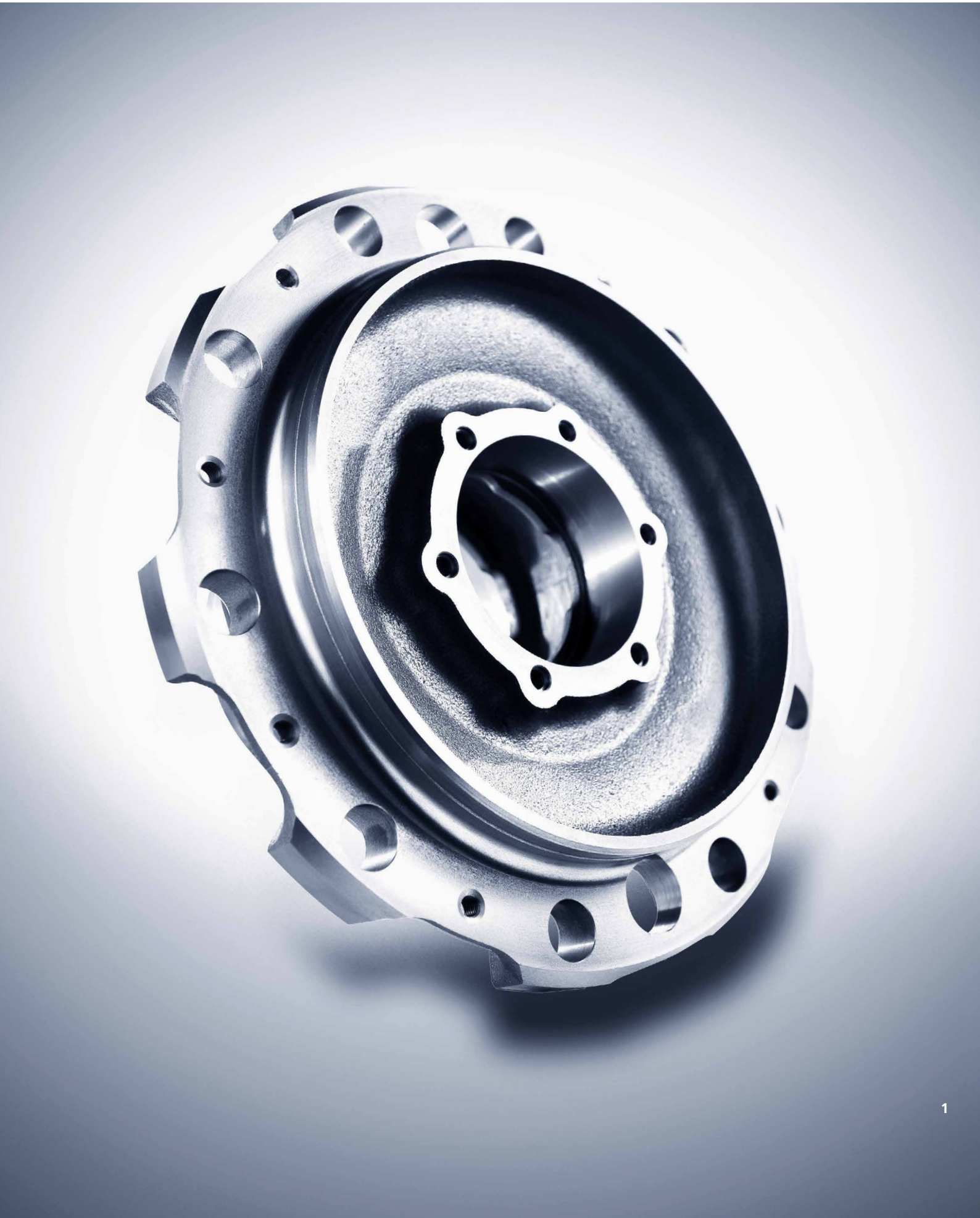
VESTA-610D

Dual-Table Vertical Machining Center

HWACHEON



DUAL-TABLE VERTICAL MACHINING CENTER

A dual-table vertical machining center for efficient mass production.
The high speed dual tables maximizes machining time; and the powerful clamping force of the tables curvic coupling allows for stability during hard cutting, which translates to consistent product quality and precision.

1 Rear Hub - 8TG / Automobile / Cast Iron
2 Transmission Case / Automobile / Aluminum
3 Transmission Cover / Automobile / Aluminum
4 Oil Pump Case / Automobile / Aluminum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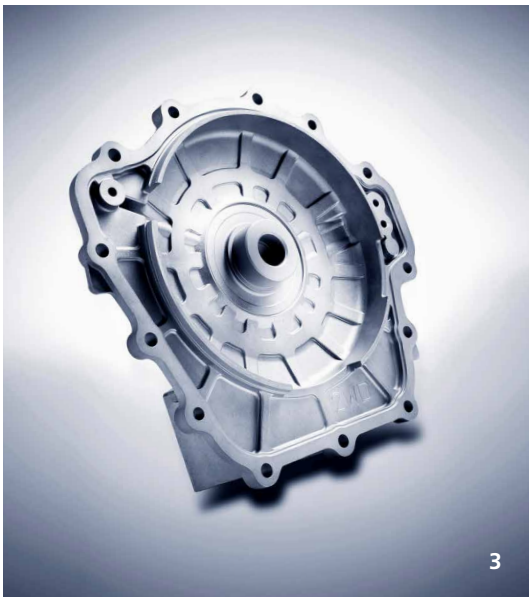
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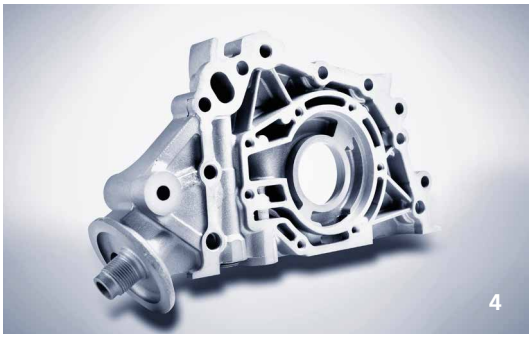
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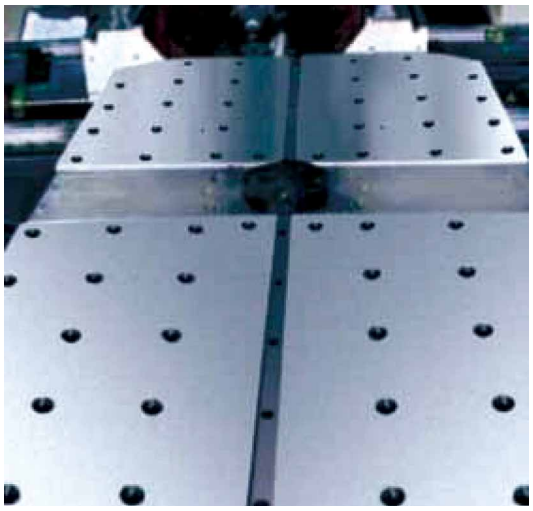
BUILT TOUGH FOR MASS PRODUCTION

The high-speed dual tables in VESTA-610D take only six seconds for the table index. One table can be loaded with a workpiece while the other is at work.
The high-power clamping and the rigid frame guarantee continued precision after repeated operations to give you consistent product quality every time. The tables are designed with ports hydraulic or air tubing so that the machine can be fitted with robotics to incorporate into a production automation system.
Hwacheon's software components assist the machine for increased efficiency.
For example, HTDC, short for Hwacheon Thermal Displacement Control system, helps the machine maintain precision by controlling heat generated after prolonged operation.
The slide covers wrap the machine vertically along with an effective cooling system to control thermal distortion and remove chips quickly.



Quick Pallet Index Table

±1.5sec degree of positioning accuracy means limited deviation when manufacturing the same pruduct in mass quantities, which makes 610D an ideal soulution for mass production and the 4.8 tons of clamping force generated by 610D's hydraulic clamps provides added stability even for the toughest roughing jobs.

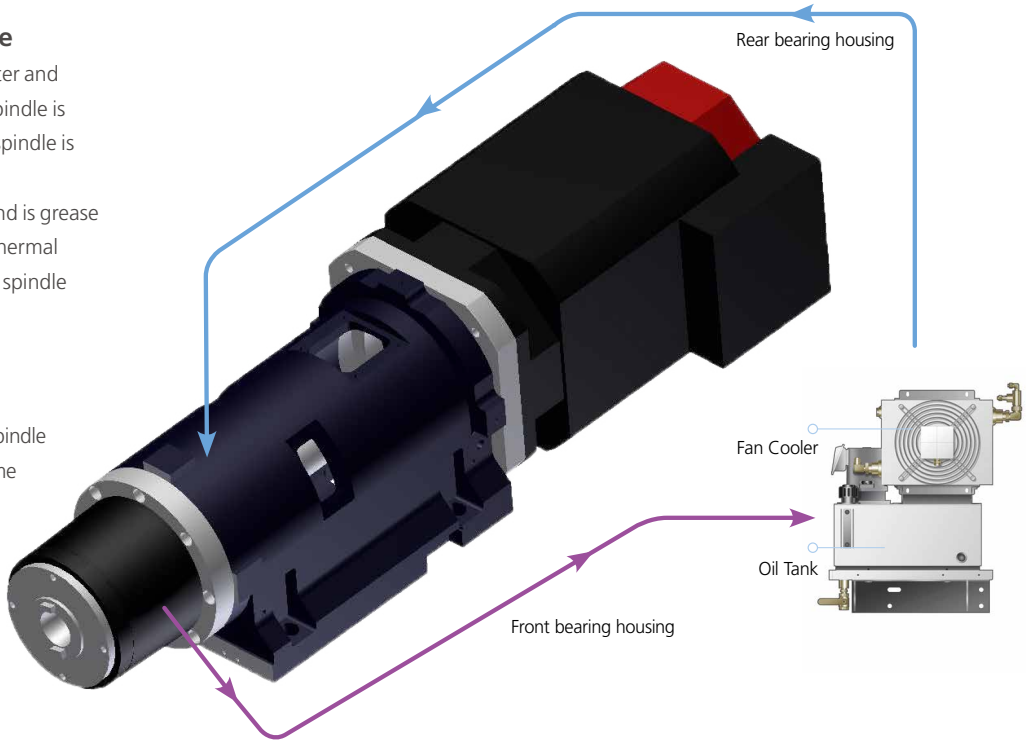
A workpiece can be loaded and unloaded during a process to save cutting time; and as an option, the tables are designed with hydraulic or air tubing for the fitting of robotics to easily incorporated a VESTA-610D into your automated production line.

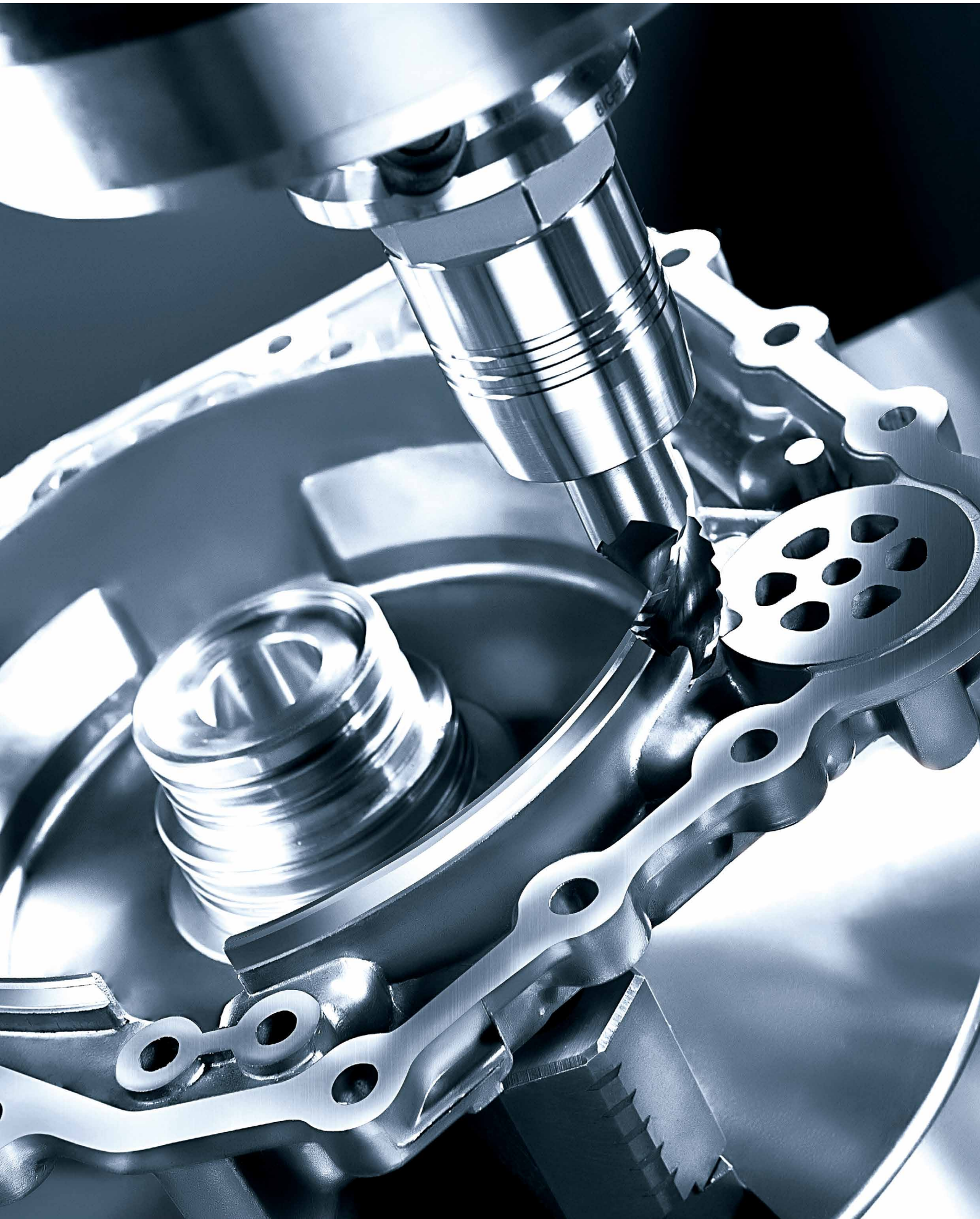
High quality spindle performance

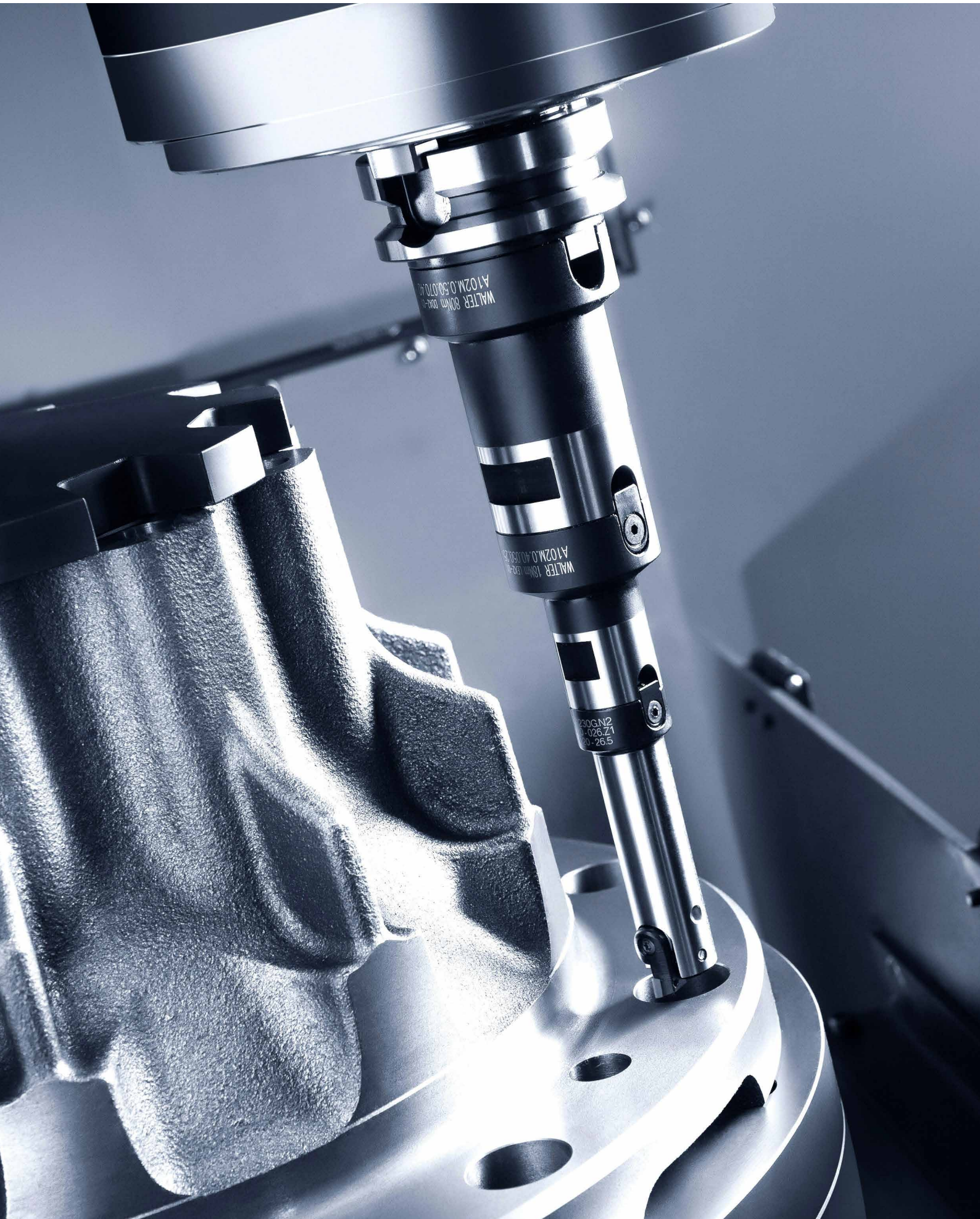
The spindle is the heart of a machining center and Hwacheon's technical know-how for the spindle is unrivaled. Hwacheon's high-performance spindle is integrated directly into
the motor for stable, high-speed cutting; and is grease -lubricated and jacket cooled to minimize thermal displacement and to increase the life of the spindle assembly.

Jacket cooling system

The oil cooling system for Hwacheon's main spindle provides a jacket of oil circulating over the frame construction, which supports the motor and the bearing housing.



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MACHINING SOFTWARE

The Hwacheon Machining Software Components

The Hwacheon developed machining software monitors different variables related to the work environment and machining conditions and makes adjustments for best quality results and optimum work efficiency.

+ RELIABILITY

HTDC (HSDC + HFDC)

Hwacheon Thermal Displacement Control System (HSDC + HFDC)

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

HFDC

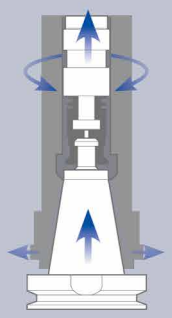
Hwacheon Frame Displacement Control System

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

HSDC

Hwacheon Spindle Displacement Control System

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.



Static displacement compensation

The HSDC system corrects the Z-axis error occuring from the taper expansion during the spindle's high speed rotation.

PRECISION +

HTLD

Hwacheon Tool Load Detect

HTLD constantly monitors the tool wear to prevent accidents, which may occur from a damaged tool and stops tool wear from deteriorating the work piece. (The load is measured every 8 msecs to ensure accuracy)

HECC

Hwacheon High-Efficiency Contour Control System

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

- Program offers different options for different cutting speed and accuracy; and for roughness and shapes.
- The customizeable display provides real-time monitoring and quick, easy access.
- The program is executable on an existing NC DATA system and works with the G Code system.

OPTIMA

Cutting Feed Optimization 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 reduced.

SPEED +

USER FRIENDLY DESIGN, WIDE UPGRADE OPTIONS

The double body covers minimize the machining space inside, so the chips can be flushed with only a small amount of lubricant. The vertical slide cover separates the machine operations from the cutting area completely, so the chips don't penetrate inside. The chip flushing nozzels shoot out from each side of the inner compartment to discharge the chips effectively.

1 Automatic tool changer
Hwacheon's unique compact magazine design allows tor quick tool changing and minimizes machine down time.

2,3 Utility maintenance system
The hydraulic and air systems are placed together on the side of the machine for easy maintenance.

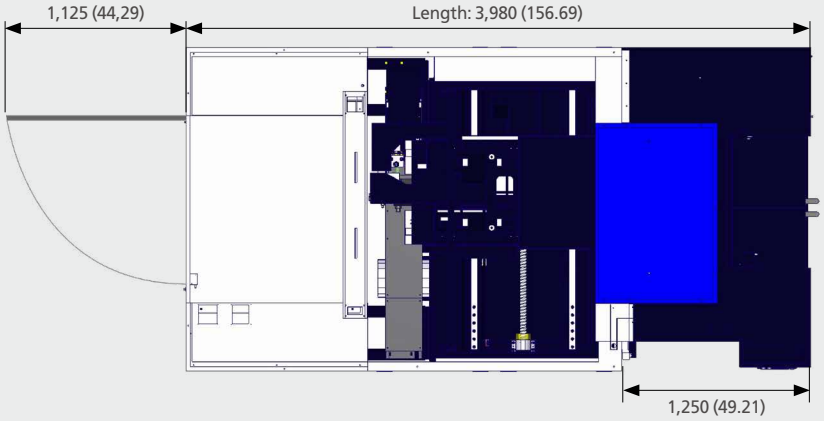

2


3

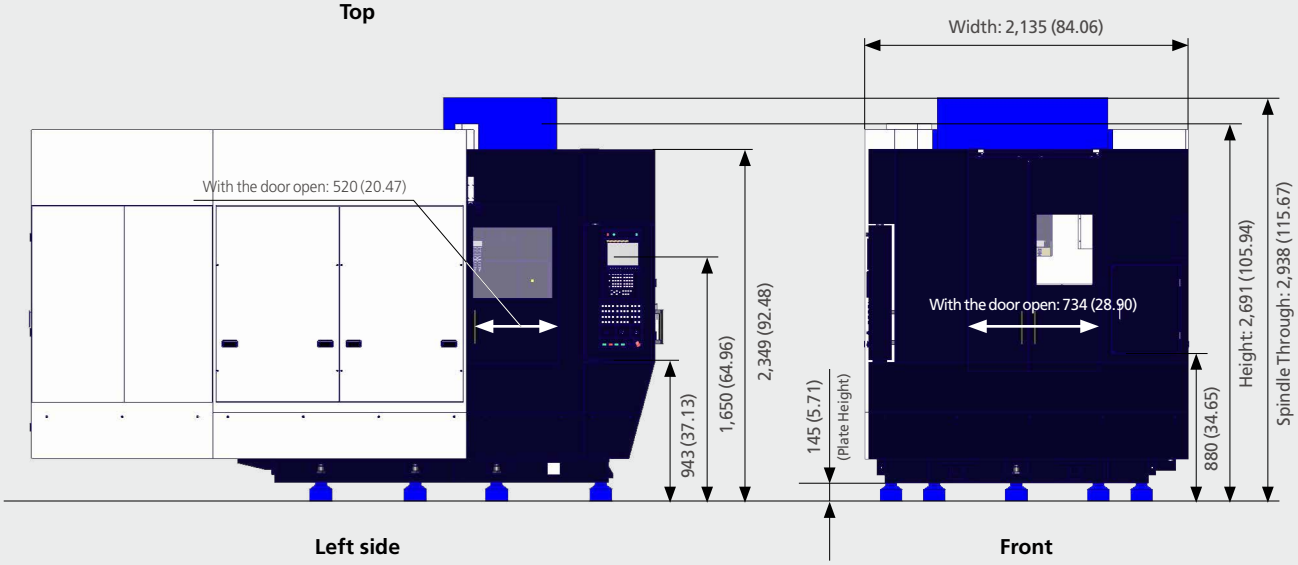

1

Product Data

* Unit: mm(inch)



Top

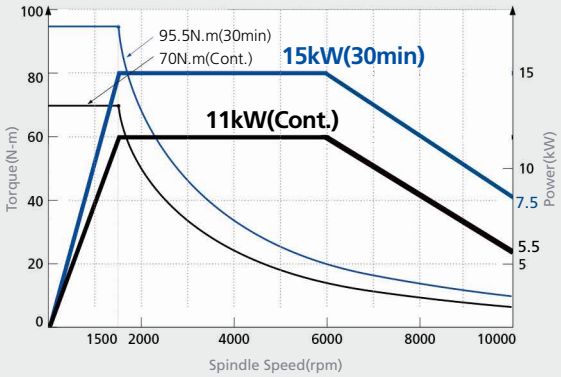


Left side

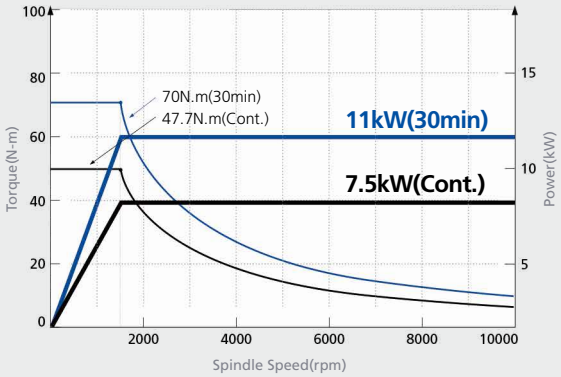
Front

Spindle Power – Torque Diagram

VESTA-610D

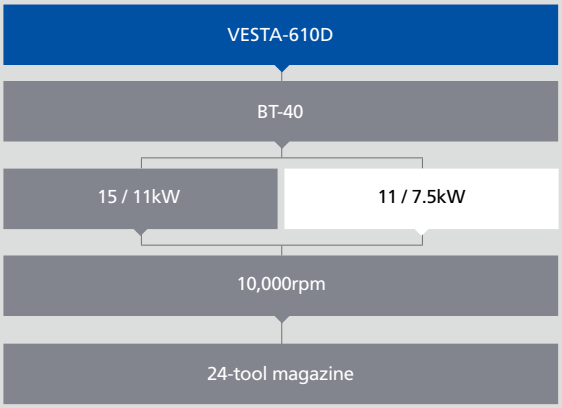


VESTA-610D (Through-spindle)



Product Configuration

Each product can be configured to fit your application. ■ Standard □ Optional



Machine Specifications

ITEM		VESTA-610D			
Travel					
Stroke (X / Y / Z)	mm(inch)	610 / 430 / 570 (24.02 / 16.93 / 22.44)			
Distance from table surface to spindle gauge plane	mm(inch)	150 ~ 720 (5.91 ~ 28.35)			
Distance between columns to spindle Center	mm(inch)	530 (20.87)			
Table					
Working surface	mm(inch)	650 x 450 (25.59 x 17.72)			
Table loading capacity	$kg_f(lb_f)$	300 (661)			
Table surface configuration (T slots WxP / No. of slots)	mm(inch)	18 x 150 (0.71 x 5.91) / 3ea			
APC Index Time (180°)	sec	6			
Spindle					
Max. spindle Speed	rpm	10,000			
Spindle Motor	kW(HP)	STD: 15 / 11 (20 / 15)	11 / 7.5 (15 / 10)	HEIDENHAIN: 17 / 10 (23 / 13)	SIEMENS: 20.9 / 10.2 (28 / 13.6)
Type of Spindle Taper Hole	-	ISO#40, 7/24 Taper (BT 40)			
Spindle Bearing Inner Diameter	mm(inch)	Ø70 (2.76)			
Method of Spindle Lubrication & Cooling	-	Grease Lub. + Jacket Cooling			
Feedrate					
Rapid Speed (X / Y / Z)	m/min(ipm)	40 / 40 / 40 (1,575 / 1,575 / 1,575)			
Feedrate (X / Y / Z)	mm/min(ipm)	1 ~ 24,000 (945)			
ATC					
Type of tool shank	-	MAS-403 BT40 (OPT: CAT40)			
Type of pull stud	-	MAS P40T-1 (45°)			
Tool storage capacity	ea	24			
Max. tool diameter (with / without adjacent tools)	mm(inch)	Ø90 / Ø150 (3.54 / 5.91)			
Max. tool length	mm(inch)	300 (11.81)			
Max. tool weight	$kg_f(lb_f)$	8 (17.64)			
Method of tool selection	-	Memory Random			
Method of operation (Magazine / Swing arm)	-	Geared Motor / Geared Motor			
Motor					
Servo motor (X / Y / Z)	kW(HP)	7 / 7 / 7 (9.4 / 9.4 / 9.4)			
Coolant motor (Spindle / Bed Flushing)	kW(HP)	0.4 / 1.1, 0.4 (0.54 / 1.5, 0.54)			
Spindle cooler / Hydraulic motor	kW(HP)	0.18 / 2.2 (0.24 / 2.95)			
Power source					
Electric power supply	kVA	50			
Compressed air supply (Pressure x Consumption)	-	0.5 ~ 0.7MPa x 690N ℓ/min			
Tank capacity					
Spindle cooling / Lubrication / Coolant / Hydraulic	ℓ (gal)	20 / 6 / 395 / 15 (5.28 / 1.59 / 104.35 / 3.96)			
Machine size					
Height (Standard / Spindle through)	mm(inch)	2,691 / 2,938 (105.94 / 115.67)			
Floor space (length × width)	mm(inch)	3,980 x 2,135 (156.69 x 84.06)			
Weight	$kg_f(lb_f)$	8,500 (18,739)			
NC controller		Fanuc 0i-MF			

Standard and Optional product components

Standard Accessories		Optional Accessories	
• Adjust Bolt, Block & Plate	• Tool Kit & Box	• Additional Fluid line 6ports & 10ports	• MPG Handle (3ea)
• Air Blower	• Work Light	on the Table(Jig & Fixure)	• NC Cooler
• Base around splash guard	• Workpiece Coordinate System 48 pairs	• Air Dryer	• Oil Mist(Semi Dry Cutting System, Eco Booster)
• Coolant system	• 10.4" Color LCD	• Air Gun	• Oil Skimmer
• Door Interlock	• Cutting Feed Optimization System(OPTIMA)	• Auto Door	• Spindle through coolant(3MPa / 7MPa)
• Dual Table with T slot type	• Hwacheon Artificial Intelligence Control	• Coil Conveyor 2ea	• Tool Life Management
• Ethernet Interface	System(HAI)-40 block	• Coolant Gun	• Tool measuring system-Renishaw/Blum
• Lub. Oil separation tank	• Hwacheon Efficient Contour Control	• Data server(256MB/1,024MB)	(Touch type, Laser type)
• Lubrication system	System(HECC)	• Data server interface	• Transfomer
• MPG Handle (1ea)	• Hwacheon Tool Load Detect System(HTLD)	• Dual table with Tap type	• Workpiece Measuring System
• Operation manual & parts list	• Hwacheon Thermal Displacement	• High pressure coolant 0.6MPa	-Renishaw/Blum(Touch type)
• Part program storage length 1,280m(512kB)	Control System(HTDC)	• Lift up chip conveyor	• 15" Color LCD (only FANUC)
• Pneumatics System	= Hwacheon Spindle Displacement	(Hinge type, Scraper type)	• Hwacheon Artificial Intelligence Control
• Rigid Tapping	Control System(HSDC)	• Linear scale(X/Y/Z)	System(HAI) 200 / 400 block buffer
• Signal Lamp (R / G / Y, 3 Color)	+ Hwacheon Frame Displacement	• Manual Guide i	
• Spindle cooler(Jacket Cooling)	Control System(HFDC)	• Mist Collector	

NC Specifications [Fanuc 0i-MF]

※ — : Not available S : Standard O : Option

Controlled axis		
Controlled axis (Cs axis)	3 - Axes	S
Controlled axis (Cs 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
Stored stroke check 1 / 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 / feed rate	1Unit / x1, x10, x100	S
Handle interruption		S
Interpolation function		
Positioning / Linear interpolation / Circular interpolation / Dwell (Per seconds)	G00 / G01 / G02,G03 / G04	S
Cylindrical interpolation	4-axis interface option is required	S
Helical interpolation	Circular interpolation plus max.2axes linear interpolation	S
Reference position return check / return	G27 / G28, G29	S
2nd reference position return	G30	S
Skip	G31	S
Feed function		
Rapid traverse override	F0, F25, F50, F100	S
Feedrate (mm/min)		S
Feedrate override	0 ~ 150%	S
Jog feed override	0 ~ 4000mm/min	S
Override cancel	M48, M49	S
Program input		
Tape code	EIA / ISO	S
Optional block skip	9ea	S
Program number	O4 - Digit	S
Sequence number	N8 - Digit	S
Decimal point programming		S
Coordinate system setting	G92	S
Workpiece coordinate system	G54 ~ G59	S
Work piece coordinate system preset		S
Additional workpiece coordinate pairs	48ea	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

Feedrate clamp based on arc radius		S
Scaling		S
Polar Coordinate System		S
Coordinate system rotation		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 / 400ea	S
Tool offset memory C		S
Tool length compensation		S
Cutter compensation C		S
Tool life management		O
Tool length measurement		S
Editing operation		
Part program storage length	1,280m (512kB)	S
Number of register able programs	400ea	S
Background editing		S
Extended part program editing / Play Back		S
Setting and display		
Dynamic graphic display		O
Clock function		S
Self-diagnosis function / Alarm history display		S
Help function / Graphic function		S
Run hour and parts count display		S
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
Reader / Puncher interface CH2	RS232C	S
Data server	256MB / 1,024MB	O
Data server Interface		O
Ethernet Interface		S
Memory / USB card interface		S
4-Axis interface function Option		
Controlled axes	included 4-axis interface option	O
Simultaneously controlled axes	included 4-axis interface option	O
Control axis detach	included 4-axis interface option	O
Others		
Display unit	10.4" color LCD	S
HWACHEON Machining Software		
Hwacheon Artificial Intelligence Control System (HAI): 40 Block		S
Hwacheon Artificial Intelligence Control System (HAI): 200 / 400 Block		O
HECC (Hwacheon Efficient Contour Control System)		S
HTLD (Hwacheon Tool Load Detect)		S
OPTIMA (Cutting Feed Optimization Sustem)		S
HTDC (Hwacheon Thermal Displacement System)		S

Hwacheon Global Network

Hwacheon Headquarters Hwacheon Europe Hwacheon Asia Hwacheon America

HWACHEON

Please contact 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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