OKUMA

GENOS series

Vertical Machining Center

New Era OSP-P300MA-e

GENOS M460-VE-e

GENOS M560-V-e

Welcome to GENOS

GENOS technology carries Okuma's genetic heritage and takes you
to the leading edge of global competition.
GENOS—A high-quality global machine for the times. Get one for yourself.

Vertical Machining Centers

GENOS M460-VE-e
GENOS M560-V-e

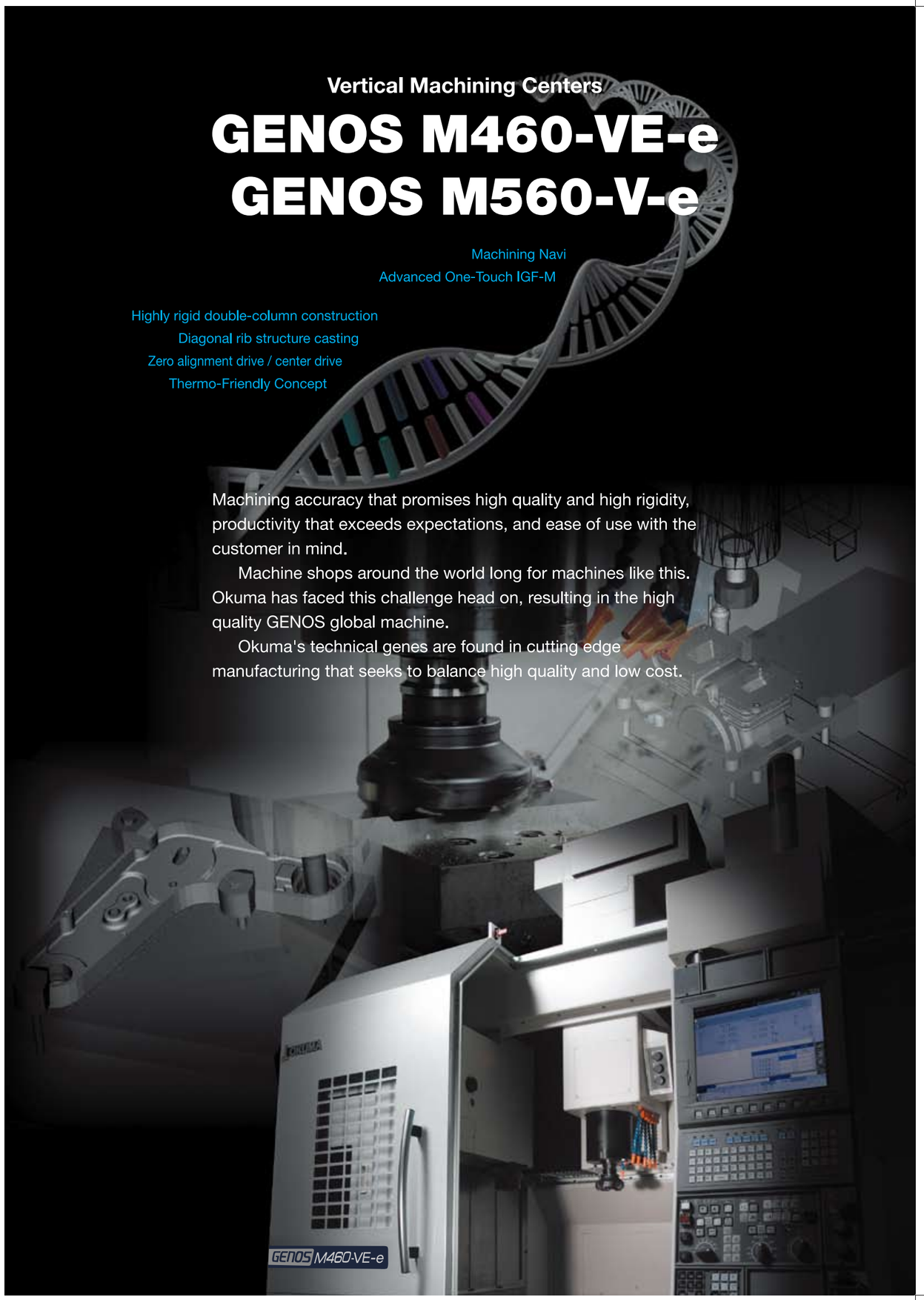
Machining Navi
Advanced One-Touch IGF-M

Highly rigid double-column construction
Diagonal rib structure casting
Zero alignment drive / center drive
Thermo-Friendly Concept

Machining accuracy that promises high quality and high rigidity, productivity that exceeds expectations, and ease of use with the customer in mind.

Machine shops around the world long for machines like this. Okuma has faced this challenge head on, resulting in the high quality GENOS global machine.

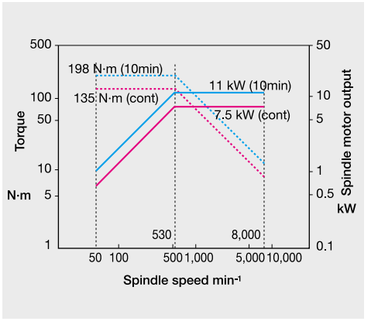
Okuma's technical genes are found in cutting edge manufacturing that seeks to balance high quality and low cost.



Highly rigid construction for productivity that exceeds expectations

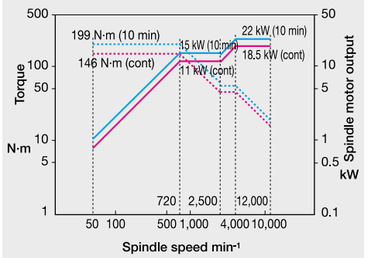
Standard spindle specifications 8,000 min^{-1}

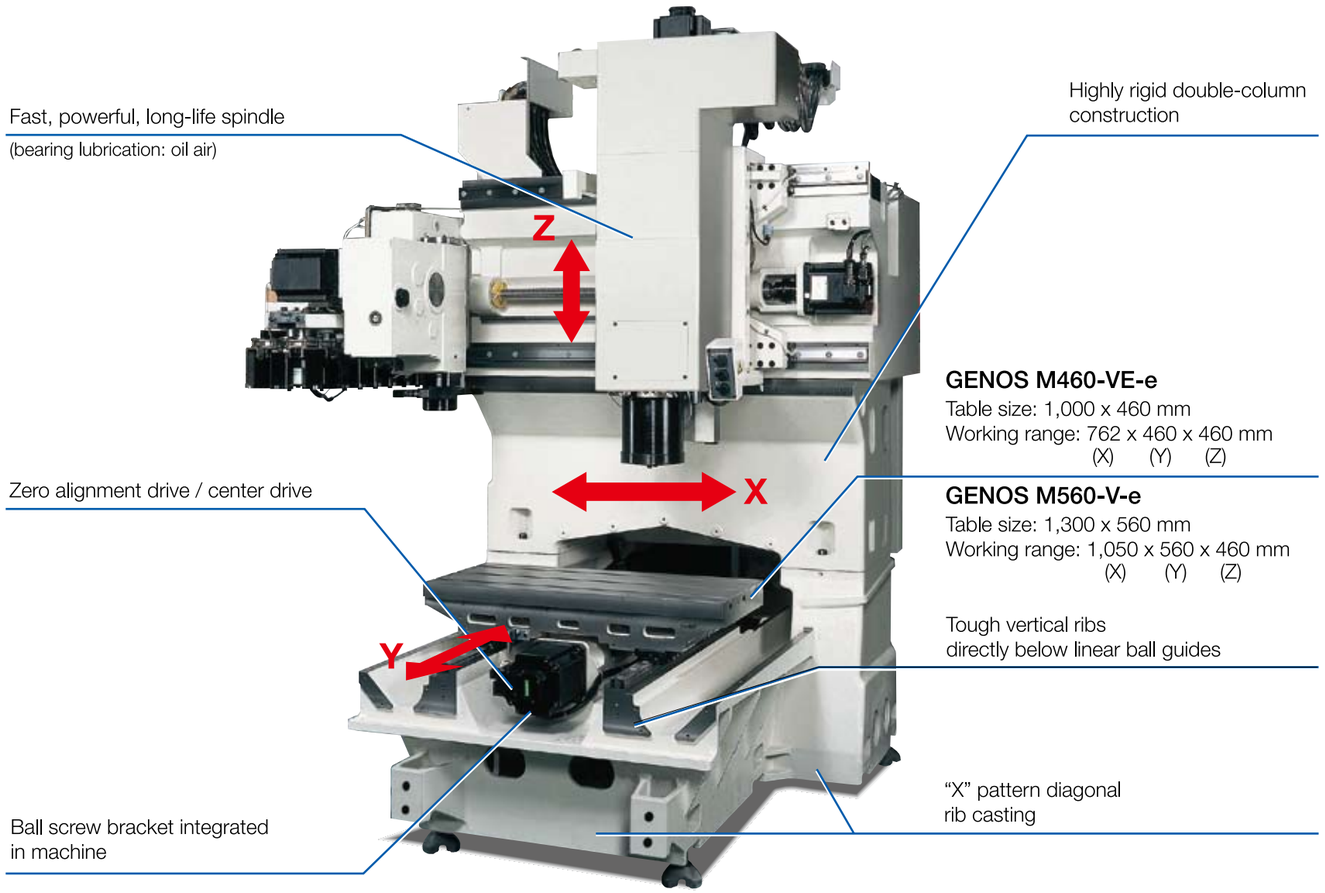
Spindle speed : 8,000 min^{-1}
Spindle motor output : 11/7.5 kW
(10 min/cont)
Torque : 198 N·m
Tapered bore : 7/24 taper No. 40



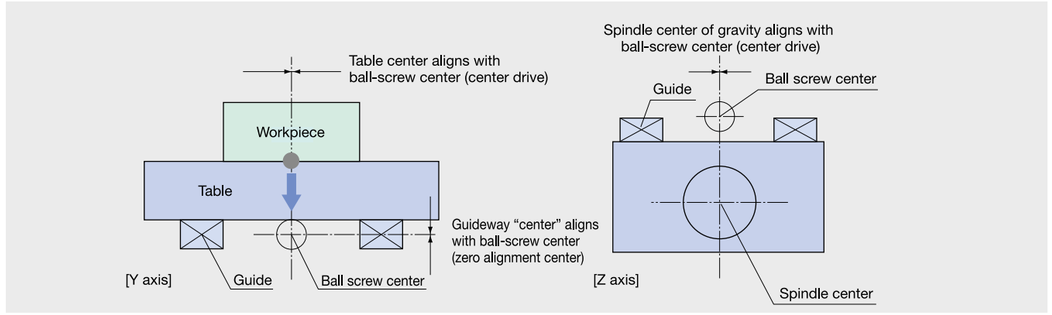
Wide-range spindle specifications 12,000/15,000 min^{-1} (Optional)

Spindle speed : 12,000/15,000 min^{-1}
Spindle motor output : 22/18.5 kW
(10 min/cont)
Torque : 199 N·m
Tapered bore : 7/24 taper No. 40



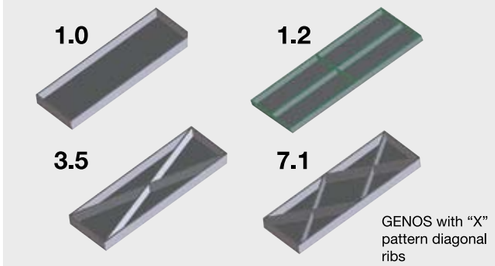


Zero alignment drive / center drive

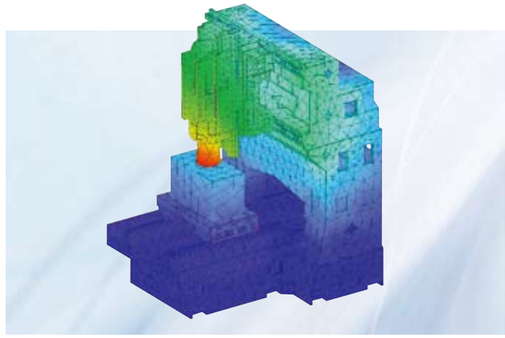


"X" pattern diagonal rib casting

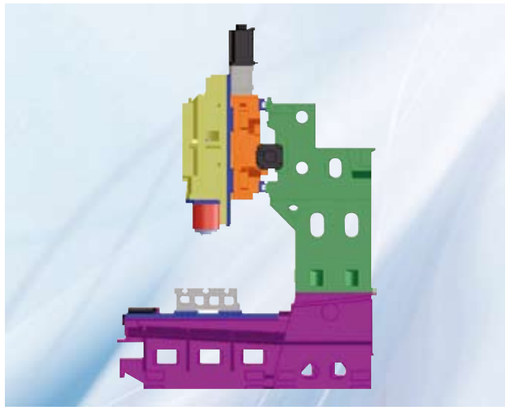
● Torsional rigidity comparisons (per weight)



Highly rigid double-column construction



Highly rigid construction using 3D-CAD and FEM analysis



Small overhang to slideways means better, more efficient cutting

Machining capacity (GENOS M460-VE-e/M560-V-e)

● 8,000 min^{-1} standard spindle cutting examples [Actual data]

Tool	Spindle min^{-1}	Cutting m/min	Feedrate mm/min	Width mm	Depth mm	Amount cm^3/min
ø80 face mill 8 blade (cermet)	895	225	2,600	56	2.5	364
ø20 roughing end 7 flute (carbide)	3,660	230	4,300	4	20	344
ø50 drill (carbide)	1,000	157	150	—	—	—
M30 x 3.5 tap	318	30	1,113	—	—	—

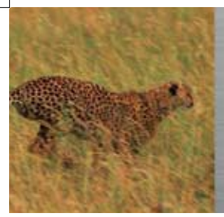
(Workpiece: S45C)

● 12,000/15,000 min^{-1} wide-range spindle [Actual data]

Tool	Spindle min^{-1}	Cutting m/min	Feedrate mm/min	Width mm	Depth mm	Amount cm^3/min
ø80 face mill 8 blade (cermet)	895	225	3,000	56	3	504
ø20 roughing end 7 flute (carbide)	4,000	251	4,800	7	20	672
ø63 drill (carbide)	720	142	108	—	—	—
M30 x 3.5 tap	318	30	1,113	—	—	—

(Workpiece: S45C)

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

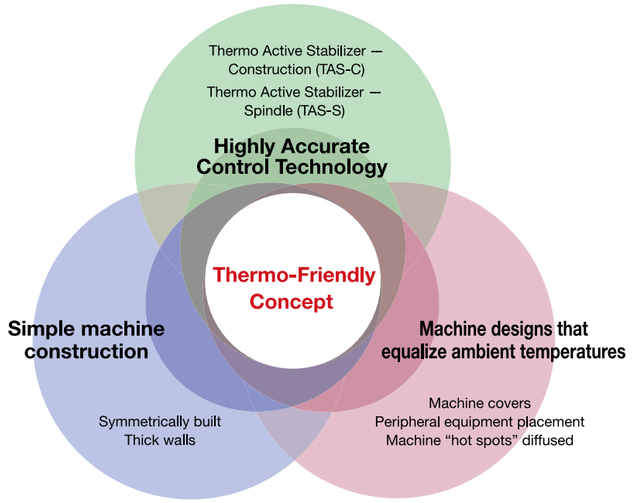


Fast and accurate machining provides superb quality

Thermo-Friendly Concept

"Working with temperature changes"

Okuma's Thermo-Friendly Concept is a structurally designed, thermal deformation control technology that provides astonishing cutting accuracy. It frees the operator from troublesome machine warm-ups and offsets. During long production runs with changing shop temperatures, the required part dimensions remain stable.

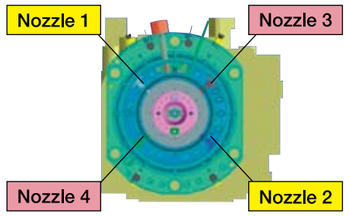


Thermal deformation over time: less than 8µm

Room temperature change of 8°C (using TAS-C)

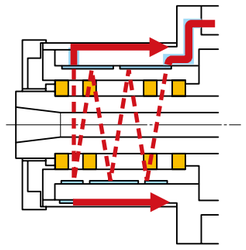
Measures to deal with heat in spindle bearing

Thermally symmetric cooling arrangement



Oil air lubrication for spindle bearing is supplied from 4 nozzles arranged evenly on left and right for uniform bearing temperature on the circumference.

Double cooling oil jacket

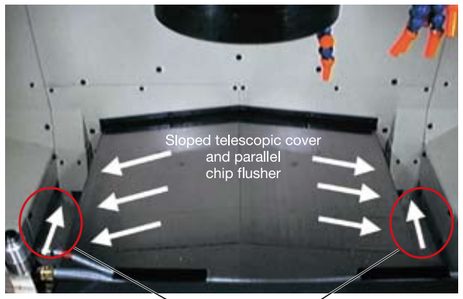


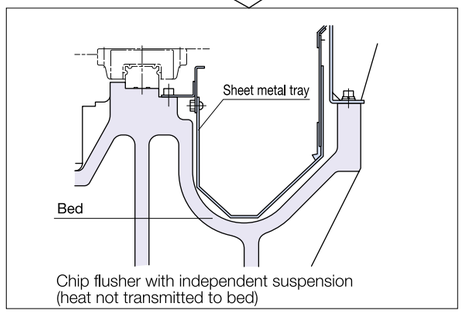
Outer perimeters of bearing housing and spindlehead are cooled to make spindlehead temperature uniform.

Thermo-Friendly Concept

Insulation measures from coolant, chips

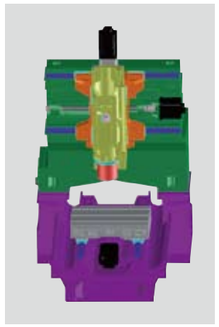
Chips with heat produced by machining are quickly removed before heat is transferred to machine.





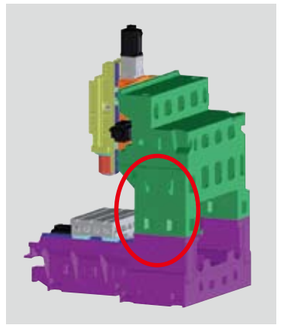
Chip flusher with independent suspension (heat not transmitted to bed)

Thermo-Friendly Construction (TFC)



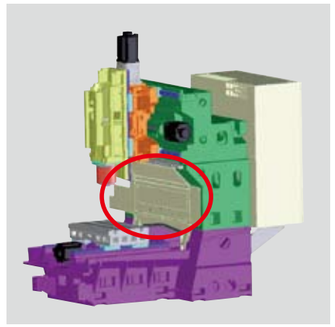
Thermally symmetric structure

Equal left-right construction permits straightforward thermal distortion



"Box-build" structure

Column structure built up of simple blocks is used to permit straightforward thermal distortion



Thermally balanced structure

A cover is set on the front of the column and the control cabinet on the back for even conduction of temperature.

TAS-C: Thermo Active Stabilizer—Construction

"Proactively" keeps the machine [construction] in optimum, stable condition during shop environment temperature change–resulting in superb (stable) machining accuracies.

TAS-S: Thermo Active Stabilizer—Spindle

Accurate compensation during spindle start/stops, and speed changes.

Non-cutting time

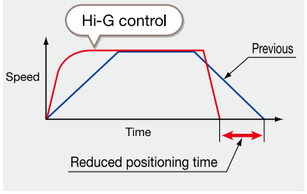
35% less non-cutting time

(Compared to previous Okuma machine)

Rapid traverse	X, Y: 40 m/min, Z: 32 m/min
ATC time (T-T)	1.2 sec
Spindle accel/decel	1.2 sec (8,000 min^{-1} spindle, 0 ↔ 8,000 min^{-1})

Hi-G Control (standard)

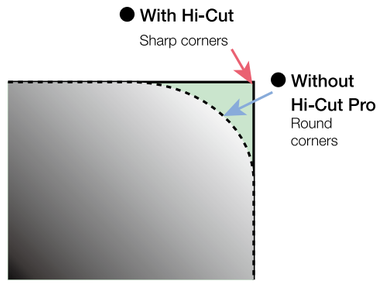
Acceleration/deceleration during positioning is controlled by math functions linked to motor speed/torque characteristics, to provide both machine accel/decel and vibration control.



Cutting time

Hi-Cut Pro (standard)

A speed and acceleration controller to make sharper corners and smoother arcs—ideal for the extra accurate and quicker cycle time jobs



Hi-Cut Pro Off

Hi-Cut Pro On

With a variety of eco-friendly features

Ecology and economy specs that eliminate waste

ECO² Friendly™
ECOLOGY & ECONOMY

Environmental economic benefits of Okuma's Thermo-Friendly Concept

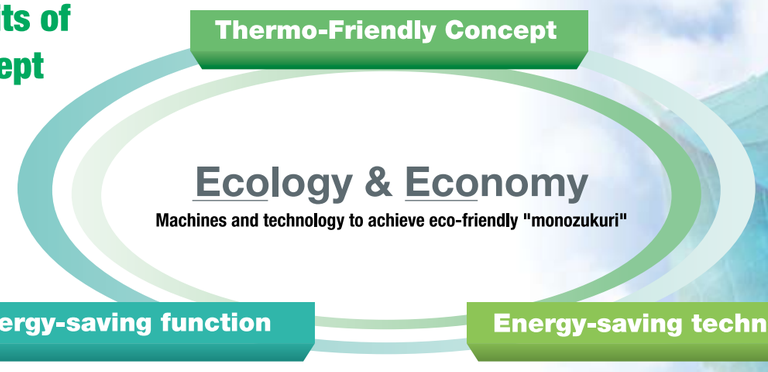
In environments with normal temperature changes, machining accuracies equivalent to those in temperature-controlled rooms are achieved.
As long as the operator is comfortable, there is no need for air conditioning to ensure accuracy.

■ **Amount of energy consumed for temperature-controlled room**

per year **Savings of approximately 135,000 kWh** (*1)

Prevents CO_2 emissions equivalent to about 7,500 beech trees

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



- Power-saving function
- Energy-saving operation

- Hydraulic unit eliminated (electric pump cylinder used for tool load/unload)
- Oil controller controlled by power-saving
- Energy-saving drive, NC unit

Energy-saving function

■ Power-saving function

After completion of automatic operation, equipment power shuts off at set time

■ Energy-saving operation

- Automatic power shutoff
- Lift-up chip conveyor, mist collector interlocked operation (Optional) (Optional)

Energy-saving technology

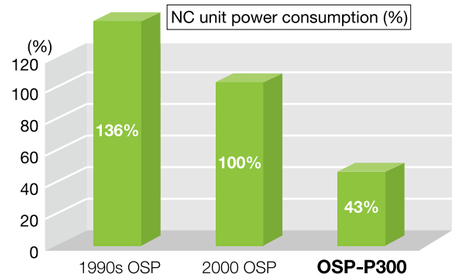
■ Energy-saving NC unit

- Computer in a flat panel with a high-performance CPU
- Power-saving design
- LCD (Liquid Crystal Display) used

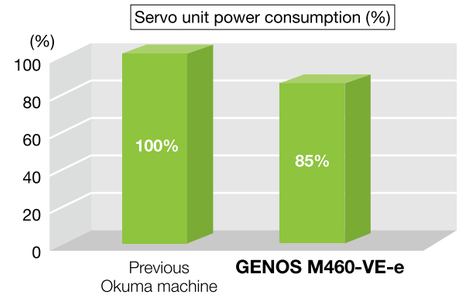
■ Energy-saving drive unit

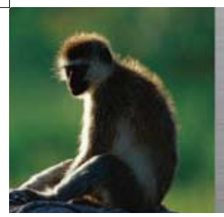
- Low-loss power transistor used
- Power regeneration system used

Power consumption **Reduced 60%** (compared to previous Okuma machine)



Power consumption **Reduced 15%** (compared to previous Okuma machine)





Truly machinist oriented, superb ease-of-use machine operation

The ultimate in user-friendly design

- Loading/unloading tools to/from the magazine can be performed from the front of the machine

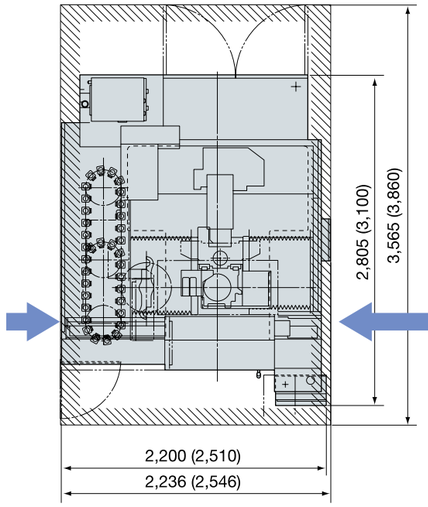
- Tool load/unload button on spindlehead

Actual required footprint: 8.0 m² (9.8 m²)

■ No maintenance on left or right

- Power lines, air source, chip discharge, and other maintenance functions are concentrated in back of the machine

Left side M460-VE-e



M460-VE-e
( ) for M560-V-e

Right side M460-VE-e

Ideal table height and workpiece access—easy setup changes

Outstanding ease of use

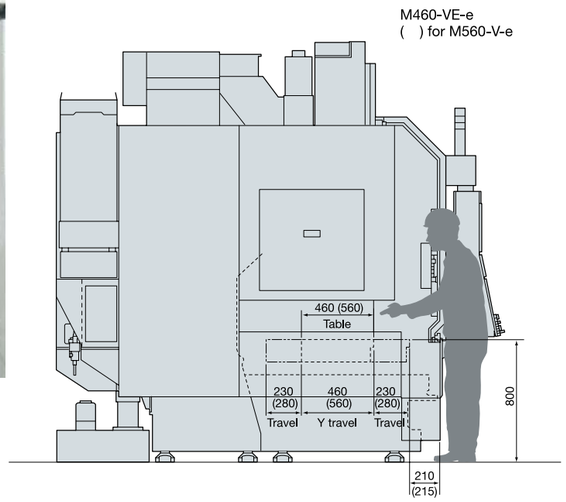
- Large door opening: 850 mm (1,323 mm)
- Approach to table: 210 mm (215 mm)
- Table height: 800 mm

M560-V-e

Wide opening

GENOS M460R-VE-e : **850** mm
GENOS M560R-V-e : **1,323** mm

M460-VE-e
( ) for M560-V-e

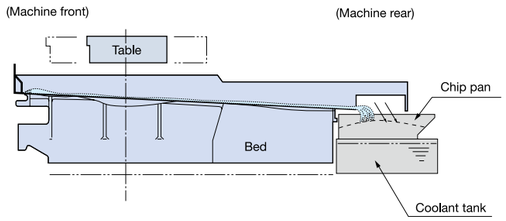


Chip discharge

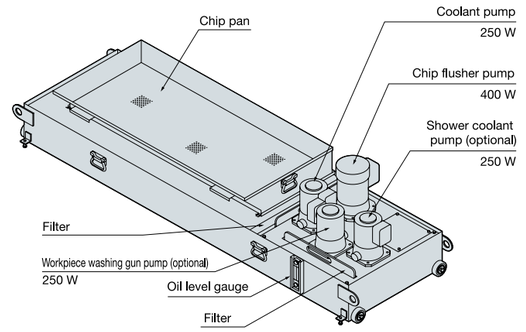
Large coolant tank: Max 190 L (230 L) (effective 100 L (120 L))

Large 60 L (69 L) chip pan

Chip flusher



Coolant supply system



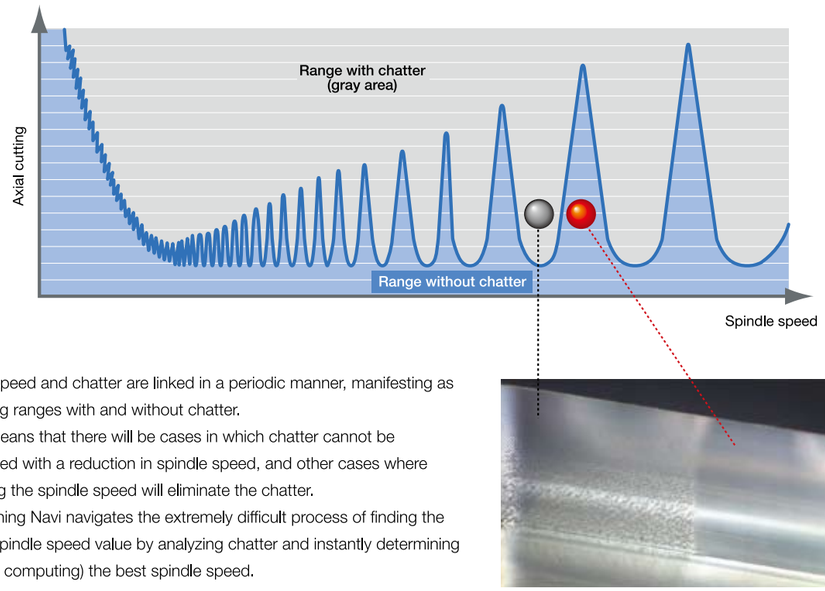
Hi-tech Okuma mechatronics for advanced machining applications

Machining Navi M-*g* (Optional)

Machining Navi

»» Push cutting conditions higher to increase profit

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



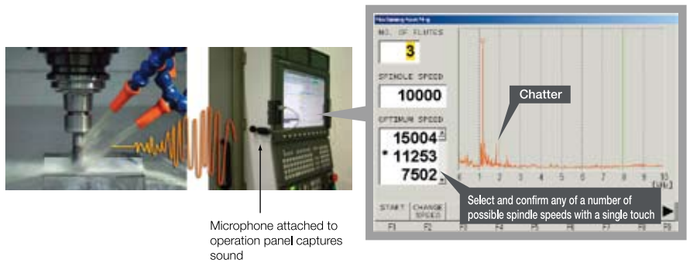
Spindle speed and chatter are linked in a periodic manner, manifesting as alternating ranges with and without chatter.

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

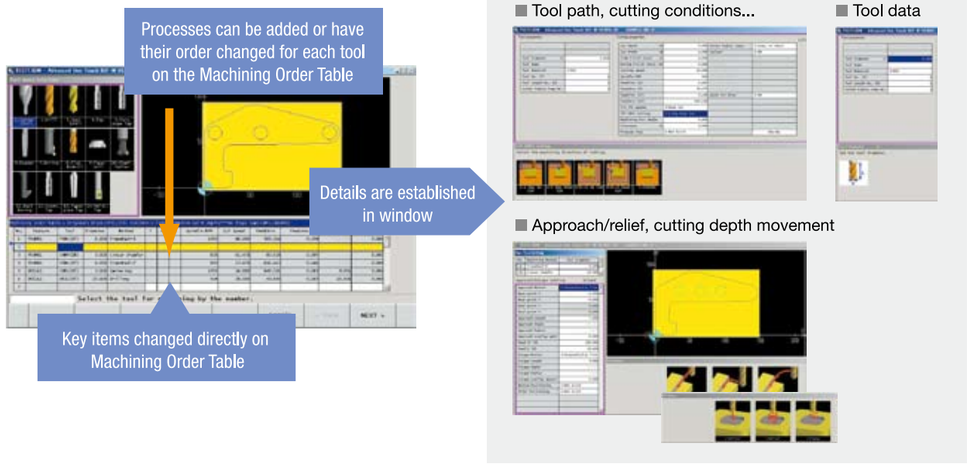
Based on the chatter noise captured by the microphone, Machining Navi displays a number of optimal spindle speed possibilities on the screen. The operator can change to the indicated spindle speed with a single touch and immediately confirm the result.



Interactive operations Advanced One-Touch IGF-M (Optional)

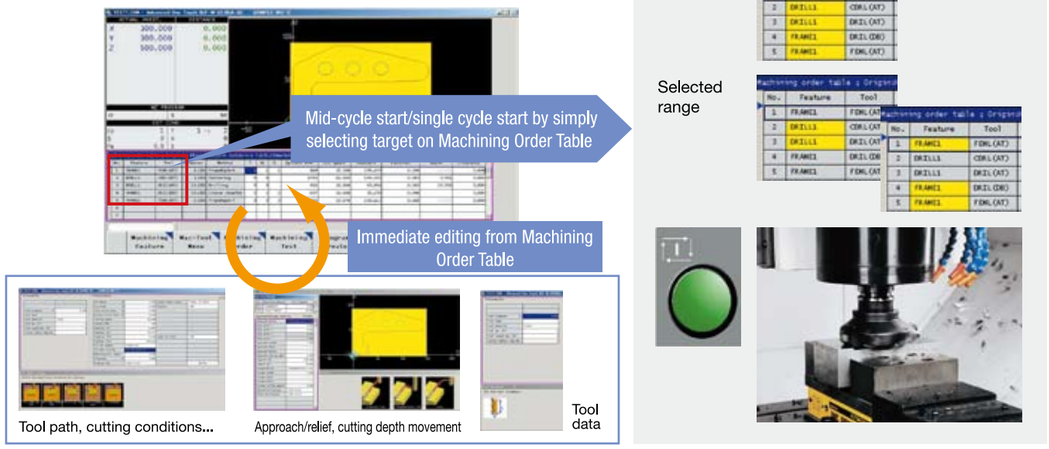
»» The objective: simple programming

Machining processes can be newly added or revised on the Machining Order Table. Each process can be set freely with tool units, and know-how can be input with the edit function with a high degree of freedom. The recommended value is automatically set when new additions are made.



»» Simple operations for 1st part machining jobs

Can be operated directly from Machining Order Table.
When a problem is detected it can be quickly corrected and checked, speeding up first part machining.



Machine Specifications

Model			GENOS M460-VE-e	GENOS M560-V-e
Travels	X axis (ram saddle horizontal)	mm	762	1,050
	Y axis (table front/back)	mm	460	560
	Z axis (spindle vertical)	mm	460	
	Table top to spindle nose	mm	150~610	
Table	Max work dimension	mm	1,000 x 460	1,300 x 560
	Floor to table top	mm	800	
	Max load capacity	kg	700	900
Spindle	Max spindle speed	min^{-1}	8,000 (12,000, 15,000)	
	Speed ranges		Stepless	
	Tapered bore		7/24 taper No. 40	
	Bearing dia	mm	ø70	
Feedrate	Rapid traverse (X·Y·Z)	m/min	X-Y: 40, Z: 32	
	Cutting feedrate (X·Y·Z)	m/min	X-Y-Z: 32	
Motors	Spindle (10 min/cont)	kW	11/7.5 (22/18.5)	
	Feed axes (X·Y·Z)	kW	X-Y-Z: 3.5	
ATC	Tool shank		MAS BT40	
	Pull stud		MAS 2	
	Tool capacity	tool	20 [32]	
	Max tool dia (w/adjacent tool)	mm	ø90	
	Max tool dia (w/o adjacent tool)	mm	ø125	
	Max tool length	mm	300	
	Max tool weight	kg	8	
	Max tool moment	N·m	7.8 [8 kg x 100 mm]	
	Tool selection		Memory random	
Machine Size	Height	mm	2,746	
	Floor space length x width	mm	2,200 x 2,805	2,510 x 3,100
	Weight	kg	6,500	7,700
Control			OSP-P300MA-e	

( ): Optional

Standard Specifications and Accessories

Item	Description
Spindle speed 50~8,000 min^{-1}	7/24 taper No. 40, 11/7.5 kW [ID min/cont]
Rapid traverse	X-Y: 40 m/min, Z: 32 m/min
Spindle cooling system	Oil controller
Air cleaner (filter)	Including regulator
Spindle oil-air lubrication system	
TAS-S	Thermo Active Stabilizer – Spindle
TAS-C	Thermo Active Stabilizer – Construction
Automatic tool changer	20-tool magazine
ATC magazine shutter	
Tool unclamp package	
Coolant supply systems tank capacities *1	M460-VE-e : 190 L (100 L effective), 250-W pump M560-V-e : 230 L (120 L effective), 250-W pump
Coolant nozzle	Flexible nozzles (5)
Chip flusher system *1	Table both sides
Chip pan *	M460-VE e : 60 L (effective) M560-V-e : 69 L (effective)
ATC air blower	Nozzle type
Chip air blower	
Foundation washers (with jack bolts)	8 pcs
3-lamp status indicator	Type C (LED signal tower)
Work lamp	Fluorescent
Full enclosure shielding	With ceiling
Tapered bore cleaning bar	
Hand tools	
Tool box	
Operation panel with color LCD	
Pulse handle	

* A required option

*1. Use water-based coolant.

Machine Specifications

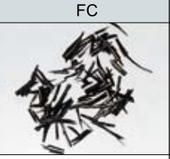
Item	Description	Item	Description
#40 wide-range spindle 50~12,000/50~15,000 min^{-1}	22/18.5 kW [10 min/cont]	Thru-spindle coolant system*2	1.5 MPa, 7.0 MPa
#50 wide-range spindle 50~12,000 min^{-1}	26/18.5 kW [10 min/cont] (only M560-V-e)	Chip air blower (thru-spindle)	(includes thru-spindle coolant system)
Dual contact spindle	BIG-PLUS®*1(spindle nose)	Oil-hole coolant system	
ATC capacity	32-tool	Semi-dry coolant system	
Tool shank	CAT-40	Shower coolant system	
Pull stud specs	MAS1 / JIS / CAT	Workpiece washing gun	
NC rotary table (A-axis)	Please specify type details	Tool breakage detection, auto tool length compensation	Touch sensor activated
Preps for NC rotary table	Includes 1 additional axis		
In-machine chip discharge	Coil conveyors (2 pcs, table L/R)	Auto zero offset/auto gauging	W/auto tool length offset (Renishaw probe)
Off-machine chip discharge	Lift-up conveyor (rear right) Refer to “Recommended” below	Auto door (front operation)	
		Machining Navi	M-*g*
Chip bucket for above		High-crossrail specs	+200 m/m (only M560-V-e)

*1. Please select this optional BIG-PLUS specification when using BIG-PLUS toolholders. *2. OKUMA pull studs required.

Recommended chip conveyors

Please contact an Okuma sales representative for details.

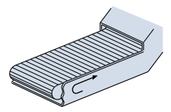
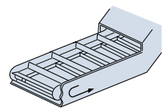
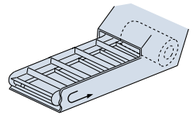
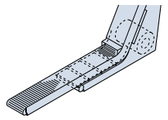
○: Standard △: Selectable

Material		Steel	FC	AL/Nonferrous metal	Mixed (general use)
Chip shape					
In-machine	Chip flusher (Std)	—	○(wet)	○	—
	Coil (Opt)	○	○(dry/wet)	—	○
Off-machine (optional)	Hinge	○	—	—	△ (*4)
	Scraper	—	○(dry)	—	—
	Scraper (drum filter)	—	○(wet) with magnet	△ (*3)	—
	Hinge + Scraper (drum filter)	△ (*1)	△(wet) (*2)	○	○

*1. When there are many fine chips *2. When chips are longer than 100 mm *3. When chips are not longer than 100 mm *4. When there are few fine chips

Caution: fire prevention measures are necessary when using oil-based coolants.

■ Off-machine lift-up chip conveyors

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

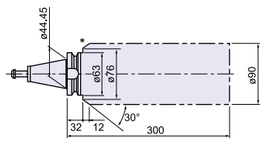
Note: The machine may need to be raised (platform) depending on the type of chip conveyor.

ATC tool dimensions

GENOS M460-VE-e / GENOS M560-V-e

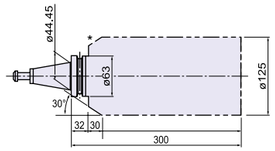
● Max tool size (adjacent tools)

In tool magazine

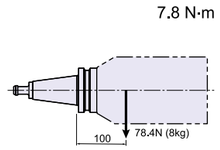


● Max single tool size

No adjacent tools



● Max tool mass moment



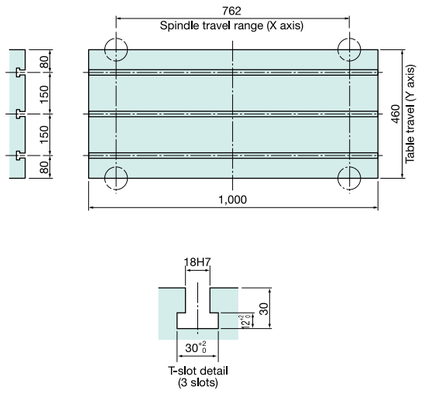
* Commercially available milling chucks may interfere with the ATC tool change arm and tooling outer portions. Please check dimensions with tool manufacturer documentation before use.

Mass including shank may be up to 78.4 N (8 kg), and the position of center of gravity at that time may be up to 100 mm from the datum diameter (ø44.45).

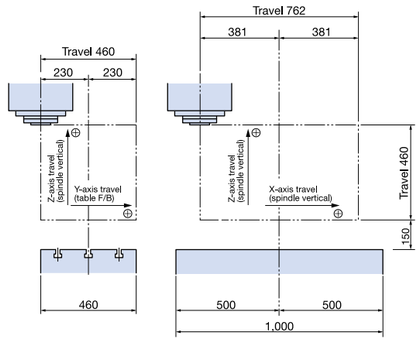
Unit: mm

GENOS M460-VE-e

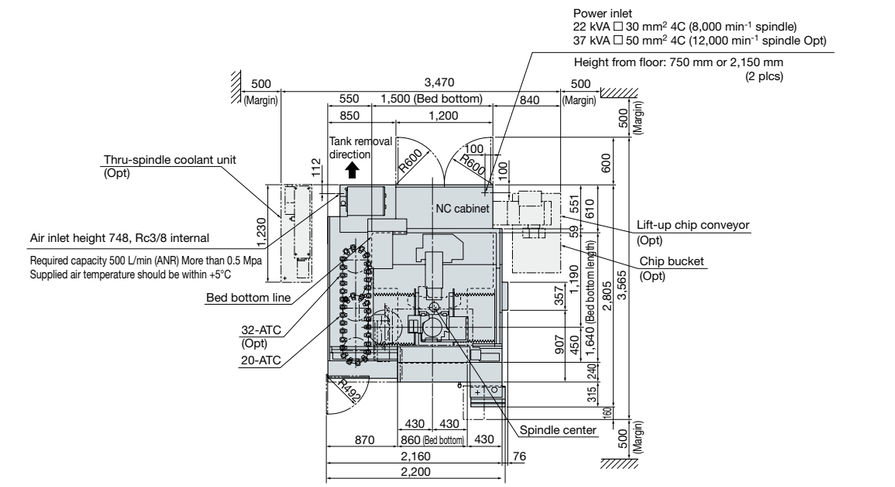
Table size

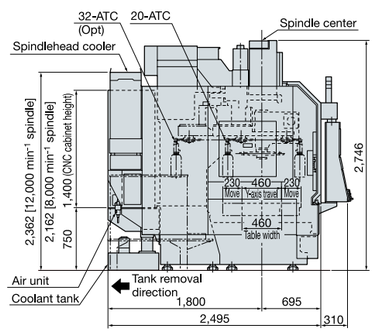


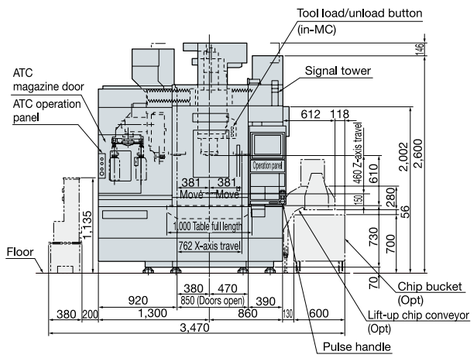
Working ranges



Dimensional drawing / Installation drawing

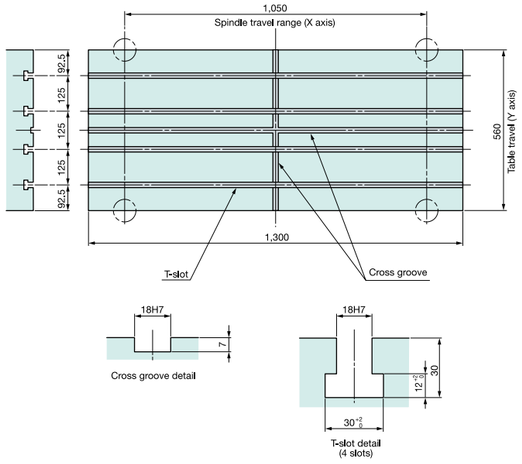




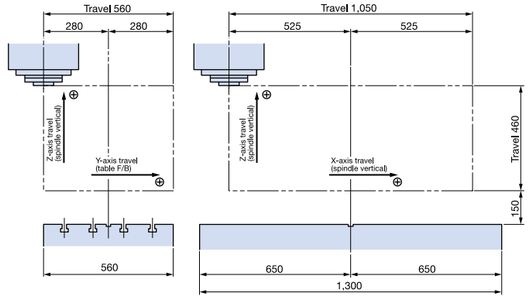


GENOS M560-V-e

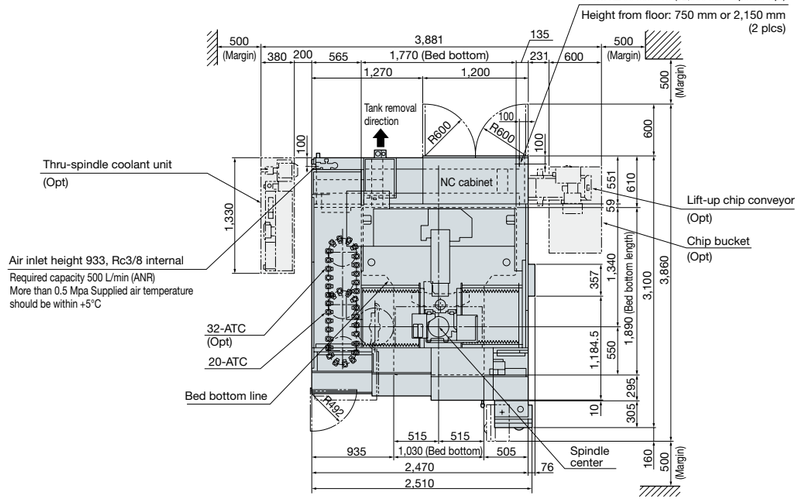
Table size

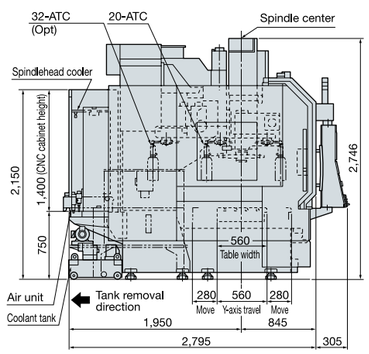


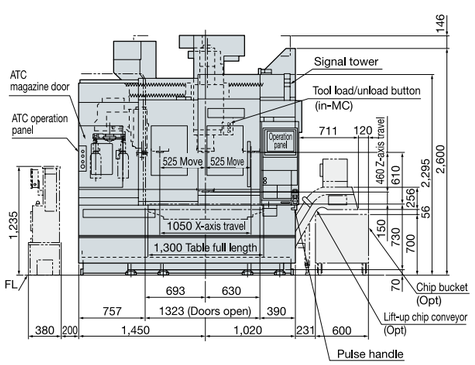
Working ranges



Dimensional drawing / Installation drawing







Human-machine interaction

Communication

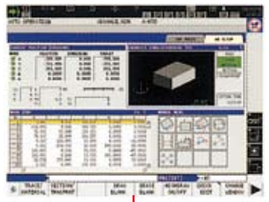
Getting the best from human operators and advanced machine tools

Okuma Control OSP-P300MA-e

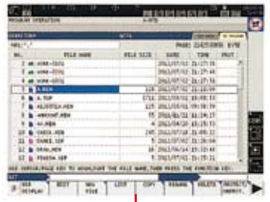
Satisfaction from complete control of a machine tool

As a “machine & control” builder, Okuma makes further strides in machine tool manufacturing with this superb control featuring "Easy Operation. " Okuma took a close look at the way machinists actually operate machine tools, to help them create smoother and more effective ways of producing parts. Novice operators as well as professional machinists get complete control—and satisfaction. Moreover, what you want to see and do conveniently come together in a “single-mode operation.” First, select one of three operation screens. Then simply touch the screen or press a function key to see and do your job.

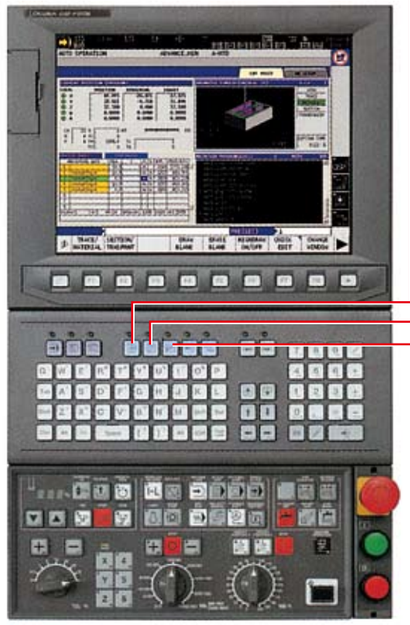
■ Setup operations
■ Trial/continuous cuts



■ Programming



■ Tool preparations



■ Easy tool registration

With spreadsheet simplicity —tool offsets, tilt, shape, life, etc—all the tool data required to cut a part can be registered here.
Since the registered tool data is also used by Okuma auto programming (Advanced One-Touch IGF) and a collision check function (Collision Avoidance System), this screen will complete the entire registering process.

The touch sensor screen pops up from the tool registration screen. Tool compensation values are set while looking at a guidance message.

■ Standard Specifications

OSP-P300MA-e

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 + 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	Easy Operation	“Single-mode operation” to complete a series of operations Comprehensive management of tool shape and tool compensation information for each tool number Tool data shared between machining, Advanced One-Touch IGF (Optional), and Collision Avoidance System (Optional) 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, RS-232-C interface (1 channel)
High speed/accuracy specs		Hi-G Control, Hi-Cut Pro, TAS,-S, TAS-C

■ Optional Specifications

Item		Kit Specs	NML E	NML D	3D E	3D D	Qne-Touch E	Qne-Touch D
Interactive functions								
Advanced One-Touch IGF-M (Real 3-D simulation included)							●	●
Interactive Map (I-MAP)					●	●		
Programming								
Auto scheduled program update (Scheduled program is standard)			●	●	●	●	●	●
Common variables (Std: 200 sets)	1,000 sets							
	2,000 sets							
Program branch; 2 sets								
Program notes (MSG)				●		●		●
Coordinate system selectıcn (Std: 20 sets)	100 sets		●		●		●	
	200 sets			●		●		●
	400 sets							
Helical cutting			●	●	●	●	●	●
3-D circular interpolation								
Synchronized Tapping II			●	●	●	●	●	●
Arbitrary angle chamfering			●	●	●	●	●	●
Cylindrical side facing								
Tool grooving (flat-tool free-shaped grooving)								
Tool max rotational speed setting								
F1-digit feed	4 sets, 8 sets, parameter							
Programmable travel limits (G22, G23)			●	●	●	●	●	●
Skip (G31)								
Axis naming (G14)								
Additional G/M code macros								
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)							
Monitoring								
Real 3-D simulation					●	●	●	●
Simple load monitor	Spindle overload monitor		●	●	●	●	●	●
NC operation monitor	Hour meter, work counter		●	●	●	●	●	●
Hour meters	Power ON, spindle run/NC ON, machining							
Operation end buzzer	With M02, M30, and END commands							
Work counter	With M02 snd M30							
MOP-TOOL	Adaptive control, overload monitor							
Tool life management	Hour meter, No. of workpieces		●	●	●	●	●	●

Item		Kit Specs	NML E	NML D	3D E	3D D	Qne-Touch E	Qne-Touch D
Gauging								
Auto gauging	Touch probe (G31)		Included in machine specs					
Auto zero offset	Includes auto gauging		Included in machine specs					
Tool breaksge detection	(touch sensor) (G31) Includes auto tool offset		Included in machine specs					
Gauging data printout	File output							
Manual gauging (w/o sensor)			●	●	●	●	●	●
Interactive gauging (touch-sensor, touch-probe required)								
External I/O communication								
DNC-DT								
Additional USB ports (standard specs include 2 ports)								
Automation / untended operation								
Auto power shut-off	M02, 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								
TAS-S (Thermo Active Stabilizer—Spindle)			●	●	●	●	●	●
TAS-C (Thermo Active Stabilizer—Construction)			●	●	●	●	●	●
Other								
Control cabinet lamp (inside)								
Circuit breaker								
Sequence operation	Sequence stop		●	●	●	●	●	●
Upgraded sequence restart	Mid-block return			●		●		●
Pulse handle	2 pts (Std: 1 pt)							
External M code	4-signals , 8-signals							
Machining Navi M-ε (cutting condition search)								
One-Touch Spreadsheet								
Block skip; 3 sete								
Additional axes	A axes [for rotary table]							
OSP-VPS (Virus Protection System)								

Note 1. NML : Normal, 3D : Real 3D simulation, E: Economy, D : Deluxe,
Qne-Touch : Advanced One-Touch IGF-M

Okuma's Global Support System

VEGETABLE OIL INK

GENOS

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

Global
Efficient
No.1
Standard

TATUNG-OKUMA

TATUNG-OKUMA Co., Ltd.
No.14-2, Donghu Rd., Yingge Dist.,
239, New Taipei City , Taiwan
TEL:+886-2-2678-8688 FAX:+886-2-2678-8506
Website : www.tatung-okuma.com.tw
E-mail : toc@tatung-okuma.com.tw

Agent