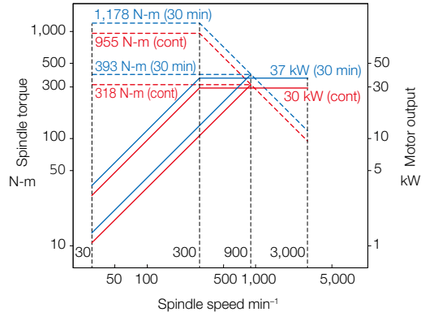
Standard spindle

ø140 4,200min⁻¹
Max output: 30/22 kW (30 min/cont)
Max torque: 700/512 N-m (30 min/cont)



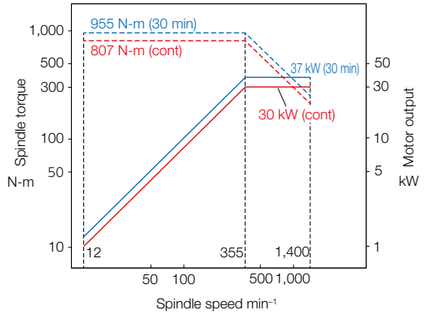
Big-Bore spindle (option)

ø160 3,000min⁻¹
Max output: 37/30 kW (30 min/cont)
Max torque: 1,178/955 N-m (30 min/cont)



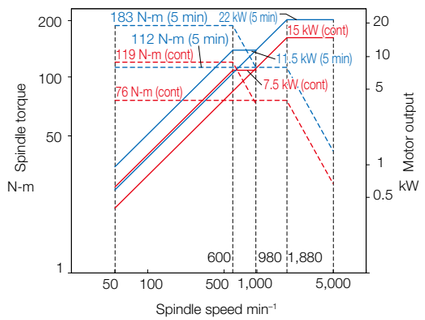
Super Big-Bore spindle (option)

ø240 1,400 min⁻¹
Max output: 37/30 kW (30 min/cont)
Max torque: 955/807 N-m (30 min/cont)



Sub spindle

ø120 5,000 min⁻¹
Max output: 22/15 kW (5 min/cont)
Max torque: 183/119 N-m (5 min/cont)



Standard Specifications

Basic Specs	Control	Turning: X, Z simultaneous 2-axis, Multitasking: X, Z, C (or Y) simultaneous 3-axis
	Position feedback	OSP full range absolute position feedback (zero point return not required)
	Min / Max command	±99999.999 mm, ±99999.999° 8-digit decimal, command units: 0.001 mm, 0.01 mm, 1 mm, 0.001°, 0.01°, 1°
	Feed override	Cutting feed override 0 to 200%, rapid traverse override 0 to 100%
	Spindle override	Turning spindle override: 50 to 200%, M-spindle override (milling specs): 30 to 300%
	Tool information management	Compensation, life management, shape data, etc. are collectively managed for each tool (1,000 tools can be registered)
	Tool compensation	Tool offset, nose R compensation (for milling, tool diameter compensation), tool wear compensation, Number of comp sets: 2 sets for each of the registered tools (up to 1,000 tools) However, the maximum number of total sets (standard) is 32
	Operation panel	15-inch operation panel (15-inch XGA screen + multi-touch panel operations), operation panel tilt adjustment, Portable pulse handle (type A), keyboard QWERTY layout, window operation that is optimal on machine shops
	Security	Operator authentication, lock screen, OSP-VPSII-STD
Machining programming	Program capacity	Program storage: 4 GB, operation buffer: 2 MB
	Programming	Program editing, file name index display, scheduled programs, combined use of mm/min, zero shift, basic interpolation, Circular radius designate, taper angle designate, threading (lead thread ridge designate, variable lead thread, Chamfering while threading, multiple threads by specifying phase difference, fixed threading cycle (single cycle, multiple cycles)), Threading slide hold (pause for threading during fixed cycle), auto chamfering, arbitrary angle chamfering, Auto programming for turning (LAP 4), fixed cycle for tapers, groove cutting/spindle drilling cycle, Specs for M-spindle machines (fixed drilling cycles, synchronized tapping, keyway cycle), user task (GOTO statement, IF statement, arithmetic operations, IF/THEN, DO/WHILE, GOTO (variables) statement, functional operations, Logical operations, Inverse trigonometric functions, common variables (Standard: 200 sets), local variables, system variables, Sub-programs, G-/M-code macros (G-code: 20 sets, M-code: 20 sets), READ/WRITE/GET/PUT) Block skip (number of sets: 1), oriented spindle stop, spindle phase synchronizing, programming help
Operations	OSP suite	Various “suite apps” support the series of machining operations, and “suite operation” enables one-touch access to those apps
	Easy Operation	“Single-mode operation” to complete a series of operations, “Setup data” to set the setup data easily, “Soft jaw machining” to automatically machine soft jaws
	Operations	Sequence return, tool restart, sequence number search, manual interrupt & auto return, MDI input, tool compensation change, Library programs, parameter I/O, relative actual position display, PLC monitor, operation help, alarm help
Monitoring, adaptive control		Load meter display, synchronized tapping torque monitor, maintenance monitor, collection of log data for maintenance, ServoNavi AP, local variables display, display of remaining machining time
MacMan plus		Aggregation and display of machining records, operating records, operating history and trouble information, Visualization of power consumption, output of records and trouble info file
Communications/Networks		USB3.0 interface (2 ports), Ethernet, DNC-T1, Smart I/F (Connect Plan interface), browser
High-Speed/ High-Accuracy Functions		Hi-G control, cycle time reduction (machining time reduction, easy parameter setting), rapid traverse droop, exact stop check, C-axis pitch error compensation (milling specs), variable lost motion compensation, turret position error comp
Energy-saving functions	ECO suite plus	ECO Idling Stop, ECO Operation, ECO Power Monitor*1
	Power Regeneration System	Regenerative power is used when the spindle and feed axes decelerate to reduce energy waste

*1. The displayed power is an approximate value. If you need an accurate power value, please select the option to attach a wattmeter.

Kit specs

			NML NML-M E	NML NML-M D	OT-IGF OTM E	OT-IGF OTM D	Digital twin Digital twin-M E	Digital twin Digital twin-M D	Digital twin Digital twin-M VE	Digital twin Digital twin-M VD	Digital twin OT-IGF Digital twin OTM E	Digital twin OT-IGF Digital twin OTM D	Digital twin OT-IGF Digital twin OTM VE	Digital twin OT-IGF Digital twin OTM VD
Interactive functions	Advanced One-Touch IGF-L (including real 3-D Simulation)				□	□					□	□	□	□
	(Turning: L, LW Milling: M, MW, MY, MYW)													
	Smart OSP Operation	Machining process chart preparation, editing and operating functions			●	●	●	●	●	●	●	●	●	●
		Task support functions using the setup process chart												
		Automatic decision of the turning process in the machining process chart			●	●	●	●	●	●	●	●	●	●
Digital Twin On Machine	Virtual machining						●	●	●	●	●	●	●	●
	Quick modeling						●	●	●	●	●	●	●	●
	OPC UA for Machine Tools						●	●	●	●	●	●	●	●
	OSP API KIT						●	●	●	●	●	●	●	●
Digital Twin On PC	Virtual machining								●	●			●	●
	Quick modeling								●	●			●	●
Programming Machining Operations	Program notes			●		●		●		●		●		●
	Work coordinate system select	10 sets		▲		▲		▲		▲		▲		▲
	Functions for milling specs	Change of coordinates	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
		Profile generate	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
	Threading	Circular threading		●		●		●		●		●		●
		Pause for threading during non-fixed cycle	●	●	●	●	●	●	●	●	●	●	●	●
	Harmonic Spindle Speed Control (HSSC)		●	●	●	●	●	●	●	●	●	●	●	●
	Mid-block sequence return			●		●		●		●		●		●
Tool management	Tool life management (including prior notice of tool life)			●		●		●		●		●		●
Monitoring	Real 3-D Simulation				●	●	●	●	●	●	●	●	●	●
	Cycle time over check		●	●	●	●	●	●	●	●	●	●	●	●
	Load monitor (spindle, feed axis), Including no-load detection, part number expansion, Workpiece ejection detection				●	●	●	●	●	●	●	●	●	●
	NC operation monitor (counter, totaling)		●	●	●	●	●	●	●	●	●	●	●	●
	Status indicator (triple lamp) Type C		●	●	●	●	●	●	●	●	●	●	●	●
Automation/Untended Operation	Auto power shutoff		●	●	●	●	●	●	●	●	●	●	●	●
High-Speed/ High-Accuracy Functions	Hi-Cut Pro		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
	Cycle time reduction (operation time reduction)		●	●	●	●	●	●	●	●	●	●	●	●

□: Applicable depending on machine specifications (L specs, LW specs, M, MW specs, MY, MYW specs)
▲: Supplied to the -M kit (milling specs of each kit)
Notes: NML = Normal; OT-IGF = One-Touch IGF; OTM = One-Touch M; E = Economy; D = Deluxe;
VE = Virtual Economy; VD = Virtual Deluxe.
For each specification, please refer to Optional Specifications in P47 and P48.

Optional Specifications

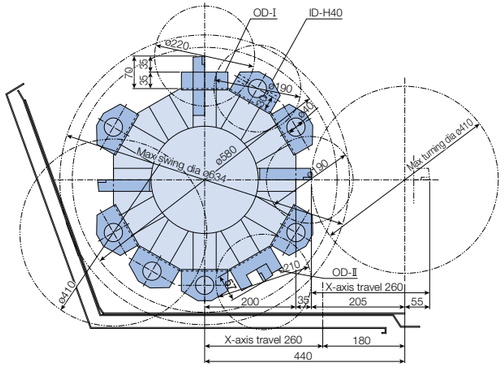
Operation panel	Keyboard		Keyboard ABC layout
Interactive functions	Advanced One-Touch		With the entry of a unicursal turning shape, the machining method is automatically decided
	IGF-L		Turning: end face, OD, ID, thread, groove, etc.
			Milling: boring, pocket machining, face milling, etc. A wide range of machining types is covered
			Realistic 3D simulated test cuts. Direct from machining order tables (no G-/M-codes)
			Slope machining (available only for slope machining specs)
	Smart OSP Operation	Machining process chart preparation and editing	By using the process chart to follow the guidance, rapid preparation for machining operations is possible even without knowing G-/M-code.
		Machining process chart operating	Direct operation from the machining order chart (no G-/M-code). Independent operation for each process or from the middle of a process is possible.
		Task support functions using the setup process chart	Pre-machining setup task guidance
		Machining process chart preparation and editing	Automatic decision of the turning process in the machining process chart
Digital Twin	Virtual machining		Confirmation tasks are more efficient in a virtual space. Machining trajectories, material scraping, interference checks.*1
			High-speed, high-precision machining time estimation
			Power consumption (carbon dioxide emissions) estimation
	Quick modeling		Easy preparation of 3D models of tools, jigs and workpieces
			Supply of affluent 3D model data
			Selecting 3D models of tools allows not only virtual spaces for digital twins but also automated configuration of real space control data.
	OPC UA for Machine Tools		Communication specification for machine tools compatible with OPC UA communication Compatible with Ver. 1.00 specifications and essential functions
	OSP API KIT		API for Windows®-based application development
Programming	Program notes		To show notes in part program screens
Machining	Imperial/metric switch		Program commands and data setting operations are switchable between metric and imperial.
Operations	Work coordinate system		Number of selected sets: 10, 100
	Functions for milling specs	Coordinate change and drawing conversion	Shift, rotation and copying of the workpiece coordinate system
			Enlarges and reduces drawings
			X-C coordinate change: X-C axes movement is commanded on the X-Y coordinate
		Profile generate	Straight-line machining and circular arc machining on workpiece sides and face
		Coordinate calculation	Sequential coordinate values on straight line and circumference designated with single command
		NCYL command	Skip of cycle axis movement in fixed drilling cycles in the commanded block
		Helical cutting	Circular interpolation + helical axis interpolation (including multiple command macros)
			Generated helical cutting with XC + Z axes (including multiple command macros)
		Flat Turning	Flat turning with synchronized rotation of the spindle and the M-spindle
		Hob machining	Hob machining with synchronized rotation of the spindle and the M-spindle
		Synchronized C-axis control	C-axis control for machining with the workpiece chucked with both main and sub spindles
		Slope machining	Type Ⅰ, Type Ⅱ
	Threading	Circular threading	Along an arc
		Threading slide hold	Pause for threading during non-fixed cycle
		Threading matching	Possible to re-cut threads for threaded parts once removed
	Threading override		Adjusts spindle overdrive while threading
	Spindle tapping cycle		Floating tapping cycle with main spindle and Z-axis
			Synchronized tapping cycle with main spindle and Z-axis
	Harmonic Spindle Speed Control (HSSC)		The spindle speed is periodically changed to avoid chatter during the cutting of large-diameter thin workpieces or small-diameter long workpieces
	Sequence return		Mid-block sequence return
	Manual cutting feed		Manual cutting feed on the operation panel
	User Task		Common variables: 1,000 sets (Standard: 200 sets), Input/output variables (8 points each)
	Block skip		Use soft on/off keys on screen to skip execution of a part program. Block skip: 9 sets
	Home position		Home position User: 64 sets, System: 192 sets
	Cutting step feed		Dwelling during cutting to cut chips
	Inverse time feed		Feed rate command with cutting time
	Z-W overlap function		Of workpiece on L/R spindles with single turret
	X-axis radius command for turning		Radius commands can be used for the X-axis during turning
	Spindle dead-slow cut		Extremely slow spindle speed cutting
Tool management	Tool life management (including prior notice of tool life)		The number of workpieces or cutting time is accumulated and when the set value is reached, a spare tool is automatically indexed; Life data of each tool are displayed as graphs
	Tool compensation		Maximum number of total sets (additional): 96, 999
	Y-axis center height offset		Misalignment in the Y-axis direction is set in Y-axis tool offset for machining with compensation
	Multiple simultaneous tool management		Up to 8 cutting edges can be attached to each station of the turret, and tools for each cutting edge can be separately managed.
	Turret intermediate indexing		The turret is indexed midway between adjacent stations to allow expansion of the number of attached tools
	TOOL-ID		Central management of tool data for tools with ID chips
	TOOL-IC		Tool management with Factory Manager manufactured by BIG DAISHOWA SEIKI
External Input Output	RS-232C interface		RS-232C interface 1CH to 4CH
Communication Functions	FL-net		Connected to host and other machines using FL-net
Networking	Ethernet/IP		Connected to host and other machines using Ethernet/IP
	DNC connection	DNC-T3	I/F for MacMan-net
		DNC-C/Ethernet	Host link via Ethernet
		DNC-DT	Remote operation using Ethernet: part programs are downloaded from PCs for the machining operation
	OSP-MTConnect		MTConnect I/F for production management systems produced by other companies

Measuring	Touch Setter M (manual)	Manual tool offset compensation using the touch setter
	Touch Setter A (auto)	Automatic tool offset compensation and breakage detection using the touch setter
	Tool breakage detection	Tool breakage is automatically detected with Touch Setter gauging
	Tool breakage detection	The sensor attached to the top of the spindle detects milling tool breakage
	In-process workpiece gauging	Auto zero offset using a standard ring. Workpieces are automatically gauged to compensate tool offset
	Z-axis automatic zero offset	Workpieces are automatically gauged to compensate Z-axis zero offset
	C-axis automatic zero offset	Workpieces are automatically gauged to compensate C-axis zero offset
	Y-axis gauging	Workpieces are automatically gauged to compensate Y-axis zero offset, tool offset and tool diameter
	3-point gauging	The cylinder outer diameter and hole inner diameter are gauged at three points to calculate diameters and central positions and set them as variables
	Post-process workpiece gauging	Measures workpiece outside machine, and compensates for tool offset based on measurement results Quantitative compensation method (five level, seven level)/BCD method/RS-232C method
	Measured data output to file	Measured data output to file
Monitoring, adaptive control	One-Touch Spreadsheet	Excel® files assist machining setups
	Collision Avoidance System (Units and actions to prevent interference are limited)	Interference during automatic, MDI and manual operations is prevented. Easy modeling of shape data
	Real 3-D Simulation	Real time simulation of all machining modes (auto, MDI, manual operation)
		Solid/cross section/transmission display of workpieces, track line display, tool shape display
		With cycle time calculator
		With 2D Simulation
	Cycle time over check	An alarm goes off and the operation stops when the prescribed cycle time is exceeded
	Load monitor	CNC monitors and displays load conditions of feed axis and spindle in a graph (machining stops when overloaded)
		No-load detection, part number expansion, workpiece ejection detection
	NC operation monitor	NC hour meters for NC start, spindle rotation, cutting, etc. and 4 NC workpiece counters
	Status indicator	NC running lamp, alarm lamp, machining end lamp
	Machine Status Logger	Commands, operations and spindle and feed axis loads are recorded to increase, analyze and improve machining traceability
	AI machine diagnostics (feed axes)*2	AI-based feed axis diagnostic function
	Machining Navi L-*g*Ⅱ	Search function for selecting the machining conditions that best prevent chatter during turning
	Machining Navi T-*g* (Threading)	Search function for selecting the cutting conditions that best prevent chatter during threading
	Workpiece counters (Workpiece counters attached to machine)	Counted with M02 and M30 or dedicated M-code [Count only], [Cycle stop when the full count is reached], [Start is disabled when the full count is reached]
	Hour meter (meter attached to machine)	The power ON time, spindle rotation time and NC running time are counted
	Operation end buzzer	A buzzer goes off at M02/M30 and M00/M01 and also when an alarm is generated
	Feed axis retraction	Pull back in axial direction during power failures
	Tapping retraction	Retract the tapping tool when a power failure occurs during tapping
	Tool retract cycle	Execute shelter cycle according to interruption signal
	Adaptive control (AC) using external signals	Interruption program start, pause, feed shaft override using external signals
	Tool monitoring system	CARON TMAC8 I/F
	General purpose overload detection	Detect overload in external devices and display an alarm
	Chucking miss detection	Detect chucking errors during workpiece loading
Automation/ unattended operation functions	Auto power shutoff	Power is automatically turned off when machining is completed or an alarm is generated
	Warm-up	Automatically turn on the power to perform warm-up at the preset time
	External program	A (pushbutton) 8 types
		B (rotary switch) 8 types
		C1 (digital switch) BCD, 2-digit
		C2 (external input) BCD, 4-digit
	Connection with automated devices	Robot loader I/F*3. Okuma loader (OGL) interface. Bar feeder I/F
Peripheral devices for machining assistance and automation	Tailstock	NC/self-traveling/programmed/simple tow-along specs
	NC tailstock	Specs with improved position detection accuracy, high-accuracy detection of sizing positions, ultra-low thrust specs
	Steady rest	NC/auto tow-along/simple tow-along specs
	Opposing spindle - tailstock control	The W-axis of the opposing spindle can be used as an NC tailstock
	Workpiece support equipment	Self-traveling workpiece support function with W-axis control
ROID control system		Easy robot programming with the guidance of ROID Navi
	ARMROID	Automation and support of machining with in-machine robots
	STANDROID	Robot control by OSP
High-Speed/ High-Accuracy functions	0.1 µm control*3	0.1 µm command increments
	AbsoScale detection*3	X-, Z-, Y-axis
	Pitch error compensation	X-Y-Z axis pitch error compensation
	Hi-Cut Pro	High-speed, high-accuracy machining with speed control and acceleration control suitable for parts machining
	Cycle time reduction*3	Shortening of operation time: Skipping of the completion of auxiliary operations such as spindle rotation, turret indexing, and coolant, and simultaneous operation with axis travel
		Chuck open/close and auto tailstock advance/retraction during spindle rotation
	TAS-C (construction)	Corrects thermal deformation error generated during shop temperature changes affecting machine construction
Energy-saving functions	ECO suite plus	ECO Power Monitor (on-machine wattmeter)
		External output interface of consumed electricity
		Spindle Power Peak Limiter
Other functions	Spindle speed setting	Spindle acceleration can be easily changed
	Holding with C-axis brake	Even if Alarm A occurs during C-axis clamping, the clamp is not released and the workpiece is held
	M spindle maximum rotation speed limit for each tool	The rotation speed limit is set for each milling tool
	Earth leakage circuit breaker	Power shutoff with the detection of earth leakage
	External M-signals	[2 sets, 4 sets, 8 sets, 16 sets]
	OSP-VPSⅡ-EX	Allowlist-based virus protection system
	Monitor display language (multi-language)	Language switchable

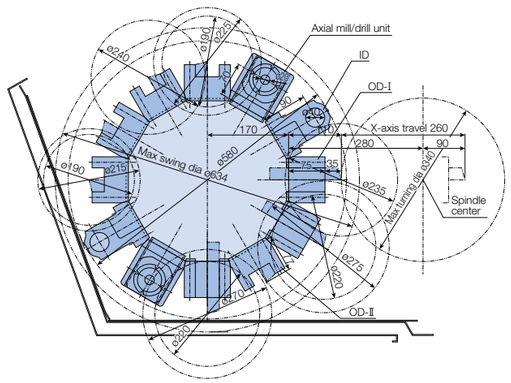
*1. If the Collision Avoidance System specs are enabled, then interference checks can be performed for structural components of the machine in addition to workpiece, tools, and fixtures.
*2. With AbsoScale detection specs, ball-screw wear detection is possible.
*3. Engineering discussions required.
Note: Cannot be selected for some machine specifications.

Tool Interference Drawings Unit: mm

LB3000 EX Ⅲ (L)



LB3000 EX Ⅲ (M)



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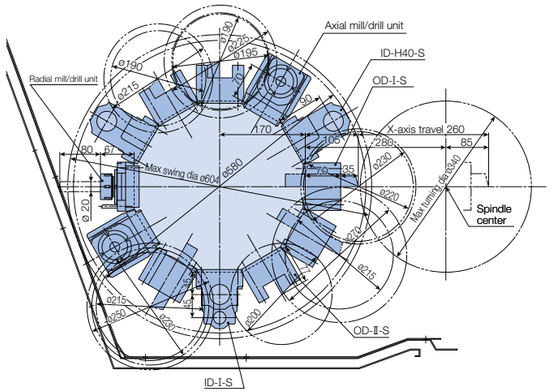

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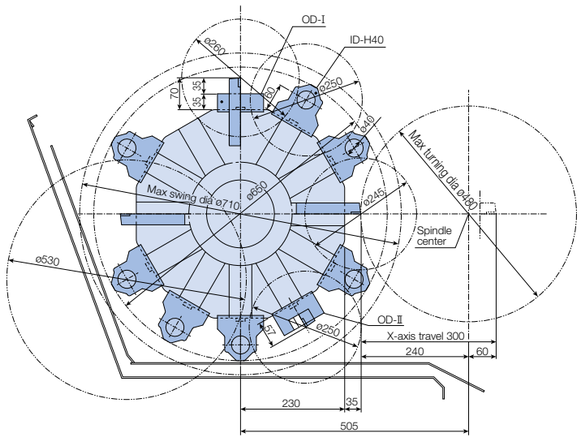

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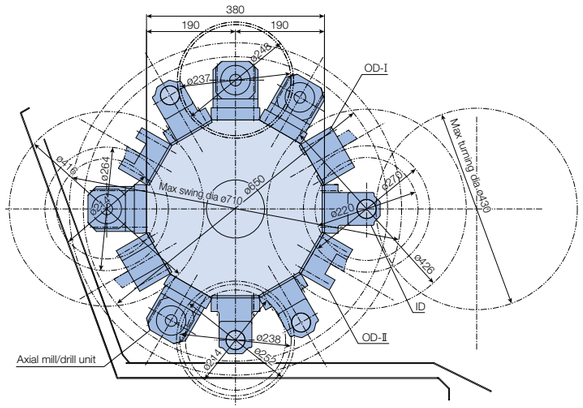

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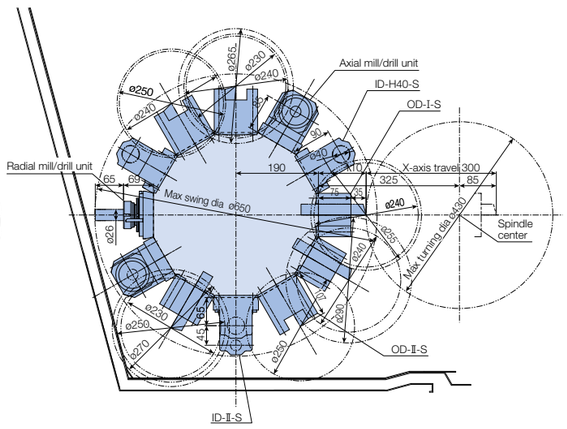
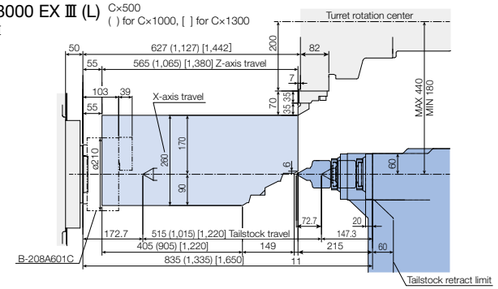


Working Ranges Unit: mm

LB3000 EX Ⅲ (L) C×500 ( ) for C×1000, [ ] for C×1300

OD-I



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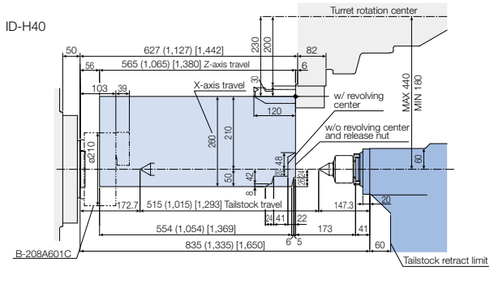
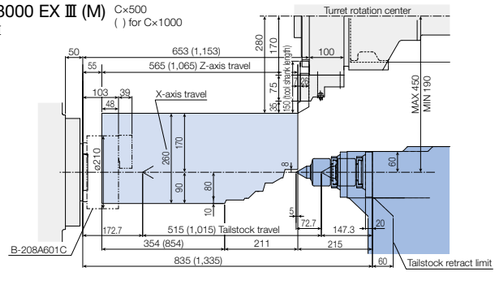
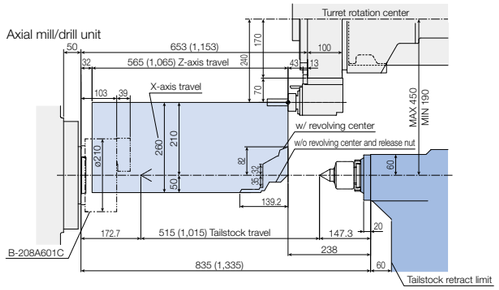


LB3000 EX Ⅲ (M) C×500 ( ) for C×1000

OD-I

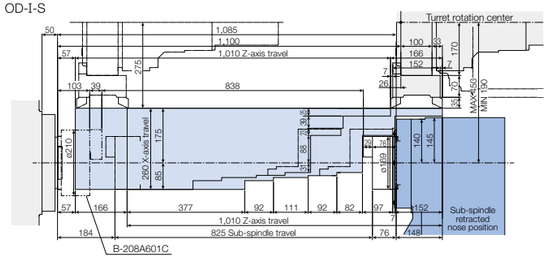


Axial mill/drill unit



LB3000 EX Ⅲ (MYW) W×800

OD-I-S



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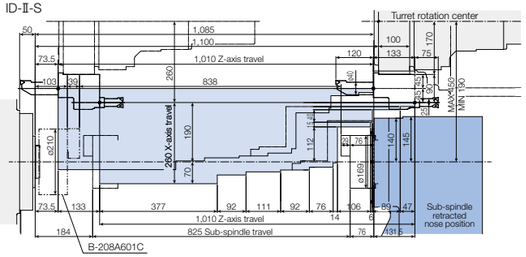
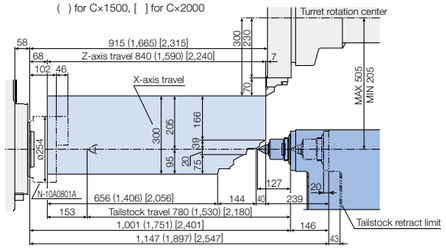


Working Ranges Unit: mm

LB4000 EX Ⅲ(L) C×750

OD-I ( ) for C×1500, [ ] for C×2000



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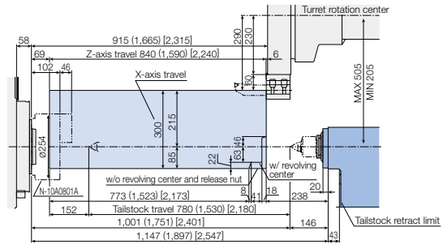
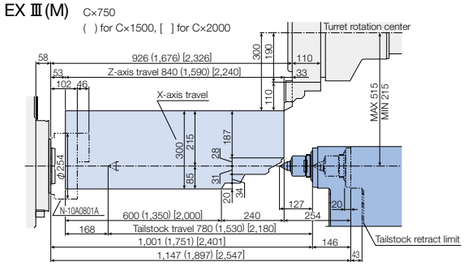
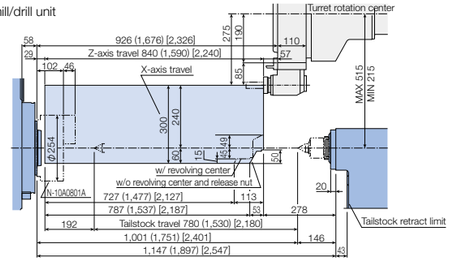


LB4000 EX Ⅲ(M) C×750

OD-I ( ) for C×1500, [ ] for C×2000

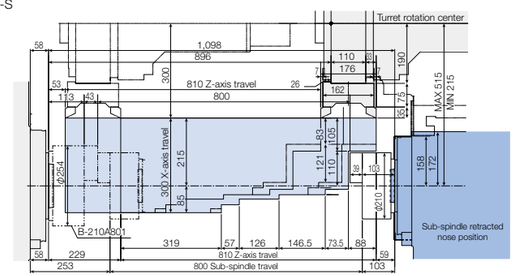


Axial mill/drill unit



LB4000 EX Ⅲ(MYW) W×720

OD-I-S



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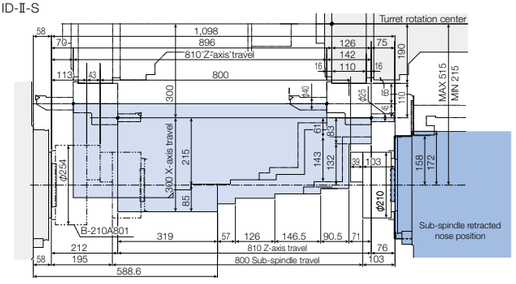
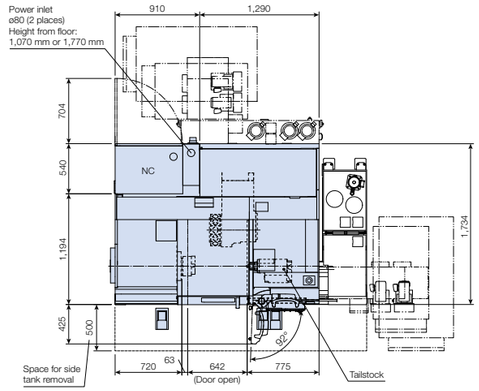
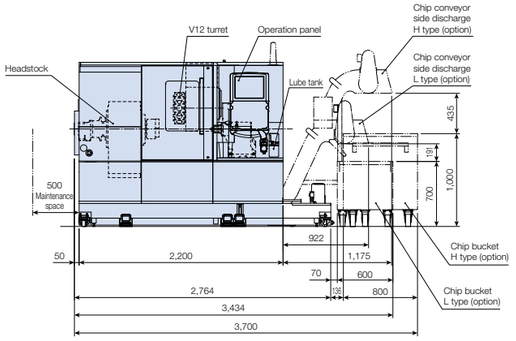
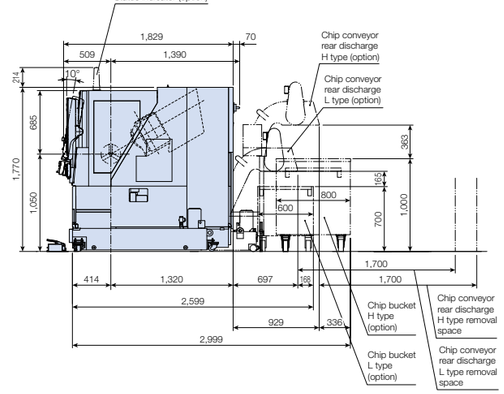


Dimensional Installation Drawings Unit: mm

LB3000 EX Ⅲ (L/M) ×500

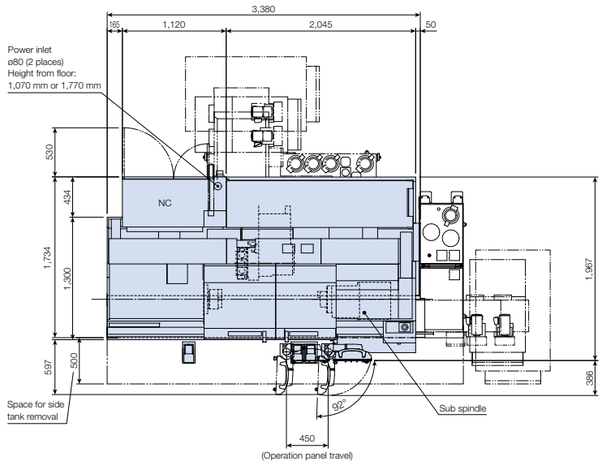


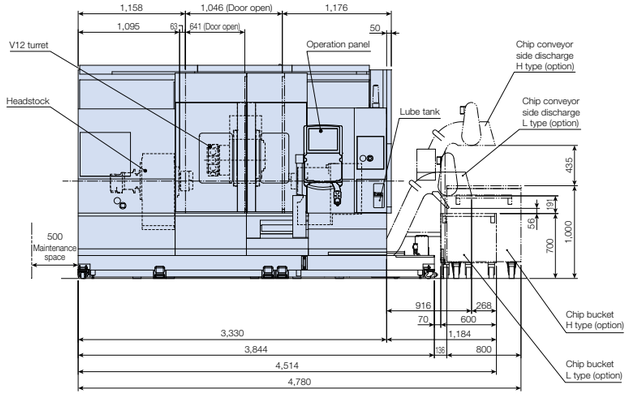


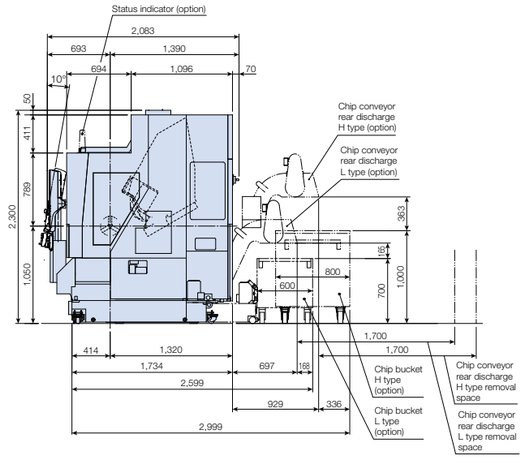


Dimensional Installation Drawings Unit: mm

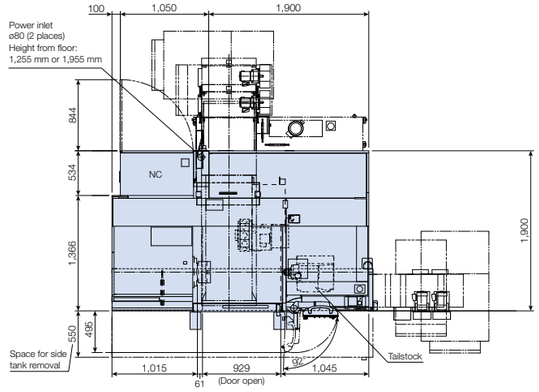
LB3000 EX Ⅲ (MYW) ×800





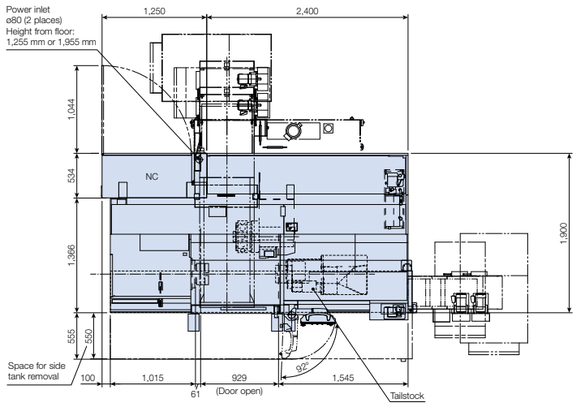


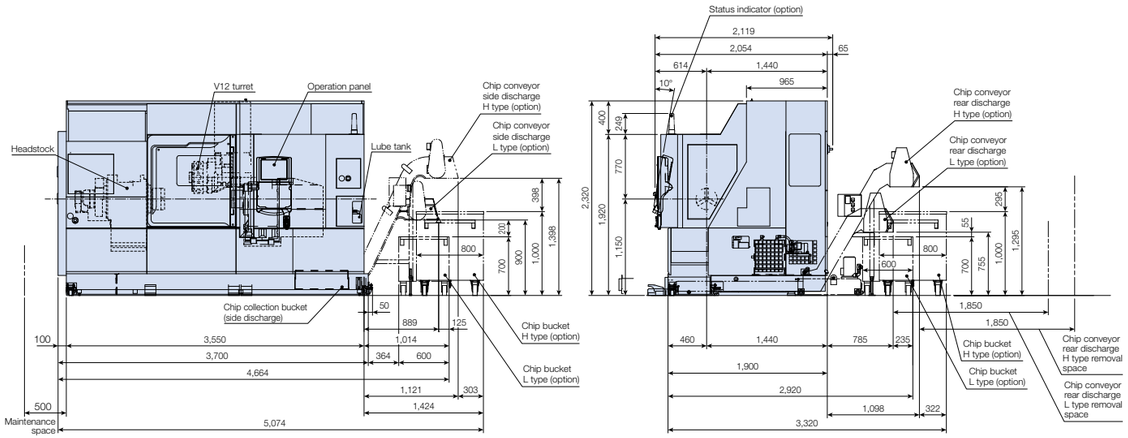
LB4000 EX Ⅲ (L/M) ×750



Dimensional Installation Drawings Unit: mm

LB4000 EX Ⅲ (MYW) ×720





LB EX III Series

When using Okuma products, always read the safety precautions mentioned in the instruction manual and attached to the product.

●The specifications, illustrations, and descriptions in this brochure vary in different markets and are subject to change without notice.
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