VESTA-2000

Software Optimized Vertical Machining Center

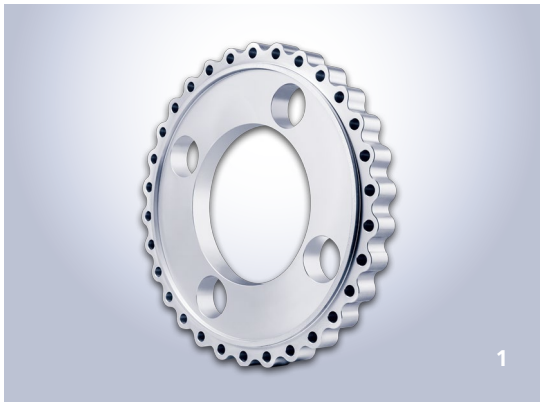
HWACHEON

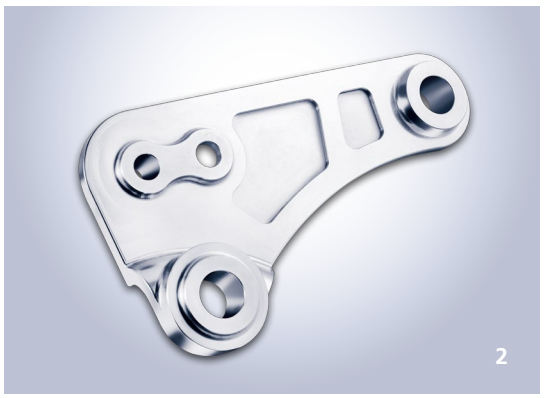
Contents

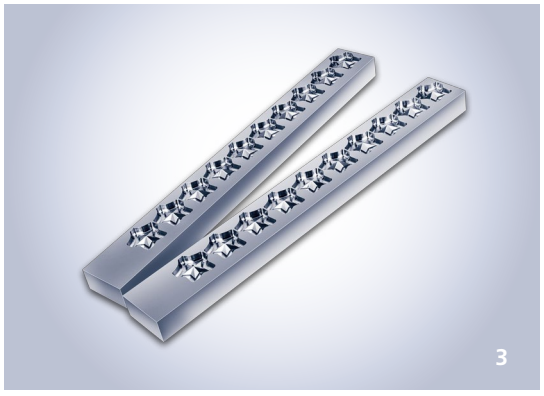
Product Overview

Basic Information

Detailed Information







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

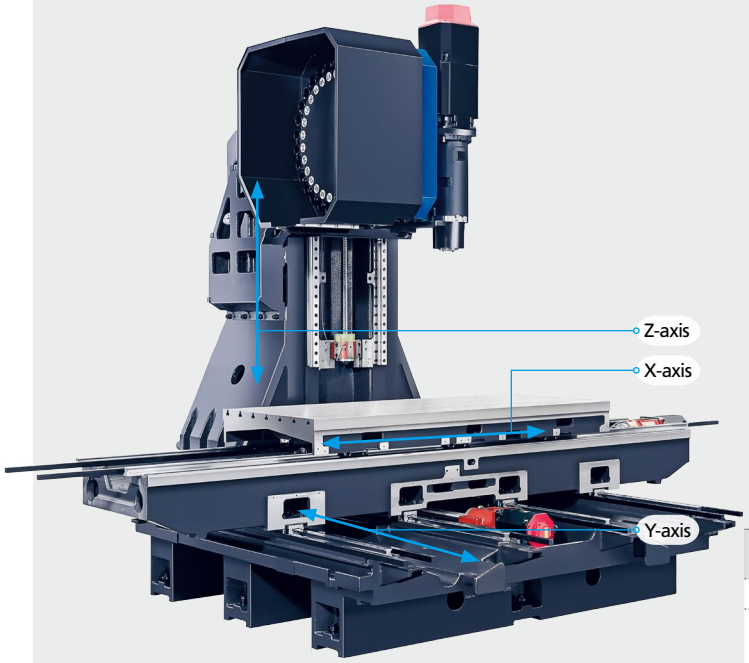
1. The tempered safety glass ensures machining visibility
2. The step integrated coolant tank ensures the front table accessibility
3. Eco-friendly oil water separation structure

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 (31.49)	24 (945)	24 (945)	24 (945)

Table

"Wide Workpiece Mounting Area"

Possible to set workpieces and vices in various sizes

* Unit : mm (inch)

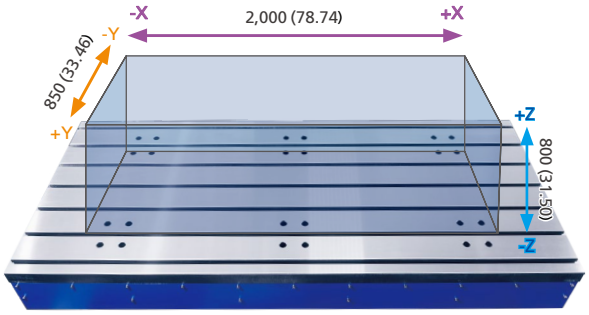


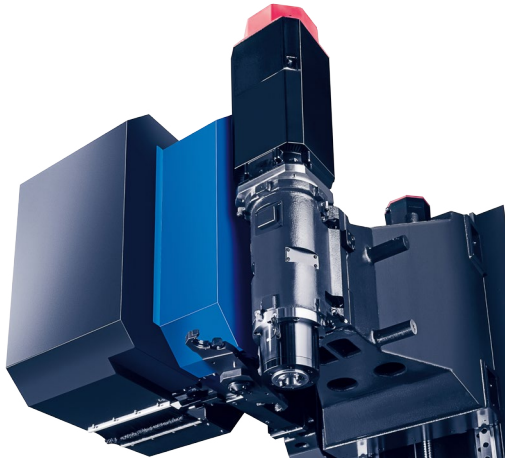
Table Size mm (inch)	T Slot W x P mm (inch)	Max Loading Capacity kg_f (lb_f)
2,000 x 850 (78.74 x 33.46)	18 x 125 (0.71 x 4.92) Number of T slot : 7 ea	1,800 (3,968)

Spindle

"Various Specifications for Direct-Coupled Spindles"

Meeting the customer's machining purposes

	Max Spindle Speed rpm		Spindle Motor kW	Max Torque Nm
BT-40	10,000	Regular Type	18.5	117.7
		CTS (OPT)		
	12,000 (OPT)	Regular Type	18.5	117.7
		CTS (OPT)		
BT-50 (OPT)	8,000	Regular Type	15	286
		CTS (OPT)	26	165



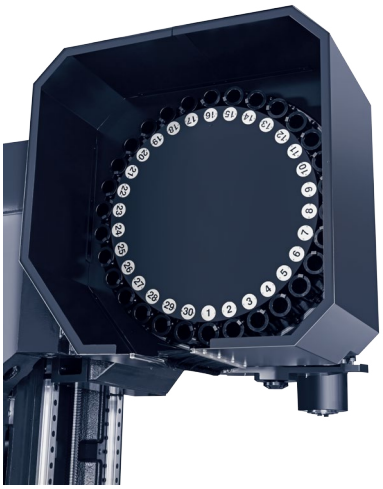
ATC (Automatic tool changer)

"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			

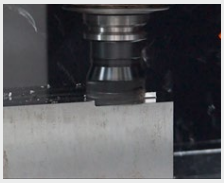
Cover Design

"Minimized Effects of External Temperature Variation"

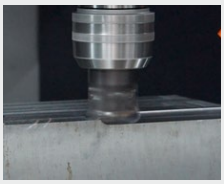
The cover designed to be tightly adhered to the bottom minimizes effects on the machine caused by various factors such as external temperature variation.

20 mm
(0.79 inch)

BT-40 Cutting Performance



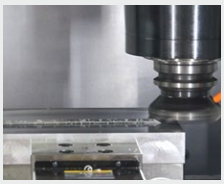
Face mill, Carbon Steel (SM45C)					
Tool Dia mm (inch)	Material Removal Rate cm^3/min	Spindle Speed rpm	Feed mm/min (ipm)	Axial Depth mm (inch)	Radial Depth mm (inch)
60 (2.36)	280	1,500	1,400 (55.12)	5 (0.2)	40 (1.57)



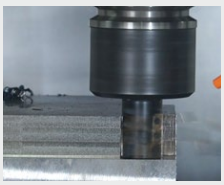
Face mill, Carbon Steel (SM45C)					
Tool Dia mm (inch)	Material Removal Rate cm^3/min	Spindle Speed rpm	Feed mm/min (ipm)	Axial Depth mm (inch)	Radial Depth mm (inch)
50 (1.97) / R8	300	1,500	1,500 (59.06)	5 (0.2)	40 (1.57)

BT-50 Cutting Performance

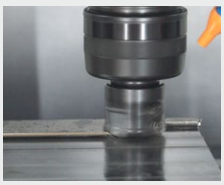
Face mill, Carbon Steel (SM45C)					
Tool Dia mm (inch)	Material Removal Rate cm^3/min	Spindle Speed rpm	Feed mm/min (ipm)	Axial Depth mm (inch)	Radial Depth mm (inch)
80 (3.15)	528	1,500	1,650 (64.96)	5 (0.2)	64 (2.52)



Face mill, Aluminum (AL6061)					
Tool Dia mm (inch)	Material Removal Rate cm^3/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 (157.48)	6 (0.24)	80 (3.15)



Face mill, Carbon Steel (SM45C)					
Tool Dia mm (inch)	Material Removal Rate cm^3/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 (154.33)	5 (0.2)	45 (1.77)



End mill, Carbon Steel (SM45C)					
Tool Dia mm (inch)	Material Removal Rate cm^3/min	Spindle Speed rpm	Feed mm/min (ipm)	Axial Depth mm (inch)	Radial Depth mm (inch)
40 (1.57)	336	800	420 (16.54)	40 (1.57)	20 (0.79)

U-Drill, Carbon Steel (SM45C)			
Tool Dia mm (inch)	Material Removal Rate cm^3/min	Spindle Speed rpm	Feed mm/min (ipm)
45 (1.77)	636	1,500	400 (15.75)

Tap, Carbon Steel (SM45C)			
Tap Size	Spindle Speed rpm	Feed mm/min (ipm)	Spindle Load %
M30 x P3.5	200 / 300	700 (27.56) / 1,050 (41.33)	60 / 60
M33 x P3.5	200 / 300	700 (27.56) / 1,050 (41.33)	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

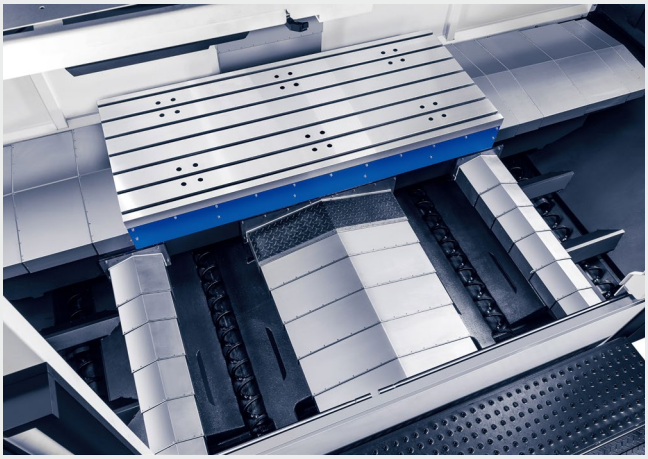
S : Standard O : Option

NO.	Item	Description				VESTA-2000
1	Spindle	#40	10,000 rpm (Regular Type)	18.5 / 11 kW	117.7 Nm	S
2			10,000 rpm (CTS)			O
3			12,000 rpm (Regular Type / CTS)			O
4		#50	8,000 rpm (Regular Type)	15 / 11 kW	286 Nm	O
5			8,000 rpm (CTS)	26 / 22 kW	165 Nm	O
6	Magazine	#40	30 Tools Magazine			S
7		#50	24 Tools Magazine			O
8			30 Tools Magazine			O
9	Tool Shank	#40	BT40			S
10			BBT40 / CAT40 / SK40 / HSK-A63			O
11		#50	BT50			O
12			BBT50 / CAT50 / SK50 / HSK-A100			O
13	Coolant Function	Head Flushing (0.15 MPa, 0.6 kW)				S
14		CTS Coolant System		3 MPa	2.2 kW	O
15				7 MPa	2.2 kW	O
16		Oil Mist (Semi dry cutting system)				O
17	Chip Removal Function	Air Blower				S
18		Coil Conveyor (4ea)				S
19		Air Gun				O
20		Coolant Gun				O
21		Lift-up Chip Conveyor		Hinge Type		O
22				Scraper Type		O
23		Mist Collector				O
24	Precision Machining Function	Linear Scale (X / Y / Z)				O
25		Hwacheon Artificial Intelligence Control System (HAI) - 40 Block				S
26		Hwacheon Efficient Contour Control System (HECC)				S
27		Hwacheon Thermal Displacement Control System (HTDC) [Hwacheon Spindle Displacement Control System (HSDC) + Hwacheon Frame Displacement Control System (HFDC)]				S
28		Hwacheon Artificial Intelligence Control System (HAI) - 200 Block				O
29		Hwacheon Artificial Intelligence Control System (HAI) - 400 Block				O
30		Lubrication System				S
31		Spindle Cooler (Jacket Cooling)		Fan Cooler Type		S
32				Oil Cooler Type (12,000 rpm Spindle)		O
33	Measuring & Automation Function	Tool Measuring System – Renishaw / Blum (Touch Type, Laser Type)				O
34		Workpiece Measuring System – Renishaw / Blum (Touch type)				O
35		Tool Life Management				O
36		Auto Door				O
37		Hwacheon Tool Load Detect System (HTLD)				S
38		Cutting Feed Optimization System (OPTIMA)				S
39	Convenient Functions	Ethernet Interface				S
40		MPG Handle (1ea)				S
41		MPG Handle (3ea)				O
42		Signal Lamp with 2 Color (R, G)				S
43		Signal Lamp with 3 Color (R, G, Y)				O
44		10.4" Color LCD				S
45		Tool Box				S
46		NC Cooler				O
47		Oil Skimmer				O
48		Air Dryer				O
49		Door Interlock				S
50		Workpiece Coordinate System 48 pairs				S
51		Lubrication Oil Separation Tank				S
52		Perfect Base Around Splash Guard				S
53		Part Program Storage Length 1,280m (512kB)				S
54		Data Server (256MB / 1,024MB)				O
55		Data Server (1,024MB)				O
56		Data Server Interface				O
57		Manual Guide i				O
58		Monitoring Solution of Real-time Operational Status (M-Vision Plus)				O
59		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

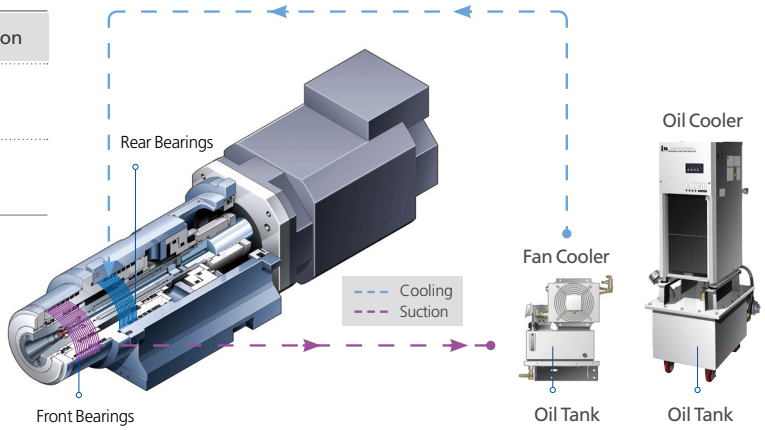
Four coils conveyors as standard will rapidly remove a large amount of chips generated during machining.

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.

· Coolant Pump Specifications

Using Oil - Viscosity of ISO VG 32 or less

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)

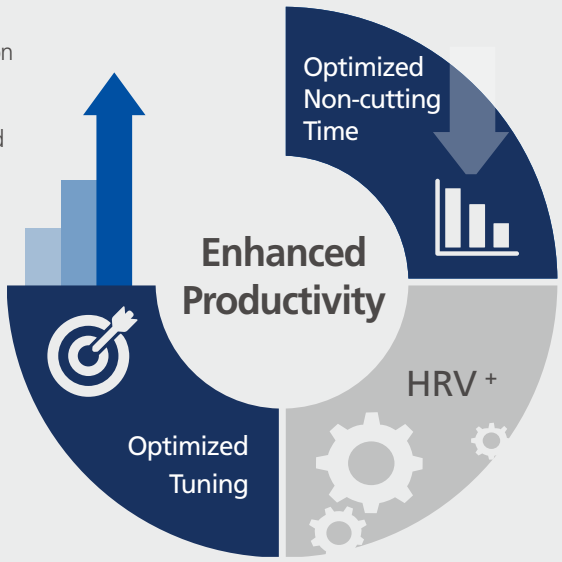
The operator panel is newly designed from the operator's viewpoint and thus enhances the operator's convenience.

"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)

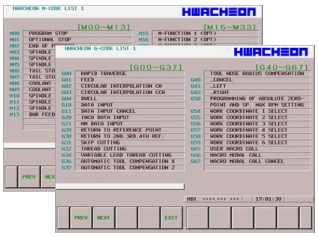
- Smart rigid tap function applied for machining time reduction.
- The cycle machining as well as the operating time and the acceleration / deceleration speed of feeding system are optimized.
- High-level precision, speed and smoothness are realized by enhanced processing performance of tiny segments.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



"Enhanced Productivity"

Operating Convenience Function

< M-CODE / G-CODE LIST >



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

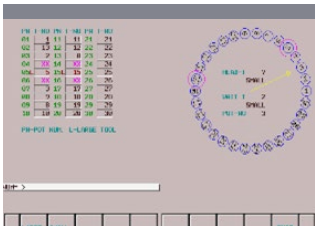
(However, it is necessary to discuss with factory in advance to add and / or change M-codes.)

< 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



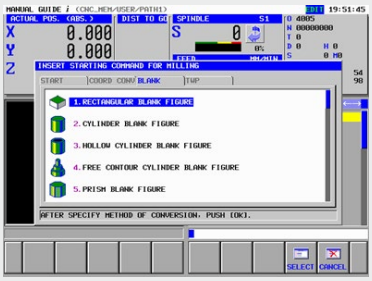
- Magazine tool management system
- Magazine tool check in real time
- Large / small diameter tools setting

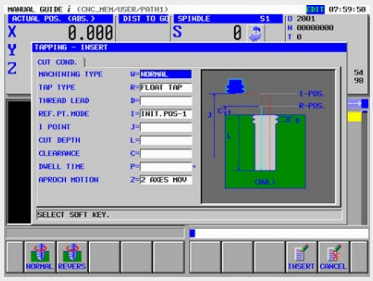
< Tool View >

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

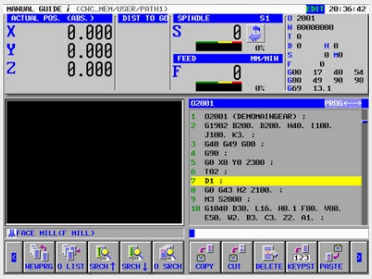
Manual Guide i

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 eff ectively 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.

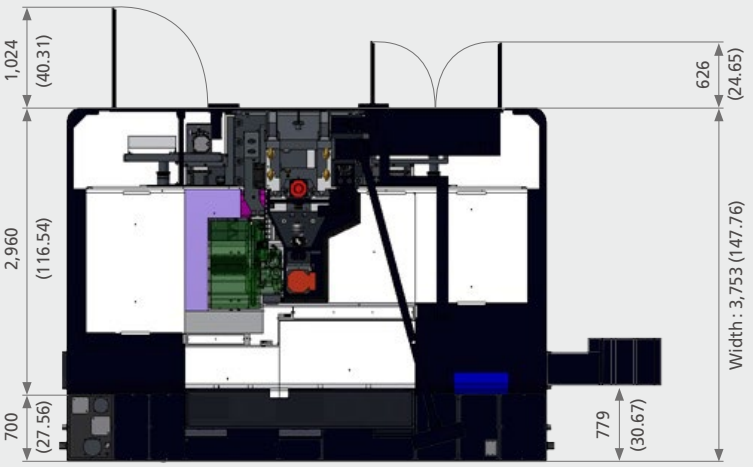
Monitoring Solution of Real-time Operational Status

"See everything everywhere"

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

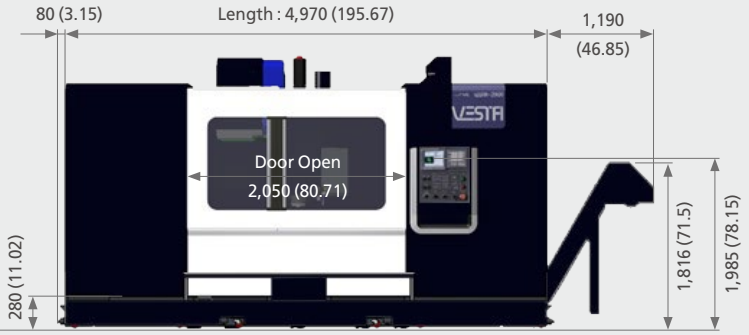
Machine Size

* Unit : mm (inch)



Top

Left Side

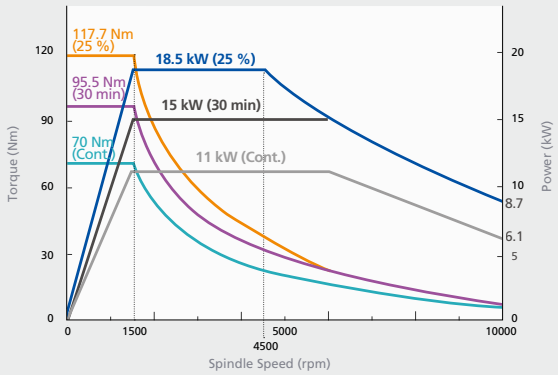


Front

Spindle Power – Torque Diagram

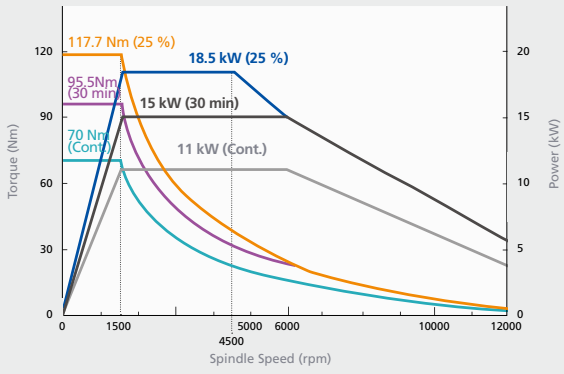
10,000 rpm

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



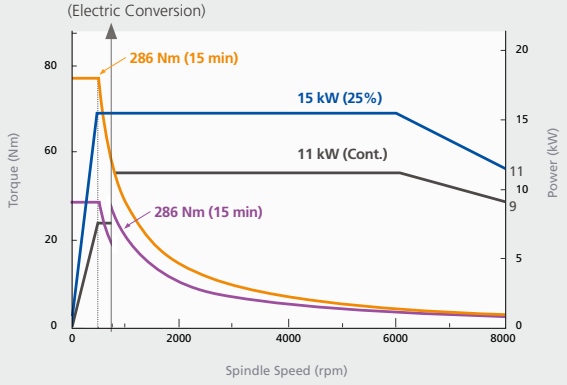
12,000 rpm (OPT)

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



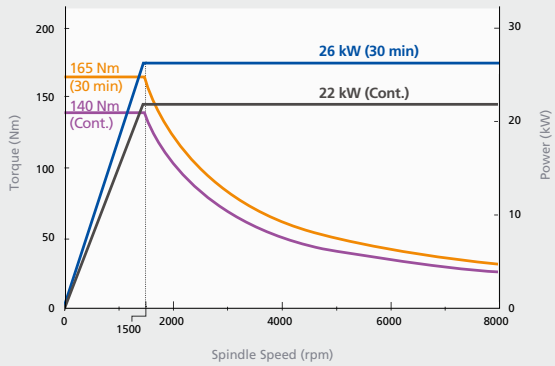
8,000 rpm (OPT)

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

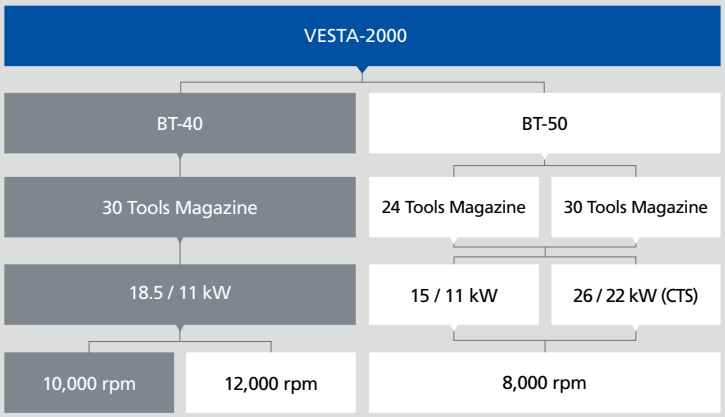


8,000 rpm (CTS)

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
Travel				
X-axis Stroke	mm (inch)	2,000 (78.74)		
Y-axis Stroke	mm (inch)	850 (33.46)		
Z-axis Stroke	mm (inch)	800 (31.50)		
Distance from Table Surface to Spindle Gauge Plane	mm (inch)	150 ~ 950 (5.91 ~ 37.41)		
Distance between Columns to Spindle Center	mm (inch)	905 (35.63)		
Table				
Table Size	mm (inch)	2,000 x 850 (78.74 x 33.46)		
Table Loading Capacity	kg_f (lb_f)	1,800 (3,968)		
T Slot (WxP – No. of slots)	mm (inch)	18 x 125 (0.71 x 4.92) - 7 ea		
Spindle				
Max Spindle Speed	rpm	10,000	12,000	8,000
Spindle Motor	kW (HP)	18.5 / 11 (25 / 15)		15 / 11 (20 / 15) CTS : 26 / 22 (35 / 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)
Feedrate				
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 ~ 393.7)		
Motor				
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 (0.24)	2.8 / 3.2 (3.8 / 4.3)	0.18 (0.24)
ATC				
Type of Tool Shank	-	BT-40 (OPT : BBT-40 ,CAT-40)		BT-50 (OPT : BBT-50 ,CAT-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 (Ø3.15) / Ø150 (Ø5.91)		Ø125 (Ø4.92) / Ø245 (Ø9.65)
Max Tool Length	mm (inch)	300 (11.81)		350 (13.78)
Max Tool Weight	kg_f (lb_f)	8 (17.64)		20 (44.09)
Method of Tool Selection	-	Memory Random		
Method of Operation	-	Servo Motor		Geared Motor
Power Source				
Electric Power Supply	kVA	45		45 / CTS : 55
Compressed Air Supply (Pressure X Consumption)	-	0.5 ~ 0.7 MPa x 690 N ℓ/min		
Tank Capacity				
Spindle Cooling / Lubrication	ℓ (gal)	20 / 6 (5.28 / 1.59)		
Coolant	ℓ (gal)	740 (195.49)		
Machine Size				
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_f (lb_f)	14,000 (30,865)	14,200 (31,306)	15,000 (33,069)
NC Controller		Fanuc-0i MF		

NC Specifications [Fanuc 0i-MF]

S : Standard O : Option

Item	Specification	
Controlled Axis		
Controlled Axis	3 - Axes	S
Controlled Axis	5 - Axes (Max)	O
Simultaneously Controlled Axes	3 - Axes	S
Simultaneously Controlled Axes	4 - Axes (Max)	O
Least Input Increment	0.001mm, 0.001deg, 0.0001inch	S
Least Input Increment 1 / 10	0.0001mm, 0.0001deg, 0.00001inch	O
inch / metric Conversion	G20, G21	S
Store Stroke Check 1		S
Store Stroke Check 2		S
Mirror Image		S
Stored Pitch Error Compensation		S
Backlash Compensation		S
Operation		
Automatic & MDI Operation		S
DNC Operation by Memory Card	PCMCIA Card is Required	S
Program Number Search		S
Sequence Number Search		S
Dry Run, Single Block		S
Manual Handle Feed	1Unit	S
Manual Handle Feed Rate	x1, x10, x100	S
Handle Interruption		S
Interpolation Function		
Positioning	G00	S
Linear Interpolation	G01	S
Circular Interpolation	G02, G03	S
Dwell (Per Deconds)	G04	S
Cylindrical Interpolation	4-Axis Interface Option is Required	S
Helical Interpolation	Circular interpolation plus max 2 axes linear interpolation	S
Reference Position Return Check	G27	S
Reference Position Return Return	G28,G29	S
2nd Reference Position Return	G30	S
Skip Function	G31	S
Feed Function		
Rapid Traverse Override	F0, F25, F50, F100	S
Feedrate (mm/min)		S
Feedrate Override	0 ~ 200 %	S
Jog Feed Override	0 ~ 6,000 mm/min	S
Override Cancel	M48, M49	S
Program Input		
Tape Code	EIA / ISO	S
Optional Block Skip	9 ea	S
Program Number	O4 - Digits	S
Sequence Number	N8 - Digits	S
Decimal Point Programming		S
Coordinate Dystem Detting	G92	S
Workpiece Coordinate System	G54 - G59	S
Workpiece Coordinate System Preset		S
Addition of Workpiece Coordinate Pair	48 ea	S
Extend Program Edit Function	Copy / Move / Etc.	S
Manual Absolute ON and OFF		S
Chamfering / Corner R		S
Programmable Data Input	G10	S
Sub Program Call	10 Folds Nested	S
Custom Macro B		S
Addition of Custom Macro Common Variables	#100 - #199, #500 - #999	S
Canned Cycles for Drilling		S
Automatic Corner Override		S

Item	Specification	
Program Input		
Feedrate Control With Acceleration in Circular Interpolation		S
Scaling		S
Coordinate System Rotation		S
Polar Coordinate System		S
Programmable Mirror Image		S
Tape Format For FANUC Series 10 / 11		S
Manual Guide i		O
Spindle Speed Function		
Spindle Serial Output		S
Spindle Override	50 - 120 %	S
Spindle Orientation		S
Rigid Tapping		S
Tool Function / Compensation		
Tool Function	T4 - digits	S
Tool Offset Pairs	±6 - digits / 400 ea	S
Tool Offset Memory C		S
Cutter Compensation C		S
Tool Length Measurement		S
Tool Life Management		O
Tool Length Compensation		S
Editing Operation		
Part program Storage length	1,280 m (512 kB)	S
Number of Register Able Programs	400 ea	S
Background Editing		S
Extended Part Program Editing		S
Play Back		S
Setting and Display		
Clock Function		S
Self-Diagnosis Function		S
Alarm History Display		S
Help Function		S
Graphic Function		S
Run Hour and Parts Count Display		S
Dynamic Garphic Display		O
Multi-language Display	English, German, French, Italian, Chinese, Spanish, Korean, Portuguese, Polish, Hungarian, Swedish, Russian	S
Data Input / Output		
Reader / Puncher Interface Ch1	RS232C	S
Data Server	256 MB / 1,024 MB	O
Data Server Interface		O
Ethernet Interface		S
Memory Card Interface		S
USB Interface		S
Others		
Display Unit	10.4" Color LCD	S
HWACHEON Artificial Intelligence		
Hwacheon Artificial Intelligence Control System (HAI) - 40 Block		S
Hwacheon Artificial Intelligence Control System (HAI) - 200 / 400 Block		O
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

HWACHEON

Please call us for product inquiries.

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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