OKUMA

OPEN POSSIBILITIES

MB-5000HII

Horizontal Machining Center

MB-5000HII

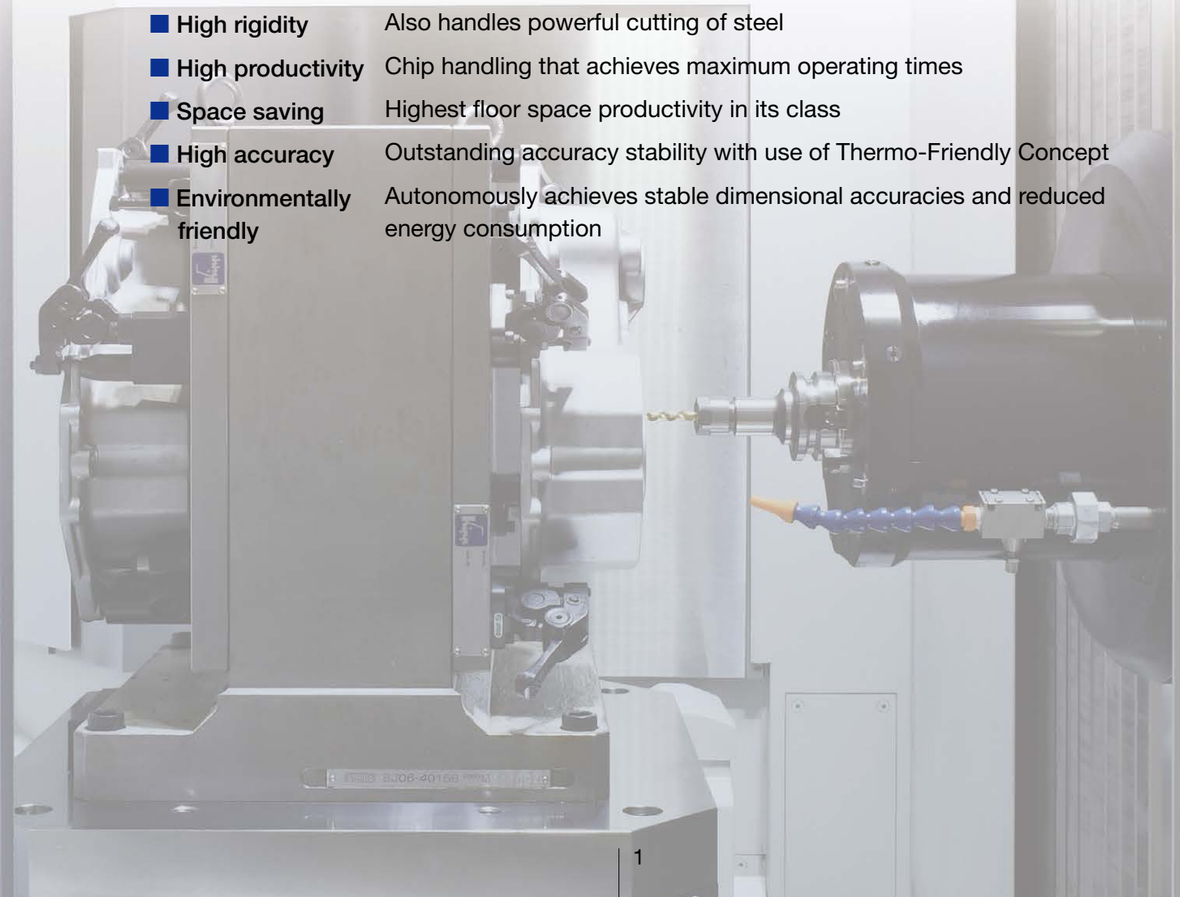
Horizontal Machining Center

Intelligent Technology | Thermo-Friendly Concept | Collision Avoidance System | Machining Navi | SERVONAVI

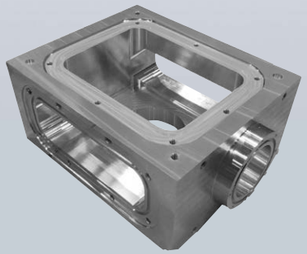
A World's Fastest Class Machine

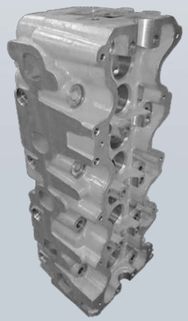
MB-5000HII achieves optimal machining at the fastest speed possible in various production forms, from mass production to variable-mix, variable-volume production. All of the units have been updated to realize revolutionary productivity. With high durability and reliability, the machine can demonstrate its best performance even on the shop floor in a tough environment.

High speed	Fast machining of aluminum parts in mass production
High rigidity	Also handles powerful cutting of steel
High productivity	Chip handling that achieves maximum operating times
Space saving	Highest floor space productivity in its class
High accuracy	Outstanding accuracy stability with use of Thermo-Friendly Concept
Environmentally friendly	Autonomously achieves stable dimensional accuracies and reduced energy consumption



MB-5000HII





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

Achieving high-speed performance in the world's fastest class

Quick machine movements

Fast acceleration/deceleration in the axis feed for shorter positioning times, high-speed table rotation, and shorter tool change times — all are effective toward achieving cycle times of the world's fastest class.

■ Reduced positioning times

With fast accel/decel axis feeds designed to reduce positioning times:

- Rapid traverse acceleration (max) X-axis: **1.0 G** Y-axis: **1.1 G** Z-axis: **1.0 G**
- Rapid traverse X-Y-Z axes: **60 m/min**

■ Machining Time Shortening Function

MTSF shortens machining time in operations with repeated rapid traverse (G00) and cutting feed (G01) movements for parts with many drilled holes. (See "Cycle time reduction" on page 12 for details.)

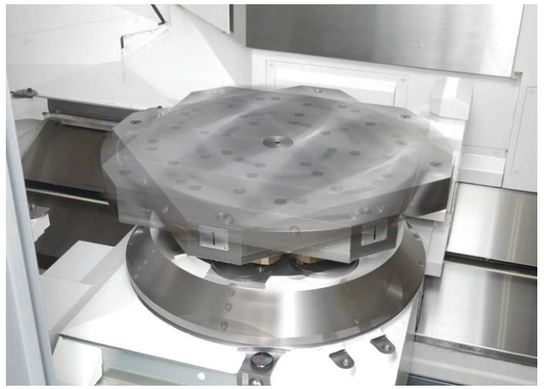
Note: The amount by which machining time is reduced will differ depending on machine setup, machined part shape, and part program.

■ Reduced table indexing times

A roller gear cam mechanism is used for the 0.001-degree indexing table (option), and that has minimized indexing time. Fast indexing has been achieved.

- 90° indexing: **1.0 sec***
- 180° indexing: **1.2 sec***

* With 0.001° indexing table (option)

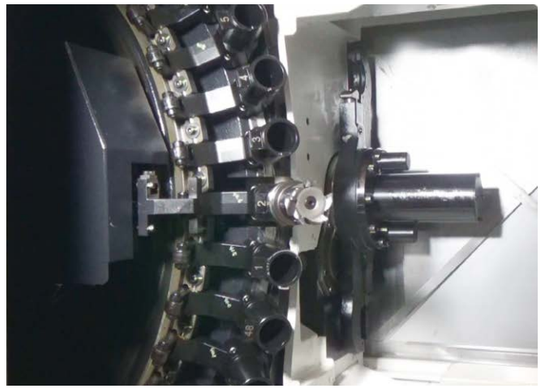


■ Reduced ATC times

The ATC disk magazine provides faster operations.
The farthest tool magazine indexing time possible is 5.1 seconds.

- ATC tools: 48 (No. 40 spindle)
- ATC time: T-T*1: **0.9 sec** (tool mass: 4 kg or less)
  1.3 sec (tool mass: 4 kg or higher)
  CTC min*2: **2.1 sec** (tool mass: 4 kg or less)
  2.5 sec (tool mass: 4 kg or higher)
- Farthest pot indexing: **5.1 sec** (With 48-tool magazine)

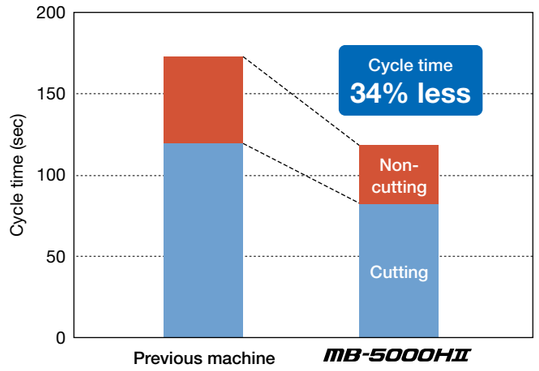
*1. MAS standard measurements (formerly JIS B 6013)
*2. ISO 10791-9 (2001) (JIS B 6336-9) measurements



Fast machining of aluminum parts in mass production

■ High-speed machining example of aluminum mass production

The cycle time became 34% less compared to the previous machine.



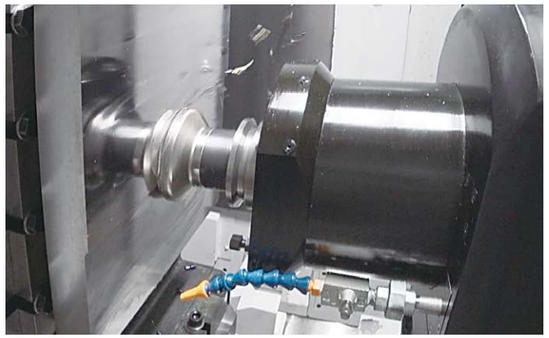
[High-speed drilling]

In addition, with the high-speed machining spindle* (20,000 min^{-1}, 30/22 kW) (option) for aluminum, tapping and other applications can be faster.

* Spindle ramp up for 0 → 15,000 min^{-1}: 1.3 sec (38% shorter compared to standard specs)

Also handles powerful cutting of steel

The lineup of spindles with roller bearings, compared to ball bearings, has higher rigidity. (option)
In addition to No. 40 spindles, No. 50 spindles are also available. With large-diameter side cutters and long boring bars etc, deep hole and protruding cut applications can be handled.
[Max tool length: 510 mm, max tool weight: 12 kg (No. 40 spdl), 15 kg (No. 50 spdl)]



■ Power spindles (options)

- Spindle taper: 7/24 taper No. 40 (BIG-PLUS®), HSK-A63
  7/24 taper No. 50 (BIG-PLUS®), HSK-A100
- Bearing dia: ø90 mm (roller bearings)
  Oil-air lubrication

End milling capacity **704 cm^3/min** (S45C)

- Spindle speed: 12,000 min^{-1}
- Max output: 33/26 kW (10 min/cont)
- Max torque: 302 N-m (10%ED)

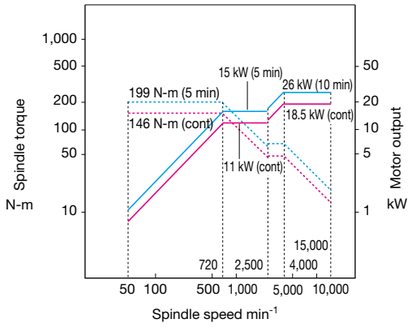
The lineup of highly rigid and highly torqued spindles

The spindle lineup

■ Standard spindle (No. 40)

For highly efficient machining of general machine parts

- Spindle speed: 15,000 min^{-1}
- Max output: 26/18.5 kW (10 min/cont)
- Max torque: 199/146 N-m (5 min/cont)



Face milling capacity

483 cm^3/min (S45C)

- Tool: ø80 face mill 8 blades (cermet)
- Spindle speed: 1,194 min^{-1}
- Cutting: 300 m/min
- Feed rate: 3,750 mm/min
- Cut width: 56 mm
- Cut depth: 2.3 mm

■ High-speed spindle (No. 40) for aluminum applications

(option)

For fast machining of aluminum

- Spindle speed: 20,000 min^{-1}
- Max output: 30/22 kW (10 min/cont)
- Max torque: 57/42 N-m (10 min/cont)

Face milling capacity

2,700 cm^3/min (A5052)

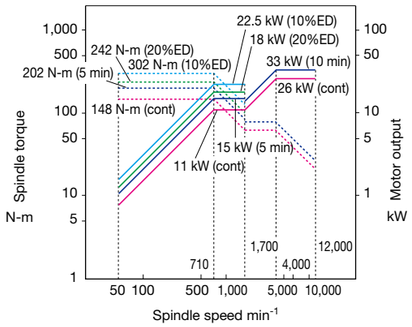
- Tool: ø63 face mill 5 blades (carbide)
- Spindle speed: 15,000 min^{-1}
- Cutting: 2,968 m/min
- Feed rate: 20,455 mm/min
- Cut width: 44 mm
- Cut depth: 3 mm

■ Power spindles (No. 40/No. 50)

(options)

For powerful cutting of castings and cast steel parts

- Spindle speed: 12,000 min^{-1}
- Max output: 33/26 kW (10 min/cont)
- Max torque: 302 N-m (10%ED)



End milling capacity

704 cm^3/min (S45C)

- Tool: ø20 roughing end mill 7 flutes
- Spindle speed: 4,029 min^{-1}
- Cutting: 253 m/min
- Feed rate: 8,800 mm/min
- Cut width: 4 mm
- Cut depth: 20 mm

Face milling capacity

628 cm^3/min (S45C)

- Tool: ø100 face mill 5 blades (cermet)
- Spindle speed: 955 min^{-1}
- Cutting: 300 m/min
- Feed rate: 1,910 mm/min
- Cut width: 70 mm
- Cut depth: 4.7 mm

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

Chip discharge designed to achieve maximum operating times

Machining chamber with accumulated chips and biting into covers — thoroughly removed

In-machine covers renewed. Flat covers are used to drastically improve chip discharge. Moreover, with simpler designs, chip accumulation and biting-in troubles have been prevented. The machine has the high durability fully capable of withstanding the long continuous runs required for mass production at maximum rapid-traverse rates and machining capacity.

■ In-machine covers with improved reliability

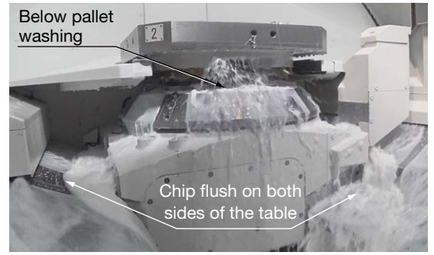
- X-/Y-axis with armored bellows, and the Z-axis with a single steel sheet cover minimize chip biting-in damage.

Single stainless steel cover (Z-axis)

X-/Y-axis armored bellow covers

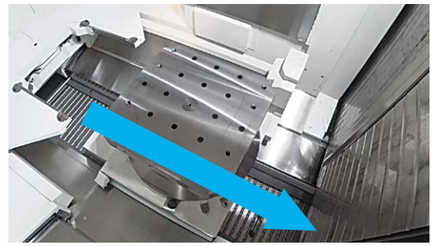
■ With smooth chip discharge, long continuous machining

- Below pallet wash, table both-side chip flush are standard. Long continuous runs are strongly supported by in-machine covers preventing chip accumulation in any.
- Large-volume shower coolant washes machining chamber corners and table periphery, to prevent chip accumulation.



■ Full center trough achieves chip discharge from any type of machining application

- All areas of the machining chamber converge with the in-machine chip conveyor.
- Larger directly-below-spindle discharge port. Smoother out-machine chip discharge possible.



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)

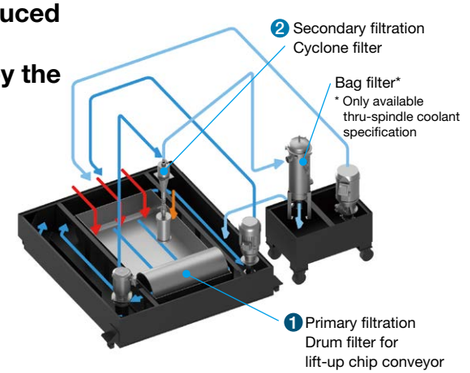
Sludge removal rate **99%** (when the material is casting and aluminum)

Note: 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: If the Sludgeless Tank option is selected, a chip conveyor with drum filter must also be selected.

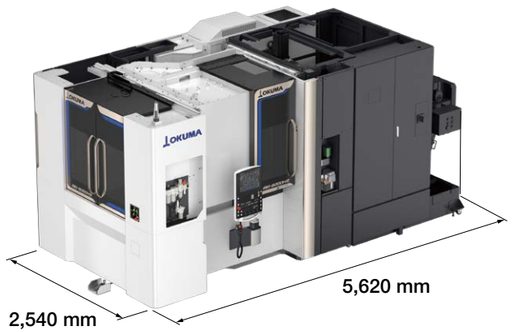


Proud of space-saving designing for class best floor space productivity

With a small footprint, providing a large machining area

Class smallest installation space

Foot print
14.3 m²



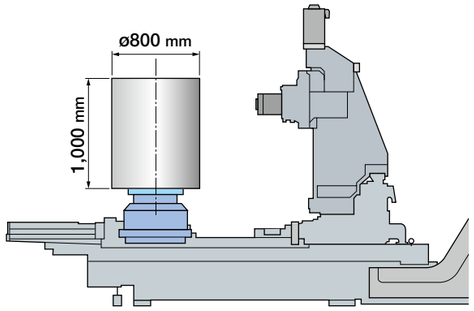
(RDF lift-up chip conveyor with drum filter)

Class largest, wide machining area

Max machining dia: ø800 mm

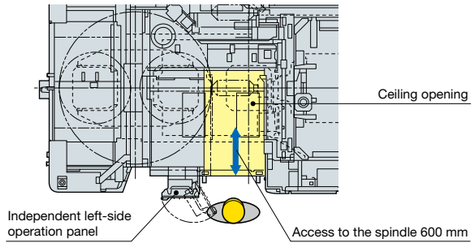
Max machining height: 1,000 mm

- **Machining area** X-axis travel: 760 mm
  Y-axis travel: 760 mm
  Z-axis travel: 810 mm

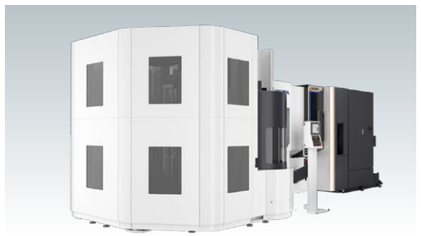


User-friendly operation

- Independent left-side operation panel (swivel type)
  The panel can be operated while watching workpieces to improve operability
- Column traverse system provides an easy access to the spindle and workpiece
- The overhead door can be opened to let light in and eliminate coolant drops

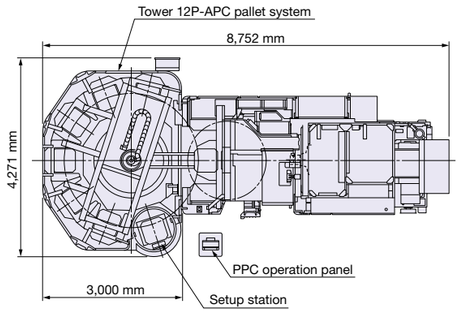


Multi-Pallet Tower APC



Tower 12P-APC pallet system

Setup station



Reliable machining with high accuracy and outstanding thermal stability

Thermo-Friendly Concept

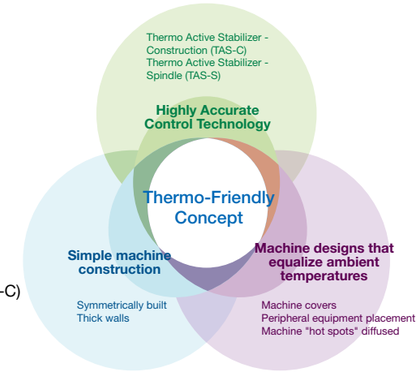
The unique approach of “accepting temperature changes”

Thermo-friendly construction gives outstanding thermal stability

~~Forced cooling and restraining of thermal deformation~~

1. Minimal temperature deviation
2. Manageable thermal deformation
3. Accurate compensation

Thermo Active Stabilizer—Construction (TAS-C)
Thermo Active Stabilizer—Spindle (TAS-S)



Machining dimensional change over time minimized with outstanding dimensional stability

Eliminate waste with the Thermo-Friendly Concept

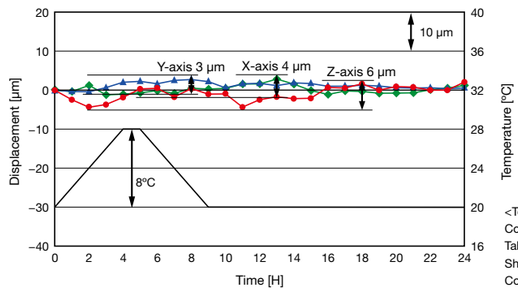
Okuma’s Thermo-Friendly Concept achieves high dimensional stability not only when the room temperature changes, but also at machine startups or when machining is resumed.
The warm-up operation time to stabilize thermal deformation is shortened, and the burden of dimensional correction when resuming machining is reduced.

Machine startup
Machining restart
Room temp change

High dimensional stability

Machining dimensional change with ambient temperature range of 8°C

6 µm (MB-5000HII Actual data)



<Testing conditions>
Coolant: yes
Table coolant: yes
Shower coolant: yes
Coolant heater/cooler: no

TAS-C (Thermo Active Stabilizer – Construction)

TAS-C estimates and accurately controls the volumetric thermal deformation of the machine's construction due to ambient temperature changes; based on data from properly placed sensors, feed axis positions, and actual machine thermal deformation characteristics.

TAS-S (Thermo Active Stabilizer – Spindle)

The TAS-S spindle thermal deformation control takes into account various conditional changes such as the spindle's temperature data, modification of the spindle rotation and speed, as well as spindle stoppage. The spindle's thermal deformation will be accurately controlled, even when the rotating speed changes frequently.

High-accuracy machining

High accuracy

- Even higher accuracy with Y-axis motor base cooling (standard) and ball screw cooling (option)

High-precision index table

- NC 0.001° indexing (option)
  Indexing time (90°/180°) 1.0/1.2 sec
- A roller gear cam is used for the drive
- The pallet seating on a tapered cone achieves highly accurate positioning and excellent durability

Highly rigid bed

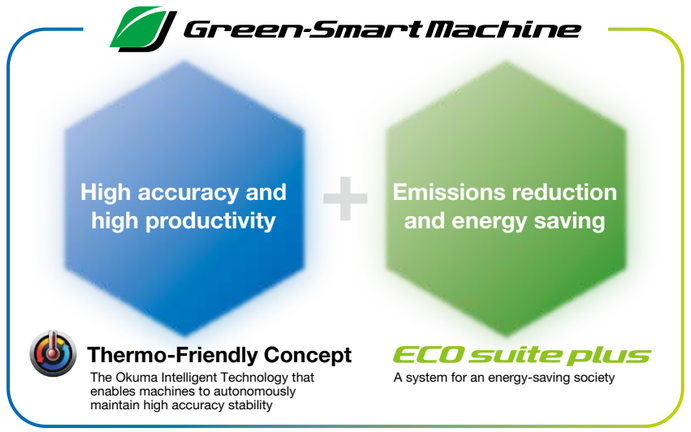
- A highly rigid 3-point support bed is used to enable easy installation and stabilize accuracy for a long time

Contribution to the realization of a carbon-free society

Highly productive, accurate and eco-friendly Green-Smart Machine

Okuma has worked to reduce energy consumption in order to achieve carbon neutrality at the three factories in Japan which are our main production bases.
We have realized high productivity through automation and process-intensive machining, in addition to high-accuracy machining, and we then introduced the use of green energy to transform the three domestic factories into carbon-neutral factories.
“Green-Smart Machines” is our definition of Okuma’s intelligent machine tools, which autonomously achieve stable dimensional accuracy and reduced energy consumption, to support environmentally friendly production. Our policy is to deploy “Green-Smart Machines” fully, to help achieve a carbon-free society.
Starting with products manufactured at those carbon-neutral factories and supplying them all over the world, we will work together with our customers to help solve the social issues faced by the manufacturing industry.

Green-Smart Machines are **environmentally friendly**
products that autonomously achieve stable dimensional accuracies and reduced energy consumption.



Thermo-Friendly Concept

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

The unique concept of accepting temperature changes achieves consistent high accuracy without special coolers or excessive air conditioning.

Reduction of warm-ups and dimensional compensation

Reduce the time needed for daily warm-ups and dimensional compensation to adjust to ambient temperature changes

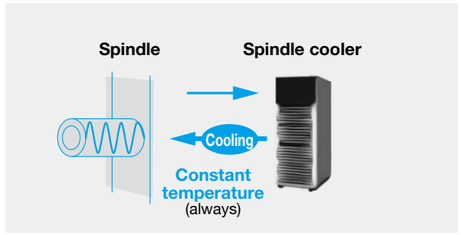
Reduction of power used for air conditioning

Maintain high stability of dimensional accuracy even if the air conditioning temperature range is expanded.

Reduction of machine body coolers

Achieve outstanding dimensional accuracy without any special machine body cooling being required to maintain accuracy

The Okuma way to cool



By always setting a constant coolant supply temperature, the cooler power consumption is reduced.

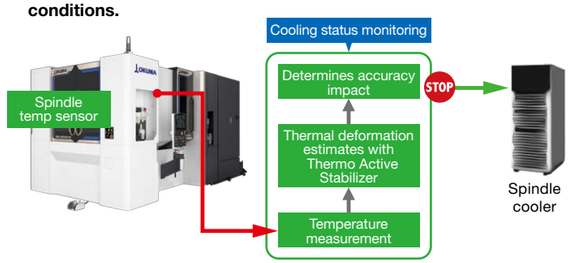
ECO suite plus

A system for an energy-saving society

ECO Idling Stop

Auxiliary equipment consume a substantial portion of the power used in a factory. This function enables each of them to be turned off when not needed to reduce power consumption.
In addition to when automatic operation is suspended, it is now possible to stop idling during manual operation. Power consumption and carbon dioxide emissions are reduced without conscious effort by the operator.

The machine monitors the cooling level when not machining, and proactively turns off the cooler while maintaining high accuracy conditions.



ECO Operation

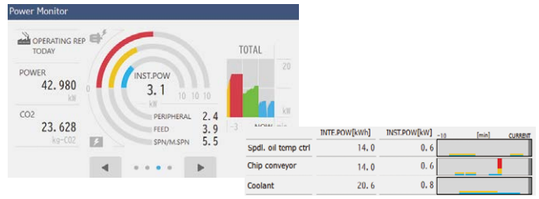
By using only the required peripherals (chip conveyor, mist collector), energy-saving operations are possible.

ECO Power Monitor

Power is shown individually for spindle, feed axes, and auxiliaries on the OSP operation screen.
In addition to regenerative power, the energy-saving benefits from auxiliary equipment stopped with ECO Idling Stop can be confirmed on the spot.

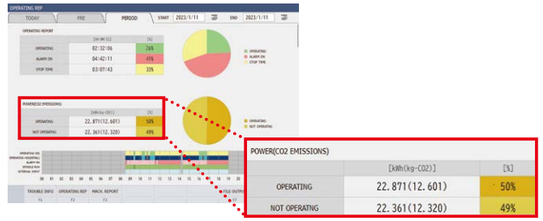
1 Check carbon dioxide emissions on the spot

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



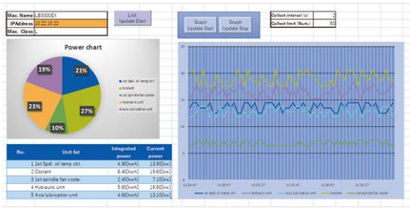
2 Simultaneously records operating status and carbon dioxide emissions

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 create visual feedback of machine’s power consumption and carbon dioxide emissions.

A wide variety of advanced technologies to increase productivity

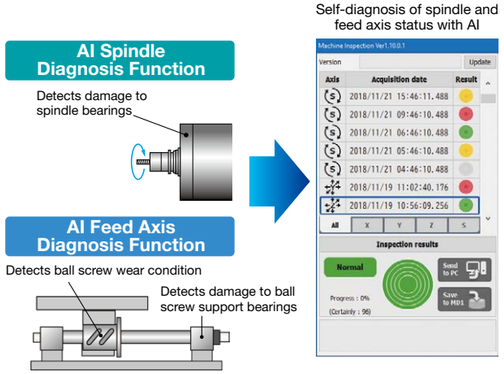
AI Machine Diagnosis Function (option)

Machine tool diagnostics technology with artificial intelligence (AI)

■ With predictive maintenance, prevent machine stoppages just in time

Okuma's AI-equipped control diagnoses the presence or absence of abnormalities in the machine spindle and feed axes and identifies any irregularities found.
Downtime from machine stoppage is minimized, so the benefits are highly accurate, productive, and stable operations over the long term.
The operators themselves can easily diagnose the machine by following simple screen guidelines on the Okuma control.

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.
With AbsoScale detection specs, ball screw wear detection is possible.



Self-diagnosis of spindle and feed axis status with AI

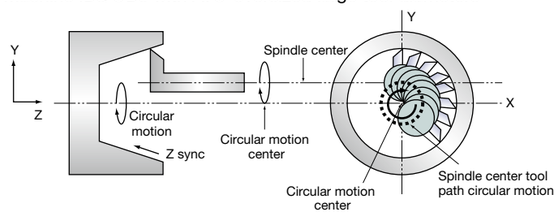
Turn-Cut (option)

Turning operations on machining centers

■ Shorter lead times with process-intensive machining

Simultaneously controlling X-Y circular motion with the tool edge position rotated by the spindle tool enables lathe-like turning.

- Tapers also possible
- Hole making with different diameters — with one tool
- Machine IDs/ODs with ATC-oversized large tool diameters



Note: AbsoScale detection and ball-screw cooling required.

[Turning valve parts]

With Turn-Cut, it's possible to turn the seating surfaces required by gas pipe sealing conditions.

Flat-Tool Grooving (option)

Airtight seal grooving

■ Grooving with high sealability

The spindle phase is precisely synchronized with cutting edge motion, to perform highly accurate grooving.

- Getting high sealability without hand finishing.
- Complex seal groove curves also cut with flat tools.

Okuma Intelligent Technology exhibits powerful effect on machine shop floors

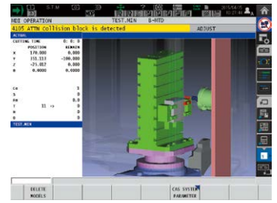
Collision Avoidance System (option)

Collision prevention

Allowing operators to focus on making parts

■ World's first "Collision-Free Machine"

CAS prevents collisions in automatic or manual mode, providing risk-free protection for the machine and great confidence for the operator.



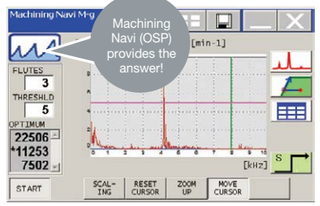
Machining Navi M-*i*, M-*g*II+ (option)

Cutting condition search for milling

Longer tool life and shorter machining times by optimizing cutting conditions

■ Searches for the best cutting conditions

- Machining Navi M-*i* changes automatically to optimum spindle speed
- Machining Navi M-*g*II+ displays several spindle speed possibilities



SERVONAVI

Optimized Servo Control

Achieves long term accuracy and surface quality

■ SERVONAVI AP (Automatic Parameter setting)

Work Weight Auto Setting

- **Cycle time shortened with faster acceleration**

Work Weight Auto Setting estimates the weight of the workpiece and fixture on the table and automatically sets the liner axis servo parameters, including acceleration, to the optimum values. Cycle times are shortened with no changes to machining accuracy.

Rotary Axis Inertia Auto setting

- **Maintains high accuracy and stable movements**

The "ServoNavi Rotary Axis Inertia Auto Setting" estimates the inertia of the workpiece and jig from the acceleration torque, and automatically sets the optimum servo parameters for the table rotation axis, including acceleration, thereby maintaining the high-precision operation of the table rotary axis.
Moreover, the table indexing time for light weight workpieces is reduced.

■ SERVONAVI SF (Surface Fine-tuning)

Reversal Spike Auto Adjustment

- **Maintains machining accuracy and surface quality**

SERVONAVI's Reversal Spike Auto Adjustment maintains machining accuracy by switching servo parameters to the optimum values matched to changes in slide resistance.

Vibration Auto Adjustment

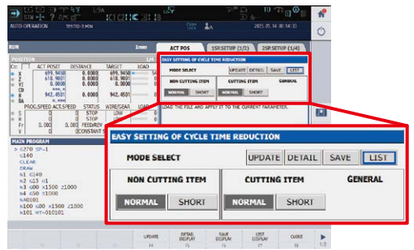
- **Contributes to longer machine life**

Vibration Auto Adjustment can quickly eliminate noise and vibration even from machines with years of operation.

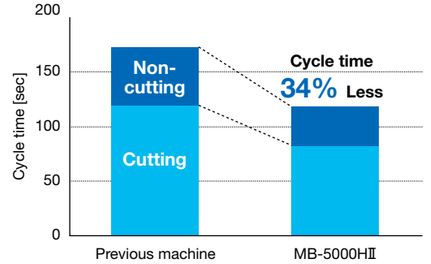
Cycle time reduction

Significantly shortens cycle times and reduces power consumption

- Operation time reduction: The non-cutting time is shortened by simultaneously performing multiple operations, such as spindle rotation and axis feed, and allowing the rotary axis to take the shortest path
- Machining time shortening: The cycle time is reduced for parts machining with frequent switches between cutting feed and rapid traverse by using feeder-mode high-speed switching and optimal acceleration/deceleration
- Easy parameter setting: Collects parameters related to cycle time reduction in a single screen for enabling changes and reuse in a single operation



Parameter easy setting
Setting screen



[Measuring conditions]
Sample part program used to drill and tap dozens of holes on three sides of an aluminum die casting.

Machine Specifications

	Item	Unit	MB-5000HII	
			No. 40	[No. 50]*1
Travels	X-axis (Left/right column)	mm (in)	760 (29.92)	
	Y-axis (spindle up/down)	mm (in)	760 (29.92)	
	Z-axis (table front/back)	mm (in)	810 (31.89)	
	Spindle center to pallet top	mm (in)	50 to 810 (1.97 to 31.89)	
	Spindle nose to pallet center	mm (in)	100 to 910 (3.94 to 35.83)	
Pallet	Pallet size	mm (in)	500 × 500 (19.69 × 19.69)	
	Max load	kg (lb)	500 (1,100)	
	Indexing angle	deg	1 [0.001]	
	Max workpiece dimensions	mm (in)	ø800 × 1,000 (31.5 × 39.37)	
Spindle	Spindle speed	min^{-1}	15,000 [12,000, 20,000]	12,000
	Tapered bore		7/24 taper No. 40 [HSK-A63]	7/24 taper No. 50 [HSK-A100]
	Bearing dia	mm (in)	ø70 (2.76) [12,000 min^{-1}: ø90 (3.54)] [20,000 min^{-1}: ø70 (2.76)]	ø90 (3.54)
Feedrate	Rapid traverse	m/min (fpm)	X, Y, Z: 60 (196.86)	
	Cutting feedrate	mm/min (ipm)	X, Y, Z: 1 to 60,000 (0.04 to 2,362)	
Motors	Spindle (10 min/cont)	kW (hp)	26/18.5 (35/25) [12,000 min^{-1}: 33/26 (44/35)] [20,000 min^{-1}: 30/22 (40/30)]	33/26 (44/35)
	Feed axes	kW (hp)	X, Y, Z: 5.2 (6.9)	
	Table indexing	kW (hp)	3.0 (4.0) [4.6 (6.1)]	
ATC	Tool shank		MAS403 BT40 [CAT40, DIN40, HSK-A63]	MAS403 BT50 [CAT50, DIN50, HSK-A100]
	Pull stud		MAS2 [MAS1, CAT, DIN, JIS]	
	Magazine capacity	tools	48*2 [64]*2 [100]*3 [140, 180, 220, 260, 300, 340]*4	40*2 [60]*2 [80]*3 [90, 120, 150, 180, 210, 240]*4
	Max tool dia (w/ adjacent)	mm (in)	ø90 (ø3.54)	ø100 (ø3.94)
	Max tool dia (w/o adjacent)	mm (in)	ø170 (ø6.69)	
	Max tool length	mm (in)	510 (20.08)	
	Max tool weight	kg (lb)	12 (26.4)	15 (33)
	Tool selection		Memory random [fixed address]*5	
Machine Size	Height	mm (in)	2,885 (113.58)	
	Floor space; width × depth (RDF specs)*6	mm (in)	2,540 × 5,620 (100 × 221.26)	2,900 × 5,620 (114.17 × 221.26)
	Mass	kg (lb)	13,700 (30,140)	14,000 (30,800)
Controller			OSP-P500M	

*1. No. 50 spindle is optional *2. Disk magazine *3. Chain magazine *4. Matrix magazine *5. Chain and matrix magazine types use the fixed address
*6. With RDF drum filter lift-up chip conveyor [ ]: option

Standard Specifications

Spindle speed	15,000 min^{-1}, 26/18.5 kW (10 min/cont)	X-/Y-axis armored bellows	
ATC magazine capacity	48 tools	Hydraulic unit	
Spindlehead cooling system	Oil temperature controller	Automatic 1° indexing table	
Centralized lubrication auto grease supply unit	Grease cartridge 700 ml, and with grease level and pressure warnings	2-pallet rotary-shuttle APC	Pallet top surface M16 tap
		Full enclosure shielding	Two-pallet pivoted type for APC
Coolant supply system	Tank 1,000 L (Effective: 710 L), pump 3.3/3.8 kW (50/60 Hz)	ATC operation panel	
		Work lamp	LED lamp
In-machine chip discharge	Hinge type chip conveyor	Status indicator	3 phase C type
Chip pan for above			Red (alarm), Yellow (end), Green (running)
ATC air blower (blast)		Foundation washers, jack bolts	
Chip air blower (blast)	Nozzle type	Tool release lever	
In-machine chip washer		Tapered bore cleaning bar	
Shower coolant system 10 nozzles		Hand tools	
Below pallet washing		TAS-S	Thermo Active Stabilizer – Spindle
Air filter and oiler		TAS-C	Thermo Active Stabilizer – Construction

Optional Specifications

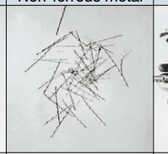
Spindle speeds * See P5 for details	12,000 min^{-1}, 33/26 kW (10 min/cont) 20,000 min^{-1}, 30/22 kW (10 min/cont)	Chip air blower (blast)	Adapter
		Sludgeless Tank	
Dual contact spindle*1	HSK, BIG-PLUS®	Off-machine chip discharge (lift-up chip conveyor types) * See the table below for details	· Hinge · Scraper + drum filter · Hinge + scraper + drum filter Conveyor discharge heights; 800, 1,200 mm
ATC magazine capacity (No. 40)	64 (disk magazine), 100 (chain) 140, 180, 220, 260, 300, 340 (matrix magazine)		
ATC magazine capacity (No. 50)	60 (disk magazine), 80 (chain) 90, 120, 150, 180, 210, 240 (matrix magazine)	Chip buckets for above	Heights: 700 mm, 1,000 mm
		Hydraulic oil cooler	
		Coolant heater/cooler	
AbsoScale detection	X-Y-Z axes	Tool breakage detection	Auto tool length compensation included (touch sensor)
Auto 0.001° indexing table	Built-in NC table		
Auto pallet changer (APC)	6-P parallel shuttle, 12-P tower, FMS	In-magazine tool breakage detection	
Pallet top	T-slots, inch holes		
Spare pallets		Auto zero offset	Auto gauging (touch probe)
Edge locator		Tool life management	By cumulative operation timer, etc
Oil-hole coolant system	1.5 MPa	Pull stud bolt shape	MAS1, CAT, DIN, JIS
Thru-spindle coolant*2	1.5, 7.0 MPa; Large flow 1.5, 7.0 MPa	Standard T-column fixture	Height: 850 mm, Pitch:100 mm
Workpiece wash gun		Standard square-column fixture	Height: 850 mm, Pitch:100 mm
Oil mist lubricator		Ball-screw cooler	X-Y-Z axis

*1. Be sure to select this specification when BIG-PLUS® holder is used.
*2. Okuma pull stud required with thru-spindle coolant.

Recommended chip conveyors

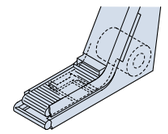
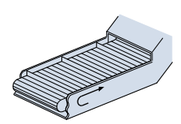
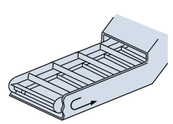
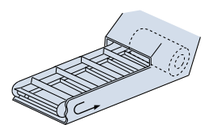
(Please contact an Okuma sales representative for details.)

○: Recommended △: Conditionally recommended

Workpiece material		Steel	FC	Aluminum / Non-ferrous metal	Mixed (general use)
Chip shape					
In-machine	Hinge type (Standard) *1	○	○	○	○
Off-machine chip discharge (option)	Hinge + scraper with drum filter	△ *2	△ (Wet) *3	○	○
	Hinge type	○	—	—	△ *4
	Scraper type	—	○ (Dry)	—	—
	Scraper type with drum filter	—	○ (Wet) with magnet	△ *5	—

*1. Scraper type (option) can be selected. *2. When there are many fine chips *3. When chips are longer than 100 mm *4. When there are few fine chips
*5. When chips are shorter than 100 mm

Off-machine lift-up chip conveyors

Type	Hinge + scraper with drum filter	Hinge	Scraper	Scraper with drum filter
Shape				

Note: Becomes hinge + scraper (with drum filter) if Sludgeless Tank (option) is selected.

A next-generation CNC that makes 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 technology, Okuma offers this CNC to build an advanced “digital twin” that faithfully reproduces machine control and machining operations and creates new value. In addition, Okuma offers productivity improvement and stable production with ease of use that allows customers to use their machining know-how, an energy-saving solutions that achieve both high accuracy/productivity and eco-friendly products, with robust security protection against increasing threats of cyber attacks.

15-inch operation panel

Faithful reproduction of machines and processing — Digital support for shop floor work

Digital Twin (option)

“Okuma’s two digital twins” made possible by an office PC and a next-generation CNC reduce machine downtime and improve machine utilization

Simulation using the latest machine information can be achieved with an office PC and OSP-P500 installed on the physical machine. This enables preparation for machining in advance in the office environment (front loading). Preparing machining for the next part while continuing machining can reduce the preparation time for the physical machine. When a problem occurs on the shop floor, it can be solved quickly on site without going back to the office.

1 Digital Twin On PC[*1]

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.

*1. The PC software is to be used with one package for one machine.

2 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.

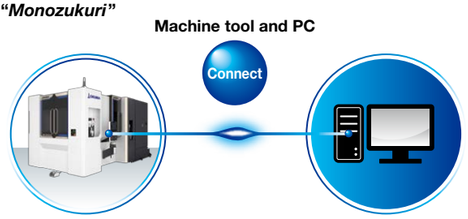
Note: The screens above are examples of the Collision Avoidance System (option).

Connect Plan

Get Connected, Get Started, and Get Innovative with Okuma “*Monozukuri*”

Connect, Visualize, Improve

Okuma’s Connect Plan is a system that provides analytics for improved utilization by connecting machine tools and visual control of factory operation results and machining records. Simply connect the OSP and a PC and install Connect Plan on the PC to see the machine operation status from the shop floor, from an office, from anywhere. The Connect Plan is an ideal solution for customers trying to raise their machine utilization.



A next-generation CNC OSP-P500M standard specifications

Basic Specs	Control	X, Y, Z, simultaneous 3 axis, spindle control (1 axis)
	Position feedback	OSP full range absolute position feedback (zero point return not required)
	Coordinate functions	Machine coordinate system (1 set), work coordinate system (20 sets)
	Min/max command	±99999.999 mm, ±9999.9999° 8-digit decimal, command units: 0.001 mm, 0.01 mm, 1 mm, 0.0001°, 0.001°, 1°
	Feed	Cutting feed override: 0 to 200%
	Spindle control	Direct spindle speed commands, override 30 to 300%, multi-point indexing
	Tool compensation	No. of registered tools: Max 999 sets, tool length/radius compensation: 3 sets per tool
	Display	15-inch color LCD + multi-touch panel operations
	Security	Operator authentication, Lock screen, OSP-VPSⅡ-STD (Virus Protection System)
Programming	Program capacity	Program storage capacity: 4 GB; operation buffer: 2 MB
	Program operations	Scheduled program, fixed cycle, G-/M-code macros, arithmetic, logic statements, math functions, variables, branch commands, coordinate calculate, area machining, coordinate convert, programming help, user task, keyway cycle
Operations	OSP suite	“suite apps” to graphically visualize and digitize information needed on the shop floor, “suite operation” enable one-touch access to “suite apps”.
	Easy Operation	“Single-mode operation” to complete a series of operations. Advanced operation panel/graphics facilitate smooth machine control
	MacMan plus	Machining management: aggregation and display of machining records, operating records and problem information, visualization of power consumption, file output
	Machine operations	Operation help, load meter, alarm help, sequence return, manual interrupt/auto return, pulse handle overlap, parameter I/O, PLC monitor, auto power shut-off
Communications / Networking		USB (2 ports), Ethernet, DNC-T1, Smart I/F
High speed/accuracy specs		Thermo Active Stabilizer—Spindle (TAS-S), Thermo Active Stabilizer—Construction (TAS-C), Hi-Cut Pro, pitch error compensation, Hi-G control, SERVONAVI, Cycle time reduction (operation/machining time reduction, easy parameter setting)
Energy-saving functions	ECO suite plus	ECO Idling Stop, ECO Operation, oil temperature controller auto control, ECO Power Monitor
	Power Regeneration System	Regenerative power is used when the spindle and feed axes decelerate to reduce energy waste.

A next-generation OSP-P500M kit specifications/optional specifications

Item	Kit specs	NML E	NML D	AOT E	AOT D	DT E	DT D	DT AOT E	DT AOT D
Digital Twin									
Virtual Machining						● (VE)	● (VD)	● (VE)	● (VD)
Quick Modeling						● (VE)	● (VD)	● (VE)	● (VD)
OPC UA for Machine Tools						●	●	●	●
OSP API KIT						●	●	●	●
Interactive functions									
Advanced One-Touch IGF-M (w/ Real 3-D simulation)				●	●			●	●
Interactive MAP (I-MAP)						●	●		
Smart OSP Operation				●	●	●	●	●	●
Programming									
Operation buffer 10 MB		●	●	●	●	●	●	●	●
Program notes (MSG)		●	●	●	●	●	●	●	●
Auto scheduled program update		●	●	●	●	●	●	●	●
Block skip; 9 sets									
Program branch; 9 sets									
Coordinate system select (Std: 20 sets)	100 sets	●		●		●		●	
	200 sets		●		●		●		●
	400 sets								
Helical cutting		●	●	●	●	●	●	●	●
3-D circular interpolation									
Skip									
Synchronized Tapping Ⅱ		●	●	●	●	●	●	●	●
Arbitrary angle chamfering		●	●	●	●	●	●	●	●
Cylindrical side facing									
Tool max rotational speed setting									
F1-digit feed	External switch type, parameter type								
Programmable travel limits (G22, G23)		●	●	●	●	●	●	●	●
Slope machining	Type Ⅰ, Type Ⅱ								
Axis name designation									
Fixture offset Ⅱ									
Dynamic fixture offset									
Tool grooving									
Turn-Cut									
Dynamic Tool Load Control									
3-D tool compensation									
Drawing conversion	Programmable mirror image (G62)		●		●		●		●
	Enlarge/reduce (G50, G51)		●		●		●		●
User task	Common variables 1,000, 2,000 pcs								
	G-code macros: 80 sets added								
	I/O variables (16 each)								
Sequence stop		●	●	●	●	●	●	●	●
Sequence return	Mid-block sequence return		●		●		●		●
Tool wear compensation	Includes input restriction	●	●	●	●	●	●	●	●
Tool life management	Includes warning	●	●	●	●	●	●	●	●
External I/O communication									
RS-232C connector									
DNC connection	DNC-T3, DNC-B, DNC-DT DNC-C/Ethernet								

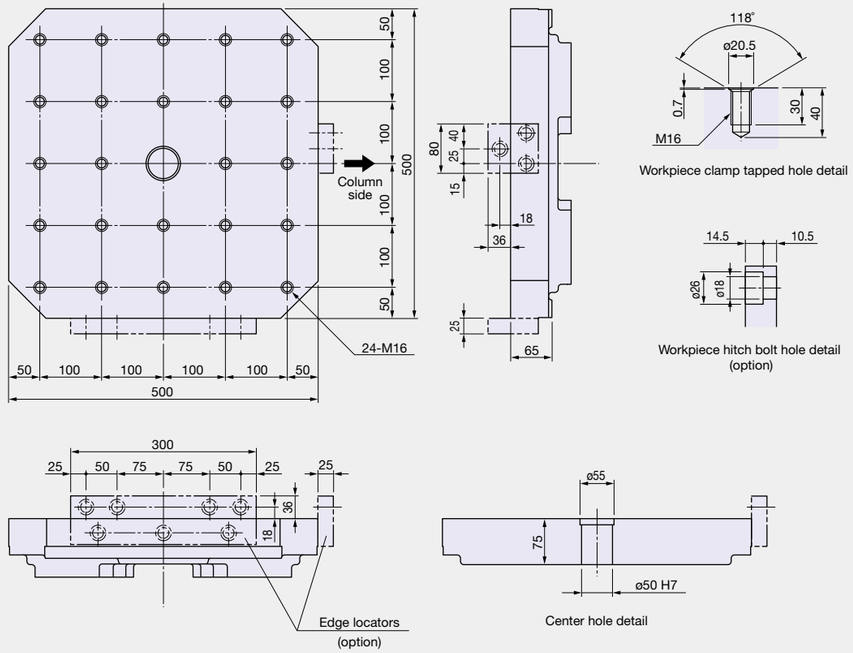
Item	Kit specs	NML E	NML D	AOT E	AOT D	DT E	DT D	DT AOT E	DT AOT D
Gauging									
Auto tool length offset/breakage detection									
In-magazine tool breakage detection									
Auto Workpiece Gauging/Auto zero offset									
Manual gauging (w/o sensor)		●	●	●	●	●	●	●	●
Interactive gauging (touch sensor, touch probe required)									
Monitoring									
21.5-inch color LCD operation panel with adjustable-tilt keyboard									
One-Touch Spreadsheet									
Collision Avoidance System									
Real 3-D Simulation				●	●	●	●	●	●
Simple load monitor	Spindle overload monitor	●	●	●	●	●	●	●	●
NC operation monitor	Hour meter, workpiece counter	●	●	●	●	●	●	●	●
Status indicator									
Operation end buzzer									
Workpiece counters on machine									
Tool breakage no-load detection			●		●		●		●
MOP-TOOL	Adaptive control, overload monitor								
AI machine diagnostics *	Spindle/feed axes, or feed axes only								
Machine Status Logger									
Cutting Status Monitor									
Machining Navi M-*i*, M-*g*Ⅱ+(cutting condition search)									
Feed axis retraction									
Tool retract cycle									
Automation / unattended operation									
Warm-up (calendar timer)									
External program	Button, rotary switch								
	Digital switch, BCD (2-digit, 4-digit)								
Pallet pool control (PPC) (Required for multi-pallet APC)									
Connection with automated devices	Robot, loader I/F								
	Stacker crane I/F								
	FMS link I/F								
High-speed, high-precision									
AbsoScale detection	X-Y-Z axes								
Dynamic displacement compensation		●	●	●	●	●	●	●	●
0.1 µm control (linear axis commands)									
Hyper-SurfaceⅡ	3 linear axes, 3 linear axes + 2 rotary axes								
ECO suite plus									
ECO Power Monitor	On-machine wattmeter								
Spindle Power Peak Limiter									
Energy-saving hydraulic unit	ECO Hydraulics								
External output interface of consumed electricity									
Other									
Circuit breaker									
OSP-VPSⅡ-EX (Virus Protection System)									
Pulse handles	2 pcs, 3 pcs								
External M codes [4 sets, 8 sets]									

Note. NML: Normal kit, AOT: Advanced One-Touch IGF-M kit, DT: Digital Twin kit, DT AOT: Digital Twin Advanced One-Touch IGF-M, E: Economy, D: Deluxe
VE and VD kits are also equipped with the Digital Twin on PC function, allowing running from a PC.
* With AbsoScale detection specs, ball screw wear detection is possible.
Specifications, etc. are subject to change without notice.

Pallet dimensions

Unit: mm

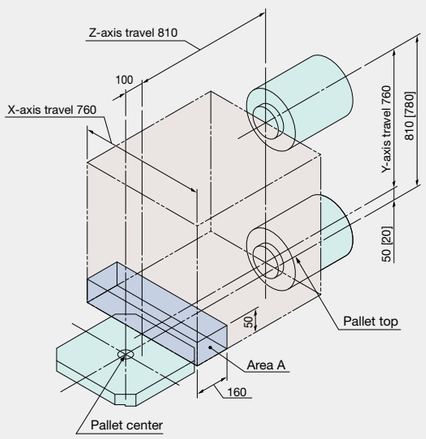
Metric tap pallet



Working range

Unit: mm

X-axis travel: 760 mm
Y-axis travel: 760 mm
Z-axis travel: 810 mm

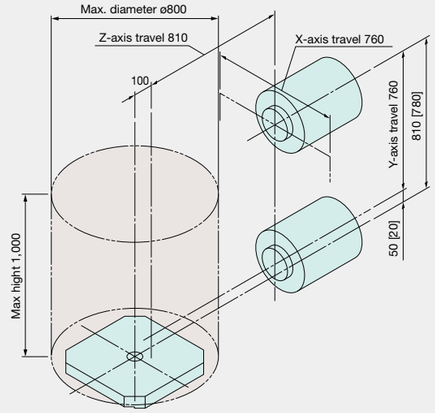


[ ]: T-slot pallets
Note: The machine should be operated with caution and with reference to the following interference areas described below.
Area A: Spindlehead interference
● 160 × 50 mm when the B-axis is 0, 90, 270, or 360 degrees.
● 160 × 50 mm or larger when the B-axis is other than 0, 90, 270, or 360 degrees.

Maximum workpiece dimensions

Unit: mm

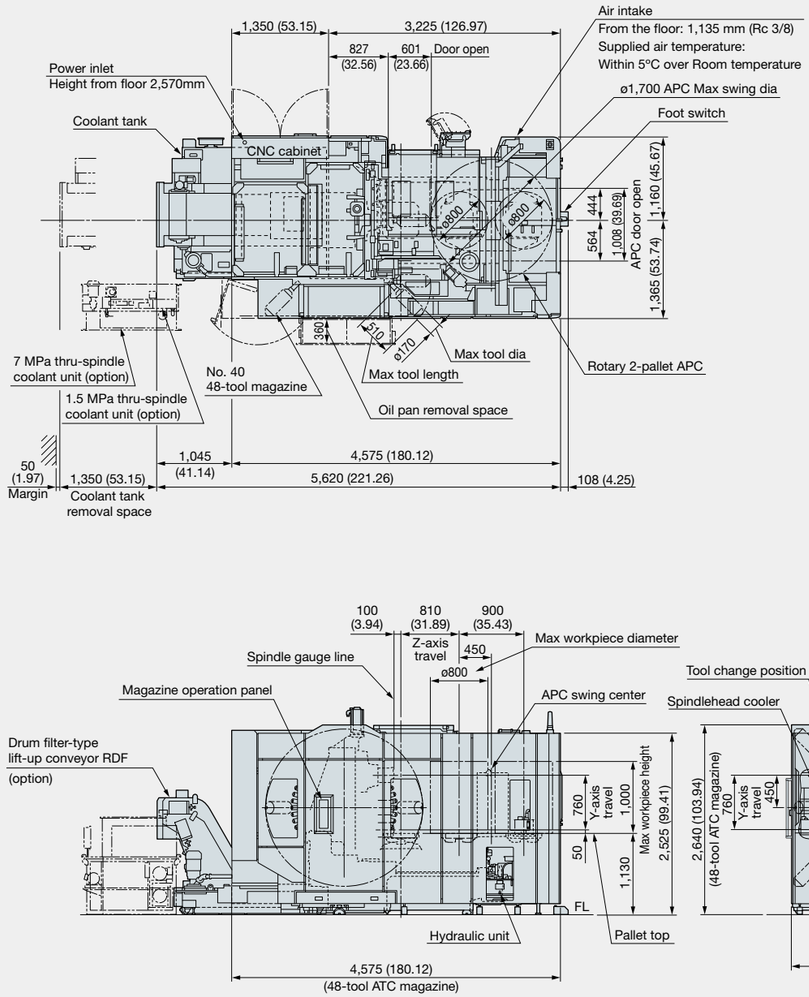
2-pallet rotary-shuttle APC specification



[ ]: T-slot pallets

Note: The minus Z and Y-axis limit area is a spindle / pallet interference zone.

MB-5000HⅡ
Dimensional and Installation Drawings (No. 40 Spindle)



Unit: mm (in)

MB-5000HII

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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