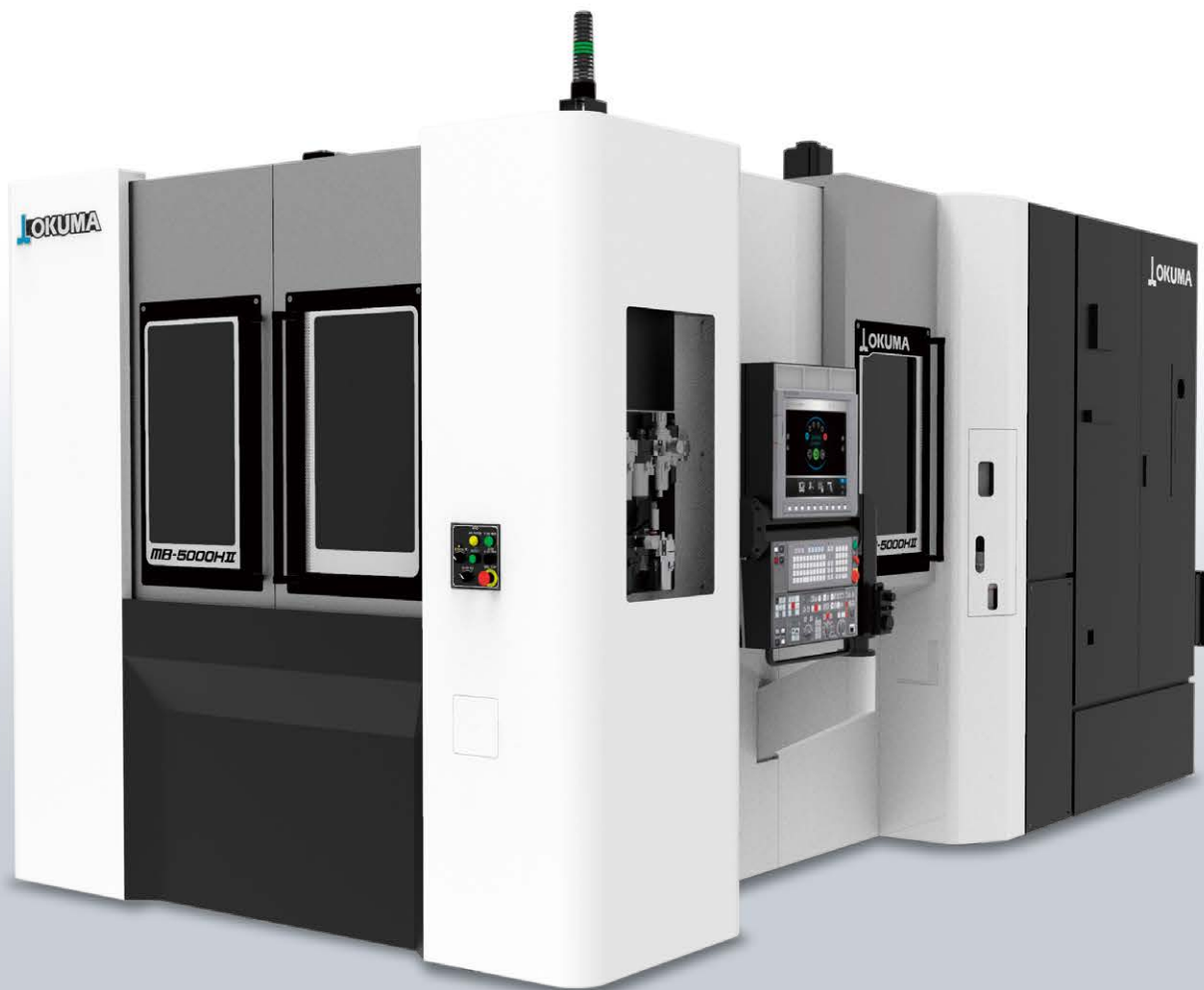Horizontal Machining Center
MB-5000HII

Horizontal Machining Center
MB-5000HⅡ

A World's Fastest Class Machine

Stepping up to the second stage of excellence
~ From Optimal Machining to Optimal Manufacturing ~

With the spread of IIoT technology, manufacturing is transforming dramatically.
From the best machining possible as a Standalone, to optimal production of
the entire factory, and the evolution to higher levels of manufacturing.
That will enable various forms of fabrication, from mass production to
variable-mix, variable-volume applications, to achieve optimum, full-scale
processing at the fastest speed possible, with the MB-5000HⅡ.
This all new horizontal machining center supports customer production
requirements at optimal levels.

MB-5000HⅡ

Photos in this brochure include optional specifications.

Everything is new,
with Okuma's new horizontal machining center

From mass production to variable-mix, variablevolume production, this machine was born to deliver the best performance ever — meet the MB-5000HⅡ.
To achieve higher levels of productivity, all the key components have been renewed. With high durability and reliability, the best performance possible will be delivered to the toughest of production floors.

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

Fast machining of aluminum parts in mass production
- Quick accel/decel axis feed (1G) reduces positioning times
- Fast table rotation and ATC movements achieve high-speed performance
- High-speed spindle for aluminum applications reduce cycle times even more

A lineup of high-rigidity/-torque spindles

Also handles powerful cutting of steel
- Max torque of 302 N-m from spindle with high-rigidity roller bearings is also on board
- No. 50 spindle specs also available to deliver even higher efficiency machining

Chip handling that achieves maximum operating times

Complete removal of chip accumulation and "biting chips" from the machining chamber
- In-machine covers used to improve reliability
- Washing with large-volume shower coolant
- *Full center trough* achieves chip discharge from any area of the machining chamber

Compact footprint design for world-class floor space productivity

- Wide machining area achieved in a compact floor space

A smart machine with OSP-AI inside

- With Okuma Intelligent Technology to support enhanced functionality through master craftsmanship

|	
Spindle speed:	15,000 min^{-1} (No. 40)
Travels (X-Y-Z):	760 × 760 × 810 mm
Pallet size:	500 × 500 mm
Max workpiece dimensions:	ø800 × 1,000 mm
Max load capacity:	500 kg
Tool magazine capacity:	48 tools

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

Fast machining of aluminum parts in mass production

With fast acceleration/deceleration axis feeds for shorter positioning times, high-speed B-axis rotation (table), high-speed ATC, plus high-speed hole making — all effective toward achieving world's fastest class level cycle times.

■ High-speed machining example of aluminum mass production

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

Cycle time **34% less**

Non-cutting

Cutting

Previous machine / **MB-5000HII**

Cycle time (sec): 0, 50, 100, 150, 200
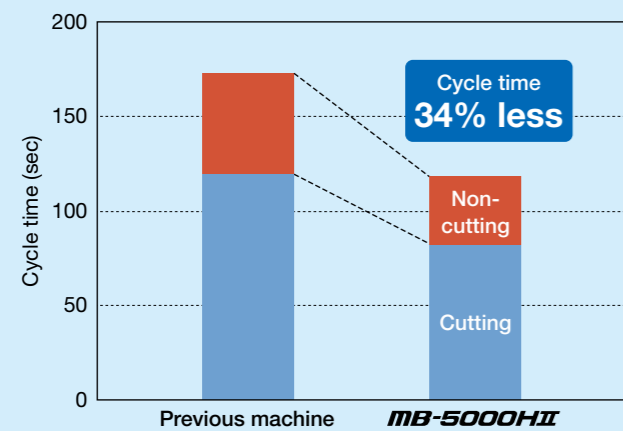
In addition, with the high-speed machining spindle* (20,000 min-1, 30/22 kW) (Optional) for aluminum, tapping and other applications can be faster.

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

■ 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**

■ 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.

(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 (Optional), 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 (Optional)

■ Reduced ATC times

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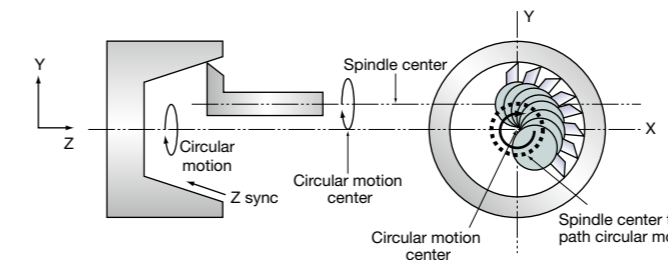The farthest tool magazine indexing time possible is 5.1 seconds.

● ATC tools:　48　(No. 40 spindle)

● T-T time:　　　　**0.9 sec** (tool mass: 4 kg or less)

1.3 sec (tool mass: 4 kg or higher)

● Farthest pot indexing:　**5.1 sec** (With 48-tool magazine)

Shorter lead times with process-intensive machining

Turn-Cut (Optional) Turning operations on machining centers

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

Spindle center

Circular motion

Z sync

Circular motion center

Spindle center tool path circular motion

Circular motion center

■ Turning valve parts

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

The lineup of highly rigid and highly torqued spindles

Also handles powerful cutting of steel

The lineup of spindles with roller bearings, compared to ball bearings, has higher rigidity. (Optional)
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)]
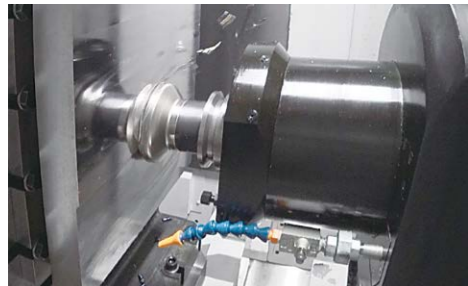
■ Power spindles (Nos. 40/50)
(Options)
For mass production of castings,
cast steel

- Spindle speed: 12,000 min⁻¹
- Max output: 33/26 kW (10 min/cont)
- Max torque: 302 N-m (10%ED)
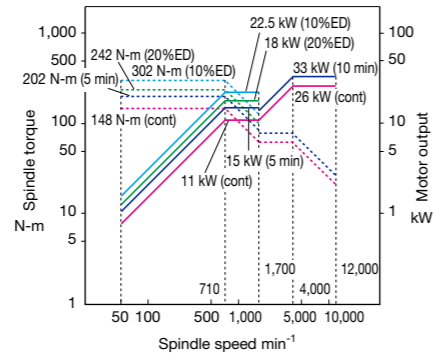
End milling capacity
704 cm³/min (S45C)
- Tool: ø20 roughing end mill
  7 flutes
- Spindle speed: 4,029 min⁻¹
- Cutting: 253 m/min
- Feed rate: 8,800 mm/min
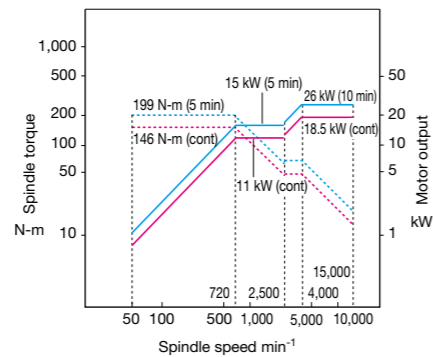- Cut width: 4 mm
- Cut depth: 20 mm

Face milling capacity
628 cm³/min (S45C)
- Tool: ø100 face
  5 blades
- Spindle speed: 955 min⁻¹
- Cutting: 300 m/min
- Feed rate: 1,910 mm/min
- Cut width: 70 mm
- Cut depth: 4.7 mm

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 cm³/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 (Optional)
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)
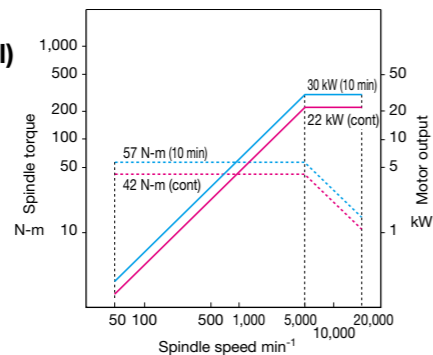
Face milling capacity
2,700 cm³/min (A5052)
- Tool: ø63 face mill
  5 blades (carbide)
- Spindle speed: 15,000 min⁻¹
- Cutting: 2,949 m/min
- Feed rate: 20,455 mm/min
- Cut width: 44 mm
- Cut depth: 3 mm

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

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 axes 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.

Below pallet washing
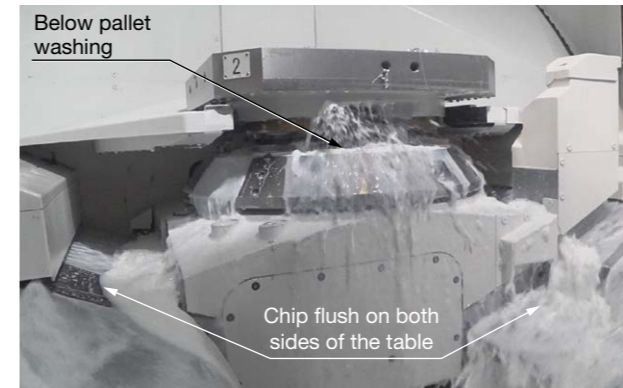
Chip flush on both sides of the table

■ *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.
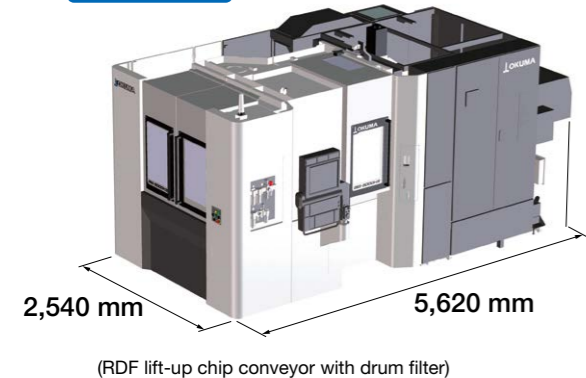 Smoother out-machine chip discharge possible.

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

2,540 mm

5,620 mm

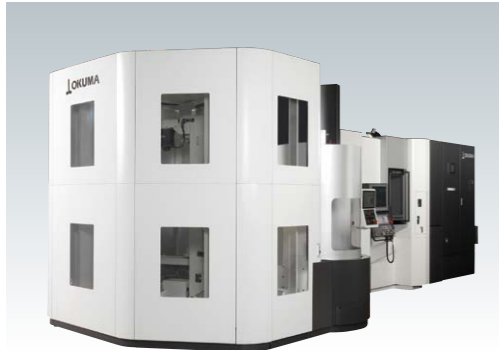(RDF lift-up chip conveyor with drum filter)

■ Class largest, wide machining area

Max machining dia: ø800 mm
Max machining height: 1,000 mm

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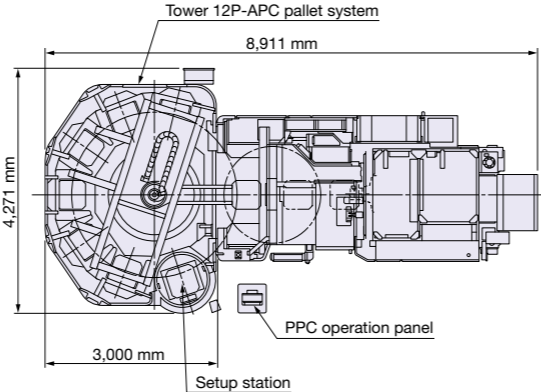Y-axis travel: 760 mm
Z-axis travel: 810 mm

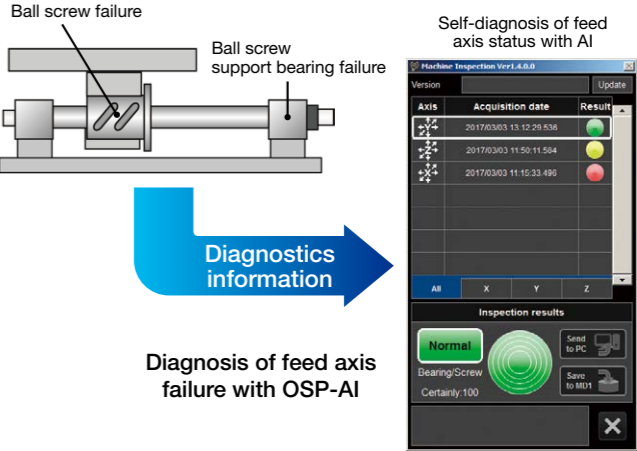## Multi-Pallet Tower APC

Tower 12P-APC pallet system

Setup station

Tower 12P-APC pallet system
8,911 mm
4,271 mm
3,000 mm
PPC operation panel
Setup station

A smart machine with OSP-AI on board

Machine tool diagnostics technology with artificial intelligence (AI)
AI Machine Diagnosis OSP-AI (Optional)

■ With predictive maintenance, prevent machine stoppages just in time

The AI embedded in Okuma's OSP-P300MA CNC makes an early diagnosis of machine feed axes to pinpoint a fault. Predictive maintenance (PdM) is possible without expertise in machine maintenance or special equipment. 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, with normal/abnormal condition lamp colors providing the results.

Notes:
1. Connect Plan is required.
2. AbsoScale specs are required to diagnose ball screw failures.

Ball screw failure
Ball screw support bearing failure
Self-diagnosis of feed axis status with AI

Diagnostics information

Diagnosis of feed axis failure with OSP-AI

Improving untilization rates with Connect Plan

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 the Factory Monitor suite 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.

① Connect
② Visualize
③ Improve
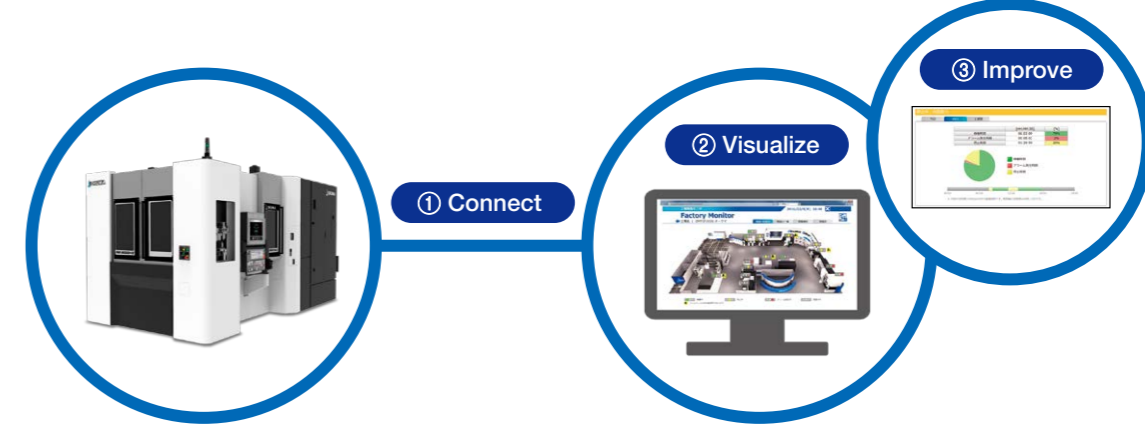
Note: Connect Plan is sold as a system separate from this product brochure.

Okuma Intelligent Technology exhibits powerful effect on machine shop floors

The unique approach of "accepting temperature changes"
Thermo-Friendly Concept

■ Thermo-friendly structure gives outstanding thermal stability

~~Forced cooling and restraining of thermal deformation~~
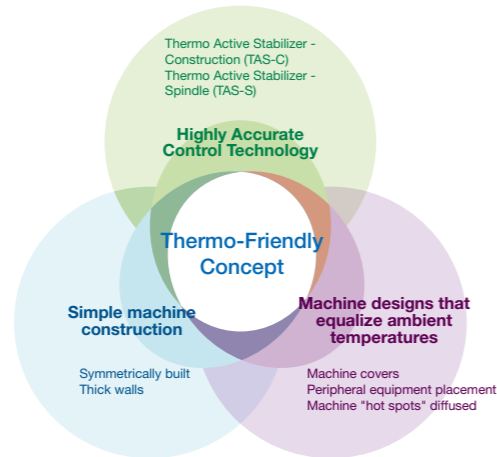
1. Minimal thermal deformation

2. Manageable thermal deformation

3. Accurate compensation

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

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

Highly Accurate Control Technology

Thermo-Friendly Concept

Simple machine construction
Symmetrically built
Thick walls

Machine designs that equalize ambient temperatures
Machine covers
Peripheral equipment placement
Machine "hot spots" diffused

Machining dimensional change over time minimized with outstanding dimensional stability

■ 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) [Optional]

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 feed axis positioning information.

■ 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.

Next-Generation Energy-Saving System
ECO suite

A suite of energy saving applications for machine tools

■ Accuracy ensured, cooler off ECO Idling Stop

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. Electricity consumption during non-machining time greatly reduced with "ECO Idling Stop", which shuts down each piece of auxiliary equipment not in use.
(Standard application on machines with Thermo-Active Stabilizer—Spindle)

■ On-the-spot check of energy savings ECO Power Monitor

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.

■ Intermittent/continuous operation of chip conveyor and mist collector during operation
ECO Operation (Optional)

■ Energy-saving hydraulic unit using servo control technology
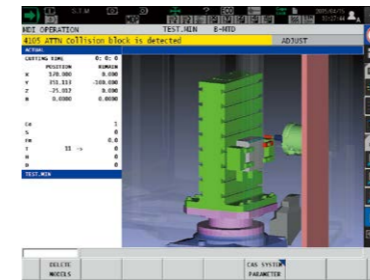## ECO Hydraulics (Optional)

Collision prevention
Collision Avoidance System (Optional)

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.
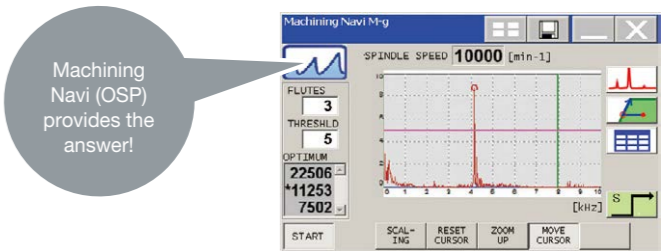
Optimized Servo Control
SERVONAVI

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.

Acceleration
High
Low
SERVONAVI
Higher acceleration, shorter cycle time
Previous control
Workpiece weight
Heavy
Light
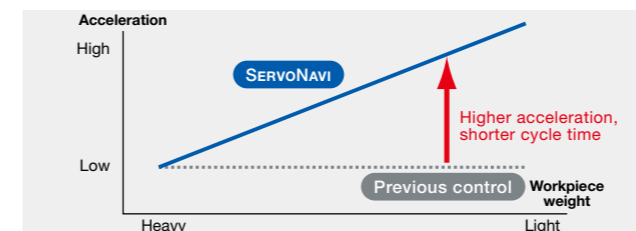
● **Maintains high accuracy and stable movements**
Auto Inertia Setting

Depending on the workpiece or fixtures, inertia will vary, and with each variation the positioning error in some cases became much larger. AIS is able to estimate inertia from workpiece/fixture acceleration and deceleration, and automatically set the optimum servo parameters to maintain highly accurate and stable machine movements.

Cutting condition search for milling
Machining Navi M-i, M-gII+ (Optional)

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-gII+ displays several spindle speed possibilities

Machining Navi (OSP) provides the answer!

■ 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.

■ Machine Specifications

	Item	Unit	MB-5000HⅡ No.40	MB-5000HⅡ 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 [ø90, ø70]	ø90
Feedrate	Rapid traverse	m/min (fpm)	X-Y-Z: 60 (196.86)	
	Cutting feedrate	mm/min (ipm)	X-Y-Z: 1 to 60,000 (2362.2)	
Motors	Spindle (10 min/cont)	kW (hp)	26/18.5 (35/25) [33/26, 30/22 (44/35, 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) [3.5 (4.7)]	
ATC	Tool shank		MAS403 BT40 [HSK-A63]	MAS403 BT50 HSK-A100
	Pull stud		MAS 2	
	Magazine capacity	tools	48 [64, 100, 140, 180, 220, 260, 300, 340]	40, 60, 80, 90, 120, 150, 180, 210, 240
	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*2	
Machine Size	Height	mm (in.)	2,893 (113.9)	
	Floor space; width × depth (RDF specs)*3	mm (in.)	2,540 × 5,620 (100 × 221.26)	2,900 × 5,620 (114.17 × 221.26)
	Weight	kg (lb)	13,700 (30,140)	14,000 (30,800)
Controller			OSP-P300MA	

*1. No.50 spindle is optional   *2. Fixed address for 80 or more tools   *3. With RDF drum filter lift-up chip conveyor
[ ]: Optional

■ Standard Specifications

Spindle speed	15,000 min⁻¹, 26/18.5 kW (10 min/cont)	Automatic 1° indexing table	
ATC magazine capacity	48 tools	2-pallet rotary-shuttle APC	Pallet top surface M16 tap
Spindlehead cooling system	Oil controller	Full enclosure shielding	Two-pallet pivoted type for APC
Centralized lubrication auto grease supply unit	Grease cartridge 700 ml, and with grease level and pressure warnings	Operation panel	Swing type located on the left
		ATC operation panel	
Coolant supply system	Tank 1,000 L (Effective: 710 L), pump 3.3/3.8 W (50/60 Hz)	NC (OSP) control cabinet ventilation fan	
		Work lamp	LED lamp
In-machine chip discharge	Hinge type chip conveyor	3-lamp status indicator	Signal tower
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	
Below pallet washing		Hand tools	
Air filter and oiler		Tool box	
X-Y armored bellows		TAS-S	Thermo Active Stabilizer—Spindle
Hydraulic unit			
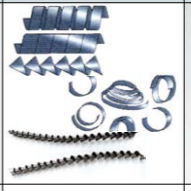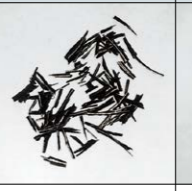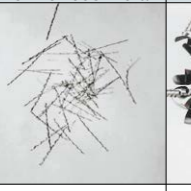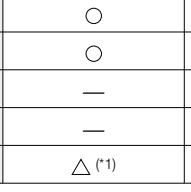
■ Optional Specifications

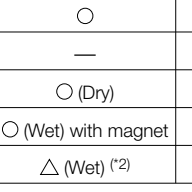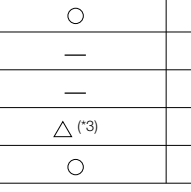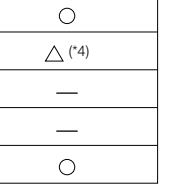|			
Spindle speeds	20,000 min⁻¹, 30/22 kW, HSK-A63 12,000 min⁻¹, 33/26 kW	Chip air blower (blast)	Adapter
Dual contact spindle	HSK, BIG-PLUS®	Off-machine chip discharge (lift-up chip conveyor types)	· Hinge
ATC magazine capacity (No.40)	64 (disk magazine)		· Scraper + drum filter
	100 (chain)		· Hinge + scraper + drum filter
	140, 180, 220, 260, 300, 340 (matrix)	Conveyor discharge heights; 800, 1,200 mm	
		Chip buckets for above	Heights: 700 mm, 1,000 mm
ATC magazine capacity (No.50)	40, 60 (disk magazine)	Hydraulic oil cooler	
	80 (chain)	Coolant heater/cooler	
	90, 120, 150, 180, 210, 240 (matrix)	Tool breakage detection	Auto tool length compensation included (touch sensor)
AbsoScale detection	X-Y-Z axes		
Auto 0.001° indexing table	Built-in NC table	In-magazine tool breakage detection	
Multi-pallet APC	6-P (parallel shuttle), 12-P (tower), FMS	Auto zero offset	Auto gauging (touch probe)
Pallet top	T-slots, inch holes	Tool life management	By cumulative operation timer, etc
Spare pallets		Overload monitoring	Adaptive feed rate control included
Edge locator		Pull stud specs	MAS 1, CAT, DIN, JIS
Oil-hole coolant system	1.5 MPa	Standard T-column fixture	Height: 850 mm, Pitch:100 mm
Thru-spindle coolant	1.5, 7.0 MPa; Large flow 1.5, 7.0 MPa	Standard square-column fixture	Height: 850 mm, Pitch:100 mm
Shower coolant	10 nozzles	Ball-screw cooler	X-Y-Z axis
Work wash gun		Machining Navi	M-i, M-gⅡ+
Oil mist lubricator		TAS-C	Thermo Active Stabilizer—Construction

■ Recommended chip conveyors

(Please contact an Okuma sales representative for details.)   ○ : Recommended   △ : Conditionally recommended
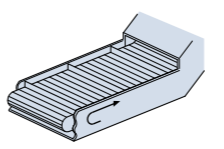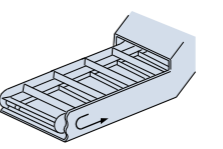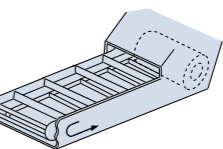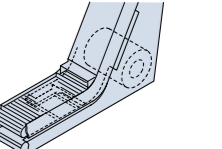
Workpiece material		Steel	FC	Aluminum / Non-ferrous metal	Mixed (general use)
Chip shape					
In-machine	Hinge type (Standard) *	○	○	○	○
Off-machine chip discharge (Optional)	Hinge type	○	—	—	△ (*4)
	Scraper type	—	○ (Dry)	—	—
	Scraper type (with drum filter)	—	○ (Wet) with magnet	△ (*3)	—
	Hinge + scraper (with drum filter)	△ (*1)	△ (Wet) (*2)	○	○

* 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

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

The Next-Generation Intelligent CNC OSP suite OSP-P300MA

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.

Smooth operations even with wet or work-gloved hands

Enlarge

Rotate

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
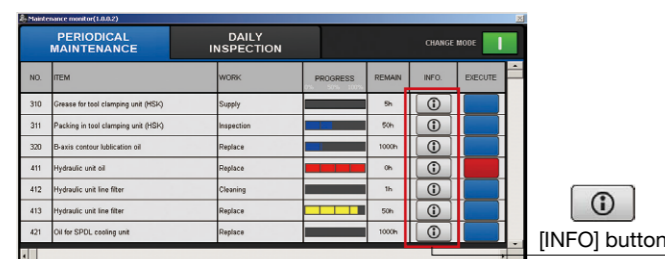
Increased productivity through visualization of motor power reserve
Spindle Output Monitor
S11

Making new machining technology simpler and easier to use
Turn-Cut Guide (Optional)
S12

Monitoring operating status even when away from the machine
E-mail Notification
S15

Automatic saving of recorded alarms
Screen Capture
S16

Easy programing without keying in code
Scheduled Program Editor
S10

■ 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.), 0.0001°
		Decimals as: 1 µm, 10 µm, 1 mm (0.0001,1 in.) (1°, 0.01°, 0.001°, 0.0001°)
	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
	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, SᴇʀᴠᴏNᴀᴠɪ, Machining Time Shortening Function, TAS-S (Thermo Active Stabilizer—Spindle)
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.
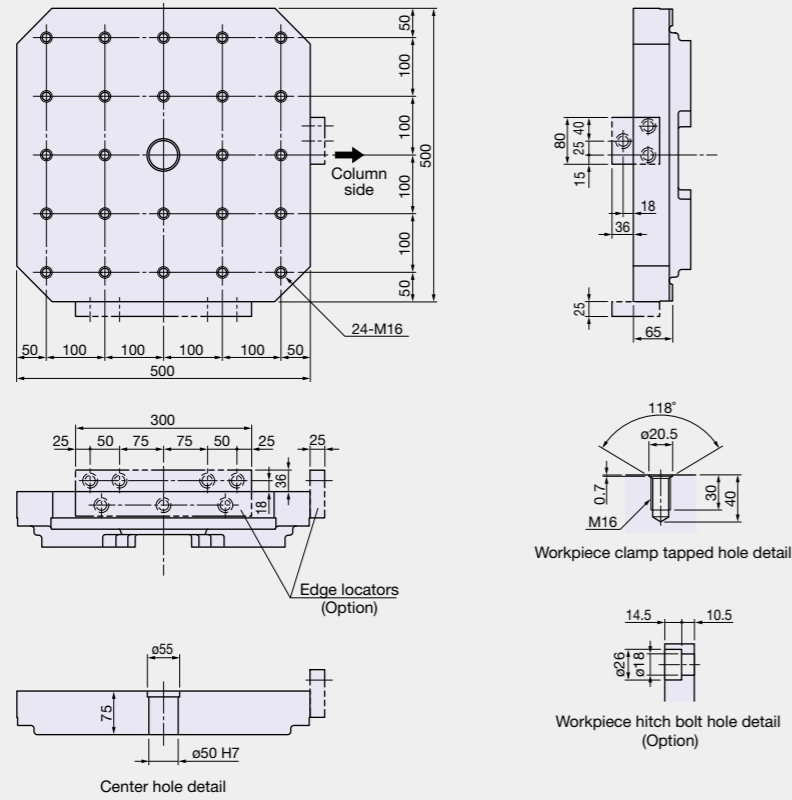
■ Optional Specifications

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	1,000 pcs						
(Std: 200 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★							
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						
Machine Status Logger							
Cutting Status 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-C (Thermo Active Stabilizer—Construction)							
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-gII+ (cutting condition search)							
One-Touch Spreadsheet							
Block skip; 3 sets							
Additional axes	A, C axes [preps, specs]						
Fixture offset							
OSP-VPS (Virus Protection System)							
19-inch display operation panel w/adjustable-tilt keyboard							

Note 1. NML: Normal, 3D: 3D simulation, E: Economy, D: Deluxe
AOT-M: Advanced One-Touch IGF-M
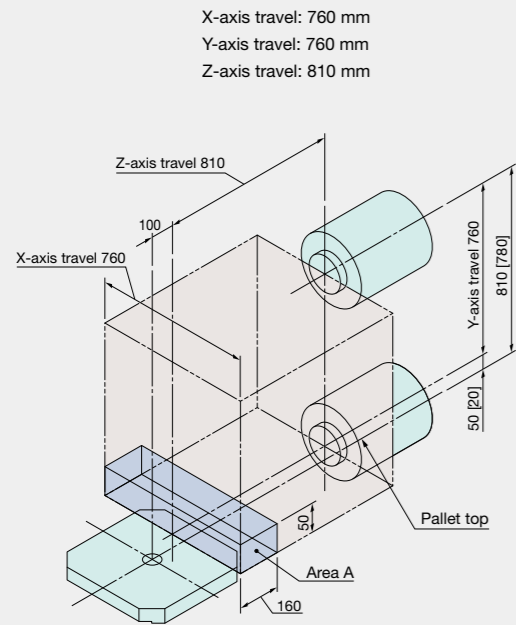Note 2. ★Technical consultation needed for specifications

■ Pallet dimensions
Unit: mm

Column side

24-M16

50 | 100 | 100 | 100 | 100 | 50
500

Edge locators (Option)

Center hole detail
ø55
ø50 H7
7.5

Workpiece clamp tapped hole detail
118°
ø20.5
M16

Workpiece hitch bolt hole detail (Option)
14.5 10.5

■ Working range
Unit: mm

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

Z-axis travel 810
X-axis travel 760
Y-axis travel 760
810 [780]
50 [20]
100
160
50
Pallet top
Area A

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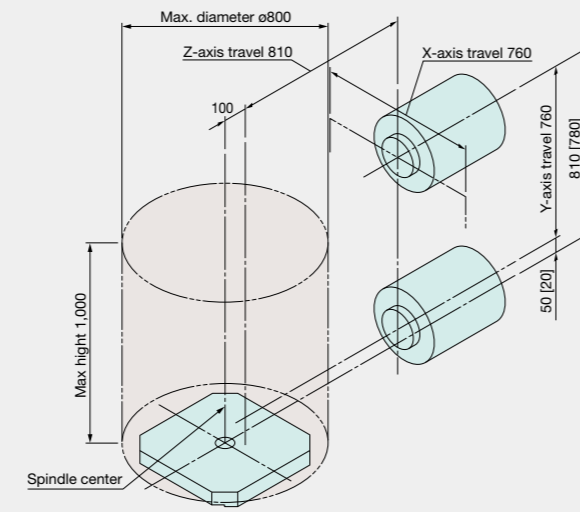Area A: Spindlehead interference
● 160 × 50 mm when the B-axis is 0, 90, 270, or 360 degrees.
● 160 × 50 mm or larger when the B-axis is other than 0, 90, 270, or 360 degrees.
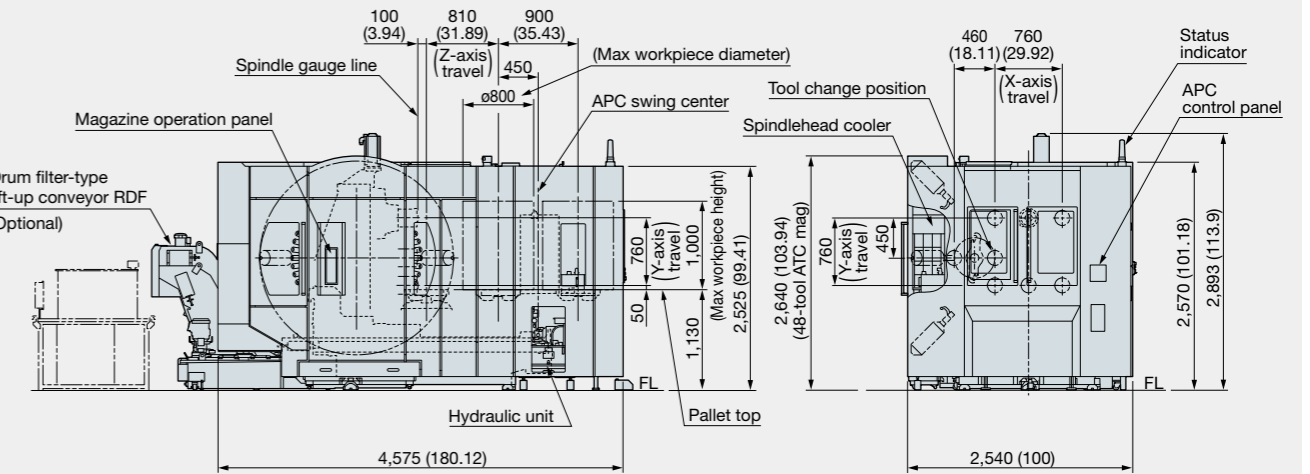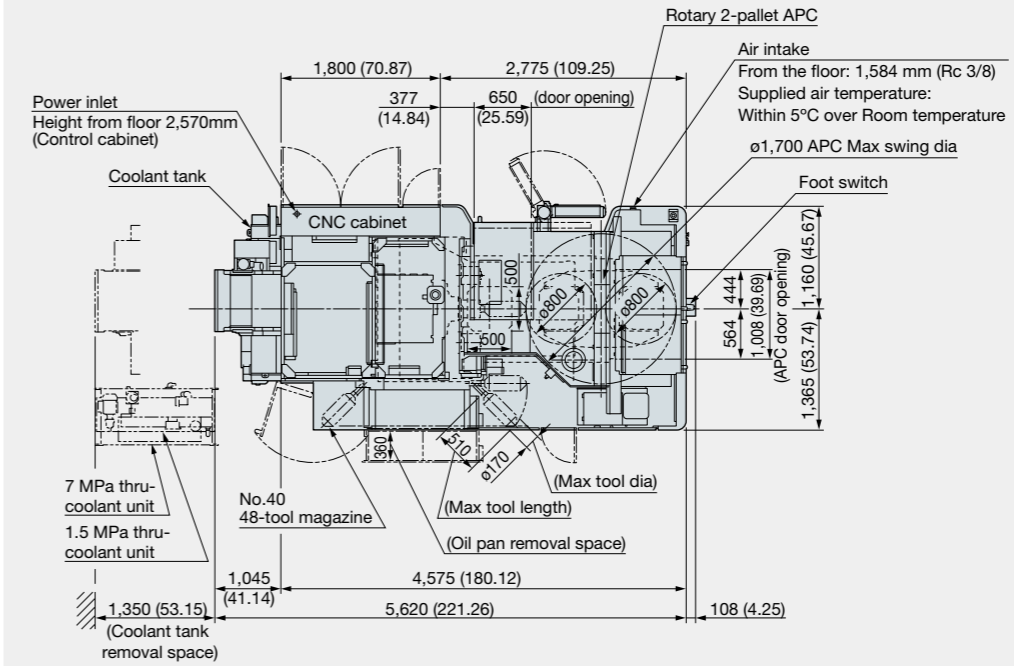
■ Maximum workpiece dimensions
Unit: mm

2-pallet rotary-shuttle APC specification

Max. diameter ø800
Z-axis travel 810
X-axis travel 760
100
Y-axis travel 760
810 [780]
50 [20]
Max. hight 1,000
Spindle center

[ ]: 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)

Rotary 2-pallet APC
Air intake
From the floor: 1,584 mm (Rc 3/8)
Supplied air temperature:
Within 5°C over Room temperature
ø1,700 APC Max swing dia
Foot switch

Power inlet
Height from floor 2,570mm
(Control cabinet)
Coolant tank
CNC cabinet
1,800 (70.87)
2,775 (109.25)
377 (14.84)
650 (25.59) (door opening)

7 MPa thru-coolant unit
1.5 MPa thru-coolant unit
No.40 48-tool magazine
(Max tool length)
(Max tool dia)
(Oil pan removal space)
1,045 (41.14)
4,575 (180.12)
108 (4.25)
1,350 (53.15)
(Coolant tank removal space)
5,620 (221.26)

Spindle gauge line
Magazine operation panel
Drum filter-type lift-up conveyor RDF (Optional)
100 (3.94)
810 (31.89)
900 (35.43)
(Z-axis travel)
450
ø800
(Max workpiece diameter)
APC swing center
Tool change position
Spindlehead cooler
460 (18.11)
760 (29.92)
(X-axis travel)
Status indicator
APC control panel

760 (Y-axis travel) 1,000
50
1,130
2,640 (103.94) (48-tool ATC mag)
2,525 (99.41) (Max workpiece height)
760 (Y-axis travel) 450
2,570 (101.18)
2,883 (113.9)

Hydraulic unit
Pallet top
4,575 (180.12)
FL
2,540 (100)
FL

Unit: mm

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