

Vertical Machining Centers

MA-V series

MA-550VB / MA-650VB



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Fast, heavy-duty, rigid, and compact vertical machining center

Combination slide/roller guideways enable
heavy duty cutting at high speed

Okuma's multifunctional, class-best dual-way system (slide/roller guideways) combines the heavy-duty cutting power of slide guideways with the fast capability of the roller guide. Slideway cooling and Y-axis column feed provide highly-accurate, compact, workability, cost performance, and other basic performance features have been polished to dramatically increase productivity as a high-quality, high-performance machine.

Rapid traverse
X-Y: 40 m/min

Best-in-class slide guideways

Machining capacity
720 cm³/min

Face milling (S45C)

Powerful
22/15/11 kW

High-powered spindle delivers maximum torque in low speed range

Y-axis column feed
Operability also greatly improved

Better access to spindle



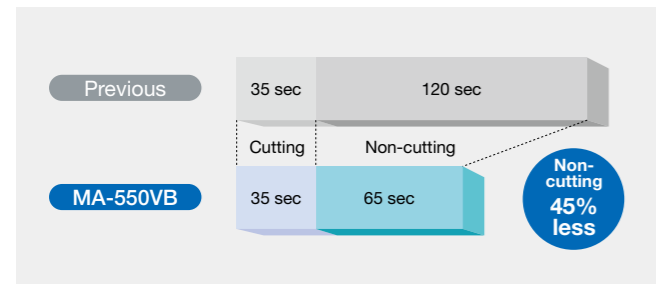
Photographs used in this brochure may show optional equipment.

Combination slide/roller guideways and guideway cooling enables heavy duty cutting at high speed without sacrificing high accuracy.

Best-in-class rapid traverse rates

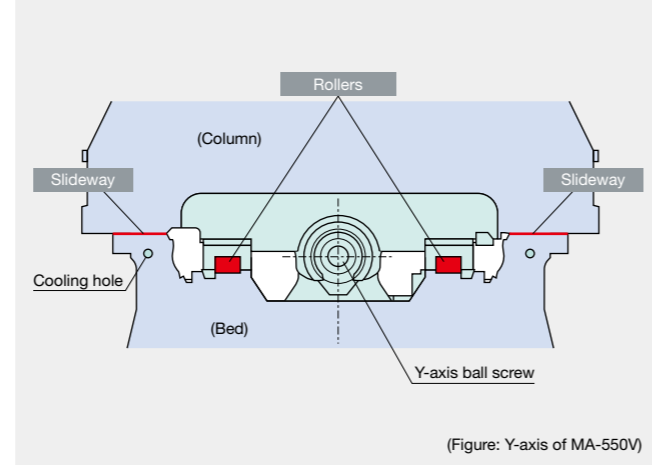
- Rapid traverse: X-Y axes: 40 m/min (1,575 ipm)
Z axis: 30 m/min (1,181 ipm)
- Acceleration: 0.5G (Hi-G control)
- ATC time: 2.4 sec (T-T)
- Spindle speed: 6,000 min⁻¹

Comparison of cycle times



Axis feed guideways designed for more speed and rigidity

- Combination slide/roller guideways (provided for all three axes)



Cutting capability: 720 cm³/min (43.93 in.³/min)

- Chip volume (Workpiece material: S45C)

Milling	720 cm ³ /min (ø160 milling)
End milling	412 cm ³ /min (ø63 roughing end mill)
Drilling	ø65 mm (f = 0.31 mm/rev)
Tapping	M42

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

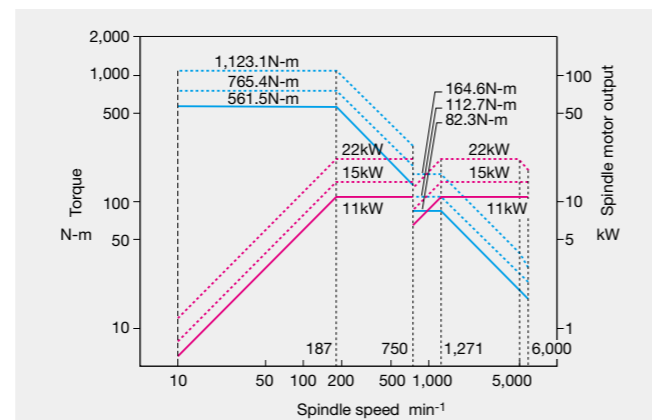


22 kW (30 hp) powerful spindle

High-power spindle with two-speed gear shift and VAC motor control

- Maximum output: 22/15/11 kW (10 min/30 min/cont)
- Maximum torque: 1,123 N-m
- Spindle speed: 6,000 min⁻¹
- Oil-air lubrication for spindle bearings

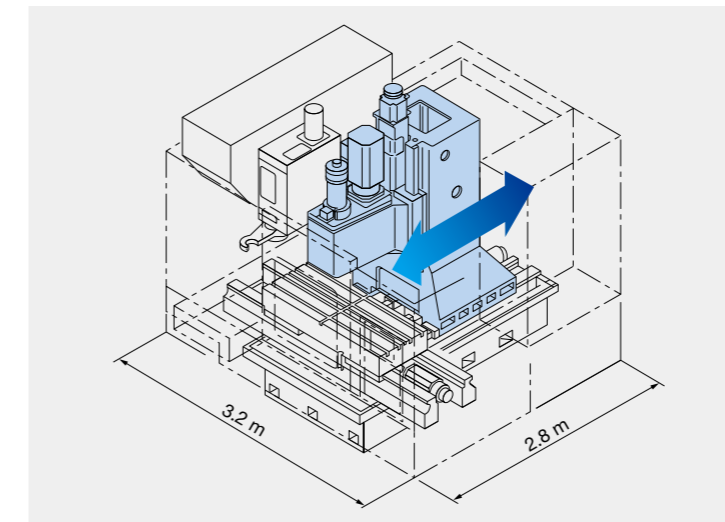
Spindle torque/output diagram



Within a small footprint — a large work envelope

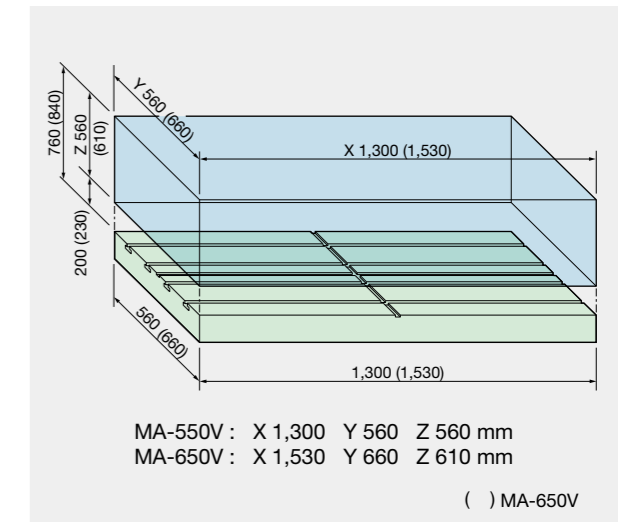
Floor space: 9 m² (96.44 ft²) (MA-550V)

Y-axis column feed further reduced the footprint



Compact body but wider working range

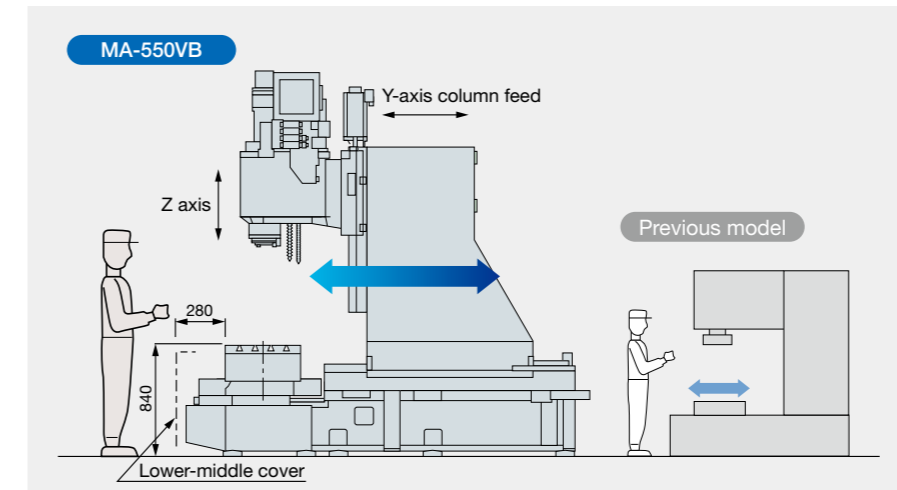
Long travels that fully cover the table



Creates a worker-friendly, comfortable environment

Safer and better machinist work efficiency

The Y-axis column feed provides easier access to the spindle and workpiece, significantly improving work efficiency by the machinist.



Eco-friendly specs

- In-machine chip conveyor (screw)
- Reduced machine power consumption
- Power-saving function
- Oil skimmer (Optional)
- Mist collector (Optional)
- Dust collector (Optional)
- Various interlocks (safety interlock)

Specifications

	Item	Unit	MA-550VB [A] (-S)*	MA-650VB [A] (-S)*
Travels	X axis (table right/left)	mm (in.)	1,300 (900)* (51.18 (35.43)*)	1,530 (1,100)* (60.23 (43.30)*)
	Y axis (column frt/bck)	mm (in.)	560 (22.04)	660 (25.98)
	Z axis (spindh up/down)	mm (in.)	560 (22.04)	610 (24.01)
	Table to spindle nose	mm (in.)	200 to 760 (7.87 to 29.92)	230 to 840 (9.05 to 33.07)
	Column front to table ctr	mm (in.)	330 to 890 (12.99 to 35.03)	380 to 1,040 (14.96 to 40.94)
Table	Size	mm (in.)	1,300 (1,050)* × 560 (51.18 (41.33) × 22.04)	1,530 (1,300)* × 660 (60.23 (51.18) × 25.98)
	Floor to table	mm (in.)	840 (33.08)	890 (35.04)
	Maximum loading capacity	kg (lb)	1,000 (39.37)	1,500 (59.05)
Spindle	Tapered bore		7/24 taper No. 50 [HSK-A63]	
	Bearing ID	mm (in.)	ø100 (ø85) [ø60] (ø3.94 (ø3.35) [ø2.37])	
	Speed	min ⁻¹	6,000 (12,000) [25,000]	
	Speed ranges		2 (stepless) [stepless]	
Feed rates	Rapid traverse	m/min (fpm)	X-Y: 40, Z: 30 (X-Y: 131, Z: 98)	
	Feed rate	mm/min (ipm)	30,000 (1,181)	
Motors	Spindle drive	kW (hp)	22/15/11 (30/20/15) {10 min/30 min/cont} [15/11 (20/15) {10 min/cont}]	
	Axis feed	kW (hp)	X-Y-Z: 4.6 (6.1)	
ATC	Magazine capacity	tool	32 (48)	
	Tool shank		MAS BT50 [HSK-A-63]	
	Pull stud		Type MAS-2 [-]	
	Max tool dia (w/ adj tools)	mm (in.)	ø135 (ø5.31) *1	
	Max tool dia (w/o adj tools)	mm (in.)	ø230 (ø9.06) face milling/ø300 (ø11.81) boring *1	
	Max tool length/weight	mm/kg (in./lb)	400/20 (15.74/44) *1	
	Max tool mass moment	N-m (ft-lbf)	29.4 (21.7) *2	
Machine dimensions	Machine height	mm (in.)	2,898 (114.09)	3,030 (119.29)
	Floor space (W × D)	mm (in.)	3,200 (2,500)* × 2,862 (126 (98)* × 112)	3,750 (3,000)* × 3,128 (147 (118)* × 123)
	Machine weight	kg (lb)	11,800 (11,300)* (29,960 (24,860)*)	14,000 (13,300)* (30,800 (29,260)*)
CNC			OSP-P300MA	

*1. Use only balanced tools and toolholders guaranteed by the tool maker.

*2. When tool with shank is 20 kg (44 lb), and center of gravity is 150 mm (5.91 in) from the gauge line (ø69.85 [spindle nose]).

() : Optional, [] : High-speed spindle

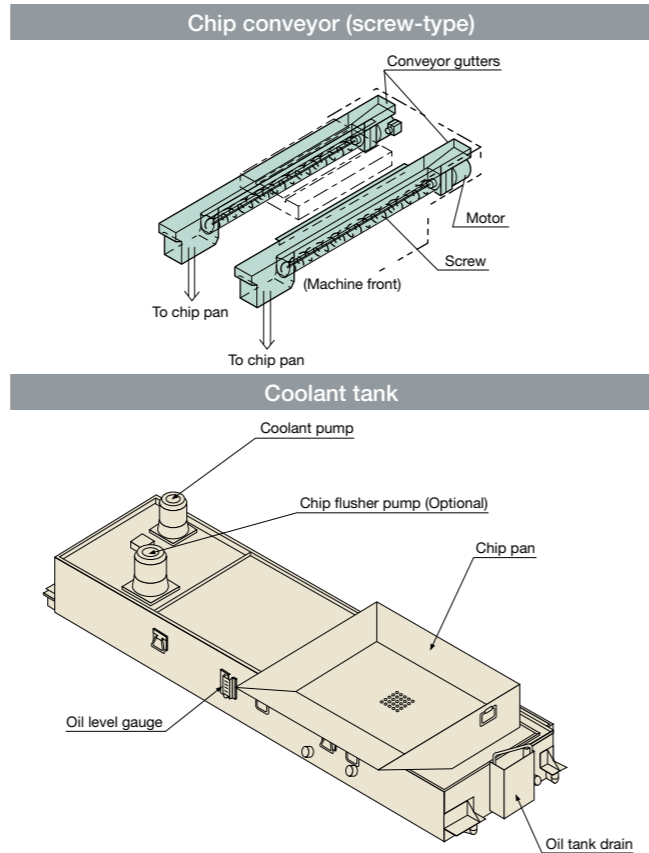
* Short table model

Standard Specifications and Accessories

Spindlehead cooling system	Oil controller
Centralized lube/auto oil supplier	With oil level and pressure checker
Air cleaner (filter)	With lubricator and regulator
Hydraulic unit	
Oil/air lubrication unit	
Operation panel with color LCD	
Manual control panel for ATC	
Pulse handle	
Coolant system*1	320-L tank and 400-W pump
ATC air blower (blast)	
Chip air blower (blast)	Nozzle
In-machine chip conveyor	Screw; table front and rear
Chip pan*2	
Work lamp	LED
3-level status indicator	
Foundation washers	
32-tool ATC	
Full-enclosure shielding	
Tool release lever	
Tapered bore cleaning bar	
Hand tools	
Tool box	

*1. Use water-based coolant. For oil-based applications when necessary, larger pumps (and in-machine coil-type chip conveyor) may be required. Highly flammable oil-based coolant require strict fire prevention measures; machine operation should be closely monitored and attended by qualified machinist or operator.

*2. "Required" optional specs



Optional Specifications

Wide-range spindle 45 to 12,000 min ⁻¹	△	No. 50
High-speed spindle 50 to 25,000 min ⁻¹	△	For HSK-A63 only
Dual contact spindle		BIG-PLUS® (No. 50 only)
TAS-S (Thermo Active Stabilizer-Spindle)		For accurate control of spindle deformation.
AbsoScale		X-Y-Z, X-Y axis
NC rotary table (A-axis)		Please indicate chuck/tailstock requirements.
ATC magazine capacities	△	48-tool
ATC magazine shutter		
Shuttle type 2-pallet APC		Tapped hole/T-slot surfaces available
High-column (+ 200 mm)	△	Required when APC ordered
Sub-table		Tapped hole/T-slot surfaces available
Oil hole coolant system		Mid-pressure
Through-spindle coolant system	*	Mid-pressure: 1.5 MPa, High-pressure: 7.0 MPa, Large flow and high-pressure: 7.0 MPa
Chip air blower (blast)		Adapter
Shower coolant system		
Workpiece cleaning gun		
Off-machine chip discharge (lift-up chip conveyor)	△	Hinge, drum filter
Hydraulic oil cooling unit		
Tool breakage detection/auto tool length comp		With a touch sensor
Tool life management (accumulated time, etc)		
Overload monitoring (feed adaptive control incl)		
Auto zero offset and auto gauging		With a touch probe
Anchor bolts		
Chemical anchors		
Ceramic/graphite dustproofing		Double-wipers for roller ways, reinforced ball-screw nut seals



△ : The corresponding standard specifications are deleted.

* : Okuma pull stud 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					
Off-machine chip disposal (Optional)	In-machine Screw (Std)	○	○	○	○
	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

Typical off-machine chip discharge (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.

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

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

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


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



Note: Collision Avoidance System (Optional) shown above.

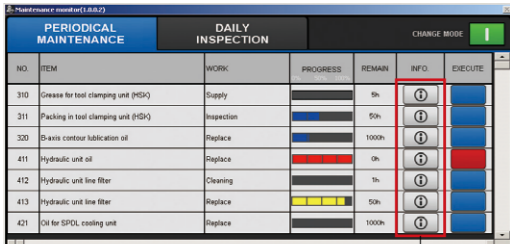
“Just what we wanted.”— Refreshed OSP suite apps

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




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



Comment display for greater ease of use and faster work
Common Variable Monitor



Automatic saving of recorded alarms
Screen Capture



Easy programming without keying in code
Scheduled Program Editor

Standard Specifications

Basic Specs	Control	X, Y, Z simultaneous 3-axis, spindle control (1 axis)
	Position feedback	OSP full range absolute position feedback (zero point return not required)
	Coordinate functions	Machine coordinate system (1 set), work coordinate system (20 sets)
	Min / Max inputs	8-digit decimal, ±99999.999 to 0.001 mm (3937.0078 to 0.0001 in.), 0.001" Decimal: 1 μm, 10 μm, 1 mm (0.0001, 1 in.) (1°, 0.01°, 0.001°)
	Feed	Cutting feed override: 0 to 200%, rapid traverse override: 0% to 100%
	Spindle control	Direct spindle speed commands override 30 to 300%, multi-point indexing
	Tool compensation	No. of registered tools: Max 999 sets, tool length/radius compensation: 3 sets per tool
	Display	15-inch color LCD + multi-touch panel operations
	Self-diagnostics	Automatic diagnostics and display of program, operation, machine, and NC system faults
	Programming	Program capacity
Program 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, SERVO NAVI	
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.

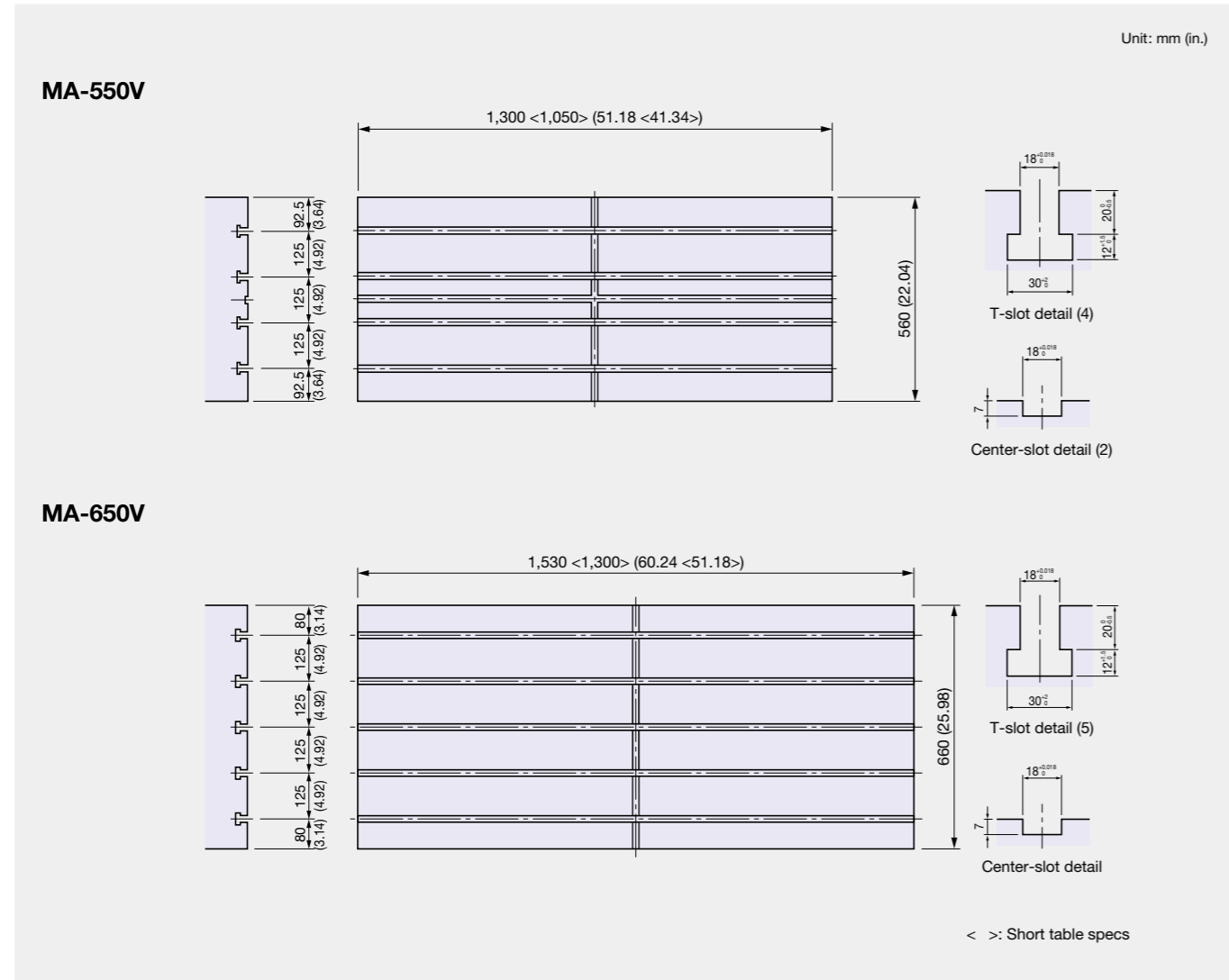
Optional Specifications

Item	Kit Specs	NML		3D		AOT	
		E	D	E	D	E	D
Interactive functions							
Advanced One-Touch IGF-M (Real 3D Simulation included)							●
Interactive Map (I-MAP)				●	●		
Programming							
Auto scheduled program update (scheduled program is standard)		●	●	●	●	●	●
Additional G/M code macros							
Common variables	1,000 pcs (Std: 200 pcs) 2,000 pcs						
Program branch; 2 sets							
Program message (MSG)			●		●		●
Coordinate system selection	100 sets (Std: 20 sets) 200 sets 400 sets		●		●		●
Helical cutting		●	●	●	●	●	●
3D circular interpolation				●	●	●	●
Synchronized Tapping II		●	●	●	●	●	●
Arbitrary angle chamfering		●	●	●	●	●	●
Cylindrical side machining							
Slope machining							
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)							
3D 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 ON, spindle run/NC ON, machining						
Operation end buzzer	With M02, M30, and END commands						
Work counter	With M02 and M30						
MOP-TOOL	Adaptive control, overload monitor						
Tool life management	Hour meter, No. of workpieces	●	●	●	●	●	●
Gauging							
Auto gauging	Touch probe (G31)						Incl in machine specs
Auto zero offset	Includes auto gauging						Incl in machine specs
Tool breakage detection	Touch sensor (G31) Includes auto tool offset						Incl in machine specs
Gauging data printout	File output						
Manual gauging (w/o sensor)		●	●	●	●	●	●
Interactive gauging (touch-sensor, touch-probe required)							
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, 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							
AbsoScale detection	X-Y-Z axes, X-Y axes						
Hyper-Surface							
TAS-S (Thermo Active Stabilizer-Spindle)							
0.1 μm control (linear axis commands)							
ECO suite (Energy-saving function)							
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 handle	2 pcs, 3 pcs (Std: 1 pc)						
External M code	4-point, 8-point						
Collision Avoidance System (CAS)							
Machining Navi*1, M-gII+*2, M-gII*3 (cutting condition search)							
One-Touch Spreadsheet							
Block skip; 3 sets							
Additional axes	A, B, C axes [preps, specs]						
OSP-VPS (Virus Protection System)							

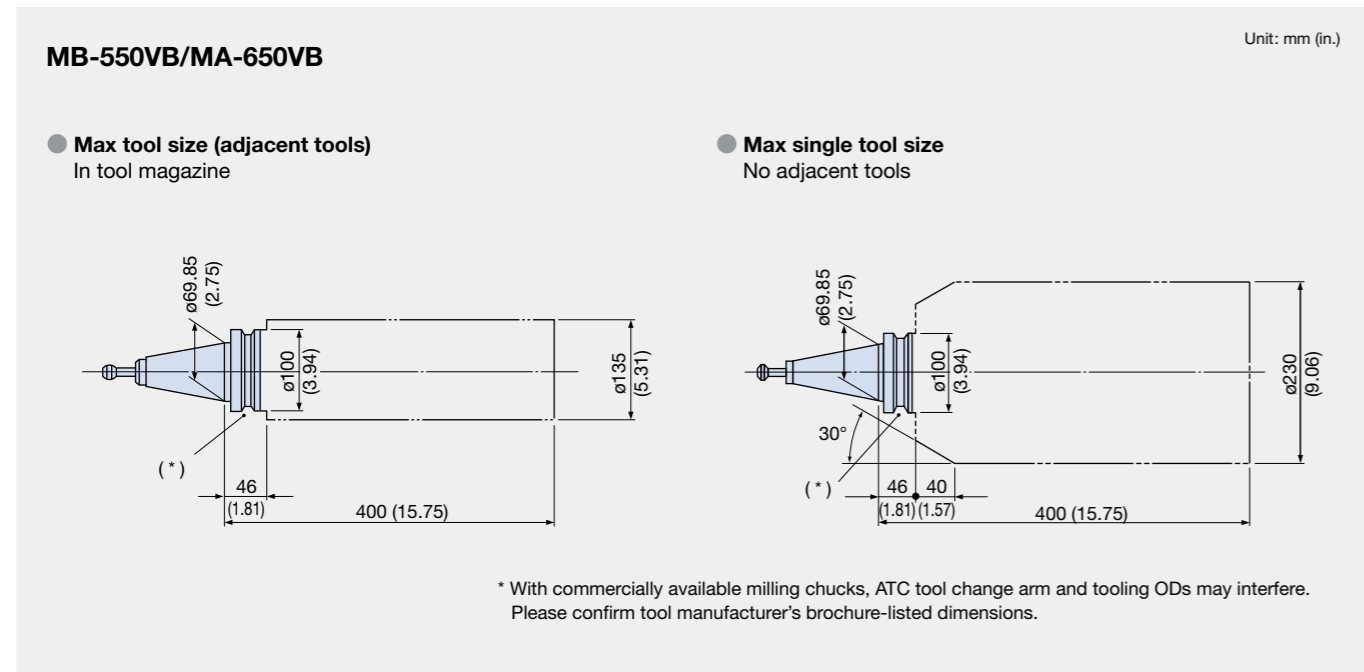
Kit full forms: NML: Normal, 3D: Real 3D Simulation, E: Economy, D: Deluxe, AOT: Advanced One-Touch IGF-M

* Requires technical consultation.
*1. Harmonic Spindle Speed Control available only with Machining Navi M-gII+ specifications.
*2. Machining Navi M-gII+ are available with integral motor/spindles.
*3. Machining Navi M-gII is available with gear spindles.

■ Table sizes

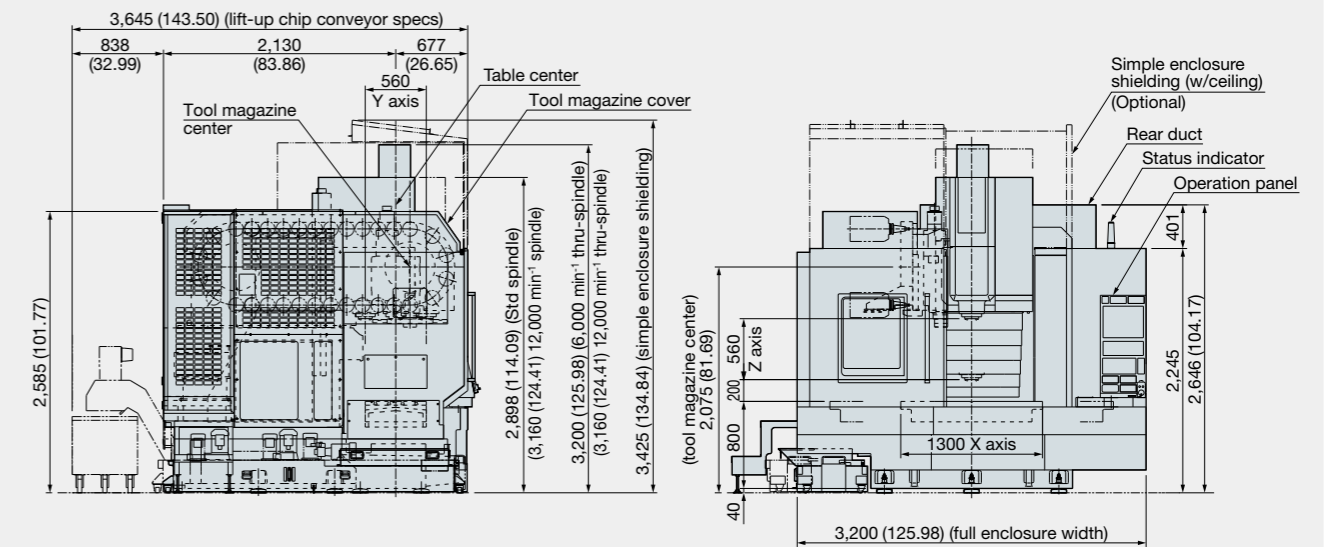
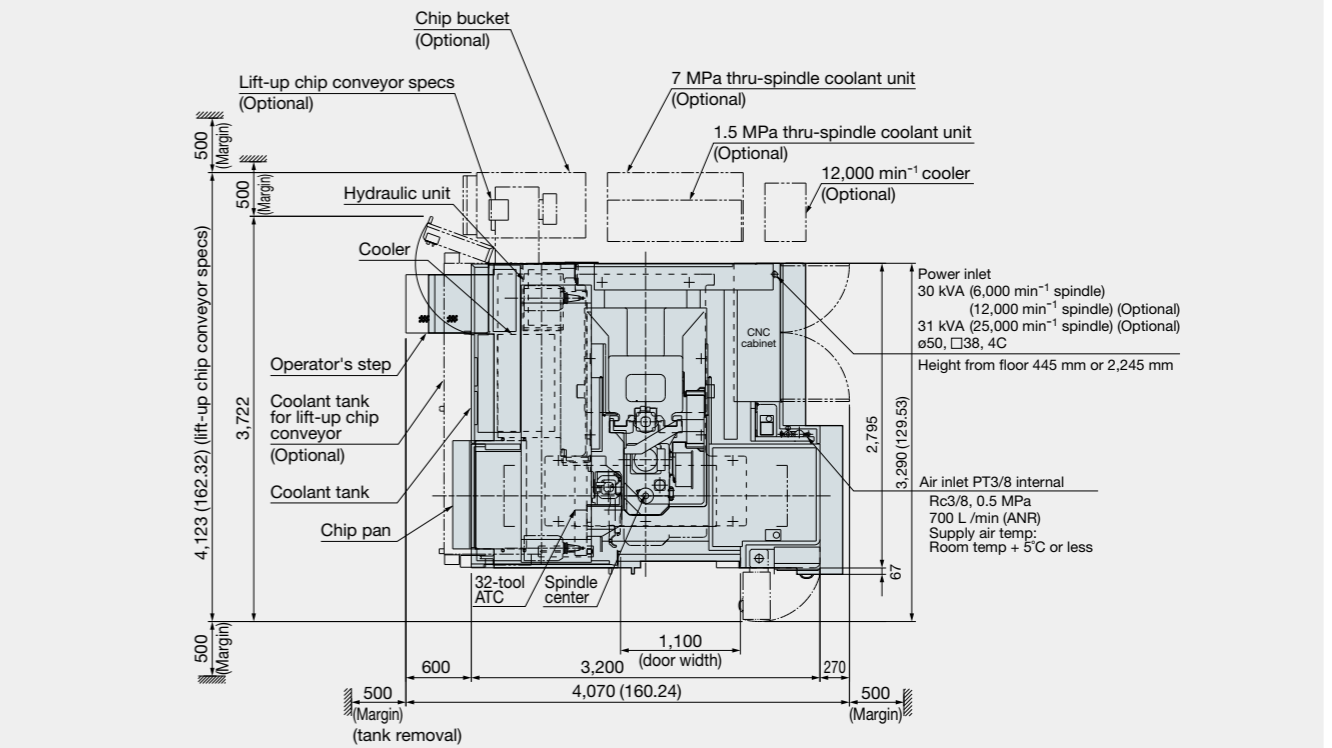


■ Maximum tool dimensions



MA-550V
Dimensional Drawing / Installation Drawing

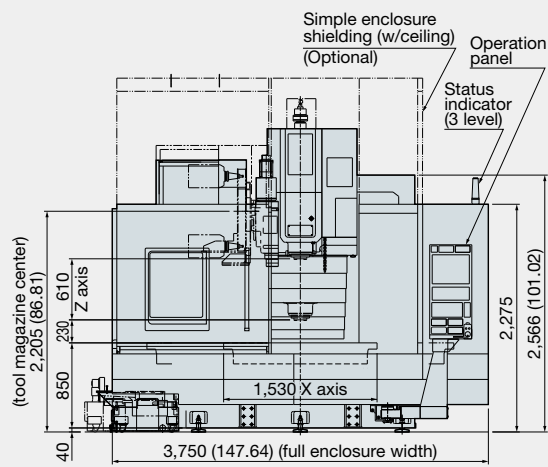
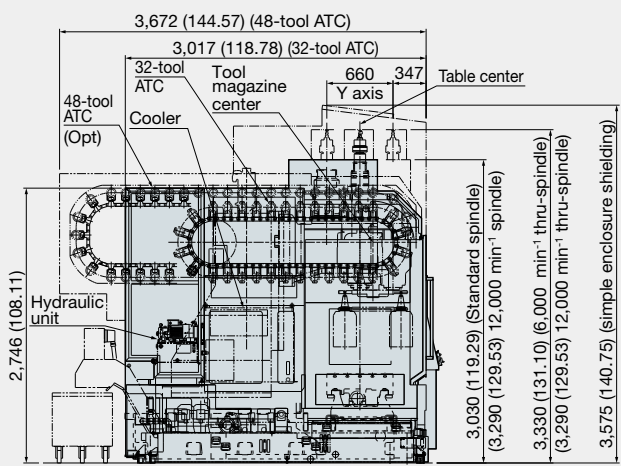
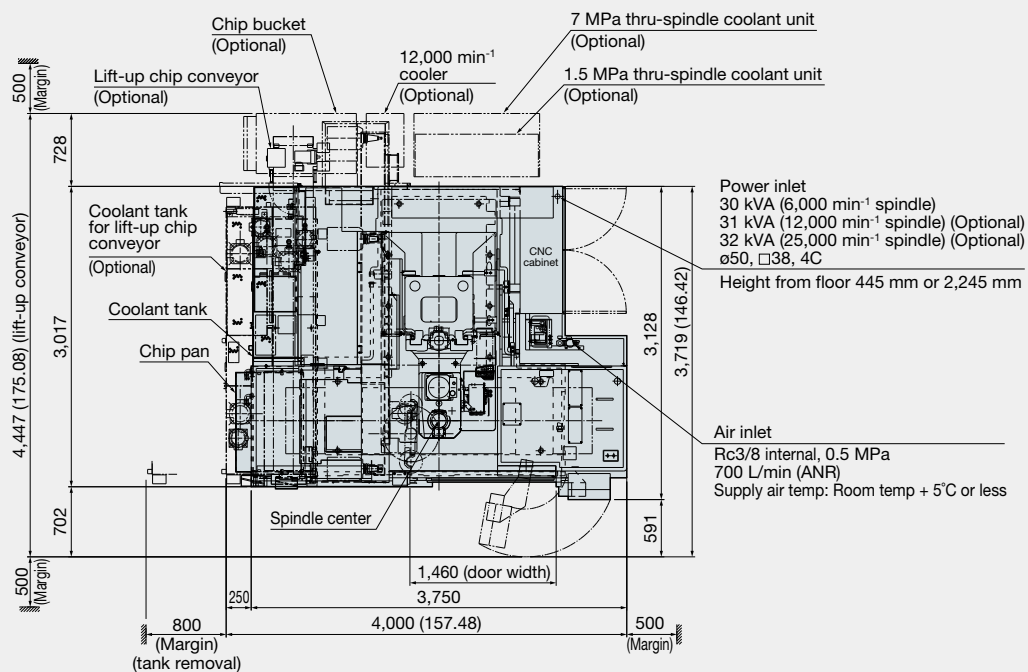
Unit: mm (in.)



Unit: mm (in.)

MA-650V

Dimensional Drawing / Installation Drawing



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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