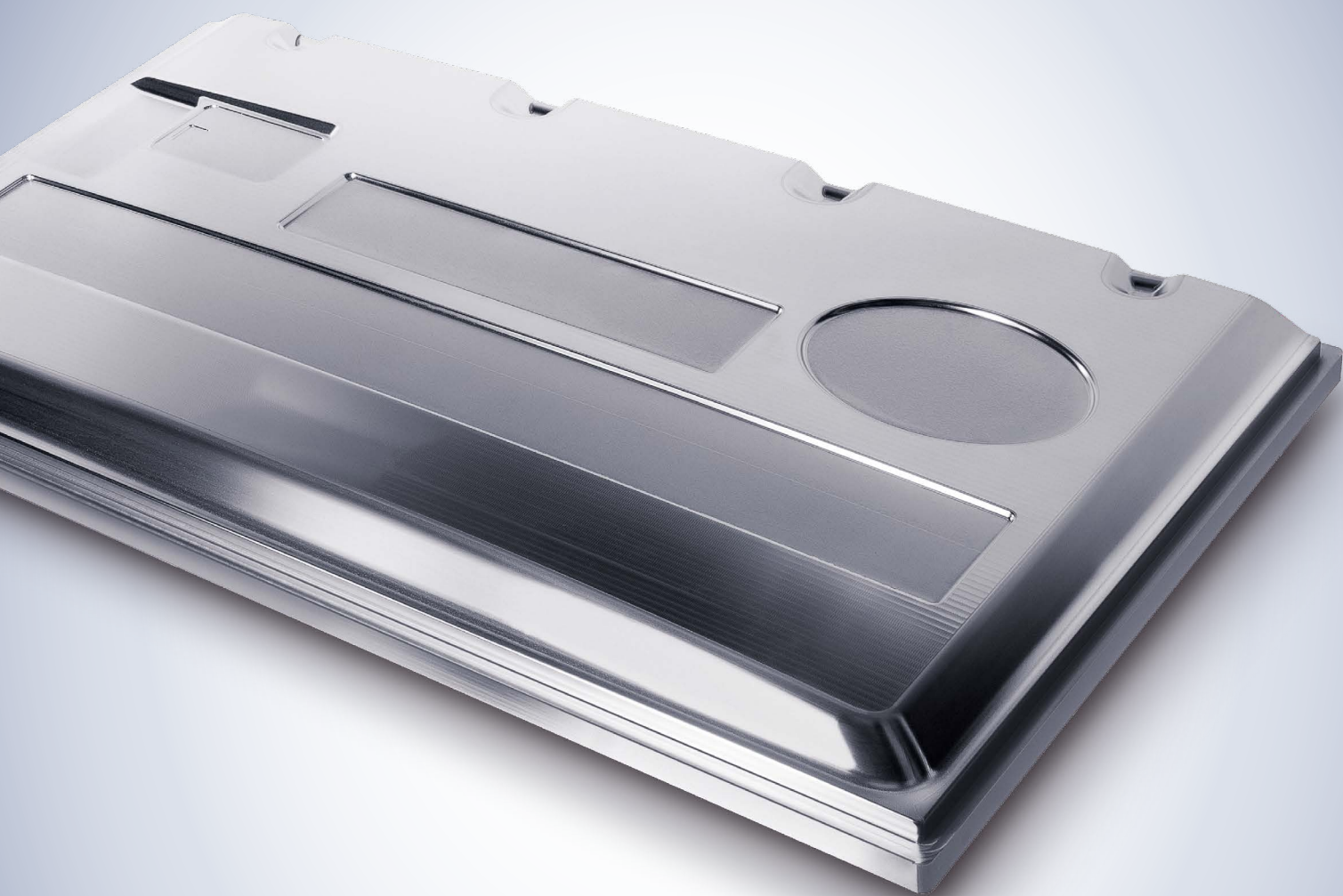




SIRIUS-2500/5AX

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 TOP Cover / Auto Driving Part / GC-250
3 Auto Mobile Bumper / Auto Driving Part / KP4M 4 Air Craft Frame Core / Air Part / KP4M

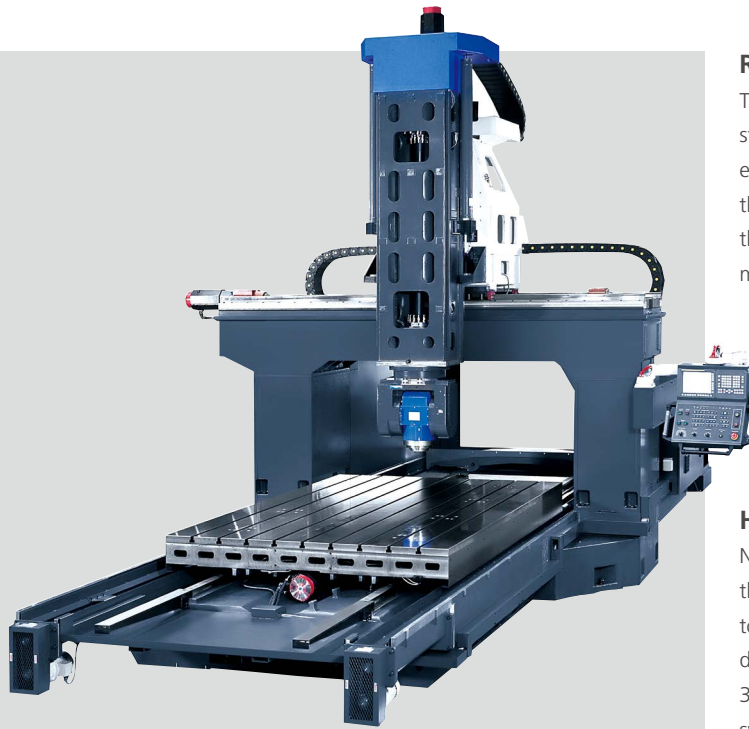


5-AXIS UNIVERSAL MACHINING CENTER FOR LARGE-SIZE DIE AND MOLD

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.



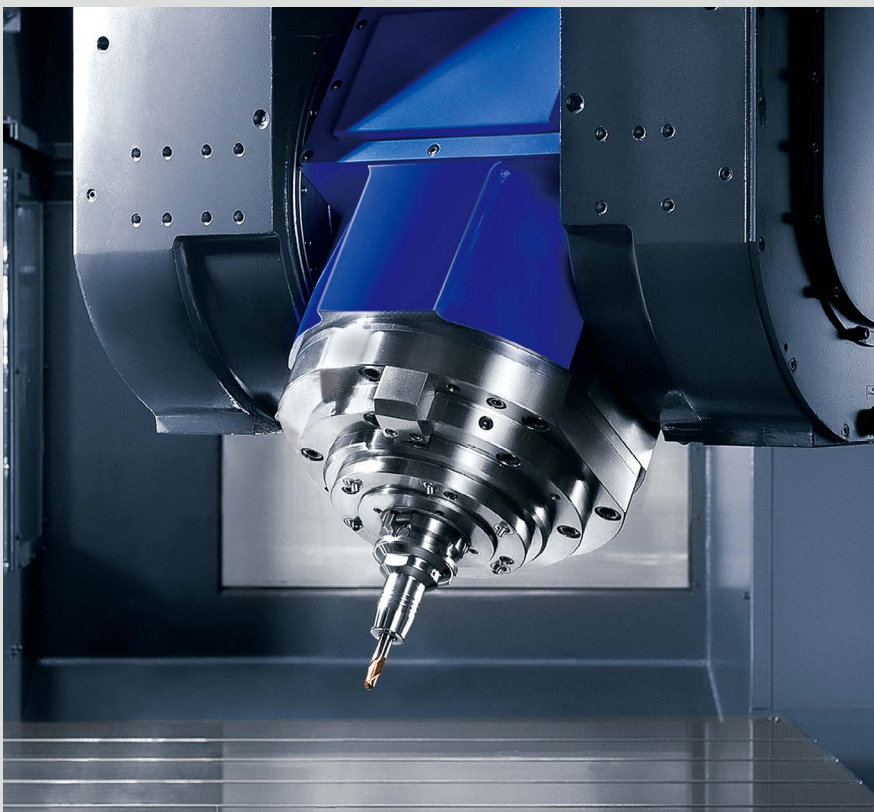
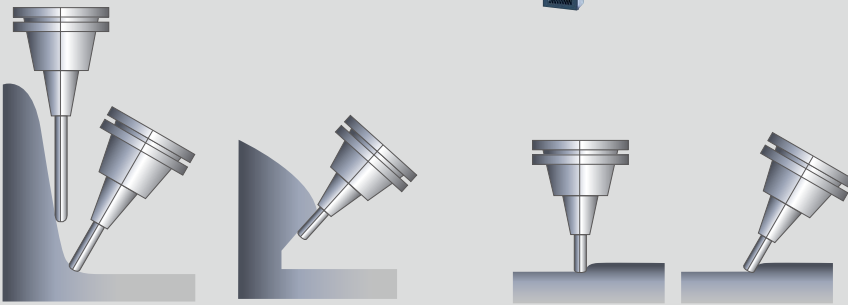


Rigid Symmetrical Portal Structure

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

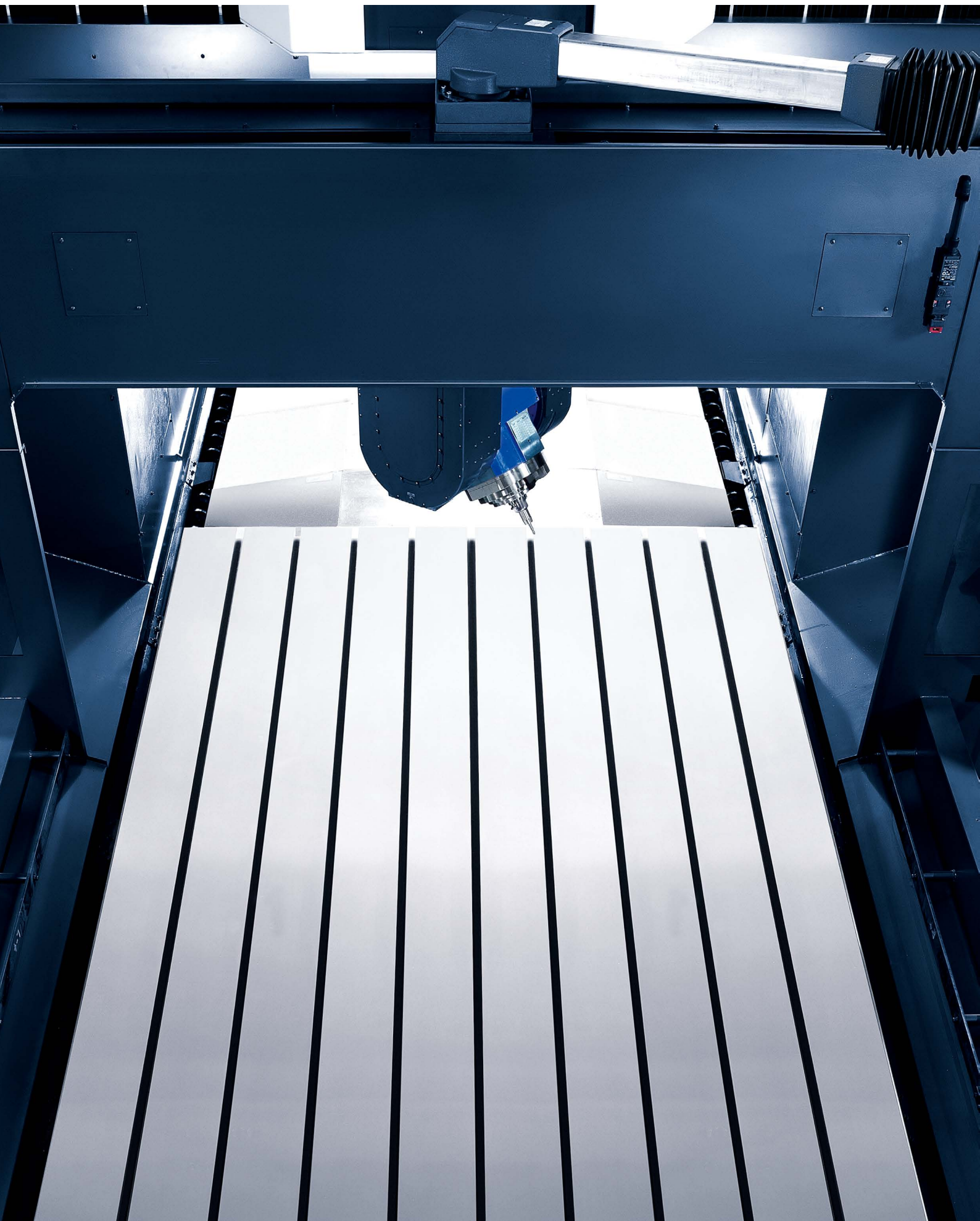
The spindle is integrated directly into the motor with the high precision encoder, without using any gears for power transfer. The result is 0.001° of high-precision angle division and 30rpm of rapid feed, which means higher machining quality and shorter cycle times.

* 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

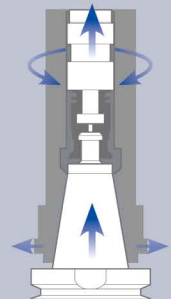
When the spindle rotates at high speed, the centrifugal force drives the taper to expand, causing errors in Z-axis. HSDC constantly monitors the temperature at each spindle region and makes optimal prediction for thermal displacement. The system then makes necessary adjustments and effectively minimizing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

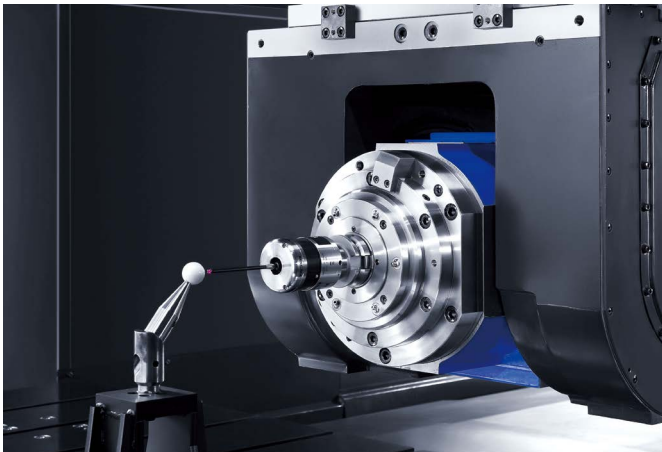
Hwacheon Rotation Center Calibration System automatically measures and sets the reference point of pivot in a 5-axis machine in under one minute, to lower the workpiece setup time and increase the machining quality. The system also creates and manages a database of the reference points for different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



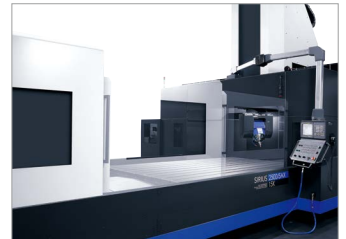
Hwacheon Rotation Center Calibration System (HRCC) (STD)

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.

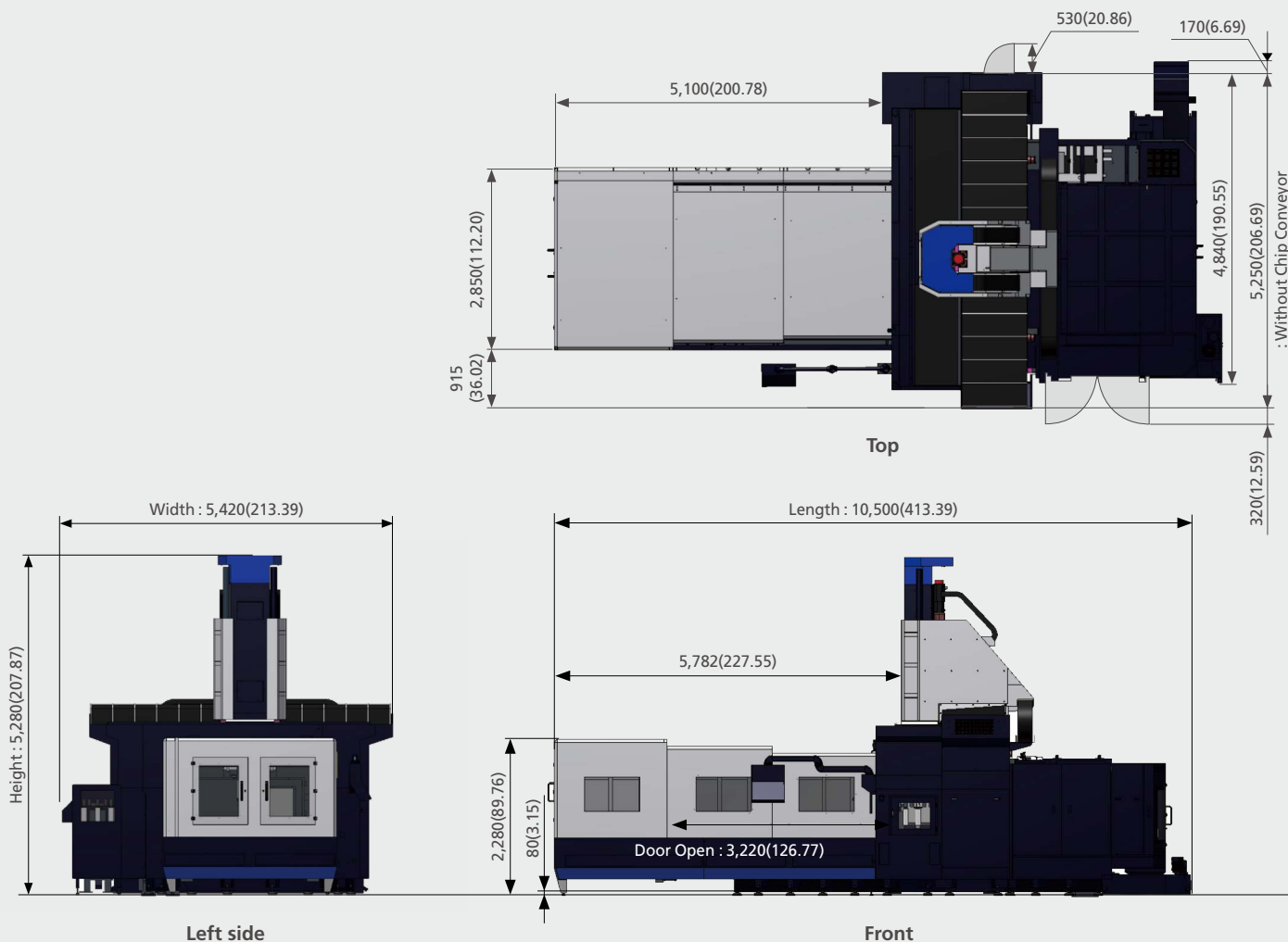


Full-Enclosure Cover (STD)

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.

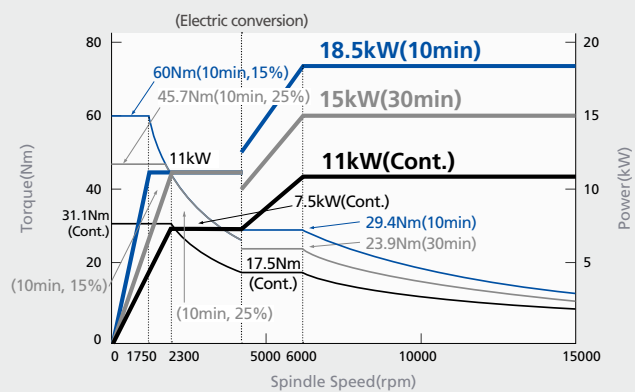
Product Data

* Unit: mm(inch)



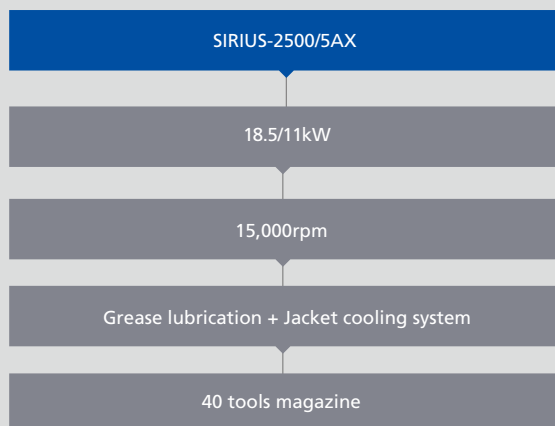
Spindle Power – Torque Diagram

Standard (15,000rpm)



Product Configuration

Each product can be configured to fit your application.



Machine Specifications

ITEM		SIRIUS-2500/5AX
Travel		
Stroke (X / Y / Z)	mm(inch)	3,100 / 2,300 / 1,000 (122.05 / 90.55 / 39.37)
Tilting(B) / Rotation(C)	deg.	±100 / ±210
Distance from Table Surface to Spindle Gauge Plane	mm(inch)	0 ~ 960 (0 ~ 37.79)
Distance between Columns to Spindle Center	mm(inch)	263 (10.35)
Distance between Columns	mm(inch)	2,300 (90.55)
Table		
Working Surface	mm(inch)	3,300 x 2,000 (129.92 x 78.74)
Table Loading Capacity	kg,(lb.)	10,000 (22,046)
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 / 11 (25/15)
Type of Spindle Taper Hole	-	ISO#40, 7 / 24 Taper (BBT-40)
Spindle Bearing Inner Diameter	mm(inch)	Ø70 (2.75)
Method of Spindle Lubrication & Cooling	-	Grease Lub. + Jacket Cooling
Feedrate		
Rapid Speed (X / Y / Z)	m/min(ipm)	16 / 16 / 16 (630 / 630 / 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 (With / Without Adjacent Tools)	mm(inch)	Ø85 / Ø170 (3.35 / 6.69)
Max. Tool Length	mm(inch)	300 (11.81)
Max. Tool Weight	kg,(lb.)	8 (17.64)
Motor		
Feed Motor (X / Y / Z)	kW(HP)	9.0 / 9.0 / 9.0 (12 / 12 / 12)
Feed Motor (B / C)	kW(HP)	4.2 / 6.3 (5.6 / 8.4)
Coolant Motor (Spindle)	kW(HP)	2.2 (2.95)
Spindle Cooler (50 / 60Hz): Inverter Type	kW(HP)	2.8 / 3.2 (3.7 / 4.3)
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 / 12 (15.85 / 3.17)
Coolant	ℓ (gal)	850 (224.55)
Machine Size		
Height	mm(inch)	5,280 (207.87)
Floor Space (Length x Width)	mm(inch)	10,500 x 5,420 (413.39 x 213.39)
Weight	kg,(lb.)	44,650 (98,436)
NC Controller		Fanuc 31i-B5

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	• Data Server (1,024MB)	• Transformer
• Base Around Splash Guard	• Work Light	• Gap 300mm (High Column)	• 3D Interference Check Function for Standard CNC
• Coil Conveyor (2ea)	• Workpiece Coordinate system (48 pairs)	• Lift Up Chip Conveyor (Hinge Type, Scraper Type)	• Hwacheon Artificial Intelligence Control System(HAI): 1000 block
• Coolant Gun	• Workpiece Setting Error Compensation for 5 axis	• Mist Collector	
• Coolant System	• 3-dimensional Manual Feed for 5 axis	• Nano Smoothing Interpolation	
• Data Server Interface	• 10.4" Color LCD	• NC Cooler	
• Data Server (256MB)	• Cutting Feed Optimization System (OPTIMA)	• NURBS Interpolation	
• Hydraulic Equipment	• Hwacheon Efficient Contour Control System (HECC)	• Oil Mist (Semi dry cutting system)	
• Lubrication System	• Hwacheon Tool Load Detect System (HTLD)	• Oil Skimmer	
• Operation Manual & Parts List	• Hwacheon Thermal Displacement Control System (HTDC)	• Spindle Through Coolant (3MPa / 7MPa)	
• Pneumatics System	- Hwacheon Spindle Displacement Control System (HSDC) + - Hwacheon Frame Displacement Control System (HFDC)	• Tool Life Management	
• Rigid Tapping	• Hwacheon Rotation Center Calibration System (HRCC)	• Tool Measuring System-Renishaw / Blum (Touch Type, Laser Type)	
• Scale (X / Y / Z / B / C)	- Include work measuring system-Renishaw (touch type)		
• Signal Lamp (R / G / Y, 3 Color)	• Hwacheon Artificial Intelligence Control System (HAI): 600 block		
• Smooth Tool Center Point Control			
• Spindle Cooler			

NC Specifications [Fanuc 31i-B5]

※ — : Not available S : Standard O : Option

ITEM	SPECIFICATION	
Controlled axis		
Controlled axis	5-Axes	S
Simultaneously controlled axes	5-Axes	S
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 / 2		S
Mirror Image		S
Operation		
Automatic & MDI operation		S
DNC operation by memory card PCMCIA card is required	PCMCIA card is required	S
Dry run, single block		S
Manual handle feed / Feed rate	1Unit / x1, x10, x100	S
Interpolation function		
Positioning / Linear interpolation / Circular interpolation / Dwell (Per seconds)	G00 / G01 / G02,G03 / G04	S
Helical interpolation	Circular interpolation plus Max.2axes linear interpolation	S
Nano smoothing		O
Reference position return check / Return	G27 / G28,G29	S
2nd reference position return / Skip	G30 / G31	S
NURBS interpolation		O
Feed function		
Rapid traverse override	F0, F25, F50, F100	S
Feedrate (mm / min)		S
Feedrate override	0 ~ 150%	S
Jog feed override	0 ~ 4,000mm/min	S
Override cancel	M48, M49	S
Program input		
Optional block skip	1ea	S
Program number	O4-Digits	S
Sequence number	N8-Digits	S
Decimal point programming		S
Coordinate system setting	G92	S
Workpiece coordinate system	G54 ~ G59	S
Workpiece coordinate system preset		O
Addition of workpiece coordinate pair	48ea	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	O
Canned cycles for drilling		S
Small-hole peck drilling cycle		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
Polar Coordinate System		O

ITEM	SPECIFICATION	
Spindle speed function		
Spindle override	50 - 120%	S
Spindle orientation		S
Rigid tapping		S
Tool function / compensation		
Tool function	T4 - digits	S
Tool offset pairs	±6 - digits 200ea	S
Tool offset pairs	±6 - digits 400ea, 999ea	O
Tool offset memory C, Tool length compensation		S
Cutter compensation C, Tool length measurement		S
Tool life management		O
Editing operation		
Part program storage length / Number of register able programs	256kB / 500ea	S
Part program storage length / Number of register able programs	512kB / 1,000ea 1MB / 1,000ea, 2MB / 1,000ea	O
Background editing / Extended editing functions		S
Play back		O
Setting and display		
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 CH 1 / CH 2	RS232C	S
Data server	256MB	S
Data server	1,024MB	O
Ethernet interface		S
Memory card / USB interface		S
Auto data backup	SRAM + Part Program	S
Others		
Display unit	10.4" Color LCD	S
HWACHEON Machining Software		
Hwacheon Artificial Intelligence Control System (HAI) 600 Block		S
Hwacheon Artificial Intelligence Control System (HAI) 1000 Block		O
Hwacheon Efficient Contour Control System (HECC)		S
Hwacheon Tool Load Detect (HTLD)		S
Cutting Feed Optimization System (OPTIMA)		S
Hwacheon Thermal Displacement Control System (HTDC)		S
Hwacheon Rotation Center Calibration System (HRCC)		S
5-axis native functions		
Smooth TCP (Tool center point control) for 5 axis		S
Tilted working plane command with guidance for 5 axis with guidance for 5 axis		S
Workpiece setting error compensation for 5 axis		S
3-dimensional manual feed for 5 axis		S
Tool radius compensation for 5 axis		O

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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