

New-Concept Machine Revolutionizing Production for the Growing EV and Semiconductor Manufacturing Equipment Industries

Optimized for small parts machining, from high-mix low-volume production to mass production, and from labor reduction to full automation

Compact Horizontal Machining Center

MS-320H

Okuma Corporation has developed the **MS-320H**, a new-concept compact horizontal machining center designed to revolutionize production for the growing electric vehicle (EV) and semiconductor manufacturing equipment industries. This machine aims to address the urgent challenges of labor shortages and facilitate work style reforms, **paving the way for a new era of manufacturing.**

The **MS-320H** frees operators from the task of loading and unloading parts to the machine, allowing for long runs of automated operation in a minimal space. Operators are only required to simply load and unload parts to an easy-access stocker.

This model supports flexible, space-efficient production for a wide range of small parts (up to 250 mm square) across diverse industries, including EVs, automotive, semiconductor manufacturing equipment, construction machinery, and hydraulic and pneumatic equipment components. The machine adapts easily to meet various production needs, from high-mix, low-volume to mass production, and from labor reduction to full automation. Developed as a "just-fit multipurpose machine," the MS-320H is designed to meet the diverse and evolving production scales and setups of our customers.

By prioritizing productivity while supporting work style reforms through efficient operation, we aim to help our customers realize a harmonious coexistence of production and creativity.

◆ **Optimized Automation for Machining Part Loading and Unloading, Liberation from Grueling Physical Labor**

Automating various production setups, from single-machine machining cells to multi-machine lines, in minimal space

- **Footprint reduced by 52%** (compared to previous model) **with an integrated compact automation cell featuring an on-machine loader.**
- **Flexibly adaptable to diverse production needs from automation for high-mix low-volume production to mixed lines with lathes.**

Compatible with various automation options, including the OMR series of mobile collaborative robots, autonomous robots, loaders, and more, tailored to the production setup.

◆ **Innovative Machine Design Eliminates Chip Problems, the Main Bottleneck of Automation**

- **Enables stable, long runs of continuous operation without requiring manual cleaning inside the machining chamber.**
- **Features a vertical surface table that prevents chip buildup and a full-center trough that collects chips across the entire machining chamber area.**

◆ **Compact Yet Fully Capable of Handling Steel Parts. Equipped with a No. 40 spindle.**

- **Maximum machining capacity for steel parts: 170 cm³/min (Material: S45C, φ63 mm milling)**

The MS-320H addresses the urgent issue of labor shortages in manufacturing, meeting the evolving demands for labor-saving and automation solutions in various markets advancing work style reform, including automotive (EV), semiconductor manufacturing equipment, construction machinery, and hydraulic/pneumatic equipment sectors.

Background and Our Development Direction

In recent years, labor shortages in the manufacturing industry have intensified, and with changing work styles, there is a growing demand for individuals to engage in more creative tasks. Amid this shift, manufacturing sites that lack personnel to handle tasks such as loading and unloading machining parts to and from machines are experiencing an urgent need for new labor-saving and automation-focused production solutions. However, while the demand for labor-saving and automation increases, many sites face challenges such as limited space for automation systems and manual labor required for chip discharge even with automation. These obstacles prevent companies from adopting automation or hinder them from realizing the full benefits of automation.

As the manufacturing landscape evolves, there is a demand for machine tools having new labor-saving and automation features that enable stable operation over long runs without human intervention and allow compact automation adaptable to various production setups for ultimately freeing people from physically demanding labor.

Furthermore, the retirement of skilled workers and workforce mobility have made it increasingly difficult to secure and cultivate talent with the skills and experience required for creative tasks. In response, Okuma is working to develop advanced technologies to **realize autonomous machine tools** that can make self-determined adjustments to ensure high accuracy, maintain stability, and optimize energy efficiency, supporting productivity improvements even for less experienced operators.

Aim of Development

The newly developed MS-320H was designed based on the following concepts.

- (1) Automation of various production setups, from single-machine processing cells to multi-machine lines, in minimal space
- (2) Innovative machine structure and intelligent technology that maintains production without human intervention
- (3) Compact yet powerful cutting performance, fully capable of machining steel parts

Features and implementing technology

(1) Automation of various production setups, from single-machine machining cells to multi-machine lines, in minimal space

- **OMR series** of mobile collaborative robots for automated high-mix low-volume production

Quickly automates necessary machine tools and machining parts based on workload demands.

If machining record already exists, switching machine tools takes **only 4.5 minutes**.

No robot-specific knowledge or skills are required, as the robots do not require teaching or programming.

- Enhanced productivity for mass production machining. Compact automated loading cell for rapid loading and unloading of machining parts onto the machine.

Machining part loading/unloading time: 5.3 seconds. With an automated ceiling shutter, machining parts can be swapped at high speed.

- Space-efficient mass production line configuration. Machine configuration designed for mixed lines with lathes.

The loader's running machine height matches that of the lathe, enabling

single-loader machining part transport.

Eliminates the need for peripheral equipment between loaders, making mass production lines more compact.

- Supports **up to 8 ports** for supplying hydraulic and pneumatic pressure to fixtures for automatic clamping of machining parts.

(2) Innovative machine structure and intelligent technology that maintains production without human intervention

- Designed to prevent chip accumulation on the table surface or fixtures, allowing chips to fall directly downward.
- Chip conveyor quickly collects chips across the entire machining area directly below the table.
- AI technology for machine status monitoring to prevent unexpected production losses
AI Machine Diagnosis (optional specification) diagnoses abnormalities in operational axes and visualizes the machine status.

AI diagnoses the spindle and feed axes for any potential issues, identifying and pinpointing any detected abnormalities

- **Green-Smart Machine** where the machine autonomously balances high productivity and high accuracy with decarbonization

- **Thermo-Friendly Concept**, an intelligent technology that allows machines to autonomously and stably maintain a high level of accuracy

Significantly reduces accuracy errors caused by thermal displacement due to room temperature changes. Eliminates the need for frequent dimensional checks and adjustments.

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 technology also greatly reduces the operating time required for warm-up operation and dimensional corrections, which allows for further power-saving.

- **ECO suite plus** energy-saving system installed as standard

The energy-saving **ECO Idle Stop** function, based on the Thermo-Friendly Concept, enables the machine to autonomously determine the necessity of cooling, idling the cooling system when not needed to maintain high accuracy while reducing energy usage.

High-accuracy machining is combined with reductions in CO2 emissions for providing strong support for factory decarbonization.

- **Sludgeless tank** (optional specification) for significantly extending coolant tank cleaning intervals

By reducing stagnant areas in the tank, residual sludge (such as fine chips) is efficiently and automatically collected. This feature dramatically reduces the time and labor required to clean the tank, which used to rely on manual labor.

This enables a longer service life for coolant, which becomes waste fluid after use, for contributing to reduced environmental impact.

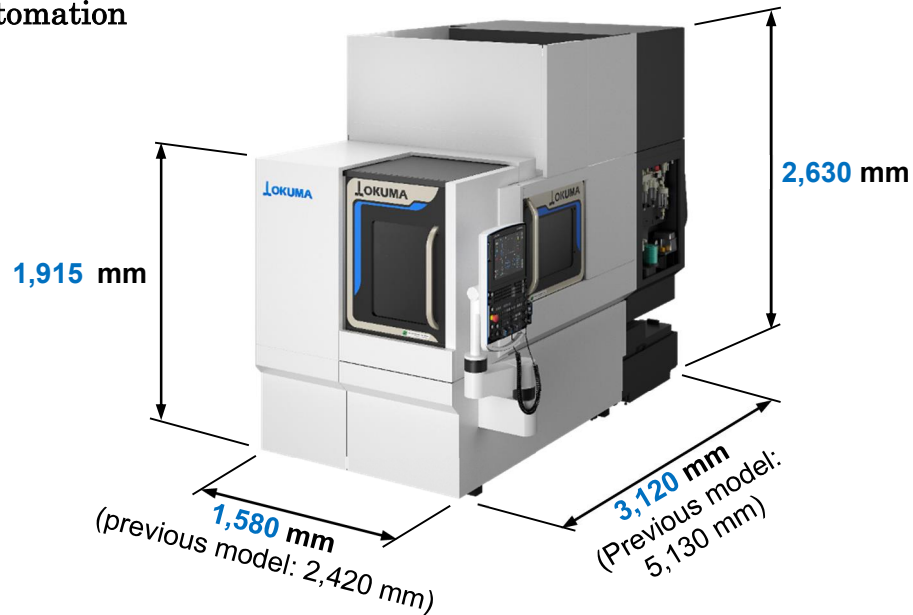
Sludge collection rate of 99% (actual data when using cast iron and aluminum workpiece materials)

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

(3) Compact yet powerful cutting performance, fully capable of machining steel parts

- Space-efficient machining of medium and small parts up to 250 mm square
Designed to fit into limited factory space. Slim machine dimensions: Width **1,580 mm** × Depth **3,120 mm**
Footprint required for the machine alone is **reduced by 56%** compared to previous model
- Effortless machining of steel parts. Equipped with a powerful No. 40 spindle.
Max. rotation speed: **15,000 min⁻¹**, Max. output: **25 kW**, Max. torque: **73 N·m**

Compact Automation



Slim machine size for installation in confined spaces

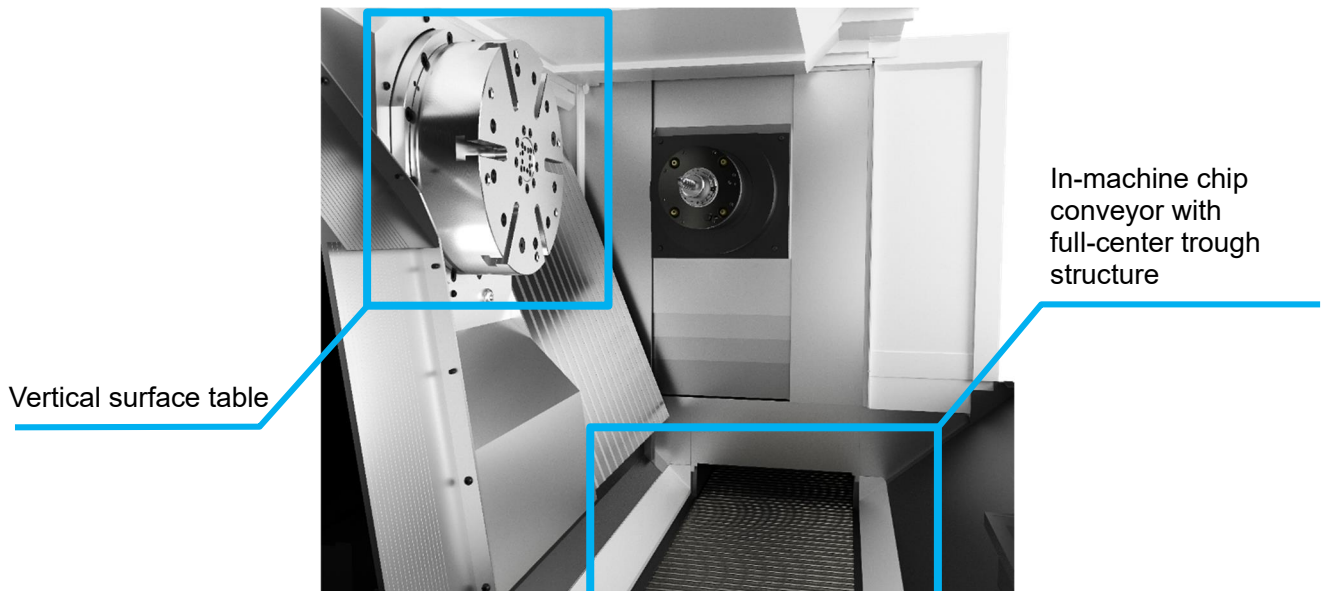


Automation cell with loader installed
directly on the machine



Robot machining cell connected to OMR

Features a vertical surface table that prevents chip buildup and a full-center trough that collects chips across the entire machining chamber area



Product Specifications

* The numbers in parentheses () indicate the values for optional specifications.

Item		MS-320H
Travel	X-axis travel (Column left/right)	250 mm
	Y-axis travel (Spindle head up/down)	250 mm
	Z-axis travel (Table forward/backward)	570 mm
Distance from table top surface to spindle center		0 to 250 mm
Distance from table center to spindle nose surface		100 to 670 mm
Table	Pallet size	320 mm diameter
	Max. workpiece dimensions	500 mm dia.× 400 mm
	Max. load capacity	100 kg
Spindle	Max. speed	15,000 min ⁻¹
	Maximum output	25/11 kW (15% ED/continuous)
	Maximum torque	73.1/45.7 N·m (15% ED/continuous)
	Tapered bore	7/24 taper No.40 [HSK-A63]
Feed rate	Rapid traverse	X-axis: 50 m/min, Y-axis: 50 m/min, Z-axis: 60 m/min
ATC	Tool magazine capacity	10 tools [24 tools]
	Max. tool diameter	115 mm (when there is an adjacent tool: 90 mm)
	Max. tool length	250 mm
	Max. tool weight	5 kg
Machine size	Machine height	2,630 mm
	Required floor size (width x depth)	1,580 × 3,120 mm
	Machine weight	7,000 kg