



Vi Vertical Machining Center **SERIES**

V33i V56i



Atsugi and Fujii Katsuyama works are certified for ISO14001 and ISO9001.

*The specifications, figures, and overviews of products, peripheral devices and accessories in this catalogue may be changed without prior notice to incorporate improvements resulting from ongoing R&D programs.
*The all products in this catalogue include the optional specifications and equipment.
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M455Ee 1607(V-T)



intelligent

machine construction

- **V33i** and **V56i** control their own heat generation •

For thermal stability of spindle — **Spindle core cooling and Under race lubrication**

For thermal stability of feed axis — **Ball screw and Motor cooling**

Against ambient temperature — **Thermal Guard** Covering the entire machine to keep out ambient air change



	V33i	V56i
Travels (X×Y×Z)	650 × 450 × 350 mm	900 × 550 × 450 mm
Spindle speed range	200 ~ 20000 min ⁻¹	50 ~ 20000 min ⁻¹
Spindle taper hole	7/24 taper No.40	7/24 taper No.40

Machining with high accuracy for a long duration can be achieved without relying on machine warm-up function and calibration.

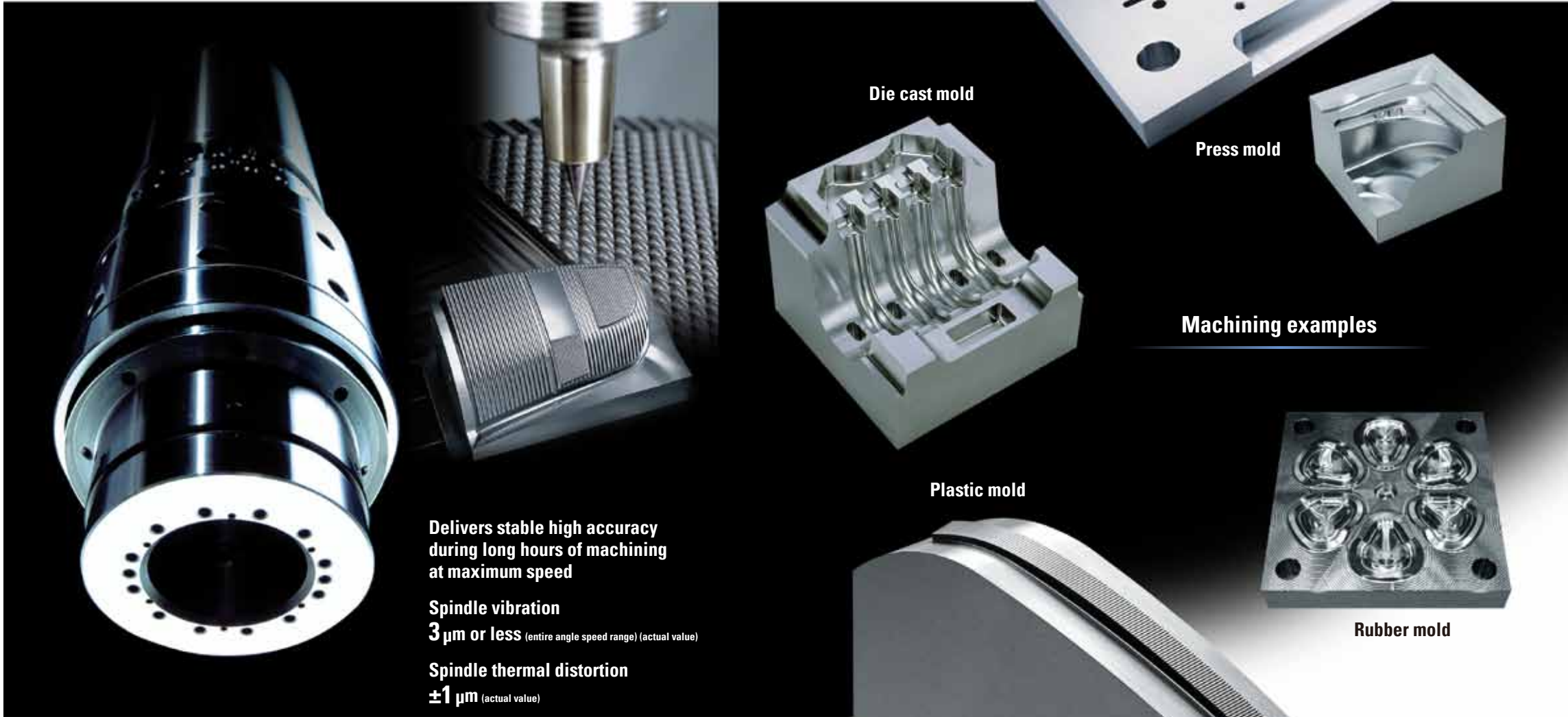


◎Actual value (μm)		V33i	V56i
Hole Pitch 140 mm Hole diameter 16 mm	Pitch accuracy	1.1	1.1
	Hole diameter variation	0.4	0.7
Straight line (one axis) 200 mm	Straightness	1.5	1.6
	Parallelism	0.7	1.4
	Face-to-face dimension difference	1.2	1.9
Straight line (simultaneous two axis) 100 mm	Squareness	1.8	1.8
	Straightness	1.9	1.9
	Parallelism	1.0	1.2
Circle (side face) 160 mm diameter	Squareness	1.7	1.7
	Roundness F2000 mm/min	1.2	1.4
◎Guaranteed value (μm)		*: Average value of ten machines	
Straightness	(full stroke)	2.5	3.0
Squareness	(V33i : 330 mm V56i : 450 mm)	2.5	3.0
Positioning accuracy (full stroke)		±1.0	±1.0

*: Tolerance at Makino's assembly plant (daily temperature change of ±1°C)

• Spindle realizes high machining accuracy •

The spindles exclude run-out and vibrations in the entire speed range.
Accuracy of all parts, including not only rotating parts but also other parts, is controlled in a submicron unit.



Delivers stable high accuracy during long hours of machining at maximum speed

Spindle vibration
3 μm or less (entire angle speed range) (actual value)

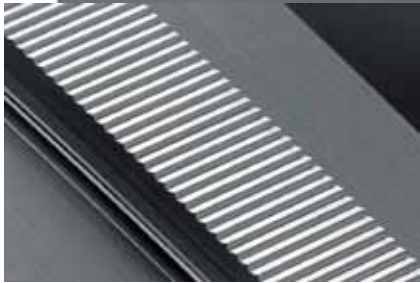
Spindle thermal distortion
±1 μm (actual value)

◎Spindle variations

V33i	
20000 min ⁻¹	BT40
	HSK-A63*
30000 min ⁻¹	HSK-E50*
	HSK-F63*
40000 min ⁻¹	HSK-E32*

*: Optional specification

V56i	
20000 min ⁻¹	BT40
	HSK-A63*
30000 min ⁻¹	HSK-E50*
	HSK-F63*
12000 min ⁻¹	BT40*
	HSK-A63*
	BIG PLUS* (BBT40)



- The controller, maximizing machine performance •

Professional 6

— Super G1.5 control —

Leading operator and machine

Professional 6 optimizes machine motion, according to machining conditions.

Even in machining with high-speed and high-acceleration, machining surface quality and shape accuracy can be kept. Machining efficiency is totally improved.



Control
technologies

Avoids Spindle Crash



Crash avoidance function "Collision Safeguard"

No More Scratch



Intuitive Operation

i Setup (optional equipment)

- ◎ It is quick at intuitive operation and easy measurement environment is realized.
- ◎ Easy operation by dialog screen that is cord-free.



Continuous operation



Photo : V56i

• Automatic Tool Changer •

Major specifications	V33i			V56i	
	20000 / 30000 min ⁻¹ spindle		40000 min ⁻¹ spindle	20000 / 30000 / 12000 min ⁻¹ spindle	
Storage capacity	15, 25*	40*, 60*	20, 40*, 120*	15, 25*	40*, 60*
Maximum tool diameter ** (mm)	80 (without limitation)	63 (without limitation) 80 (with limitation)	32 (without limitation)	80 (without limitation)	63 (without limitation) 80 (with limitation)
Maximum tool length ** (mm)	250	250	120	300	300
Maximum tool weight (kg)	7	7	0.5	8	8

*: optional specification **: There are some restrictions when a hybrid automatic tool length measuring device is attached.

• Automatic Work Changer •

(optional specification)



- V33i
- Automatic work changer (24, 36, 48, 60 and 90 tools)
 - Robot shutter
 - Large robot shutter
 - Loader interface
 - Pallet changer
- V56i
- Robot shutter
 - Pallet changer

Column type	V33i	V56i
Standard	Z min. 150mm	Z min. 150mm
High column	Z min. 250mm Z min. 350mm	Z min. 350mm

• Automatic Tool Measuring Device •

(optional equipment)

Seam level differences are kept within 0.8 μm.
Hybrid automatic tool length measuring device*1

Measuring tool tip position of tool

Measuring the position of the spindle nose that is revolving at a speed of machining operation

Major specifications

Measuring method	Stylus + Sensor (during rotation)
Measurable tool diameter (mm)	Min. diameter: 0.03
Repeatability (μm)	1 or less

*1: Only available with the 30000 min⁻¹ (HSK-E50) or 40000 min⁻¹ (HSK-E32) spindle (optional specification)

Measuring of fine tools—Precision Tool Image Measuring 2

Measuring of fine tools

Display of measurement results
<Measurement examples> Tool diameter 0.2 mm
Spindle speed 10000 min⁻¹

Major specifications

Measuring method	CCD camera (during rotation)
Measurable tool diameter (mm)	Min. diameter : 0.01 Max. diameter: 32.0
Repeatability (μm)	1 or less

*2: Requires calibration tool.
Please contact your makino sales representative when simultaneously attaching a pallet changer to the machine.

© Selectable according to the machining jobs.

Major specifications	Basic type	For small-diameter	Tool length and tool diameter measuring for small-diameter tools
	Contact type	Low-pressure type	Non-contact type
Measuring method	Stylus (stationary)	Stylus (stationary)	Laser beam (during rotation)
Measurable tool diameter (mm)	Min. diameter: 0.3	Min. diameter: 0.1	Min. diameter : 0.05 Max. diameter: For tool length measuring : 80 For tool diameter measuring: 25 (V33i) For tool diameter measuring: 50 (V56i)
Repeatability (μm)	3 or less	3 or less	3 or less

(actual value)

Power consumption can be reduced by up to **30%**.

— ECO Mode Functions —

- ◎ Power consumption monitoring*
 - ◎ ECO mode of air consumption volume*
 - ◎ ECO mode of hydraulic unit
 - ◎ ECO mode of spindle lubricant temperature controller
 - ◎ ECO mode of axis lock
 - ◎ ECO mode of lighting device
- *: optional equipment

Information Management Software

— MPmax —

MPmax is software for monitoring multiple machines. Through LAN network connection, information of all machines' status are collected and displayed together. It contributes to reduce downtime.

(sold separately)





Photo : V56i

• Structure for smooth operation accessibility •

Tool tip and workpiece can be checked in natural posture.
Furthermore, workpiece loading is easy, thanks to the full overhead clearance for crane.



Photo : V33i

• Efficient Chip Removal •

◎ Nozzle coolant (standard specification)

Coolant nozzles and air blower nozzles are effectively positioned around the spindle.

◎ Through-spindle air (standard specification)

Air is supplied from the tool tip and holder.

* V33i : Unavailable with the 40000 min⁻¹ spindle

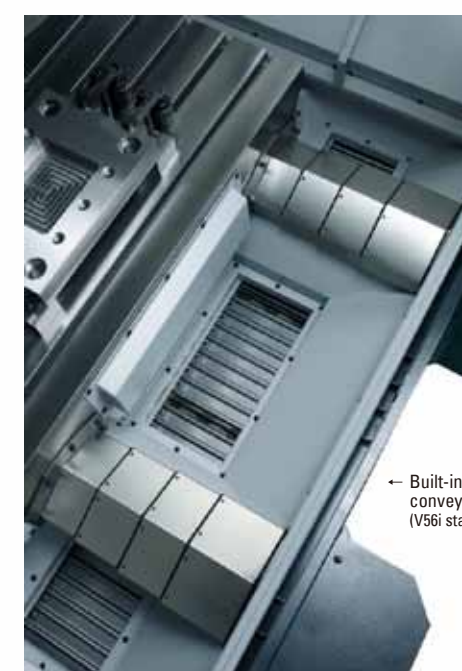
◎ Through-spindle coolant 1.5 MPa (optional specification)

Completely removing chips from machining points during hole machining and high speed machining.



Through spindle coolant

Chips are flushed together with the coolant through outlet provided below the table.



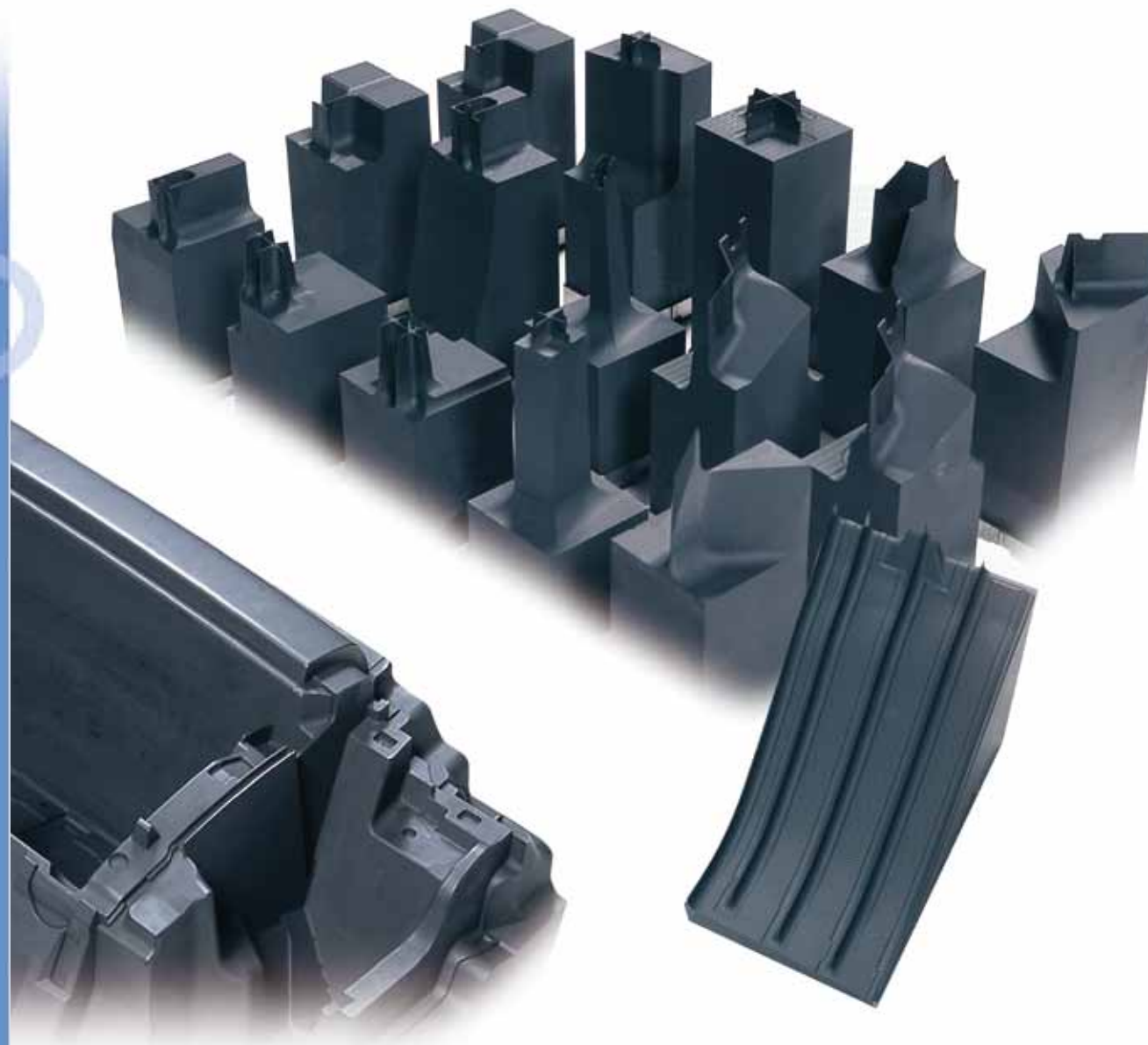
← Built-in high speed conveyors (V56i standard specification)



← Coolant tank (V33i standard specification)

• Graphite machining facilitated by Makino's versatile V-Series •

Graphite machining specification

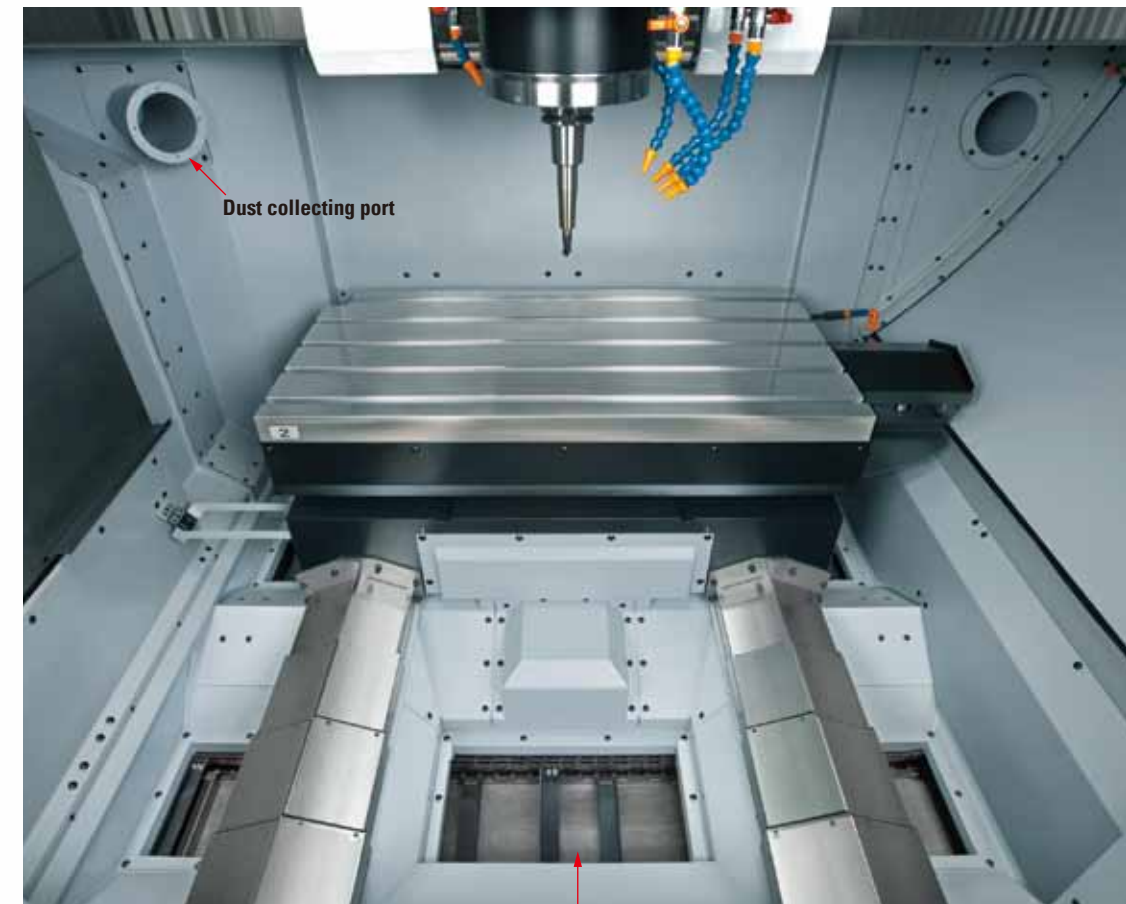


Advantages of graphite as a material for electrode

- Easy-to-cut
- Outstanding performance of rough EDM machining (1.5 times-3 times faster than copper electrode)
- Light weight (1/5 of copper)
- Easy-to-polish
- Small thermal expansion rate (1/4 of copper)



V33i GRAPHITE

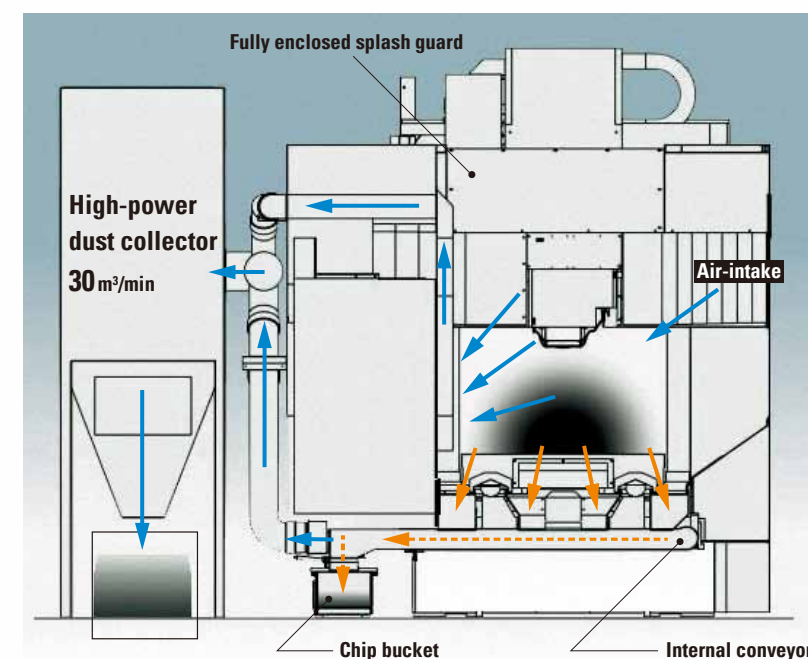


Dust collecting port

High-speed internal conveyor

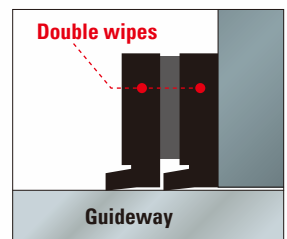
Photo: Machining chamber of V56i GRAPHITE (High column specification)

Dust control



- ← Graphite dust
- ← Small fragments of graphite and steel chips

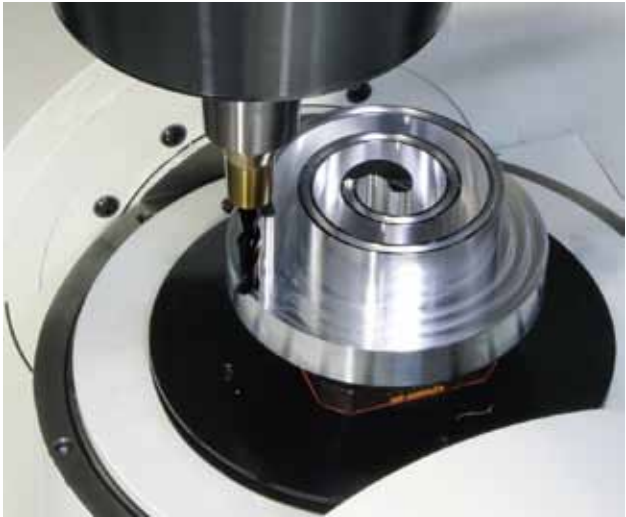
Dust-proof design of feed mechanism



• Suitable for process integration of multi-face machining jobs and intricately shaped parts. •



- ◎ Less setup work for one-chucking operation of multi-face machining
- ◎ Minimal interference design of the spindle and the table
- ◎ A wide variety of tables



— Workpiece setting function —



By simply entering the data on an inclined surface, this function will automatically generate the optimum data for index machining.

Macro Chuck*



(System 3R)

ITS Chuck*



(EROWA)

*: optional specification

	Measured axes	Guaranteed value	
		Servo motor specification	DD motor specification
Positioning accuracy	B	±4 sec	±2 sec
	C	±3 sec	±2 sec
Repeatability	B	±2 sec	±2 sec
	C	±1 sec	±1 sec

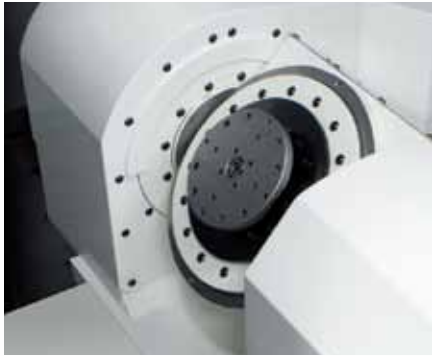
Guaranteed value: Tolerance at Makino's assembly plant (daily temperature change of ±1°C)

Servo motor specification



Circular table (standard specification)

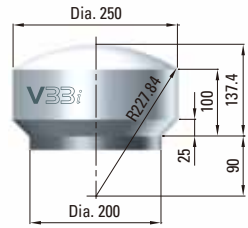
DD motor specification



Circular table (standard specification)

Main specification		V33i-5XB, V56i-5XB	V33i-5XB
		Servo motor specification	DD motor specification
Feedrates	X · Y · Z axes	20000 mm/min	20000 mm/min
	B · C axes	10800°/min	54000°/min
Table working area (Circular table)		Dia. 200 mm	Dia. 200 mm
Maximum load	Circular table	30 kg	20 kg
	Automatic work changer	M-type	25 kg (V33i-5XB only)
		S-type	15 kg (V33i-5XB only)

Workpiece limitation
(Circular table)



Workpiece limitation for full travel in the Y axis



Workpiece limitation when the Y axis travel is limited to a range of 0 to -240 mm

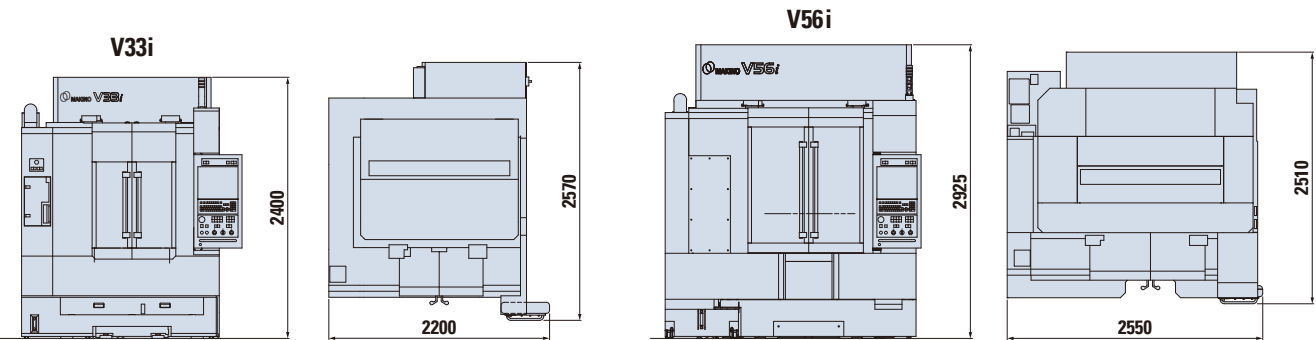


Workpiece limitation for full travel in the Y axis

Machine Specifications (standard specification)

■ Travels	V33i	V56i
X × Y × Z axis	650 × 450 × 350 mm	900 × 550 × 450 mm
Distance from table top to spindle end	150 ~ 500 mm	150 ~ 600 mm
■ Table		
Table Working area	750 × 450 mm	1050 × 550 mm
Maximum workpiece size (W × D × H)	750 × 635 × 250 mm (with limitation)	1050 × 720 × 450 mm (with limitation)
Maximum table load (evenly distributed)	300 kg	800 kg
Table Surface configuration	T-slot (18H8 × 4)	T-slot (18H8 × 5)
■ Spindle		
Speed range	200 ~ 20000 min ⁻¹	50 ~ 20000 min ⁻¹
Motor power	15 / 11 kW (30 min / cont.)	18.5 / 15 kW (30 min / cont.)
Torque	45.7 / 31.1 N·m (25%ED / cont.)	95.5 / 63.7 N·m (10 min / cont.)
Taper hole	7/24 No.40 taper	←
Bearing inner diameter	65 mm	80 mm
No. of spindle speed ranges	2 steps with electric changeover	←
Cooling / lubrication	Spindle core cooling / Under race lubrication	←
■ Feedrates		
Rapid traverse	20000 mm/min	←
Cutting feed	1 ~ 20000 mm/min	←
■ Automatic tool changer		
Tool shank	JIS B6339 40T	←
Retention knob	MAS403 P40T1 type	←
Tool storage capacity	15 tools	←
Maximum tool diameter	80 mm	←
Maximum tool length	250 mm	300 mm
Maximum tool weight	7 kg	8 kg
■ Machine size		
Width × depth × Height	2200 × 2570 × 2400 mm	2550 × 2510 × 2925 mm
Weight	7400 kg	10400 kg
■ Floor space		
Width × depth	2700 × 4055 mm	4550 × 3440 mm

Front View / Floor Plan (mm)



Note: The space for the movable parts and maintenance in addition to the space for the machine main body are required. For the details, please refer to the specifications.

Standard Specifications

- 20000 min⁻¹ spindle (BT40)
 - 15-tool storage capacity (V33i : selectable only with 20000 and 30000 min⁻¹ spindle)
 - 20-tool storage capacity (V33i : selectable only with 40000 min⁻¹ spindle)
 - Tool magazine doorlock
 - Spindle temperature controller
 - Scale feedback 0.05 μm
 - Fully enclosed splash guard
 - Splash guard lighting device
 - Operator doorlock (operation mode)
 - Chip bucket
 - 2 built-in conveyors (available on V56i)
- Nozzle coolant (3 pcs)
 - Automatic air blower
 - Through-spindle air (unavailable with the 40000 min⁻¹ spindle)
 - Automatic lubrication unit
 - Thermal Guard
 - Portable manual pulse generator with the handle enable button
 - Rigid tap
 - GI control
 - Linear interpolation positioning
 - User memory 2GB+1GB
 - Tool offset 400 pairs
- Tool offset memory type C
 - Programmable data input
 - T code eight digits
 - Standard tool length function
 - ECO mode functions
 - Professional 6
 - Automatic fire extinguisher interface
 - Automatic power shutoff
 - Machine controller behind machine
 - Collision Safeguard

Optional Specification ● V33i | ● V56i

Optional Equipment ★ V33i | ★ V56i

(Optional specification: not retrofittable / Optional equipment: retrofittable)

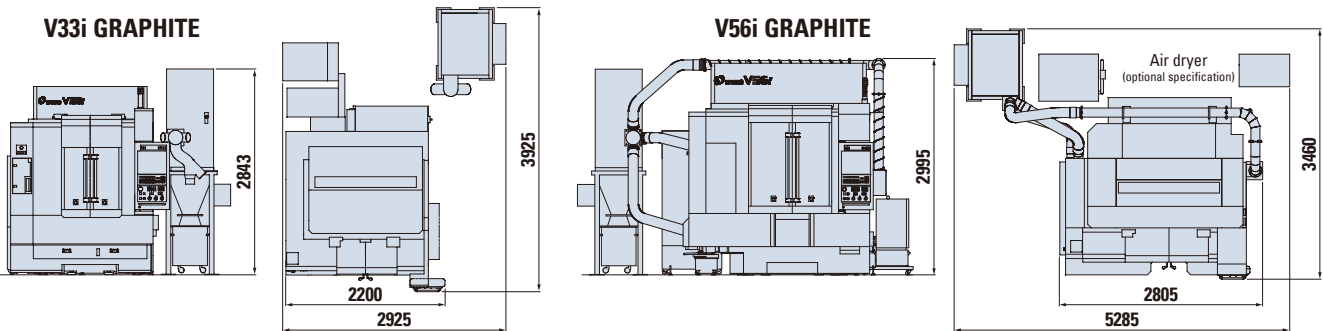
- |—|●| 12000 min⁻¹ spindle (BT40, BIG PLUS and HSK-A63)
 - |●|●| 20000 min⁻¹ spindle (HSK-A63)
 - |●|●| 30000 min⁻¹ spindle (HSK-E50, HSK-F63)
 - |●|—| 40000 min⁻¹ spindle (HSK-E32)
 - |●|●| Preparation for BIG Air turbine spindle (80000 min⁻¹)
 - |★|★| Hale machining (including Cs contour control/helical interpolation/normal direction control, unavailable with the 40000 min⁻¹ spindle)
 - |●|●| High column Z min. = 350 mm specification (V33i 40000 min⁻¹ spindle: Z min = 300)
 - |●|—| High column Z min. = 250 mm specification (V33i 40000 min⁻¹ spindle: Z min = 200)
 - |—|●| Column Stabilizer
 - |●|●| 25 / 40 / 60-tool storage capacity (BT40 / HSK-A63 / HSK-F63 / HSK-E50)
 - |●|—| 40 / 120-tool storage capacity (V33i : 40000 min⁻¹ spindle HSK-E32)
 - |●|—| Automatic work changer (Work storage capacity 24, 36, 48, 60 and 90 tools)
 - |●|●| Pallet changer (including the high column specification)
 - |—|●| Pallet random calling function
 - |●|●| Robot shutter
 - |●|—| Large robot shutter (requires the high column specification)
 - |★|—| Loader interface
 - |●|—| Through-spindle coolant 1.5 MPa (including flow switch) (selectable only with the 20000 min⁻¹ and HSK-A63 spindle.)
 - |—|●| Through-spindle coolant 1.5 MPa and air (require for 20000 min⁻¹ spindle + HSK, 12000 min⁻¹ spindle + HSK or JIS retention knob spindle) (including line filter)
 - |—|●| Nozzle coolant (50 L/min, nozzle 6 pcs)
 - |★|—| Nozzle coolant flow switch
 - |★|★| Workpiece washing gun (operator side)
 - |—|★| Telescopic washing coolant
 - |—|★| Inner splash guard washing coolant (including telescopic washing coolant)
 - |★|★| Coolant temperature controller (with heater) (required for oil type coolant and high precision machining)
 - |★|★| Oil skimmer
 - |★|★| MQL unit
- |★|★| Tilttable chip bucket (143 L, for Lift-up chip conveyor)
 - |—|★| Chip bucket (Tilt Truck, for Lift-up chip conveyor)
 - |★|—| Lift-up chip conveyor (with filtration function)
 - |★|—| Short-type lift-up chip conveyor
 - |—|★| Front or Rear unloading lift-up chip conveyor with coolant filtration (Scraper type, with coolant filtration unit)
 - |★|★| Additional lighting device inside of splashguard (1 LED)
 - |★|★| Mist collector (including connection port)
 - |★|★| Connection port for mist collector
 - |★|★| Mist collector interface (not including connection port)
 - |★|★| Air dryer
 - |★|★| Automatic tool length measuring device (contact type) (Including broken tool sensor)
 - |★|★| Automatic tool length measuring device (low contact-pressure) (Including broken tool sensor)
 - |★|★| Automatic Non-contact tool measuring device (Including broken tool sensor)
 - |★|★| Hybrid automatic tool length measuring device (30000 min⁻¹ spindle : HSK-E50 and 40000 min⁻¹ spindle : HSK-E32.)
 - |★|★| Precision Tool Image Measuring 2 (requires calibration tool)
 - |★|★| Reference master tool (HSK-E32 / HSK-E50 / HSK-F63 / HSK-A63)
 - |★|★| Automatic workpiece measuring device
 - |★|★| Ring gauge for automatic workpiece measuring device
 - |★|★| i Setup
 - |—|★| Plate machining function
 - |★|★| Portable manual pulse generator with tool position display and the handle enable button
 - |★|★| Run hour meter (power ON, NC automatic ON, spindle ON, with reset function)
 - |★|★| Warmup timer (with automatic running function)
 - |★|★| Lighting device inside of electric enclosure and 100V outlet
 - |★|★| Signal light 3-layer
 - |★|★| Circuit breaker
 - |●|●| Super GI.5 control
 - |●|—| Machine controller right location
 - |●|●| Customer-specified machine color

Machine Specifications (standard specification)

■ Travels	V33i GRAPHITE	V56i GRAPHITE
X × Y × Z axis	650 × 450 × 350 mm	900 × 550 × 450 mm
Distance from table top to spindle end	350 ~ 700 mm *1 250 ~ 600 mm *2	150 ~ 600 mm
■ Table		
Table Working area	750 × 450 mm	1050 × 550 mm
Maximum workpiece size (W × D × H)	750 × 635 × 450 mm *1 750 × 635 × 350 mm *2 (with limitation)	1050 × 720 × 450 mm (with limitation)
Maximum table load (evenly distributed)	300 kg	800 kg
Table Surface configuration	T-slot (18H8 × 4)	T-slot (18H8 × 5)
■ Spindle		
Speed range	200 ~ 20000 min ⁻¹	50 ~ 20000 min ⁻¹
Motor power	15 / 11 kW (30 min / cont.)	18.5 / 15 kW (30 min / cont.)
Torque	45.7 / 31.1 N·m (25%ED / cont.)	95.5 / 63.7 N·m (10 min / cont.)
Taper hole	7/24 No.40 taper	←
Bearing inner diameter	65 mm	80 mm
No. of spindle speed ranges	2 steps with electric changeover	←
Cooling / lubrication	Spindle core cooling / Under race lubrication	←
■ Feedrates		
Rapid traverse	20000 mm/min	←
Cutting feed	1 ~ 20000 mm/min	←
■ Automatic tool changer		
Tool shank	JIS B6339 40T	←
Retention knob	MAS403 P40T1 type	←
Tool storage capacity	15 tools	←
Maximum tool diameter	80 mm	←
Maximum tool length	250 mm	300 mm
Maximum tool weight	7 kg	8 kg
■ Machine size		
Width × depth × Height	2200 × 2570 × 2600 mm	2805 × 2510 × 2995 mm
Weight	8200 kg	10400 kg
■ Floor space		
Width × depth	4195 × 4495 mm	5285 × 3790 mm

*1 : Z min. = 350 mm specification
*2 : Z min. = 250 mm specification

Front View / Floor Plan (mm)



Note: The space for the movable parts and maintenance in addition to the space for the machine main body are required. For the details, please refer to the specifications.

Standard Specifications

- 20000 min⁻¹ spindle (BT40)
- High column Z min. = 350 mm specification or Z min. = 250 mm specification (V33i only)
- 15-tool storage capacity (V33i : selectable only with 20000 and 30000 min⁻¹ spindle)
- 20-tool storage capacity (V33i : selectable only with 40000 min⁻¹ spindle)
- Tool magazine doorlock
- Spindle temperature controller
- Scale feedback 0.05 μm
- Fully enclosed splash guard
- Automatic air blower
- Splash guard lighting device
- Operator doorlock (operation mode)
- Dust collector
- Chip bucket
- 2 built-in conveyors (V56i only)
- Nozzle coolant (3 pcs)
- Automatic air blower
- Through-spindle air (unavailable with the 40000 min⁻¹ spindle)
- Automatic lubrication unit
- Thermal Guard
- Portable manual pulse generator with the handle enable button
- Rigid tap
- GI control
- Linear interpolation positioning
- User memory 2GB+1GB
- Tool offset 400 pairs
- Tool offset memory type C
- Programmable data input
- T code eight digits
- Standard tool length function
- ECO mode functions
- Professional 6
- Automatic fire extinguisher interface
- Automatic power shutoff
- Machine controller behind machine
- Collision Safeguard

Optional Specification ● V33i GRAPHITE | ● V56i GRAPHITE
Optional Equipment ★ V33i GRAPHITE | ★ V56i GRAPHITE

(Optional specification: not retrofittable / Optional equipment: retrofittable)

- |-|●| 12000 min⁻¹ spindle (BT40, BIG PLUS and HSK-A63)
- |●|●| 20000 min⁻¹ spindle (HSK-A63)
- |●|●| 30000 min⁻¹ spindle (HSK-E50, HSK-F63)
- |●|_| 40000 min⁻¹ spindle (HSK-E32)
- |●|●| Preparation for BIG Air turbine spindle (80000 min⁻¹)
- |★|★| Hale machining (including Cs contour control/helical interpolation/normal direction control, unavailable with the 40000 min⁻¹ spindle)
- |-|●| High column Z min. = 350 mm specification
- |-|●| Column Stabilizer
- |●|●| 25 / 40 / 60-tool storage capacity (BT40 / HSK-A63 / HSK-F63 / HSK-E50)
- |●|_| 40 / 120-tool storage capacity (V33i : Z-axis minimum of 200 mm with 40000 min⁻¹ spindle)
- |●|_| Automatic work changer (Work storage capacity 24, 36, 48, 60 and 90 tools)
- |●|●| Pallet changer (including the high column specification)
- |-|●| Pallet random calling function
- |●|●| Robot shutter
- |●|_| Large robot shutter (requires the high column specification)
- |★|_| Loader interface
- |★|★| Oil skimmer
- |★|★| MQL unit
- |★|★| Machining chamber air blow
- |-|★| Chip bucket (for metal dry machining)
- |-|★| Front unloading lift-up chip conveyor (hinge type, for metal dry machining)
- |★|★| Splash guard lighting device (1 LED)
- |★|★| Air dryer
- |★|★| Automatic tool length measuring device (contact type) (including broken tool sensor)
- |★|★| Automatic tool length measuring device (low contact-pressure) (including broken tool sensor)
- |★|★| Automatic Non-contact tool measuring device (including broken tool sensor)
- |★|★| Hybrid automatic tool length measuring device (30000 min⁻¹ spindle : HSK-E50 and 40000 min⁻¹ spindle : HSK-E32.)
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- |★|★| Signal light 3-layer
- |★|★| Circuit breaker
- |●|●| Super GI.5 control
- |●|●| Customer-specified machine color

Machine Specifications (standard specification)

■ Travels	V33i-5XB	V56i-5XB
X × Y × Z axis	650 × 325 × 350 mm	900 × 460 × 450 mm
B axis	130° (-20° ~ +110°)	←
C axis	360° (cont.)	←
Distance from table surface to spindle gauge line plane : Z axis (B = 0°)	+45 ~ +395 mm	+10 ~ +460 mm
Distance from table center to spindle center : X axis (B = 0°)	-450 ~ +200 mm	-650 ~ +250 mm
Distance from table center to spindle gauge line plane : Z axis (B = 90°)	+135 ~ +485 mm	+100 ~ +550 mm
Distance from table surface to spindle center : X axis (B = 90°)	-360 ~ +290 mm	-560 ~ +340 mm
■ Table		
Table Working area	200 mm	←
Maximum workpiece size (dia. × height)	250 × H135 mm (with limitation) 130 × H300 mm (Y axis travel limited)	250 × H310 mm (with limitation)
Maximum table load (evenly distributed)	30 kg (Servo motor specification) 20 kg (DD motor specification)	30 kg (Servo motor specification)
Minimum indexing angle (B-C axis)	0.0001°	←
■ Spindle		
Speed range	200 ~ 20000 min ⁻¹	50 ~ 20000 min ⁻¹
Motor power	15 / 11 kW (30 min / cont.)	18.5 / 15 kW (30 min / cont.)
Torque	45.7 / 31.1 N·m (25%ED / cont.)	95.5 / 63.7 N·m (10 min / cont.)
Taper hole	7/24 No.40 taper	←
Bearing inner diameter	65 mm	80 mm
No. of spindle speed ranges	2 steps with electric changeover	←
Cooling / lubrication	Spindle core cooling / Under race lubrication	←
■ Feedrates		
X · Y · Z axis	20000 mm/min	←
B · C axis	10800°/min (Servo motor specification) 54000°/min (DD motor specification)	10800°/min (Servo motor specification)
■ Automatic tool changer		
Tool shank	JIS B6339 40T	←
Retention knob	MAS403 P40T1 type	←
Tool storage capacity	15 tools	←
Maximum tool diameter	80 mm	←
Maximum tool length	250 mm	300 mm
Maximum tool weight	7 kg	8 kg
■ Machine size		
Width × depth × Height	2200 × 2570 × 2600 mm	2550 × 2510 × 3125 mm
Weight	7900 kg	11100 kg
■ Floor space		
Width × depth	2700 × 4055 mm	4550 × 3440 mm

Standard Specifications

- 20000 min⁻¹ spindle (BT40)
 - High column
 - NC rotary table
 - Rotary encoder (B·C axse)
 - 200 mm dia. circular table
 - 15-tool storage capacity (V33i : selectable only with 20000 and 30000 min⁻¹ spindle)
 - 20-tool storage capacity (V33i : selectable only with 40000 min⁻¹ spindle)
 - Tool magazine doorlock
 - Spindle temperature controller
 - Scale feedback 0.05 μm
 - Fully enclosed splash guard
 - Splash guard lighting device
 - Operator doorlock (operation mode)
 - Chip bucket
- 2 built-in conveyors (V56i only)
 - Nozzle coolant (3 pcs)
 - Automatic air blower
 - Through-spindle air (unavailable with the 40000 min⁻¹ spindle)
 - Automatic lubrication unit
 - Thermal Guard
 - Portable manual pulse generator with the handle enable button
 - Rigid tap
 - Super G1.5 control
 - High-speed smooth TCP
 - Tool tip point control
 - Linear interpolation positioning
 - User memory 2GB+1GB
 - Tool offset 400 pairs
- Tool offset memory type C
 - Programmable data input
 - T code eight digits
 - Standard tool length function
 - 3-dimensional cutter compensation
 - Tilted working plane indexing command
 - VP control
 - ECO mode functions
 - Professional 6
 - Automatic fire extinguisher interface
 - Automatic power shutoff
 - Machine controller behind machine
 - Collision Safeguard

Optional Specification ● V33i-5XB | ● V56i-5XB

Optional Equipment ★ V33i-5XB | ★ V56i-5XB

(Optional specification: not retrofittable / Optional equipment: retrofittable)

- |—|●| 12000 min⁻¹ spindle (BT40, BIG PLUS and HSK-A63)
 - |●|●| 20000 min⁻¹ spindle (HSK-A63)
 - |●|●| 30000 min⁻¹ spindle (HSK-E50, HSK-F63)
 - |●|—| 40000 min⁻¹ spindle (HSK-E32)
 - |★|★| Hale machining (including Cs contour control/helical interpolation/normal direction control, unavailable with the 40000 min⁻¹ spindle)
 - |—|●| Column stabilizer
 - |●|●| 25 / 40 / 60-tool storage capacity (BT40 / HSK-A63 / HSK-F63 / HSK-E50)
 - |●|—| 40 / 120-tool storage capacity (V33i : with 40000 min⁻¹ spindle HSK-E32)
 - |●|—| Automatic work changer (Work storage capacity 24, 36, 48, 60 and 90 tools)
 - |●|●| Robot shutter
 - |●|—| Large robot shutter (requires the high column specification)
 - |★|—| Loader interface
 - |●|—| Through-spindle coolant 1.5 MPa (including flow switch) (selectable only with the 20000 min⁻¹ and HSK-A63 spindle.)
 - |—|●| Through-spindle coolant 1.5 MPa and air (require for 20000 min⁻¹ spindle + HSK, 12000 min⁻¹ spindle + HSK or JIS retention knob spindle) (including line filter)
 - |—|●| Nozzle coolant (50 L/min, nozzle 6 pcs)
 - |★|—| Nozzle coolant flow switch
 - |★|★| Workpiece washing gun (operator side)
 - |—|★| Telescopic washing coolant
 - |—|★| Inner splash guard washing coolant (including telescopic washing coolant)
 - |★|★| Coolant temperature controller (with heater) (required for oil type coolant and high precision machining)
 - |★|★| Oil skimmer
 - |★|★| MQL unit
 - |★|★| Tilttable chip bucket (143 L, for Lift-up chip conveyor)
 - |—|★| Chip bucket (Tilt Truck, for Lift-up chip conveyor)
 - |★|—| Lift-up chip conveyor (with filtration function)
- |★|—| Short-type lift-up chip conveyor
 - |—|★| Front or Rear unloading lift-up chip conveyor with coolant filtration (Scraper type, with coolant filtration unit)
 - |★|★| Additional lighting device inside of splashguard (1 LED)
 - |★|★| Mist collector (including connection port)
 - |★|★| Connection port for mist collector
 - |★|★| Mist collector interface (not including connection port)
 - |★|★| Air dryer
 - |★|★| Automatic tool length measuring device (contact type) (Including broken tool sensor)
 - |★|★| Automatic tool length measuring device (low contact-pressure) (Including broken tool sensor)
 - |★|★| Automatic Non-contact tool measuring device (Including broken tool sensor)
 - |★|★| Hybrid automatic tool length measuring device (30000 min⁻¹ spindle : HSK-E50 and 40000 min⁻¹ spindle : HSK-E32.)
 - |★|★| Precision Tool Image Measuring 2 (requires calibration tool)
 - |★|★| Reference master tool (HSK-E32 / HSK-E50 / HSK-F63 / HSK-A63)
 - |★|★| Automatic workpiece measuring device
 - |★|★| Ring gauge for automatic workpiece measuring device
 - |★|★| i Setup
 - |★|★| Portable manual pulse generator with tool position display and the handle enable button
 - |★|★| 3-dimensional cam machining function
 - |★|★| Scroll machining function
 - |★|★| Run hour meter (power ON, NC automatic ON, spindle ON, with reset function)
 - |★|★| Warmup timer (with automatic running function)
 - |★|★| Lighting device inside of electric enclosure and 100V outlet
 - |★|★| Signal light 3-layer
 - |★|★| Circuit breaker
 - |●|—| Machine controller right location
 - |●|●| Customer-specified machine color

Machine Specifications (standard specification)

■ Travels	V33i-5XB GRAPHITE	V56i-5XB GRAPHITE
X × Y × Z axis	650 × 325 × 350 mm	900 × 460 × 450 mm
B axis	130° (-20° ~ +110°)	←
C axis	360° (cont.)	←
Distance from table surface to spindle gauge line plane : Z axis (B = 0°)	+45 ~ +395 mm	+10 ~ +460 mm
Distance from table center to spindle center : X axis (B = 0°)	-450 ~ +200 mm	-650 ~ +250 mm
Distance from table center to spindle gauge line plane : Z axis (B = 90°)	+135 ~ +485 mm	+100 ~ +550 mm
Distance from table surface to spindle center : X axis (B = 90°)	-360 ~ +290 mm	-560 ~ +340 mm
■ Table		
Table Working area	200 mm	←
Maximum workpiece size (dia. × height)	250 × H135 mm (with limitation) 130 × H300 mm (Y axis travel limited)	250 × H310 mm (with limitation)
Maximum table load (evenly distributed)	30 kg (Servo motor specification) 20 kg (DD motor specification)	30 kg (Servo motor specification)
Minimum indexing angle (B-C axis)	0.0001°	←
■ Spindle		
Speed range	200 ~ 20000 min ⁻¹	50 ~ 20000 min ⁻¹
Motor power	15 / 11 kW (30 min / cont.)	18.5 / 15 kW (30 min / cont.)
Torque	45.7 / 31.1 N·m (25%ED / cont.)	95.5 / 63.7 N·m (10 min / cont.)
Taper hole	7/24 No.40 taper	←
Bearing inner diameter	65 mm	80 mm
No. of spindle speed ranges	2 steps with electric changeover	←
Cooling / lubrication	Spindle core cooling / Under race lubrication	←
■ Feedrates		
X · Y · Z axis	20000 mm/min	←
B · C axis	10800°/min (Servo motor specification) 54000°/min (DD motor specification)	10800°/min (Servo motor specification)
■ Automatic tool changer		
Tool shank	JIS B6339 40T	←
Retention knob	MAS403 P40T1 type	←
Tool storage capacity	15 tools	←
Maximum tool diameter	80 mm	←
Maximum tool length	250 mm	300 mm
Maximum tool weight	7 kg	8 kg
■ Machine size		
Width × depth × Height	2200 × 2570 × 2600 mm	2805 × 2510 × 3125 mm
Weight	7900 kg	11100 kg
■ Floor space		
Width × depth	4195 × 4495 mm	5285 × 3790 mm

Standard Specifications

- 20000 min⁻¹ spindle (BT40)
 - High column
 - NC rotary table
 - Rotary encoder (B-C axes)
 - 200 mm dia. circular table
 - 15-tool storage capacity (V33i : selectable only with 20000 and 30000 min⁻¹ spindle)
 - 20-tool storage capacity (V33i : selectable only with 40000 min⁻¹ spindle)
 - Tool magazine doorlock
 - Spindle temperature controller
 - Scale feedback 0.05 μm
 - Fully enclosed splash guard
 - Splash guard lighting device
 - Operator doorlock (operation mode)
 - Dust collector
 - Chip bucket
- 2 built-in conveyors (V56i only)
 - Nozzle coolant (3 pcs)
 - Automatic air blower
 - Through-spindle air (unavailable with the 40000 min⁻¹ spindle)
 - Automatic lubrication unit
 - Thermal Guard
 - Portable manual pulse generator with the handle enable button
 - Rigid tap
 - Super G1.5 control
 - High-speed smooth TCP
 - Tool tip point control
 - Linear interpolation positioning
 - User memory 2GB+1GB
 - Tool offset 400 pairs
- Tool offset memory type C
 - Programmable data input
 - T code eight digits
 - Standard tool length function
 - 3-dimensional cutter compensation
 - Tilted working plane indexing command
 - VP control
 - ECO mode functions
 - Professional 6
 - Automatic fire extinguisher interface
 - Automatic power shutoff
 - Machine controller behind machine
 - Collision Safeguard

Optional Specification ● V33i-5XB GRAPHITE | ● V56i-5XB GRAPHITE

Optional Equipment ★ V33i-5XB GRAPHITE | ★ V56i-5XB GRAPHITE

(Optional specification: not retrofittable / Optional equipment: retrofittable)

- |—|●| 12000 min⁻¹ spindle (BT40, BIG PLUS and HSK-A63)
 - | |●| 20000 min⁻¹ spindle (HSK-A63)
 - | |●| 30000 min⁻¹ spindle (HSK-E50, HSK-F63)
 - | |—| 40000 min⁻¹ spindle (HSK-E32)
 - |★|★| Hale machining (including Cs contour control/helical interpolation/normal direction control, unavailable with the 40000 min⁻¹ spindle)
 - |—|●| Column stabilizer
 - | |●| 25 / 40 / 60-tool storage capacity (BT40 / HSK-A63 / HSK-F63 / HSK-E50)
 - | |—| 40 / 120-tool storage capacity (V33i : with 40000 min⁻¹ spindle HSK-E32)
 - | |—| Automatic work changer (Work storage capacity 24, 36, 48, 60 and 90 tools)
 - | |●| Robot shutter
 - | |—| Large robot shutter (requires the high column specification)
 - |★|—| Loader interface
 - |★|★| Oil skimmer
 - |★|★| MQL unit
 - |★|★| Machining chamber air blow
 - |—|★| Chip bucket (for metal dry machining)
 - |—|★| Front unloading lift-up chip conveyor (hinge type, for metal dry machining)
 - |★|★| Splash guard lighting device (1 LED)
 - |★|★| Air dryer
- |★|★| Automatic tool length measuring device (contact type) (Including broken tool sensor)
 - |★|★| Automatic tool length measuring device (low contact-pressure) (Including broken tool sensor)
 - |★|★| Automatic Non-contact tool measuring device (Including broken tool sensor)
 - |★|★| Hybrid automatic tool length measuring device (30000 min⁻¹ spindle : HSK-E50 and 40000 min⁻¹ spindle : HSK-E32.)
 - |★|★| Precision Tool Image Measuring 2 (requires calibration tool)
 - |★|★| Reference master tool (HSK-E32 / HSK-E50 / HSK-F63 / HSK-A63)
 - |★|★| Automatic workpiece measuring device
 - |★|★| Ring gauge for automatic workpiece measuring device
 - |★|★| i Setup
 - |★|★| Portable manual pulse generator with tool position display and the handle enable button
 - |★|★| 3-dimensional cam machining function
 - |★|★| Scroll machining function
 - |★|★| Run hour meter (power ON, NC automatic ON, spindle ON, with reset function)
 - |★|★| Warmup timer (with automatic running function)
 - |★|★| Lighting device inside of electric enclosure and 100V outlet
 - |★|★| Signal light 3-layer
 - |★|★| Circuit breaker
 - |●|●| Customer-specified machine color