

Vertical Machining Center for High Speed Contouring

VC Series



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VC Series



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- High rigidity structure
- Wide span column with the best force flow route ensures the machine rigidity.
 - Through finite element analysis (FEA), the static, mold and optimization analyses of structure were processed for ensuring high dynamic rigidity and stability.
- Various spindles are available
- For ensuring the motor's performance, direct-drive spindle with 12,000 rpm is equipped as standard (15,000 rpm is optional).
- Tongtai self-made built-in spindle (optional)
- Maximum spindle speed 20,000rpm, which allows the machine to expand the range of machining applications.
 - Oil-air lubricated bearings and the floating sleeve on rear-end bearing are able to reduce thermal generation and avoid thermal expansion that affects machining accuracy and bearing life.

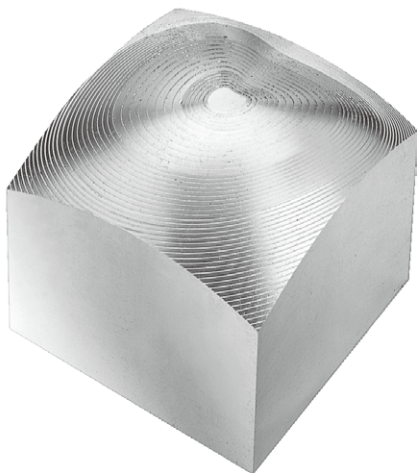
Main Specifications

Spindle	12,000 rpm Direct-drive spindle (standard)
	15,000 rpm Direct-drive spindle (optional)
	20,000 rpm Built-in spindle (optional)
	Rapid traverse 24 m/min
Three axes	X/Y/Z axis stroke
	VC-608 850/610/530 mm
	VC-610 1,050/610/530 mm
	VC-711 1,100/710/710 mm
	□45 mm high rigidity roller guideways
	X/Y axis Ø40 mm
	Z axis Ø45 mm (VC-608/610) / Ø50 mm (VC-711)
	High precision ballscrews with the pitch 10 mm on Z axis
ATC	Tool capacity 24 pc (optional : 30 pc)

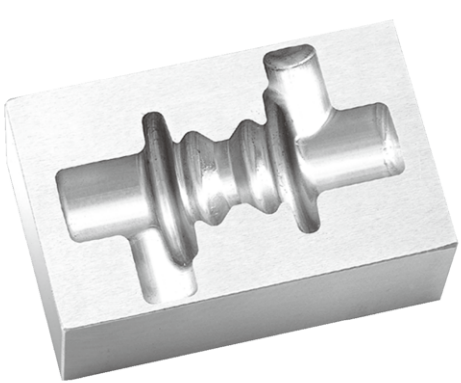


High accuracy

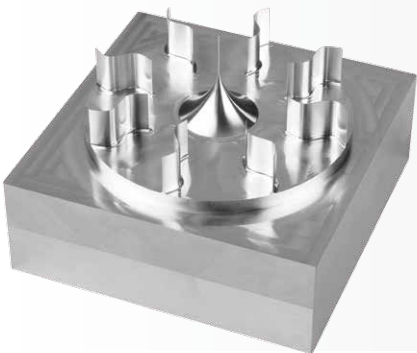
Machining examples



Car lamp mold	
Materials	NAK80 (HRC 40°)
Size	120×120×80 mm
Tools	R 0.2 mm
Spindle speed	20,000 rpm
Cutting feedrate	1,000 mm/min
Machining time	9.8 hr



Crankshaft mold	
Materials	SKD11 (HRC 60°)
Size	80×50×30 mm
Tools	R1.5 mm
Spindle speed	13,000 rpm
Cutting feedrate	2,200 mm/min
Machining time	70 min



Thin wall machining	
Materials	A6061
Size	100×100×70 mm
Tools	R1.0 mm
Spindle speed	10,000 rpm
Cutting feedrate	1,000 mm/min

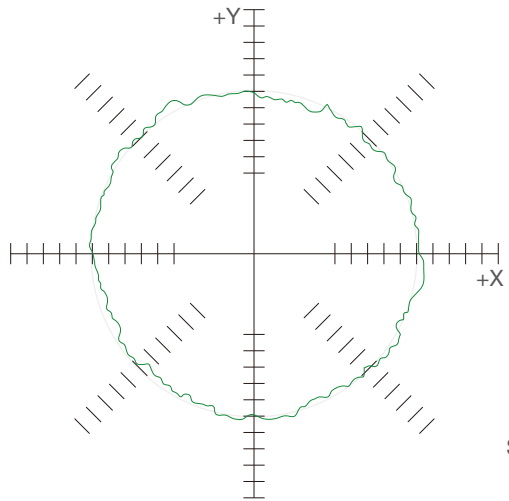
Three axes accuracy

Test standard : VDI3441

	Positioning accuracy	Repeatability accuracy
X axis	4.59	3.79
Y axis	3.42	2.64
Z axis	4.78	3.76

Unit : μm

X-Y Ball-bar test



F : 1,000 mm/min
R : 150 mm
Circularity : 3.2 μm

Scale: 2 $\mu\text{m}/\text{div.}$



Depth : 2 μm

Micromachining	
Materials	A6061
Size	150×80×70
Tools	R1.0 mm
Spindle speed	14,000 rpm
Cutting feedrate	1,000 mm/min

Basic structure

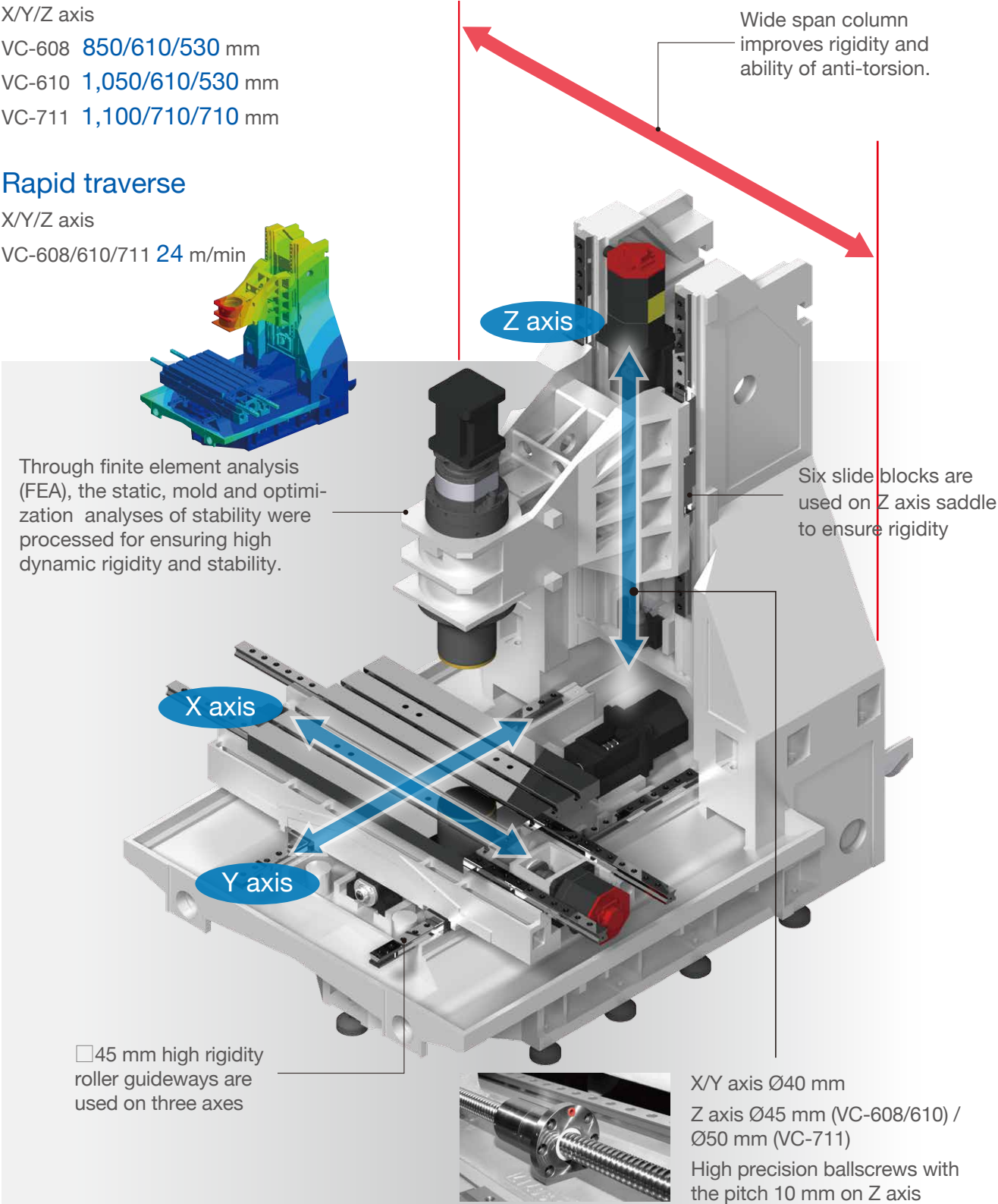
High rigidity structure

Stroke

X/Y/Z axis
VC-608 850/610/530 mm
VC-610 1,050/610/530 mm
VC-711 1,100/710/710 mm

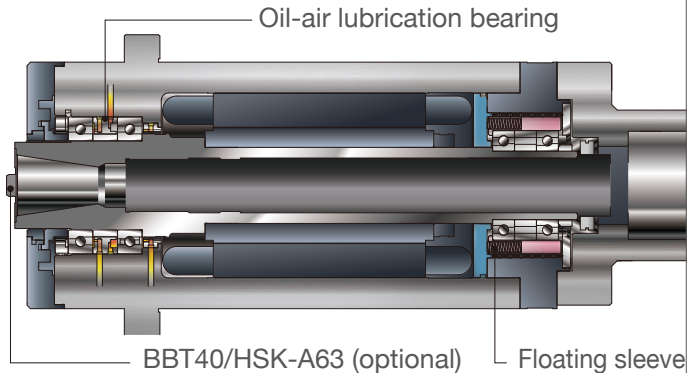
Rapid traverse

X/Y/Z axis
VC-608/610/711 24 m/min



Spindle

Specification	Max. speed	Horsepower	Torque
12,000rpm direct-drive spindle (standard)	12,000 rpm	11/7.5 kW	70/48 Nm
15,000rpm direct-drive spindle (optional)	15,000 rpm	15/11/7.5 kW	95/70/48 Nm
Built-in spindle (optional)	20,000 rpm	40/30 kW	38/29 Nm



- The spindle of VC series is equipped with oil-air lubricated bearings and oil-cooling cartridge, it constrains the thermal generation and reduces the thermal expansion in the spindle.
- Floating sleeve on rear-end bearing is used in 20,000 rpm built-in spindle, that is avoids the preload variation of bearing induced by thermal expansion that affects bearing life.
- BBT dual-contact tool holder is equipped to enhance the stability and machining quality.

ATC

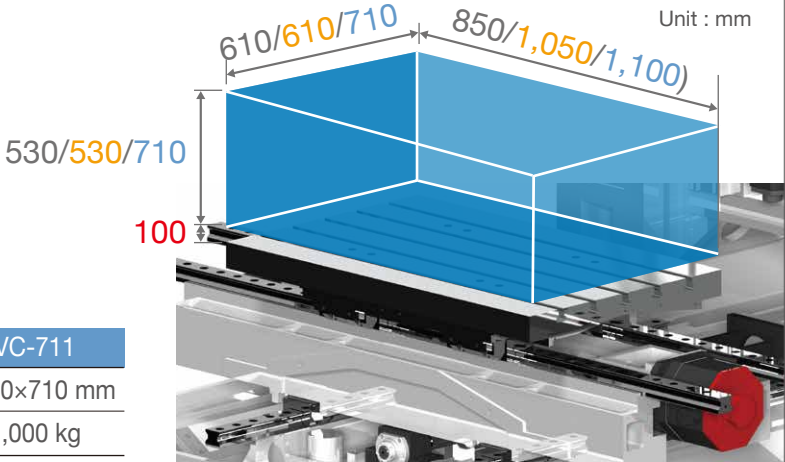
The cam-type tool changer has higher accuracy and lower noise. In addition, the stable tool clamping can ensure spindle accuracy and expand bearing life.

Tool capacity 24 tools
30 tools (optional)



Working area

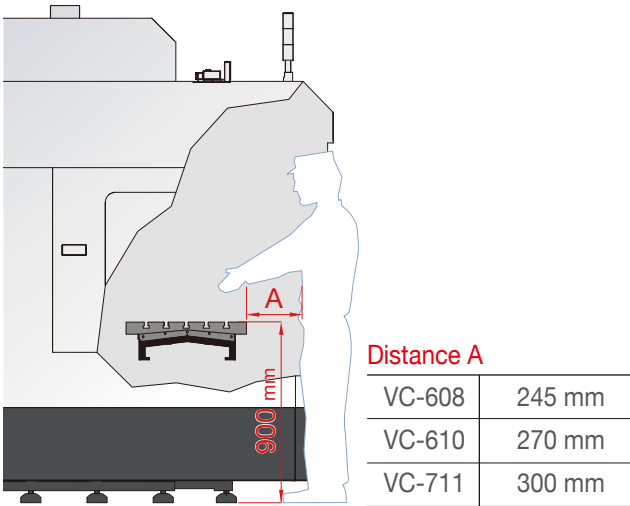
Specifications	VC-608	VC-610	VC-711
Table size	950×600 mm	1,100×650 mm	1,200×710 mm
Max. load	500 kg		1,000 kg



Operation

Accessibility

Suitable table height and reasonable distance between table and operator provide an excellent machining experience during operation.



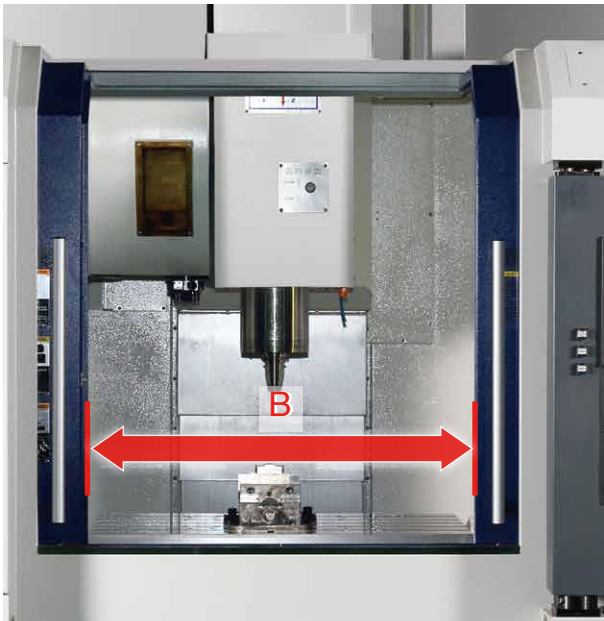
Swivel-type operation panel

The operation panel is able to swivel from 0 to 90 degrees, which improves visibility during operation.



Door opening width

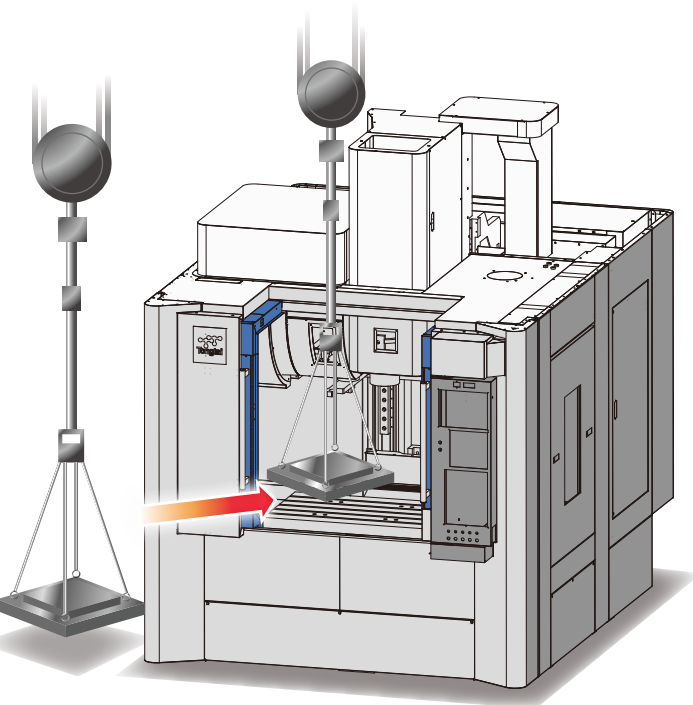
The wide door opening makes machine operation and loading/unloading more convenient.



Distance B

Model	Distance B (mm)
VC-608	950 mm
VC-610	1,100 mm
VC-711	1,200 mm

Spacious working zone facilitates operation of overhead travelling crane.



High resolution control

Equipped with Mitsubishi M720-VS series controller, which supports high speed and high accuracy control, combined with high rigidity and high stability machine structure, MDV-608/611 shows outstanding performance in high speed contouring.

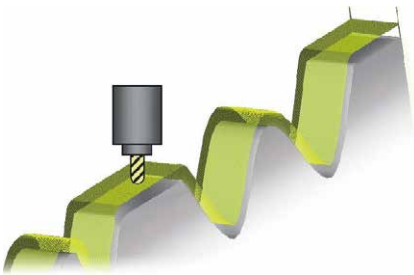
- Supports high-class, high speed, and high accuracy control
- Super Smooth Surface controlling function



High-speed & High accuracy control mode I/II

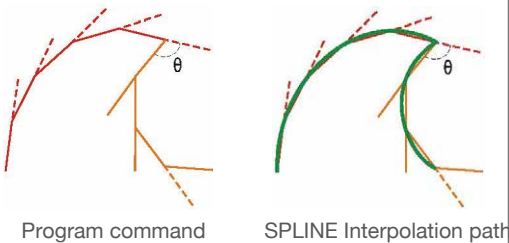
Utilizing our block look ahead from the commanded paths, unnecessary deceleration is reduced even when fine steps exist; thereby, realizing smooth surfaces. Machining time can be shorter than conventional system.

High speed & high accuracy control model I : G05.1Q1
High speed & high accuracy control model II : G05P10000



SPLINE Interpolation

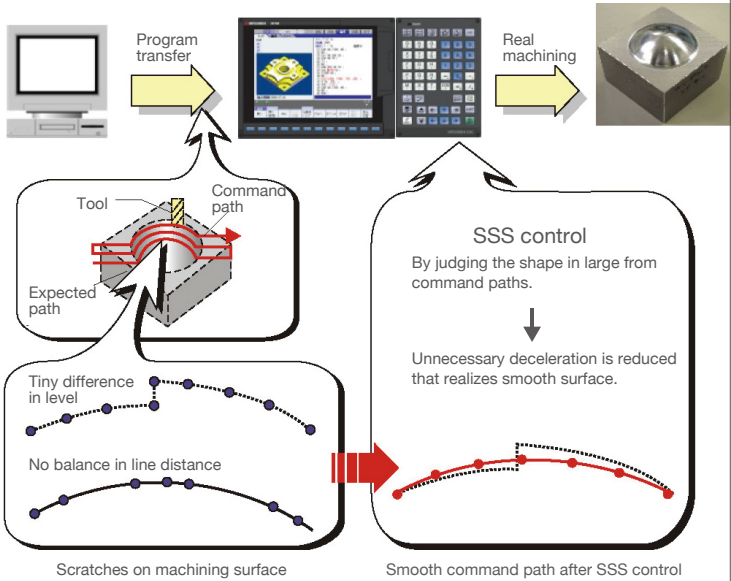
This function can be commanded in high speed and high accuracy mode II to automatically generate a spline curve that passes through a sequence of points commanded by the fine segment machining program, and interpolates the path along this curve. This allows highly accuracy machining at a high speed.



SSS Control

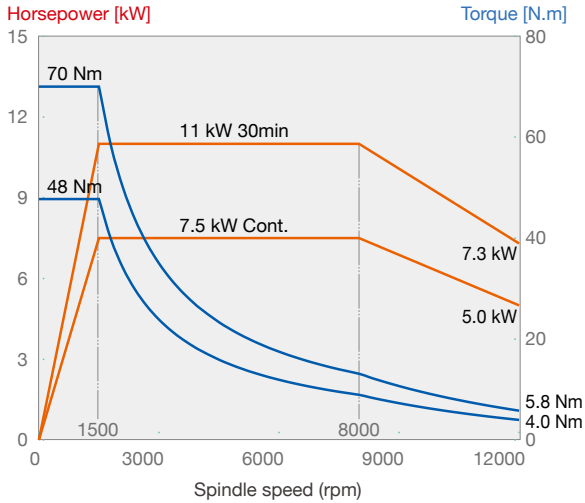
SSS control (Super Smooth Surface) ensures high machining stability and quality with virtual no effects resulting from cutting shape or speed; that is suitable for high precision mold machining.

Optimum speed control is always performed even with the program with error, resulting smooth surface in short time.

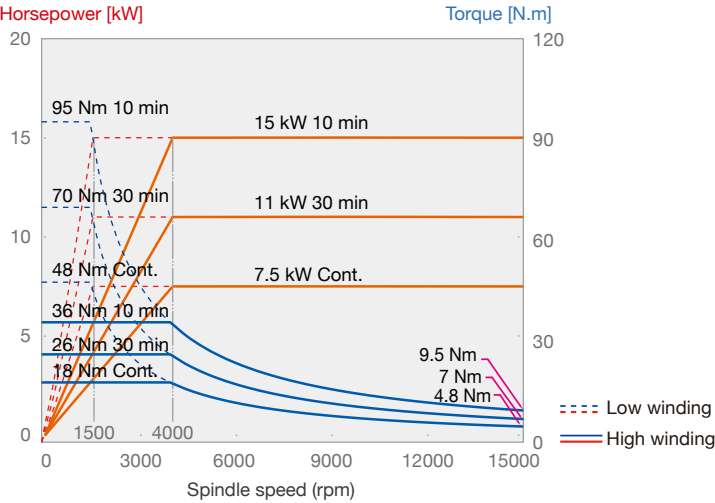


Spindle output and torque chart · Machine dimensions

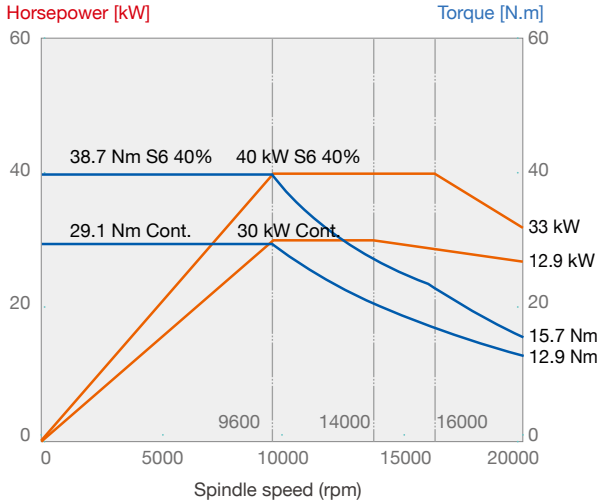
12,000 rpm Direct-drive spindle (std.)



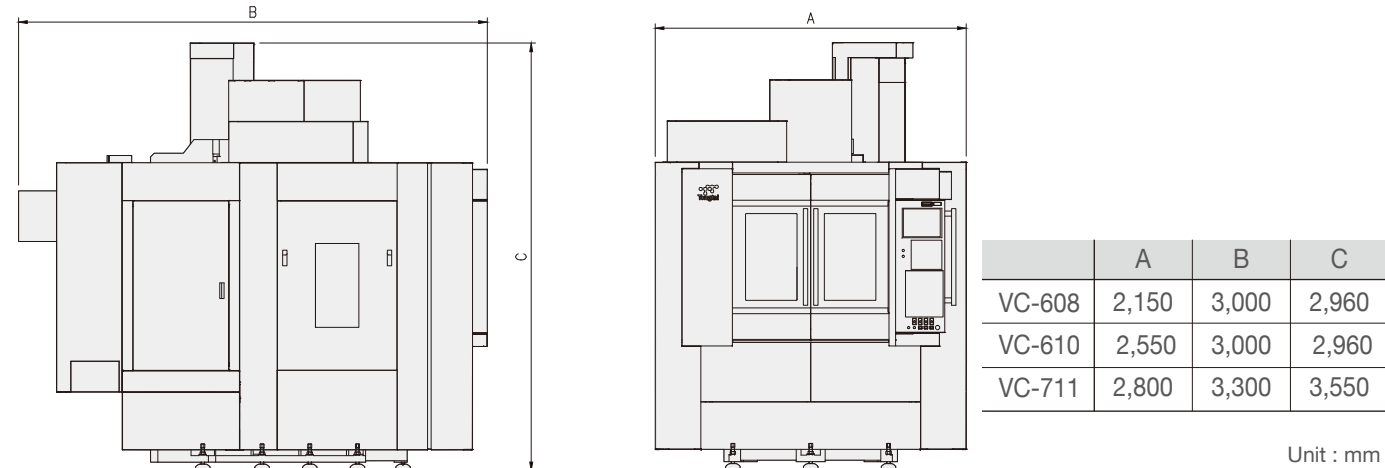
15,000 rpm Direct-drive spindle (opt.)



20,000 rpm Built-in spindle (opt.)



Machine dimensions



Specification · Standard/Optional accessories

Specification

Item	Specification	Unit	VC-608	VC-610	VC-711
Table	Table size (L×W)	mm	950×600	1,100×650	1,200×710
	Max.loading capacity	kg	500		
	Table height from floor	mm	900		
	T-slot (size×No.)	mm	18×5		
Spindle	Spindle taper		7/24 Taper No.40		
	Spindle speed	rpm	direct-drive type 12,000 (opt. 15,000)(opt. Built-in type 20,000)		
Stroke	X/Y/Z axis stroke	mm	850/610/530	1,050/610/530	1,100/710/710
	Spindle nose to table	mm	100~630	100~630	100~810
Feed	X/Y/Z axis rapid traverse	m/min	24/24/24		
	Cutting feedrate	mm/min	1~10,000		
ATC	Tool shank		BBT-40 (Opt. HSK-A63)		
	Tool capacity	pc	24		
	Max. tool diameter	mm	Ø95		
	Max. tool diameter (w/o adjacent tool)	mm	Ø180		
	Max. tool length	mm	300		
	Max. tool weight	kg	7		
Motor	Spindle motor	kW	7.5/11(opt. 15/11/7.5, 40/30)		
	X/Y/Z servo motor	kW	2/2/3		
	Coolant motor	kW	0.37		
	Controller		Mitsubishi M720-VS (opt. Fanuc 31i)		
Machine size	Width×Depth×Height	mm	2,150×3,000×2,960	2,550×3,000×2,960	2,800×3,300×3,550
	Weight	kg	7,000	8,000	9,000

specifications may be changed without prior notice

Standard/Optional accessories

		Standard	Optional
Tool shank	BBT-40	●	
	HSK-A63		○
Coolant through spindle pump	20 bar		○
	35 bar		○
	70 bar		○
Cooling system	Spindle cooling system	●	
	Hydraulic temperature control system		○
	Coolant temperature control system		○
	Air conditioner for electrical cabinet		○
Chip conveyor	Two chip augers	●	
	Scraper type conveyor		○
	Magnetic scraper type conveyor		○
	Hinge type conveyor		○
	Bed flushing pump.		○
Lubrication system	General lubricant system	●	
	LHL integrated lubrication system		○
Positioning accuracy control	Three axes linear scale 5μm resolution		○
	Three axes linear scale 3μm resolution		○
	Three axes magnetic scale with 5μm resolution		○
Tool measuring system	Tongtai made touch type broken tool detector		○
	Marposs Mida Laser 75P Tool breakage detector		○
4 th axis rotary table			○
Automatic door			○
Others	Renishaw OMP60/RMP60		○
	Machining air blow		○
	Minimum quantity lubrication (MQL)		○
	Air gun		○
	Coolant gun		○
	Oil skimmer		○
	Oil mist collector		○
	Mitsubishi M720-VS	●	
	Mitsubishi M730-VW		○
	FANUC Oi-MD		○
Controller	FANUC 31i-MB		○
	SIEMENS 828D		○