

GENOS M4000H-e

Horizontal Machining Center



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A horizontal machining center that boosts productivity through high machining capacity, agile machine operation, and excellent accuracy stability

Higher productivity through high-efficiency machining

Equipped with a high-speed, high-torque spindle capable of handling applications from heavy-duty cutting to high-speed machining

Reduced machining time

Machining time is reduced by minimizing non-cutting time and eliminating unnecessary motion

Stable, high-accuracy machining over extended periods

The Thermo-Friendly Concept ensures excellent accuracy stability, enabling consistently high-accuracy machining over long operating hours



GENOS M4000H-e

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

Higher productivity achieved with higher machining capacity and reduced non-cutting time

High machining capacities achieved with fast, powerful spindles

Machining capacity

638 cm³/min

ø20 roughing end mill

15,000 min⁻¹ Standard spindle (No. 40)

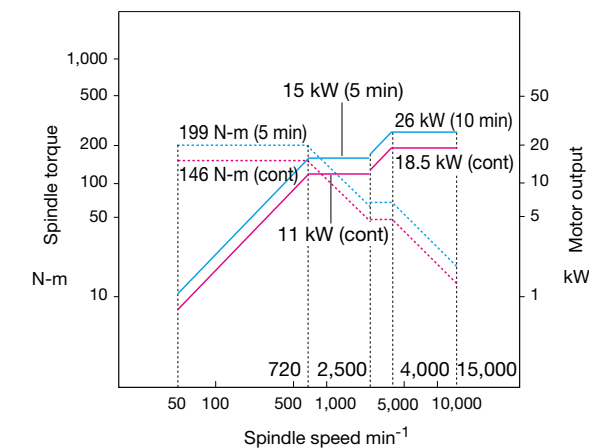
Material: S45C

Tool	Spindle speed min ⁻¹	Cutting speed m/min	Feed rate mm/min	Cutting width mm	Cutting depth mm	Chips cm ³ /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	—	—	—

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

Standard spindle No. 40

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



Mechanical structure and construction achieving highly efficient machining

Shorter lead times with reduced non-cutting time

Machine performance

Quicker movements reduce non-cutting time—ideal for high-mix production applications.

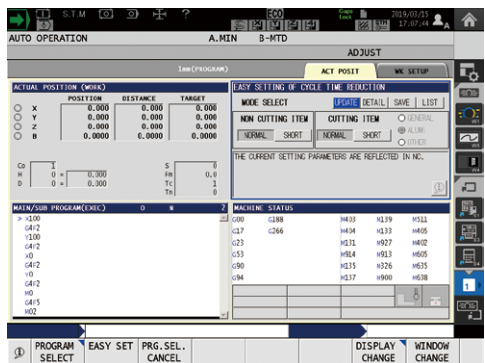
Rapid traverse	X-Y-Z: 60 m/min
Acceleration	Max. 1 G
Tool change	*1 T-T/C-C: 1.0/2.6 sec (tool mass less than 4 kg) 1.3/2.9 sec (tool mass more than 4 kg) *2 CTC min: 2.9 sec
Pallet change	*1 6.9 sec *2 7.0 sec

*1. MAS standard measurements (formerly JIS B 6013)

*2. ISO 10791-9 (2001) (JIS B 6336-9) measurements

Cycle time reduction

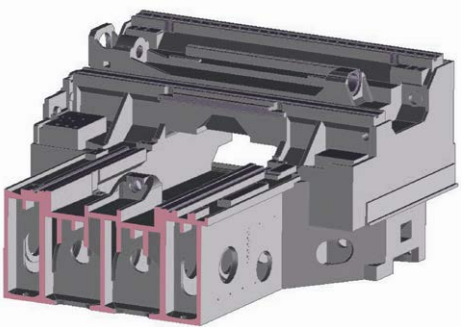
- Operation time reduction
The non-cutting time is shortened by simultaneously performing multiple operations, such as spindle rotation and axis movements, and allowing the rotational axis to take the shortest path.
- Machining time shortening (option)
The cycle time is reduced for parts machining with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



Machine structure

- Integrated ball-screw bracket
- High accuracy indexing table
- Y-axis motor base cooling
- Pallet seating surface uses a taper cone system for high accuracy.
- NC 0.001° indexing

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

High accuracy and high quality machining with Intelligent Technology



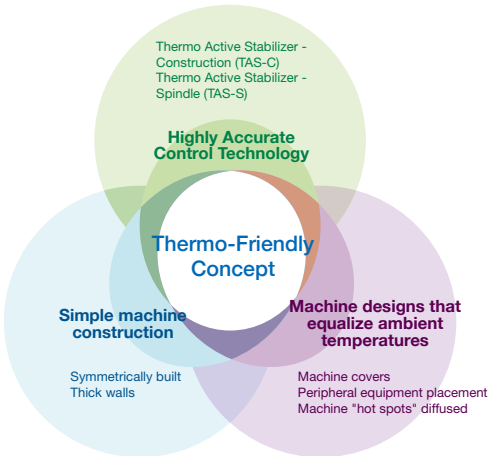
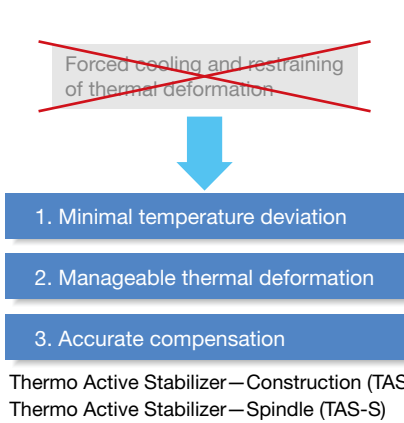
Thermo-Friendly Concept
Manageable Deformation—Accurately controlled

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 accommodates such temperature changes, achieving stable accuracy together with reduced carbon dioxide emissions. There is no requirement for excessive ambient temperature control or special machine cooling systems to maintain processing accuracy.

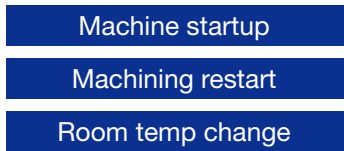
Thermo-friendly construction gives outstanding thermal stability



Eliminate waste with the Thermo-Friendly Concept

Okuma's Thermo-Friendly Concept achieves high dimensional stability not only when the room temperature changes, but also at machine startups or when machining is resumed.

The warm-up operation time to stabilize thermal deformation is shortened, and the burden of dimensional correction when resuming machining is reduced.



High dimensional stability



SERVO NAVI
Optimized Servo Control

Achieves long term accuracy and surface quality

SERVO NAVI AP (Automatic Parameter setting)

Work Weight Auto Setting

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

Rotary Axis Inertia Auto setting

● **Maintains high accuracy and stable movements**
Rotary Axis Inertia Auto Setting is able to estimate inertia from workpiece/fixture acceleration and deceleration, and automatically set the optimum the rotary axis servo parameters to maintain highly accurate and stable machine movements.

SERVO NAVI SF (Surface Fine-tuning)

Reversal Spike Auto Adjustment

● **Maintains machining accuracy and surface quality**
Reversal Spike Auto Adjustment maintains machining accuracy by switching servo parameters to the optimum values matched to changes in slide resistance.

Vibration Auto Adjustment

● **Contributes to longer machine life**
Vibration Auto Adjustment can eliminate noise and vibration even from machines with years of operation.

Excellent operability for improved production efficiency

Easy to operate (making life easier for the operator)

Ceiling door

- Good lighting and no coolant dripping
- Easy workpiece mounting/dismounting with a crane



Independent left-side operation panel

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



Column traverse system

- Outstanding accessibility to pallet (workpiece), spindle

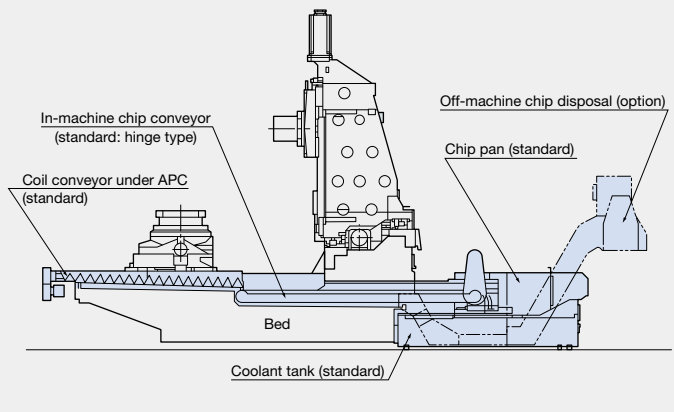
Chip discharge

- Chips discharged directly with center trough just under spindle
- Washing in-machine and under pallet



In-machine chip conveyor

Chips discharged by conveyor



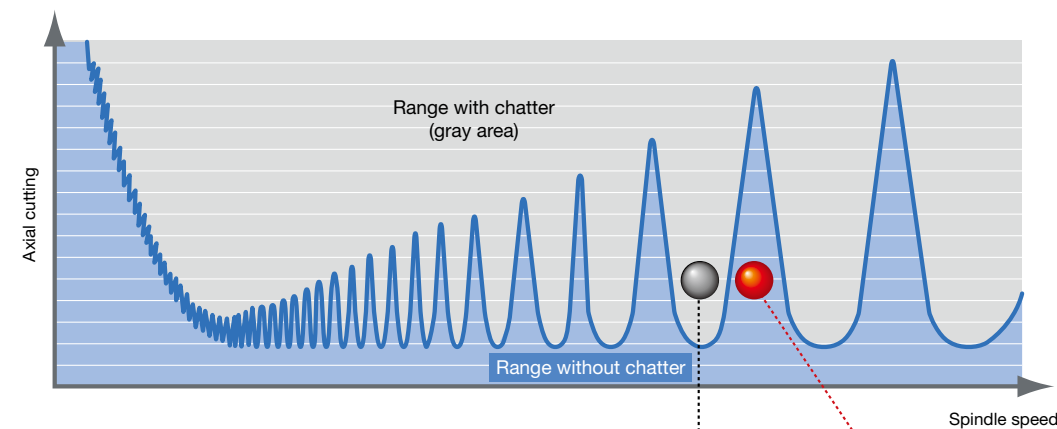
Advanced technology of OSP that is effective at the machining site



Machining Navi M-gII+ (option)
Cutting condition search for milling

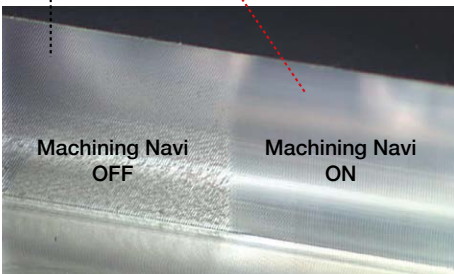
Find the best cutting condition for your application

Machining Navi instantly determines the optimal cutting conditions for highly efficient machining.



Spindle speed and chatter are linked in a periodic manner, manifesting as alternating ranges with and without chatter. This means that there will be cases in which chatter cannot be suppressed with a reduction in spindle speed, and other cases where increasing the spindle speed will eliminate the chatter.

Machining Navi navigates the extremely difficult process of finding the optimal spindle speed value by analyzing chatter and instantly determining (powerful computing) the best spindle speed.



Cutting conditions can be changed while looking at analysis results

Based on the chatter noise captured by the microphone, Machining Navi displays a number of optimal spindle speed possibilities on the screen. The operator can change to the indicated spindle speed with a single touch and immediately confirm the result.



This sign indicates a change to the optimum spindle speed.

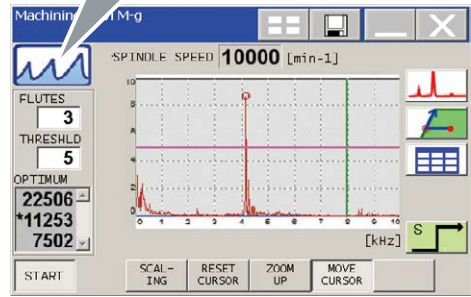


This sign indicates that spindle speed is being changed.



This sign indicates that the cutting load needs to be reduced.

Machining Navi (OSP) provides the answer!



Contribution to the realization of a carbon-free society



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

Okuma has worked to reduce energy consumption in order to achieve carbon neutrality at the three factories in Japan which are our main production bases.

We have realized high productivity through automation and process-intensive machining, in addition to high-accuracy machining, and we then introduced the use of green energy to transform the three domestic factories into carbon-neutral factories. “Green-Smart Machines” is our definition of Okuma’s intelligent machine tools, which autonomously achieve stable dimensional accuracy and reduced energy consumption, to support environmentally friendly production. Our policy is to deploy “Green-Smart Machines” fully, to help achieve a carbon-free society.

Starting with products manufactured at those carbon-neutral factories and distributing them globally, we will partner with our customers to address the social challenges faced by the manufacturing industry.

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



Green-Smart Machine Technology that achieves Green-Smart Machine

Thermo-Friendly Concept

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

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

Reduction of warm-ups and dimensional compensation

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

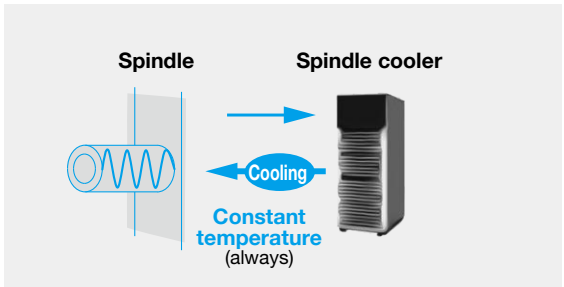
Reduction of power used for air conditioning

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

Reduction of machine body coolers

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

The Okuma way to cool



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

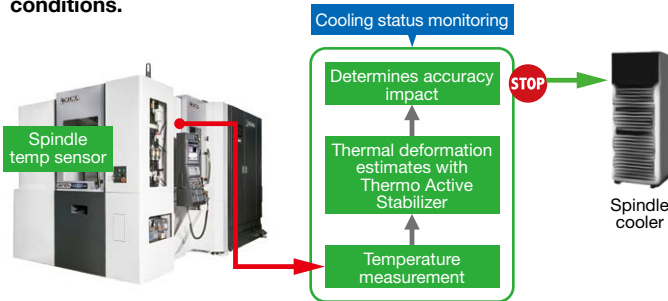
ECO suite plus

A system for an energy-saving society

ECO Idling Stop

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

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



ECO Power Monitor

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

ECO Operation

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



Machine Specifications

	Item	Unit	GENOS M4000H-e
Travels	X-axis (column left/right)	mm	560
	Y-axis (spindle up/down)	mm	560
	Z-axis (table front/back)	mm	625
	Spindle center to pallet top	mm	50 to 610
	Spindle nose to pallet center	mm	85 to 710
Pallet	Pallet size	mm	400 × 400
	Max load capacity	kg	400
	Indexing angle	deg	0.001
	Max workpiece dimensions	mm	ø600 × 900*1
Spindle	Speed	min ⁻¹	50 to 15,000
	Tapered bore		7/24 taper No. 40
	Bearing dia	mm	ø70
Feed rate	Rapid traverse	m/min	X, Y, Z: 60
	Cutting feed rate	mm/min	1 to 60,000
Motors	Spindle (10 min/cont)	kW	26/18.5
	Feed axes	kW	X: 4.6, Y, Z: 3.5
	Table indexing	kW	3.0
Auto tool changer (ATC)	Tool shank		MAS403 BT40
	Pull stud		MAS2
	Magazine capacity	tools	64
	Max tool dia (w/ adjacent)	mm	ø70
	Max tool dia (w/o adjacent)	mm	ø150*2
	Max tool length	mm	300
	Max tool mass	kg	10
	Tool selection		Memory random
Machine Size	Height	mm	2,650
	Floor space; width × depth	mm	2,420 × 5,358*3
	Mass	kg	9,600
Controller			OSP-P300MA-e

*1. When the pallet approaches closest to the spindle (to the position 50 mm from the Z-axis negative end), the workpiece diameter to be loaded is limited to ø500 to avoid interference between the workpiece and the X/Y telescopic cover.

*2. Tools with diameters between ø70 mm and ø150 mm require empty pots on both adjacent sides.
When exceeding ø110 mm, it requires two empty pots between adjacent tools.

*3. Machine with CP2000 drum filter lift-up chip conveyor (option).

GENOS M4000H-e Standard Specifications

Spindle/spindlehead cooling system	Oil temperature controller	Work lamp	LED, 1 location
		Status indicator	3-lamp signal tower
Hydraulic unit		Foundation washers	
Centralized lubrication automatic oil supplier	Tank 6 L, oil level alarm and pressure alarm equipped	Side-slip prevention tool	Chemical anchors included
		Auto tool changer (ATC)	Tool capacity: 64
Coolant supply system	Tank 750 L (510 L*), pump motor 1,500 W (double use for nozzle and in-machine)	Auto 0.001° indexing table	
		Auto pallet changer (APC)	2-pallet rotary-shuttle*2
Coolant nozzle	Insert nozzle type	In-machine chip discharge*3	Hinge type chip conveyor
Table area wash	In-machine and under-pallet wash	Chip pan for above	
Spindle air blower (blast)		In-machine chip discharge (below APC)	Coil type chip conveyor
Chip air blower (blast)	Nozzle type		
Full enclosure shielding		TAS-S	Thermo Active Stabilizer—Spindle
Hand tools, tool box		TAS-C	Thermo Active Stabilizer—Construction
Tool release lever		Door interlock	
Tapered bore cleaning bar		*1. Effective *2. Pallets with MAS tapped holes *3. Directly below the spindle	

GENOS M4000H-e Optional Specifications

Dual contact spindle*1	BIG-PLUS®	Off-machine chip discharge (lift-up chip conveyor)	Please see the chip conveyors below
Pallet surfaces	T-slot	Chip buckets (heights)	L type: 700 mm, H type: 1,000 mm
Spare pallets		Hydraulic oil cooler	
Edge locator		Coolant heater/cooler	
Coolant pump		Auto tool length compensation	Touch sensor (w/tool breakage detection)
Thru-tool coolant	1.5 MPa	Auto workpiece gauging	Touch probe (w/zero offset)
Thru-spindle coolant*2	MPa: 1.5, 7.0, large flow 1.5, large flow 7.0	Pull stud shape	MAS1, JIS, CAT, DIN
Suction of excess coolant in spindle		Standard T-column fixture	Height: 640 mm, width: 400 mm, T-slot pitch: 80 mm
Semi-dry machining	Thru-spindle, nozzle, thru/nozzle switch	Standard square-column fixture	Height: 640 mm, width: 270 mm, T-slot pitch: 80 mm
Shower coolant	10 nozzles, 550 W pump	Angle plate	
Table area wash discharge		Additional work lamp	
Workpiece wash gun			
Mist collector			
Chip air blower	Adapter		
In-machine chip discharge	Scraper type chip conveyor	Machining Navi	M-gII+

*1. Be sure to select this specification when BIG-PLUS® holder is used.

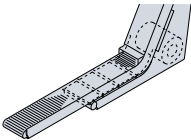
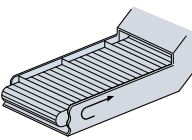
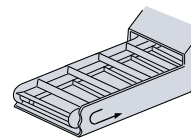
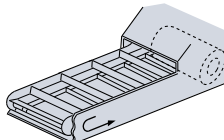
*2. Okuma pull studs required.

Chip conveyors (Please contact an Okuma sales representative for details.) ○ : recommended △ : conditionally recommended

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

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

Off-machine lift-up chip conveyors

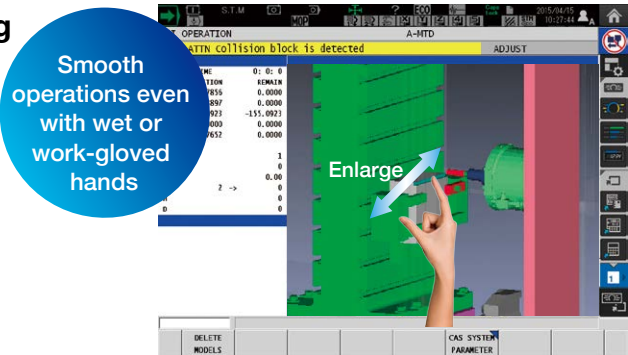
Name	Hinge + scraper with drum filter	Hinge	Scraper	Scraper with drum filter
Shape				

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

Smart factories are using advanced digitization and networking (IIoT) in manufacturing to achieve enhanced productivity and added value. Okuma's excellent control uses high-end CPUs for a significant 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 smartphone

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 smartphone. 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: Collision Avoidance System (option) shown above.

“Just what we wanted.”— Refreshed OSP suite apps

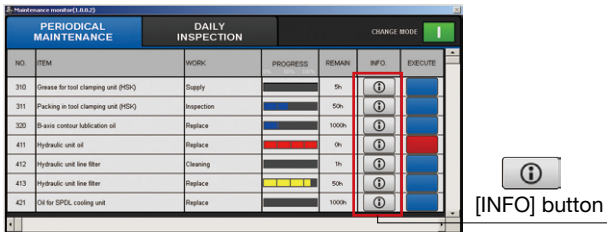
This became possible through the addition of Okuma's machining expertise based on requests we heard from real, machine-shop customers. The brain power packed into the CNC, built by a machine tool manufacturer, will “empower shop floor” management.



Maintenance Monitor

Routine inspection support

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.





Spindle Output Monitor

Increased productivity through visualization of motor power reserve



E-mail Notification

Monitoring operating status even when away from the machine



Screen Capture

Automatic saving of recorded alarms



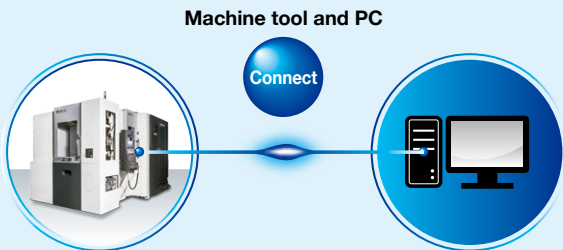
Scheduled Program Editor

Easy programming without keying in code

Connect Plan Get Connected, Get Started, and Get
Innovative with Okuma “Monozukuri”

Connect, Visualize, Improve

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



OSP-P300MA-e Standard Specifications

Basic specs	Control	X, Y, Z, simultaneous 3 axis, spindle control (1 axis)
	Position feedback	OSP full range absolute position feedback (zero-point return not required)
	Coordinate functions	Machine coordinate system (1 set), work coordinate system (20 sets)
	Min/max command	±99999.999 mm, ±9999.9999° 8-digit decimal, command units: 0.001 mm, 0.01 mm, 1 mm, 0.0001°, 0.001°, 1°
	Feed	Cutting feed override 0 to 200%, 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
	Security	Operator authentication, OSP-VPSII-STD (Virus Protection System)
Programming	Program capacity	Program storage capacity: 4 GB; operation backup capacity: 2 MB
	Program operations	Program management, editing, 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, Smart I/F, DNC-T1
High speed/accuracy specs		Hi-G Control, Hi-Cut Pro, pitch error compensation, SERVO NAVI, Cycle time reduction (operation time reduction, easy parameter setting), TAS-S (Thermo Active Stabilizer – Spindle), TAS-C (Thermo Active Stabilizer – Construction)
Energy-saving function	ECO suite plus	ECO Idling Stop, ECO Power Monitor*1
	Power Regeneration	Using the energy generated when spindle and feed axis speeds decelerate

*1. The power display shows estimated values. When precise electrical values are needed, select the wattmeter option.

OSP-P300MA-e Optional Specifications

Item		Kit specs		NML		3D		AOT	
		E	D	E	D	E	D	E	D
Interactive functions									
Advanced One-Touch IGF-M (Real 3-D Simulation included)									
Interactive MAP (I-MAP)									
Programming									
Operation buffer 10 MB									
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									
100 sets									
200 sets									
(Std: 20 sets)									
400 sets									
Helical cutting (within 360 degrees)									
3D circular interpolation									
Synchronized Tapping II									
Arbitrary angle chamfering									
Cylindrical side facing									
Slope machining									
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 3-D 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									
Workpiece counter									
With M02 and M30 commands									
MOP-TOOL									
Adaptive control, overload monitor									
AI machine diagnostics									
AI Feed Axis Diagnosis*2									
Machining data 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									
Manual gauging (w/o sensor)									
Interactive gauging (touch sensor, touch probe required)									
External I/O communication									
RS-232C interface									
DNC-T3									
DNC-B (RS-232C-Ethernet transducer used on OSP side)									
DNC-DT									
DNC-C/Ethernet									
Additional USB (Additional 2 ports, Std: 2 ports)									
Automation/Unattended									
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)									
Robot, loader I/F									
High-speed, high-precision									
Super-NURBS*3									
X-Y-Z axes, rotational axis (up to 2)									
0.1 μm control (linear axis commands)									
ECO suite plus (energy-saving functions)									
ECO Operation									
ECO Power Monitor									
Wattmeter									
Energy-saving									
Inverter									
hydraulic unit									
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 codes									
4, 8 signals									
Machining Navi M-gII+ (cutting condition search)									
One-Touch Spreadsheet									
Block skip; 3 sets									
Additional axes									
A, B, C axes [preps, specs]									
Fixture offset									
OSP-VPSII-EX (Virus Protection System)									

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

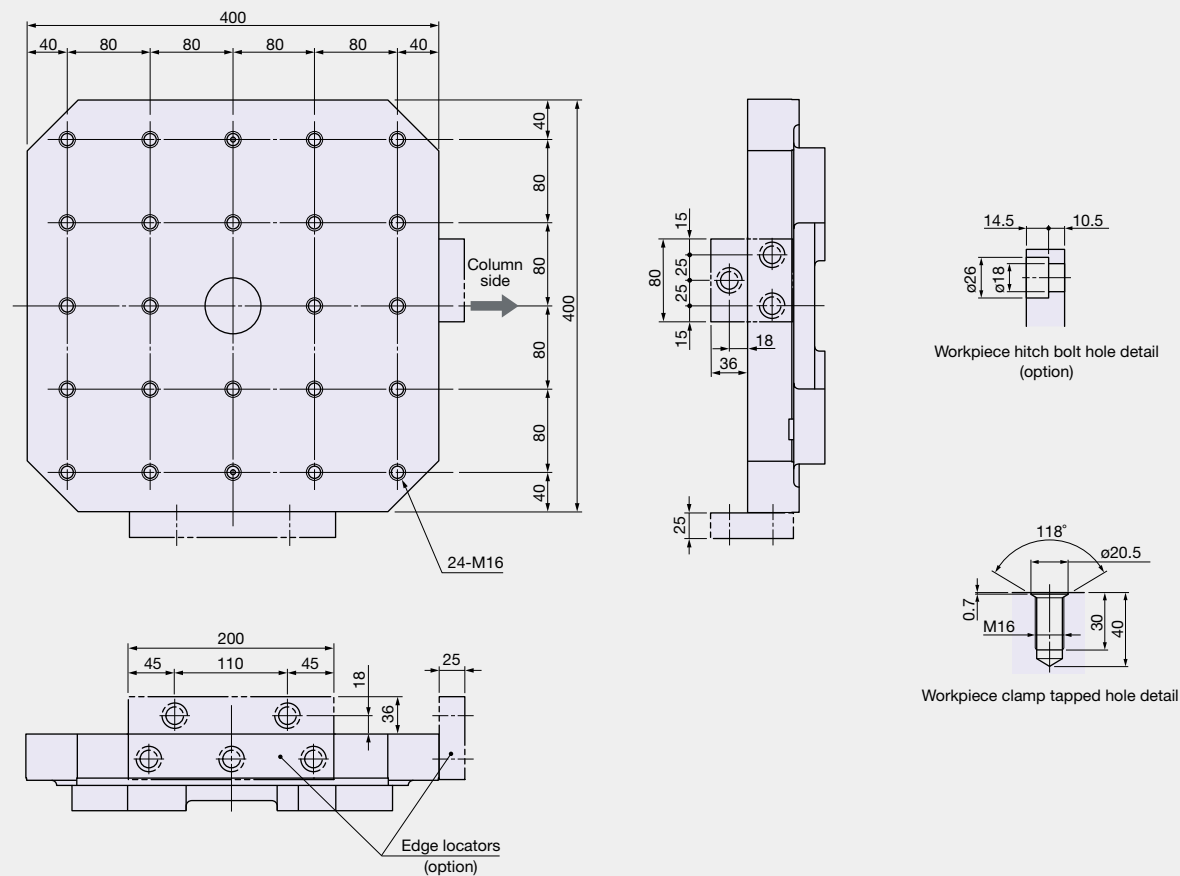
*1. Requires technical consultation.

*2. Detects damage to ball-screw support bearings.

*3. Select Super-NURBS for simultaneous linear and rotational axis machining.

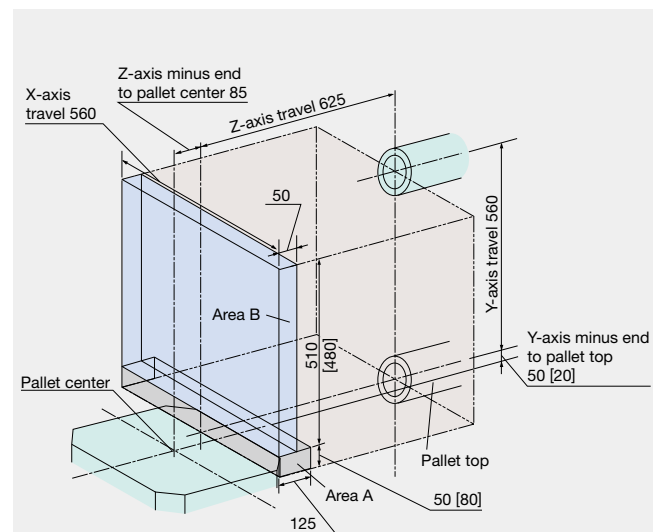
■ Pallet dimensions

Unit: mm



■ Working range

Unit: mm

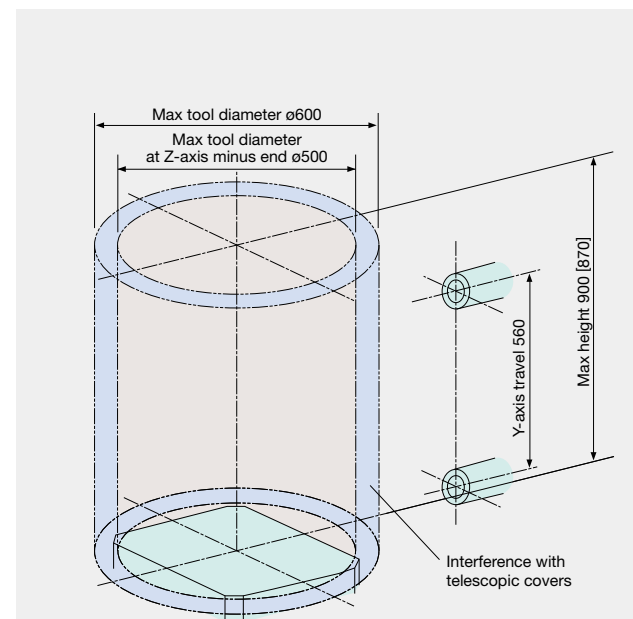


[]: T-slot pallets

Interference areas
A: Spindlehead and table
B: X-/Y-axis telescopic covers. (Max workpiece dimensions)

■ Maximum workpiece dimensions

Unit: mm



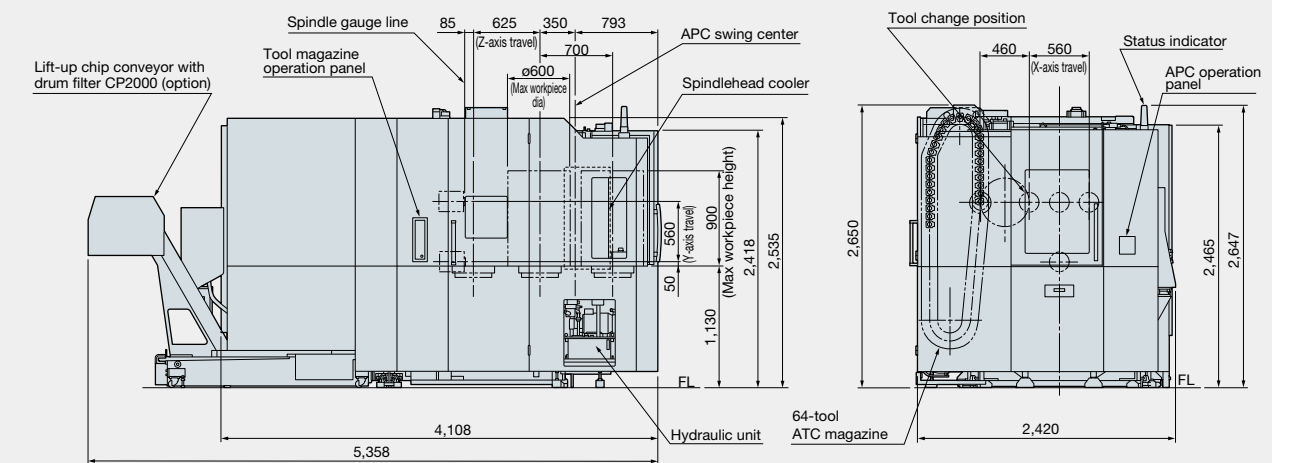
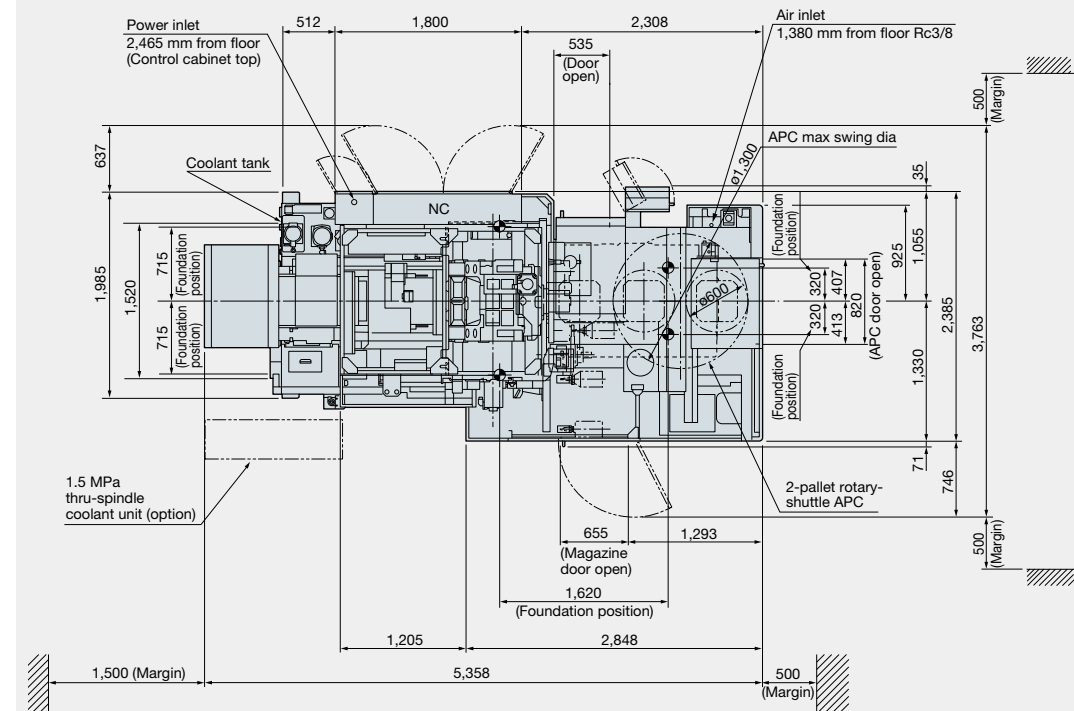
[]: T-slot pallets

At the Z-axis minus end, the X/Y-axis telescopic covers will interfere with the workpiece, therefore, set the maximum diameter to $\phi 500$ mm.

GENOS M4000H-e

Dimensional and Installation Drawings

Unit: mm



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

● The specifications, illustrations, and descriptions in this brochure vary in different markets and are subject to change without notice.
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GENOS

The origin of gene, from Greek *genos*
meaning race, offspring, origin
(pronounced “γένος” as in “generous”)

Global
Efficient
No.1
Standard

