2021-11-15
Okuma Corporation
Marketing Office

Okuma Launches New MA-8000H

Horizontal Machining Center

Offering Strong Support for Decarbonization and Automation

Okuma Corporation has developed the new MA-8000H Horizontal Machining Center with a pallet size of 800 x 800 mm. Equipped with abundant power-saving functions and eco-friendly technologies that operate autonomously without human intervention, this new product strongly supports user efforts to decarbonize. In addition, by enhancing the ability to respond to automation, Okuma offers greater flexibility to meet various automation requirements.

In a wide range of large-scale machining applications such as in the semiconductor manufacturing market, which continues to expand globally, the renewable energy and electric vehicle (EV) markets are undergoing remarkable changes as decarbonization accelerates. For these applications, Okuma offers horizontal machining centers with outstanding production capacity that also contribute to decarbonization for the entire supply chain.

Background

As the movement towards a decarbonized society accelerates globally, growth markets like renewable energy, which is expected to grow continuously, are changing significantly as well as the automobile market where all auto manufacturers are making full-scale shifts to EV. In addition, the movement of companies striving to decarbonize the entire supply chain is growing in Japan and overseas, with small and medium-sized enterprises (SMEs) also aware of the need to act now on decarbonization.

On the other hand, for our manufacturing industry, Okuma strives to solve serious issues like the decrease in the working population, the legal upper limits of overtime work, and the problem of technology transfer affected by the retirement of skilled, veteran engineers.

Under these circumstances, there is a demand for machining systems that allow machines to autonomously save energy, and significantly improve labor productivity through automation that is best for the user's production system and assure stable operation over long runs.

Development Objectives

To achieve significant increases in production capacity, the new MA-8000H was designed with the following goals to reduce carbon, labor shortages, the difficulties with the passing on of in-house technology, and to solve other challenges customers face on the factory floor.

① Machines autonomously achieving energy savings without human intervention

② Improved labor productivity by strengthening “automation responsiveness” and reliability to support long periods of stable operation

③ Further improved production capacity for machining large components with enhanced basic performance capability

Features and Key Enabling Technologies

① Machines autonomously achieving both stabile accuracies and energy savings without human intervention

- Okuma's **Thermo-Friendly Concept** allows the machine to autonomously maintain stable accuracy without requiring specific measures against thermal deformation that accompany excessive power consumption.

  Providing excellent accuracy stability without relying on excessive ambient temperature control from airframe cooling systems and factory air conditioners to maintain accuracy. Contributing to entire factory power savings with Okuma's original idea of "accepting temperature changes."

  The operating time needed for machine warm-up and dimensional compensation has been significantly reduced, and the power consumption of the machine itself has been reduced.

- **"ECO suite plus" Next-Generation Energy-Saving System** “knows, analyzes, and reduces” CO_2 emissions

  ECO Power Monitor allows the operator to check power consumption and CO_2 emissions per operation on the spot. Improvement is possible by analyzing the CO_2 emissions of each device.

  ECO Idling Stop, an intelligent energy-saving function that uses Okuma’s Thermo-Friendly Concept, allows the machine itself to judge the necessity of stopping cooler idling while maintaining high accuracy. Both high accuracy and power savings are achieved.

② Improved labor productivity by strengthening automation responsiveness and reliability to support long periods of stable operation

- More hydraulic and pneumatic supply ports to fixtures that automatically clamp workpieces to the highest level in its class

  Setup station: 16 ports (previous machine: 4 ports) (Optional)

  Workspace area: 7 ports (previous machine: 4 ports) (Optional)

  This makes it possible to do more independent fixture operations, and various user requirements like multiple auto/robotic part load/unload operations are met, with collision avoidance between the tool and the fixture during fixture operations in the workspace area.

- Excellent chip discharge performance enables long-run continuous operation without cleaning the chips inside the machine.

  The smooth in-machine covers minimize chip accumulation for easier and clean in-machine chip washing of residual chips.

- **Sludgeless Tank (Optional)** drastically reduces the frequency of coolant tank cleaning
  By reducing coolant tank stagnation, sludge (minute chips and other residue) is automatically and efficiently collected. That dramatically reduces time and effort needed to clean the tank, which relies on human labor. Moreover, coolant life becomes longer, and the coolant eventually becomes a waste liquid after use, which contributes to less environmental impact.

  Sludge recovery rate: 99% (actual data with castings)

  No cleaning of coolant tank for three years, no replacement of coolant for three years (actual data with in-house equipment)

- **AI Machining Diagnosis Function (drilling) (Optional)** prevents sudden tool breakage and achieves stable operations

  This AI function monitors the machining status and automatically retracts the tool when AI detects an abnormality. Damage to the workpiece due to sudden tool breakage is prevented, and the loss required for work recovery is drastically reduced.

  Tool life 1.3 to 2.2 times more, 24 months of no tool damage
  (actual data with in-house equipment)

③ **Further improved production capacity for machining large components with enhanced basic performance capability**

- **The work envelope has been expanded by 27%, with fortified support for heavy workpieces;** further expanding the range of workpiece applications.

  The installation floor space is 95.5% (of the MB-8000H), which saves space while expanding the work envelope by expanding all the travels (X, Y, and Z axes) by 100 mm.

  Supporting a maximum load capacity mass of 3,000 kg (Optional) (20% improvement compared to MB-8000H)

- Achieving highly efficient machining with a lineup of powerful spindles (Optional) that use roller bearings designed for a wide range of workpiece materials.

  Maximum spindle speed of 10,000 min^{-1}, torque at 652/349 N m, output of 45/30 kW (short/cont)

  Maximum chip volume of 1,157 cm^3/min (73% improvement compared to MB-8000H standard spindle)

  (Material: S45C steel, face mill)

- **Suction of Excess Coolant in Spindle (Standard) instantly removes residual coolant from tools.**

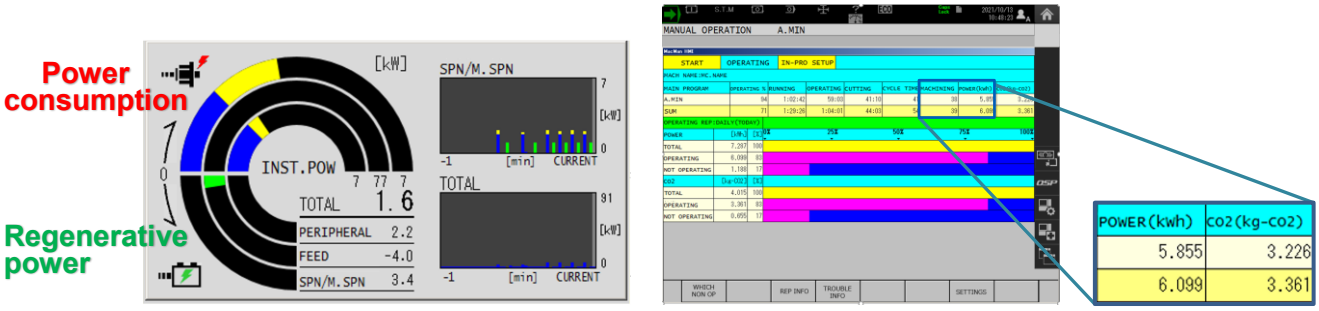
  When changing tools, air blow (at least 15-second blast) was required to remove the residual coolant from the tool and in the spindle, but this feature removes residual coolant in just 0.5 seconds (actual data with a drill) . The tool change time has been reduced.

- **Order acceptance:** Orders will be accepted starting from January 2022.

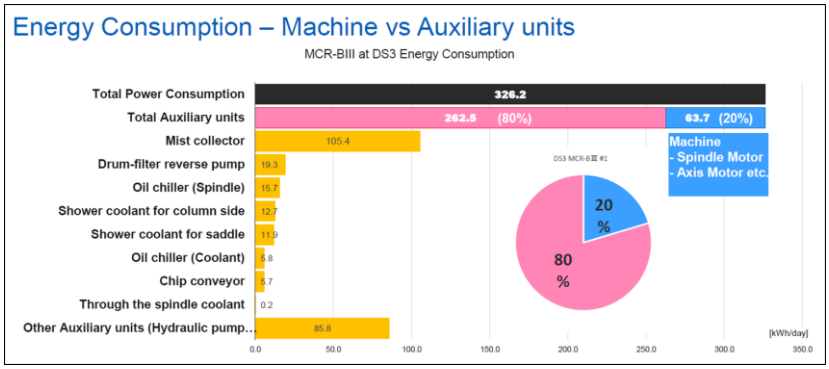
ECO Power Monitor

Checking power consumption on the spot

- Simultaneous records management of operating status and CO_2 emissions
- Power consumption is displayed as CO_2 emissions

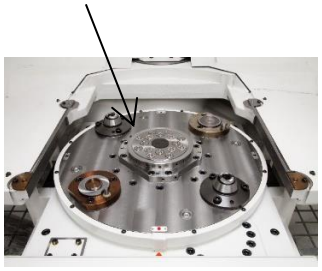


Analysis possible from the power consumption report for each device

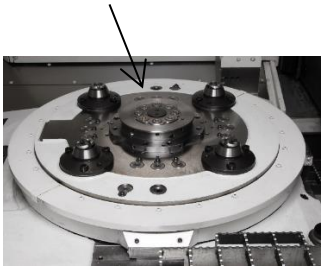


No. of hydraulic/pneumatic supply fixture ports

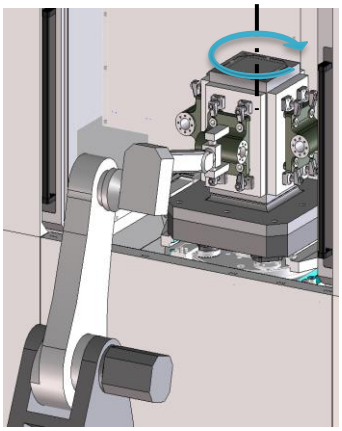
Setup station
16 ports



Workspace area
7 ports

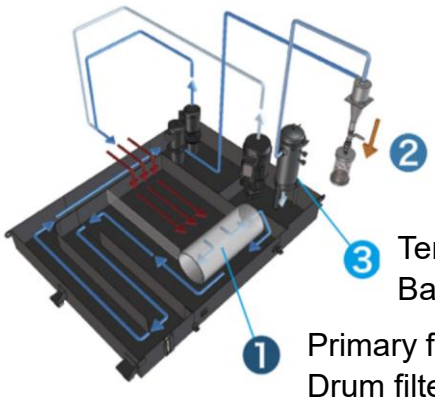


Auto part load/unload of multiple workpieces by robot



Sludgeless Tank

Filtering process



2 Secondary filtration
Cyclone filter

3 Tertiary filtration
Bag filter

1 Primary filtration
Drum filter for lift-up chip conveyor

Product Specifications [ ] = Optional

Items		MA-8000H
Travels	X-axis (column left/right)	1,400 mm
	Y-axis (spindlehead up/down)	1,200 mm
	Z axis (table front/back)	1,350 mm
Spindle center to pallet top		100 ～ 1,300 mm
Spindle nose to pallet center		100 ～ 1,450 mm
Pallet	Work surface	800 x 800 mm
	Max load dimensions	ø1,450 × 1,450 mm
	Max loading mass	2,000 kg [3,000 kg]*1
Spindle	Max spindle speed	6,000 min^{-1} [6,000 min^{-1},*2, 10,000 min^{-1}, 12,000 min^{-1}]
	Max output	30/22 kW (10 min/cont) [45/37 kW (20 min/cont)]*2 [45/30 kW (20 min 60% ED/cont)]*3 [45/30 kW (10 min 25% ED/cont)]*4
	Max torque	606/349 N·m (10 min/cont) [1,071/637 N·m (3 min/cont)]*2 [652/349 N·m (15% ED/cont)]*3 [419/194 N·m (2 min/cont)]*4
	Tapered bore	7/24 taper No. 50, [HSK-A100]
Feed rate	Rapid traverse	X-axis: 50 m/min, Y-axis: 50 m/min, Z-axis: 50 m/min
ATC	Magazine capacity	60*5 [40]*5, [81, 111, 141, 171, 195, 225, 255, 285]*6, [320, 400]*7
	Max tool diameter	ø240 mm [ø315 mm]*8 (with adjacent tools: ø140 mm)
	Max tool length	600 mm, [800 mm]*8,*9*
	Max tool mass	25 kg [30 kg]*8
Machine size	Machine height	3,442 mm
	Required floor space (width x depth)	3,960 x 8,178 mm*10
	Machine mass	33,000 kg*11

*1. Longer operating time *2. High-torque spindle *3. 10,000 min^{-1} spindle *4. 12,000 min^{-1} spindle

*5. Chain magazine *6. Matrix magazine *7. Multiple magazine *8. Longer ATC operation

*9. May be limited by maximum workpiece diameter *10. Hinge + scraper (with drum filter), external chip discharge

*11. Excluding workpiece and tool mass

End of document