OKUMA

Vertical Machining Centers

ACE CENTER MB-V series
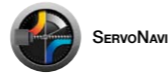
MB-46VA / MB-46VB
MB-56VA / MB-56VB
MB-66VA / MB-66VB

Vertical Machining Centers

ACE CENTER
MB-V series

MB-46VA / MB-46VB   MB-56VA / MB-56VB   MB-66VA / MB-66VB

Intelligent Technology

Thermo-Friendly Concept

Collision Avoidance System

Machining Navi

SᴇʀᴠᴏNᴀᴠɪ

ACE CENTER

Accuracy / **S**peed / **P**ower
Communication
Ecology

Productivity—Machining Quality—Operational Ease
Vertical machining centers that satisfies all of the above

Reliable intelligent technology starts with the MB-V series

The global standard for vertical machining centers. MB-V series machines give outstanding machining performance with high-accuracy, high-speed, and powerful cutting in manufacturing settings worldwide. At the same time, they provide a working space that is good for both people and the environment, including good workability, low energy use, and a clean environment. Try pleasant manufacturing with the MB-V series for yourself.

Thermo-Friendly Concept used

Machining dimensional change over time: **8 μm** MB-46/56V /Per 8 ℃ room temp change. Actual data with TAS-C.

Machining dimensional change over time: **10 μm** MB-66V /Per 8 ℃ room temp change. Actual data with TAS-C.

ACE CENTER **MB-46VA / B**

ACE CENTER **MB-56VA / B**

ACE CENTER **MB-66VA / B**

Photographs used in this brochure may show optional equipment.

Parts machined with higher quality

Positioning accuracy

MB-46VA with AbsoScale; actual data (measurement method based on ISO 230-2)

■ The exactness of bi-directional positioning

- X-axis (travel 560 mm) **1.7 µm**
- Y-axis (travel 460 mm) **2.4 µm**
- Z-axis (travel 460 mm) **2.2 µm**

■ Bi-directional repeatability

- X-axis (travel 560 mm) **1.0 µm**
- Y-axis (travel 460 mm) **1.3 µm**
- Z-axis (travel 460 mm) **1.0 µm**

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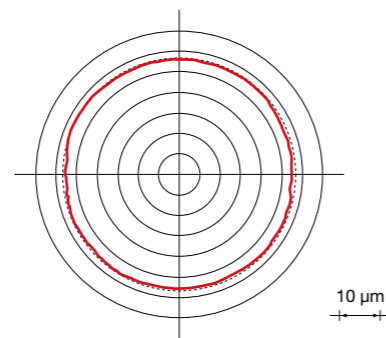
High-accuracy machining

■ Flatness **3 µm** (actual data)

- Machine: MB-66VA
- Machined part: Plate (LCD)
- Material: A5052
- Size: 560 × 600 × 60 mm
- Cycle time: 50 min

■ Roundness **1.65 µm** (actual data)

- Machine: MB-56VA
- Machining dia: ø150 mm
- Material: Al
- Spindle speed: 8,000 min⁻¹
- Feedrate: 2,000 mm/min

10 µm

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 environmental conditions during measurement.
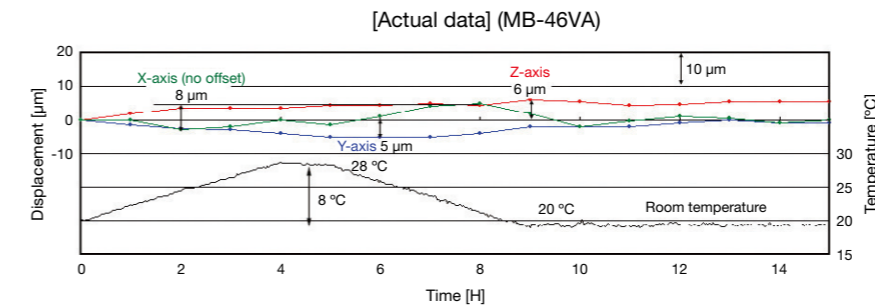

"Working with temperature changes"
Thermo-Friendly Concept

The "Thermo-friendly" concept enables remarkable machining accuracy through original structural design and thermal deformation control technology. If frees you from troublesome dimensional compensation and warm-up. Exhibits excellent dimensional stability even during consecutive operation over long periods and environmental temperature change in the plant.
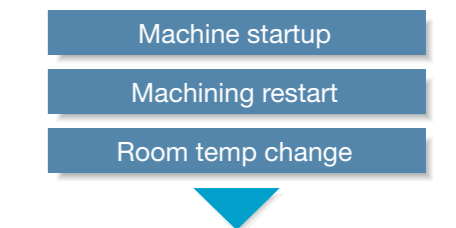
MB-46/56V Actual data **8 µm** Machining dimensional change over time:
Per 8°C room temp change (TAS-C)

MB-66V Actual data **10 µm** Machining dimensional change over time:
Per 8°C room temp change (TAS-C)

■ 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

[Actual data] (MB-46VA)

X-axis (no offset) 8 µm
Z-axis 6 µm 10 µm
Y-axis 5 µm
28 ℃
8 ℃
20 ℃ Room temperature

■ **TAS-C**: Thermo Active Stabilizer-Construction (Optional)
"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 (Optional)
Spindle deformation will be accurately controlled even during operations with frequent speed changes.

Machine tool idling stop
ECO Idling Stop

ECO suite

Only the necessary units run

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.
(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.

■ ECO suite provides a suite of energy-saving functions that can be used on machines

- **"ECO Idling Stop"** for operation of necessary units only
- **"ECO Power Monitor"** for visual graphics of power
- Intermittent/continuous operation of chip conveyor and mist collector during operation—**"ECO Operation"** (Optional)
- Energy-saving hydraulic unit using servo control technology—**"ECO Hydraulics"** (APC specs only) (Optional)

■ ECO suite benefits

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

Reduction in power consumption (example)

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

233 kWh **18% reduction!**
191 kWh

Non-machining time 59 kWh → 17 kWh

Machining time 174 kWh 174 kWh

(Non-machining time)
42 kWh (71%) reduction!
ECO Idling Stop benefit*

MB-46V   MB-46V *ECO suite*
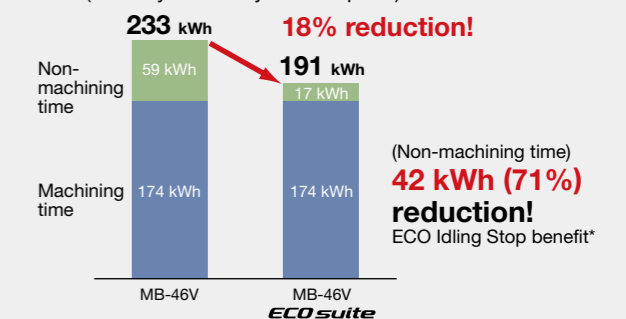
* Calculated from actual electricity consumption data. Electricity consumption will differ depending on machine specifications and usage status.

High productivity per faster cycle times

35% less non-cutting time (MB-46VA: Compared to previous Okuma machine)

- Acceleration   Max 0.7 G
- Rapid traverse   40 m/min (1,575 ipm) (X-Y)

- ATC time (T-T)   1.2 sec (MB-46/56VA)
                        1.5 sec (MB-66VA)
- Spindle accel/decel   1.2 sec ($0 \leftrightarrow 8,000$ min^{-1})

Process time comparison

Sample workpiece

- No. of tools used: 4 tools in 1st operation
                      6 tools in 2nd operation
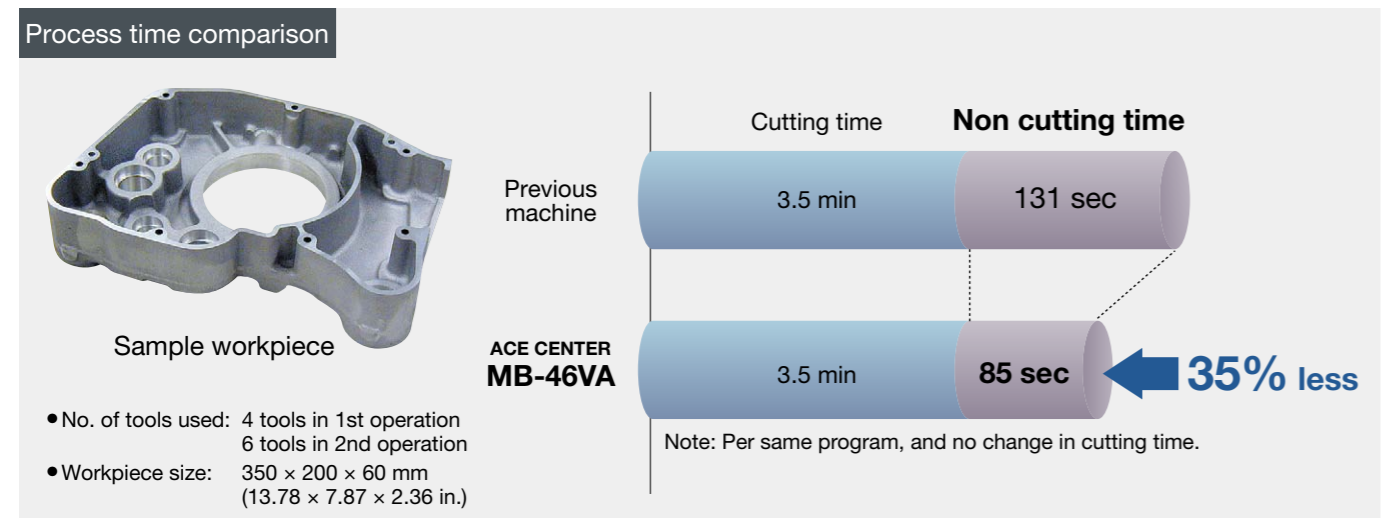- Workpiece size: 350 × 200 × 60 mm
                      (13.78 × 7.87 × 2.36 in.)

	Cutting time	Non cutting time
Previous machine	3.5 min	131 sec
ACE CENTER MB-46VA	3.5 min	85 sec ← 35% less

Note: Per same program, and no change in cutting time.

■ Hi-G Control (Standard)

During positioning, this function controls the acceleration/deceleration speed according to the speed-torque characteristics of the BL motor, resulting in high-speed and highly stable positioning. The Hi-G control function reduces positioning time and greatly reduces non-cutting time.

Hi-G control
Previous
Speed
Time
Reduced positioning time
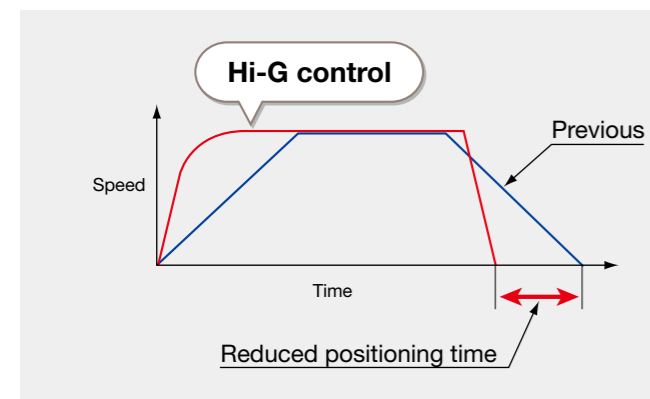
■ Machining Time Shortening Function (Standard)

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

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

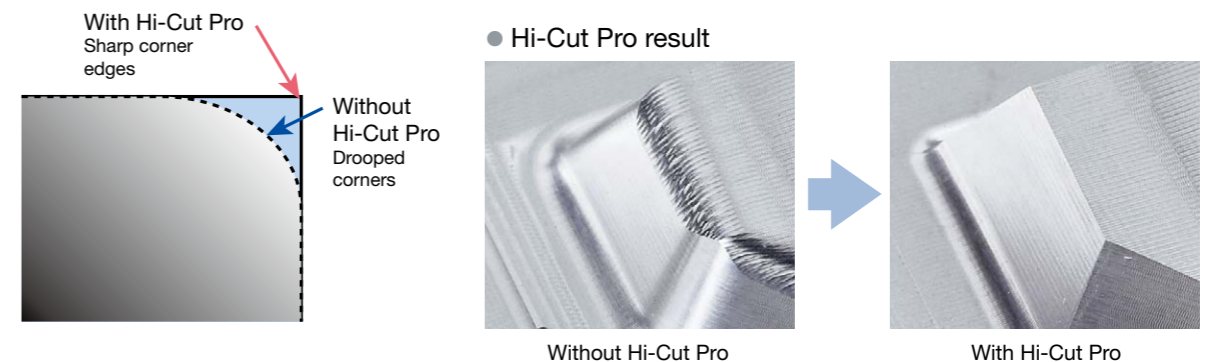## 30% faster cutting time (Compared to previous Okuma machine)

■ High-speed spindle
- MB-VA (No. 40)   **8,000 min^{-1}** (Standard)
                    15,000 / 20,000 / 25,000 / 35,000* min^{-1} (Optional)
- MB-VB (No. 50)   **6,000 min^{-1}** (Standard)
                    12,000 min^{-1} (Optional)

■ Cutting feedrate   **32 m/min** (1,260 ipm)

* Not availale for MB-66VA

■ Hi-Cut Pro (Standard)   for general machining

This controls the feedrate to provide machining suitable for corner shapes and circular shapes of machining parts, with the aim of ensuring high-accuracy machining and reducing cycle time.

With Hi-Cut Pro
Sharp corner edges

Without Hi-Cut Pro
Drooped corners

● Hi-Cut Pro result

Without Hi-Cut Pro   With Hi-Cut Pro

■ Super-NURBS (Optional)   for die/mold machining & general machining

Super-NURBS is a high-speed NC function with specially developed speed control functions for processing curved surfaces. Super-NURBS gives you high-speed, high-accuracy and high-quality machining for any shape, ranging from machine parts to complex curves.

● Before   ● Super-NURBS

Feedrate

Shaping feedrates much faster

Much faster acceleration
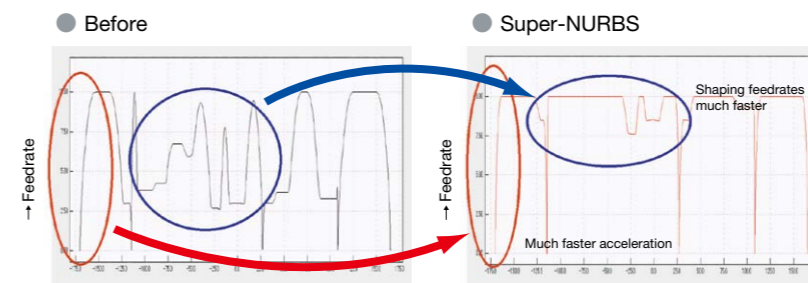
Super-NURBS takes the machining program's command path and calculates a path that provides smoother tool movement and has less impact on the machine.
    Machining along this smoother path means that acceleration and deceleration of the tool movement can be controlled, and greatly reduces the shock and oscillation on the machine and drive unit during high-speed feeding.
    This improved speed control results in more efficient machining at the machine's maximum speed.

This function is indispensable for die/mold machining. It is greatly effective in reducing cycle time and improving quality. Moreover, with the addition of AbsoScale (Optional), it can achieve further improvement.

Powerful spindles and highly rigid machine structures provide heavy-duty cutting with ease

Cutting capacities: 504 cm³/min / 672 cm³/min
(face milling)   (end milling)

■ Powerful cutting examples

● 8,000 min⁻¹ (No. 40) / 6,000 min⁻¹ (No. 50) high power spindle (Standard)

Tool	Spindle min⁻¹	Cutting m/min	Feedrate mm/min	Width mm	Depth mm	Chips cm³/min
ø80 face mill 8 blades (cermet)	895	225	2,600	56	2.5	364
ø20 roughing end mill, 7 flutes (carbide)	3,660	230	4,300	4	20	344
ø50 insert drill	1,000	157	150	–	–	–
Tap M30P3.5	318	30	1,113	–	–	60% (Spindle load)

(Workpiece material: S45C)

● 15,000 min⁻¹ (No. 40) wide-range spindle (Optional)

Tool	Spindle min⁻¹	Cutting m/min	Feedrate mm/min	Width mm	Depth mm	Chips cm³/min
ø80 face mill 8 blades (cermet)	895	225	3,000	56	3	504
ø20 roughing end mill, 7 flutes (carbide)	4,000	251	4,800	7	20	672
ø63 insert drill	720	142	108	–	–	–
Tap M30P3.5	318	30	1,113	–	–	66% (Spindle load)

(Workpiece material: S45C)

● 12,000 min⁻¹ (No. 50) wide-range spindle (Optional)

Tool	Spindle min⁻¹	Cutting m/min	Feedrate mm/min	Width mm	Depth mm	Chips cm³/min
ø80 face mill 8 blades (cermet)	895	225	3,000	56	3	504
ø20 roughing end mill, 7 flutes (carbide)	4,000	251	2,800	12	20	672
ø63 insert drill	909	180	137	–	–	–
Tap M36P4	106	12	424	–	–	–

(Workpiece material: 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.

■ High power spindle (Standard)

For general machine components

MB-46/56/66VA
● 8,000 min⁻¹
● 11/7.5 kW (15/10 hp) (10 min/cont)
● 198/135 N-m (5 min/cont)
● 7/24 taper No. 40
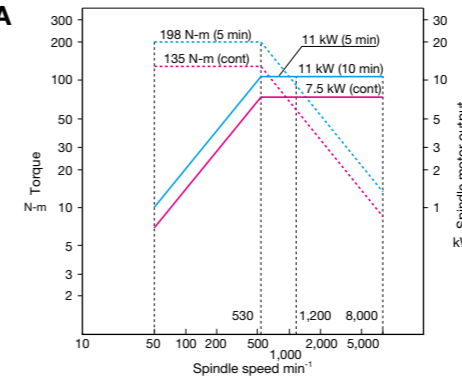
MB-46/56/66VB
● 6,000 min⁻¹
● 11/7.5 kW (15/10 hp) (10 min/cont)
● 198/135 N-m (5 min/cont)
● 7/24 taper No. 50
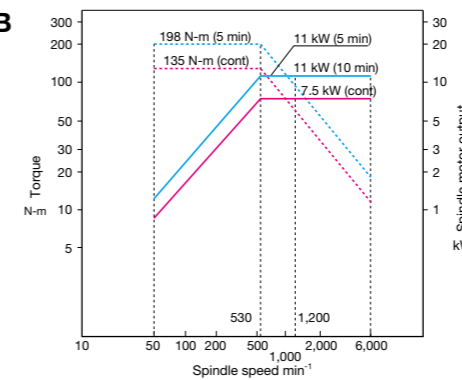
■ Wide-range spindle (Optional)

Fast/efficient non-ferrous to structural steel

MB-46/56/66VA
● 15,000 min⁻¹
● 22/18.5 kW (30/25 hp) (10 min/cont)
● 199/146 N-m (5 min/cont)
● 7/24 taper No. 40
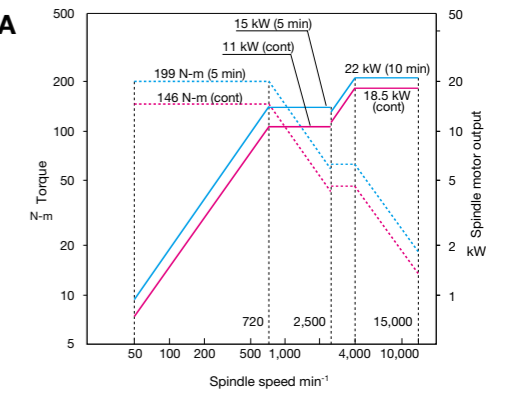
MB-46/56/66VB
● 12,000 min⁻¹
● 26/18.5 kW (35/25 hp) (10 min/cont)
● 199/146 N-m (5 min/cont)
● 7/24 taper No. 50
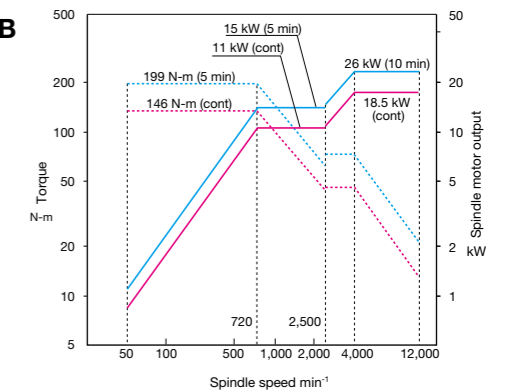
■ Rugged machine structure

● Rugged machine structure developed using 3D-CAD and FEM analysis
● Same rugged column structure as used in our proven column machining centers
● Bearing bracket of feeding axis integrated into the machine
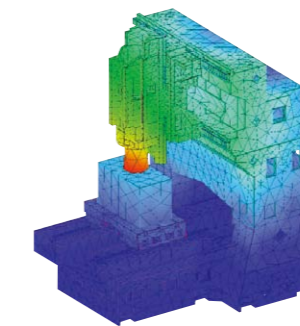
FEM analysis

■ Less overhang

● Less overhang from slideway to machining phase means a more stable machine structure
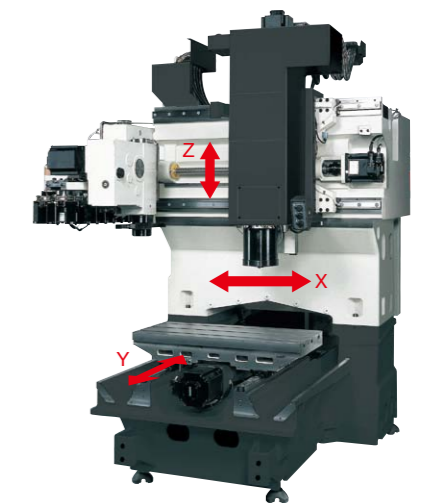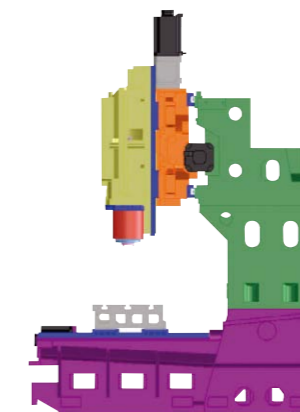
Creating user- and earth-friendly environments

■ Ergonomic front access and environmentally friendly

■ Work-intensive space
● Loading/unloading magazine tools can also be performed from the front of the machine

■ Tools can be loaded/unloaded from spindle side
● Tool load/unload button on spindlehead

Tool load/unload button

■ Easy workpiece, setup change
● Ideal table height easy to access and work with

210 mm
1,700 mm
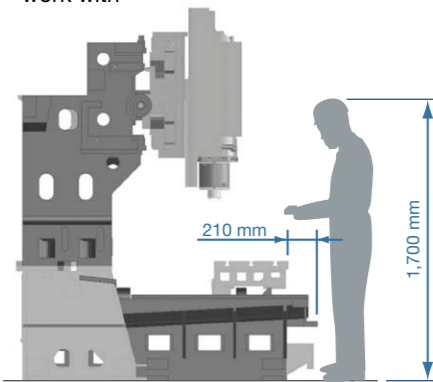
● Wide door opening

MB-46V 720 mm
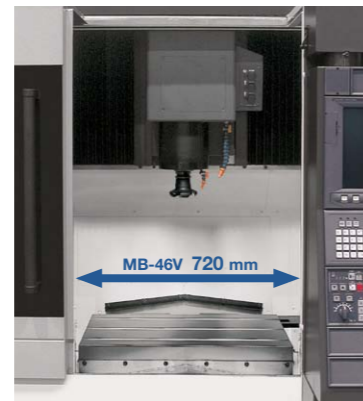
MB-46VE*: 850 mm
MB-56V: 1,329 mm
MB-66V: 1,510 mm

* E: Extension type

■ Superior operability even with 2-pallet shuttle APC (Optional)
● Pallets returned to the interior are automatically moved to front
 • Setup work is concentrated at machine front
● Machine front and APC front correspond
 • Close to operating panel, good workability
 • Regular tasks, including tool access, also done from the front of the machine

ATC
Spindle center
Pallet movement
APC control panel
Operation panel
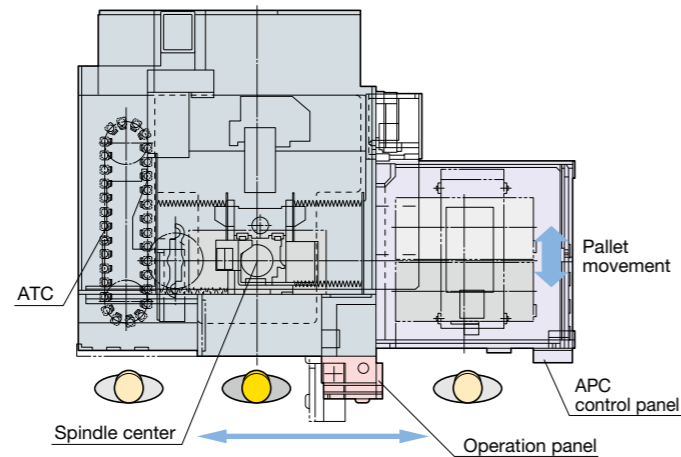
■ Eco-friendly and energy-saving features

■ Huge reduction in power consumption
● PREX motor used in energy-saving magazine drive system
● No hydraulic unit
An energy-saving, compact, and quieter tool unclamp package (electric pump cylinder) is used instead
● Oil controller controlled by power-saving inverter

■ For safe and clean factories
● Fully enclosed shielding with ceiling

Cover closed

Cover open

■ Reduced use of lubricating oil
● Grease lubricant used (centralized grease lube system from back of machine) *
 * MB-46V, MB-56V: Optional
 MB-66V: Standard

■ Low-noise guideways

■ Reduced machine installation space
● No maintenance on left or right
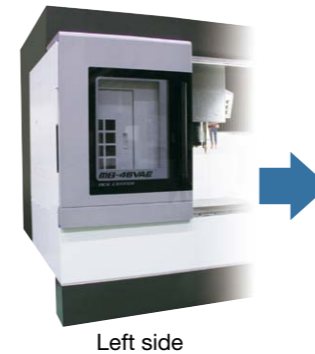
Maintenance concentrated in rear

CNC cabinet

2,810 / 3,123 / 3,325
3,580 / 3,893 / 4,015
1,976 / 2,546 / 3,035

Left side
Right side

MB-46V images
MB-46V / 56V / 66V dimensions

■ Machine specifications

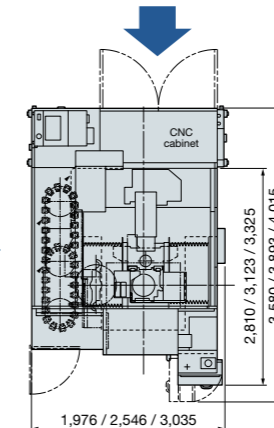| item		MB-46VA <VAE> MB-46VB <VBE>	MB-56VA MB-56VB	MB-66VA MB-66VB
Travels	X-axis (ram saddle R/L) mm (in.)	560 <762> (22.05 <30.00>)	1,050 (41.34)	1,500 (59.06)
	Y-axis (table B/F) mm (in.)	460 (18.11)	560 (22.05)	660 (25.98)
	Z-axis (spindle U/D) mm (in.)	460 (18.11)		660 (25.98)
	Table top to spindle nose mm (in.)	150 to 610 (5.91 to 24.02)		150 to 810 (5.91 × 31.89)
Table	Max work dimension mm (in.)	760 × 460 <1,000 × 460> (29.92 × 18.11 <39.37 × 18.11>)	1,300 × 560 (51.18 × 22.05)	1,530 × 660 (60.24 × 25.98)
	Floor to table top mm (in.)	800 (31.50)		850 (33.46)
	Max load capacity kg (lb)	500 <700> (1,100 <1,540>)	900 (1,980)	1,500 (3,300)
Spindle	Spindle speed min⁻¹	8,000 [15,000, 20,000, 25,000, 35,000] (*1)		
		6,000 [12,000]		
	Speed ranges	Infinintely variable		
	Tapered bore	7/24 taper No. 40 [HSK-A63 / HSK-F63] (*1)		
		7/24 taper No.50		
	Bearing dia mm (in.)	ø70 [ø70, ø70, ø60, ø60] (ø2.76 [ø2.76, ø2.76, ø2.37, ø2.37]) (*1)		
		ø90 [ø90] (ø3.54 [ø3.54])		
Feedrate	Rapid traverse m/min (ipm)	X-Y : 40 (1,575) Z : 32 (1,260)		
	Cutting feedrate mm/min (ipm)	X-Y-Z : 32,000 (1,260)		
Motors	Spindle kW (hp)	11/7.5 [22/18.5, 30/22, 15/11, 15] (15/10 [30/25, 40/30, 20/15, 20]) (*1)		
		11/7.5 [26/18.5] (15/10 [35/25])		
	Feed axes kW (hp)	X-Y-Z : 3.5 (4.7)		X-Y-Z : 4.6 (6.1)
ATC	Tool shank	MAS BT.40 [HSK]		
		MAS BT.50		
	Pull stud	MAS 2 [−]		
		MAS 2		
	Tool capacity tool	20 [32, 48] 48-tool only for MB-46VAE, MB-56V, MB-66V		
	Max tool dia (w/adjacent tool) mm (in.)	ø90 (ø3.54)		
		ø100 (ø3.94)		
	Max tool dia (w/o adjacent tool) mm (in.)	ø125 (ø4.92)		
		ø152 (ø5.98)		
	Max tool length mm (in.)	300 (11.81)		400 (15.75)
	Max tool mass kg (lb)	8 (18)		8 (18)
		12 (26)		12 [15] (26 [33])
	Max tool moment N-m (ft-lbf)	7.8 (5.7) (8 kg × 100 mm (17.6 lb × 3.94 in.))		
		15.3 (12 kg × 130 mm) (11.3 (26.4 lb × 5.12 in.))		15.3 [19.1] (12 [15] kg × 130 mm) (11.3 [14.1]) (26.4 [33] lb × 5.12 in.)
	Tool selection	Memory random		
Machine size	Height mm (in.)	2,746 (108.11)		3,295 (129.72)
	Floor space mm (in.)	1,976 (2,026*2) <2,236> × 2,810 (78 (80) <88> × 111)	2,546 × 3,123 (100 × 123)	3,035 × 3,325 (119 × 131)
	Weight kg (lb)	6,800 <7,100> (14,960 <15,620>)	8,300 (18,260)	11,200 (24,640)
		7,000 <7,300> (15,400 <16,060>)	8,500 (18,700)	11,800 (25,960)

*1. 35,000 min⁻¹ spindle (15 kW, HSK-F63) not available with MB-66VA
*2. MB-46VB

[   ] : Optional
< > : E (extension type)

■ Standard specifications

Spindle speed 50 to 8,000 min⁻¹		7/24 taper No. 40, 11/7.5 kW (46/56/66VA)
Spindle speed 50 to 6,000 min⁻¹		7/24 taper No. 50, 11/7.5 kW (46/56/66VB)
Rapid traverse; X-Y: 40, Z: 32 m/min		
Spindle/spindlehead cooler		Oil controller
Air cleaner (filter)		Regulator included
Spindle oil-air lubricator		
Slideway lube supplier		
ATC		20-tool magazine
ATC magazine shutter		
Tool unclamp package		
Coolant tank capacities *1	MB-46V	190 L (effective: 100 L), pump: 250 W (50 Hz/60Hz)
	MB-56V	230 L (effective: 120 L), pump: 250 W (50 Hz/60Hz)
	MB-66V	460 L (effective: 270 L), pump: 390 W (50 Hz) 620 W (60Hz)
Coolant nozzles		Flexible, 5
Clloolant flusher *1		Table L/R
Chip pan *2	MB-46V	60 L (effective)
	MB-56V	69 L (effective)
	MB-66V	92 L (effective)
ATC air blower (blast)		
Chip air blower (blast)		Nozzles
Spindle air blower (blast)		
Foundation washers (with jack bolts)		8 pcs
3-lamp status indicator		Type C (LED signal tower)
Work lamp *2		LED
Full enclosure shielding		With ceiling
Tapered bore cleaning bar		
Hand tools		
Tool box		
Numerical controller		OSP-P300MA
Color LCD operation panel		
Pulse handle		

*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

Air blower (blast) nozzle

Signal tower

Full enclosure shielding

Chip flusher system	Coolant supply system

(Machine front)   (Machine rear)

Table

Bed

Chip pan

Coolant tank

Chip pan

Workpiece washing gun pump (Optional)

Chip flusher pump

Shower coolant pump (Optional)

Filter

Coolant pump

Oil level gauge

Filter
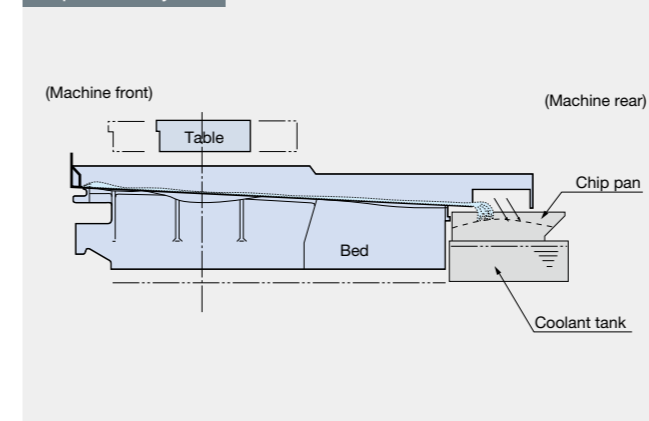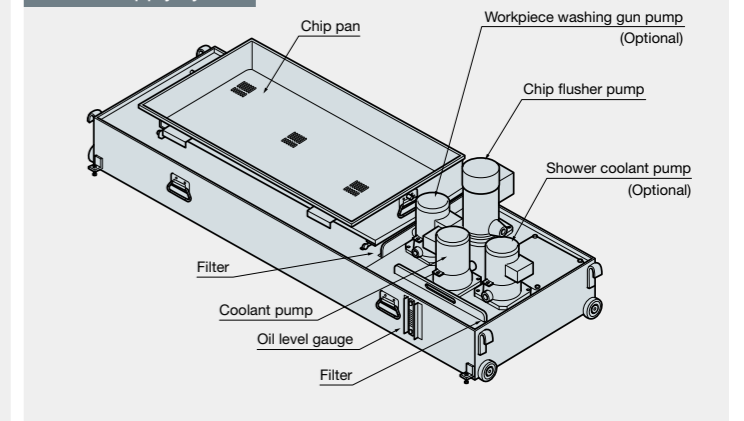
Optional specifications

Spindles available:		
Wide-range: 50 to 15,000 min^{-1}	△	22/18.5 kW, No. 40, HSK-A63
High-speed: 50 to 20,000 min^{-1}	△	30/22 kW, HSK-A63, BIG-PLUS® (No. 40)
High-speed: 50 to 25,000 min^{-1}	△	15/11 kW, HSK-A63, BIG-PLUS® (No. 40)
High-speed: 35,000 min^{-1}	△	15 kW, HSK-F63 (*1)
Wide-range: 50 to 12,000 min^{-1}	△	26/18.5 kW, No. 50
Dual contact spindle	△	HSK, BIG-PLUS®
Recommended die/mold specs		Die/mold & find-feed specs
		AbsoScale
		Super-NURBS
		0.1 μm control
		DNC-DT
Tool unclamp hydraulic unit (*2)	△	Separately mounted
ATC magazine capacities	△	32-tool (48-tool available for 46VAE, 56V, 66V)
Pull stud specs	△	MAS 1, JIS, CAT, DIN
Attachment preps		Accelerator attachment
		Angle-head attachment
		Oil-hole supplier
AbsoScale		X-Y-Z axes
Die/mold & find-feed specs	△	X-Y-Z rapids: 20 m/min
NC rotary table		Specify chuck, tailstock requirements, rotarty table type
Preps for above		
Index table		
2-pallet parallel shuttle APC (right side)		46VAE/VBE, 56V, 66V Tapped or T-slot pallets available.
High crossrail (+200 mm)	△	Required with APCs
Thru-spindle coolant (*3)		Specify 1.5 or 7.0 MPa 25,000 min^{-1} specs for HSK-A63 only 35,000 min^{-1} specs (HSK-F63) available
Chip air blower (adapter)		
Oil mist unit		
Mist collector		
Semi-dry machining		
Shower coolant		
Workpiece wash gun		
In-machine chip conveyor (coil)	△	Table L/R
Lift-up chip conveyors	△	See "Recommended chip conveyors" on page 14
Chip bucket for above	△	
Dust collector		
Tool breakage detection / Auto tool length compensation		Touch sensor (Metrol)
Auto zero offset / Auto gauging		Touch probe (Renishaw, Marposs)
Chemical anchors		
Sub-tables		
Work lamp		LED, added to left side

△: Corresponding standard specification is deleted.
*1. Not available for MB-66VA
*2. Recommended for short and repetitive ATC operations.
 For details, please contact your Okuma sales representative.
*3. Okuma pull studs required.

Wide-range spindle

See page 8

High-speed spindle

● Die/mold, AI applications

- ● Spindle 50 to 20,000 min^{-1}
- ● Output 30/22 kW (10 min/cont)
- ● Torque 57/42 N-m (10 min/cont)
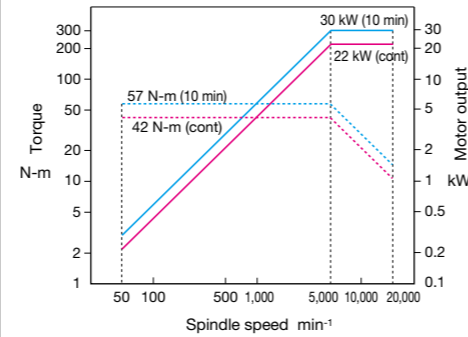
● High-speed/-quality die/mold applications

- ● Spindle 50 to 25,000 min^{-1}
- ● Output 15/11 kW (10 min/cont)
- ● Torque 29.1/19.9 N-m (10 min/cont)
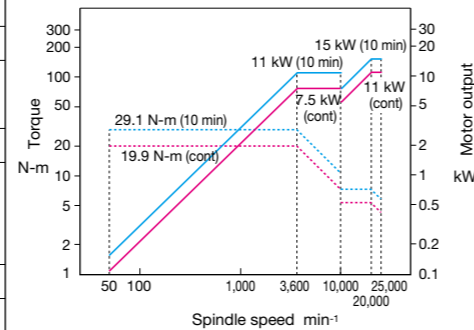
- ● Spindle 35,000 min^{-1} (*1)
- ● Output 15 kW (cont)
- ● Torque 4.09 N-m (cont)
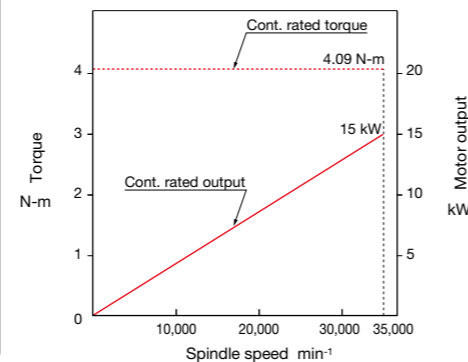
Hinge lift-up chip conveyor

In-machine chip discharge (coil)

Shower coolant (ceiling)

Workpiece washing gun
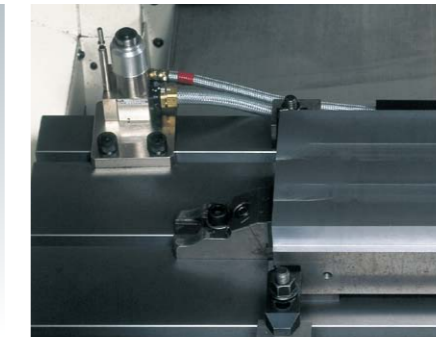
Auto tool length compensation
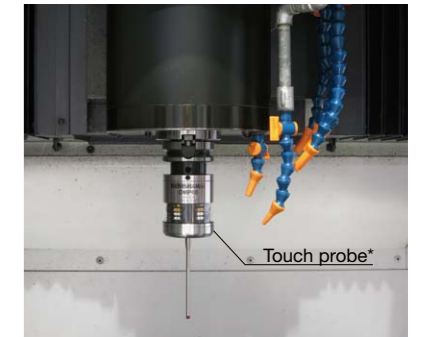
Touch probe*
Auto zero offset & auto gauging (*optical signal)

Recommended Chip Conveyors (Please contact an Okuma sales representative for details.)

○: Recommended
△: Recommended with conditions

Workpiece material		Steel	FC	Aluminum / Nonferrous	Mixed (general use)
Chip shape					
In-machine	Chip flusher (Standard)	—	○ (Wet)	○	—
	Coil (Optional)	○	○ (Dry-Wet)	—	○
Off-machine (Optional)	Hinge	○	—	—	△ (*4)
	Scraper	—	○ (Dry)	—	—
	Scraper (with drum filter)	—	○ (Wet) with magnet	△ (*3)	—
	Hinge + scraper (with drum filter)	△ (*1)	△ (Wet) (*2)	○	○

*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

Off-machine lift-up chip conveyors

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

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

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 "Monozukuri," (manufacturing) achieving enhanced productivity and added value.

The OSP has evolved tremendously as CNC control 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 tastes, and customized for needs from beginning to veteran operator.

Smooth operations even with wet or work-gloved hands

Enlarge

Rotate

Note: Collision Avoidance System (Optional) shown above.

Features you wanted – loaded with OSP suite apps!

We made these real through the addition of Okuma's machining expertise based on requests we heard from customers in the machine shop. These are filled with intelligence that enhances the "strength in the field" that CNC control can accomplish because it's created by a machine-tool manufacturer.

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

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

Comment display for greater ease of use and faster work
Common Variable Monitor
S17

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.), 0.001°
		Decimals: 1 μm, 10 μm, 1 mm (0.0001,1 in.) (1°, 0.01°, 0.001°)
	Feed	Cutting feed override 0 to 200%, rapid traverse override 0 to 100%
	Spindle control	Direct spindle speed commands override 30 to 300%, multi-point indexing
	Tool compensation	No. of registered tools: Max 999 sets, tool length/radius compensation: 3 sets per tool
	Display	15-inch color LCD + multi-touch panel operations
	Self-diagnostics	Automatic diagnostics and display of program, operation, machine, and NC system faults
Programming	Program capacity	Program storage capacity: 4 GB; operation backup capacity: 2 MB
	Program operations	Program management, editing, multitasking, scheduled program, fixed cycle, G-/M-code macros, arithmetic, logic statements, math functions, variables, branch commands, coordinate calculate, area calculate, coordinate convert, programming help
Operations	suite apps	Applications to graphically visualize and digitize information needed on the shop floor
	suite operation	Highly reliable touch panel suited to shop floors. One-touch access to suite apps.
	Easy Operation	"Single-mode operation" to complete a series of operations
		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
High speed/accuracy specs		Hi-G Control, Hi-Cut Pro, pitch error compensation, ServoNavi, Machining Time Shortening Function
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 on-machine 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 (W/Real 3-D simulation)						●	●
Interactive Map (I-MAP)				●	●		
Programming							
Auto scheduled program update		●	●	●	●	●	●
Common variables	1,000 pcs						
(Std: 200 pcs)	2,000 pcs						
Program branch; 2 sets							
Program notes (MSG)		●		●		●	
Coordinate system	100 sets	●		●		●	
selection	200 sets		●		●		●
(Std: 20 sets)	400 sets						
Helical cutting		●	●	●	●	●	●
3D circular interpolation							
Synchronized Tapping II		●	●	●	●	●	●
Arbitrary angle chamfering		●	●	●	●	●	●
Cylindrical side facing							
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)							
Additional G/M code macros							
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	●	●	●	●	●	●

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

Item	Kit Specs	NML E	NML D	3D E	3D D	AOT E	AOT D
Gauging							
Auto gauging	Touch probe (G31)	Included in machine specs					
Auto zero offset	Includes auto gauging	Included in machine specs					
Tool breakage detection	(touch sensor) (G31)	Included in machine specs					
	Includes auto tool offset						
Gauging data printout	File output						
Manual gauging (w/o sensor)		●	●	●	●	●	●
Interactive gauging (touch-sensor, touch-probe required)							
External I/O communication							
RS-232-C interface							
DNC-T3							
DNC-B (232-C, Ethernet transducer used on OSP side)							
DNC-DT							
DNC-/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						
Super-NURBS							
0.1 μm control (linear axis commands)							
TAS-S (Thermo Active Stabilizer—Spindle)							
TAS-C (Thermo Active Stabilizer—Construction)							
ECO suite (energy saving functions)							
ECO Operation							
ECO Power Monitor	Wattmeter						
Energy-saving hydraulic unit	Inverter						
	ECO Hydraulics (APC specs)						
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 signals	4, 8 signals						
Collision Avoidance System							
Machining Navi M-i, M-gII+ (cutting condition search)							
One-Touch Spreadsheet							
Block skip; 3 sets							
Additional axes	A, B, C axes [preps, specs]						
Fixture offset II							
OSP-VPS (Virus Protection System)							

Okuma Intelligent Technology for competitive machine shops

Collision prevention
Collision Avoidance System (Optional)

■ World's first "Collision-Free Machine"

CAS prevents collisions in automatic or manual mode, providing risk-free protection for the machine and great confidence for the operator.

Optimized Servo Control
SERVONAVI
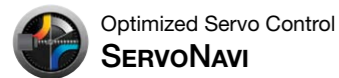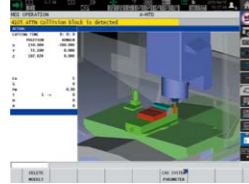
Achieves long term accuracy and surface quality

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
SERVONAVI
Higher acceleration, shorter cycle time
Low
Previous control / Workpiece weight
Heavy — Light

Cutting condition search for milling
Machining Navi M-*i*, M-*g*II+ (Optional)

■ Searches for the best cutting conditions

- Machining Navi M-*i* changes automatically to optimum spindle speed
- Machining Navi M-*g*II+ 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.

Dynamic Tool Load Control (Optional)

Prevents chipping, extends tool life

When machining of difficult-to-cut material, chipping from blade runout often occurs with insert-tipped end mills. To stabilize such machining, solid end mills with high tool costs have generally been used.

Dynamic Tool Load Control gives uniform cutting force with advanced synchronization of spindle phase and feed rate to control end mill chipping. This improves tool life and stabilizes machining. Switching from expensive solid tools also leads to reduced tool costs.

[Actual data]
Chip volume per tool under the same cutting conditions (tool life)

DTLC "OFF"
DTLC "ON"

(Chip volume) 0   2,000   4,000   6,000   8,000   10,000 (cm³)

Tool life when cutting titanium
About 2.3-times longer
(Okuma comparison)
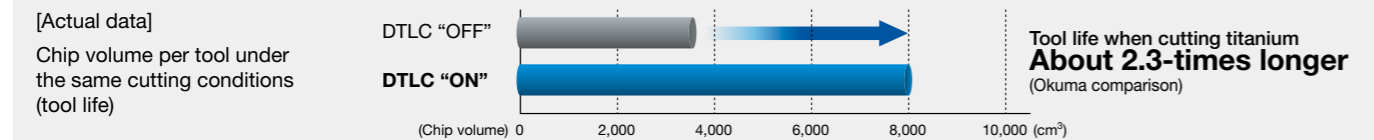
Runout of insert-tipped end mill

End mill
Insert
Runout: large
Difference in runout
Runout: small

Without control
Runout: small — Cutting force: small
Runout: large — Cutting force: large

With control
Runout: large
Controls feed amount for all blade runout Gives uniform cutting force

Insert-tipped end mill

Note: The above are actual examples. Your results may vary due to differences in specifications, tooling and cutting conditions.

■ Maximum tool dimensions

Unit: mm (in.)

● Max tool size (adjacent tools) In tool magazine

● MB-46/56VA
ø44.45 (1.75), ø63 (2.48), ø90 (3.54)
(*1) 32 (1.26), 300 (11.81)

● MB-46/56VB
ø69.85 (2.75), ø100 (3.94)
(*1) 46 (1.81), 300 (11.81)

● MB-66VA
ø44.45 (1.75), ø63 (2.48), ø40 (1.57), ø90 (3.54)
(*1) 32 (1.26), 276 (10.87), 42 (1.65), 50 (1.97), 400 (15.75)

● MB-66VB
ø69.85 (2.75), ø40 (1.57), ø100 (3.94)
(*1) 46 (1.81), 300 (11.81), 54 (2.13), 400 (15.75)
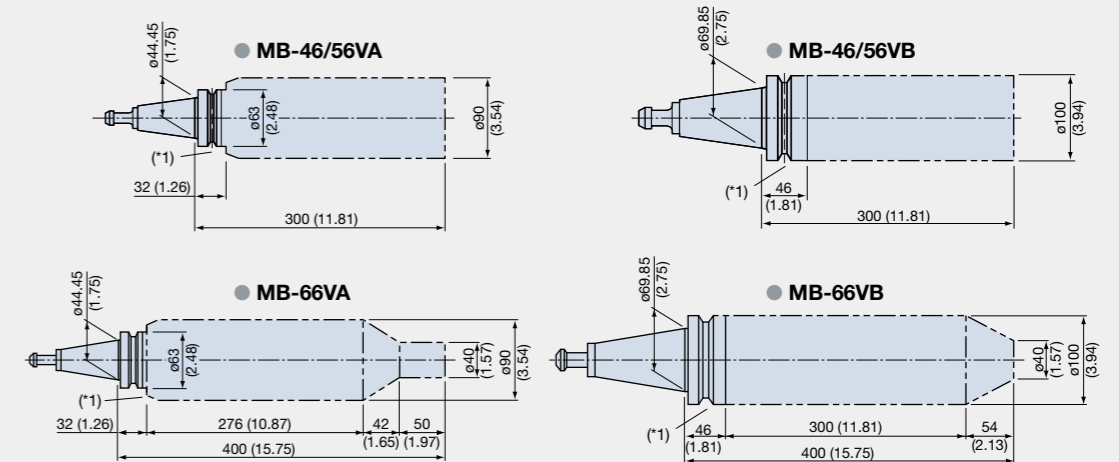
● Max single tool size No adjacent tools

● MB-46/56VA
ø44.45 (1.75), ø63 (2.48), ø125 (4.92), 30°
(*1) 32 (1.26), 30 (1.18), 300 (11.81)

● MB-46/56VB
ø69.85 (2.75), ø100 (3.94), ø152 (5.98), 30°
(*1) 46 (1.81), 40 (1.57), 300 (11.81)

● MB-66VA
ø44.45 (1.75), ø40 (1.57), ø125 (4.92), 30°
(*1) 32 (1.26), 30 (1.18), 218 (8.58), 70 (2.76), 50 (1.97), 400 (15.75)

● MB-66VB
ø69.85 (2.75), ø40 (1.57), ø125 (4.92), ø152 (5.98), 30°
(*1) 46 (1.81), 40 (1.57), 214 (8.43), 100 (3.94), 400 (15.75)

● Max tool mass moment

● MB-46/56/66VA
ø44.45 (1.75)
100 (3.94), 78.4N (57 ft-lbf) (8kg) (18 lb)
Tool mass moment: 7.84 N-m

● MB-46/56/66VB
ø69.85 (2.75)
130 (5.12), 117.6 N (86 ft-lbf) (12Kg) (26 lb)
Tool mass moment: 15.3 N-m

● MB-66VB (Optional)
ø69.85 (2.75)
130 (5.12), 147N (108 ft-lbf) (15kg) (33 lb)
Tool mass moment: 19.1 N-m

*1. With commercially available milling chucks, ATC tool change arm and tooling ODs may interfere.
   Please confirm tool manufacturer's brochure-listed dimensions.

Table size

● MB-46V

560 [762] (22.05 [30.00])
Spindle travel range (X-axis)
18H7
Table travel range (Y-axis)
460
T-slot detail (3)
760 [1,000] (29.92 [39.37])
Machine front [ ] dimensions are for MB-46VE

● MB-56V

1,050 (41.34)
Spindle travel range (X-axis)
18H7
Table travel range (Y-axis)
560 (22.05)
T-slot detail (4)
18H7
1,300 (51.18)
T-slot   Machine front   Cross grooves
Cross groove detail

● MB-66V

1,500 (59.06)
Spindle travel range (X-axis)
18H7
Table travel range (Y-axis)
660 (25.98)
T-slot detail (5)
18H7
1,530 (60.24)
T-slot   Machine front   Cross groove

Working ranges

● MB-46V

[Travel 762] [30.00]
[381] [15.00]   [381] [15.00]
Travel 460 (18.11)   Travel 560 (22.05)
230 (9.06)   230 (9.06)   280 (11.02)   280 (11.02)
Z-axis travel
Y-axis travel
Travel 460 (18.11)
150 (5.91)
460 (18.11)   380 (14.96)   380 (14.96)
760 (29.92)
[500] [19.69]   [500] [19.69]
[1,000] [39.37]
[ ] dimensions are for MB-46VE

● MB-56V

Travel 560 (22.05)   Travel 1,050 (41.34)
280 (11.02)   280 (11.02)   525 (20.67)   525 (20.67)
Z-axis travel
Y-axis travel   X-axis travel
Travel 460 (18.11)
150 (5.91)
560 (22.05)   650 (25.59)   650 (25.59)
1,300 (51.18)

● MB-66V

Travel 660 (25.98)   Travel 1,500 (59.06)
330 (12.99)   330 (12.99)   750 (29.53)   750 (29.53)
Z-axis travel
Y-axis travel   X-axis travel
Travel 660 (25.98)
150 (5.91)
660 (25.98)   765 (30.12)   765 (30.12)
1,530 (60.24)

MB-46V
Dimensional and Installation Drawings

(Dimensions for MB-46VA, [MB-46VAE/46VBE], <MB-46VB>)

32-tool ATC (Opt)   20-tool ATC   Spindle center   Spindle tool manual change button (in-machine)
Spindlehead cooler   ATC magazine door   Signal tower
ATC operation panel   Operation panel
810 [700]   140
937* [827]   313*
Move 280 + 280 [381] [381]   460 Z travel 610
560 [762]
X-axis travel
760 [1,000]   150
Table full length
2,746 (108.11)   2,600 (102.36)   2,002
230 Move   460 Y travel   230 Move
460
Table width
61   33*
700 [1,000]   730   70
Air unit
Tank removal
Chip pan
Coolant tank
1,800   708
2,508   302
2,810 (110.63)
FL
350 [240]   600
450* [340]   800*
1,900 [2,160] <1,950>
2,850 [3,000] <2,900>
*3,150 [3,300] <3,200>
Chip bucket (Opt)
Lift-up chip conveyor (Opt)
Pulse handle

500 (Margin)   2,850 [3,000] <2,900>   500 (Margin)
*3,150 [3,300] <3,200>
400 [550] <450>   1,500 (bed bottom width)   350 450*   600 800*
700 [650] <750>   1,200
Tank removal
Air inlet
Height: 748 mm, Rc3/8 internal
Required capacity 500 L/min (ANR)
More than 0.5 MPa
Supplied air temperature
should be within +5°C
Control cabinet
Power inlet
22 KVA □30 mm² 4C (6,000 min⁻¹, 8,000 min⁻¹)
37 KVA □50 mm² 4C (12,000 min⁻¹, 15,000 min⁻¹)*
42 KVA □60 mm² 4C (20,000 min⁻¹)*
27 KVA □38 mm² 4C (25,000 min⁻¹)*
33 KVA □38 mm² 4C (35,000 min⁻¹)*
Height from floor: 750 mm or 2,150 mm
* Options
Bed bottom line
32-tool ATC (Opt)
20-tool ATC
Spindle center
720   430   860   430   320   50   76
[870] <770> (bed bottom width) [430]
1,900 [2,160] <1,950>
1,976 [2,236] <2,026>
100   100
551   610   59   1,190
357   907   450   240   320   170
1,640 (bed bottom length)
2,810
3,580 (140.94)
500 (Margin)
600

• Lift-up chip conveyor .... Height: 750 mm
  * Height: 1,000 mm

MB-56V
Dimensional and Installation Drawings

(Dimensions are for MB-56VA, installation drawing for MB-56VA and MB-56VB)

Spindle tool manual change button (in-machine)

32-tool ATC (Opt) 20-tool ATC Spindle center

Spindlehead cooler

Air unit

ATC magazine door

ATC operation panel

Signal tower
Operation panel

2,746 (108.11)

2,600 (102.36)

2,045

1,400 (control cabinet height)

2,150 (84.65)

750

Move 525 Move 525

280 Move 560 Y travel 280 Move

560 table width

1,050 X travel

1,300 Table full length

FL

718 845* 112 336*

61 33*

Z travel 460 610

150 730

700 1,000*

70

Chip pan

Tank removal

Coolant tank

Chip bucket (Opt)

Lift-up chip conveyor (Opt)

Pulse handle

1,950 870 303
2,820
3,123 (122.95)

751 1,329 (door open) 390 230 600
1,450 1,020 380* 800*
3,300 3,650*

146

Power inlet
22 KVA □30 mm² 4C (6,000 min⁻¹, 8,000 min⁻¹)
37 KVA □50 mm² 4C (12,000 min⁻¹, 15,000 min⁻¹)*
42 KVA □60 mm² 4C (20,000 min⁻¹)*
27 KVA □38 mm² 4C (25,000 min⁻¹)*
33 KVA □38 mm² 4C (35,000 min⁻¹)*
Height from floor: 750 mm or 2,150 mm
* Options

Air inlet
Height: 933 mm, Rc3/8 internal
Required capacity 500 L/min (ANR)
More than 0.5 MPa
Supplied air temperature should be within +5°C

500 (Margin) 3,300 3,650* 500 (Margin)
565 1,770 (bed bottom width) 135 230 600
1,270 1,200 380* 800*
500 (Margin)

Tank removal

Control cabinet

32-tool ATC (Opt)

20-tool ATC

Bed bottom line

Spindle center

R600 R600

100 100 600

551 610

59

357 1,340

1,185 550 1,890 (bed bottom length) 3,123 3,893 (153.27)

285 338

14 110

935 515 515 505 50
1,030
2,470
2,546

170 500 (Margin)

76

• Lift-up chip conveyor .... Height: 750 mm
* Height: 1,000 mm

Unit: mm (in.)

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MB-66V
Dimensional and Installation Drawings

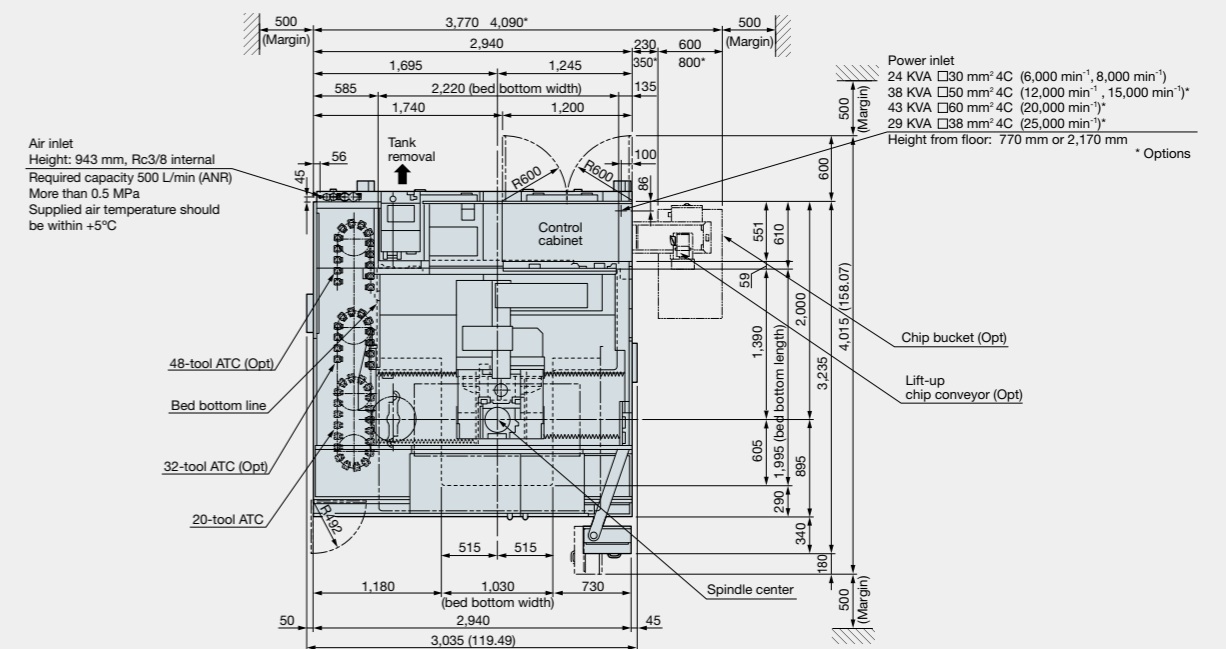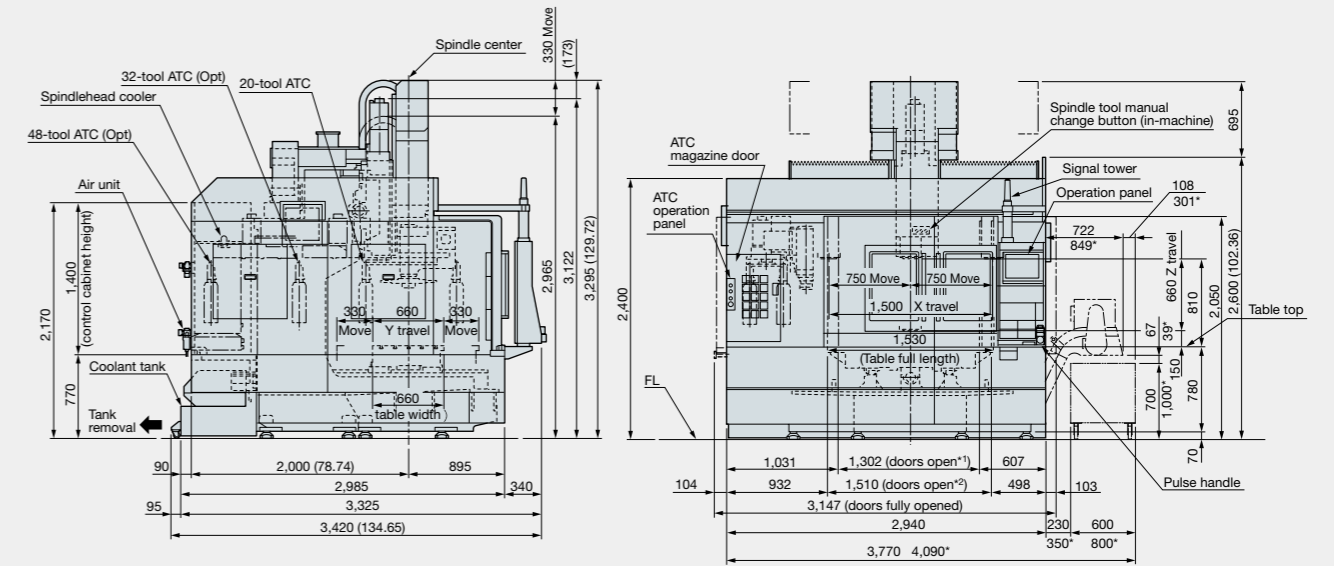(Dimensions are for MB-66VA, installation drawing for MB-66VA and MB-66VB)

32-tool ATC (Opt) 20-tool ATC Spindle center

Spindlehead cooler

48-tool ATC (Opt)

Air unit

ATC magazine door

ATC operation panel

Spindle tool manual change button (in-machine)

Signal tower
Operation panel

330 Move (173)

695

2,965 3,122 3,295 (129.72)

2,400

1,400 (control cabinet height)

2,170

770

330 Move 660 Y travel 330 Move

660 table width

Coolant tank

Tank removal

FL

750 Move 750 Move
1,500 X travel
1,330 (Table full length)

722 849* 108 301*

67 33*

660 Z travel 810 2,050 2,600 (102.36)

1,000* 150 760

700

70

Table top

90 2,000 (78.74) 895 340
95 2,985
3,325
3,420 (134.65)

104 1,031 1,302 (doors open*¹) 607
932 1,510 (doors open*²) 498 103
3,147 (doors fully opened)
2,940
3,770 4,090*

1,330

230 600
350* 800*

Pulse handle

Power inlet
24 KVA □30 mm² 4C (6,000 min⁻¹, 8,000 min⁻¹)
38 KVA □50 mm² 4C (12,000 min⁻¹, 15,000 min⁻¹)*
43 KVA □60 mm² 4C (20,000 min⁻¹)*
29 KVA □38 mm² 4C (25,000 min⁻¹)*
Height from floor: 770 mm or 2,170 mm
* Options

Air inlet
Height: 943 mm, Rc3/8 internal
Required capacity 500 L/min (ANR)
More than 0.5 MPa
Supplied air temperature should be within +5°C

500 (Margin) 3,770 4,090* 500 (Margin)
585 2,220 (bed bottom width) 135 230 600
1,695 1,245 350* 800*
1,740 1,200
500 (Margin)

Tank removal

Control cabinet

48-tool ATC (Opt)

Bed bottom line

32-tool ATC (Opt)

20-tool ATC

Spindle center

R600 R600

100 600

56 45 86

551 610

59

1,390 2,000 3,235 4,015 (158.07)

605 1,995 (bed bottom length) 895

290 340 180

50 1,180 1,030 730 45
(bed bottom width)
2,940
3,035 (119.49)

515 515

Chip bucket (Opt)

Lift-up chip conveyor (Opt)

500 (Margin)

• Lift-up chip conveyor .... Height: 750 mm
* Height: 1,000 mm
*1. Door opening operation
*2. Maximum door open width

Unit: mm (in.)

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

OKUMA

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