

# Double-Column Machining Centers

[5-Face Machining]





Okuma has worked closely with manufacturers in their machine shops for half a century since the first double-column machining center was launched in 1964. The reliable product quality has provided manufacturing excellence for satisfied customers worldwide, with cumulative sales approaching 10,000 units.

# Quality is Okuma's responsibility.

We embody that spirit in our quality.

Okuma's "double-column machining center" is a brand that has always met the expectations and quality standards of machine shop leaders by delivering on their basic performance requirements like high rigidity and accuracy, ease of use and better environmental performance as a matter of course. In addition to being the face of the Okuma brand, all of our machines incorporate the determination and will to support global manufacturing.

# Providing solutions for heavy cutting, with high accuracy and surface quality for all kinds of large parts, and significant improvement in productivity through process-intensive 5-face machining

High accuracy and rigidity impresses machine shop operators. Okuma double columns, with proprietary Thermo-Friendly Concept, providing high-quality solutions in all key industries: aerospace, railway, die/mold, power generation, shipping, and industrial machinery.

A general-purpose machine for a variety of applications from high-accuracy machining to heavy-duty cutting



## MCR-BV

### 01 High accuracy

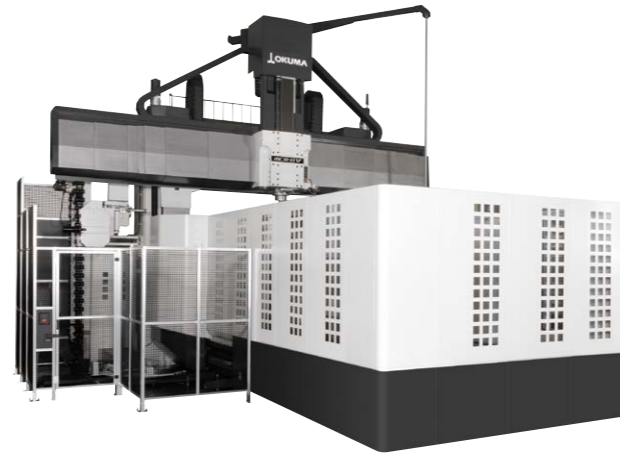
High accuracy machining specs are standard

### 02 High efficiency

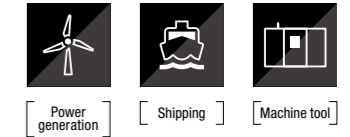
Spindle with high torque and output integral motor/spindle: standard

### 03 Attachment head variations

More than 100 types available



With overwhelming cutting ability, for machining large parts of heavy industry



## MCR-C

### 01 High rigidity, powerful cutting

Highly rigid ram with 420 x 425 mm cross section  
Maximum torque: 2,025 N-m

### 02 Large work envelope

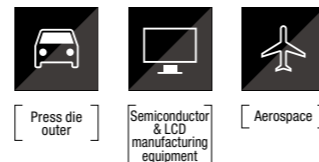
Wide width between columns, long travels handle big and tall parts

### 03 Stable, high-accuracy machining

Achieving stable, highly accurate machining with highly rigid machine construction



Super fast, high-quality machine achieves innovative production of press dies



## MCR-S

### 01 High speed

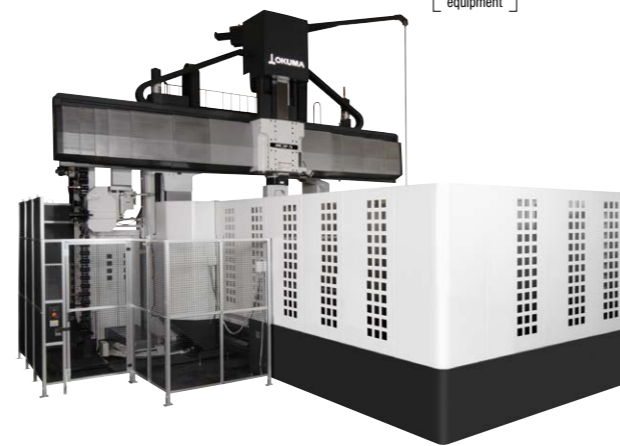
Achieves class fastest continuous cutting feed while maintaining high shape accuracy and surface quality

### 02 High surface quality

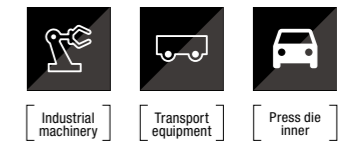
Standard equipped specs achieve high surface quality dies

### 03 High efficiency

From roughing to finishing, machine rigidity withstands heavy cutting to reduce production lead times of complete molds with one machine



A superb general-purpose machine for smaller footprint and better cost-performance



## MCR-A5CII

### 01 Space saving

2-station ACC placed on right column side minimizes machine width

### 02 5C Kits

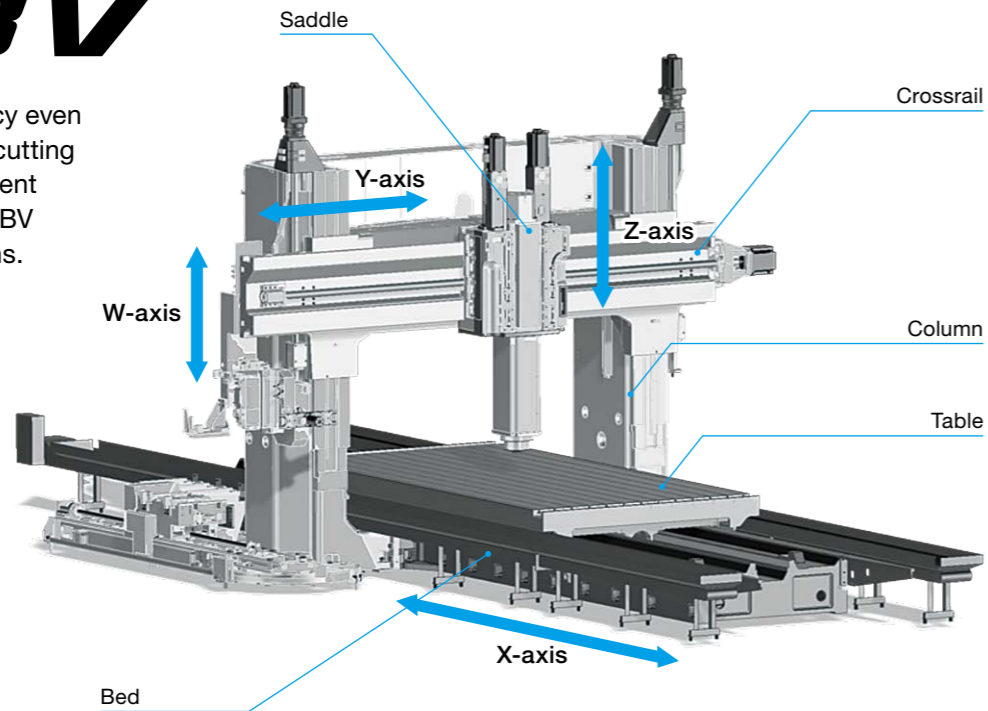
Kit specifications available for general-purpose 5-face machining



## A general-purpose machine for various high-accuracy to heavy cutting applications

# MCR-BV

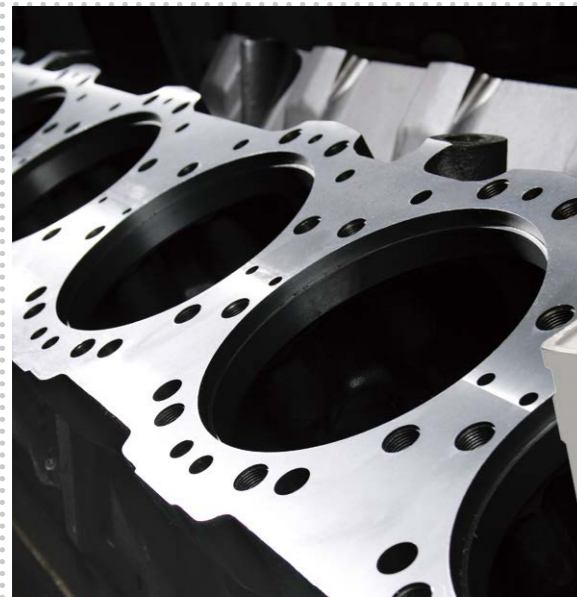
Providing stable machining accuracy even during long runs, from heavy-duty cutting of steel and castings to highly efficient machining of aluminum. One MCR-BV handles a wide range of applications.



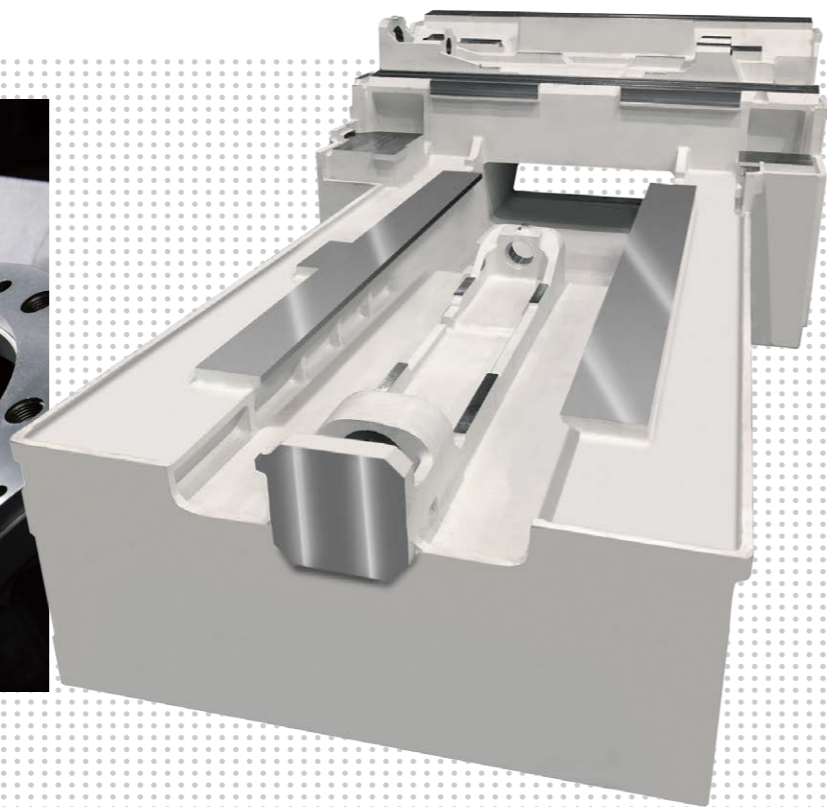
## Industries



Being used by machine tool, aircraft, railcar manufacturers and in various other core industries that require higher product accuracies.



Engine block



Medium machine tool bed

## Benefits

### 01 | High accuracy

High accuracy machining specs are standard

### 02 | High efficiency

Spindle with high torque and output integral motor/spindle: standard

### 03 | Attachment head variations

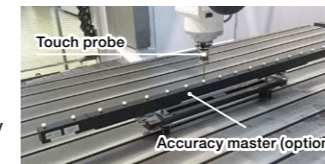
More than 100 types available

## Features

### 01 | High accuracy

#### 3D Smart Calibration System Calibrates spatial accuracy

Automatic and easy measuring of spatial accuracy with the calibration master and touch probe. Calibrating machine accuracies by any operator is easy.



#### Thermo-Friendly Premium Thermal deformation control for the large machines

Even for large machines where suppressing thermal displacement is difficult, high dimensional stability is achieved not only when ambient temperatures change, but also for machine start ups or machining restarts.



#### Accuracy Stability Diagnosis Function Self-diagnosis of changes in machine accuracy

Self-diagnosis of machine accuracy changes due to uneven factory temperatures and floor thermal deformation.

#### AbsoScale (X-Y-Z-W axes)

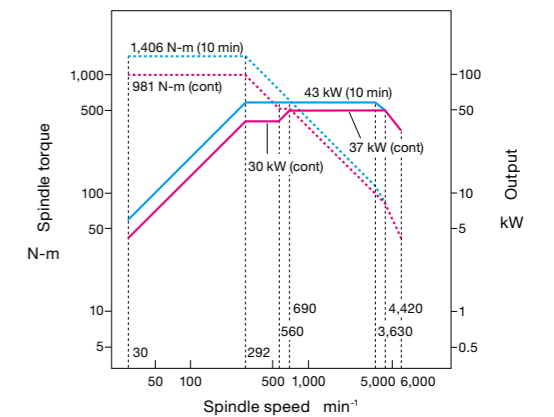
Improved positioning accuracy for each axis

### 02 | High efficiency

#### Integral motor/spindle with high torque and output

Handling everything from powerful cutting to high-accuracy finishing.

● Machining capacity: **1,170 cm<sup>3</sup>/min**  
(Material: S45C; Z-axis protrusion: 600 mm)



● Spindle speed: **6,000 min<sup>-1</sup>** (integral motor/spindle)

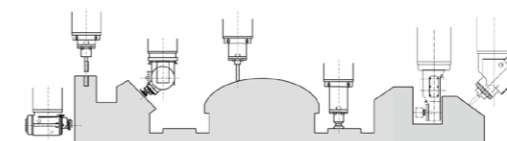
● Max output: **43/37/30 kW** (57/50/40 hp)  
(10 min/cont (high speed) / cont (low speed))

● Max torque: **1,406/981 N-m** (10 min/cont)

### 03 | Attachment head variations

#### Over 100 attachment head types to choose from

A wide variety of attachment heads are available, including the NC-BC universal head with integral motor/spindle (option). Machining parts with complex shapes can be handled by one machine, greatly improving productivity.



Special angular head NC-BC universal head

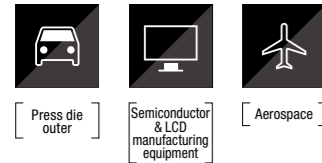
Note: The "actual data" referred to above for this brochure represent examples, and may not be obtained due to differences in specifications, tooling, cutting condition, and others.

## Super fast, high quality machining – achieving innovative press die/mold productivity

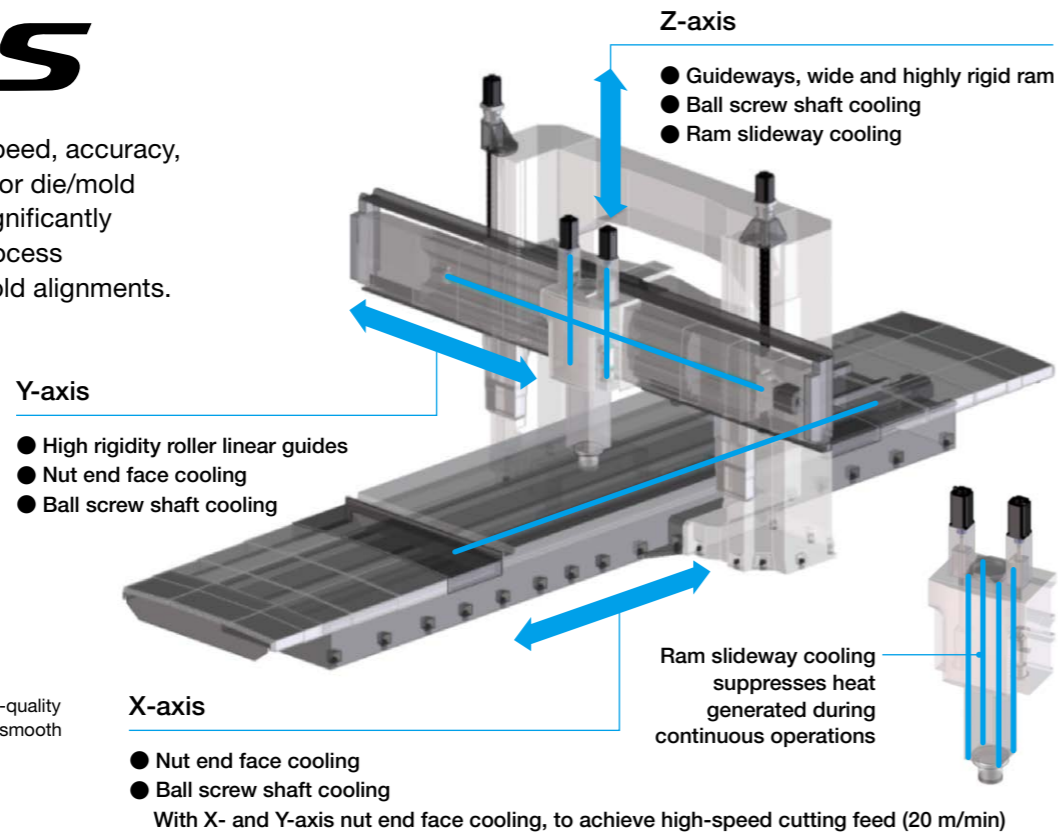
# MCR-S

Striving to provide the high speed, accuracy, and surface quality required for die/mold machining. Lead times are significantly reduced by reducing post-process polishing and upper/lower mold alignments.

### Industries



Installed in machine shops producing high-quality automobile press dies for sharp edge and smooth curve applications.



Press die outer

## Benefits

### 01 | High speed

Achieves class fastest continuous cutting feed while maintaining high shape accuracy and surface quality

### 02 | High surface quality

Standard equipped specs achieve high surface quality dies

### 03 | High efficiency

From roughing to finishing, machine rigidity withstands heavy cutting to reduce production lead times of complete molds with one machine

## Features

### 01 | High speed

#### Mechanical structure enables high-speed continuous cutting feed and 20,000 min<sup>-1</sup> high-speed attachment head applications

Achieving 25% shorter cycle times while maintaining shape accuracy with optimum cooling. The machine design ensures minimal following error even at fast feed rates.

- Average continuous cutting feed rates

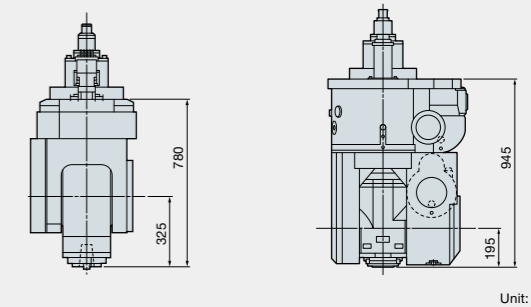
X-, Y-axis: **20 m/min** Z-axis: **10 m/min**

- Cycle times

**25% less\*** (Previous machine: 7 hr 13 min; MCR-S: 5 hr 25 min)

\* Automobile side panel machining compared to the previous machine.

- BC-axis universal index head  
1° B-axis, 1° C-axis; 20,000 min<sup>-1</sup>, 15 kW (30 min) (integral motor/spindle)
- NC-BC universal head  
20,000 min<sup>-1</sup>, 15 kW (30 min) (integral motor/spindle)



### 02 | High surface quality

#### Hyper-Surface

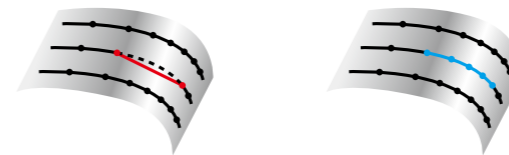
##### Reducing hand finishing times

Achieving auto compensation of part program disturbances that lead to part defects, and high surface quality cuts that suppress machining surface ridges.

- Adjust steps errors between adjacent cutter paths

No compensation

Compensation



#### Thermo-Friendly Premium

##### Controlling thermal deformation in large machines

Z-axis tilt due to ambient temperature change reduced to 1.7 μm/200 mm, and step error to 10 μm or less.

#### AbsoScale (X-Y-Z-W axes)

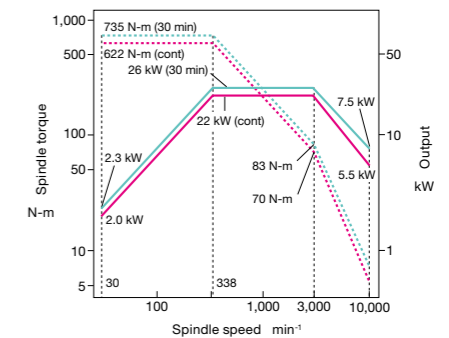
##### Improved positioning accuracy for each axis

### 03 | High efficiency

#### High torque and power integral motor/spindle

Heavy cutting with a powerful spindle reduces cycle times. Roughing to finishing with one machine also shortens setup change times significantly.

- Machining capacity: **710 cm<sup>3</sup>/min**  
(Workpiece: S45C; Z-axis protrusion: 800 mm, omnidirectional machining)



- Spindle speed: **10,000 min<sup>-1</sup>**

- Max output: 26/22 kW (30 min/cont)
- Max torque: 735/622 N-m (30 min/cont)

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With tremendous cutting capacity for the large parts of heavy industry

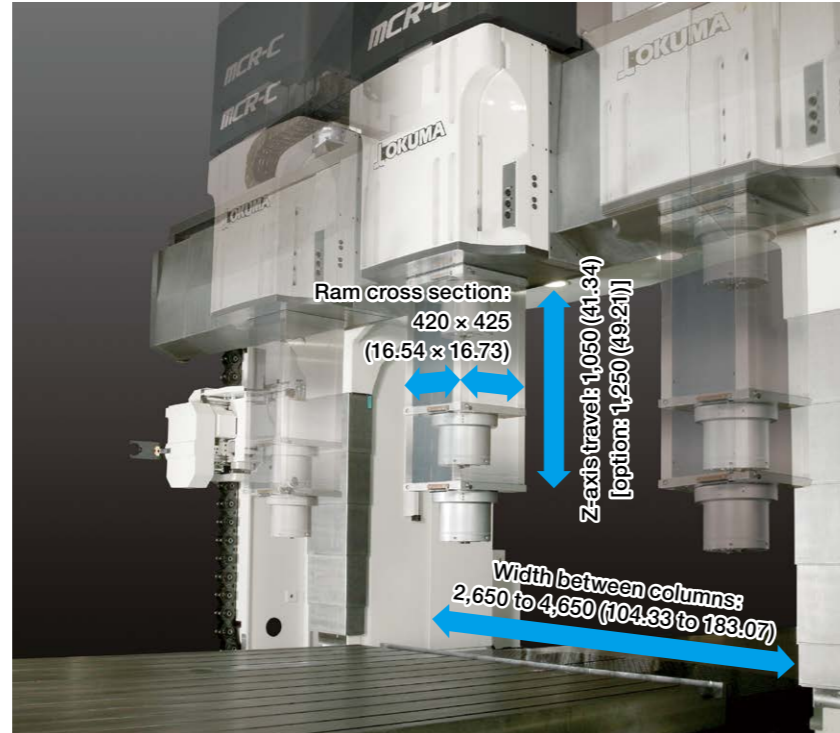
# MCR-C

Achieving highly efficient roughing to highly accurate finishing of the super large parts of heavy industry, with this one machine.

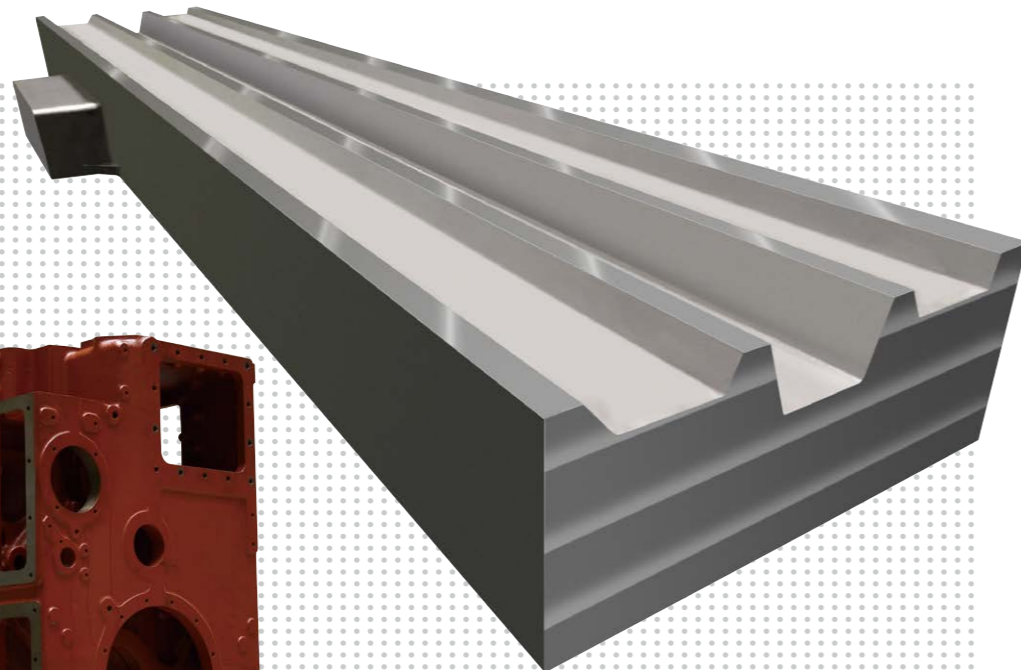
## Industries



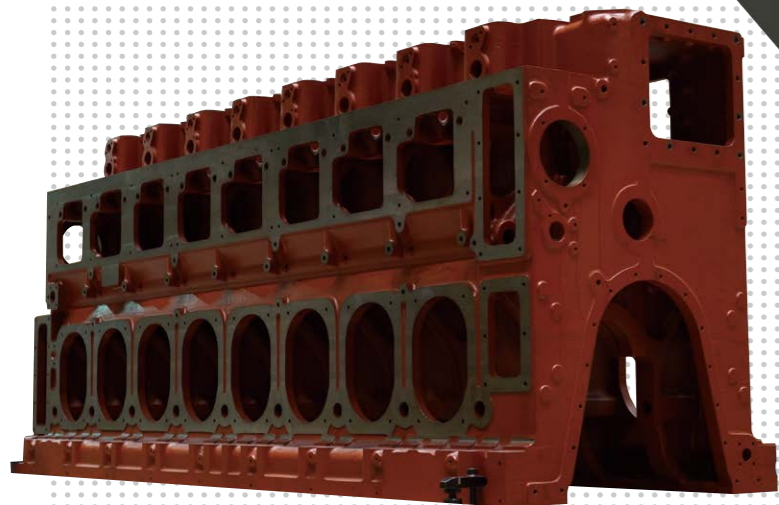
Installed in machine shops producing large parts requiring powerful, high output and high torque applications.



Unit: mm (in)



Large machine tool bed



Cylinder block

## Benefits

01 | High rigidity, powerful cutting

Highly rigid ram with 420 x 425 mm cross section  
Max torque: 2,025 N-m

02 | Large work envelope

Wide width between columns, long travels handle big and tall parts

03 | Stable, high-accuracy machining

Achieving stable, highly accurate machining with highly rigid machine construction

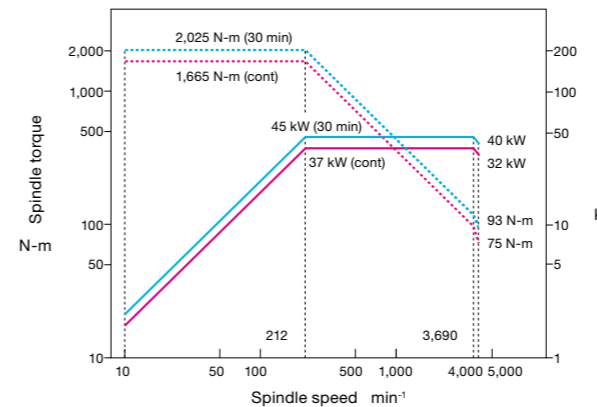
## Features

01 | High rigidity, powerful cutting

### Equipped with gear driven ram spindle to deliver powerful machining

Ram structure with the largest cross-sectional area in the Okuma series of double columns. The ram rigidity supports powerful cuts with horizontal spindles.

● Ram size: **420 x 425 mm**  
(16.54 x 16.73 in)

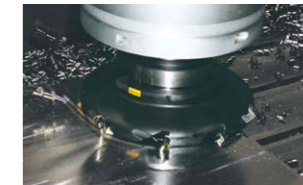


● Spindle speed: 4,000 min<sup>-1</sup> (gear)

● Max output: **45/37 kW** (60/50 hp) (30 min/cont)

● Max torque: **2,025/1,665 N-m** (30 min/cont)

### High output extension heads (option)



● Machining capacity: **1,210 cm<sup>3</sup>/min**  
(spindle bearings ID: ø130, L250)

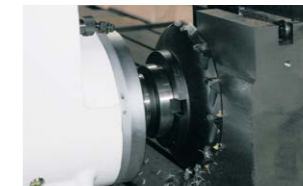
ø250 mm 10-blade face mill

● Cutting feed rate: 188 m/min

● Infeed x cutting width: 8 x 175 mm

● Feed rate: 864 mm/min (0.36 mm/blade)

### High output 90° angular attachment head (option)



● Machining capacity: **1,075 cm<sup>3</sup>/min**  
(spindle bearing ID: ø130, L270)

ø250 mm 10-blade face mill

● Cutting feed rate: 188 m/min

● Infeed x cutting width: 8 x 175 mm

● Feed rate: 768 mm/min (0.32 mm/blade)

02 | Large work envelope

● Z-axis travel: **1,050 mm** (41.34 in) [option: 1,250 mm (49.21 in)]

● Max width between columns: **4,650 mm** (183.07 in) (45 model)

● Long travel: 12,200 mm (480.31 in) (X-axis)

● Max table top to spindle nose: **4,000 mm** (157.48 in) [high column] **+2,200 mm** (86.61 in)

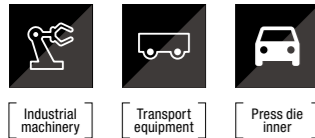
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## A general-purpose machine with excellent space saving and cost performance

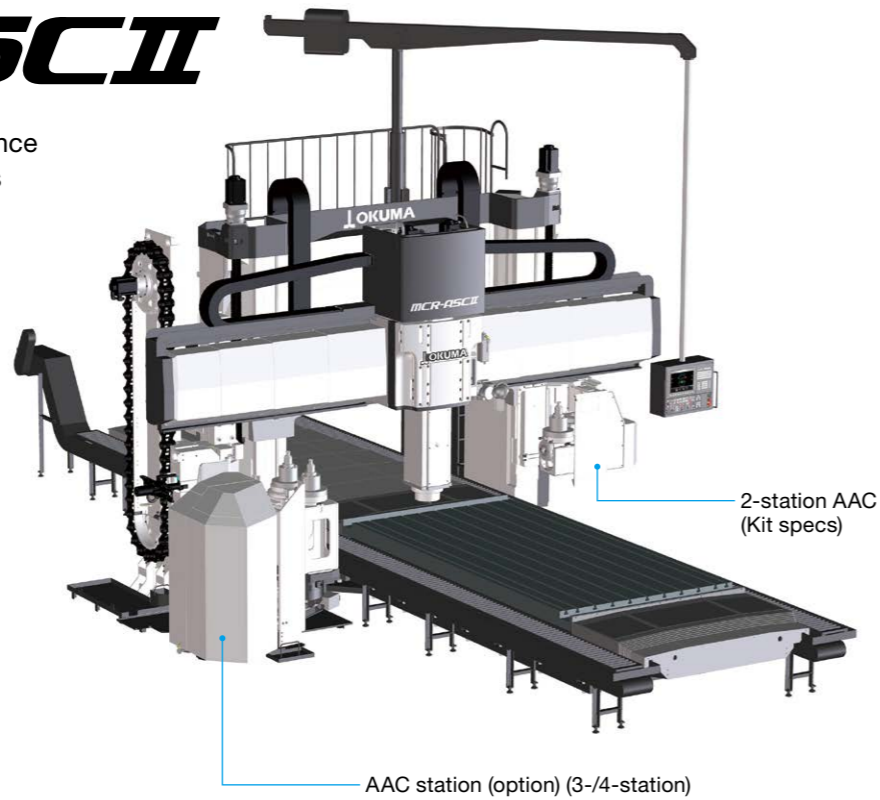
# MCR-A5CII

A machine with excellent cost-performance that brings together the best of Okuma's technology into a space-saving design. We are delivering high productivity to various machine shops, for general parts to high-accuracy applications.

### Industries



By taking advantage of the easy to install, space-saving performance, a variety of industrial and transportation equipment machine shops are benefiting from effective parts applications.



## Benefits

### 01 | Space saving

2-station AAC placed on the right column side minimizes machine width

### 02 | 5C Kits

Kit specifications available for general-purpose 5-face machining

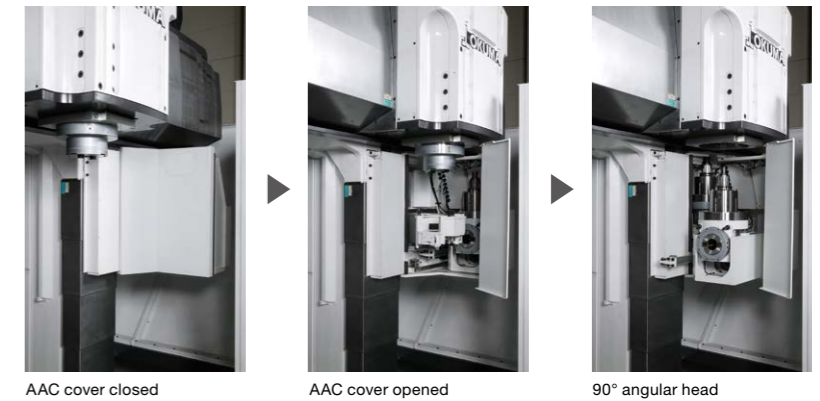
## Features

### 01 | Space saving

#### Compact AAC (Auto Attachment head Changer)

Auto load/unload and ATC to attachment heads enable completely automatic multi-face machining. Column right side mounted AAC also allows fully automated changing of extension and 90° angular heads.

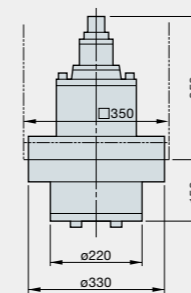
● AAC time: **36 seconds**  
(Machine size: 25 × 40; actual data)



### 02 | 5C Kits

#### Extension heads

■ L150 4,000, 6,000 min<sup>-1</sup>

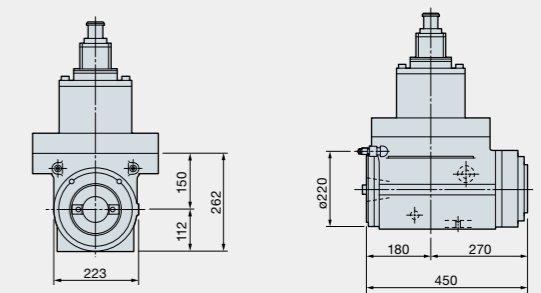


Unit: mm

- Machining capacity: **710 cm<sup>3</sup>/min** (spindle bearing ID: ø100 L150)
- ø160 mm 8-blade face mill
- Cutting feed rate: 221 m/min
- Infeed × cutting width: 5 × 112 mm
- Feed rate: 1,267 mm/min (0.36 mm/blade)
- Z-axis protrusion: 800 mm

#### 90° angular heads

■ L150 3,000, 6,000 min<sup>-1</sup> (C-axis indexing: 5°)



Unit: mm

- Machining capacity: **600 cm<sup>3</sup>/min** (spindle bearing ID: ø100 L150)
- ø160 mm 8-blade face mill
- Cutting feed rate: 221 m/min
- Infeed × cutting width: 5 × 112 mm
- Feed rate: 1,071 mm/min (0.30 mm/blade)
- Z-axis protrusion: 800 mm

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.

# Machine Specification Comparisons

Bold descriptions indicate specifications characteristic of each model. For detailed specifications, please refer to the model brochure.

Major applications and performance			Wide-Ranging General Parts High-Accuracy Parts	Outer Dies High-Speed/-Quality Die/Molds	Super-Large Parts Long and Heavy Cutting Parts	General Parts, Inner Dies Cost-Conscious, Space-Saving
Model feature			High-Performance Spindle	High- Feed Rate/-Speed Attachment Heads	High Rigidity, High Torque, Gear Spindle	Cost-Conscious, Kit Specs
			<b>MCR-BV</b>	<b>MCR-S</b>	<b>MCR-C</b>	<b>MCR-A5CII</b>
Machine size	Nominal (max width between columns)		25, 30, 35 (to 3,650 mm)	<b>25, 30, (2,650, 3,150 mm)</b> Sizes limited	<b>25, 30, 35, 45 (to 4,650 mm)</b> Up to 45 type model for large parts	20, 25, 30, 35 (to 3,650 mm)
Travel	X-axis	mm (in)	to 12,200 (480.31)	to 6,700 (263.78)	to 12,200 (480.31)	to 12,200 (480.31)
	Y-axis	mm (in)	3,200, 3,700, 4,200 (125.98, 145.67, 165.35)	3,200, 3,700 (125.98, 145.67)	3,200, 3,700, 4,200, 5,200 (125.98, 145.67, 165.35, 204.72)	2,600, 3,100, 3,600, 4,100 (102.36, 122.05, 141.73, 161.42)
	Z-axis	mm (in)	800 [1,000] (31.50 [39.37])	800 [1,000] (31.50 [39.37])	<b>1,050 [1,250] (41.34 [49.21])</b>	800 (31.50)
	W-axis	mm (in)	1,000, 1,200 (39.37, 47.24)	1,000, 1,200 (39.37, 47.24)	1,000, 1,200 (39.37, 47.24)	800, 1,000, 1,200 (31.50, 39.37, 47.24)
Table top to spindle nose (35 type, 30 type for MCR-S.)	Standard	mm (in)	1,800 (70.87) (35 type)	1,750 (68.90) (30 type)	1,800 (70.87) (35 type)	1,800 (70.87) (35 type)
	Max (option)	mm (in)	2,800 (110.24) (35 type)	2,750 (108.27) (30 type)	<b>4,000 (157.48) (35 type)</b>	2,400 (94.49) (35 type)
	High column (option)	mm (in)	Max 1,000 (39.37) (35 type)	Max 1,000 (39.37) (30 type)	<b>Max 2,200 (86.61) (35 type)</b>	Max 600 (23.62) (35 type)
Axis guideway/ cooling	X-axis		Roller/narrow guideway	Roller/narrow guideway <b>Ball screw shaft cooling, nut end face cooling</b>	Roller/narrow guideway	Roller/narrow guideway
	Y-axis		Slide/roller hybrid guideway	<b>Roller linear guideway Ball screw shaft cooling, nut end face cooling</b>	Slide/roller hybrid guideway	Slide/roller hybrid guideway
	Z-axis		Slide guideway	Slide guideway <b>Slide guideway cooling, ball screw shaft cooling</b>	Slide guideway	Slide guideway
	Ram size	mm (in)	350 × 350 (13.78 × 13.78)	350 × 350 (13.78 × 13.78)	<b>420 × 425 (16.54 × 16.73)</b>	350 × 350 (13.78 × 13.78)
Rapid traverse	X-axis	m/min (fpm)	30 (98)*1	30 (98)	24 (79)*1	30 (98)*1
	Y-axis	m/min (fpm)	32 (105)	32 (105)	24 (79)*1	32 (105)*1
	Z-axis	m/min (fpm)	15 (49)	15 (49)	15 (49)	20 (66)
	W-axis	m/min (fpm)	3 (10)	4.8 (16)	3 (10)	3 (10)
Cutting feed rate	X-/Y-axis	m/min (fpm)	10 (33)	20 (66)	10 (33)	10 (33)
	Z-axis	m/min (fpm)	10 (33)	15 (49)	10 (33)	10 (33)
Average continuous cutting feed rate	X-/Y-axis	m/min (fpm)	4 [6, 10] (13 [20, 33])	<b>20 (66)</b>	4 (13)	4 [6] (13 [20])
	Z-axis	m/min (fpm)	4 [6] (13 [20])	<b>10 (33)</b>	4 (13)	4 [6] (13 [20])
Spindle	Speed	min <sup>-1</sup>	<b>6,000 [10,000]</b>	<b>10,000</b>	4,000 [6,000]	4,000 [6,000, 10,000]
	Output	kW (hp)	<b>43/37 (57/50) (10 min/cont)</b>	26/22 (35/30) (30 min/cont)	<b>45/37 (60/50) (30 min/cont)</b>	26/22 (35/30) (30 min/cont)
	Torque	N-m	<b>1,406/981 (10 min/cont)</b>	735/622 (30 min/cont)	<b>2,025/1,665 (30 min/cont)</b>	735/622 (30 min/cont)
	Gear or integral motor/spindle		<b>Integral motor/spindle</b>	Integral motor/spindle	<b>Gear</b>	Integral motor/spindle
Extension head	Bearing ID	mm (in)	<b>ø100 [ø85] (ø3.94 [ø3.35])</b>	ø85 (ø3.35)	<b>ø100 [ø85], [ø130, ø100 high output] (ø3.94 [ø3.35], [ø5.12, ø3.94 high output])</b>	ø100 [ø85] (ø3.94 [ø3.35])
Heavy cutting (actual data) <sup>2</sup> Material: S45C	Extension head	cm <sup>3</sup> /min	<b>1,170</b>	710	<b>1,210</b>	710
	90° angular head	cm <sup>3</sup> /min	600	600	<b>1,075</b>	600
Head (Ex.)	BC-axis universal index head	min <sup>-1</sup>	6,000, 2,000 (gear)	<b>10,000, 12,000 high-speed integral motor/spindle</b>	6,000, 2,000 (gear)	6,000, 2,000 (gear) (integral motor/spindle head not available)
	NC-BC universal head	min <sup>-1</sup>	6,000 (gear)	<b>20,000 high-speed integral motor/spindle</b>	6,000, (gear)	(Not available)
Auto tool changer (ATC)	Max tool dia (w/o adjacent)	mm (in)	ø230 (ø9.06)	ø230 (ø9.06)	<b>ø264 (ø10.39)</b>	ø230 (ø9.06)
	Max tool length	mm (in)	400 (15.75)	400 (15.75)	<b>600 (23.62)</b>	400 (15.75)
	Max tool mass	kg (lb)	25 (55)	25 (55)	25 (55)	25 (55)
Auto attachment head changer (AAC)			[2 to 7 stations]	[2 to 7 stations]	[2 to 7 stations]	<b>2 stations</b> [3, 4 stations]
For high-accuracy applications	AbsoScale	X-Y-Z-axis	<b>Standard</b>	<b>Standard</b>	Option	Option
	Thermo-Friendly Premium		<b>Standard</b>	<b>Standard</b>	Option	Option
	3D Smart Calibration System		<b>Standard</b>	Option	Option	Option
	Accuracy Stability Diagnosis Function		<b>Standard</b>	Option	Option	Option
	Hyper-Surface <sup>3</sup>		Option	<b>Standard</b>	Option	Option

\*1. May vary depending on the machine size.

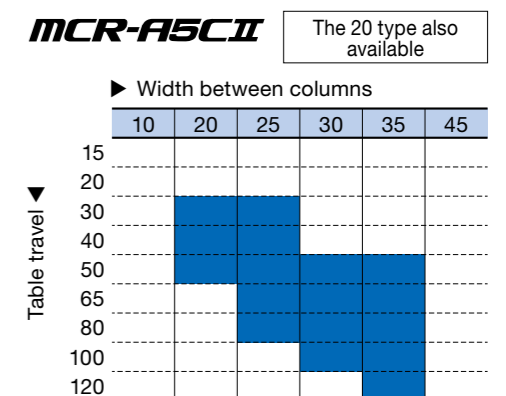
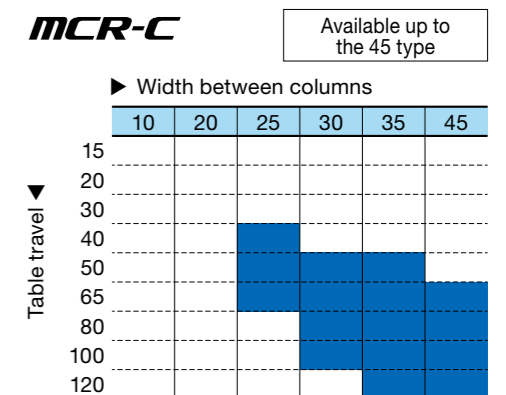
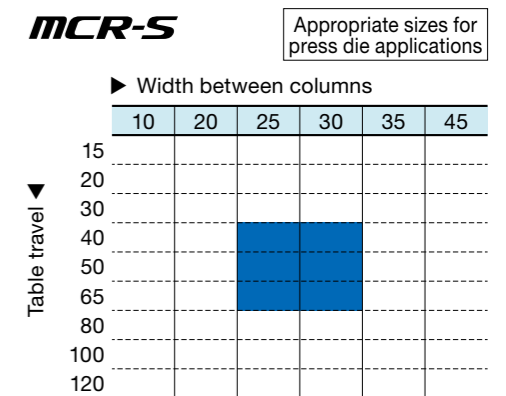
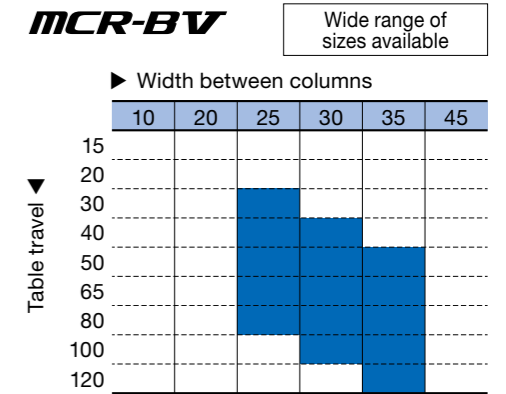
\*2. The "actual data" referred to above for this brochure represent examples, and may not be obtained due to differences in specifications, tooling, cutting condition, and others.

\*3. Super-NURBS will be available for 5-axis applications.

[ ]: Option

# Sizes available

Suitable model types per table travel and width between columns.





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

This product is subject to the Japanese government Foreign Exchange and Foreign Trade Control Act with regard to security controlled items; whereby Okuma Corporation should be notified prior to its shipment to another country.

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The logo for Okuma Corporation, featuring a stylized 'O' symbol followed by the word 'OKUMA' in a bold, sans-serif font.

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● The specifications, illustrations, and descriptions in this brochure vary in different markets and are subject to change without notice.  
Consult your local Okuma representative for specific end-user requirements.

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