OKUMA

OPEN POSSIBILITIES

MF-46VA/B
ACE CENTER

Vertical Machining Centers with 2-APC

MF-46VA/B
ACE CENTER

Vertical Machining Centers with 2-APC

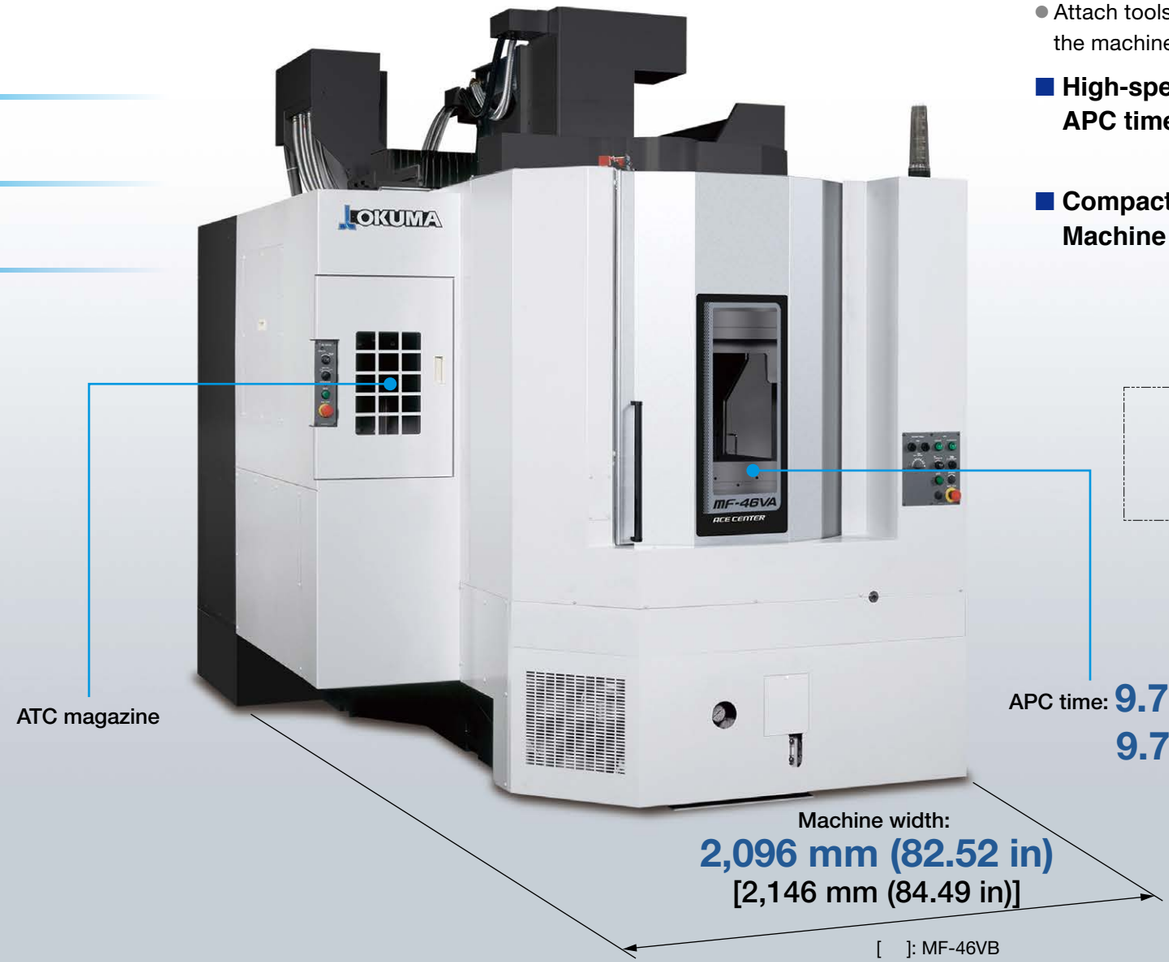
Intelligent Technology | Thermo-Friendly Concept | Collision Avoidance System | Machining Navi | SERVONAVI

Sharp vertical machining centers with smart 2-pallet rotary-shuttle APCs– designed for easy production-line applications

Line Applications

High Accuracies

High Speeds



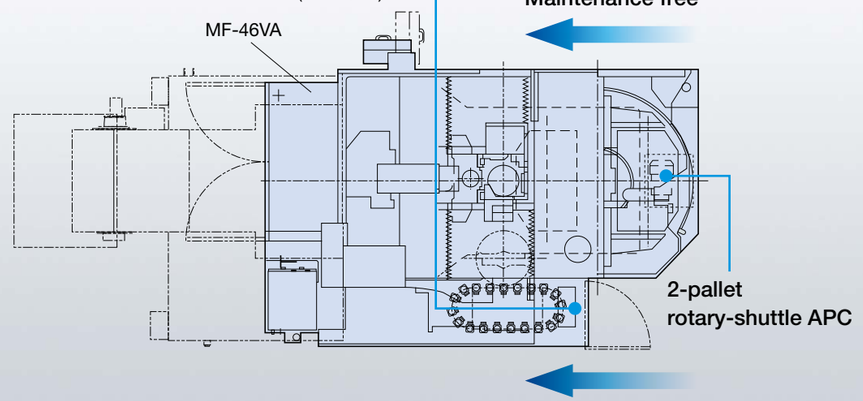
Ideal for production line applications

■ Easy system configuration and automation

- Easy installation of loaders, robots, and more
- Easy parallel installation of machines
  Since both sides of the machine are maintenance-free, designing effective line layouts is easy
- Attach tools to the ATC magazine from the machine front

■ High-speed 2-APC
APC time: 9.7 sec*1
9.7 sec*2

■ Compact machine
Machine width: 2,096 mm (82.52 in)
(MF-46VA)



*1. MAS standard measurements (formerly JIS B 6013)
*2. ISO 10791-9 (2001) (JIS B 6336-9) measurements
Photographs used in this brochure may show optional equipment.

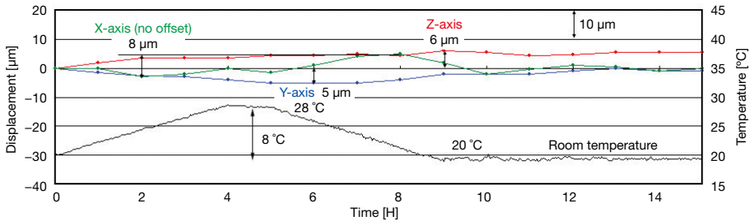
Achieving highly accurate machining with advanced technologies

Thermo-Friendly Concept
The unique approach of “accepting temperature changes.”

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.

Thermal deformation over time: 8 µm Room temperature change: 8°C

[Actual Data]



■ **TAS-C**: Thermo Active Stabilizer—Construction (option)
Providing optimal control of the machine and stable machining accuracies even during ambient temperature changes.

■ **TAS-S**: Thermo Active Stabilizer—Spindle (option)
Spindle deformation will be accurately controlled even during operations with frequent speed changes.

■ Eliminate waste with the Thermo-Friendly Concept

Okuma’s Thermo-Friendly Concept achieves high dimensional stability not only when the room temperature changes, but also at machine startups or when machining is resumed.
To stabilize thermal deformation, warming-up time is shortened and the burden of dimensional correction during machining restart is reduced.

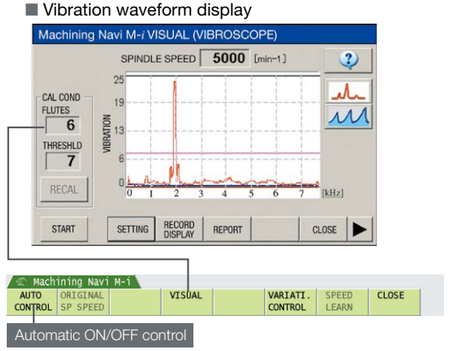
Machine startup
Machining restart
Room temp change

High dimensional stability

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

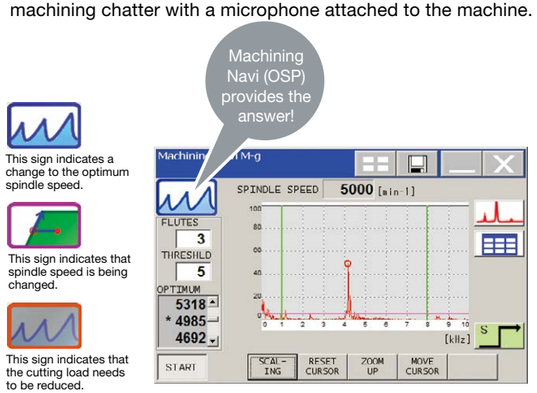
■ Automatically changes to optimum spindle speed (M-*i*)
Built-in sensors measure chatter vibration and the machine automatically changes to the best spindle speed.

■ Vibration waveform display



Automatic ON/OFF control

■ Adjust cutting conditions while monitoring the data (M-*g*Ⅱ+)
Navigates effective measures by detecting and analyzing machining chatter with a microphone attached to the machine.



Fast operations and powerful cutting to improve productivity

35% less non-cutting time

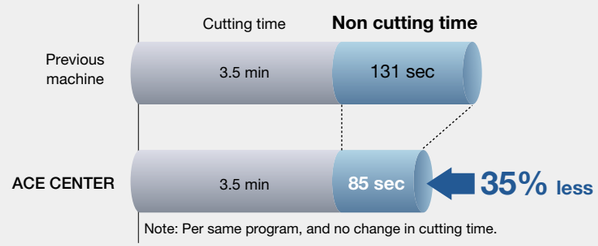
■ **APC time (workpiece load/unload time)**
: 9.7 sec[*1]
: 9.7 sec[*2]
■ **Acceleration : max 0.7 G**
■ **Rapid traverse : 40 m/min (X-, Y-axis)**
■ **ATC time**[*3] **: 1.5 sec (T-T)**[*1]
: 3.4 sec (C-C)[*1]
: 3.4 sec (CTC min)[*2]
■ **Spindle accel/decel**
: 1.2 sec
(0↔8,000 min^{-1})

*1. MAS standard measurements (formerly JIS B 6013)
*2. ISO 10791-9 (2001) (JIS B 6336-9) measurements
*3. MF-46VA

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)



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

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

● **8,000 min^{-1} (No. 40) / 6,000 min^{-1} (No. 50) high power spindle** (standard)

Tool	Spindle min^{-1}	Cutting m/min	Feed rate 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** (option)

Tool	Spindle min^{-1}	Cutting m/min	Feed rate 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** (option)

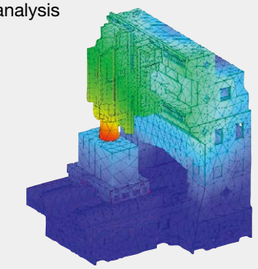
Tool	Spindle min^{-1}	Cutting m/min	Feed rate mm/min	Width mm	Depth mm	Chips cm³/min
ø80 face mill 8 blades (cermet)	895	225	3,000	56	3	504
ø20 roughing end mill, 7 flutes (carbide)	4,000	251	2,800	12	20	672
ø63 insert drill	909	180	137	–	–	–
Tap M36P4	106	12	424	–	–	–

(workpiece material: S45C)

Highly rigid machine structure supports powerful cutting

- 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



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

Abundance of powerful and fast spindle variations

A complete lineup of powerful and fast spindles

MF-46VA (No. 40)

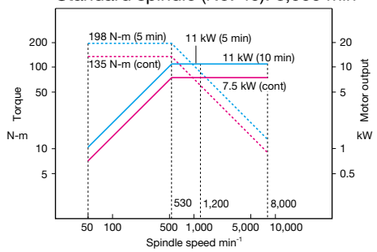
Standard: 8,000 min^{-1}, 11/7.5 kW (15/10 hp)
Wide-range: 15,000 min^{-1}, 22/18.5 kW (30/25 hp)
High-speed: 20,000 min^{-1}, 30/22 kW (40/30 hp)
25,000 min^{-1}, 15/11 kW (20/15 hp)
35,000 min^{-1}, 15 kW (20 hp)

MF-46VB (No. 50)

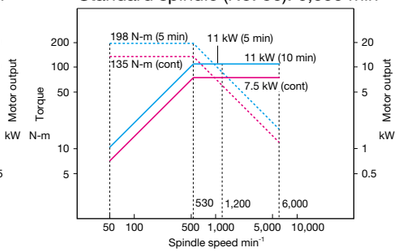
Standard: 6,000 min^{-1}, 11/7.5 kW (15/10 hp)
Wide-range: 12,000 min^{-1}, 26/18.5 kW (35/25 hp)

High power spindle (standard) <For general machine components>

Standard spindle (No. 40): 8,000 min^{-1}

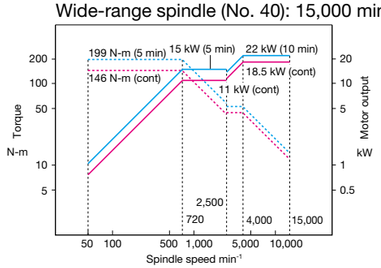


Standard spindle (No. 50): 6,000 min^{-1}

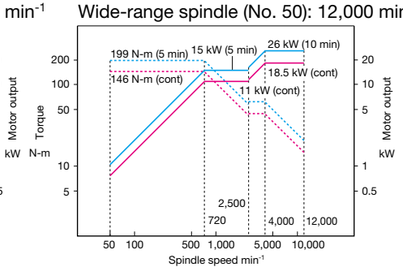


Wide-range spindle (option) <Fast/efficient non-ferrous to structural steel>

Wide-range spindle (No. 40): 15,000 min^{-1}



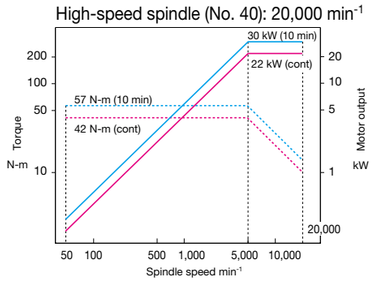
Wide-range spindle (No. 50): 12,000 min^{-1}



High-speed spindle (option)

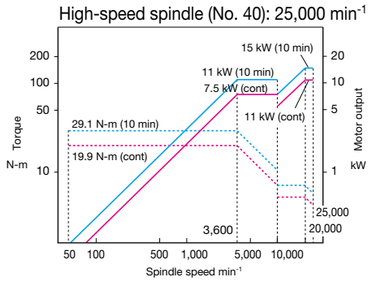
<Die/mold, Al applications>

High-speed spindle (No. 40): 20,000 min^{-1}

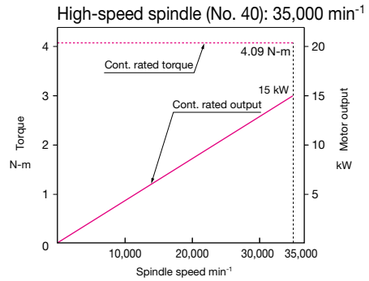


<High-speed/-quality die/mold applications>

High-speed spindle (No. 40): 25,000 min^{-1}



High-speed spindle (No. 40): 35,000 min^{-1}



Machine specifications

	Item	Unit	MF-46VA	MF-46VB
Travels	X-axis (saddle left/right)	mm (in)	762 (30)	
	Y-axis (pallet front/back)	mm (in)	560 <460 + APC stroke 100> (22.05 <18.11 + APC stroke 3.94>)	
	Z-axis (spindle up/down)	mm (in)	460 (18.11)	
	Pallet surface to spindle nose	mm (in)	Tap pallet: 180 to 640 [T-slot pallet: 150 to 610] (7.09 to 25.2 [T-slot pallet: 5.91 to 24.02])	
Pallet	Pallet size	mm (in)	760 × 460 (29.92 × 18.11)	
	Floor to pallet top	mm (in)	Tap pallet: 970 [T-slot pallet: 1,000] (38.19 [T-slot pallet: 39.37])	
	Max load capacity	kg (lb)	400 [T-slot pallet: 345] (880 [T-slot pallet: 759])	
Spindle	Speed	min^{-1}	8,000 [15,000, 20,000, 25,000, 35,000]	6,000 [12,000]
	Speed ranges		Infinitely variable	
	Tapered bore		7/2 taper No. 40 [7/24 taper No. 40, HSK-A63, HSK-F63]	7/24 taper No. 50 [7/24 taper No. 50]
	Bearing dia	mm (in)	ø70 [ø70, ø60] (ø2.76 [ø2.76, ø2.36])	ø90 [ø90] (ø3.54 [ø3.54])
Feed rate	Rapid traverse	m/min (ipm)	X, Y: 40 (1,575) Z: 32 (1.260)	
	Cutting feed rate	m/min (ipm)	X, Y, Z: 32 (1,260)	
Motors	Spindle (10 min/cont)	kW (hp)	11/7.5 [22/18.5, 30/22, 15/11, 15] (15/10 [30/25, 40/30, 20/15, 20])	11/7.5 [26/18.5] (15/10 [35/25])
	Feed axes	kW (hp)	X, Y, Z: 3.5 (4.67)	
ATC	Tool shank		MAS BT40 [HSK]	MAS BT50 [HSK]
	Pull stud		MAS 2 [–]	
	Magazine capacity	tools	20 [32, 48]	20 [32]
	Max tool dia (w/ adjacent)	mm (in)	ø90 (ø3.54)	ø100 (ø3.94)
	Max tool dia (w/o adjacent)	mm (in)	ø125 (ø4.92)	ø152 (ø5.98)
	Max tool length	mm (in)	300 (11.81)	
	Max tool mass	kg (lb)	8 (18)	12 (26)
	Max tool moment	N-m (ft-lbf)	7.8 {8 kg × 100 mm} (5.7 {17.6 lb × 3.94 in})	15.3 {12 kg × 130 mm} (11.3 {26.4 lb × 5.12 in})
	Tool selection		Memory random	
Machine size	Height	mm (in)	2,946 (115.98)	
	Floor space; width × depth	mm (in)	2,406 × 3,270 (94.72 × 128.74)	2,456 × 3,270 (96.69 × 128.74)
	Mass	kg (lb)	9,700 (21,340)	9,900 (21,780)
Controller			OSP-P300MA	

[ ]: Option

Standard Specifications

Item	Remarks	Item	Remarks
Spindle speed 50 to 8,000 min^{-1}	No. 40, 11/7.5 kW (MF-46VA)	Chip air blower (blast)	Nozzle type
Spindle speed 50 to 6,000 min^{-1}	No. 50, 11/7.5 kW (MF-46VB)	Work lamp	LED
Rapid traverse	X, Y: 40 m/min, Z: 32 m/min	Chip flusher system*2	Table left/right, pump 1.1/1.5 kW (50/60 Hz)
Spindle/spindlehead cooler	Oil temperature controller	Chip pan	Effective: 70 L
Air cleaner (filter)	Including regulator	Foundation washers (with jack bolts)	10 pcs
Spindle oil-air lubricator		3-lamp status indicator	Type C (LED signal tower) Red (alarm), yellow (end), green (running)
Color LCD operation panel			
Pulse handle			
Tapered bore cleaning bar		ATC	20-tool magazine
Hand tools		ATC magazine shutter	
Tool box		Tool unclamp package	
APC hydraulic unit		2-pallet rotary-shuttle APC	
Coolant supply system	5-nozzle, tank 400 L (effective 220 L), pump 250 W*1	Pallets for above	Metric tap, 2 pcs
		2-pallet rotary-shuttle APC cover	
ATC air blower (blast)	Spindle hole only	Full enclosure shielding	With ceiling (fully enclosed)

*1. Pump capacity may need increasing when using an oil-based coolant.
*2. Use an in-machine coil type chip conveyor when using an oil-based coolant.
Note: Oil-based coolants are highly flammable, so fire prevention measures must always be taken when using these coolants. Do not operate unattended.

Optional Specifications

Item	Remarks	Item	Remarks
Spindle speeds:		Index table	
Wide-range 50 to 15,000 min^{-1} △	22/18.5 kW, HSK-A63, BIG-PLUS® (No. 40)	Thru-spindle coolant*	Specify 1.5 or 7.0 MPa
High-speed 50 to 20,000 min^{-1} △	30/22 kW, HSK-A63, BIG-PLUS® (No. 40)		25,000 min^{-1} specs for HSK-A63 only
High-speed 50 to 25,000 min^{-1} △	15/11 kW, HSK-A63, BIG-PLUS® (No. 40)	Chip air blower (adapter)	Not available with thru-spindle coolant specs
High-speed 35,000 min^{-1} △	15kW, HSK-F63	Oil mist lubricator	
Wide-speed 50 to 12,000 min^{-1} △	26/18.5kW, No.50	Mist collector	
Dual contact spindle △	HSK, BIG-PLUS®	Semi-dry machining	
Die/mold & find-feed specs △	X-, Y-, Z-axis rapids: 20 m/min	Shower coolant systems	
Die/mold kits	Die/mold & find-feed specs	Workpiece wash gun	
	AbsoScale detection	In-machine chip discharge △	Coil type chip conveyor (table L/R)
	Hyper-Surface : X-Y-Z axes only*1 Super-NURBS : X-Y-Z axes, rotational axis (up to 2)*1	Off-machine chip discharge △	Lift-up chip conveyor : hinge, scraper types
	0.1µm feedback	Chip bucket for above △	
	DNC-DT (recommended)	Dust collector	
ATC magazine capacities △	32-tool (48-tool available for MF-46VA)	Tool breakage detection & auto tool length compensation	With touch sensor
Pull stud specs △	MAS1·JIS·CAT·DIN		
Attachment preps	Accelerator attachment	Auto zero offset/auto gauging	With touch probe (Renishaw, Marposs)
	Angle-head attachment	Setup station auto door O/C	
	Oil-hole coolant system	Pallet top setup hydraulic/ pneumatic lines	Contact Okuma to confirm no. of pipes and hydraulic/pneumatic pressures.
AbsoScale	X-Y-Z axes	Chemical anchors	
Pallet top	T-slot type	Work lamp	Added to right side
NC rotary table	Specify chuck, tailstock requirements, rotarty table type	TAS-S	Thermo Active Stabilizer—Spindle
		TAS-C	Thermo Active Stabilizer—Construction
Install work for above			

△: Corresponding standard specification is deleted.
* : Okuma pull studs required.
*1. Select Super-NURBS for simultaneous linear and rotational axis machining.

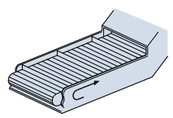
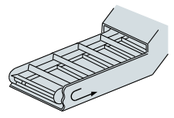
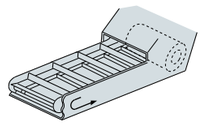
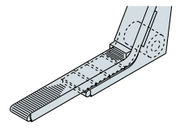
Chip conveyors (Please contact an Okuma sales representative for details.)

○: Recommended △: Conditionally recommended

Workpiece Material		Steel	Cast iron	Aluminum/non-ferrous metal	Mixed (general use)
Chip shape					
In-machine chip discharge	Chip flusher (standard)	—	○ (wet)	○	—
	Coil (option)	○	○ (dry/wet)	—	○
Off-machine chip discharge (option)	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

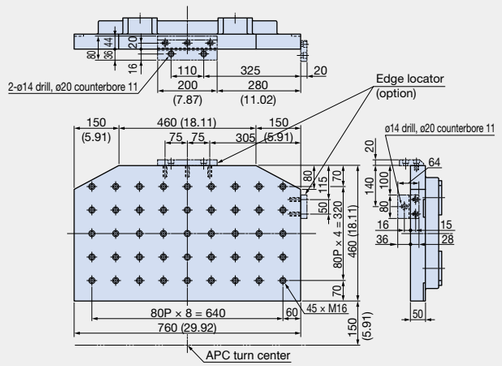
Type	Hinge	Scraper	Scraper with drum filter	Hinge + scraper with drum filter
Shape				

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

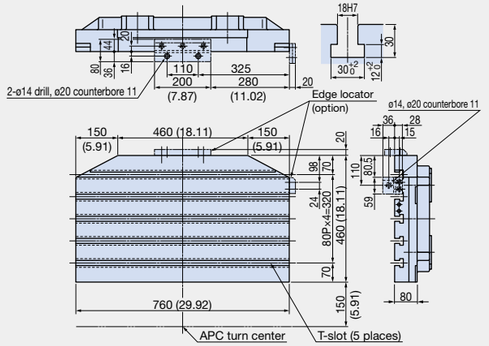
Pallet dimensions

Unit: mm (in)

Metric tap type

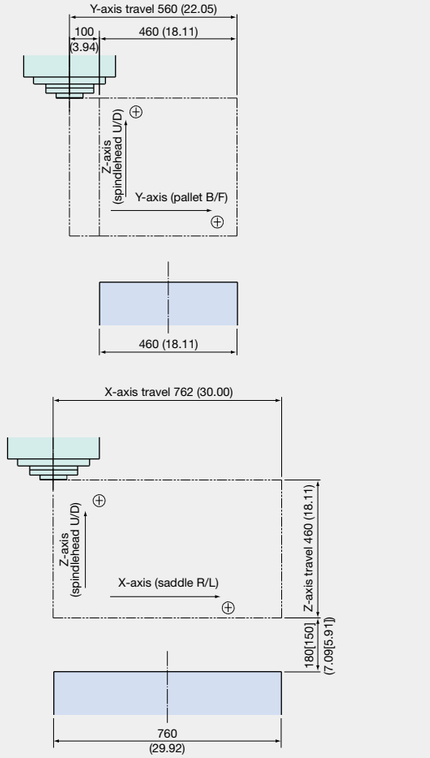


T-slot type (option)



Working ranges

Unit: mm (in)

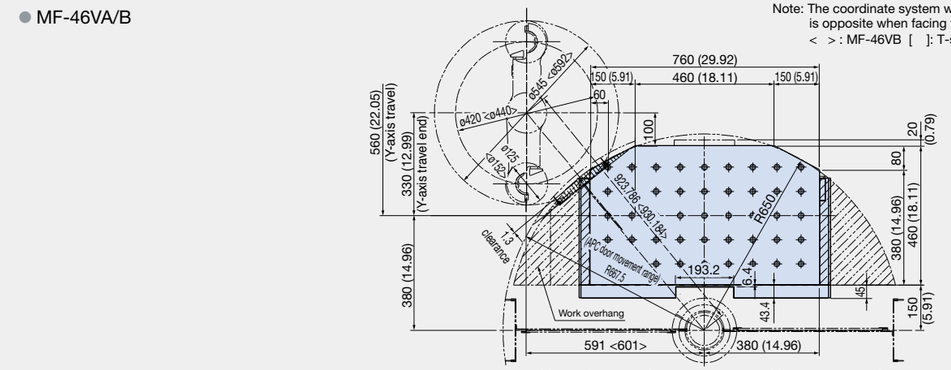


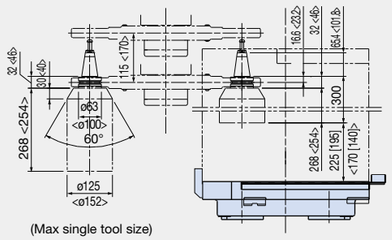
Max fixture/Workpiece dimensions

Unit: mm (in)

● MF-46VA/B

Note: The coordinate system when facing the machine is opposite when facing the pallet.
< > : MF-46VB [ ]: T-slot pallets





(Max single tool size)

OSP suite OSP-P300MA

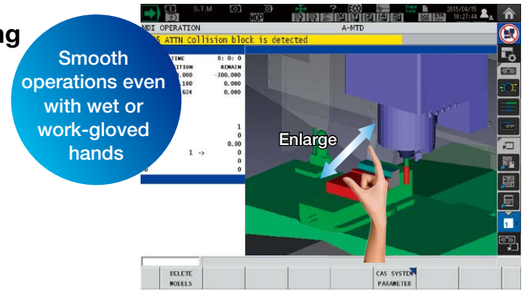
The Next-Generation Intelligent CNC

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

Smart factories are using advanced digitization and networking (IIoT) in manufacturing to achieve enhanced productivity and added value. 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 smartphone

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



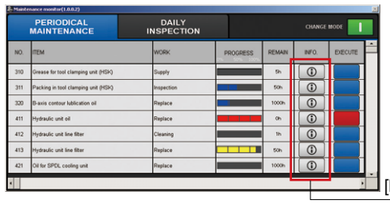
Note: Collision Avoidance System (option) shown above.

"Just what we wanted."— Refreshed OSP suite apps

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

Maintenance Monitor
Routine inspection support

The Maintenance Monitor displays items for inspections before starting daily operation and regular inspections and the rough estimate of inspection timing. Touching the [INFO] button displays the PDF instruction manual file of relevant maintenance items.



[INFO] button

Spindle Output Monitor
Increased productivity through visualization of motor power reserve

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

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

Screen Capture
Automatic saving of recorded alarms

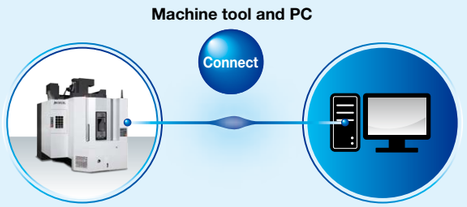
Scheduled Program Editor
Easy programming without keying in code

Connect Plan

Get Connected, Get Started, and Get Innovative with Okuma "*Monozukuri*"

Connect, Visualize, Improve

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



Standard Specifications

Basic Specs	Control	X, Y, Z, simultaneous 3 axis, spindle control (1 axis)
	Position feedback	OSP full range absolute position feedback (zero point return not required)
	Coordinate functions	Machine coordinate system (1 set), work coordinate system (20 sets)
	Min / Max command	±99999.999 mm, ±9999.9999° 8-digit decimal, command units: 0.001mm, 0.01mm, 1mm, 0.0001°, 0.001°, 1°
	Feed	Cutting feed override 0 to 200%, rapid traverse override 0 to 100%
	Spindle control	Direct spindle speed commands, override 30 to 300%, multi-point indexing
	Tool compensation	No. of registered tools: Max 999 sets, tool length/radius compensation: 3 sets per tool
	Display	15-inch color LCD + multi-touch panel operations
	Self-diagnostics	Automatic diagnostics and display of program, operation, machine, and NC system faults
Programming	Program capacity	Program storage capacity: 4 GB; operation buffer: 2 MB
	Program operations	Program management, editing, scheduled program, fixed cycle, G-/M-code macros, arithmetic, logic statements, math functions, variables, branch commands, coordinate calculate, area machining, 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, easy setting of cycle time reduction
	MacMan	Machining management: machining results, machine utilization, fault data compile & report, external output
Communications / Networking		USB (2 ports), Ethernet, DNC-T1
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, ECO Power Monitor*1

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

Optional Specifications

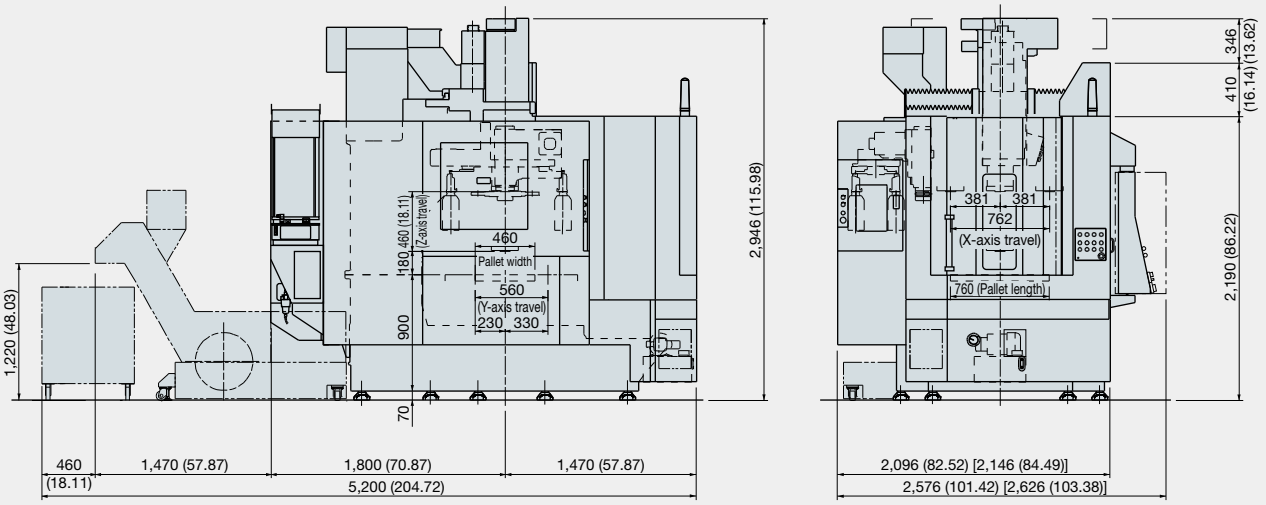
Item	Kit Specs	NML E	NML D	3D E	3D D	AOT E	AOT D
Interactive functions							
Advanced One-Touch IGF-M (Real 3D simulation included)						●	●
Interactive MAP (I-MAP)				●	●		
Programming							
Operation buffer 10MB							
Auto scheduled program update		●	●	●	●	●	●
Common variables	1,000 pcs						
(Std: 200 pcs)	2,000 pcs						
Program branch; 2 sets							
Program notes (MSG)			●		●		●
Coordinate system selection (Std: 20 sets)	100 sets	●		●		●	
	200 sets		●		●		●
	400 sets						
Helical cutting (within 360°)		●	●	●	●	●	●
3D circular interpolation							
Synchronized Tapping II		●	●	●	●	●	●
Arbitrary angle chamfering		●	●	●	●	●	●
Cylindrical side facing							
Slope machining							
Tool grooving (flat-tool free-shaped grooving)							
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, spindle, NC, cutting						
Operation end buzzer	With M02, M30, and END commands						
Work counter	With M02 and M30 commands						
MOP-TOOL	Adaptive control, overload monitor						
AI Machine Diagnosis	Spindle, feed axes / Spindle						
Machine Status Logger							
Cutting Status Monitor							
Tool life management	Hour meter, No. of workpieces	●	●	●	●	●	●

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) Includes auto tool offset	Included in machine specs					
Manual gauging (w/o sensor)		●	●	●	●	●	●
Interactive gauging (touch sensor, touch probe required)							
External I/O communication							
RS-232C connector							
DNC-T3							
DNC-B (RS-232C-Ethernet transducer used on OSP side)							
DNC-DT							
DNC-C/Ethernet							
Additional USB (Additional 2 ports, Std: 2 ports)							
Automation / untended operation							
Auto power shut-off	M02 and END alarms, work preps done → OFF	●	●	●	●	●	●
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						
Hyper-Surface*1	X-Y-Z axes only						
Super-NURBS*2 *3	X-Y-Z axes, rotational axis (up to 2)						
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						
Other							
CNC cabinet lamp							
Circuit breaker							
Sequence operation	Sequence stop	●	●	●	●	●	●
Upgraded sequence restart	Mid-block return		●		●		●
Pulse handles	2 pcs, 3 pcs (Std: 1 pc)						
External M codes	4 sets, 8 sets						
Collision Avoidance System*1 *2							
Machining Navi M-*g*II+, M-*i* (cutting condition search)							
One-Touch Spreadsheet							
Block skip; 3 sets							
Additional axes	A-, B-, C-axis [preps, specs]						
OSP-VPS (Virus Protection System)							

Note 1. NML: Normal, 3D: Real 3D Simulation, AOT: Advanced One-Touch IGF-M, E: Economy, D: Deluxe
Note 2. ★Technical consultation needed for specifications
*1. There are limitations when Hyper-Surface and Collision Avoidance System are used simultaneously.
*2. There are limitations when Super-NURBS and Collision Avoidance System are used simultaneously.
*3. Select Super-NURBS for simultaneous linear and rotational axis machining.

MF-46VA/B
Dimensional/Installation Drawings

Unit: mm (in)



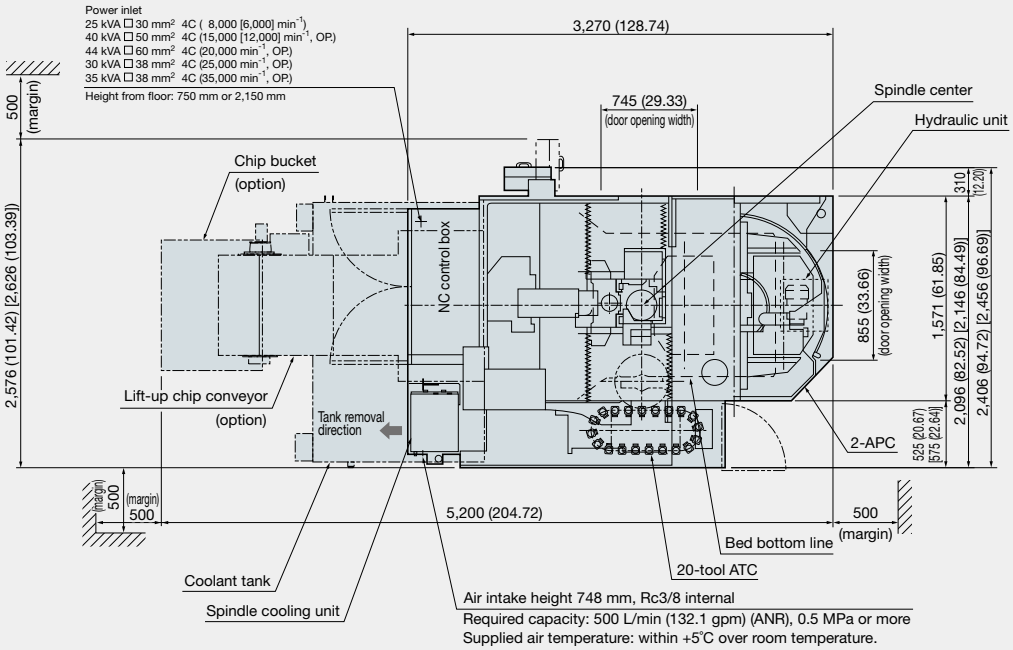


Diagram shows MF-46VA. [ ]: MF-46VB

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