



# SIRIUS-UL<sup>+</sup>

High Precision 600mm Y-Axis Vertical Machining Center



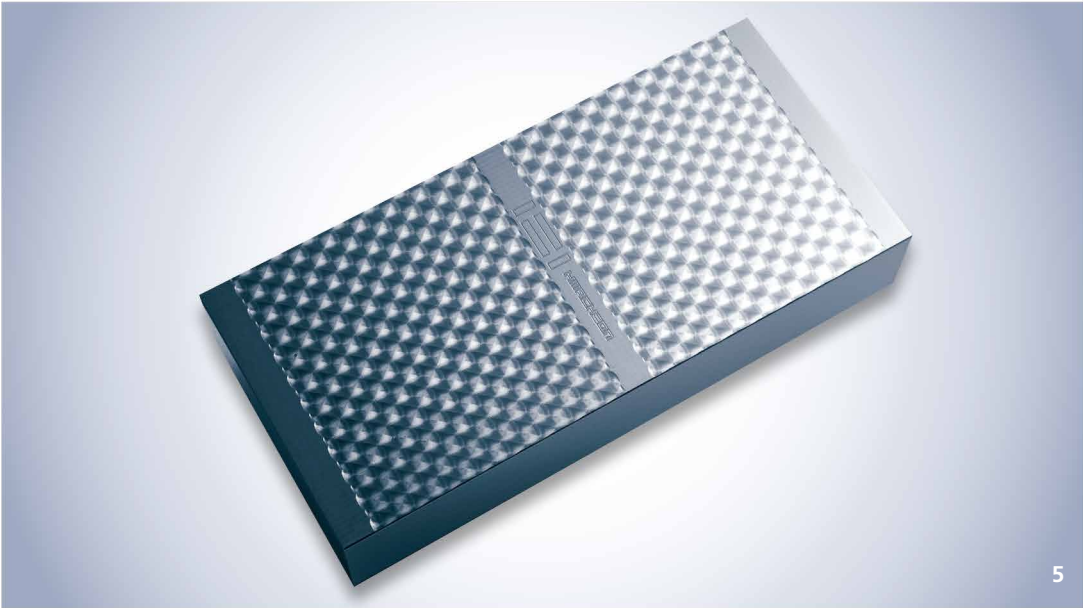
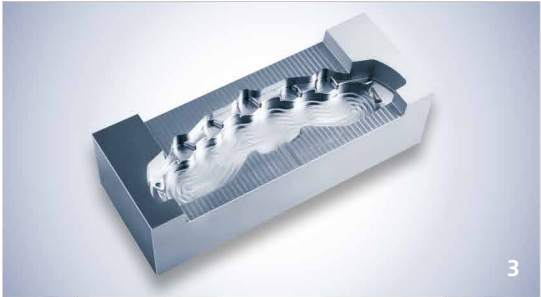


# HIGH PRECISION 600mm Y-AXIS VERTICAL MACHINING CENTER

## High-Precision Vertical Machining Center with Hard Roughing Capability

(New)SIRIUS-UL<sup>+</sup> is a high-precision vertical machining center that boasts the world's best performance. Its powerful roughing and precise finish machining capabilities provide the best machining solution in terms of product quality.

- 1 Mold / Grill / KP4M
- 2 Motor Bike / Toy / NAK80
- 3 Break Calliper / Automobile / NAK80
- 4 LCD Back Cover(Cavity) / Home Appliances / NAK80
- 5 Surface Finishing / Automobile / NAK80



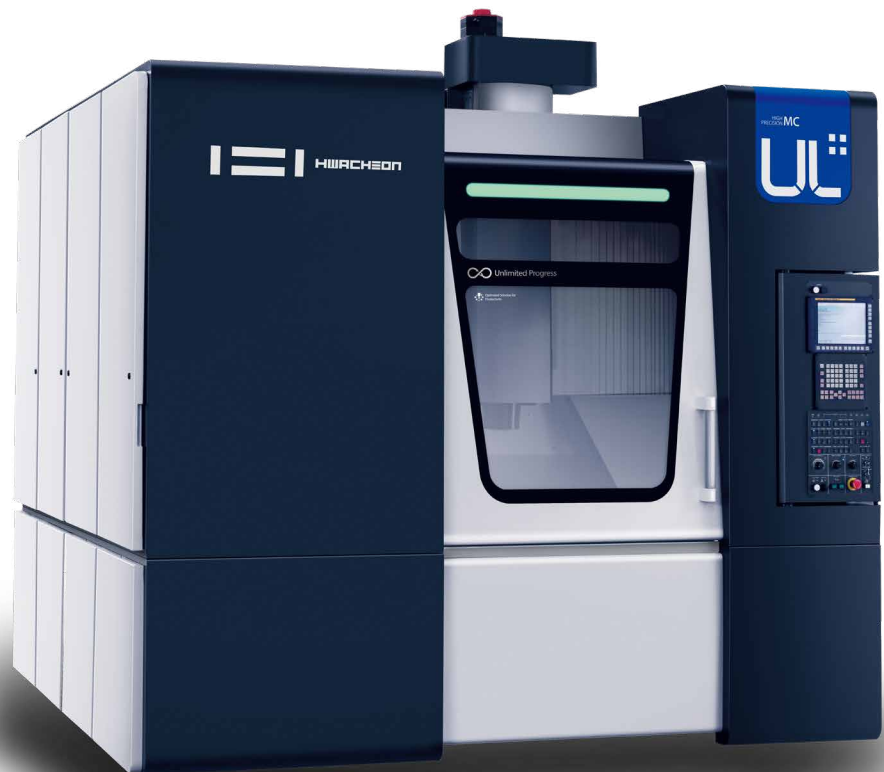
# “HWACHEON PERFORMANCE LEAVES COMPETITION IN THE DUST- THIS IS THE BEST MACHINING CENTER YOU CAN GET, PERIOD.”

**World's best precision machining center**

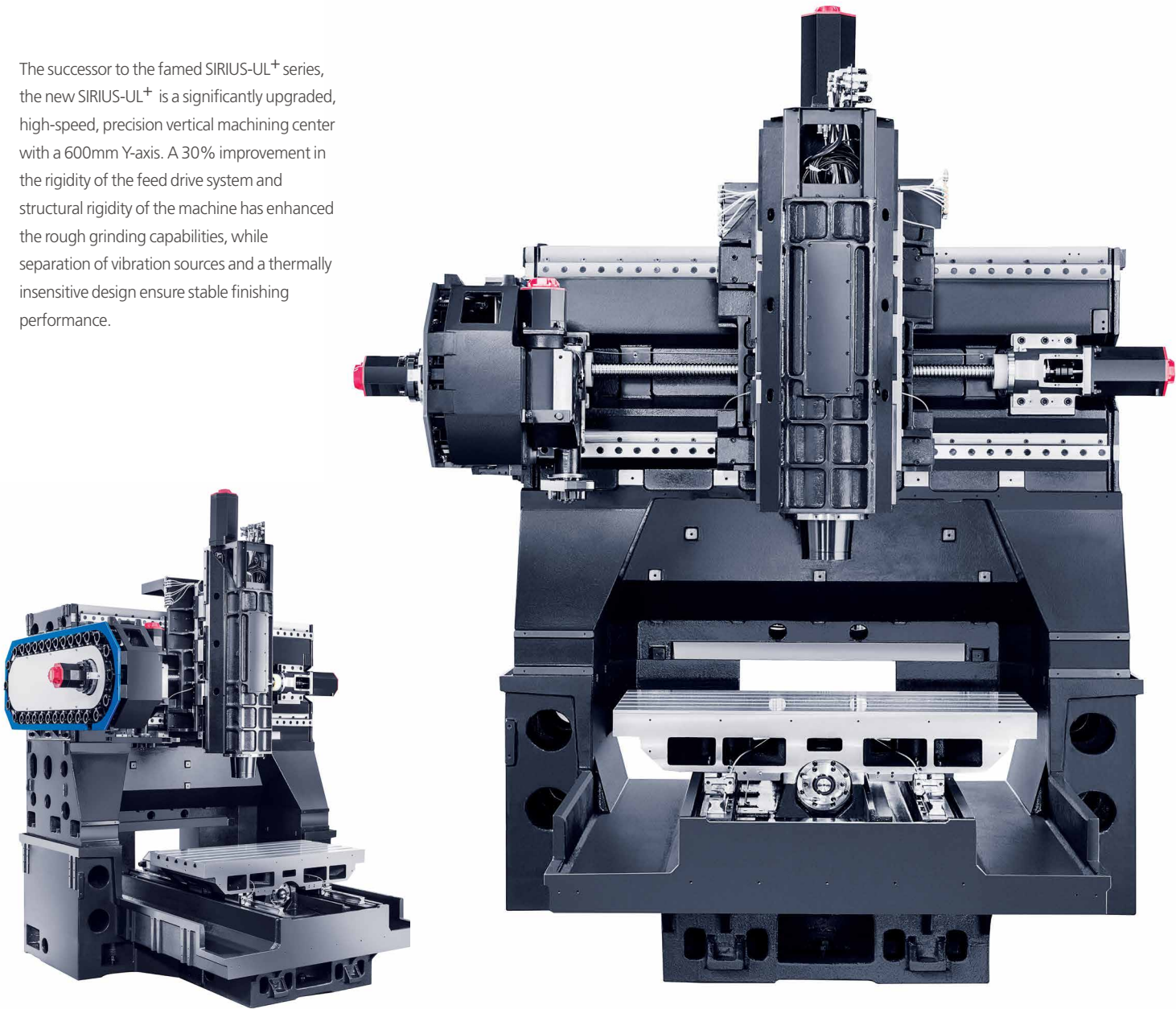
**(New) SIRIUS-UL<sup>+</sup> is the best SIRIUS-UL<sup>+</sup> Model yet.**

A long-time favorite and bestseller, SIRIUS-UL<sup>+</sup>, has been rejuvenated to present you with extraordinary perfection once again.

From the elegant design, superb machining performance, user convenience to a variety of extra features, (New)SIRIUS-UL<sup>+</sup> doesn't miss a beat and delivers greater convenience and quality.

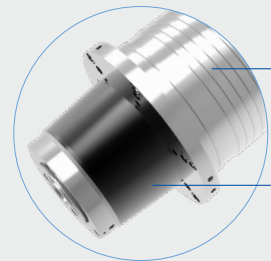
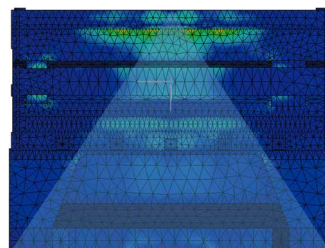
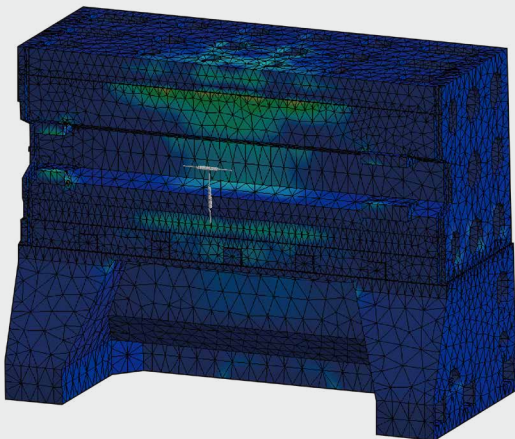


The successor to the famed SIRIUS-UL<sup>+</sup> series, the new SIRIUS-UL<sup>+</sup> is a significantly upgraded, high-speed, precision vertical machining center with a 600mm Y-axis. A 30% improvement in the rigidity of the feed drive system and structural rigidity of the machine has enhanced the rough grinding capabilities, while separation of vibration sources and a thermally insensitive design ensure stable finishing performance.

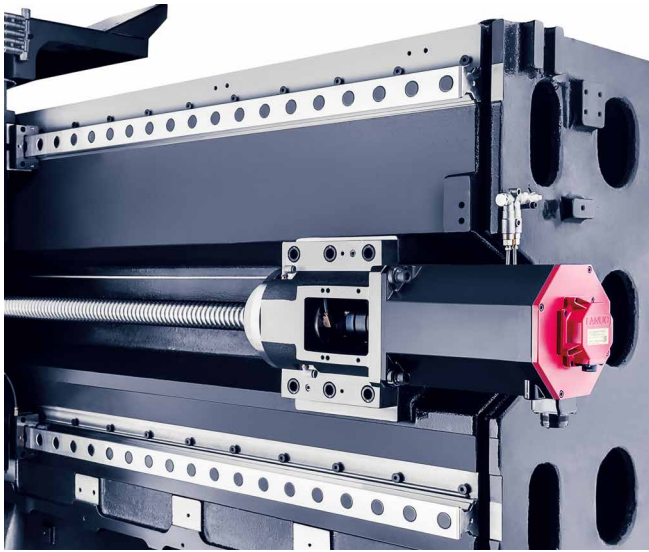


**Optimized structural design through FEM analysis.**

(New)SIRIUS-UL<sup>+</sup> has an optimally-designed frame structure. Experience top quality, precise machining based on a powerful frame.



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### Excellent performance in Roughing machining

Increase the stiffness of the X-axis by expanding the X axis LM Guide

### Improved X-axis stiffness and precision

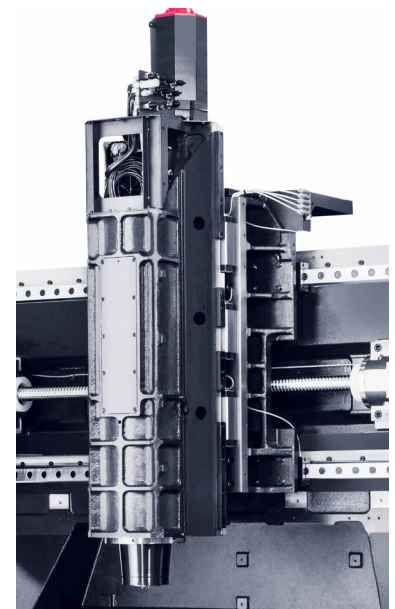
The rigidity of the driveline element such as ball screw, bracket, and frame is strengthened to precise feed is possible

Meeting the customer's machining purposes

### Various Specifications for Direct-Coupled Spindles

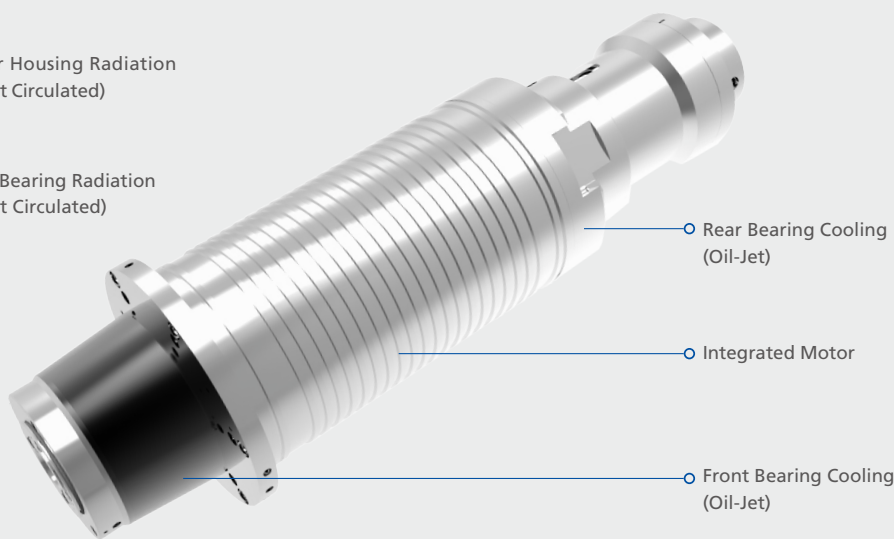
	Max Spindle Speed rpm		Spindle Motor kW	Max Torque Nm
BBT-40 (HSK-A63)	20,000	Regular Type	37	221
		CTS (OPT)		
	12,000 (OPT)	Regular Type		
		CTS (OPT)		
14,000 (OPT)	Regular Type	37	303	
	CTS (OPT)			
HSK-A63	24,000 (OPT)	Regular Type	37	221
		CTS (OPT)		

\* For 24,000 rpm, The tool type is only used 'HSK-A63'.



Motor Housing Radiation (Jacket Circulated)

Front Bearing Radiation (Jacket Circulated)

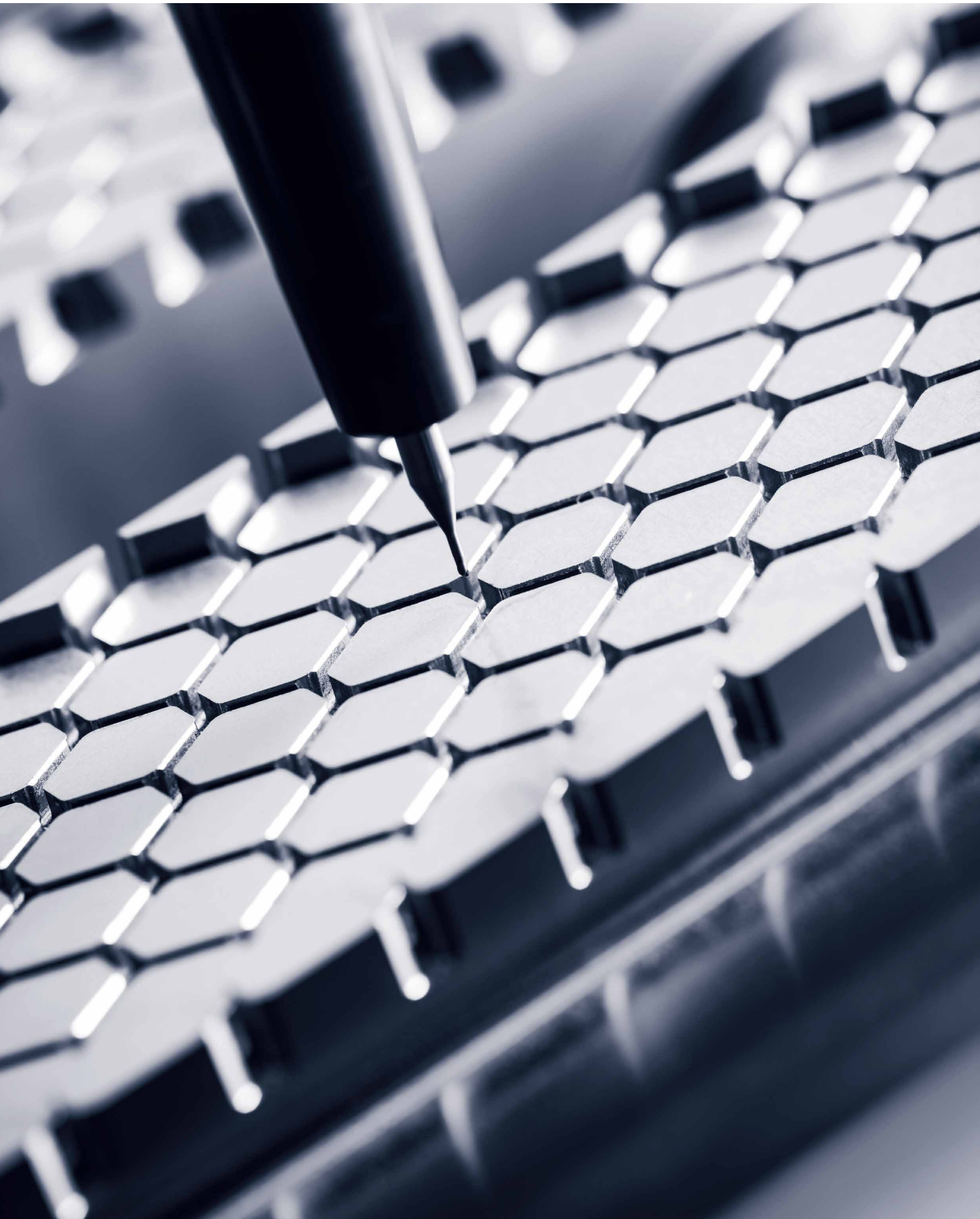


### Spindle assembly

The Hwacheon clean room assembly facility, where the super-precision, super-speed spindle built inside SIRIUS-UL<sup>+</sup> is manufactured, maintains optimal temperature and humidity, and is kept free of any foreign substances. Only the most skilled master engineers are allowed in the assembly facility, in the production of only the best equipment to comply with the toughest quality standard in the industry.

### Oil-jet Cooling System

The jet of oil is injected directly onto the spindle bearing for effective cooling, and the motor and the spindle assembly are jacket-cooled to limit the displacement caused by heat.



# MACHINING SOFTWARE

## The Hwacheon Machining Software Components

The Hwacheon's 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

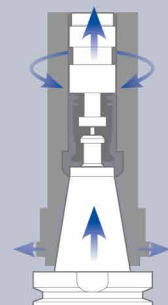
Hwacheon Spindle Displacement Control System



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 occurring from the taper expansion during the spindle's high speed rotation.





# PRECISION +



## HTLD Hwacheon Tool Load Detect System

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)



## 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 workpiece, 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 for roughness and shapes.
- The customizable 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, A WIDE RANGE OF OPTIONAL FEATURES

## User convenience, a variety of extra features

With a user-centric architecture, (New) SIRIUS-UL<sup>+</sup> offers a user-friendly design and a variety of options. The standard options include lift-up chip conveyors, air/coolant gun and 3-color warning lamp.

These functions help operators concentrate fully on machining operations and work more safely and efficiently.

Based on Hwacheon's exceptional technological expertise, a wide range of options are available for upgrading performance, ensuring more powerful and precise results.

### Auto measurement system (Option)

When the machine begins to work, the measurement system automatically measures the workpiece reference and the tool, and makes necessary adjustment. This system saves machining time and guarantees high quality result every time regardless of the machinist's skill and because the system constantly monitors the tools and the work -piece for any abnormality, potential machine-related accidents can be prevented. The system integrates perfectly with other equipment to make your automated production line more productive and efficient.



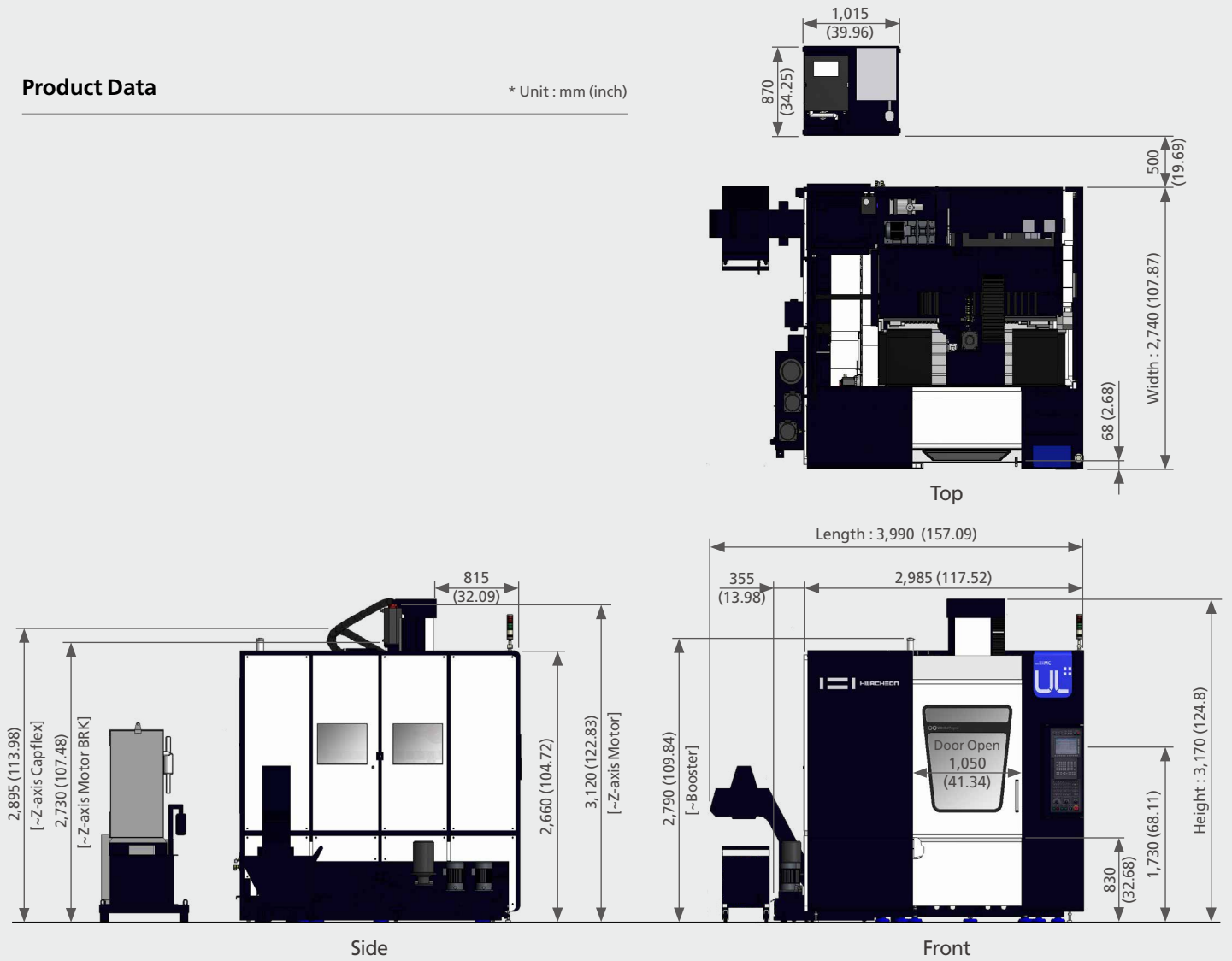
### Enhanced table space utilization

Enhanced table space utilization by placing the tool measuring unit outside the processing area.



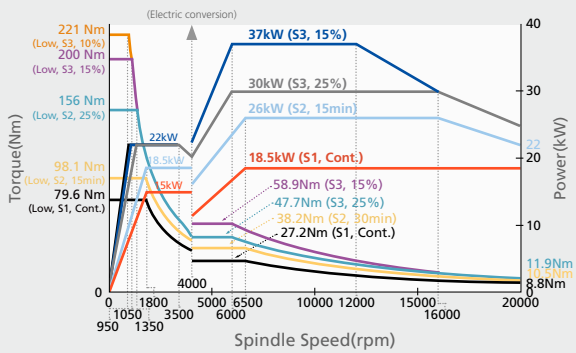
Product Data

\* Unit : mm (inch)

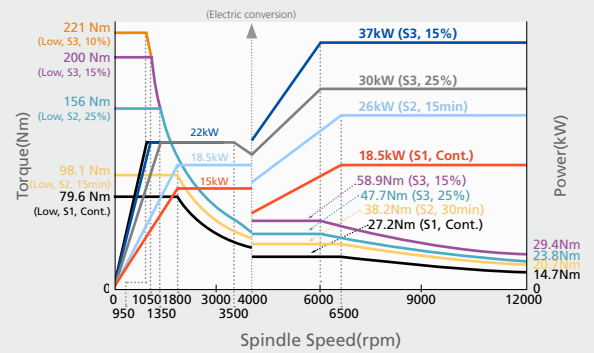


Spindle Power – Torque Diagram

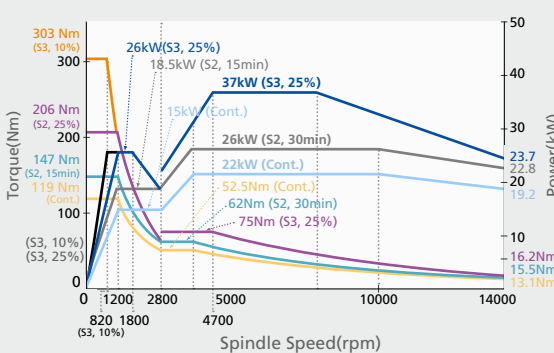
Standard (20,000rpm)



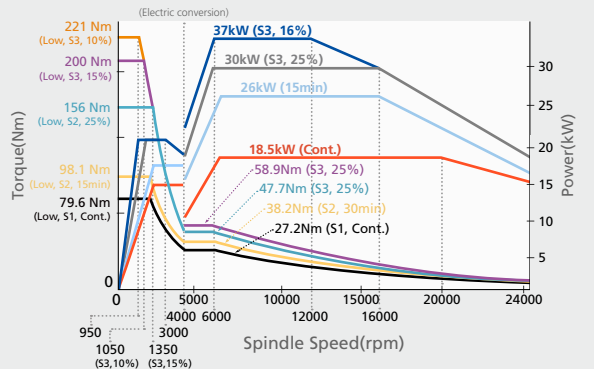
Option (12,000rpm)



Option (14,000rpm)

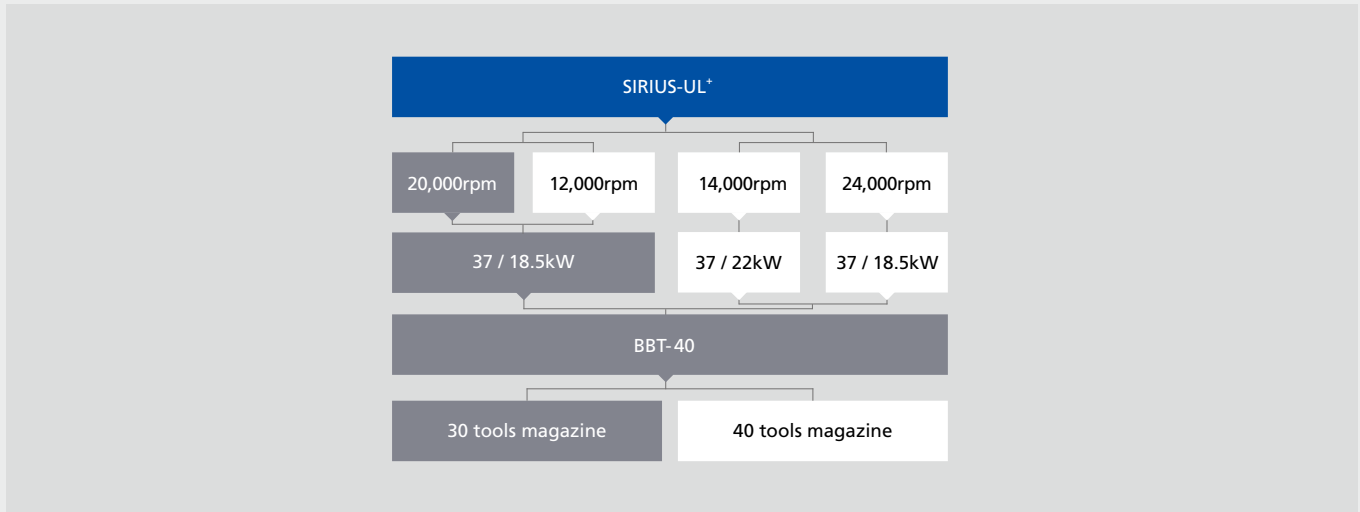


Option (24,000rpm)



## Product Configuration

Each product can be configured to fit your application.



## Machine Specifications

ITEM	SIRIUS-UL*				
		20,000	12,000	14,000	24,000
<b>Travel</b>					
X-axis Stroke	mm(inch)	1,050 (41.34)			
Y-axis Stroke		600 (23.62)			
Z-axis Stroke		550 (21.65)			
Distance from Table Surface to Spindle Gauge Plane	mm(inch)	150 (5.91) ~ 700 (27.56)			
<b>Table</b>					
Working Surface (W x L)	mm(inch)	1,200 (47.24) x 600 (23.62)			
Table Loading Capacity	kg,(lb <sub>t</sub> )	800 (1,764)			
Table Surface Configuration (T slots WxP / No. of slots)	mm(inch)	18 x 100 (0.71 x 3.94) / 5ea			
<b>Spindle</b>					
Max. Spindle Speed	rpm	20,000	12,000	14,000	24,000
Spindle Motor	kW(HP)	37 / 18.5 (50 / 25)		37 / 22 (50 / 29)	37 / 18.5 (50 / 25)
<b>Feedrate</b>					
Rapid Speed (X / Y / Z)	m/min(ipm)	36 (1,417) / 36 (1,417) / 36 (1,417)			
Feedrate (X / Y / Z)	mm/min(ipm)	1 ~ 24,000 (0.04 ~ 945)			
<b>ATC</b>					
Type of Tool Shank	-	BBT-40 (Opt.: CAT-40, HSK-A63, SK-40)		HSK-A63	
Type of Pull Stud	-	MAS P40T-1 (45°)			
Tool Storage Capacity	ea	30 (Opt. : 40)			
Max. Tool Diameter [With / Without Adjacent Tools]	mm(inch)	Ø90 (3.54) / Ø170 (6.69)			
Max. Tool Length	mm(inch)	300 (11.81)			
Max. Tool Weight	kg,(lb <sub>t</sub> )	8 (17.64)			
<b>Motor</b>					
Feed Motor (X / Y / Z)	kW(HP)	4.0 (5.4) / 4.0 (5.4) / 7.0 (9.4)			
Coolant Motor (Spindle / Coolant Gun)	kW(HP)	0.75 (1.0) / 0.75 (1.0)			
Spindle Cooler (50 / 60Hz) : Inverter Type	kW(HP)	5.0 / 5.6 (6.7 / 7.5)			
<b>Power Source</b>					
Electric Power Supply	kVA	55			
Compressed Air Supply (Pressure X Consumption)	-	0.5 ~ 0.7MPa x 690Nℓ/min			
<b>Tank Capacity</b>					
Spindle Cooling / Lubrication / Coolant	ℓ (gal)	30 (7.92) / 12 (3.17) / 430 (113.59)			
<b>Machine Size</b>					
Height	mm(inch)	3,170 (124.80)			
Floor Space (Length x Width)	mm(inch)	3,990 (157.09) x 2,740 (107.87)			
Weight	kg,(lb <sub>t</sub> )	11,800 (26,014)			
NC Controller		Fanuc 31i-B			

## Standard and Optional Product Components

Standard Accessories		Optional Accessories	
• Adjust Bolt & Block	• Rigid Tapping	• Auto Door	• Transformer
• Air Blower	• Signal Lamp (R / G / Y, 3 Color)	• CTS (3MPa, 7Mpa)	• Workpiece Measuring System
• Air Dryer	• Spindle Cooler	• Data Server (1,024MB)	• Renishaw / Blum (Touch Type)
• Air Gun	• Tool Box	• Linear Scale (X / Y / Z)	• 40 tools magazine
• Base Around Splash Guard	• Workpiece Coordinate System (48ea)	• Lift-up Chip Conveyor (Mesh-drum)	• 4-axis Interface
• Coil Conveyor (2ea)	• Work Light	• Manual Guide i	• Hwacheon Artificial Intelligence
• Coolant Gun	• 10.4" Color LCD	• Mist Collector	System(HAI): 600/1000 Block
• Coolant / Lubrication System	• Hwacheon Efficient Contour Control System (HECC)	• MPG Handle (3ea)	
• Data Server (256MB)	• Hwacheon Tool Load Detect System (HTLD)	• Nano Smoothing Interpolation	
• Data Server Interface	• Hwacheon Thermal Displacement Control System (HTDC)	• NURBS Interpolation	
• Door Interlock	• Hwacheon Artificial Intelligence Control System(HAI): 200 Block	• Oil Mist (Semi Dry Cutting System)	
• Lift-up Chip Conveyor (Hinge / Scraper)	• Cutting Feed Optimization System (OPTIMA)	• Oil Skimmer	
• MPG Handle (1ea)		• Tool Life Management	
• Operation Manual & Parts List		• Tool Measuring System-Renishaw /Blum (Touch Type, Laser Type)	
• Pneumatics System			

## NC Specifications [Fanuc 31i-B]

※ — : Not available S : Standard O : Option

ITEM	SPECIFICATION	ITEM	SPECIFICATION
Controlled Axis		Automatic Corner Override	O
Controlled Axis	3-axis	Feedrate Clamp Based on Arc Radius	S
Controlled Axis	5-axis (Max.)	Scaling	O
Simultaneously Controlled Axis	3-axis	Coordinate System Rotation	S
Simultaneously Controlled Axis	4-axis (Max.)	Programmable Mirror Image	O
Least Input Increment	0.001mm, 0.001deg, 0.0001inch	Tape Format for Fanuc Series 15	O
Least Input Increment 1 / 10	0.0001mm, 0.0001deg, 0.00001inch	Manual Guide i	O
inch / metric Conversion	G20, G21	Spindle Speed Function	
Store Stroke Check 1 / 2		Spindle Override	50 - 120%
Mirror Image		Spindle Orientation	S
Operation		Rigid Tapping	S
Automatic & MDI operation		Tool Function / Compensation	
DNC Operation by Memory Card	PCMCIA Card is Required	Tool Function	T4-digits
Dry Run, Single Block		Tool Offset Pairs	±6-digits / 200ea
Manual Handle Feed / Feed Rate	1Unit / x1, x10, x100	Tool Offset Pairs	±6-digits / 400ea, 999ea
Interpolation Function		Tool Offset Memory C	S
Positioning / Linear interpolation / Circular interpolation / Dwell (Per seconds)	G00 / G01 / G02, G03 / G04	Tool Length Compensation	S
Cylindrical interpolation	4-axis interface option is required	Cutter Compensation C	S
Helical Interpolation	Circular interpolation plus max. 2-axis linear interpolation	Tool Life Management	O
Nano Smoothing		Tool Length Measurement	S
Reference Position Return Check / Return	G27 / G28, G29	Editing Operation	
2nd reference Position Return / Skip	G30 / G31	Part Program Storage Length / Number of Register Able Programs	256kB / 500ea
NURBS Interpolation		Part Program Storage Length / Number of Register Able Programs	512kB / 1,000ea
Feed Function		Background Editing / Extended Part Program Editing	S
Rapid Traverse Override	F0, F25, F50, F100	Play Back	O
Feedrate (mm/min)		Setting and Display	
Feedrate Override	0 ~ 150%	Display Unit	10.4" Color LCD
Jog feed Override	0 ~ 4,000 mm/min	Clock Function	S
Override Cancel	M48, M49	Self-diagnosis Function / Alarm History Display	S
Program Input		Help Function / Graphic Function	S
Optional Block Skip	1ea	Run Hour and Parts Count Display	S
Program Number Search	O4-digits	Dynamic Graphic Display	O
Sequence Number	N8-digits	Multi-language Display	English, German, French, Italian, Chinese, Spanish, Korean, Russian, Portuguese, Polish, Hungarian, Swedish
Decimal Point Programming		Data Input/Output	
Coordinate System Setting	G92	Reader / Puncher Interface CH1	RS232C
Workpiece Coordinate System	G54 - G59	Data Server	256MB
Workpiece Coordinate System Preset		Data Server	1,024MB
Addition of Workpiece Coordinate Pair	48ea	Ethernet Interface	S
Addition of Workpiece Coordinate Pair	300ea	Memory Card / USB Interface	S
Manual Absolute ON and OFF		Auto Data Backup	SRAM + Part Program
Chamfering / Corner R		HWACHEON Machining Software	
Programmable Data Input	G10	Hwacheon Artificial Intelligence Control System (HAI): 200 Block	S
Sub Program Call	10 Folds Nested	Hwacheon Artificial Intelligence Control System (HAI): 600 / 1000 Block	O
Custom Macro B		Hwacheon Tool Load Detect System (HTLD)	S
Addition of Custom Macro Common Variables	#100 - #199, #500 - #999	Cutting Feed Optimization System (OPTIMA)	S
Canned Cycles for Drilling		Hwacheon Thermal Displacement Control System (HTDC)	S
Small-hole Peck Drilling Cycle		Hwacheon Efficient Contour Control System(HECC)	S
Polar Coordinate System			
Program Restart			

## 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.

### HEAD OFFICE

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