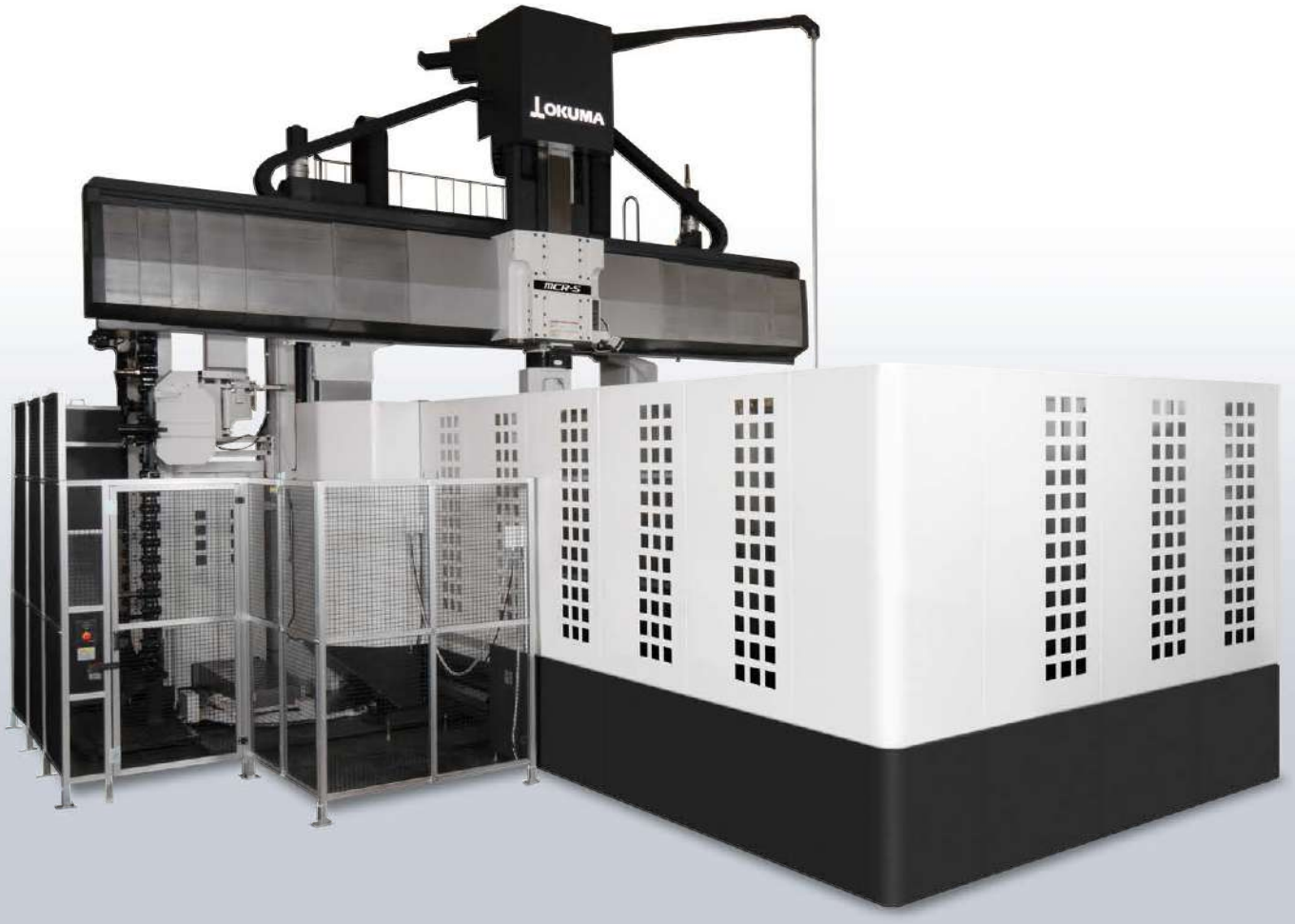
OKUMA

OPEN POSSIBILITIES

High-Speed, High-Quality
Double-Column Machining Center

MCR-S (Super)

[5-Face Machining]



High-Speed, High-Quality
Double-Column Machining Center

MCR-S (Super)

[5-Face Machining]

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

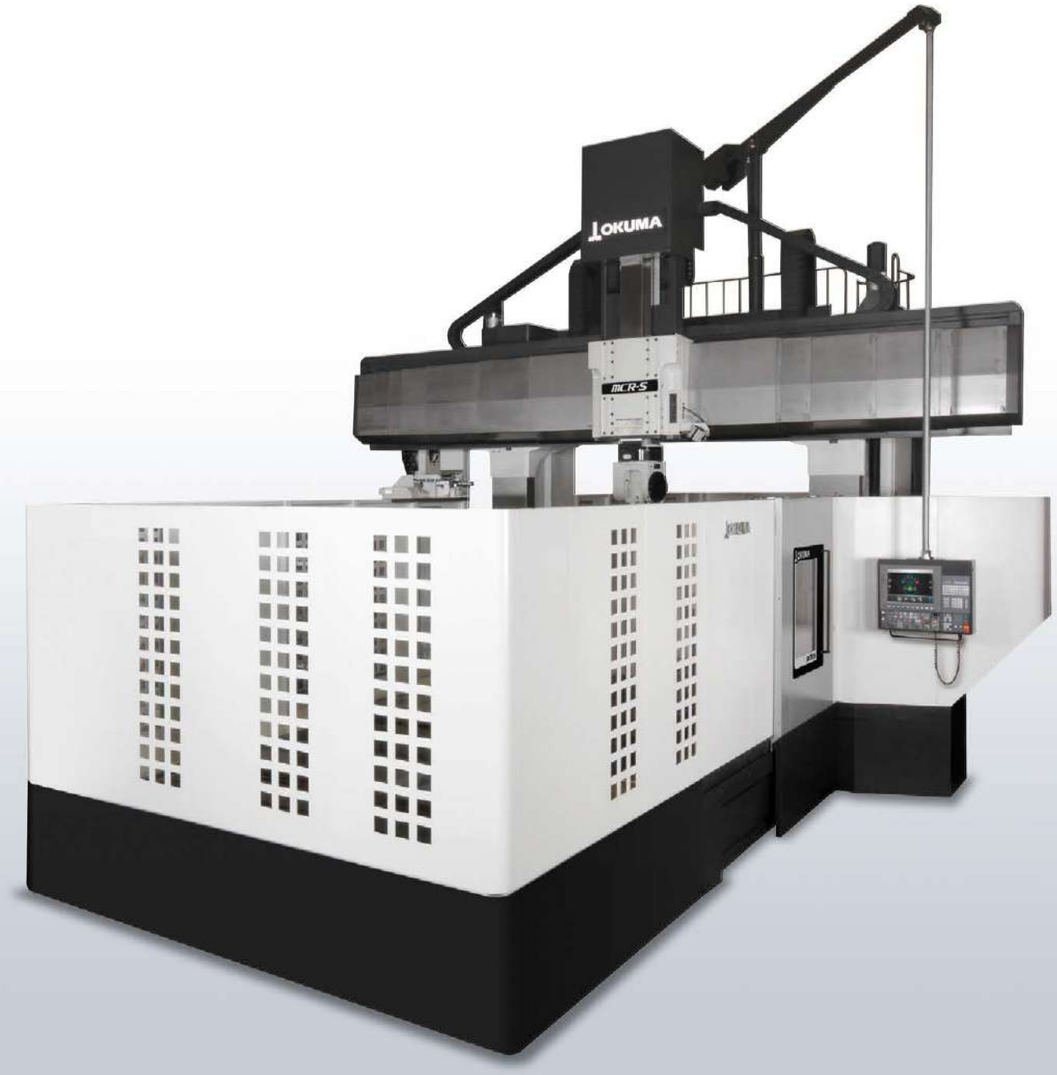
The productivity revolution for press die manufacturing. How to amaze your polishing and die matching meister with superb machined surface quality

The perfectionist designer wanted to reproduce sharp edges and beautiful, curved surfaces with very high fidelity and speed — and that gave birth to the MCR-S (Super), a next-generation, high-speed, high-quality double-column machining center.

By constantly striving to provide solutions for higher speed, accuracy, and surface quality, Okuma delivers what's required of a machine for advanced die/mold applications.

Geometric accuracy, machined surface quality, and feed rates have evolved to new dimensions with higher finishing accuracy, which drastically reduces post-process work by "saving operators the time and trouble" of polishing surfaces and assuring upper/lower die alignments.

Heavy-duty cutting is also possible due to excellent machine rigidity for roughing to finishing done completely on one machine, resulting in considerably reduced lead times — a significant advantage for truly efficient die/mold manufacturing.



Photographs used in this brochure may show optional equipment.

The designer strove for the best industrial design possible to achieve high-quality surfaces with superb accuracy at fast cutting speeds.

The key die/mold issues include improving cycle times, accuracy, area level errors, and surface quality — at high speeds and quality levels that would satisfy any customer. Production lead times can become considerably shorter while improving finishing accuracies at the same time.

Significant reduction in production lead time

Machine structural design achieves fastest-class continuous feed rates

While maintaining high shape accuracy and machined surface quality, cycle times were reduced by 25% at best-class fast continuous feeds. In addition, the MCR-S enables highly efficient heavy-duty cutting of large press dies.

Advanced, high surface quality technology dramatically reduces polishing work

Streak-free machined surfaces that minimize polishing provided by Okuma Machine & Control mechatronics.
Okuma's Hyper-Surface NC technology automatically compensates for "disturbances" found in part programs that can lead to defective machined surfaces. In addition, the acquired highly accurate and rigid designs have been fortified to achieve even higher surface quality at higher finishing speeds.

High-accuracy engineering drastically reduces hand finishing times in die alignments

The further evolvement of our Thermo-Friendly Concept also minimizes step errors between machined surface areas that occur during long runs. In addition, cutting edge position measuring by the swivel laser sensor helps keep machined area step errors cut by tools with different indexing angles to 10 µm or less.
The number of upper/lower die alignments has been greatly reduced.

X-axis travel (table front/back)	mm	4,200 to 6,700
Y-axis travel (spindlehead L/R)	mm	3,200, 3,700
Z-axis travel (ram vertical)	mm	800
W-axis travel (crossrail vertical)	mm	1,000, 1,200
Effective width between columns	mm	2,650, 3,150
Speed range	min^{-1}	30 to 10,000
Rapid traverse	m/min	X: 30, Y: 32*, Z: 15
Table size	mm	2,000 × 4,000 to 2,500 × 6,500
Table maximum load	kg	22,000 to 43,000

* Deceleration near both ends of Y-axis travel

Significant reduction in production lead time
Machine structural design achieves fastest-class continuous feed rates

Cycle times: 25% shorter*

Previous model: 7 h 13 min

MCR-S: 5 h 25 min
(Body designed surface only)

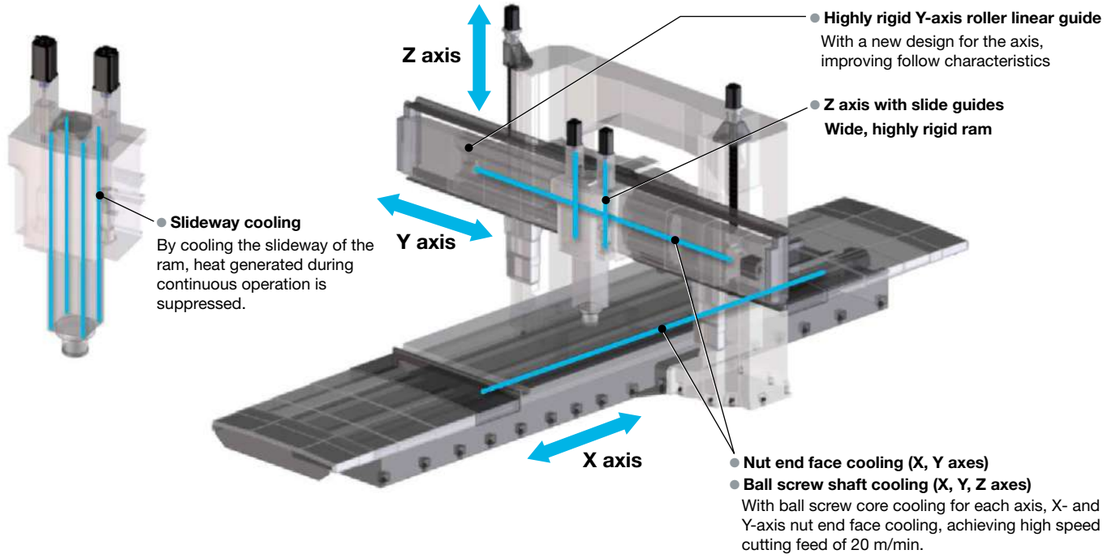
Note: Compared to previous model automobile side panel operations

High speed continuous feed while maintaining high shape accuracy and machined surface quality

Average continuous cutting feed: X/Y axes: Max 20 m/min
Z axis: Max 10 m/min

Machine designed high-speed continuous feed

Shortening cycle times while maintaining geometric accuracy with optimal cooling.
Mechanically designed to ensure minimal following error even at fast feeds.



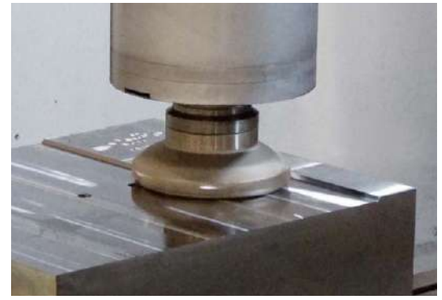
- **Highly rigid Y-axis roller linear guide**
  With a new design for the axis, improving follow characteristics
- **Z axis with slide guides**
  Wide, highly rigid ram
- **Slideway cooling**
  By cooling the slideway of the ram, heat generated during continuous operation is suppressed.
- **Nut end face cooling (X, Y axes)**
- **Ball screw shaft cooling (X, Y, Z axes)**
  With ball screw core cooling for each axis, X- and Y-axis nut end face cooling, achieving high speed cutting feed of 20 m/min.

Everything from roughing to finishing is completed with one machine

Cycle time is shortened for heavy-duty cutting with a powerful spindle.
By completing roughing to finishing with one machine, the operator time for changing setups is greatly reduced.

Powerful spindle enables heavy-duty cutting

- Cutting capacity: **710 cm³/min**
  (Z-axis 800 mm extension; machining in all directions)
- Max spindle output: 26 kW
- Max spindle torque: 735 N-m



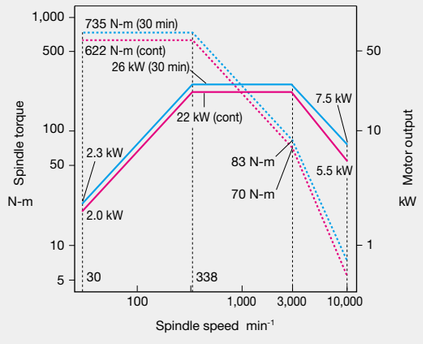
High-rigidity ram type spindlehead

- Ram size: □ 350 mm

Spindle torque/power diagrams

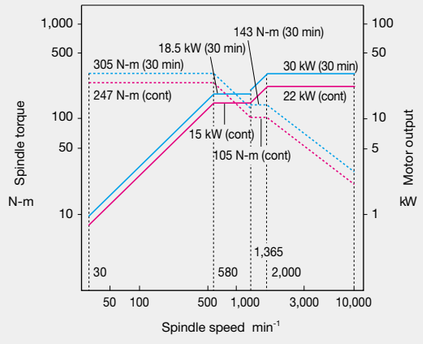
Standard spindle

- Spindle speed ..... 10,000 min^{-1}
- Max output ..... 26/22 kW (30 min/cont)
- Max torque ..... 735/622 N-m (30 min/cont)



Aluminum applications (Optional)

- Spindle speed ..... 10,000 min^{-1}
- Max output ..... 30/22 kW (30 min/cont)
- Max torque ..... 305/247 N-m (30 min/cont)



Advanced, high surface quality technology dramatically reduces polishing work

Reduction of hand finishing time

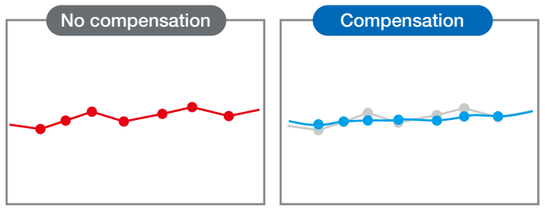
Hyper-Surface

Automatically compensates for disturbances in part programs that lead to defective machining surfaces, achieving high quality surfaces without streaks. Because it can reduce grinder polishing, imperfect shapes are prevented, to reproduce exactly what the designer wanted.

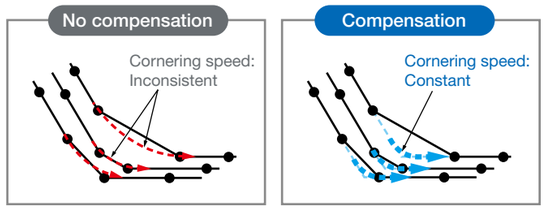
Improve machined surface quality by suppressing variations in command position and feed rates

Automatically compensates for small variations in machining data command positions of output from a CAM processor. And passing speeds for each cutter path at corners are made consistent. That stabilizes feed rates and improves surface quality.

Smooths minor fluctuations and variations In command points



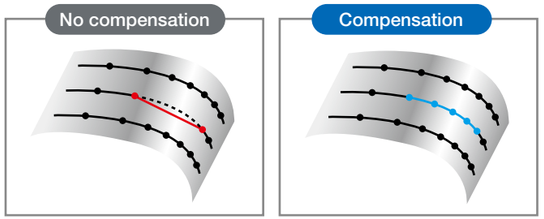
Consistent passing speeds to align corner paths



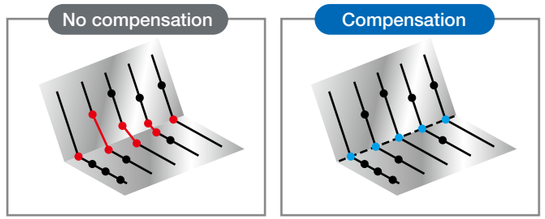
Aligning adjacent cutter paths, reducing ridges

Correcting uneven spaces between adjacent cutter paths, and reducing inconsistent valley depths and edge widths.

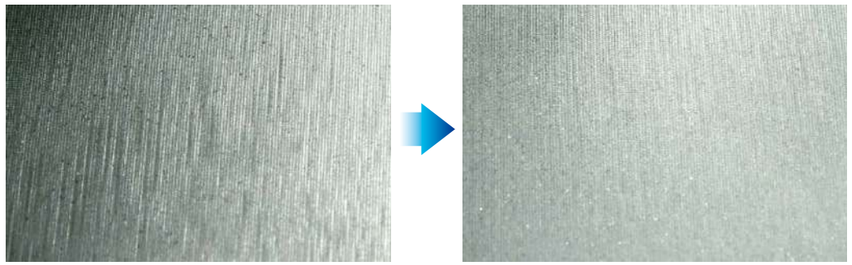
Adjust steps errors between adjacent cutter paths



Reproducing edge lines between sides



Comparison of machined surface quality



Hyper-Surface
No compensation

Hyper-Surface
Compensation

High-accuracy engineering drastically reduces hand finishing times in die alignments

Area step errors 10 µm or less Machine designed to achieve high geometric accuracies

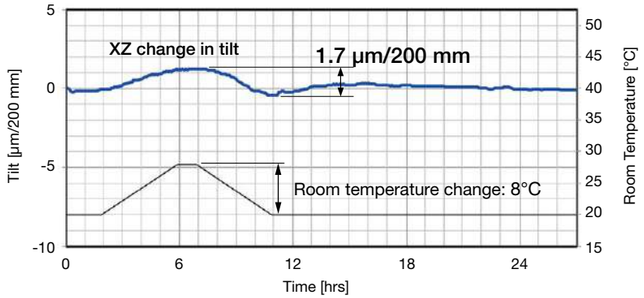
Enhanced Thermo-Friendly Concept

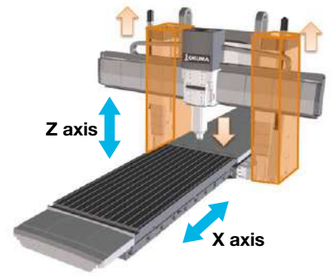
Without column cooling (as before), the new machine design further adjusts the thermal balance of the column, etc by suppressing Z-axis tilt that occurs with ambient temperature change — even better than ever.
Even with long periods of operation, it is possible to reduce the step height errors caused by corner cuts to reduce the time required for hand finishing.

Z-axis tilt due to ambient temperature change

1.7 µm/200 mm (actual data)*1

Ambient temperature change: 8°C in the X-axis direction

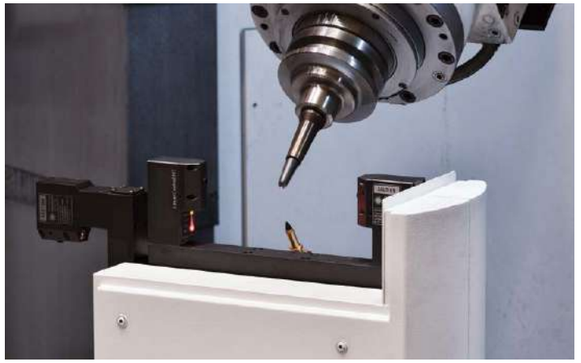




*1. Calculated from measurement displacement at the height of 500 mm

The swivel type laser sensor is mounted behind the table near the cutting point (Optional)

Measurement of tool length with the swivel type laser sensor eliminates cutting edge position error caused by differences in indexing angle and rotation speed of the tool, to minimize area step errors.



The swivel type laser sensor is mounted behind the table near the cutting point. Since the measuring device also turns with the indexing of the attachment head measurement of the cutting edge position is done while in the machining area.

Okuma's advanced technology enhance machine shop performance

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

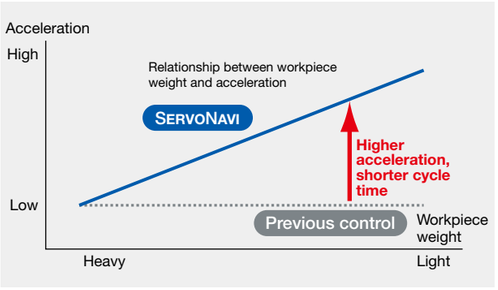
On table travel type machining centers, the table feed acceleration with the previous system was the same regardless of weight, such as workpieces and fixtures loaded on the table.
Work Weight Auto Setting estimates the weight of the workpiece and fixture on the table and automatically sets servo parameters, including acceleration, to the optimum values. Cycle times are shortened with no changes to machining accuracy.

Comparison of press die finishing times

▶ Cycle time reduced 12%

● Previous: About 13 h
● SERVONAVI: About 11.5 h

Simulated comparison.
Especially beneficial for dies requiring sculptured surface shaping.



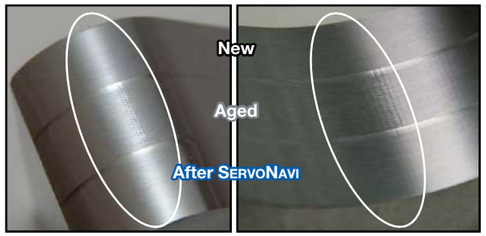
SERVONAVI SF (Surface Fine-tuning)

● 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).
Reversal Spike Auto Adjustment maintains machining accuracy by switching servo parameters to the optimum values matched to changes in slide resistance.

Comparison of machined surface quality

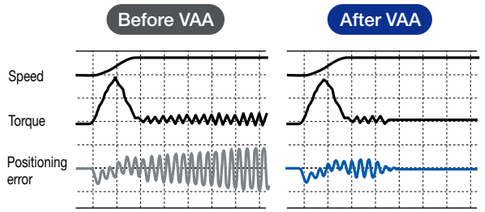


● Contributes to longer machine life

Vibration Auto Adjustment

When aging changes machine performance, noise, vibration, crease marks, or fish scales may appear. VAA can quickly eliminate noise and vibration even from machines with years of operation.

Comparison of following error during feed axis movement



MCR-BⅢ (30 × 50) X-axis rapid traverse positioning time
[rapid traverse: 15 m/min]

● Maintaining high quality machined surfaces on dies/molds

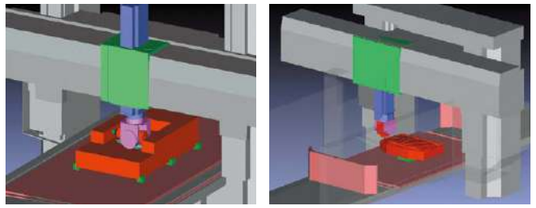
Deflection Auto Adjustment

With fast accleration/deceleration in the machining of dies and molds, etc, positioning error due to bending (ball screw expansion/contraction) can affect the machined surface quality. Deflection Auto Adjustment maintains the surface quality of die/mold machined surfaces by automatically adjusting the servo parameters to match the amount of bending, even when positioning error (amount of bending) has changed as a result of changes over time.

Setups, first-part cycle times greatly reduced
Collision prevention ## Collision Avoidance System (Optional)

"Concentrate on machining" without collision worries

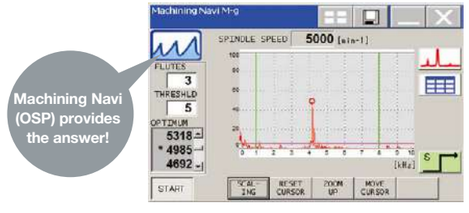
NC controller (OSP) with 3D model data of machine components— workpiece, tool, fixture, spindle, attachment head— performs real time simulation just ahead of actual machine movements. In both automatic operation and manual movements, advance checks are made for interference or collisions and the machine movement is stopped.
Machinists (novice or pro) will benefit from reduced setup and trial cycle times, and the confidence to focus on making parts.



Longer tool life and shorter machining times by optimizing cutting conditions
Cutting condition search for milling/machining ## Machining Navi M-*g*Ⅱ (Optional)

Maximizing machine tool performance

Navigates effective measures by detecting and analyzing machining chatter with a microphone attached to the machine. Effects are seen mainly on high rotation chatter with M-*g*Ⅱ.



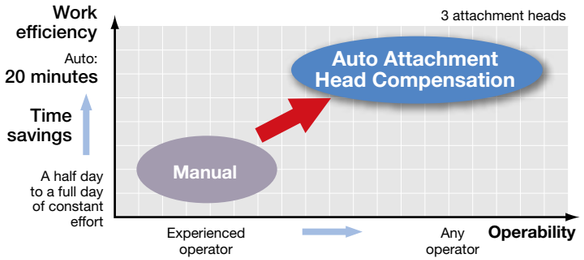
Auto Attachment Head Compensation (Optional)

Rotation compenstion that used to take half day to a full day now done automatically in twenty minutes*

Auto Attachment Head Compensation is a function that is automatically sets attachment head rotation compensation values. It is quick, easy and can be used by any operator. By setting the compensation values, the program commands can be made for tool tip position even with different attachment head type and rotation tilt. Creation of NC programs and machine operation becomes much easier.
Auto Attachment Head Compensation performs this rotation compensation work automatically, enabling automatic setting in 20 minutes* for a task that used to take an experienced operator a half to full day with three attachment heads. High machining accuracy can also be maintained with regular measurements.

*The time needed for automatic settings differs with the attachment head.

The datum sphere is fixed to the table and measurement preparations are completed by simply positioning the attachment head with attached touch probe near the top of the datum sphere.

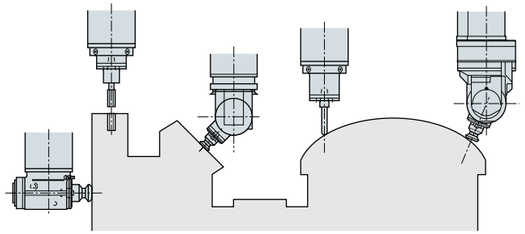


Note: AAHC requires Okuma's auto gauging and auto zero offset functions (with touch probe).

Lineup of attachment heads suitable for advanced die making

Abundant range of attachment heads (Built-in)

All kinds of shapes can be machined under the best conditions by changing the abundant variation of heads.
Many different processes can be performed continuously in auto operation with the auto tool changer (ATC) and auto attachment changer (AAC), greatly increasing productivity.

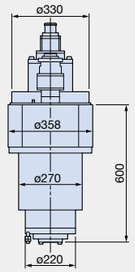


High-speed machining

- Max spindle speed: 15,000 to 30,000 min^{-1}
- Continuous cutting feed rate: Max X/Y axis: 20 m/min
  Max Z axis: 10 m/min

Extension head

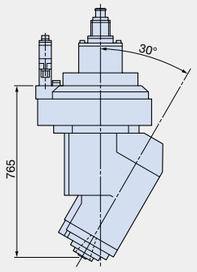
■ 15,000 min^{-1} 11 kW
20,000 min^{-1} 15 kW



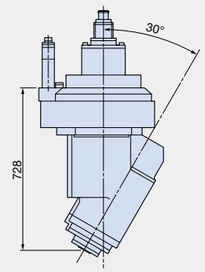
Unit: mm

30° angular heads

■ 30° angle
20,000 min^{-1} 15 kW



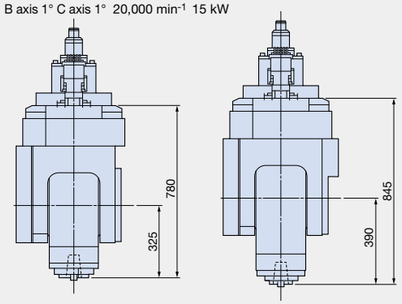
■ 30° angle
30,000 min^{-1} 11 kW



Unit: mm

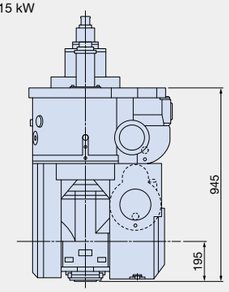
Universal index head (B-/C-axis), NC-BC Universal head

■ Universal index head (B-/C-axis)
B axis 1° C axis 1° 20,000 min^{-1} 15 kW



Unit: mm

■ NC-BC Universal head
20,000 min^{-1} 15 kW



Unit: mm

Smooth discharge of large amounts of chips

Recommended specifications for chip discharge

○ : Recommended △ : Conditionally recommended

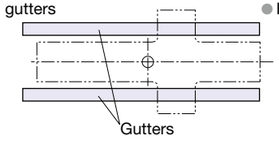
Material		Steel, stainless steel	FC	Aluminum, titanium, non-ferrous metal	Mixed (general)*1	Special blank materials
Chip shape						Ceramic, carbon, class, etc.
In-machine chip conveyor	Full length gutters (Std)	○	○	○ (*2 Chip flusher)	○	○
	Hinge type	○	○	○	○	—
Off-machine chip conveyor (Collection conveyor) (Optional)	Hinge type	○	○ (Dry)	—	△ (*3)	—
	Scraper type	—		—	—	—
	Magnet scraper type	—	○ (Wet)	—	—	—
	Hinge + scraper (with drum filter)	△ (*1)	△ (*1)	○	○ (*4)	—

*1. When there are many fine chips *2. Chip flusher is an optional specification *3. When there are few fine chips *4. With magnets

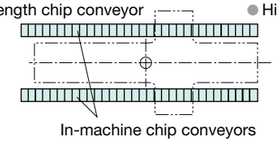
Example of chip conveyor placement

■ In-machine chip discharge

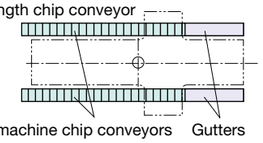
- Full length gutters (Std)



- Hinged full-length chip conveyor

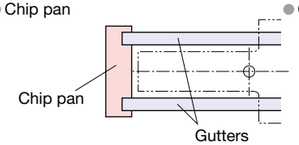


- Hinged half-length chip conveyor

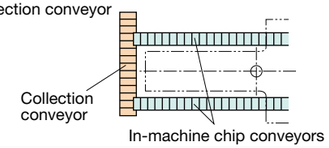


■ Off-machine chip discharge

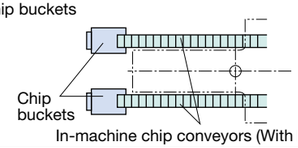
- Chip pan



- Collection conveyor

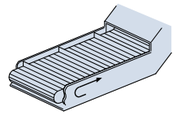
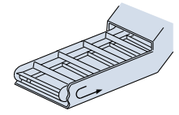
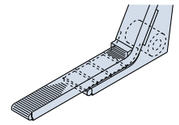


- Chip buckets



Note: Conveyor chip discharge direction (rear), off-machine chip conveyor discharge direction (operation side, magazine side), chip coolant tank position, etc. can be combined to match space. Please consult with your Okuma sales representative to confirm final arrangements.

Collection conveyor chip discharge (lift-up conveyors)

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

Machine Specifications

Model			MCR-S 25			MCR-S 30		
Item			25 × 40	25 × 50	25 × 65	30 × 40	30 × 50	30 × 65
Travel								
	X-axis (table front / back)	mm (in.)	4,200 (165.35)	5,200 (204.72)	6,700 (263.78)	4,200 (165.35)	5,200 (204.72)	6,700 (263.78)
	Y-axis (spindlehead horizontal)	mm (in.)	3,200 (125.98)			3,700 (145.67)		
	Z-axis (ram vertical)	mm (in.)	800 [1,000] (31.50 [39.37])					
	W-axis (crossrail vertical)	mm (in.)	1,000 (39.37)			1,200 (47.24)		
	Effective width between columns	mm (in.)	2,650 (104.33)			3,150 (124.02)		
	Table to spindle nose	mm (in.)	0 to 1,550 (0 to 61.02)			0 to 1,750 (0 to 68.90)		
Table								
	Working surface	mm (in.)	2,000 × 4,000 (78.74 × 157.48)	2,000 × 5,000 (78.74 × 196.85)	2,000 × 6,500 (78.74 × 255.91)	2,500 × 4,000 (98.43 × 157.48)	2,500 × 5,000 (98.43 × 196.85)	2,500 × 6,500 (98.43 × 255.91)
	Maximum load	kg (lb)	22,000 (48,400)	27,000 (59,400)	34,000 (74,800)	25,000 (55,000)	33,000 (72,600)	43,000 (94,600)
	T-slots Width x No. <center pitch>	mm	24H7 × 11 (center 200, both ends 130)			24H7 × 13 (center 200, both ends 180)		
	Height from machine bottom	mm (in.)	850 (33.46)			900 (35.43)		
Spindle								
	Speed range	min^{-1}	30 to 10,000					
	Taper bore		7/24 taper No. 50					
	Bearing diameter	mm (in.)	ø85 (3.35)					
Feedrates								
	Rapid traverse	m/min (fpm)	X: 30, Y: 32*1, Z: 15 (X: 98.43, Y: 104.99*1, Z: 49.22)					
	Feedrate	m/min (fpm)	X: 20, Y: 20, Z: 15 (X: 65.62, Y: 65.62, Z: 49.22)					
	Average continuous feedrate	m/min (fpm)	X: 20, Y: 20, Z: 10 (X: 65.62, Y: 65.62, Z: 32.81)					
	W axis traverse (crossrail)	m/min (fpm)	4.8 (15.75)					
Automatic Tool Changer								
	Tool shank		MAS BT50					
	Pull stud		MAS P50T-2					
	Tool magazine capacity	tools	50 [80, 100, 120, 180]					
	Max tool diameter	mm (in.)	w/ adjacent tools: ø135 (5.31), w/o adjacent tools: ø230 (9.06)					
	Max tool length	mm (in.)	400 (15.75)					
	Max tool weight	kg (lb)	25 (55)					
	Tool selection		Fixed adress					
Motors								
	Spindle drive	kW (hp)	26/22 (35/30) (30 min/cont)					
	Axis feed drives	kW (hp)	X: 14.0, Y: 6.4, Z: 5.2 × 2 (X: 18.6, Y: 8.5, Z: 6.9 × 2)					
	Crossrail traverse drive	kW (hp)	W: 5.6 × 2 (7.5 × 2)					
Power Sources								
	Electrical power supply	kVA	60*2					
	Compressed air supply	L/min (ANR)	1,040 (0.5 MPa or more)*2					
Machine Size								
	Height	mm (in.)	6,420 [6,620] (252.76 [260.63])			6,700 [6,900] (263.78 [271.65])		
	Floor space (machine only)	mm (in.)	7,370 × 10,730 (290.16 × 422.44)	7,370 × 12,830 (290.16× 505.12)	7,370 × 16,430 (290.16× 646.85)	7,870 ×10,730 (309.84 × 422.44)	7,870 × 12,830 (309.84 × 505.12)	7,870 × 16,430 (309.84 × 646.85)
	Weight (machine only)*3	kg (lb)	46,000 (101,200)	52,000 (114,400)	60,000 (132,000)	53,000 (116,600)	58,000 (127,600)	67,000 (147,400)
CNC			OSP-P300MA					

[ ]: Optional

*1. Deceleration near both ends of Y-axis travel

*2. Standard specs

*3. With 50-tool magazine, 2-station AAC

Standard Accessories

Main motor and standard electricals		Spindle air curtain	
Spindle cooler, ram slideway, feed axis coolers	Oil controller	Magazine tool loader	
		ATC magazine safety fence	
AbsoScale detection (X, Y, Z axis)		Column slideway covers	
Thermo-Friendly Premium Note: Refer to the table below.	Includes TAS-S	Crossrail clamp system	
		Seesaw pendant operation panel	Elevation: 600 mm
Synchronized NC W-axis		Work lamp	LED
Hydraulic unit		Status indicator	3-color LED
Automatic Tool Changer	No. of tools: 50	Door interlock	
Z axis double ball screw		Tool kit	
Full length gutter	Both machine sides	Tapered bore cleaning bar	
ATC air blower (blast)		Tool box	

	Thermo-Friendly Premium
Spindle thermal deformation control technology	**Thermo Active Stabilizer—Spindle (TAS-S)** Thermal deformation from spindle rotation controlled with high accuracy.
Environmental thermal deformation control technology	**Thermo Active Stabilizer— Construction for large machines (TAS-C²)** TAS-C² : Thermo Active Stabilizer - Table Thermo Active Stabilizer - Construction In addition to TAS-T (highly accurate displacement control of table thermal growth), even with ambient temperature changes, providing optimal machine control to maintain required machining accuracies during ambient temperature changes.

Kit Specifications

Machine kit specs Kit	S	A	P	AP
Attachment head ATC	●	●	●	●
Attachment head auto attaching/indexing unit (AAC)		●		●
Attachment head manual tool changing	●	●	●	●
Attachment head coolant lines	●	●	●	●
Auto pallet changer (APC) preparations			●	●
X-axis 2.0-m travel extension (side shuttle APC)			●	●

Optional Specifications

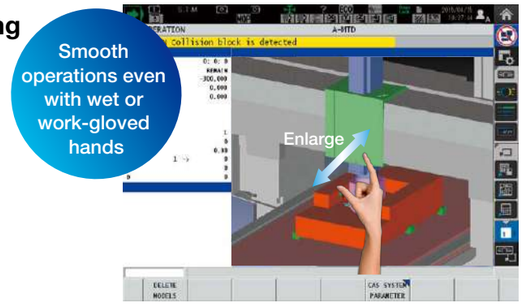
Automatic pallet changer	2-pallet side shuttle (2.0 m extension in X-axis travel)	Attachment head accelerator preps	
		Angle head preps	
Optional Z-axis travel	1,000 mm	Auto attachment changer (AAC)	2 stations to 7 stations
Coolant system		Attachment head	Please consult
Coolant tank	500 L, 1000 L	Dust-proofing	
Coolant heater/cooler		NC rotary tables	NC rotary table, inclined rotary table
Oil skimmer		Mist collector	
Filtration system		Dust collector	
Semi-dry machining		Full-enclosure shielding	Column front/back covers, w/o ceiling With ceiling (auto open/close)
Thru-spindle coolant *	High/low pressure switch (2 MPa, 7 MPa)		
Centralized coolant application		Auto tool length compensation & breakage detection	Touch sensor system, Laser sensor system
Coolant pump	0.75 kW, 1.1 kW		
Oil mist coolant	Eyeball nozzle	Auto gauging & auto zero offset	Touch probe
Oil-hole coolant system	High/low pressure switch (2 MPa), Simple system	In-machine conveyors	Full length, lift-up type Half length, lift-up type Full length gutter + gutter chip flusher
Chip air blower (blast)			
ATC tool magazine capacity	80, 100, 120, 180 tools		
ATC tools	Tool weigth (35 kg × 100 mm)	Chip flushers	Crossrail shower (L/R column front), front/back gutters with telescopic covers, work wash gun
Tool shank profile	CAT 50, DIN 50		
Pull stud shape	MAS 1, special CAT		
Table T-slot width	20H7, 22H7, 28H7	Collection conveyors	Hinged, hinge + scraper (w/ drum filter) Hinged + magnetic separator
Table cross slot width	Please consult for width depth, pitch		
Optional table width	+300 mm	Chip buckets	L type, H type
High column specs	200 mm, 400 mm (please inquire for higher specs)	Pendant arms	Parallel linked, manual, electric, floor mounted, front/back travel types
Optional W axis travel	Standard travel can accommodate up to +200 mm, +400 mm	Foundation methods	Chemical anchors, no foundation bolts (foundation pad only)
Fire regulations compliance		Machine foundation pit work	50 to 1,400 mm, Please consult
Automatic extinguisher		Optional control cabinet positions	
Ram oil pan slush collector		*. Okuma pull stud required for thru-spindle coolant.	
Door interlock	Type Ⅱ for double-column machining center (memorandum required)		

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.

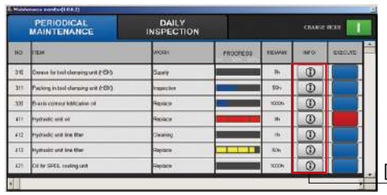


"Just what we wanted."— Refreshed OSP suite apps

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

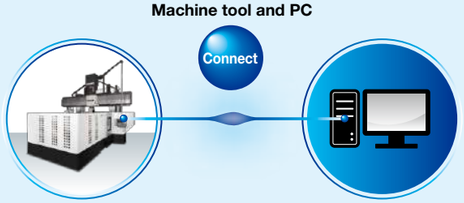
Automatic saving of recorded alarms
Screen Capture

Easy programing without keying in code
Scheduled Program Editor

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

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, W simultaneous 4-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	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 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		Thermo-Friendly Premium (Thermo Active Stabilizer—Spindle TAS-S, Thermo Active Stabilizer—Construction for large machines TAS-C[2]), AbsoScale detection X-Y-Z axes, Pitch error compensation, SERVONAVI, Hyper-Surface*1
Energy-saving	ECO suite	ECO Idling Stop, ECO Power Monitor*2

*1. Replaced by Super-NURBS for 5-axis applications.
*2. The power display shows estimated values. When precise electrical values are needed, select the wattmeter option.

Optional Specifications

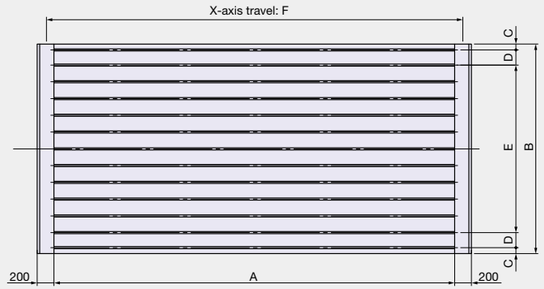
Item	Kit Specs*1	NML E	NML D	3D E	3D D	AOT E	AOT D
Interactive functions							
Advanced One-Touch IGF-M (Real 3-D simulation included)						●	●
Interactive MAP (I-MAP)				●	●		
Programming							
Auto scheduled program update (Scheduled program is standard)		●	●	●	●	●	●
Additional G/M code macros							
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 degrees)		●	●	●	●	●	●
3-D circular interpolation							
Synchronized Tapping II							
Arbitrary angle chamfering		●	●	●	●	●	●
Cylindrical side machining							
Slope machining							
Tool max rotational speed setting							
F1-digit feed	4 sets, 8 sets, parameter						
Programmable travel limits (G22, G23)		●	●	●	●	●	●
Skip (G31)							
Axis naming (G14)							
3-D tool compensation							
Tool wear compensation			●		●		●
Drawing conversion	Programmable mirror image (G62)		●		●		●
	Enlarge/reduce (G50, G51)		●		●		●
User task 2	I/O variables (16 each)						
Tape conversion*2							
Leading edge offset*2							
Inverse time feed							
Alignment compensation							
Monitoring							
Real 3-D simulation				●	●	●	●
Simple load monitor	Spindle overload monitor	●	●	●	●	●	●
NC operation monitor	Hour meter, work counter	●	●	●	●	●	●
Hour meters	Power ON, spindle run/NC ON, machining						
Operation end buzzer	With M02, M30, and END commands						
NC work counter	With M02 and M30						
MOP-TOOL	Adaptive control, overload monitor						
Tool life management	Hour meter, No. of workpieces	●	●	●	●	●	●
Energy-saving function ECO suite							
ECO Operation							
ECO Power Monitor	On-machine wattmeter						
Energy-saving hydraulic unit	Inverter system						
	ECO Hydraulics						

Item	Kit Specs*1	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					
Gauging data printout	File output						
Manual gauging (w/o sensor)		●	●	●	●	●	●
Interactive gauging (touch setter, touch probe required)							
External I/O communication							
RS-232-C connector							
DNC-T3							
DNC-B (RS-232C-Ethernet transducer used on OSP side)							
DNC-DT							
DNC-C/Ethernet							
Additional USB 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, BCD (2-digit, 4-digit)						
Cycle time reduction (ignores certain commands)							
High-speed, high-precision							
Straightness compensation							
0.1 µm control (command unit for linear axes)							
Simultaneous 5-axis kit							
Other							
Control cabinet lamp (inside)							
Circuit breaker							
Sequence operation	Sequence stop	●	●	●	●	●	●
Upgraded sequence restart	Mid-block return		●		●		●
Pulse handle	2 pts, 3 pts (Std: 1 pt)						
LCD pulse handle							
External M code	4-point, 8-point						
Collision Avoidance System*3							
Machining Navi M-gII (cutting condition search)							
One-Touch Spreadsheet							
Block skip	3 sets						
Feed axis retract							
OSP-VPS (virus protection system)							
19-inch operation panel							

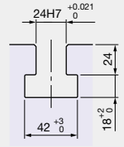
*1. Kit full forms: NML: Normal, 3D: Real 3D simulation, E: Economy, D: Deluxe
AOT: Advanced One-Touch IGF-M
*2. Requires technical consultation
*3. Simultaneous operation with Hyper-Surface has some limitations.

Table dimensions

Unit: mm



T-slot details

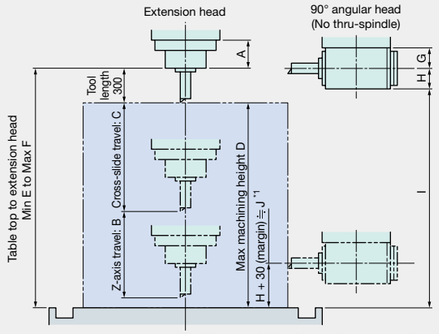


Unit: mm

Size		A	B	C	D	E	F
25	25 × 40	4,000	2,000	70	130	8×200 =1,600	4,200
	25 × 50	5,000					5,200
	25 × 65	6,500					6,700
30	30 × 40	4,000	2,500		180	10×200 =2,000	4,200
	30 × 50	5,000					5,200
	30 × 65	6,500					6,700

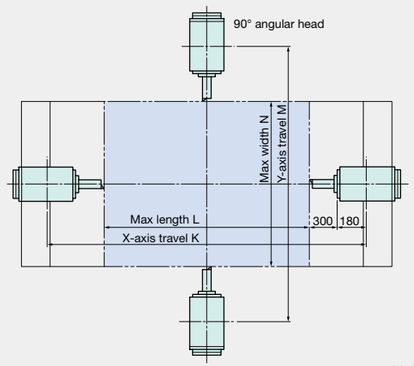
Working Range Drawings

● **Extension head, 90° angular head**
Max height (300-mm tool length)



*1. "J"; to avoid interference between attachment head and table.

● **90° angular head**
Max width × length (300-mm tool length)



Extension head Unit: mm

Size		EW BC*	A L250 Spec	A L350 Spec	B	C	D L250 Spec	D L350 Spec	E	F L250 Spec	F L350 Spec
25	25 × 40	2,650	250	350	800	1,000	1,250	1,150	0	1,550	1,450
	25 × 50										
	25 × 65										
30	30 × 40	3,150				1,200	1,450	1,350		1,750	1,650
	30 × 50										
	30 × 65										

90° angular head Unit: mm

Size		EW BC*	G L150 Spec	G L250 Spec	H L150 Spec	H L250 Spec	I L150 Spec	I L250 Spec	J L150 Spec	J L250 Spec
25	25 × 40	2,650	150	250	112	117	1,538	1,433	140	150
	25 × 50									
	25 × 65									
30	30 × 40	3,150					1,738	1,633		
	30 × 50									
	30 × 65									

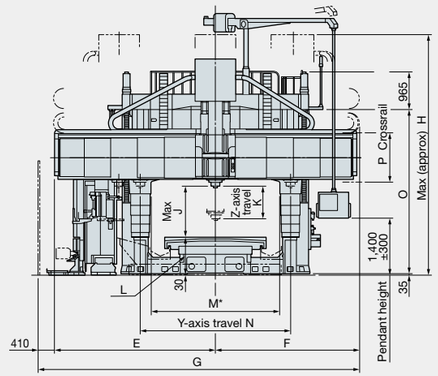
Unit: mm

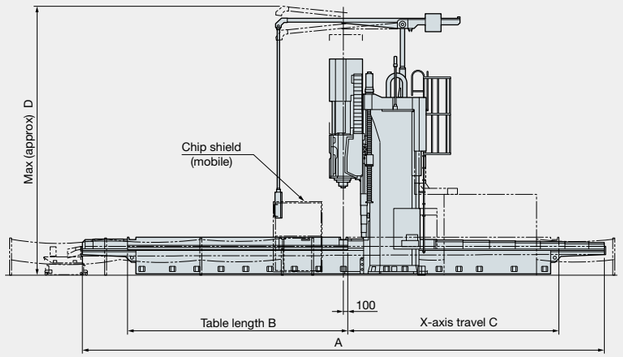
Size		EWBC*	K	L	M	N
25	25 × 40	2,650	4,200	3,240	3,200	2,240
	25 × 50		5,200	4,240		
	25 × 65		6,700	5,740		
30	30 × 40	3,150	4,200	3,240	3,700	2,740
	30 × 50		5,200	4,240		
	30 × 65		6,700	5,740		

Remarks:
· The upper drawings and tables show the working range when a 300-mm long tool is attached to the extension or, 90° angular heads.
· Dimensions may change depending on specifications, so please refer to actual delivered machine specifications.

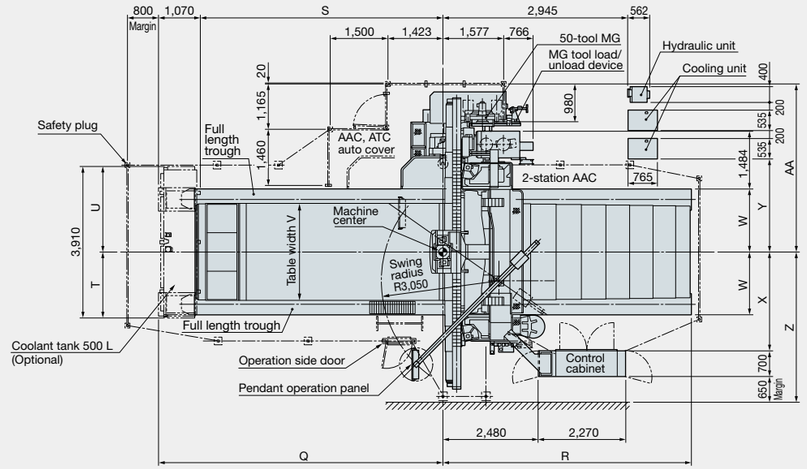
* Effective width between columns

Dimensional Drawing / Installation Drawing





* Effective width between columns



Unit: mm

Size		A	B	C	D Z-axis travel 800 specs	D Z-axis travel 1,000 specs	E	F	G	H Z-axis travel 800 specs	H Z-axis travel 1,000 specs	J	K Z-axis travel 800 specs	K Z-axis travel 1,000 specs
25	25 × 40	10,730	4,400	4,200	6,420	6,620	3,700	3,260	7,370	5,690	5,890	1,550	800	1,000
	25 × 50	12,830	5,400	5,200										
	25 × 65	16,430	6,900	6,700										
30	30 × 40	10,730	4,400	4,200	6,700	6,900	3,950	3,510	7,870	5,940	6,140	1,750		
	30 × 50	12,830	5,400	5,200										
	30 × 65	16,430	6,900	6,700										

Size		L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA
25	25 × 40	850	2,650	3,200	3,650	1,000	6,310	5,400	5,240	1,455	2,455	2,000	1,386	2,280	2,150	3,630	4,110
	25 × 50						7,360	6,450	6,290								
	25 × 65						9,160	8,250	8,090								
30	30 × 40	900	3,150	3,700	4,025	1,200	6,310	5,400	5,240	1,705	2,205	2,500	1,636	2,530	2,400	3,880	4,360
	30 × 50						7,360	6,450	6,290								
	30 × 65						9,160	8,250	8,090								

* Dimensions may change depending on specifications. Please refer to final delivered machine specifications.

MCR-S (Super)

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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