Press Release

September 2025
Okuma Corporation

Operator-friendly, Stable, High-Accuracy Machining of Large Parts for Semiconductor Manufacturing Equipment, Construction Machinery, and Die/Molds
High-accuracy, Large Vertical Machining Center

MB-100V

Okuma has developed the MB-100V, a large vertical machining center designed to enhance productivity in the machining of large parts. The **MB-100V** integrates Okuma's strengths in double-column machining centers with the proven technologies of the MB-V series. As the largest model in the MB-V lineup, it features a maximum table size of **3,000 mm × 1,000 mm**, making it an intelligent machine ideally suited for the precision machining of large workpieces. This new model meets the demand for production innovation in precision machining of large workpieces across a wide range of growth markets, from semiconductor manufacturing equipment, which continues to expand globally, to construction and agricultural machinery with sustained demand, as well as industrial machinery and die/molds.

Okuma has long advanced the development of intelligent technologies that ensure exceptional accuracy stability even under varying factory environment temperatures. These technologies have been deployed in our MB-V series of high-accuracy vertical machining centers and further extended to our high-end double-column machining centers.
As the flagship model of the MB-V Series, the MB-100V enables high-accuracy, high-efficiency machining of large parts, even for operators with limited experience, while also making demanding tasks such as large part setup, loading/unloading, and chip discharge safer and easier. In this way, the MB-100V supports productivity improvements in machining environments facing labor shortages, generational turnover, and workforce mobility.

- ◆ Minimizes production losses through advanced chip discharge and predictive maintenance for enabling continuous automatic operation over long runs
  - The Crossrail Shower Cleaning system efficiently flushes away large volumes of chips, significantly reducing the need for cleaning workpieces, fixtures, and the machine interior for enabling improved uptime.
  - Built-in AI monitoring of machine status for preventing production losses due to unexpected breakdowns
- ◆ Stable high-level machining accuracy of large parts even for less-experienced operators, achieved by combining the long-term accuracy stability of high-rigidity double-column machining centers with the thermal displacement suppression technology of the MB-V Series.
  - Maintains thermal deformation over time (7 μm max. even with ambient temperature fluctuations of 8°C)
  - With the Accuracy Stability Diagnostic Function and 3D Calibration, the machine detects accuracy deterioration caused by changes in installation level and corrects it semi-automatically with ease.
- ◆ Outstanding workability and operability that reduce operator workload in large-part machining
  - A machine rear-side service door and sub-operation panel are provided as standard, enabling setup work on the rear side that cannot be reached from the front. This eliminates awkward working postures, ensuring operator safety while also improving efficiency.
- ◆ Compact footprint with ample machining area and high-productivity cutting performance for maximizing throughput
  - Uses a double-column structure for expanding the machining area by 16% while reducing installation space by 32% compared with the previous model
  - Delivers maximum cutting capacity of 704 cm^3/min when machining steel workpieces (material: S45C, end milling)

◆ Process-integration that reduces transfers and setup work for large parts for enabling reduced workloads and shorter lead times

- A wide Y-axis travel enables process-intensive machining for the side-faces of large parts
  With an indexing angle head, parts up to 1,000 mm in width can be machined from multiple directions in a single setup

With the launch of the new MB-100V, Okuma has completed a comprehensive lineup ranging from the MB-V Series vertical machining centers to double-column machining centers, capable of handling a wide spectrum of part sizes. This lineup provides the "just-right" machine for addressing the challenges faced by manufacturing sites across various industries, including labor shortages, skills transfer, and heavy operator workloads, for delivering customers the **highest levels of quality and productivity**.

Background

In recent years, manufacturing sites have been facing not only with chronic labor shortages but also with the urgent challenge of transferring expertise as veteran craftsmen retire. At the same time, restrictions on working hours due to work-style reforms and the growing trend of early turnover caused by workforce mobility have become significant obstacles to both training and productivity improvements.
Large-part machining, in particular, has traditionally required both advanced craftsmanship and substantial labor. From an accuracy standpoint, maintaining stable accuracy was difficult due to thermal deformation during long machining times and changes in machine installation floor surfaces caused by seasonal temperature variations. Skilled operators were relied upon to control room temperatures and perform dimensional compensation based on their experience. Also, the loading and unloading of large parts, setup operations, and chip-cleaning tasks required considerable time and effort.
For these reasons, production sites engaged in large-part machining are calling for machines that are easy to use even for less-experienced operators, while still ensuring stable, high-accuracy machining. At the same time, such machines must reduce the operator workload and significantly enhance productivity.

Aim of Development

The newly developed MB-100V was designed with the following concepts to address the challenges of large-part machining at production sites:

(1) Minimizes production loss through advanced chip discharge and predictive maintenance for enabling continuous automatic operation over long runs
(2) Stable high-level machining accuracy of large parts even for less-experienced operators, achieved by combining the long-term accuracy stability of high-rigidity double-column machining centers with the thermal deformation suppression technology of the MB-V Series
(3) Outstanding workability and operability that reduce operator workload in large-part machining
(4) Compact footprint with ample machining area and high-productivity cutting performance for maximizing throughput
(5) Process-integration that reduces transfers and setup work for large parts for enabling reduced workloads and shorter lead times

User Benefits Enabled by Advanced Technologies

(1) Minimizing production loss through advanced chip discharge and predictive maintenance for continuous automatic operation over long runs

- Interior cover design for preventing accumulation of chips combined with crossrail shower cleaning

  Effectively removes large volumes of chips. Greatly reduces the need for troublesome cleaning of parts, fixtures, and the machine interior for improving the machine uptime.
  Wide interior conveyors installed at the front and rear of the table smoothly discharge even large amounts of chips outside the machine.
- "**Sludgeless Tank**" for automatic and efficient recovery of fine sludge (microscopic chips, etc.)
  Dramatically reduces the frequency of tank cleaning, which was previously performed manually with production downtime, for improving the machine uptime.
  Also, by reducing the frequency of coolant replacement (which becomes industrial waste after replacement), it also contributes to lowering the environmental impact.
  Achieves a **sludge recovery rate of 99%** (based on test results with cast iron and aluminum workpieces).

No coolant tank cleaning or coolant replacement required for three years (actual results at Okuma facilities)

- Built-in "AI Machine Diagnosis" that automatically monitors the machine status and detects early signs of failure

Predictive maintenance detects potential faults in spindle bearings and feed-axis ball screws before they occur, preventing unexpected machine downtime and reducing production losses.

Since abnormal components can be pinpointed, the downtime otherwise required to identify the fault location is also reduced.

(2) Stable high-level machining accuracy of large parts even for less-experienced operators, achieved by combining the long-term accuracy stability of high-rigidity double-column machining centers with the thermal deformation suppression technology of the MB-V Series

- **Thermo-Friendly Concept**, an intelligent technology that allows machines to autonomously and stably maintain a high level of accuracy
  7μm max. (for ambient temperature change of 8°C)
  Significantly reduces accuracy errors caused by thermal deformation due to room temperature changes.
  Significantly reduces the frequency of dimensional checks and corrections traditionally requiring advanced skills and expertise for large-part machining.
  Because the machine does not require a temperature-controlled room to maintain a constant temperature, factory facility costs and power usage can be significantly reduced.
- This allows easy semi-automatic calibration for deterioration in machine accuracy due to the effects of the machine's installation floor, which changes throughout the year.

3D Calibration

By simply installing a calibration master, the machine can automatically measure and calibrate its accuracy for enabling long-term accuracy stability without requiring advanced skills or expertise.

- **Accuracy Stability Diagnosis Function**
  The machine continuously monitors its own accuracy in the background and notifies operators when precision adjustment (3D calibration) is needed. Even less experienced operators can carry out adjustments at the optimal timing while maintaining high accuracy for minimizing production losses due to accuracy measurement and adjustments.
- **Automatic In-Process Gauging and Calibration**
  Automatically calibrates measurement devices whose accuracy would otherwise deteriorate due to changes in ambient temperature. This automates the calibration of touch probes and touch sensors, which were tasks that traditionally required specialized skills, for achieving

high-accuracy quality control with ease and **cutting calibration time dramatically from 20 minutes to just 2 minutes**.

(3) Outstanding workability and operability that reduce operator workload in large-part machining

- Wide-opening, motorized front door is provided as standard, making it easy to load and unload long workpieces
  Long workpieces up to 3,000 mm in table length can be safely loaded and unloaded without concern about interference with lifting wires.
  The electric auto-door is standard, allowing the large door to be opened and closed effortlessly. The door can also be inched open to the desired position.
- Rear-side service door and sub-operation panel provided as standard
  This design accommodates setup operations at the back of the machine, which cannot be reached from the front, for reducing operator stress and improving work efficiency.
- Equipped with the next-generation CNC **OSP-P500**, which revolutionizes usability
  By simply following on-screen guidance, operators can begin machining quickly and easily, even without knowledge of G/M codes. At the same time, it can be combined with users' existing programs that incorporate their accumulated expertise, allowing new machining programs to be created with ease for enhanced productivity.

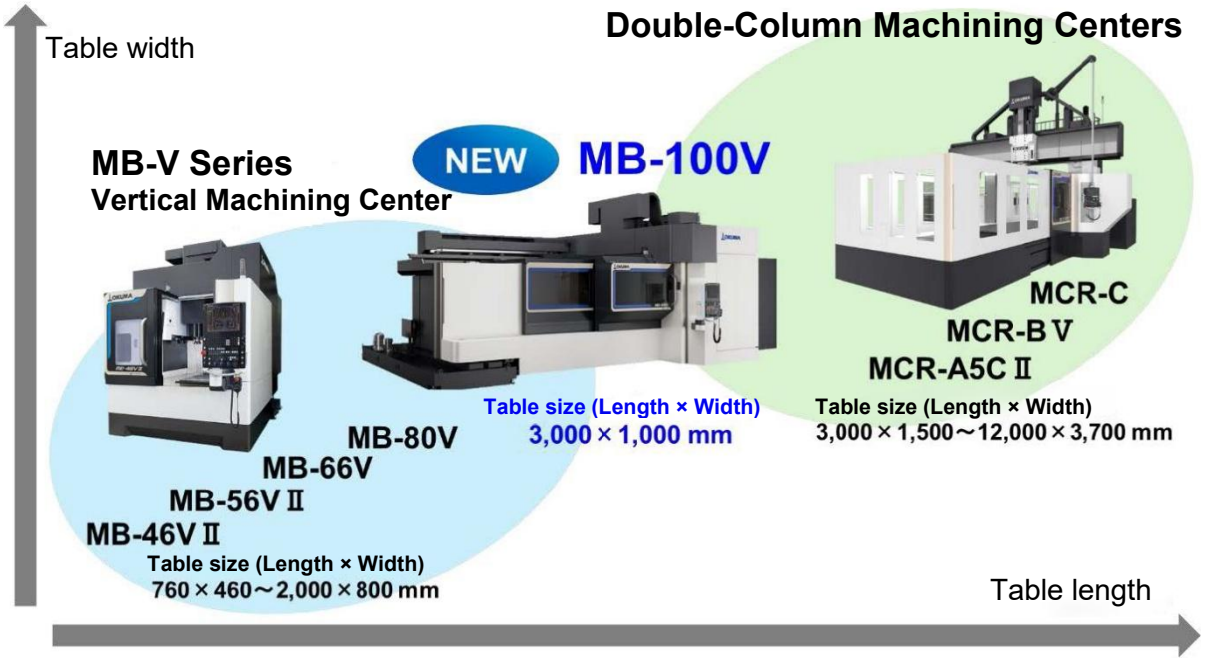
(4) Compact footprint with ample machining area and high-productivity cutting performance for maximizing throughput

- Provides ample machining area relative to the table size (length 3,000 mm × width 1,000 mm), with X/Y/Z-axis travels of 3,200 mm / 1,250 mm / 750 mm, which is **16% larger** than the previous model.
- Uses a double-column structure for enabling large-part machining within a compact footprint
  Installation area: 27.8 m² (width 8,995 mm × depth 3,095 mm), **32% smaller** than the previous model
- Equipped as standard with a No. 50 spindle using roller bearings
  High-efficiency cutting shortens machining time for large parts and boosts productivity, achieving heavy cutting performance of up to **704 cm³/min** with end milling (workpiece material: S45C)

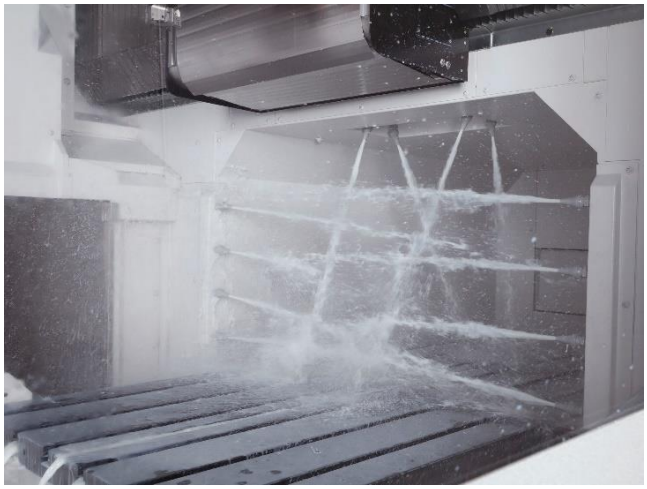
(5) Process-integration that reduces transfers and setup work for large parts for enabling reduced workloads and shorter lead times

- Uses an **angle head with indexing function** that has a wide Y-axis travel for enabling machining of large workpieces up to approx. 1,000 mm in width from multiple directions, allowing integration of side machining processes
- Supports "tool grooving" for high-grade machined surfaces that require excellent sealing performance for delivering smooth, streak-free finishes and greatly reducing hand-finishing processes
- The machine's high-rigidity structure enables support of **"friction stir welding" as standard**. This consolidates joining processes, reducing manual work and shortening lead time, while also improving the durability and adhesion of joints
  Also, dissimilar-material joining enables lighter weight and enhanced cooling performance

MB-V Series of Vertical Machining Centers – Model Lineup



Crossrail Shower Cleaning – Sweeps Away Large Volumes of Chips
Ample Machining Area for a Table Size of 3,000 mm (L) × 1,000 mm (W)



Crossrail Shower Cleaning

Ample Machining Area

Rear-Side Service Door and Sub-Operation Panel Provided as Standard

Makes setup work on the rear side easy and more efficient for large parts that are out of reach from the front

Product Specifications

[ ] indicate optional specifications

Item		MB-100V	
		No. 40 spindle	No. 50 spindle
Travel	X-axis travel (Table left-right)	3,200 mm	
	Y-axis travel (Ram saddle front-back)	1,250 mm	
	Z-axis travel (Spindlehead up-down)	750 mm	
Distance from table top to spindle nose		200 to 950 mm	
Distance from floor to table top		900 mm	
Table	Work area	3,000 × 1,000 mm	
	Max. load capacity	6,000 kg	
Spindle	Max. speed	15,000 min^{-1} [12,000 min^{-1}] [20,000 min^{-1}]	12,000 min^{-1}
	Maximum output	26/18.5 kW (10 min/cont) [33/26 kW (10 min/cont)] [30/22 kW (10 min/cont)]	33/26 kW (10 min/cont)
	Max. torque	199/146 N・m (5 min/cont) [302/148 N・m (10%ED/cont)] [57/42 N・m (10 min/cont)]	302/148 N・m (10%ED/cont)
	Tapered bore	7/24 taper No. 40	7/24 taper No. 50
Feed rate	Rapid traverse speed	X-axis: 32 m/min, Y-axis: 42 m/min, Z-axis: 32 m/min	
ATC	Tool magazine capacity	32 tools [48 tools, 64 tools]	
	Max. tool diameter	90 mm dia. (w/o adjacent tools: 125 mm dia.)	100 mm dia. (w/o adjacent tools: 200 mm dia.)
	Max. tool length	400 mm	
	Max. tool weight	8 kg	20 kg [12 kg]
Machine size	Machine height	3,500 mm	
	Required floor space (width × depth)	8,995 × 3,095 mm	
	Machine weight	25,000 kg	