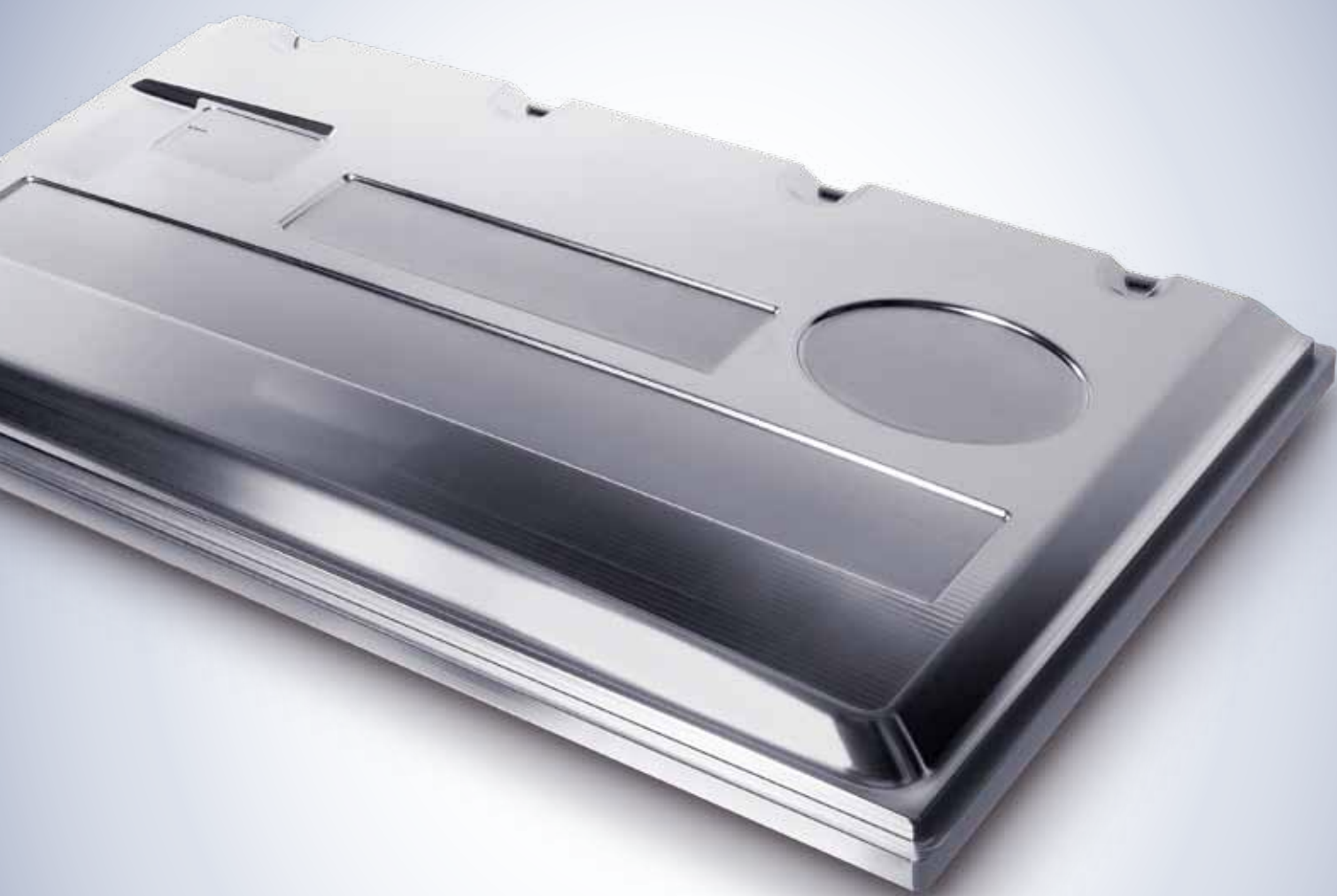




SIRIUS-2500/5AX

5-Axis Universal Machining Center
for Large-size Die and Mold



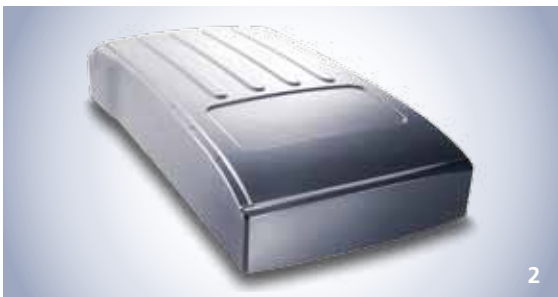


5-AXIS UNIVERSAL MACHINING CENTER FOR LARGE-SIZE DIE AND MOLD

This large scale machining center is capable of performing 5-axis Machining in a single setting

Hwacheon's SIRIUS-2500/5AX is capable to work on large, complex workpiece which requires many individual processes with just one single setting. Along with the Hwacheon Total Solution, it is the production solution you've been looking for.

1 63" LCD TV Back Cover / Home Appliances / KP4M 2 Auto Mobile Pop Cover / Auto Driving Part / GC-250
3 Auto Mobile Bumffer / Auto Driving Part / KP4M 4 Air Craft Frame Core / Air Part / KP4M



5-AXIS UNIVERSAL MACHINING CENTER FOR LARGE-SIZE DIE AND MOLD

Hwacheon's large-size 5-axis machining center guarantees to enhance the quality of the molds for large display panel, automotive and aerospace components which require the highest level of precision and it will shorten your delivery time too.

With the help of the high performance high-speed, high-precision direct-drive universal head the SIRIUS-2500/5AX will continue to turn out quality products even after many hours of operation, and the machine will process a most complex work-piece thanks to the 3D FEM analysis, the software components specially made by Hwacheon will increase the machine's productivity and process speed. The machine comes with many functional options as standard that will make your production even more efficient.



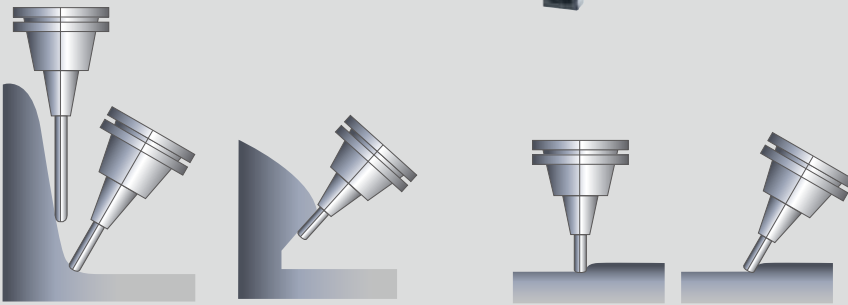


Rigid symmetrical portal structure

The double columns in Symmetrical Portal structure of the SIRIUS-2500/5AX provides excellent support for the feed drive by distributing the vibration, the weight and the heat throughout the entire frame. This guarantees the machine to maintain its feed stability.

High-efficiency multi-axis machining

Not only can a 5-axis machine move in the same three directions of a 3-axis machine but the cutting tool can also rotate to approach the work from any direction, enabling easy access to undercuts which a 3-axis machine can't reach. Also, the end mill sweeping provides significant savings in machining time-, of up-to one fifth of the time it would take for the ball-end mill to be fed back and forth along a curvilinear path at close intervals when producing complex three-dimensional surfaces. Another benefit behind a 5-axis system is that the length of the tools can be compact, which used to be made longer to match the size and shape of workpieces; the cutting is done with the side of the ball end mill, not just with the tip of it, which increases the life of the tool and results in ultra fine cutting surface.



Direct drive spindle

The spindle is integrated directly into the motor with the high precision encoder, without using any gears for power transfer. The result is 0.001° of high-precision angle division and 30rpm of rapid feed, which means higher machining quality and shorter cycle times.

* Brake torque(B/C): 3,000 / 4,000Nm

Integrated Motor Spindle

In Hwacheon temperature controlled clean room facilities, where this Super Precision High Speed Spindles are assembled, only the most experienced and skilled engineers are allowed to produce at highest industry and quality standards a spindle worth to be named Made by Hwacheon.





MACHINING SOFTWARE

The Hwacheon Machining Software Components

The Hwacheon's developed machining software monitors different variables related to the work environment and machining conditions automatically 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.

HTDC™

Hwacheon Thermal Displacement Control

HFDC

Hwacheon Frame Displacement Control System

HFDC is equipped with highly sensitive thermal sensors located at various locations where thermal activity is suspected; monitoring and correcting displacement.

HFDC™

Hwacheon Frame Displacement Control

HSDC

Hwacheon Spindle Displacement Control System

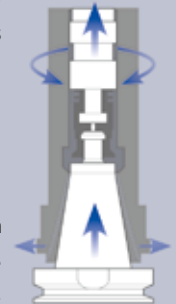
When the spindle rotates at high speed, the centrifugal force drives the taper to expand, causing errors in Z axis. HSDC constantly monitors the temperature at each spindle region and makes optimal prediction for thermal displacement. The system then makes necessary adjustments and effectively minimizing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

HSDC™

Hwacheon Spindle Displacement Control

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)

HTLD™
Hwacheon
Tool Load Detect

**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.

HECC®
Hwacheon Efficiency
Contour Control

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.

OPTIMA™
Cutting Feed
Optimization

**HRCC****Hwacheon Rotation Center Calibration System**

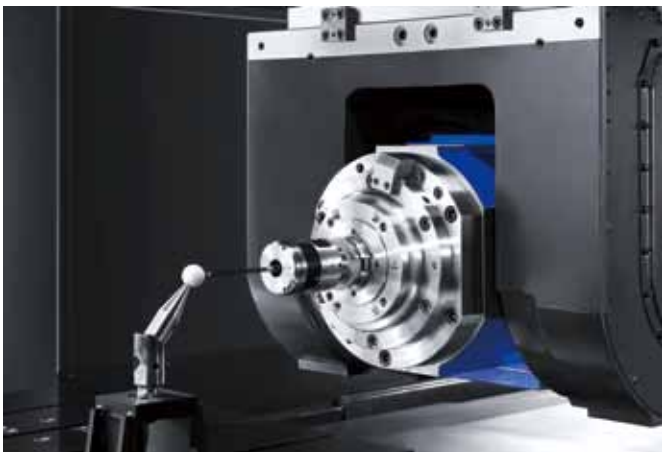
Hwacheon Rotation Center Calibration System automatically measures and sets the reference point of pivot in a 5-axis machine in under one minute, to lower the workpiece setup time and increase the machining quality. The system also creates and manages a database of the reference points for different temperature and time to limit the deviation of the rotation center.

HRCC™
Hwacheon Rotation
Center Calibration
System

SPEED +

USER FRIENDLY DESIGN, A WIDE RANGE OF OPTIONAL FEATURES

SIRIUS-2500/5AX offers not only a user friendly design and a wide variety of useful options for practical applications, so you can concentrate on what you do best: creating quality products-without losing your valuable time to the worries of machine failure and safety. A wide variety of performance enhancing options are available for faster, more precise machining.



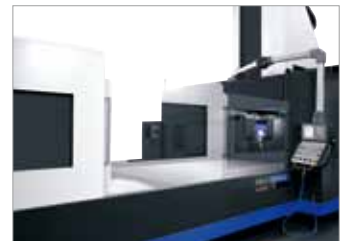
Hwacheon Spindle Center Calibration System (HRCC) (STD)

The Hwacheon Spindle Center Calibration System automatically measures and sets the reference point in a 5-axis machine in under one minute, to lower the workpiece setup time and increase the machining quality. The system also creates and manages a database of the reference points for different temperature and time to limit the deviation of the rotation center.



High-precision balance (STD)

The head frame design incorporates on each side a nitrogen gas-packed cylinder which compensates the weight of the Z-axis unit. Enhancing controlled performance even on the most complex and critical work-pieces which require constant fine acceleration and breakage.



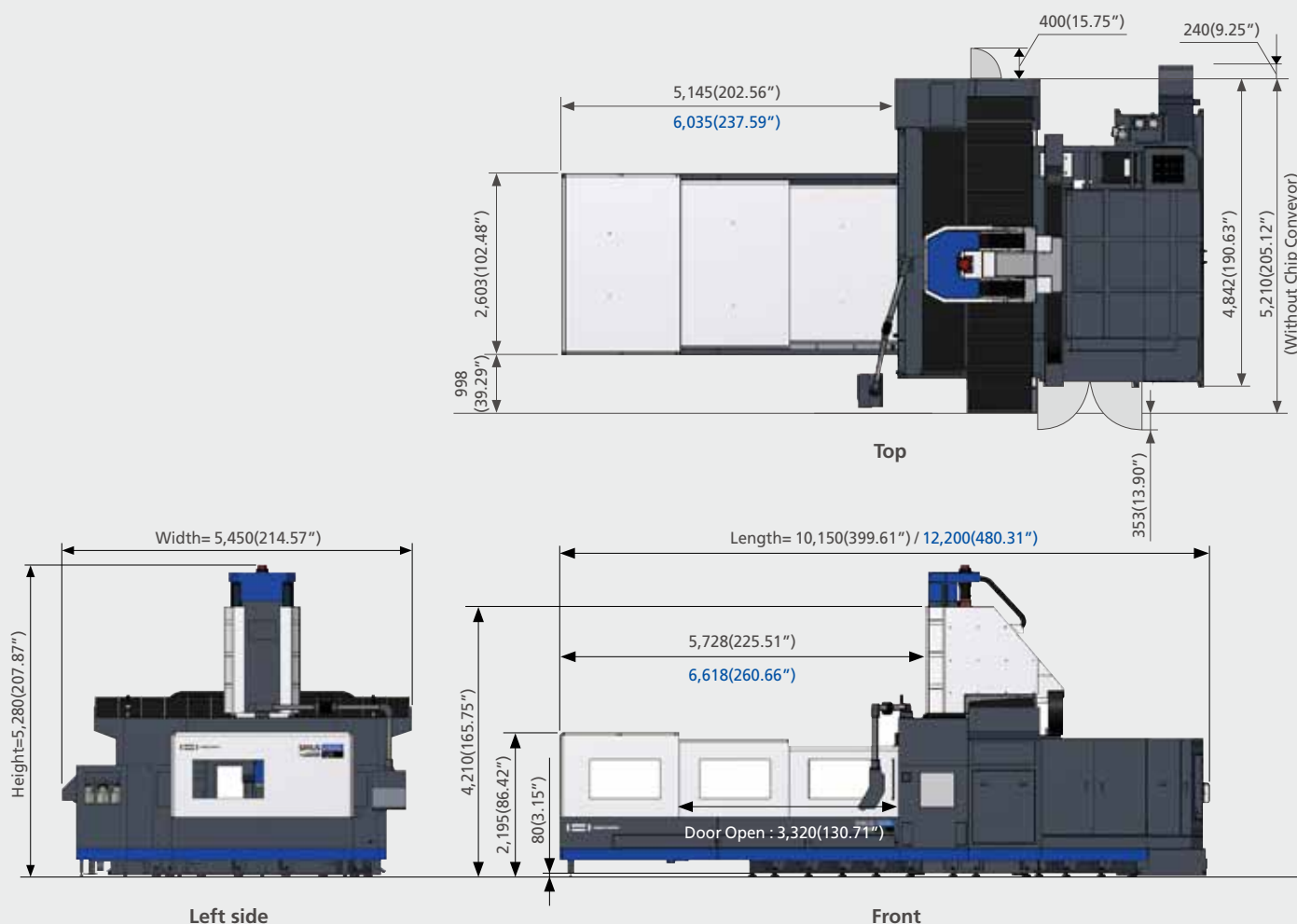
Full-enclosure cover (STD)

The fully enclosed exterior cover option prevents the spread of chips, lubes and dust during process to make the workplace safer and cleaner. The smooth-operating slide door is accessible even from the opposite side when setting up a large workpiece.

Product Data

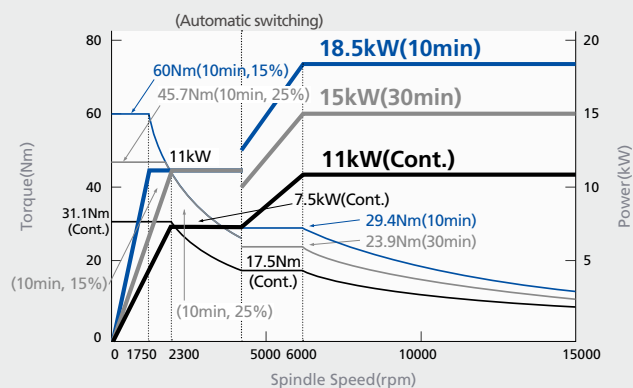
* Unit: mm(inch)

■ Short Bed ■ Long Bed



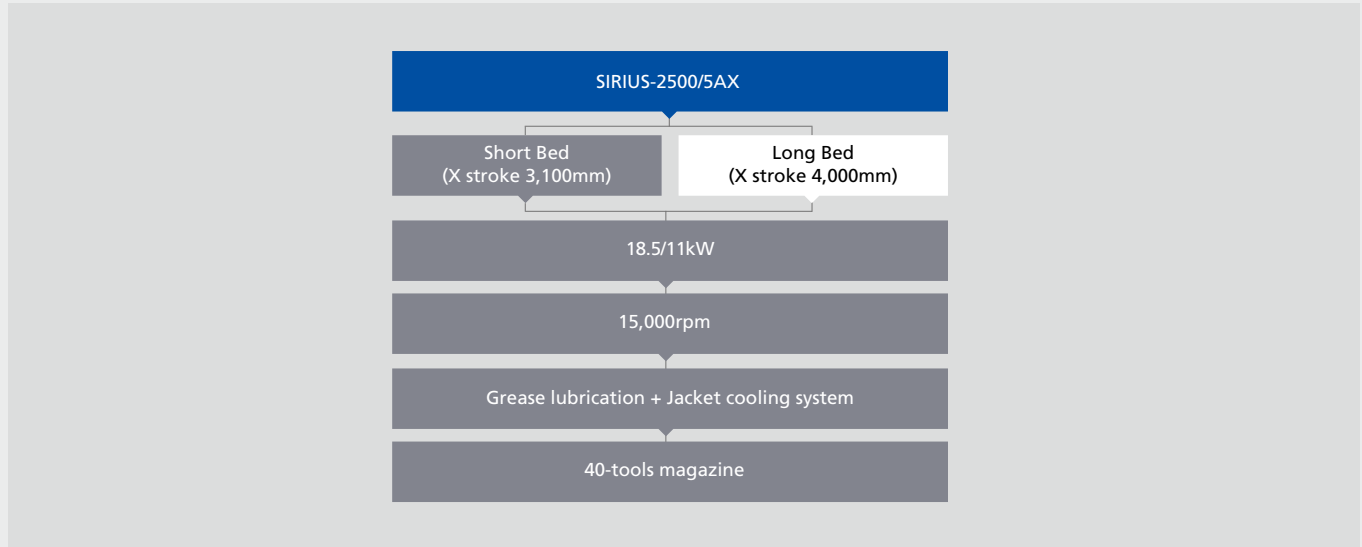
Spindle Power – Torque Diagram

Standard (15,000rpm)



Product Configuration

Each product can be configured to fit your application.



Machine Specifications

ITEM		SIRIUS-2500/5AX	
		Short Bed	Long Bed
Travel			
Stroke (X / Y / Z)	mm(inch)	3,100 (122.05") / 2,300 (90.55") / 1,000 (39.37")	4,000 (157.48") / 2,300 (90.55") / 1,000 (39.37")
Tilting(B) / Rotation(C)	°(deg)	±100° / ±210°	
Distance from table surface to spindle gauge plane	mm(inch)	0 (0") ~ 1,000 (39.37")	
Distance between columns to spindle center	mm(inch)	263 (10.35")	
Distance between columns	mm(inch)	2,300 (90.55")	2,400 (94.49")
Table			
Working surface	mm(inch)	3,300 (129.92") x 2,000 (78.74")	4,200 (165.35") x 2,000 (78.74")
Table loading capacity	kg(lb)	10,000 (22,046)	15,000 (33,069)
Table surface configuration (T slots WxP – No. of slots)	mm(inch)	22 x 200 (0.87" x 7.87") - 9ea	
Spindle			
Max. Spindle speed	rpm	15,000	
Spindle Motor	kW(HP)	18.5 (24.81) / 11 (14.75)	
Type of spindle taper hole	-	ISO#40, 7 / 24 Taper (BBT-40)	
Spindle bearing inner diameter	mm(inch)	Ø70 (3.94")	
Method of spindle lubrication & cooling	-	Grease Lub. + Jacket Cooling	
Feedrate			
Rapid speed (X / Y / Z)	m/min(ipm)	16 (630) / 16 (630) / 16 (630)	10 (394) / 16 (630) / 16 (630)
Rapid speed (B / C)	rpm	30 / 30	
Feedrate (X / Y / Z)	mm/min(ipm)	1 ~ 8,000 (0.04 ~ 315)	
ATC			
Type of tool shank	-	BBT-40 (Opt.: HSK-A63, CAT-40)	
Type of pull stud	-	JIS-B6339 BBT-40 75° Type	
Tool storage capacity	ea	40	
Max. Tool diameter [Without adjacent tools]	mm(inch)	Ø85 (3.35") / Ø170 (6.69")	
Max. Tool length	mm(inch)	300 (11.81")	
Max. Tool weight	kg(lb)	8 (17.64)	
Tool changing time (T to T / C to C)	sec	3.5 / 10	
Motor			
Feed motor (X / Y / Z)	kW(HP)	9.0 (12) / 9.0 (12) / 9.0 (12)	
Feed motor (B / C)	kW(HP)	4.2 (5.6) / 6.3 (8.4)	
Coolant motor (Spindle)	kW(HP)	0.4 (0.55)	
Spindle cooler (50 / 60Hz) – Inverter type	kW(HP)	5.0 (6.67) / 5.6 (7.47)	
Power Source			
Electric power supply	kVA	75	
Compressed air supply (Pressure x Consumption)	-	0.5 ~ 0.7MPa x 1,870N ℓ/min	
Tank Capacity			
Spindle cooling / Lubrication	ℓ (gal)	60 (15.85) / 12 (3.17)	
Coolant	ℓ (gal)	850 (224.55)	
Machine Size			
Height	mm(inch)	5,280 (207.87")	
Floor space (Length x Width)	mm(inch)	10,150(399.61") x 5,450(214.57")	12,200(480.31") x 5,450(214.57")
Weight	kg(lb)	41,350 (91,161)	45,350 (99,980)
NC Controller		Fanuc 31i-A5	

Standard and Optional product components

Standard Accessories		Optional Accessories	
• Adjust bolt, block & plate	• Tilted working plane command with guidance for 5 axis	• Air gun	• Tool radius compensation for 5 axis
• Air dryer	• Tool kit & box	• Coolant through spindle (30bar, 70bar)	• Transformer
• Base around splash guard	• Work light	• Data server (1,024MB)	• 3D interference check function for standard CNC
• Coil conveyor (2ea)	• Workpiece coordinate system (48ea)	• Gap 300mm (High column)	
• Coolant gun	• Workpiece setting error compensation for 5 axis	• Hwacheon AI Nano Contour Control System (HAI) 1000 block buffer	
• Coolant system	• 3-dimensional manual feed for 5 axis	• Lift up chip conveyor (Hinge type, Scraper type)	
• Data server interface	• 10.4" Color LCD display	• Mist collector	
• Data server (256MB)	• Cutting Feed Optimization System (OPTIMA)	• Nano smoothing interpolation	
• Hydraulic equipment	• Hwacheon Efficient Contour Control System (HECC)	• NC cooler	
• Lubrication system	• Hwacheon Tool Load Detect System (HTLD)	• NURBS interpolation	
• Operation manual & parts list	• Hwacheon Thermal Displacement Control System (HTDC)	• Oil mist (Semi dry cutting system)	
• Pneumatics system	- Hwacheon Spindle Displacement Control System (HSDC) +	• Oil skimmer	
• Rigid tapping	- Hwacheon Frame Displacement Control System (HFDC)	• Signal lamp (R / G / Y, 3 color)	
• Scale (X / Y / Z / B / C)	• Hwacheon Rotation Center Calibration System (HRCC)	• Tool life management	
• Signal lamp (R / G, 2 color)	- Include work measuring system-Renishaw (touch type)	• Tool measuring system-Renishaw / Blum (Touch type, laser type)	
• Smooth TCP (Tool center point control) for 5 axis	• Hwacheon AI Nano Contour Control System (HAI) 600 block buffer		
• Spindle cooler			

NC Specifications [Fanuc 31i-A5]

※ — : Not available S : Standard O : Option

ITEM			SPECIFICATION		
Controlled axis			Spindle speed function		
Controlled axis	5-Axes	S	Spindle override	50 - 120%	S
Simultaneously controlled axes	5-Axes	S	Spindle orientation		S
Least input increment	0.001mm,0.001deg,0.0001inch	S	Rigid tapping		S
Least input increment 1 / 10	0.0001mm,0.0001deg,0.00001inch	O	Tool function / compensation		
inch / metric conversion	G20, G21	S	Tool function	T4 - digits	S
Store Stroke Check 1 / 2		S	Tool offset pairs	±6 - digits 200ea	S
Mirror Image		S	Tool offset pairs	±6 - digits 400ea, 999ea	O
Operation			Tool offset memory C, Tool length compensation		S
Automatic & MDI operation		S	Cutter compensation C, Tool length measurement		S
DNC operation by memory card	PCMCIA card is required	S	Tool life management		O
PCMCIA card is required			Editing operation		
Dry run, single block		S	Part program storage length / Number of register able programs	128kB / 250ea	S
Manual handle feed / Feed rate	1Unit / x1, x10, x100	S	Part program storage length / Number of register able programs	256kB / 500ea, 512kB / 1,000ea	O
Interpolation function			Background editing / Extended editing functions	1MB / 1,000ea, 2MB / 1,000ea	
Positioning / Linear interpolation / Circular interpolation / Dwell (Per seconds)	G00 / G01 / G02,G03 / G04	S	Play back		O
Helical interpolation	Circular interpolation plus Max.2axes linear interpolation	S	Setting and display		
Nano smoothing		O	Clock function		S
Reference position return check / Return	G27 / G28,G29	S	Self-diagnosis function / Alarm history display		S
2nd reference position return / Skip	G30 / G31	S	Help function / Graphic function		S
NURBS interpolation		O	Run hour and parts count display		S
Feed function			Multi-language display	English, German, French, Italian, Chinese, Spanish, Korean, Portuguese, Polish, Hungarian, Swedish, Russian	S
Rapid traverse override	F0, F25, F50, F100	S	Data input / output		
Feedrate (mm / min)		S	Reader / Puncher interface CH1	RS232C	S
Feedrate override	0 ~ 150%	S	Data server	256MB	S
Jog feed override	0 ~ 4,000mm/min	S	Data server	1,024MB	O
Override cancel	M48, M49	S	Ethernet interface / Memory card interface		S
Program input			Auto data backup	SRAM + Part Program	S
Optional block skip	1ea	S	Others		
Program number	O4-Digits	S	Display unit	10.4" Color LCD	S
Sequence number	N8-Digits	S	HWACHEON Artificial Intelligence		
Decimal point programming		S	AI Nano Contour Control System (HAI) 600 Block Buffer		S
Coordinate system setting	G92	S	AI Nano Contour Control System (HAI) 1000 Block Buffer		O
Workpiece coordinate system	G54 ~ G59	S	Hwacheon Efficient Contour Control System (HECC)		S
Workpiece coordinate system preset		O	Hwacheon Tool Load Detect (HTLD)		S
Addition of workpiece coordinate pair	48ea	S	Cutting Feed Optimization System (OPTIMA)		S
Manual absolute on and off		S	Hwacheon Thermal Displacement Control System (HTDC)		S
Chamfering / Corner R		S	Hwacheon Rotation Center Calibration System (HRCC)		S
Programmable data input	G10	S	5-axis native functions		
Sub program call	10 folds nested	S	Smooth TCP (Tool center point control) for 5 axis		S
Custom macro B		S	Tilted working plane command with guidance for 5 axis with guidance for 5 axis		S
Addition of custom macro common variables	#100 - #199, #500 - #999	O	Workpiece setting error compensation for 5 axis		S
Canned cycles for drilling		S	3-dimensional manual feed for 5 axis		S
Small-hole peck drilling cycle		O	Tool radius compensation for 5 axis		O
Automatic corner override		O			
Feedrate clamp based on arc radius		S			
Scaling		O			
Coordinate system rotation		S			
Programmable mirror image		O			
Tape format for fanuc series 15		O			

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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