MAKINO

Promise of Performance

ISO 9001
ISO 14001
BUREAU VERITAS
Certification

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

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*The all products in this catalogue include the optional specifications and equipment.

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OFFICIAL WEBSITE

M455En 2305/3 (V-T)

Vi SERIES

Vertical Machining Center

V33i V56i

MAKINO

Promise of Performance

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 change – **Thermal Guard** Covering the entire machine to keep out ambient air

Photo: ATC 25 tools (optional specification)

	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 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}	HSK-A63*
30000 min^{-1}	HSK-E50*
	HSK-F63 *
40000 min^{-1}	HSK-E32*

V56i	
20000 min^{-1}	BT40
	HSK-A63*
30000 min^{-1}	HSK-F63*
12000 min^{-1}	BT40*
	HSK-A63*
	BIG PLUS* (BBT40)

*: Optional specification

High precision machining

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

◎Actual value measured (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
		Squareness	1.8	1.8
Straight line (simultaneous two axis)	100 mm	Straightness	1.9	1.9
		Parallelism	1.0	1.2
		Squareness	1.7	1.7
Circle (side face)	160 mm diameter F2000 mm/min	Roundness	1.2	1.4

Average value of ten machines

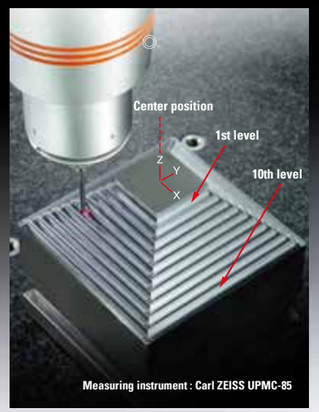
24 hours continuous operation Maximum error of center position 1.9μm

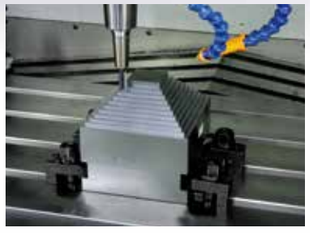
<Machining accuracy evaluation test>

Vi series is run 2.5 hours at every level in the process of machining a 10th level pyramid. An evaluation was made of the center position error induced by changes in the machine attitude during this continuous operation.

Cold start ▶ 1st level machining ▶ 2nd and later level machining ----▶ 2.5 hours running ▶ Machining end

Repeat until the 10th level





◎Measured result

Machining place	Elapsed time	Center position (μm)	
		X-axis error	Y-axis error
1st level (baseline)	0.15	0	0
2nd level	2.80	-0.3	-0.9
3rd level	5.45	-0.7	-1.3
4th level	8.10	-1.2	-1.1
5th level	10.75	-1.1	-1.7
6th level	13.40	-1.9	-1.6
7th level	16.05	-0.9	-1.6
8th level	18.70	-0.6	-1.2
9th level	21.35	-1.0	-0.4
10th level	24.00	-0.8	-0.7

Actual value measured

V56i

Workpiece material : S55C
Workpiece size : 150 × 150 × 100 mm
Temperature during machining : Start 20.7°C → End 21.7°C

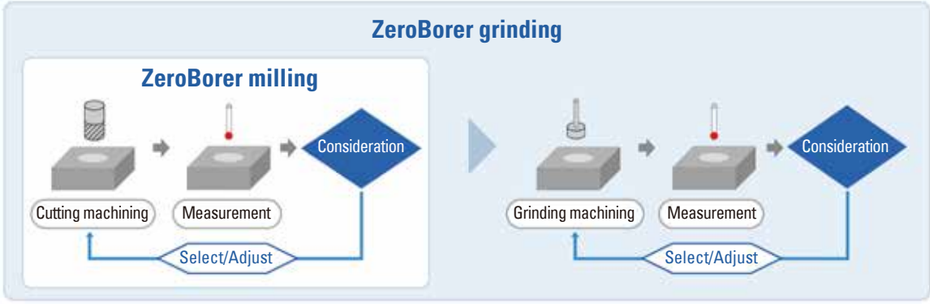
●Machining condition
Tool used : 10 mm diameter endmill [4 flutes]
Spindle speed : 3500 min^{-1}
Cutting feed : 700 mm/min

●Running condition
2.5 hours continuous operation / Simultaneous 3-axis travel (X, Y, Z 900 × 880 × 200 mm)
Spindle speed : 3500 min^{-1}
Cutting feed : 4000 mm/min

Zero Borer Video

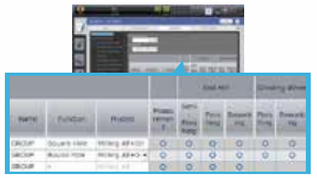
Target accuracy has been automatically achieved without human intervention

The operator measurements and subsequent adjustments that were conventionally required to achieve machining accuracy were eliminated.
ZeroBorer can automate all of processes with allowing the software to determine and repeat machining, measurement and adjustment.
ZeroBorer milling is for cutting machining,
ZeroBorer grinding supports cutting machining to grinding machining.



Intuitive interface and operator friendly full support function

The programming using the dedicated screen built-in to the Professional 6 enables a smooth start of machining without changing the screen.
The optimal machining method, tools, machining process and machining condition are automatically set by selecting the machining shape and workpiece material type.



Process setting is only check

Quick input screen

Machining condition automatic setting screen

Machining examples

Workpiece material : SKD11 59HRC
Workpiece size : 400 × 250 × 30 mm
Finishing allowance : One side 0.2 mm

Total machining time **12 hr. 20 min.**

(μm)	ø30 mm ø27cBN Vitrified #230	ø10 mm ø9cBN Vitrified #230	45 × 60 Pocket size Dia. 10 end mill
Diamete	±1	±1.5	±1
Ra	0.05	0.07	0.16
Position	±1.5	±2	±1.5

Actual results in the environment in our factory

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.

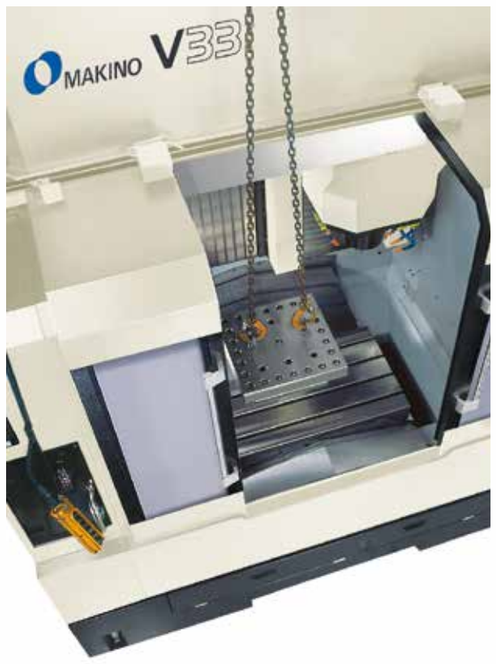


Photo : V33i

• 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

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

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

← Coolant tank
(V33i standard specification)

Continuous operation

Photo : V56i

• Automatic Tool Changer •

Major specifications	V33i 20000 / 30000 min-1 spindle		V33i 40000 min-1 spindle	V56i 20000 / 30000 / 12000 min-1 spindle	
Storage capacity	15, 25*	40*, 60*	20, 40*	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)

Photo : V33i

V33i

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

V56i

- Robot shutter
- Pallet changer
- Loader interface

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

← Tool tip position: Low-pressure contact probe

↓Spindle nose position: Non-contact sensor

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

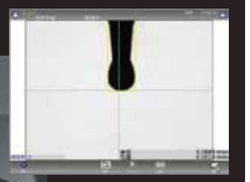
Major specifications

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) (40000 min-1 : V33i only)

Measuring of fine tools

Precision Tool Image Measuring 3*2



Display of measurement results

<Measurement example>
Tool diameter 0.1 mm
Spindle speed 10000 min-1

(Cover closes after measurement)

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. When simultaneously attaching a pallet changer to the machine is not available.

◎ Selectable according to the machining jobs.

Major specifications	Basic type Contact type	For small-diameter Low-pressure type	Tool length and tool diameter measuring for small-diameter tools 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)

• The controller, maximizing machine performance •

Professional 6

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.**

Spindle Crash Avoidance

Crash avoidance function "Collision Safeguard"

No More Scratch

Intuitive Operation

i Setup (optional equipment)

- ◎ Quick and easy measuring for setup by intuitive operation
- ◎ Code-free programming on dialogue screen

Graphite machining facilitated by Makino's versatile V-Series

Graphite machining specification

Photo：V33i GRAPHITE

Advantages of graphite as a material for electrode

- ◎ Easy-to-cut
- ◎ Outstanding performance of rough EDM machining
  - ・Machining speed: 1.5 to 3 times faster than copper electrode
  - ・Specific gravity: 1/5 of copper
- ◎ Easy-to-polish
- ◎ Small thermal expansion rate
  - ・1/4 of copper

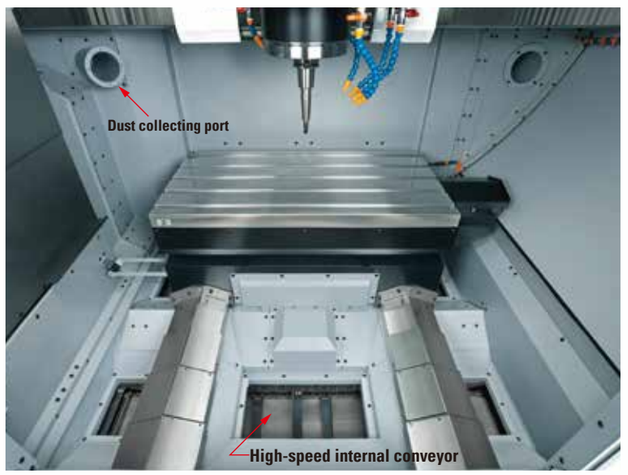
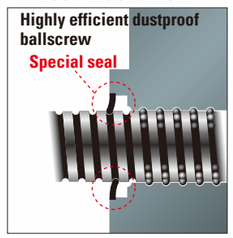
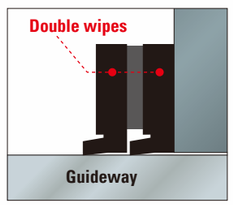


Photo: Machining chamber of V56i GRAPHITE (High column specification / Pallet changer specification)

Dust-proof design of feed mechanism

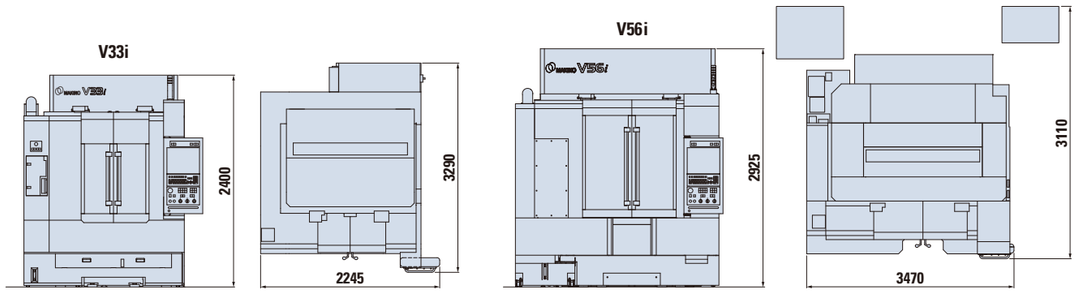




Machine Specifications (standard specification)

■ Travels	V33i	V56i
X × Y × Z axis	650 × 450 × 350 mm	900 × 550 × 450 mm
Distance from table surface to spindle end	150 - 500 mm	150 - 600 mm
■ Table		
Size	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 payload (evenly distributed)	300 kg	800 kg
Surface configuration	T-slot (18H8 × 4)	T-slot (18H8 × 5)
■ Spindle		
Speed range	200 - 20000 min^{-1}	50 - 20000 min^{-1}
Motor drive	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.)
Interface	HSK-A63 (optional specification)	BT40 (7/24 taper #40)
Main bearings (inner)	65 mm dia.	80 mm dia.
No. of spindle speed ranges	2 steps with electric changeover	2 steps with electric changeover
Cooling / lubrication	Spindle core / Under race	Spindle core / Under race
■ Feedrates		
Rapid traverse	20000 mm/min	20000 mm/min
Cutting feed	1 - 20000 mm/min	1 - 20000 mm/min
■ Automatic tool changer		
Tool shank	—	JIS B6339 40T
Retention knob	—	MAS403 P40T1 type
Tool storage capacity	15 tools	15 tools
Maximum tool diameter	80 mm	80 mm
Maximum tool length	250 mm	300 mm
Maximum tool weight	7 kg	8 kg
■ Machine size		
Width × Depth × Height	2245 × 3290 × 2400 mm	3470 × 3110 × 2925 mm
Weight	7400 kg	10400 kg
■ Floor space		
Width × Depth	2700 × 4055 mm	4550 × 4440 mm

Front View / Floor Plan (mm)



Standard Specifications

- 20000 min^{-1} spindle (BT40) (V56i 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
- Splash guard
- Splash guard lighting device (1 LED)
- Operator doorlock (operation mode)
- Chip bucket (V33i only)
- 2 built-in conveyors (V56i only)
- Nozzle coolant
- 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 C
- Programmable data input
- T code eight digits
- Standard tool length function
- ECO mode functions
- Professional 6
- Automatic fire extinguisher interface
- Automatic power shutoff
- Collision Safeguard
- Program quick restart function
- MRDF (Machine Retransfer Detect Function)

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

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

|—|●| 12000 min^{-1} spindle (BT40, BBT40 and HSK-A63)
|●|●| 20000 min^{-1} spindle (HSK-A63)
|●|—| 30000 min^{-1} spindle (HSK-E50)
|●|●| 30000 min^{-1} spindle (HSK-F63)
|●|—| 40000 min^{-1} spindle (HSK-E32)
|●|●| Preparation for BIG Air turbine spindle (80000 min^{-1}) (Requires additional spindle attachment. Customers have to prepare.)
|★|★| Hale machining (including Cs contour control/helical interpolation/normal direction control, V33i : unavailable with the 40000 min^{-1} spindle)
|●|●| High column Z min. = 350 mm specification (V33i 40000 min^{-1} spindle: Z min. = 300 mm)
|●|—| High column Z min. = 250 mm specification (V33i 40000 min^{-1} spindle: Z min. = 200 mm)
|—|●| Column Stabilizer
|●|●| 25 / 40 / 60-tool storage capacity (BT40 / HSK-A63 / HSK-F63 / HSK-E50)
|●|●| 36 / 40-tool storage capacity (V33i 40000 min^{-1} spindle HSK-E32 / BIG Air turbine spindle)
|●|—| Automatic work changer (workpiece storage capacity 24, 36, 48, 60 and 90 tools)
|●|●| Pallet changer (including high column specification)
|—|★| Pallet random calling function
|●|—| WPS shutter
|—|●| Robot shutter
|●|●| Loader interface (V33i: layout with rear control panel required)
|●|—| Air piping for table chuck (dia.6 × 6)
|●|—| 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 (20000 min^{-1} spindle + HSK-A63)
|★|—| Nozzle coolant flow switch
|★|★| Workpiece washing gun (operator side)
|—|★| Inner splash guard washing coolant
|—|●| Highly efficient dust-proof specification
|★|★| Coolant temperature controller (with heater) (required for oil type coolant and high precision machining)
|★|★| GI breaker
|★|★| Oil skimmer
|★|★| MQL unit
|★|★| MTConnect interface
|★|★| OPC UA interface
|★|★| Tiltable chip bucket
|★|—| Chip bucket for short-type lift-up chip conveyor
|—|★| Tilt truck chip bucket (for Lift-up chip conveyor)
|★|—| Lift-up chip conveyor (with filtration function)
|★|—| Short-type lift-up chip conveyor (with filtration function)
|—|★| Front or Rear discharge lift-up chip conveyor (Scraper type, with coolant filtration unit)
|★|★| Additional lighting device inside of splashguard (1 LED)
|★|★| Mist collector
|★|★| Connection port for mist collector
|★|★| 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 3 (requires calibration tool)
|★|★| Reference master tool
|★|★| Automatic workpiece measuring device
|★|—| High precision automatic workpiece measuring device
|★|★| Ring gauge for automatic workpiece measuring device
|★|★| I/O interface for measurement
|★|★| Curved shape measuring function A
|★|★| i Setup
|●|●| ZeroBorer milling *1
|●|●| ZeroBorer grinding *2
|★|★| 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 (spindle running)
|★|★| Lighting and 100V (5A) outlet inside Machine Tool Controller
|★|★| Signal light 3-layer
|★|★| Machine controller door interlock
|★|★| Circuit breaker
|★|★| Super GI.5 control
|★|★| ECO mode of air consumption volume
|●|●| Customer-specified machine color
|★|★| Consumables package

*1 Required: Automatic workpiece measuring device
*2 Required: Automatic non-contact tool measuring device, Automatic workpiece measuring device, Highly efficient dust-proof specification
Not available with Pallet changer, Rotary work head, Automatic tool length measuring device (Metrol/Low contact-pressure), Hybrid automatic tool length measuring device, Precision Tool Image Measuring 3, High precision automatic non-contact tool measuring device

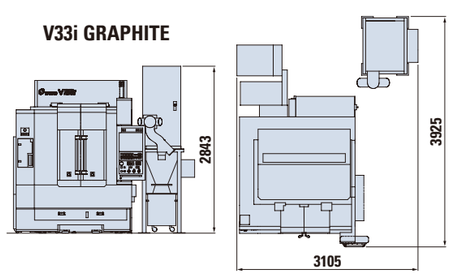
Machine Specifications (standard specification)

■ Travels	V33i GRAPHITE	V56i GRAPHITE
X × Y × Z axis	650 × 450 × 350 mm	900 × 550 × 450 mm
Distance from table surface to spindle end	350 - 700 mm *1 250 - 600 mm *2	150 - 600 mm
■ Table		
Size	750 × 450 mm	1050 × 550 mm
Maximum workpiece size (W × D × H)	750 × 635 × 450 mm *1 (with limitation) 750 × 635 × 350 mm *2 (with limitation)	1050 × 720 × 450 mm (with limitation)
Maximum payload (evenly distributed)	300 kg	800 kg
Surface configuration	T-slot (18H8 × 4)	T-slot (18H8 × 5)
■ Spindle		
Speed range	200 - 20000 min^{-1}	50 - 20000 min^{-1}
Motor drive	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.)
Interface	BT40 (7/24 taper #40)	BT40 (7/24 taper #40)
Main bearings (inner)	65 mm dia.	80 mm dia.
No. of spindle speed ranges	2 steps with electric changeover	2 steps with electric changeover
Cooling / lubrication	Spindle core / Under race	Spindle core / Under race
■ Feedrates		
Rapid traverse	20000 mm/min	20000 mm/min
Cutting feed	1 - 20000 mm/min	1 - 20000 mm/min
■ Automatic tool changer		
Tool shank	JIS B6339 40T	JIS B6339 40T
Retention knob	MAS403 P40T1 type	MAS403 P40T1 type
Tool storage capacity	15 tools	15 tools
Maximum tool diameter	80 mm	80 mm
Maximum tool length	250 mm	300 mm
Maximum tool weight	7 kg	8 kg
■ Machine size		
Width × Depth × Height	3105 × 3925 × 2843 mm	4640 × 3460 × 2995 mm
Weight	8200 kg	10400 kg
■ Floor space		
Width × Depth	4195 × 4495 mm	5285 × 3790 mm

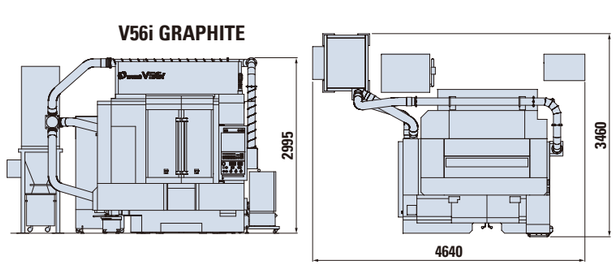
*1 : Z min. = 350 mm specification
*2 : Z min. = 250 mm specification

Front View / Floor Plan (mm)

V33i GRAPHITE



V56i GRAPHITE



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 (V33i only)
- 2 built-in conveyors (V56i only)
- 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 C
- Programmable data input
- T code eight digits
- Standard tool length function
- ECO mode functions
- Professional 6
- Automatic fire extinguisher interface
- Automatic power shutoff
- Collision Safeguard
- Program quick restart function
- MRDF (Machine Retransfer Detect Function)

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

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

|–|●| 12000 min^{-1} spindle (BT40, BBT40 and HSK-A63)
|●|●| 20000 min^{-1} spindle (HSK-A63)
|–|●| 20000 min^{-1} spindle (BBT40)
|●|●| 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, V33i : unavailable with the 40000 min^{-1} spindle)
|–|●| High column Z min. = 350 mm specification
|–|●| Column Stabilizer
|●|●| 25 / 40 / 60-tool storage capacity (BBT40 / HSK-A63 / HSK-F63 / HSK-E50)
|●|–| 40-tool storage capacity (V33i : 40000 min^{-1} spindle HSK-E32)
|●|–| Automatic work changer (workpiece storage capacity 24, 36, 48, 60 and 90 tools)
|●|●| Pallet changer (including high column specification)
|●|–| WPS shutter
|–|●| Robot shutter
|●|●| Loader interface
|●|–| Air piping for table chuck (dia.6 × 6)
|★|★| MQL unit
|●|●| Machining chamber air blow
|–|★| Chip bucket (for metal dry machining)
|★|★| Additional lighting device inside of splashguard (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 (40000 min^{-1} spindle : HSK-E32.)
|★|★| Automatic workpiece measuring device
|★|–| High precision automatic workpiece measuring device
|★|★| Ring gauge for automatic workpiece measuring device
|★|★| I/O interface for measurement
|★|★| i Setup
|★|★| 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 (spindle running)
|★|★| Lighting and 100V (5A) outlet inside Machine Tool Controller (1 LED)
|★|★| Signal light 3-layer
|★|★| Circuit breaker
|●|–| Layout with rear control panel
|★|★| Machine controller door interlock
|★|★| Super GI.5 control
|●|●| Customer-specified machine color
|★|★| MTConnect interface
|★|★| OPC UA interface
|★|★| Consumables package