OKUMA

OPEN POSSIBILITIES

High-Speed Horizontal Machining Centers

MB-Hseries

MB-4000H / MB-5000H
MB-8000H / MB-10000H

High-Speed Horizontal Machining Centers

MB-Hseries

MB-4000H / MB-5000H / MB-8000H / MB-10000H

Intelligent Technology

Thermo-Friendly Concept

Collision Avoidance System

Machining Navi

SERVONAVI

High accuracy / High productivity

The best series for all types of machining—from mass produced parts to large, high value-added parts—based on a concept of smooth, stress-free operation.

- **High productivity** Reduced non-cutting time
- **High accuracy** Outstanding accuracy stability with use of Thermo-Friendly Concept
- **Small footprint** Compact
- **Expandable** Easy to add more specs
- **Easy to operate** User friendly

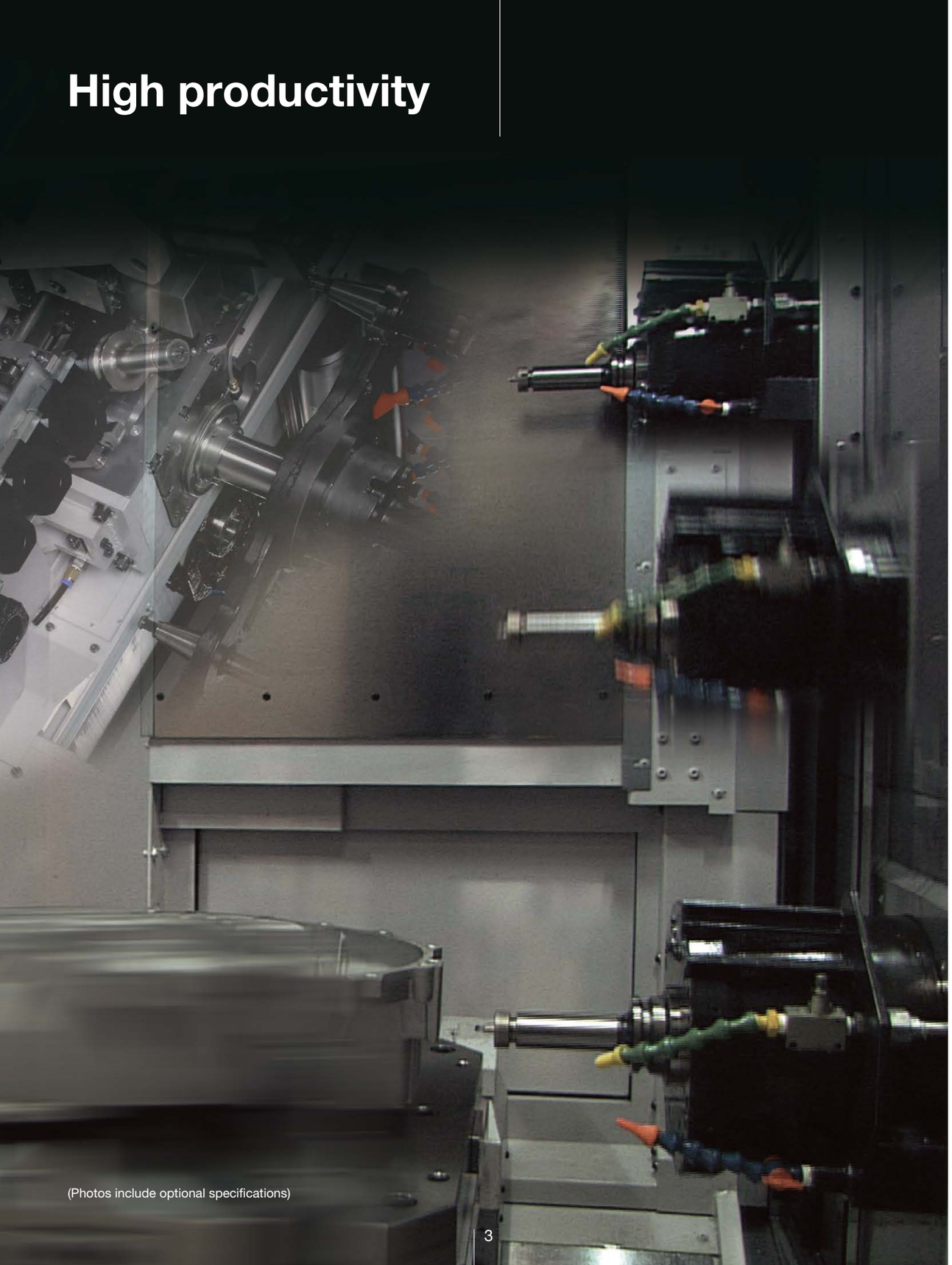
MB-4000H

MB-5000H

MB-8000H

Photos in this brochure include optional specifications.

High productivity



(Photos include optional specifications)

Reduced non-cutting time

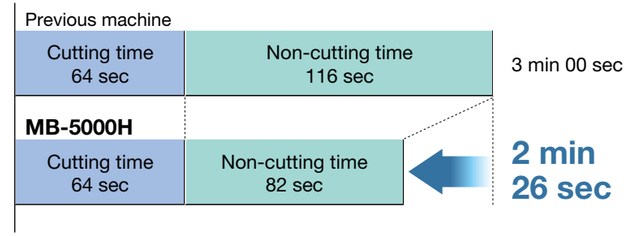
Cycle time comparisons

Workpiece: Gear case
Material: Die cast aluminum

Rapid traverse	X-Y-Z: 60 m/min
Rapid acceleration	X: 0.8 G Y: 1.0 G Z: 0.9 G

Non-cutting time 30% reduction
(**MB-5000H** actual data)

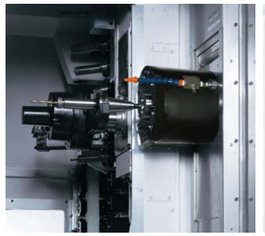
Aluminum part comparison



Machine performance

MB-4000H	**Rapid traverse**	X-Y-Z: 60 m/min
	Acceleration	Max. 1 G
	Tool change	T-T/C-C: 1.0/2.6 sec (tool weight less than 4 kg) 1.3/2.9 sec (tool weight more than 4 kg)
	Pallet change	7.0 sec
MB-5000H	**Rapid traverse**	X-Y-Z: 60 m/min
	Acceleration	Max. 0.8 G (Option: 1 G)
	Tool change	T-T/C-C: 1.3/3.1 sec
	Pallet change	9.0 sec
MB-8000H	**Rapid traverse**	X-Y-Z: 50 m/min
	Tool change	T-T/C-C: 2.0/5.2 sec
	Pallet change	14.5 sec
MB-10000H	**Rapid traverse**	X-Y-Z: 50 m/min
	Tool change	T-T/C-C: 2.0/5.5 sec
	Pallet change	15.0 sec

Automatic Pallet Changer (APC)



Automatic Tool Changer (ATC)
(Including optional specifications)

Machining Time Shortening Function

MTSF shortens machining time in operations with repeated rapid traverse (G00) and cutting feed (G01) movements, such as for parts with many drilled holes.

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

● Example of MTSF (MB-5000H actual data)

2 min 00 sec → 1 min 48 sec

10% reduction

Note: The data shown here represent "actual data," which may not be obtained under different specifications, tooling, cutting, and other conditions.

High productivity

Machining capacity

1,081 cm³/min (MB-8000H actual data)

ø200 face mill, material: S45C
high power spindle: 6,000 min^{-1} (45/37 kW [20 min/cont]) (Optional)

MB-4000H

Standard spindle: 15,000 min^{-1}
26/18.5 kW (10 min/cont)
Material: S45C

Tool	Spindle speed min^{-1}	Cutting m/min	Feed rate mm/min	Cut width mm	Cut depth mm	Chips cm³/min
ø80 face mill 8 blades (cermet)	895	225	2,650	56	2.7	**400**
ø20 roughing end mill 7 flutes (carbide)	4,000	251	5,320	6	20	**638**
ø35 insert drill (carbide)	880	97	132	–	–	–
Tap M30P3.5	320	30	1,120	–	–	–

MB-5000H

Standard spindle: 15,000 min^{-1}
26/18.5 kW (10 min/cont)
Material: S45C

Tool	Spindle speed min^{-1}	Cutting m/min	Feed rate mm/min	Cut width mm	Cut depth mm	Chips cm³/min
ø80 face mill 8 blades (cermet)	895	225	2,880	56	3	**483**
ø20 roughing end mill 7 flutes (carbide)	4,000	251	8,400	4	20	**672**
ø55 insert drill (carbide)	580	100	87	–	–	–
Tap M30P3.5	320	30	1,120	–	–	–

MB-8000H

Standard spindle: 6,000 min^{-1}
30/22 kW (10 min/cont)
Material: S45C

Tool	Spindle speed min^{-1}	Cutting m/min	Feed rate mm/min	Cut width mm	Cut depth mm	Chips cm³/min
ø100 face mill 10 blades (carbide)	955	300	3,220	70	4	**901**
ø50 porcupine cutter (carbide)	955	150	504	25	50	**630**
ø63 insert drill (carbide)	950	188	180	–	–	–
Tap M42P4.5	90	12	405	–	–	**81%** (Spindle load)

MB-8000H

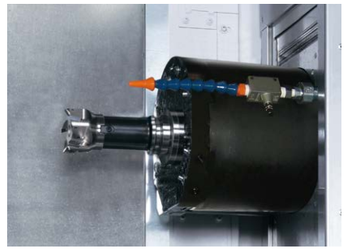
High power spindle: 6,000 min^{-1}
45/37 kW (20 min/cont)
Material: S45C

Tool	Spindle speed min^{-1}	Cutting m/min	Feed rate mm/min	Cut width mm	Cut depth mm	Chips cm³/min
ø200 face mill 10 blades (carbide)	398	250	1,404	140	5.5	**1,081**

Note: The data shown here represent "actual data," which may not be obtained under different specifications, tooling, cutting, and other conditions.

Spindles

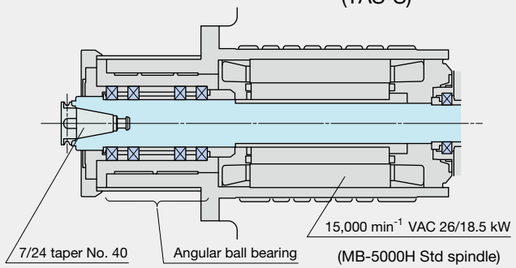
The types available include: standard, for various applications; high-speed / wide-range, for highly efficient aluminum and die/mold machining; high-power, for difficult-to-cut and high stock removals — just pick the right spindle for the job.



With optional specs

Integral motor/spindle

- High-speed cartridge spindle
- Long-life oil air lubrication
- Thermo Active Stabilizer – Spindle (TAS-S)



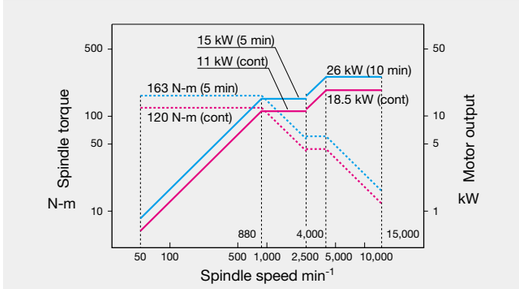
Spindle variations, spindle torque, power graphs

MB-4000H

Standard spindle	7/24 taper No. 40, HSK-A63* ● Spindle speed: 15,000 min^{-1} ● Output: 26/18.5 kW (10 min/cont) ● Torque: 163/120 N-m (5 min/cont)
High-speed spindle*	HSK-A63 ● Spindle speed: 20,000 min^{-1} ● Output: 30/22 kW (10 min/cont) ● Torque: 57/42 N-m (10 min/cont)

* Optional

- Spindle speed: 15,000 min^{-1} (Std specs)
- Max output: 26/18.5 kW (35/25 hp) (10 min/cont)
- Max torque: 163/120 N-m (120/88 ft-lbf) (5 min/cont)

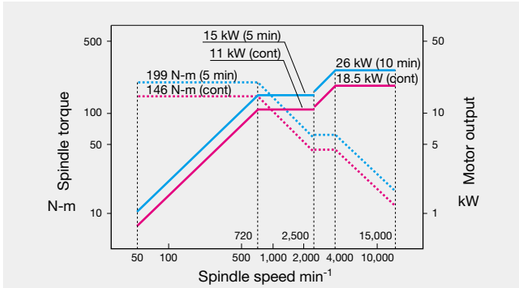


MB-5000H

Standard spindle	7/24 taper No. 40, HSK-A63* ● Spindle speed: 15,000 min^{-1} ● Output: 26/18.5 kW (10 min/cont) ● Torque: 199/146 N-m (5 min/cont)
High-speed spindle*	HSK-A63 ● Spindle speed: 20,000 min^{-1} ● Output: 30/22 kW (10 min/cont) ● Torque: 57/42 N-m (10 min/cont)

* Optional

- Spindle speed: 15,000 min^{-1} (Std specs)
- Max output: 26/18.5 kW (35/25 hp) (10 min/cont)
- Max torque: 199/146 N-m (146/107 ft-lbf) (5 min/cont)

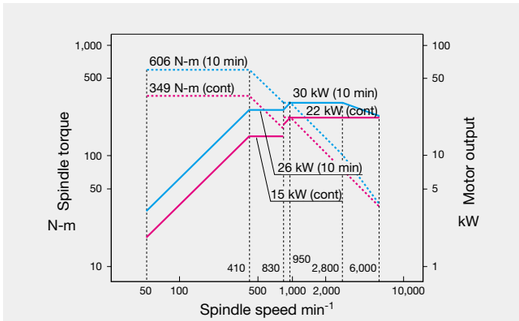


MB-8000H/MB-10000H

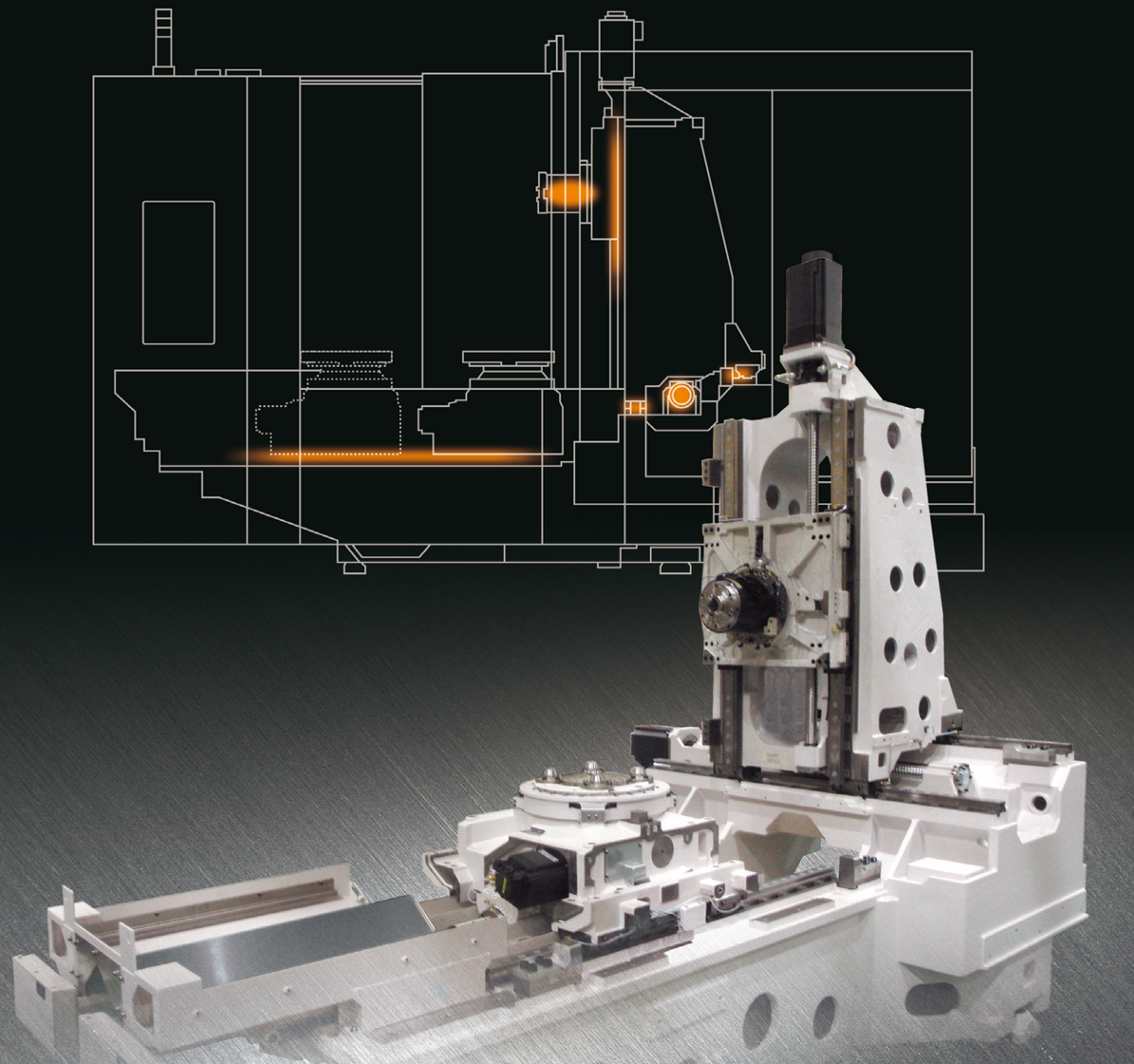
Standard spindle	7/24 taper No. 50, HSK-A100* ● Spindle speed: 6,000 min^{-1} ● Output: 30/22 kW (10 min/cont) ● Torque: 606/349 N-m (10 min/cont)
Wide-range spindle*	7/24 taper No. 50, HSK-A100 ● Spindle speed: 12,000 min^{-1} ● Output: 37/26 kW (10 min/cont) ● Torque: 419/284/194 N-m (2 min/10 min/cont)
High power spindle* (MB-8000H)	7/24 taper No. 50, HSK-A100 ● Spindle speed: 6,000 min^{-1} ● Output: 45/37 kW (20 min/cont) ● Torque: 1,071/637 N-m (3 min/cont)

* Optional

- Spindle speed: 6,000 min^{-1} (Std specs)
- Max output: 30/22 kW (40/30 hp) (10 min/cont)
- Max torque: 606/349 N-m (446/257 ft-lbf) (10 min/cont)



High-accuracy machining



The MB-10000H has a “box in box” structure (X axis carrier system).

Manageable Deformation—Accurately controlled

Thermo-Friendly Concept

High accuracy is enabled in normal factory environments. The unique approach of “accepting temperature changes.”

The machining accuracy of the workpiece changes significantly due to temperature change in the machine's periphery, heat generated from the machine itself, and heat generated from machining.

This unique thermo-friendly concept, which accommodates such temperature changes, achieves high accuracy in normal factory environments.

Eliminate waste with the Thermo-Friendly Concept

In addition to maintaining high dimensional accuracy when room temperature changes, Okuma's Thermo-Friendly Concept provides high dimensional accuracy during machine startup and machining restart.
To stabilize thermal deformation, warming-up time is shortened and the burden of dimensional correction during machining restart is reduced.

Machine startup
Machining restart
Room temp change

High dimensional stability

TAS-C (Thermo Active Stabilizer—Construction)
The TAS-C environmental thermal deformation control accurately controls the machine's structural thermal deformation; by taking into consideration the machine's thermal deformation characteristics, temperature data from properly placed sensors, and the location information of the feed axis.

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.

Machining dimensional change over time less than 10 µm (MB-5000H actual data).

ECO² Friendly™ ECOLOGY & ECONOMY

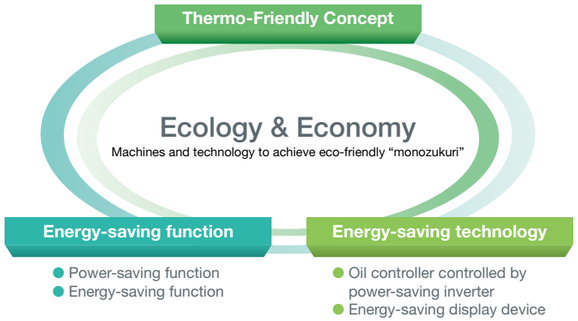
Environmental economic benefits of Okuma’s Thermo-Friendly Concept

In environments with normal temperature changes, machining accuracies equivalent to those in temperature-controlled rooms are achieved.
As long as the operator is comfortable, there is no need for air conditioning to ensure accuracy.

■ Amount of energy consumed for temperature-controlled room per year **Savings of approximately 135,000 kWh***

Prevents CO_2 emissions equivalent to about 7,500 beech trees

* Calculations are examples only, and may differ from actual circumstances.
Temperature-controlled room capacity: 10 m × 10 m × H3 m ±2°C



High-accuracy machining

Positioning accuracy

MB-5000H AbsoScale actual data (Based on ISO 230-2 machine tool test conditions)

● The exactness of bi-directional positioning

X-axis (travel 760 mm)
1.9 µm

Y-axis (travel 760 mm)
2.7 µm

Z-axis (travel 760 mm)
1.8 µm

● Bi-directional repeatability

X-axis (travel 760 mm)
1.2 µm

Y-axis (travel 760 mm)
1.9 µm

Z-axis (travel 760 mm)
1.2 µm

* Note: The “actual data” referred to above represent examples of data obtained by using ISO 230-2 test methods done at Okuma factories, and they are not guaranteed values.

Machine structure

■ Integrated ball screw bracket (except on MB-10000H)

■ Y-axis motor base cooling

■ Ball screw cooling
MB-4000H, 5000H (Optional)

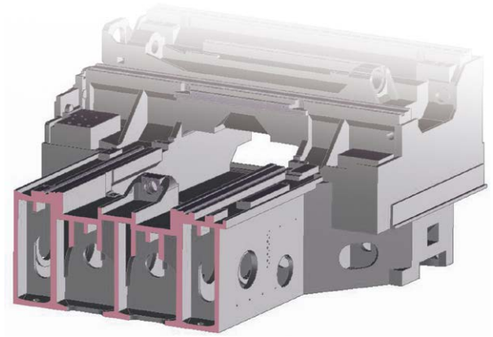
■ High accuracy double ball screw employed in all axes. (MB-10000H)

■ High accuracy indexing table

Pallet seating surface uses a taper cone system for high accuracy.
NC 0.001 degree:
MB-4000H (Standard)
MB-5000H, 8000H, 10000H (Optional)

■ Achieves highly stable accuracy by employing a highly rigid 3-point support bed. (MB-5000H)

■ Bed supports rapid travel of large masses



Ribs placed directly under guideways

■ Highly rigid column strongly withstands bending and torsion

Diagonal rib configuration of columns

Optimized Servo Control
SERVONAVI

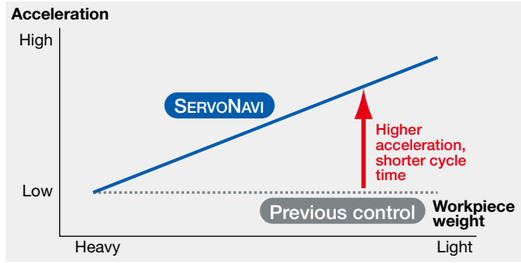
Achieves long term accuracy and surface quality

■ SERVONAVI AI (Automatic Identification)

● Cycle time shortened with faster acceleration

Work Weight Auto Setting

On table travel type machining centers, the table feed acceleration with the previous system was the same regardless of weight, such as workpieces and fixtures loaded on the table.
Work Weight Auto Setting estimates the weight of the workpiece and fixture on the table and automatically sets servo parameters, including acceleration, to the optimum values. Cycle times are shortened with no changes to machining accuracy.



● Maintaining high accuracy and stable operations

Inertia Auto Setting

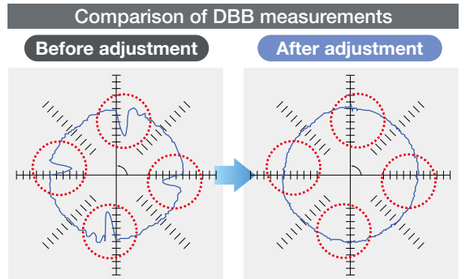
When workpieces or fixtures are changed, inertia (inertial mass) also changes, sometimes resulting in greater positioning error of the rotary axis. IAS estimates workpiece/fixture inertia from acceleration torque and automatically changes servo parameter settings to the optimum values so that high accuracy and stable movement can be maintained.

■ SERVONAVI SF (Surface Fine-tuning)

● Maintains machining accuracy and surface quality

Reversal Spike Auto Adjustment

Slide resistance changes with length of time machine tools are utilized, and discrepancies occur with the servo parameters that were the best when the machine was first installed. This may produce crease marks at motion reversals and affect machining accuracy (part 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.



● Contributes to longer machine life

Vibration Auto Adjustment

When aging changes machine performance, noise, vibration, crease marks, or fish scales may appear.
Vibration Auto Adjustment can quickly eliminate noise and vibration even from machines with years of operation.

Next-Generation Energy-Saving System
ECO suite

A suite of energy saving applications for machine tools

■ ECO Idling Stop

Accuracy ensured, cooler off

Intelligent energy-saving function with the Thermo-Friendly Concept.
The machine itself determines whether or not cooling is needed and cooler idling is stopped with no loss to accuracy.
(Standard application on machines with Thermo-Active Stabilizer—Spindle)

■ ECO Power Monitor

On-the-spot check of energy savings

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

■ ECO Operation (Optional)

Intermittent/continuous operation of chip conveyor, or mist collector during machining

■ ECO Hydraulics (Optional)

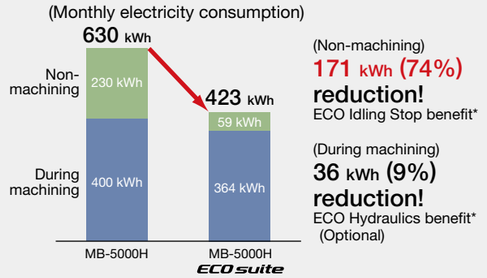
Energy-saving hydraulic unit using servo control technology

■ ECO suite benefits

Electricity consumption during non-machining time greatly reduced with “ECO Idling Stop,” which shuts down each piece of auxiliary equipment not in use.

Reduction in power consumption (example)

● Operating time 88 h, Non-operating time 72 h
Total 160 h (8 × 20 days)



(Non-machining)
171 kWh (74%) reduction!
ECO Idling Stop benefit*

(During machining)
36 kWh (9%) reduction!
ECO Hydraulics benefit* (Optional)

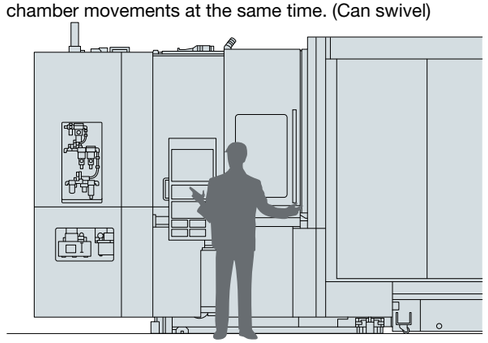
* Calculated from actual electricity consumption data. Electricity consumption will differ depending on machine specifications and usage status.

Comfortable operation

Easy to operate

■ Independent left-side operation panel (except on MB-10000H)

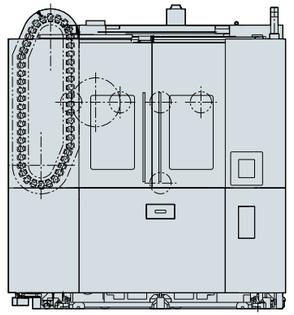
- Easier to operate the switches and watch machining chamber movements at the same time. (Can swivel)



Independent swivel-type operation panel

■ Front-facing ATC magazine (MB-4000H and MB-5000H only)

- Easy tool exchange: 48-tool, 64-tool tool magazines
- Magazine door opens to the floor



■ Column traverse system

(MB-10000H uses a traverse carrier system)

- Outstanding accessibility to pallet (workpiece), spindle

■ Ceiling door

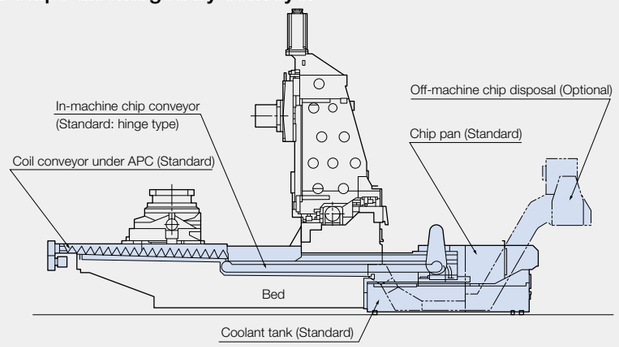
- Good lighting and no coolant dripping

■ Chip discharge

- Chips discharged directly with center trough just under spindle
- No accumulation of chips in the machining chamber, neat and simple covering
- Washing in-machine and under pallet

In-machine chip conveyor

■ Chips discharged by conveyor



(MB-10000H will discharge chips to the front of the machine)

Expandable

■ Space-saving with large tool capacity

MB-4000H/MB-5000H

Standard	Chain system	48 tools
Optional Specifications	Chain system	64 tools
	Matrix system	110 tools, 146 tools, 182 tools, 218 tools, 326 tools

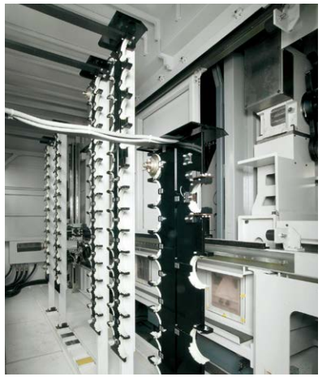
MB-8000H

Standard	Chain system	40 tools
Optional Specifications	Chain system	60 tools
	Matrix system	81 tools, 111 tools, 141 tools, 171 tools, 195 tools, 225 tools, 255 tools, 285 tools
	Multiple magazine system	320 tools, 400 tools

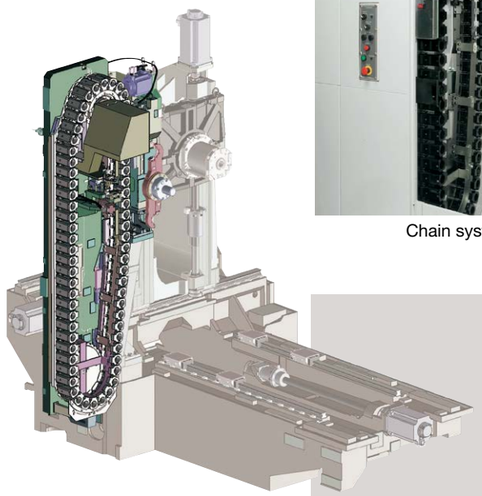
MB-10000H

Standard	Chain system	40 tools
Optional Specifications	Chain system	60 tools
	Multiple magazine system	100 tools, 150 tools, 200 tools, 240 tools, 320 tools, 400 tools

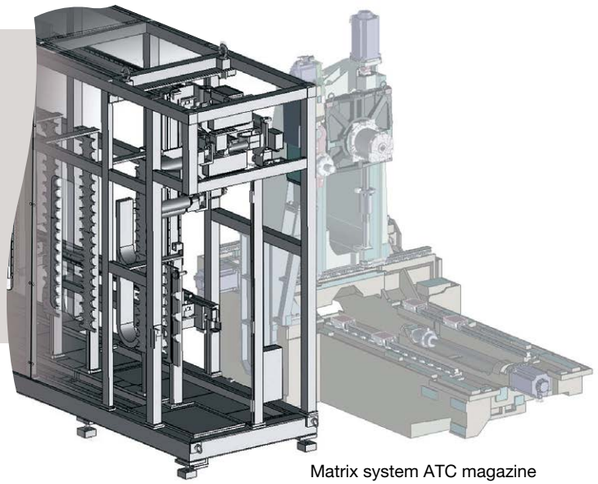
Chain system ATC magazine
(64 tool: Optional)



Matrix system ATC magazine (Optional)



Chain system ATC magazine
(front-facing)
(MB-4000H, MB-5000H only)

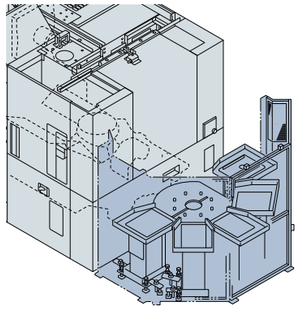


Matrix system ATC magazine

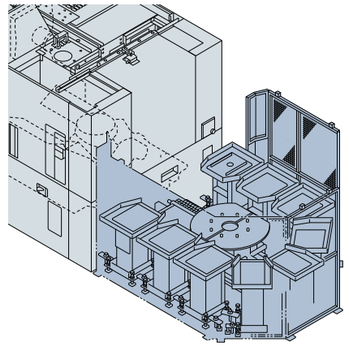
Flexible APC systems

- Multi-pallet APC connects to standard 2-pallet rotary-shuttle APC
- APC change time is the same as in the standard APC
- Can be adapted to match plant layout and type of production

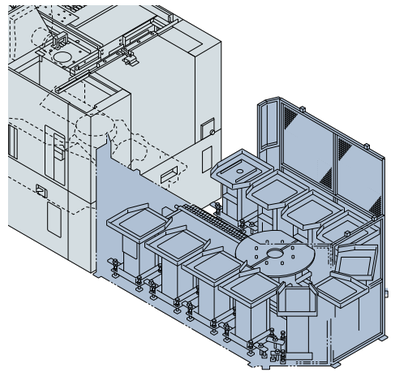
6-pallet APC



10-pallet APC



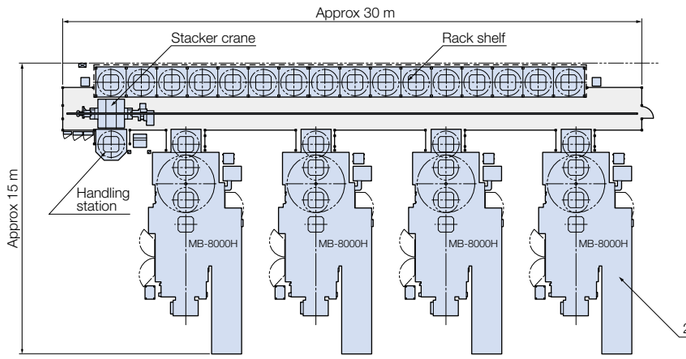
12-pallet APC



Ready for FMS applications

■ A compact FMS designed to simplfy the task of setting up 24-hour operations

■ An FMS with a smart, expandable stacker crane system



[System layout example]

- MB-8000H 4
- Pallets 32
- Rack levels 2
  (system height approximately 5.5 m)
- Handling station 1

Machine Specifications

	Item	Unit	MB-4000H	MB-5000H	MB-8000H	MB-10000H
Travels	X axis (Left/right column/ MB-10000H uses left/right carrier)	mm (in.)	560 (22.05)	760 (29.92)	1,300 (51.18)	1,400 (55.12)
	Y axis (spindle up/down)	mm (in.)	560 (22.05)	760 (29.92)	1,100 (43.31)	1,250 (49.21)
	Z axis (table front/back)	mm (in.)	625 (24.61)	760 (29.92)	1,250 (49.21)	
	Spindle center to pallet top	mm (in.)	50 to 610 (1.97 to 24.02)	50 to 810 (1.97 to 31.89)	50 to 1,150 (1.97 to 45.28)	-20 to 1,230 (-0.79 to 48.43)
	Spindle nose to pallet center	mm (in.)	85 to 710 (3.35 to 27.95)	135 to 895 (5.31 to 35.23)	100 to 1,350 (3.94 to 53.15)	
Pallet	Pallet size	mm (in.)	400 × 400 (15.75 × 15.75)	500 × 500 (19.69 × 19.69)	800 × 800 (31.50 × 31.50)	1,000 × 1,000 (39.37 × 39.37)
	Max load	kg (lb)	400 (880)	500 (1,100)	2,000 (4,400) [2,500 (5,500)]*1	2,000 (4,400)
	Indexing angle	deg	0.001	1 [0.001]	1 [0.001]	
	Max workpiece dimensions	mm (in.)	ø600 × 900 (ø23.62 × 35.43)	ø800 × 1,000 (ø31.5 × 39.37)	ø1,450 × 1,450 (ø57.09 × 57.09)	ø1,400 × 1,450 (ø55.12 × 57.09)
Spindle	Spindle speed	min^{-1} (rpm)	50 to 15,000 [50 to 20,000]		50 to 6,000 [12,000, 6,000 high power]	50 to 6,000 [50 to 12,000]
	Tapered bore		7/24 taper No. 40 [HSK-A63]		7/24 taper No. 50 [HSK-A100]	
	Bearing dia	mm (in.)	ø70 (ø2.76)		ø100 (ø3.94)	
Feed rate	Rapid traverse	m/min (ipm)	X-Y-Z: 60 (2,362)		X-Y-Z: 50 (1,969)	
	Cutting feed rate	mm/min (ipm)	1 to 60,000 (0.04 to 2,362)		1 to 50,000 (0.04 to 1,969)	
Motors	Spindle (10 min/cont)	kW (hp)	26/18.5 (35/25) [30/22 (47/33)]		30/22 (40/30) [37/26 (50/35), 45/37 (60/50) (20 min/cont)]	30/22 (40/30) [37/26 (50/35)]
	Feed axes	kW (hp)	X: 4.6 (6.13), Y-Z: 3.5 (4.67)	X-Y-Z: 4.6 (6.13)	X: 5.1 (6.8), Y: 3.5 (4.7) × 2, Z: 5.1 (6.8)	X-Y-Z: 4.6 (6.1) × 2
	Table indexing	kW (hp)	3.0 (4.0)		4.6 (6.1)	
ATC	Tool shank		MAS403 BT40 [HSK-A63]		MAS403 BT50 [HSK-A100]	
	Pull stud		MAS 2 [–]		MAS 2 [–]	
	Magazine capacity	tools	48 [64, 110 to 326]		40 [60, 81 to 285, 320, 400]	40 [60, 100 to 400]
	Max tool dia (w/ adjacent)	mm (in.)	ø70 (ø2.76)		ø140 (ø5.51)	
	Max tool dia (w/o adjacent)	mm (in.)	ø150*2 (ø5.91)		ø240 (ø9.45)*3	ø240 (ø9.45)
	Max tool length	mm (in.)	300 (11.81) [400 (15.75)]*3	300 (11.81) [450 (17.72)]*3	600 (23.62) [800 (31.50)]*3*5	600 (23.62)
	Max tool weight	kg (lb)	10 (22)		25 (55) [30 (66)]*3	25 (55)
	Tool selection		Memory random*4		Memory random*6	Memory random*7
Machine Size	Height	mm (in.)	2,647 (104.21)	2,864 (112.76)	3,449 (135.79)	3,410 (134.25)
	Floor space; width × depth	mm (in.)	2,420 × 4,700 (95.28 × 185.04)	2,700 × 4,710 (106.30 × 185.43)	3,960 × 7,505 (155.91 × 295.47)	4,545 × 6,465 (178.94 × 254.53)
	Weight	kg (lb)	9,500 (20,900)	11,500 (25,300)	27,000 (59,400)	33,600 (73,920)
Controller			OSP-P300MA		OSP-P300MA	

*1. Machine component movements become slower with this optional specification.
*2. Max tool size 2 pots away can not exceed ø110 mm (ø4.33 in.)
*3. Shutter open/close times become longer with the optional specification.
*4. Fixed address for 110 or more tools
*5. Max workpiece diameters may be limited by required tool lengths.
*6. Fixed address for 81 or more tools
*7. Fixed address for 100 or more tools
[ ]: Optional

Standard Specifications

Spindlehead cooling system		Oil controller	Work lamp		LED, 1 location*3
Hydraulic unit			Status indicator		3-lamp signal tower
Centralized lubrication automatic oil supplier	MB-4000H	Tank 6 L	Foundation blocks		
	MB-5000H	Oil level alarm and pressure alarm equipped	Side-slip prevention tool		Chemical anchors included
	MB-8000H	Tank 20 L	Automatic tool changer	MB-4000H MB-5000H	Tool capacity: 48
	MB-10000H	Oil level alarm and pressure alarm equipped		MB-8000H MB-10000H	Tool capacity: 40
Coolant supply system	MB-4000H	Tank 750 L (510 L*1), Pump motor 1500 W (double use for nozzle and in-machine)	1-degree indexing table		MB-4000H indexing: 0.001 degree (MB-4000H only)
	MB-5000H	Tank 640 L (430 L*1) Pump motor 390 W*2 (for nozzle), 730 W*2 (for in-machine wash)	APC		2-pallet rotary-shuttle*4
	MB-8000H	Tank 1,100 L (690 L*1), Pump motor 390 W*2 (for nozzle), 550 W (for in-machine wash)	In-machine chip discharge*5		Hinge type chip conveyor
	MB-10000H	Tank 840 L (530 L*1), Pump motor 390 W*2 (for nozzle), 1,500 W (for in-machine wash)	Chip pan for above		MB-10000H uses a lift-up conveyor; chip pan not required.
Coolant nozzle		Eyeball nozzle type	In-machine chip discharge (below APC)		Coil type chip conveyor N/A for MB-10000H which discharges to front
Table area wash		In-machine and under-pallet wash			
ATC air blower (blast)			Ball screw cooling		Std: MB-8000/10000H [Opt: -4000/5000H]
Chip air blower (blast)		Nozzle type	TAS-S		Std: MB-4000/5000H [Opt: -8000/10000H]
Full enclosure shielding			Door interlock		
Operating tools, tool box			B-axis rotation interlock		Standard on MB-10000H only
Tool release leve					
Tapered bore cleaning bar					

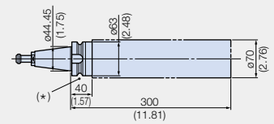
*1. Effective *2. At 50 Hz *3. 2 locations on MB-8000H and MB-10000H
*4. Pallets with MAS tapped holes *5. Directly below the spindle

Maximum tool dimensions

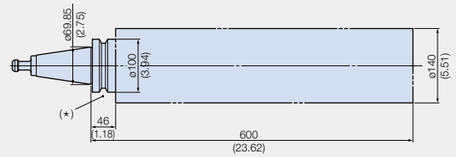
Unit: mm (in.)

- Maximum tool size (adjacent tools)
  In tool magazine

MB-4000H
MB-5000H

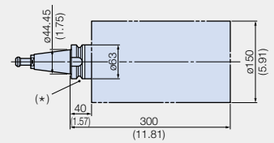


MB-8000H
MB-10000H

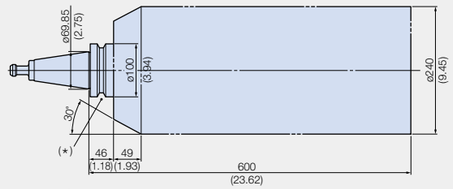


- Maximum single tool size
  (no adjacent tools)

MB-4000H
MB-5000H

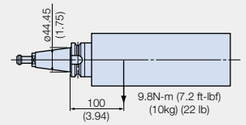


MB-8000H
MB-10000H

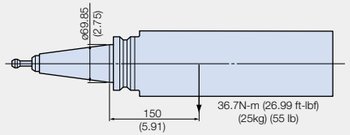


- Maximum tool mass moment

MB-4000H
MB-5000H



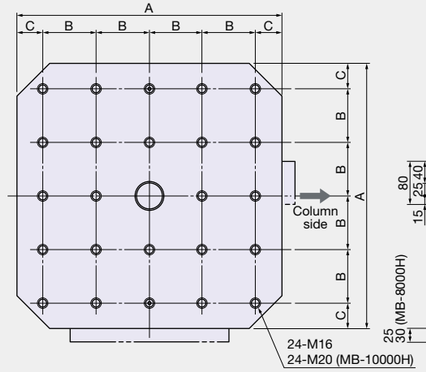
MB-8000H
MB-10000H



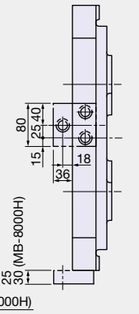
* With commercially available milling chucks, interference between the ATC arm and milling outer diameter may occur. Always be sure to check the dimensions in the catalog or other data sources from the tool manufacturer before use.

Pallet dimensions

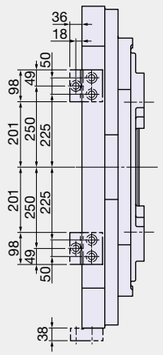
Unit: mm



MB-4000H
5000H
8000H



MB-10000H

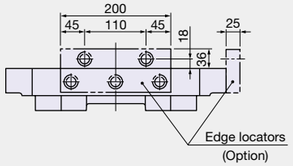


	A	B	C	D
MB-4000H	400	80	40	0.7
MB-5000H	500	100	50	0.7
MB-8000H	800	160	80	0.7
MB-10000H	1,000	200	100	0.5

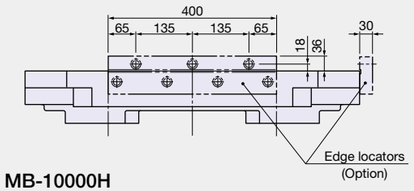
	E	F	G	H
MB-4000H	ø20.5	30	40	M16
MB-5000H	ø20.5	30	40	M16
MB-8000H	ø20.5	30	40	M16
MB-10000H	ø22	35	50.2	M20

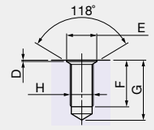
	I	J	K	L
MB-4000H	ø26	ø18	14.5	10.5
MB-5000H	ø26	ø18	14.5	10.5
MB-8000H	ø26	ø18	14.5	15.5
MB-10000H	ø33	ø22	21	17

MB-4000H



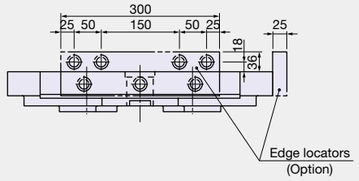
MB-8000H



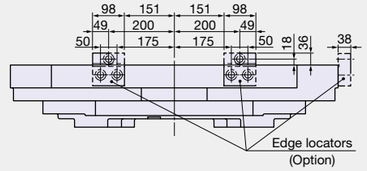


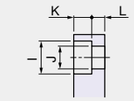
Workpiece clamp tapped hole detail

MB-5000H



MB-10000H

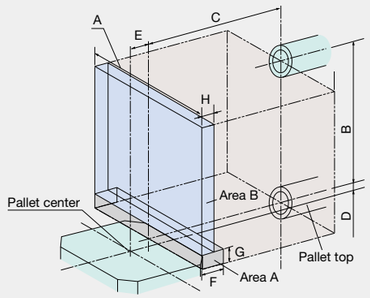




Workpiece hitch bolt hole detail
(Option)

Working range

Unit: mm



[ ] : T-slot pallets

	X-axis travel A	Y-axis travel B	Z-axis travel C	Y-axis minus end to pallet top D	Z-axis minus end to pallet center E
MB-4000H	560	560	625	50 [20]	85
MB-5000H	760	760	760	50 [20]	135
MB-8000H	1,300	1,100	1,250	50 [20]	100
MB-10000H	1,400	1,250	1,250	-20 [-50]	100

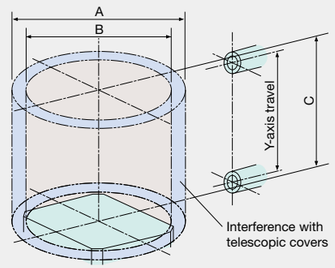
Interference	Area A F	Area A G	Area B H
MB-4000H	125	50 [80]	50
MB-5000H	125	50 [80]	85
MB-8000H	320	85 [115]	225
MB-10000H	410	155 [185]	200*

Interference areas
A: Spindlehead and table
B: X-Y telescopic covers (max workpiece size)

* At 125, pallet and X-Y axis telescopic covers

Maximum workpiece dimensions

Unit: mm



[ ]: T-slot pallets

	Machining dia A	-Z-axis end B	Machining height C
MB-4000H	ø600	ø500	900 [870]
MB-5000H	ø800	ø630	1,000 [970]
MB-8000H*	ø1,450	ø1,000	1,450 [1,420]
MB-10000H	ø1,400	ø1,000	1,450 [1,420]

At the Z-axis minus end, the X and Y-axis telescopic covers will interfere with the workpiece, therefore, set the maximum diameter to Area B.
* MB-8000H max workpiece diameter: ø1300 mm at ø120 mm from pallet top surface.

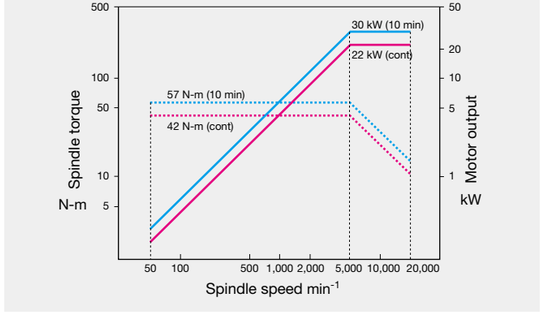
Optional Specifications

Spindle speeds	MB-4000H MB-5000H	50 to 20,000 min^{-1}, HSK-A63, 30/22 kW	Work wash gun	250-W pump
			Oil mist lubricator	
	MB-8000H MB-10000H	50 to 12,000 min^{-1}, No.50, 37/26 kW	Mist collector	
			Chip air blower	Adapter
Main motor	MB-8000H	50 to 6,000 min^{-1}, No.50, 45/37 kW, 1,071 N-m	In-machine discharge	Scraper type chip conveyor
			Off-machine chip discharge (lift-up chip conveyor)	Refer to Recommended chip conveyors on page 19.
Dual contact spindle	MB-4000H MB-5000H	HSK-A63, BIG-PLUS®	Chip buckets (heights)	L type: 700 mm, H type: 1,000 mm
	MB-8000H MB-10000H	HSK-A100, BIG-PLUS®	Hydraulic oil cooler	
			Coolant heater/cooler	
ATC magazine capacity (tools)	MB-4000H	64 (chain)	Auto tool length compensation	Touch sensor (w/tool breakage detection)
	MB-5000H	110 , 146 , 182, 218, 326 (matrix)		
	MB-8000H	60 (chain) 81, 111, 141, 171, 195, 225, 255, 285 (matrix), 320, 400 (multiple magazine)	Auto gauging (w/zero offset)	Touch probe
			Pull stud shape	MAS-1, JIS, CAT, DIN
			Standard T-column fixture	
	MB-10000H	60 (chain) 100, 150, 200, 240, 320, 400 (multiple magazine)	Standard square-column fixture	
AbsoScale detection		X-Y-Z axes	Angle plate	
Auto 0.001 indexing table		Built-in NC table (standard specification on MB-4000H)	Ball-screw cooler	Std: MB-8000/10000H [Opt: -4000/5000H]
APC pallets		6, 10, 12*1, FMS	Additional work lamp	
Pallet surfaces		T-slot	Machining Navi	M-*i*, M-*g*II+
Spare pallets			Turning cut	
Edge locator			Hydraulic fixture systems	Linked, pallet-thru types
Coolant pump			TAS-S	Std: MB-4000/5000H [Opt: -8000/10000H]
Thru-tool coolant		1.5 MPa		
Thru-spindle coolant*2		MPa: 1.5, 7.0, large flow 1.5, large flow 7.0	TAS-C	Optional for all 4 models
Semi-dry machining		Thru-spindle, thru nozzle, thru/nozzle switch	Recommended for die machining	AbsoScale detection (X-Y-Z axes)
Shower coolant		10 nozzles, 550-W pump		Super-NURBS
Table area wash discharge				DNC-DT, 0.1 µm control

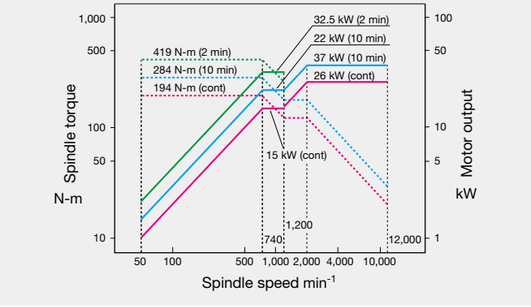
*1. 12 pallets for MB-4000H/5000H only. *2. Okuma pull studs required.

Optional Spindles (Optional)

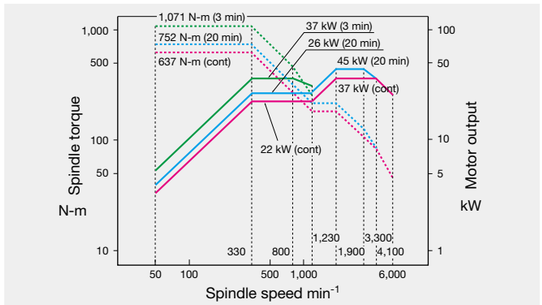
High-speed (MB-4000H/5000H)
- Spindle speed: 20,000 min^{-1}
- Output: 30/22 kW (40/30 hp) (10 min/cont)
- Torque: 57/42 N-m (42/31 ft-lbf) (10 min/cont)



Wide-range (MB-8000H / MB-10000H)
- Spindle speed: 12,000 min^{-1}
- Output: 37/26 kW (50/35 hp) (10 min/cont)
- Torque: 419/194 N-m (308/143 ft-lbf) (2 min/cont)



High power (MB-8000H)
- Spindle speed: 6,000 min^{-1}
- Output: 45/37 kW (60/50 hp) (20 min/cont)
- Torque: 1,071/637 N-m (788/468 ft-lbf) (3 min/cont)



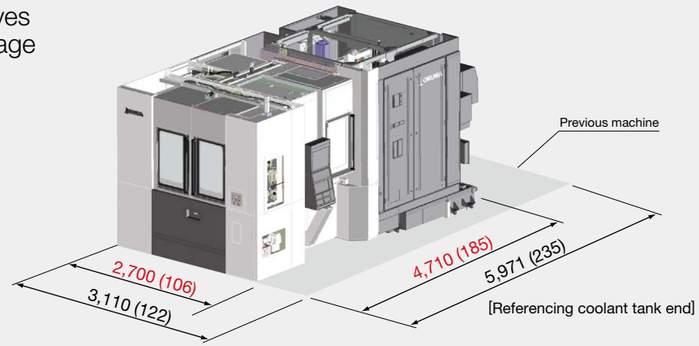
Compact

Unit: mm (in.)

Space-saving design improves productivity per square footage

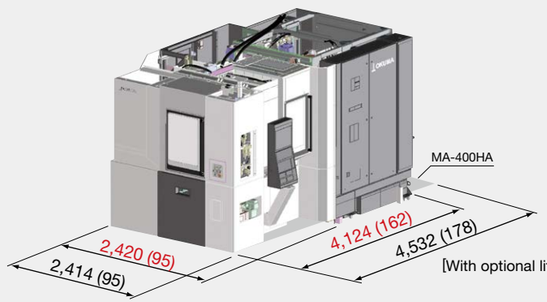
MB-5000H
32% smaller footprint

(Compared to previous machine)



MB-4000H
10% smaller footprint

(Compared to MA-400HA)



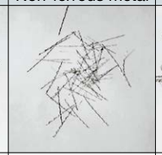
MB-8000H
3,960 × 7,505
(155 × 295)

MB-10000H
4,545 × 6,465
(178 × 255)

Recommended chip conveyors

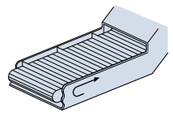
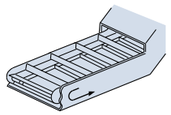
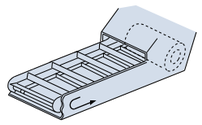
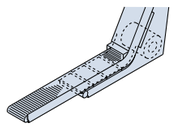
(Please contact an Okuma sales representative for MB-10000H recommendations.)

○ : Recommended △ : Conditionally recommended

Workpiece material		Steel	FC	Aluminum / Non-ferrous metal	Mixed (general use)
Chip shape					
In-machine	Hinge type (Standard) *	○	○	○	○
Off-machine chip discharge (Optional)	Hinge type	○	—	—	△ (*4)
	Scraper type	—	○ (Dry)	—	—
	Scraper type (with drum filter)	—	○ (Wet) with magnet	△ (*3)	—
	Hinge + scraper (with drum filter)	△ (*1)	△ (Wet) (*2)	○	○
	In-machine integrated coil conveyor type	—	—	○ (MB-4000H only)	—

* Scraper type (optional) can be selected.
*1. When there are many fine chips *2. When chips are longer than 100 mm *3. When chips are shorter than 100 mm *4. When there are few fine chips
Note: When chips are dry, clean out chips that have accumulated under the pallet or elsewhere in the machine as needed.

Off-machine lift-up chip conveyors

Name	Hinge	Scraper	Scraper (with drum filter)	Hinge + scraper (with drum filter)
Shape				

With revamped operation and responsiveness— ease of use for machine shops first!

Smart factories implement advanced digitization and networking (IoT) in manufacturing to achieve enhanced productivity and added value. The OSP has evolved tremendously as a CNC suited to advanced intelligent technology. Okuma's new control uses the latest CPUs for a tremendous boost in operability, rendering performance, and processing speed. The OSP suite also features a full range of useful apps that could only come from a machine-tool manufacturer, making smart manufacturing a reality.

Smooth, comfortable operation with the feeling of using a smart phone

Improved rendering performance and use of a multi-touch panel achieve intuitive graphical operation. Moving, enlarging, reducing, and rotating 3D models, as well as list views of tool data, programs, and other information can be accomplished through smooth, speedy operations with the same feel as using a smart phone. The screen display layout on the operation screen can also be changed to suit operator preferences and customized for the novice and/or veteran machinists.

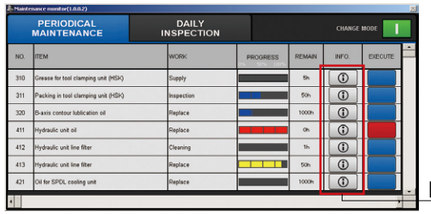
Note: 15-in. operation panel screen shots.
Collision Avoidance System (Optional) shown above.

"Just what we wanted."— Refreshed OSP suite apps

This became possible through the addition of Okuma's machining expertise based on requests we heard from real, machine-shop customers. The brain power packed into the CNC, built by a machine tool manufacturer, will "empower shop floor" management.

Routine inspection support
Maintenance Monitor

The Maintenance Monitor displays items for inspections before starting daily operation and regular inspections and the rough estimate of inspection timing. Touching the [INFO] button displays the PDF instruction manual file of relevant maintenance items.



[INFO] button

Increased productivity through visualization of motor power reserve
Spindle Output Monitor

Making new machining technology simpler and easier to use
Turn-Cut Guide (Optional)

Monitoring operating status even when away from the machine
E-mail Notification

Automatic saving of recorded alarms
Screen Capture

Easy programing without keying in code
Scheduled Program Editor

OSP advanced technology

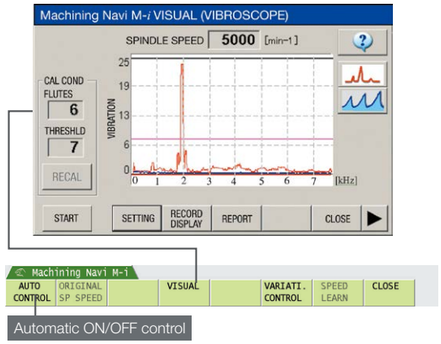
Cutting condition search for milling

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

Automatically changes to optimum spindle speed (M-*i*)

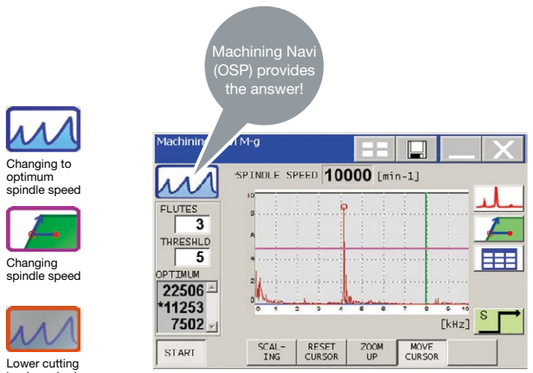
Built-in sensors measure chatter vibration and the machine automatically changes to the best spindle speed.

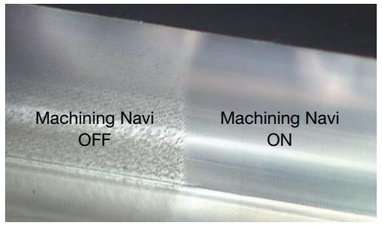
■ Vibration waveform display



Adjust cutting conditions while monitoring the data (M-*g*Ⅱ+)

Navigates effective measures by detecting and analyzing machining chatter with a microphone attached to the machine.



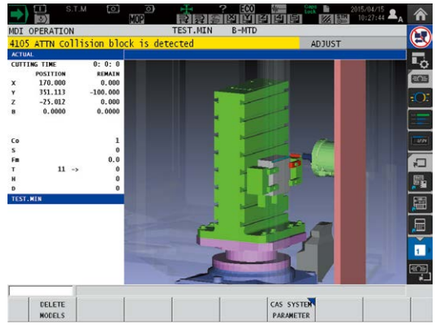


Collision prevention

Collision Avoidance System (Optional)

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.

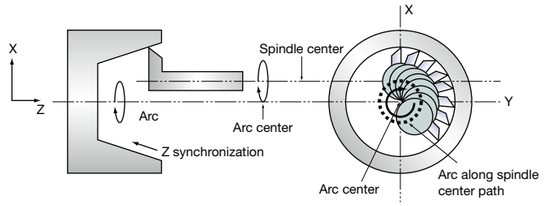


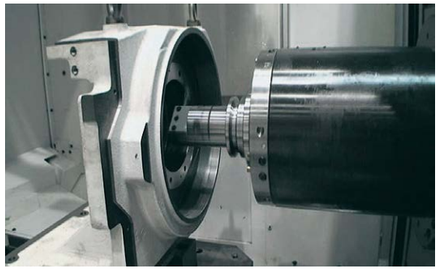
Turn-Cut (Optional)

Turning on a machining center

Turning is done with synchronized control with X-Y coordinate arc and tool edge position of rotating spindle tool.

- Machining of tapered holes
- Machining of various diameters with a single tool
- Machining of ID/OD greater than largest tool diameter





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 inputs	8-digit decimal, ±99999.999 to 0.001 mm (3937.0078 to 0.0001 in.), 0.001° Decimals as: 1 µm, 10 µm, 1 mm (0.0001,1 in.) (1°, 0.01°, 0.001°)
	Feed	Cutting feed override 0 to 200%, rapid traverse override 0 to 100%
	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
	Self-diagnostics	Automatic diagnostics and display of program, operation, machine, and NC system faults
Programming	Program capacity	Program storage capacity: 4 GB; operation backup capacity: 2 MB
	Program operations	Program management, editing, multitasking, scheduled program, fixed cycle, G-/M-code macros, arithmetic, logic statements, math functions, variables, branch commands, coordinate calculate, area calculate, coordinate convert, programming help
Operations	"suite apps"	Applications to graphically visualize and digitize information needed on the shop floor
	"suite operation"	Highly reliable touch panel suited to shop floors. 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
	Machine operations	MDI, manual (rapid traverse, manual cutting feed, pulse handle), load meter, operation help, alarm help, sequence return, manual interrupt/auto return, pulse handle overlap, parameter I/O, PLC monitor, alignment compensation
	MacMan	Machining management: machining results, machine utilization, fault data compile & report, external output
Communications / Networking		USB (2 ports), Ethernet
High speed/accuracy specs		Hi-G Control, Hi-Cut Pro, pitch error compensation, SERVONAVI, Machining Time Shortening Function, TAS-S (Thermo Active Stabilizer—Spindle) : MB-4000H, MB-5000H
Energy-saving	ECO suite	ECO Idling Stop*1, ECO Power Monitor*2

*1. Spindle cooler Idling Stop is used on TAS-S machines.
*2. The power display shows estimated values. When precise electrical values are needed, select the wattmeter option.

Optional Specifications

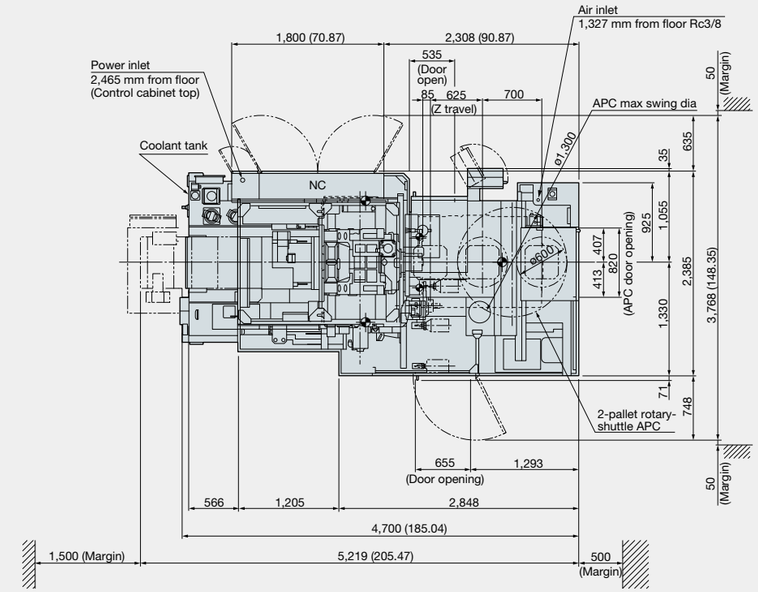
Item	Kit Specs	NML E	NML D	3D E	3D D	AOT E	AOT D
Interactive functions							
Advanced One-Touch IGF-M (Real 3-D simulation included)						●	●
Interactive MAP (I-MAP)				●	●		
Programming							
Auto scheduled program update		●	●	●	●	●	●
Additional G-/M-code macros							
Common variables (Std: 200 pcs)	1,000 pcs						
	2,000 pcs						
Program branch; 2 sets							
Program notes (MSG)			●		●		●
Coordinate system selection (Std: 20 sets)	100 sets	●		●		●	
	200 sets		●		●		●
	400 sets						
Helical cutting (within 360°)		●	●	●	●	●	●
3D circular interpolation							
Synchronized Tapping Ⅱ		●	●	●	●	●	●
Arbitrary angle chamfering		●	●	●	●	●	●
Cylindrical side facing							
Slope machining							
Tool grooving (flat-tool free-shaped grooving)							
Turn-Cut							
Tool max rotational speed setting							
F1-digit feed	4 sets, 8 sets, parameter						
Programmable travel limits (G22, G23)		●	●	●	●	●	●
Skip (G31)							
Axis naming (G14)							
3-D tool compensation							
Tool wear compensation			●		●		●
Drawing conversion	Programmable mirror image (G62)		●		●		●
	Enlarge/reduce (G50, G51)		●		●		●
User task 2	I/O variables (16 each)						
Tape conversion*1							
Monitoring							
Real 3D simulation				●	●	●	●
Simple load monitor	Spindle overload monitor	●	●	●	●	●	●
NC operation monitor	Hour meter, work counter	●	●	●	●	●	●
Hour meters	Power, spindle, NC, cutting						
Operation end buzzer	With M02, M30, and END commands						
Work counter	With M02 and M30 commands						
MOP-TOOL	Adaptive control, overload monitor						
Tool life management	Hour meter, No. of workpieces	●	●	●	●	●	●
Gauging							
Auto gauging	Touch probe (G31)	Incl in machine specs					
Auto zero offset	Includes auto gauging	Incl in machine specs					
Tool breakage detection	(touch sensor) (G31) Includes auto tool offset	Incl in machine specs					
Gauging data printout	File output						
Manual gauging (w/o sensor)		●	●	●	●	●	●
Interactive gauging (touch sensor, touch probe required)							

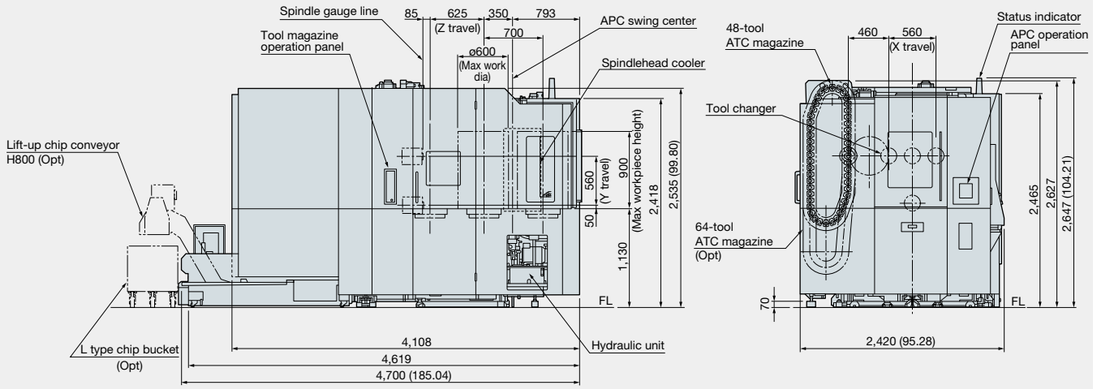
Item	Kit Specs	NML E	NML D	3D E	3D D	AOT E	AOT D
External I/O communication							
RS-232-C connector							
DNC-T3							
DNC-B (RS-232-C-Ethernet transducer used on OSP side)							
DNC-DT							
DNC-C/Ethernet							
Additional USB (Additional 2 ports, Std: 2 ports)							
Automation / untended operation							
Auto power shut-off	M02 and END alarms, work preps done	●	●	●	●	●	●
Warm-up (calendar timer)							
External program selection	Button, rotary switch, digital switch BCD (2-digit, 4-digit)						
Cycle time reduction (Ignores certain commands)		●	●	●	●	●	●
Pallet pool control (PPC) (Required for multi-pallet APC)							
Robot, loader I/F							
High-speed, high-precision							
AbsoScale detection	X-, Y-, Z-axis						
Inductosyn detection	A-, B-, C-axis						
Super-NURBS							
0.1 µm control (linear axis commands)							
TAS-S (Thermo Active Stabilizer—Spindle)*2							
TAS-C (Thermo Active Stabilizer—Construction)*3							
ECO suite (energy saving functions)							
ECO Operation							
ECO Power Monitor	Wattmeter						
Energy-saving hydraulic unit	Inverter						
	ECO Hydraulics						
Other							
Control cabinet lamp (inside)							
Circuit breaker							
Sequence operation	Sequence stop	●	●	●	●	●	●
Upgraded sequence restart	Mid-block return		●		●		●
Pulse handles	2 pcs, 3 pcs (Std: 1 pc)						
External M signals	4, 8 signals						
Collision Avoidance System (CAS)							
Machining Navi M-*i*, M-*g*Ⅱ+ (cutting condition search)							
One-Touch Spreadsheet							
Block skip; 3 sets							
Additional axes	A, B, C axes [preps, specs]						
Fixture offset							
OSP-VPS (Virus Protection System)							
19-inch display operation panel w/adjustable-tilt keyboard							

Kit full forms: NML: Normal, 3D: Real 3D simulation, E: Economy, D: Deluxe, AOT: Advanced One-Touch IGF-M

*1. Requires technical consultation.
*2. Standard for MB-4000/5000H (Opt: -8000/10000H)
*3. Optional for all 4 models

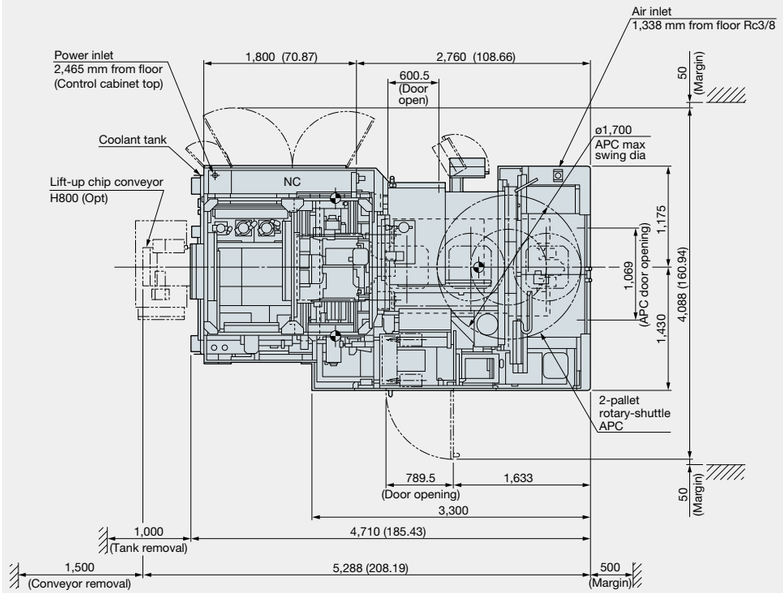
MB-4000H
Dimensional and Installation Drawings

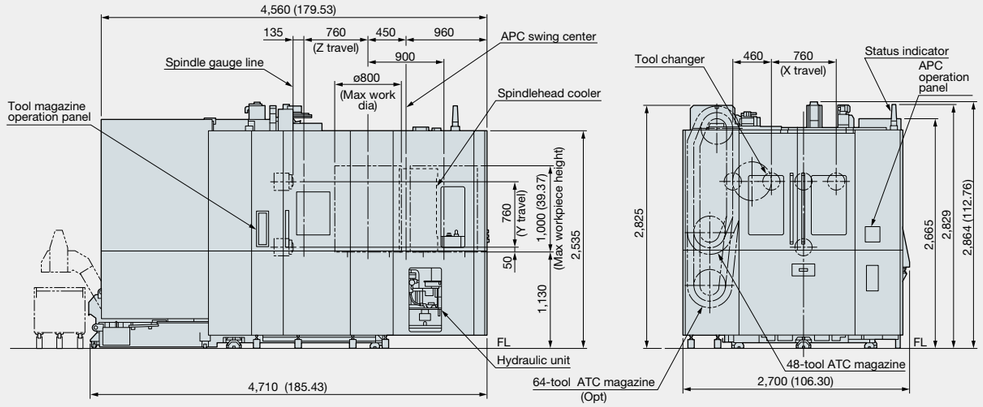




Unit: mm (in.)

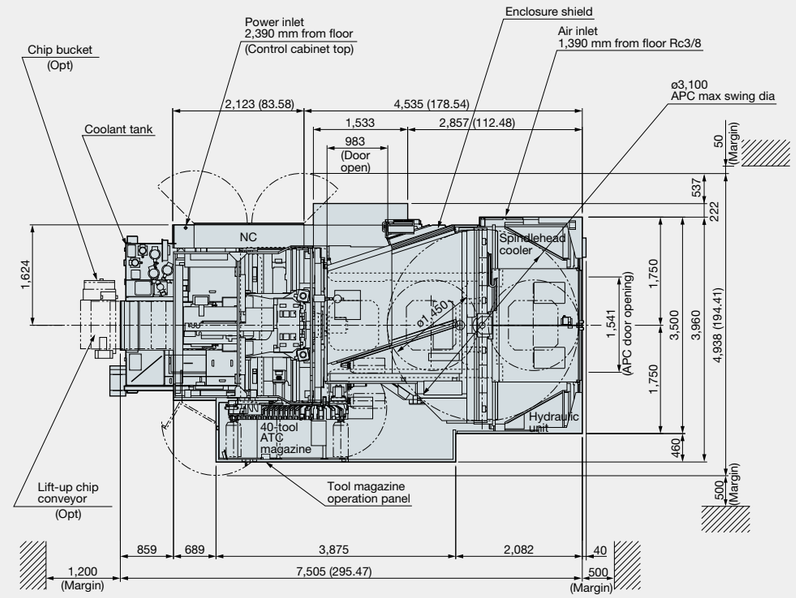
MB-5000H
Dimensional and Installation Drawings

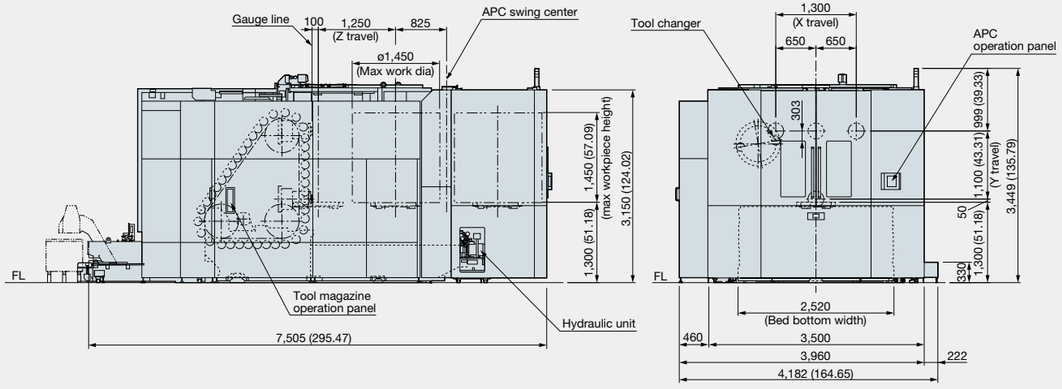




Unit: mm (in.)

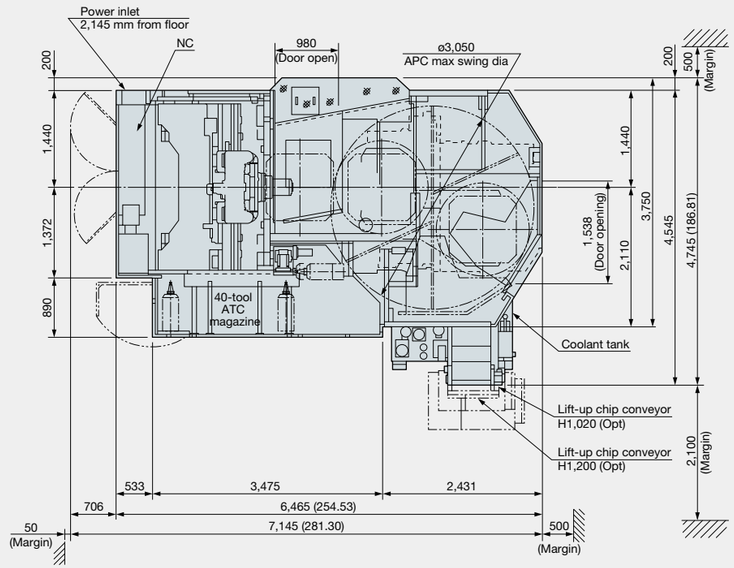
MB-8000H
Dimensional and Installation Drawings

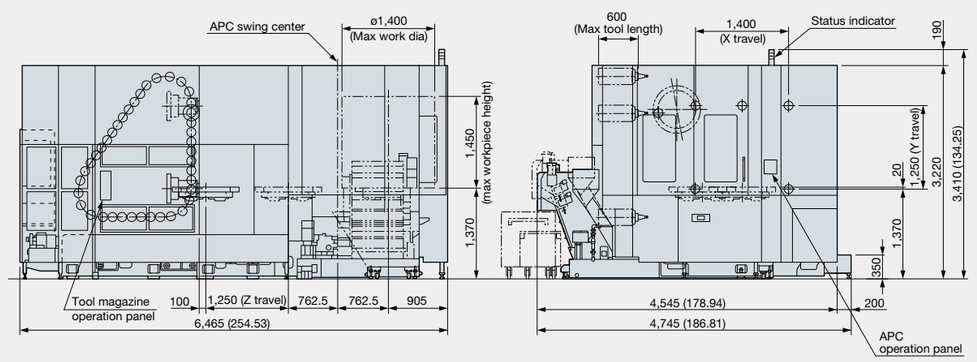




Unit: mm (in.)

MB-10000H
Dimensional and Installation Drawings





Unit: mm (in.)

MB-Hseries

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

Pub.No.MB-H series-E-(8a)-400 (Jul 2018)

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