



# VESTA-2000

Software Optimized Vertical Machining Center



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## Product Overview

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1 Gear / Robot Arm / Aluminum  
2 Part / Air Flap Link / Aluminum  
3 HECC Sample / KP4M

## 850 mm Y-axis Vertical Machining Center with Software Function for Enhanced Productivity and Precision

VESTA-2000 is recommended for powerful cutting based on its stable structure. It is equipped with Hwacheon's proprietary technologies such as productivity enhancement software (HECC, HTLD and OPTIMA) and precision enhancement software (HTDC and HAI) and provides differentiated quality different from existing machining center for parts.



### Upgrades for Enhanced Machining Performance

- 1 High rigid roller LM guide for every axis
- 2 4 coil conveyors to enhance chip discharge performance
- 3 The table wide enough to mount multiple workpieces
- 4 Various direct-coupled main spindle specifications that meet machining purposes
- 5 The servo type ATC (BT-40) to enhance the tool change time
- 6 Hwacheon's proprietary software

### Enhanced User Convenience

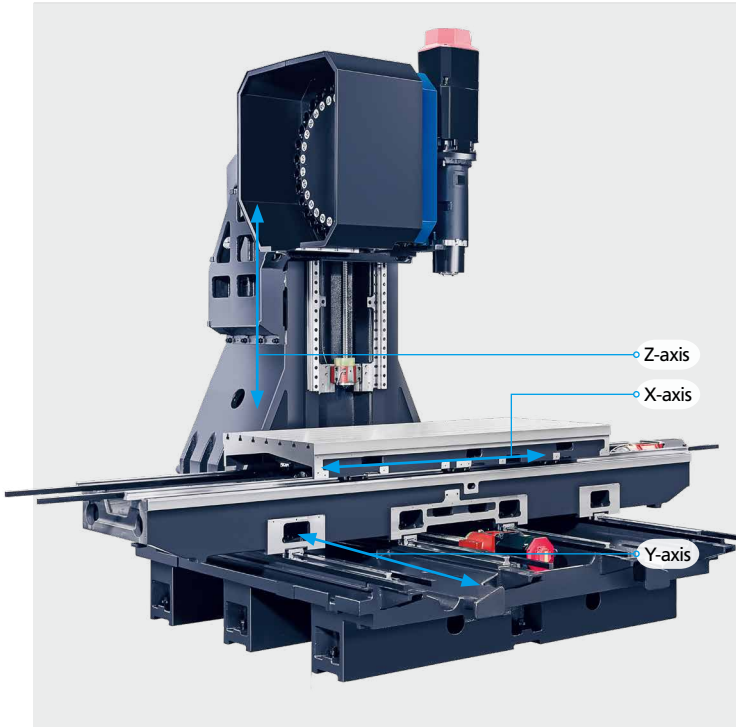
- 1 The tempered safety glass ensures machining visibility
- 2 The step integrated coolant tank ensures the front table accessibility
- 3 Eco-friendly oil water separation structure

### Easy Maintenance

- 1 Peripherals requiring maintenance are gathered in one place
- 2 Easy lubrication points

## Basic Information

### Basic Structure



### "Machining Stability Ensured"

- Stable machine structure  
(Outstanding rigid base and column structure ensured)
- C type structure for work accessibility
- High rigid roller LM guide for every axis  
(The Y-axis has 4 columns LM guide for saddle rigidity)



※ Y-axis, 4 columns LM Guide

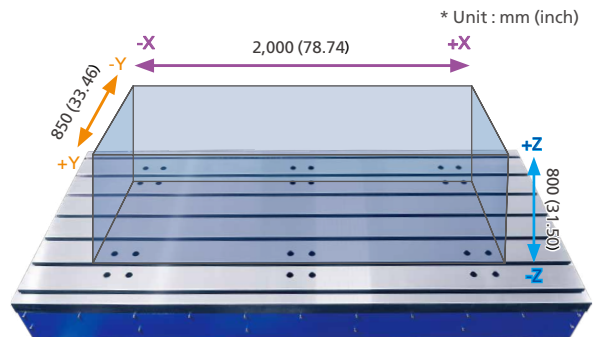
Stroke mm (inch)			Rapid Speed m/min (ipm)		
X-axis	Y-axis	Z-axis	X-axis	Y-axis	Z-axis
2,000 (78.74)	850 (33.46)	800 (31.5)	24 (945)	24 (945)	24 (945)

### Table

### "Wide Workpiece Mounting Area"

Possible to set workpieces and vices in various sizes

Table Size mm (inch)	TSlot W x P mm (inch)	Max Loading Capacity kg <sub>r</sub> (lb <sub>r</sub> )
2,000 x 850 (78.74 x 33.46)	18 x 125 (0.71 x 4.92) Number of T slot : 7 ea	1,800 (3,968)

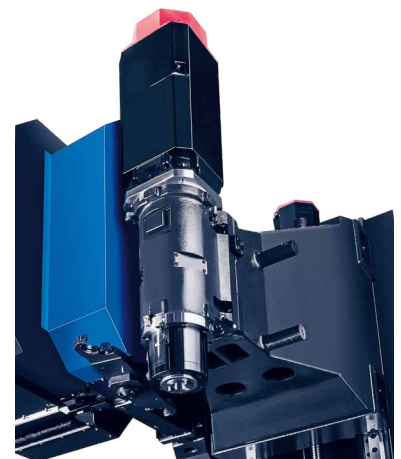


### Spindle

### "Various Specifications for Direct-Coupled Spindles"

Meeting the customer's machining purposes

	Max Spindle Speed rpm		FANUC		SIEMENS		HEIDENHAIN	
			Spindle Motor kW	Max Torque Nm	Spindle Motor kW	Max Torque Nm	Spindle Motor kW	Max Torque Nm
BT-40	10,000	Regular Type	18.5	117.7	20.9	178	32	203.7
		CTS (OPT)						
	12,000 (OPT)	Regular Type	18.5	117.7				
		CTS (OPT)						
BT-50 (OPT)	8,000	Regular Type	15	286	-	-	46	286.5
		CTS (OPT)	26	165				



ATC (Automatic tool changer)



"Optimized Tool Change Time"

Reduces non-cutting time for productivity

Tool to Tool Time	
BT-40	BT-50
1.8 sec	3.5 sec

Magazine



"Magazines in Various Specifications"

Various specifications are available based on users' tool types

Item	Tool Shank	BT-40	OPT) SK-40, CAT-40 HSK-A63	OPT) BT-50, CAT-50 SK-50, HSK-A100
		Drum Type		Chain Type
Tool Storage Capacity		30	24	30
Drive Type		Servo Motor		Geared Motor
Method of Tool Selection		Memory Random		
Tool Change Type		Swing Arm		

Cover Design

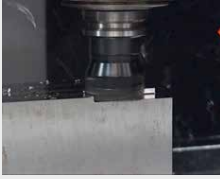


"Minimized Effects of External Temperature Variation"

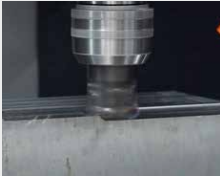
The cover designed to be tightly adhered to the bottom minimizes effects on the machine caused by various factors such as external temperature variation.

20 mm  
(0.79 inch)

**BT-40 Cutting Performance**



Face mill, Carbon Steel (SM45C)					
Tool Dia mm (inch)	Material Removal Rate cm <sup>3</sup> /min	Spindle Speed rpm	Feed mm/min (ipm)	Axial Depth mm (inch)	Radial Depth mm (inch)
60 (2.36)	280	1,500	1,400 (55.12)	5 (0.2)	40 (1.57)



Face mill, Carbon Steel (SM45C)					
Tool Dia mm (inch)	Material Removal Rate cm <sup>3</sup> /min	Spindle Speed rpm	Feed mm/min (ipm)	Axial Depth mm (inch)	Radial Depth mm (inch)
50 (1.97) / R8	300	1,500	1,500 (59.1)	5 (0.2)	40 (1.57)

**BT-50 Cutting Performance**



Face mill, Carbon Steel (SM45C)					
Tool Dia mm (inch)	Material Removal Rate cm <sup>3</sup> /min	Spindle Speed rpm	Feed mm/min (ipm)	Axial Depth mm (inch)	Radial Depth mm (inch)
80 (3.15)	528	1,500	1,650 (65)	5 (0.2)	64 (2.52)



Face mill, Aluminum (AL6061)					
Tool Dia mm (inch)	Material Removal Rate cm <sup>3</sup> /min	Spindle Speed rpm	Feed mm/min (ipm)	Axial Depth mm (inch)	Radial Depth mm (inch)
100 (3.94)	1,920	2,000	4,000 (157)	6 (0.24)	80 (3.15)



Face mill, Carbon Steel (SM45C)					
Tool Dia mm (inch)	Material Removal Rate cm <sup>3</sup> /min	Spindle Speed rpm	Feed mm/min (ipm)	Axial Depth mm (inch)	Radial Depth mm (inch)
63 (2.48) / R8	882	1,500	3,920 (154)	5 (0.2)	45 (1.77)



End mill, Carbon Steel (SM45C)					
Tool Dia mm (inch)	Material Removal Rate cm <sup>3</sup> /min	Spindle Speed rpm	Feed mm/min (ipm)	Axial Depth mm (inch)	Radial Depth mm (inch)
40 (1.57)	336	800	420 (16.5)	40 (1.57)	20 (0.79)



U-Drill, Carbon Steel (SM45C)			
Tool Dia mm (inch)	Material Removal Rate cm <sup>3</sup> /min	Spindle Speed rpm	Feed mm/min (ipm)
45 (1.77)	636	1,500	400 (15.7)



Tap, Carbon Steel (SM45C)			
Tap Size	Spindle Speed rpm	Feed mm/min (ipm)	Spindle Load %
M30 x P3.5	200 / 300	700 (27.6) / 1,050 (41.3)	60 / 60
M33 x P3.5	200 / 300	700 (27.6) / 1,050 (41.3)	76 / 78

\* The machining results above are examples based on the factory test standards, and are subjected to the changes in conditions.

## Standard / Optional Accessories Status

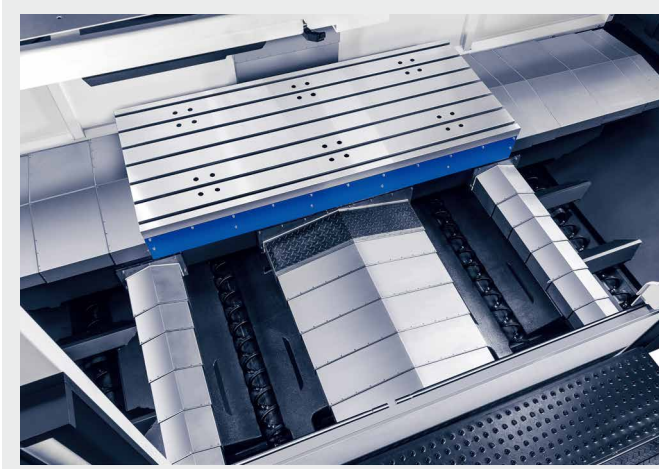
S : Standard O : Option

NO.	Item	Description	VESTA-2000	
1	Spindle	10,000 rpm	S	
2		FANUC 10,000 rpm (CTS) 18.5 / 11 kW 117.7 Nm	O	
3		12,000 rpm	O	
4		SIEMENS 10,000 rpm 20.9 / 10.2 kW 178 Nm	O	
5			12,000 rpm	O
6		HEIDENHAIN 10,000 rpm 32 / 15 kW 203.7 Nm	O	
7			12,000 rpm	O
8		#50 FANUC 8,000 rpm 15 / 11 kW 286 Nm	O	
9			8,000 rpm (CTS) 26 / 22 kW 165 Nm	O
10			HEIDENHAIN 8,000 rpm 46 / 22 kW 286.5 Nm	O
11	#40	30 Tools Magazine	S	
12	Magazine	#50 24 Tools Magazine	O	
13		#50 30 Tools Magazine	O	
14	Tool Shank	#40 BT-40	S	
15		BBT-40 / CAT-40 / HSK-A63 / SK-40	O	
16		#50 BT-50	O	
17		BBT-50 / CAT-50 / HSK-A100 / SK-50	O	
18	Coolant Function	Head Flushing (0.15 MPa, 0.6 kW)	S	
19		CTS Coolant System	3 MPa 2.2 kW	O
20			7 MPa 2.2 kW	O
21		Oil Mist (Semi dry cutting system)	O	
22	Chip Removal Function	Air Blower	S	
23		Coil Conveyor (4ea)	S	
24		Air Gun	O	
25		Coolant Gun	O	
26		Lift-up Chip Conveyor	Hinge Type	O
27			Scraper Type	O
28	Mist Collector	O		
29	Precision Machining Function	Linear Scale (X / Y / Z)	O	
30		Hwacheon Artificial Intelligence Control System (HAI): 40 Block	S	
31		Hwacheon Efficient Contour Control System (HECC)	S	
32		Hwacheon Thermal Displacement Control System (HTDC) [ Hwacheon Spindle Displacement Control System (HSDC) + Hwacheon Frame Displacement Control System (HFDC) ]	S	
33		Hwacheon Artificial Intelligence Control System (HAI): 200 Block	O	
34		Hwacheon Artificial Intelligence Control System (HAI): 400 Block	O	
35		Lubrication System	S	
36		Spindle Cooler (Jacket Cooling)	Fan Cooler Type	S
37	Oil Cooler Type (12,000 rpm Spindle)		O	
38	Measuring & Automation Function	Tool Measuring System – Renishaw / Blum (Touch Type, Laser Type)	O	
39		Workpiece Measuring System – Renishaw / Blum (Touch type)	O	
40		Tool Life Management	O	
41		Auto Door	O	
42		Hwacheon Tool Load Detect System (HTLD)	S	
43	Cutting Feed Optimization System (OPTIMA)	S		
44	Convenient Functions	Ethernet Interface	S	
45		MPG Handle (1ea)	S	
46		MPG Handle (3ea)	O	
47		Signal Lamp with 3 Color (R, G, Y)	S	
48		10.4" Color LCD	S	
49		Tool Box	S	
50		NC Cooler	O	
51		Oil Skimmer	O	
52		Air Dryer	O	
53		Door Interlock	S	
54		Workpiece Coordinate System 48 pairs	S	
55		Lubrication Oil Separation Tank	S	
56		Perfect Base Around Splash Guard	S	
57		Part Program Storage Length 1,280m (512kB)	S	
58		Data Server (256MB / 1,024MB)	O	
59		Data Server (1,024MB)	O	
60		Data Server Interface	O	
61		Transformer	O	
62		Manual Guide i	O	
63		Monitoring Solution of Real-time Operational Status (M-VISION Plus)	O	
64	4-axis Interface	O		

# USER FRIENDLY DESIGN, A WIDE RANGE OF OPTIONAL FEATURES

User convenience and various additional function

VESTA-2000 system offers a user friendly design and a wide variety of upgrade options for a faster, more precise machining performance, so you can concentrate on what you do best : creating quality products.



## "Excellent Chip Disposal"

Four coil conveyors in the wide and steeply slanted slide cover structure that are located under the table provide excellent chip disposal performance.

## 4 Coil Conveyors

Four coils conveyors as standard will rapidly remove a large amount of chips generated during machining.

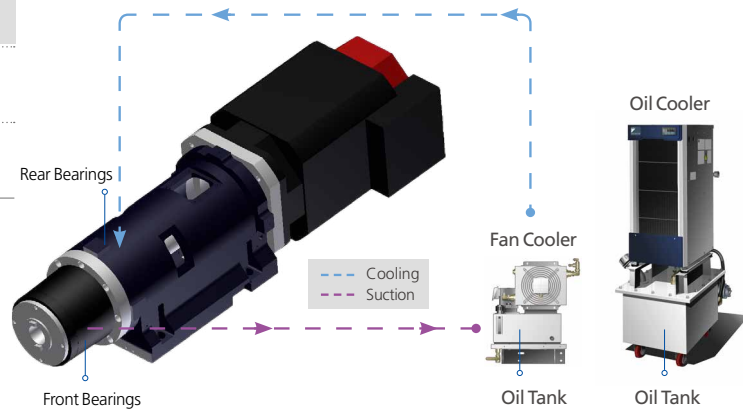


## Convenient Accessibility

Coolant tank combined with step helps user accessibility during operation and enhance space utilization.

### Cooling System

	Jacket Cooling	Bearing Lubrication
10,000 rpm (STD) 8,000 rpm (OPT)	Fan Cooler	Grease Type
12,000 rpm (OPT)	Oil Cooler	Air-Oil Type



### Convenient Maintenance

Improved the manageability of machine through the integration of peripheral devices for required maintenance.

### LED Work Light

Long-life LED work lights at three places ensures comfortable working environment and minimizes heat generation.



### Excellent Coolant Tank and Chip Removal

### "Possible to Select Type of Chip Conveyor" according to machining purpose

- Hinge Type Chip Conveyor (Suitable for coarse chips discharge)
- Scraper Type Chip Conveyor (Suitable for fine chips discharge)



### External Coolant Tank Tank Capacity : 740 ℓ (195.49 gal)

- External coolant tank is installed at the front of machine.
- Easy to exchange coolant, clean the tank and maintain pump.
- Step integrated coolant tank for better table accessibility.



- **Micro Chip Separation**  
Chip filter is used to remove micro chips and keep the coolant tank clean.

Chip Filter

### Coolant Pump Specifications

- CTS Coolant Pump (OPT) - Pressure : 3 MPa  
- Power : 2.2 kW
- Head Coolant Pump - Power : 0.6 kW
- Coolant Gun Pump - Power : 1.1 kW

Convenient Operator Panel

Pendant Arm Type Operator Panel (STD)



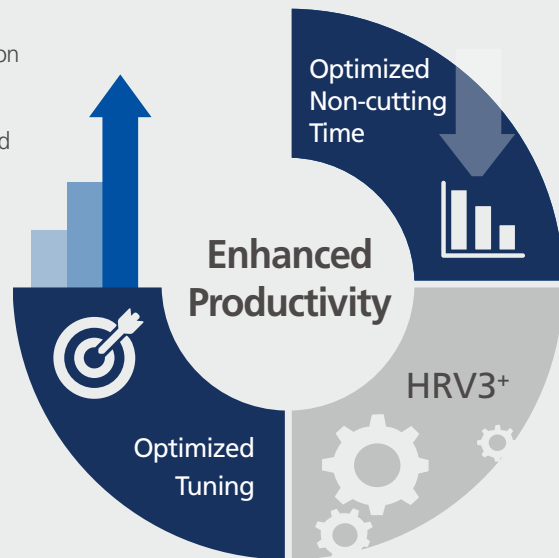
The operator panel is newly designed from the operator's viewpoint and thus enhances the operator's convenience.

"User Friendly Design"

- 10.4" display as standard (USB and PCMCIA cards as standard)
- Enhanced operability by optimizing the layout and improving the touch feeling of control buttons
- Horizontal keys enhance user convenience.
- Separately mounting MPG for workpiece setting convenience.
- Long time continuous DNC operation with the CF card even without the data server.

Machine Optimization (STD)

- Smart rigid tap function applied for machining time reduction.
- The cycle machining as well as the operating time and the acceleration / deceleration speed of feeding system are optimized.
- High-level precision, speed and smoothness are realized by enhanced processing performance of tiny segments.
- Dramatically reduced non-cutting time during machining ensures optimal productivity.
- The latest machining technology adopted.
- Machining surface quality enhanced by HRV3+ control. (HRV3+: effectively prevents machine oscillation by controlling the servo current to enhance the machining surface quality.)



"Enhanced Productivity"

## Operating Convenience Function

### < M-CODE LIST >



- M-CODE LIST
- The screen provides easy and quick search and utilization.

(However, it is necessary to discuss with factory in advance to add and / or change M-codes.)

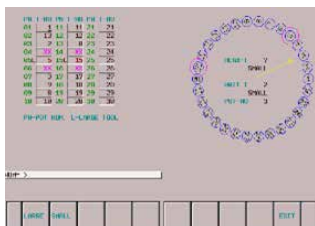
### < GUI (Graphical User Interface) >



- Graphic interface for tool / workpiece measurement
- Automatic offset update function
- Tool setting and damaged tool detection, Workpiece setup and measuring while machining
- Optimized time and failure rate High competitiveness

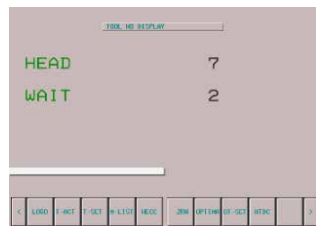
### < Tool Management >

Large / Small Diameter Tool Management System



- Magazine tool management system
- Magazine tool check in real time
- Large / small diameter tools setting

### < Tool View >



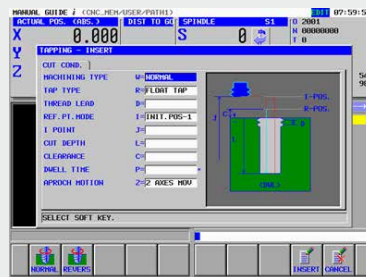
- Head mounted tool check in real time
- Waiting pot mounted tool check in real time

## Manual Guide i

With the Manual Guide i, the operator is able to create a machining program for the desired geometry including the pattern simply if he / she enters numeric values for the basic machining geometry.



- Programming in convenient functions and rich machining cycles



- It displays the machine status and the tools in use while machining.



- The realistic machining simulation checks the program.

Hwacheon Software



### Hwacheon Tool Load Detect System

"Detect and diagnose the most minute of tool-end point movement"

HTLD constantly monitors the tool wear to prevent accidents, which may occur from a damaged tool and help to stop tool wear from deteriorating the workpiece.  
(The load is measured every 8 msec to ensure accuracy.)



### Hwacheon High Efficiency Contour Control System

"Roughing quickly, finishing is precisely"

HECC offers an easy to use programming interface for different workpieces and different processing modes. The system provides a precise, custom contour control for the selected workpiece, while prolonging the life of the machine and decreasing process time. The customizable display provides real-time monitoring and quick access.



### Cutting Feed Optimization System

"Maximize your productivity with intelligent system"

OPTIMA utilizes an adaptive control method to regulate the feed rate in real time, to sustain the cutting load during a machining process. As a result the tools are less prone to damage and the machining time is optimized.



### Hwacheon Spindle Displacement Control System

"Real-time correction for the displacement in the spindle"

When the spindle rotates at high speed, the centrifugal force drives the taper to expand, causing errors in Z axis. HSDC constantly monitors the temperature at each spindle region and makes optimal prediction for thermal displacement. The system then makes necessary adjustments and effectively minimizing thermal displacement.



### Hwacheon Frame Displacement Control System

"System for maintaining processing accuracy for a long period of machining"

HFDC is equipped with highly sensitive thermal sensors in the casting region where thermal activity is suspected; monitoring and correcting displacement.



### Hwacheon Thermal Displacement Control System

"Hwacheon Spindle Displacement Control System + Hwacheon Frame Displacement Control System"

HTDC integrates the Hwacheon Spindle Displacement Control system and the Frame Displacement Control System.



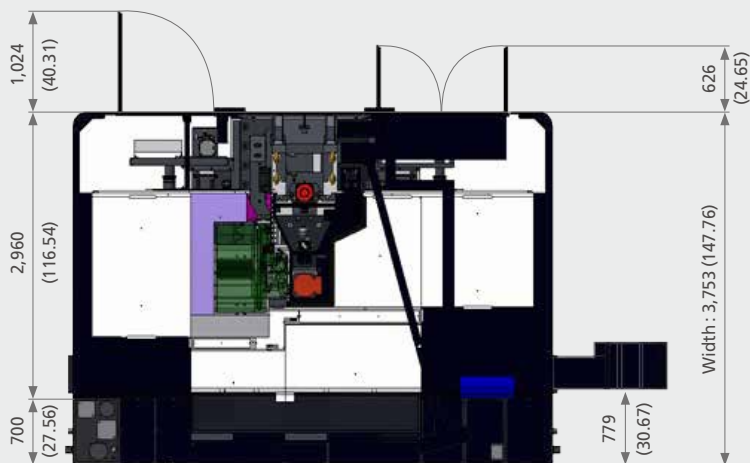
### Monitoring Solution of Real-time Operational Status

"See everything everywhere"

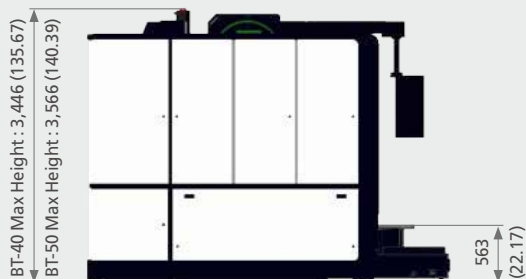
- Monitoring system for the User's factory machine management
- User can always check the status of the machine utilizes a smartphone

### Machine Size

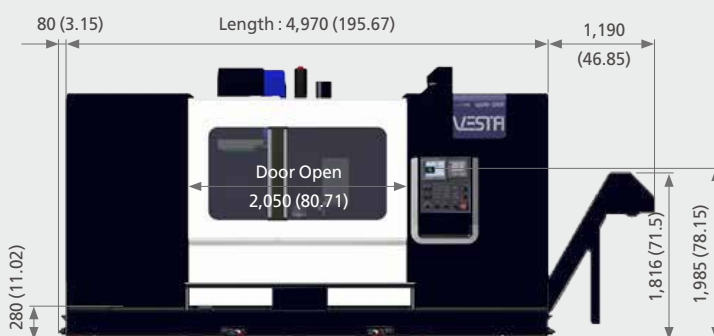
\* Unit : mm (inch)



Top



Left Side

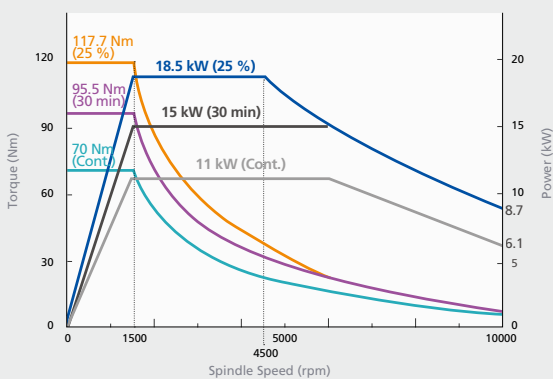


Front

### Spindle Power – Torque Diagram

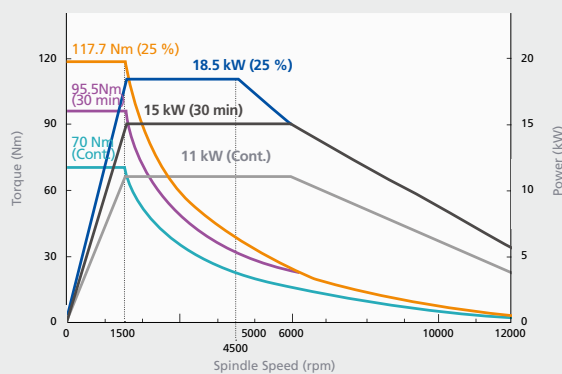
#### 10,000 rpm

Max Power : 18.5 kW (25 HP) / Max Torque : 117.7 Nm



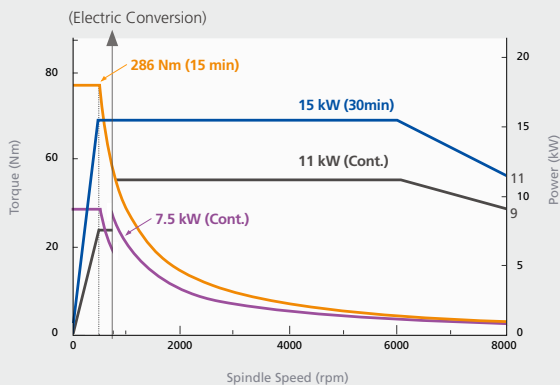
#### 12,000 rpm (OPT)

Max Power : 18.5 kW (25 HP) / Max Torque : 117.7 Nm



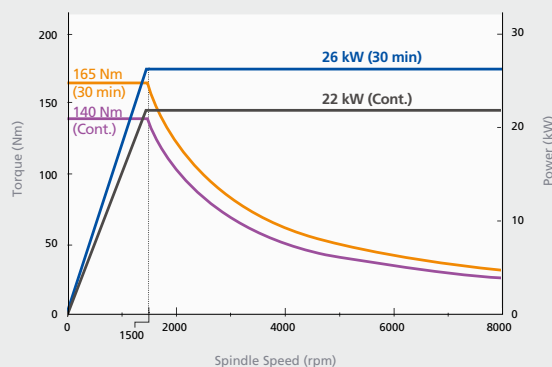
#### 8,000 rpm (OPT)

Max Power : 15 kW (20 HP) / Max Torque : 286 Nm

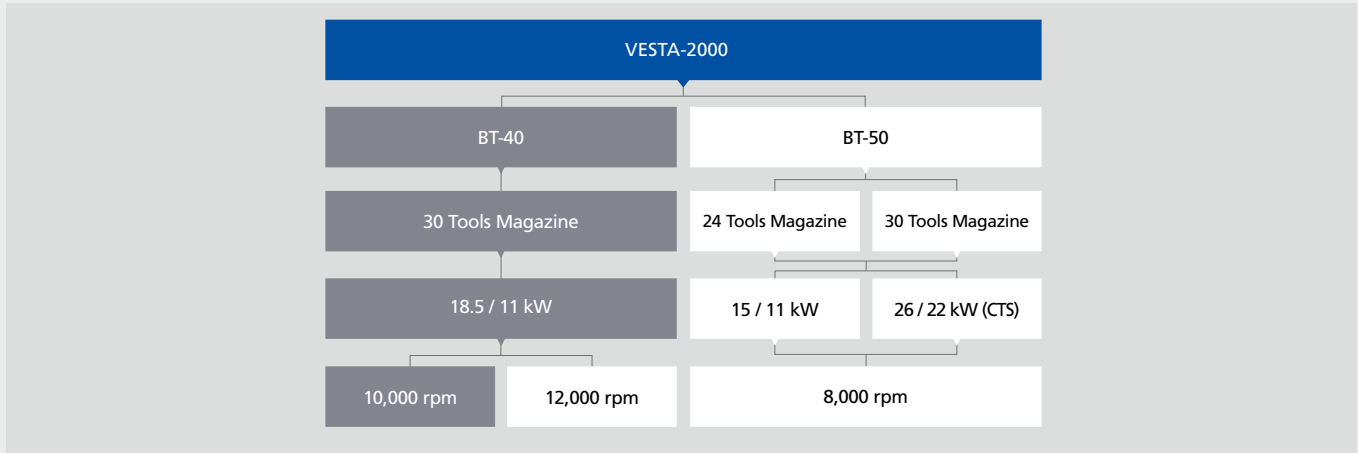


#### 8,000 rpm (CTS)

Max Power : 25 kW (35 HP) / Max Torque : 165 Nm



## Product Line-up



## Machine Specifications

Item		VESTA-2000 / BT-40 10,000 rpm	VESTA-2000 / BT-40 12,000 rpm	VESTA-2000 / BT-50 8,000 rpm
<b>Travel</b>				
Stroke (X / Y / Z)	mm (inch)	2,000 / 850 / 800 (78.74 / 33.46 / 31.5)		
Distance from Table Surface to Spindle Gauge Plane	mm (inch)	150 ~ 950 (5.91 ~ 37.4)		
Distance between Columns to Spindle Center	mm (inch)	905 (35.63)		
<b>Table</b>				
Table Size	mm (inch)	2,000 x 850 (78.74 x 33.46)		
Table Loading Capacity	kg, (lb <sub>r</sub> )	1,800 (3,968)		
T Slot (WxP / No. of slots)	mm (inch)	18 x 125 (0.71 x 4.92) / 7 ea		
<b>Spindle</b>				
Max Spindle Speed	rpm	10,000	12,000	8,000
Spindle Motor	kW (HP)	18.5 / 11 (25 / 15) SIEMENS: 20.9 / 10.2 (28 / 13.6), HEIDENHAIN: 32 / 15 (43 / 20)		15 / 11 (20 / 15) [CTS : 26 / 22 (35 / 30)] SIEMENS: 33 / 22 (44 / 30), HEIDENHAIN: 46 / 22 (62 / 30)
Type of Spindle Taper Hole	-	ISO#40, 7/24 Taper (BT-40)		ISO#50, 7/24 Taper (BT-50)
Spindle Bearing Inner Diameter	mm (inch)	Ø70 (2.76)		Ø90 (3.54)
<b>Feedrate</b>				
Rapid Speed (X / Y / Z)	m/min (ipm)	24 / 24 / 24 (945 / 945 / 945)		
Feed (X / Y / Z)	mm/min (ipm)	1 ~ 10,000 (0.04 ~ 394)		
<b>Motor</b>				
Feed Motor (X / Y / Z)	kW (HP)	4 / 4 / 7 (5.4 / 5.4 / 9.4)		
Coolant Motor (Spindle)	kW (HP)	0.6 (0.8)		
Spindle Cooler Motor	kW (HP)	0.18 (0.2)	2.8 / 3.2 (3.8 / 4.3)	0.18 (0.2)
<b>ATC</b>				
Type of Tool Shank	-	BT-40 (OPT: BBT-40, CAT-40, HSK-A63, SK-40)		BT-50 (OPT: BBT-50, CAT-50, HSK-A100, SK-50)
Type of Pull Stud	-	MAS P40T-1 (45°)		BT-50 (90°)
Tool Storage Capacity	ea	30		24 (OPT: 30)
Max Tool Dia (with / without Adjacent Tools)	mm (inch)	Ø75 / Ø150 (Ø2.95 / Ø5.91)		Ø125 / Ø245 (Ø4.92 / Ø9.65)
Max Tool Length	mm (inch)	300 (11.81)		350 (13.78)
Max Tool Weight	kg, (lb <sub>r</sub> )	8 (17.64)		20 (44.09)
Method of Tool Selection	-	Memory Random		
Method of Operation	-	Servo Motor		Geared Motor
<b>Power Source</b>				
Electric Power Supply	kVA	45		45 / CTS:55
Compressed Air Supply (Pressure x Consumption)	-	0.5 ~ 0.7 MPa x 690 N ℓ/min		
<b>Tank Capacity</b>				
Spindle Cooling / Lubrication	ℓ (gal)	20 / 6 (5.28 / 1.59)		
Coolant	ℓ (gal)	740 (195.49)		
<b>Machine Size</b>				
Height	mm (inch)	3,446 (135.67)		3,566 (140.39)
Floor Space (Length x Width)	mm (inch)	4,970 x 3,753 (195.67 x 147.76)		
Weight	kg, (lb <sub>r</sub> )	12,700 (27,999)		13,900 (30,644)
NC Controller		Fanuc 0i-MF		

## NC Specifications [Fanuc 0i-MF]

S : Standard O : Option

Item	Specification		Item	Specification	
<b>Controlled Axis</b>			<b>Program Input</b>		
Controlled Axis	3-axis	S	Feedrate Control With Acceleration in Circular Interpolation		S
Controlled Axis	5-axis (Max)	O	Scaling		S
Simultaneously Controlled Axis	3 -axis	S	Coordinate System Rotation		S
Simultaneously Controlled Axis	4-axis (Max)	O	Polar Coordinate System		S
Least Input Increment	0.001mm, 0.001deg, 0.0001inch	S	Programmable Mirror Image		S
Least Input Increment 1 / 10	0.0001mm, 0.0001deg, 0.00001inch	O	Tape Format For Fanuc Series 10 / 11		S
inch / metric Conversion	G20, G21	S	Manual Guide i		O
Store Stroke Check 1		S	<b>Spindle Speed Function</b>		
Store Stroke Check 2		S	Spindle Serial Output		S
Mirror Image		S	Spindle Override	50 - 120 %	S
Stored Pitch Error Compensation		S	Spindle Orientation		S
Backlash Compensation		S	Rigid Tapping		S
<b>Operation</b>			<b>Tool Function / Compensation</b>		
Automatic & MDI Operation		S	Tool Function	T4-digits	S
DNC Operation by Memory Card	PCMCIA Card is Required	S	Tool Offset Pairs	±6-digits / 400 ea	S
Program Number Search		S	Tool Offset Memory C		S
Sequence Number Search		S	Cutter Compensation C		S
Dry Run, Single Block		S	Tool Length Measurement		S
Manual Handle Feed	1Unit	S	Tool Life Management		O
Manual Handle Feed Rate	x1, x10, x100	S	Tool Length Compensation		S
Handle Interruption		S	<b>Editing Operation</b>		
<b>Interpolation Function</b>			Part program Storage length	1,280 m (512 kB)	S
Positioning	G00	S	Number of Register Able Programs	400 ea	S
Linear Interpolation	G01	S	Background Editing		S
Circular Interpolation	G02, G03	S	Extended Part Program Editing		S
Dwell (Per Deconds)	G04	S	Play Back		S
Cylindrical Interpolation	4-Axis Interface Option is Required	S	<b>Setting and Display</b>		
Helical Interpolation	Circular interpolation plus max 2-axis linear interpolation	S	Clock Function		S
Reference Position Return Check	G27	S	Self-Diagnosis Function		S
Reference Position Return Return	G28,G29	S	Alarm History Display		S
2nd Reference Position Return	G30	S	Help Function		S
Skip Function	G31	S	Graphic Function		S
<b>Feed Function</b>			Run Hour and Parts Count Display		S
Rapid Traverse Override	F0, F25, F50, F100	S	Dynamic Garphic Display		O
Feedrate (mm/min)		S	Multi-language Display	English, German, French, Italian, Chinese, Spanish, Korean, Portuguese, Polish, Hungarian, Swedish, Russian	S
Feedrate Override	0 ~ 200 %	S			
Jog Feed Override	0 ~ 6,000 mm/min	S	<b>Data Input / Output</b>		
Override Cancel	M48, M49	S	Reader / Puncher Interface CH1	RS232C	S
<b>Program Input</b>			Data Server	256 MB / 1,024 MB	O
Tape Code	EIA / ISO	S	Data Server Interface		O
Optional Block Skip	9 ea	S	Ethernet Interface		S
Program Number	O4-digits	S	Memory Card Interface		S
Sequence Number	N8-digits	S	USB Interface		S
Decimal Point Programming		S	<b>Others</b>		
Coordinate System Setting	G92	S	Display Unit	10.4" Color LCD	S
Workpiece Coordinate System	G54 - G59	S	<b>HWACHEON Machining Software</b>		
Workpiece Coordinate System Preset		S	Hwacheon Artificial Intelligence Control System (HAI): 40 Block		S
Addition of Workpiece Coordinate Pair	48 ea	S	Hwacheon Artificial Intelligence Control System (HAI): 200 / 400 Block		O
Extend Program Edit Function	Copy / Move / Etc.	S	Hwacheon Efficient Contour Control System (HECC)		S
Manual Absolute ON and OFF		S	Hwacheon Tool Load Detect System (HTLD)		S
Chamfering / Corner R		S	Cutting Feed Optimization System (OPTIMA)		S
Programmable Data Input	G10	S	Hwacheon Thermal Displacement Control System (HTDC) = Hwacheon Spindle Displacement Control System (HSDC) + Hwacheon Frame Displacement Control System (HFDC)		S
Sub Program Call	10 Folds Nested	S			
Custom Macro B		S	<b>HWACHEON Machining Software</b>		
Addition of Custom Macro Common Variables	#100 - #199, #500 - #999	S	Hwacheon Artificial Intelligence Control System (HAI): 40 Block		S
Canned Cycles for Drilling		S	Hwacheon Artificial Intelligence Control System (HAI): 200 / 400 Block		O
Automatic Corner Override		S	Hwacheon Efficient Contour Control System (HECC)		S
			Hwacheon Tool Load Detect System (HTLD)		S
			Cutting Feed Optimization System (OPTIMA)		S
			Hwacheon Thermal Displacement Control System (HTDC) = Hwacheon Spindle Displacement Control System (HSDC) + Hwacheon Frame Displacement Control System (HFDC)		S

## Hwacheon Global Network

 Hwacheon Headquarters  Hwacheon Europe  Hwacheon Asia  Hwacheon America



Please contact us for product inquiries.

[www.hwacheon.com](http://www.hwacheon.com)

The product design and specifications may change without prior notice.  
Read the operation manual carefully and thoroughly before operating the product,  
and always follow the safety instructions and warnings labels attached on the surfaces of the machines.

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