

SINCE 1950

*Continuous Evolution of Technology
accumulated for 60 years*

5-Axis Machining Center

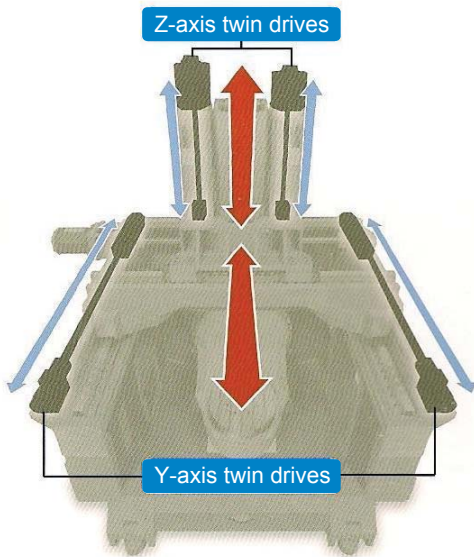
SPHINX-5XT/60



World Top Class Quality

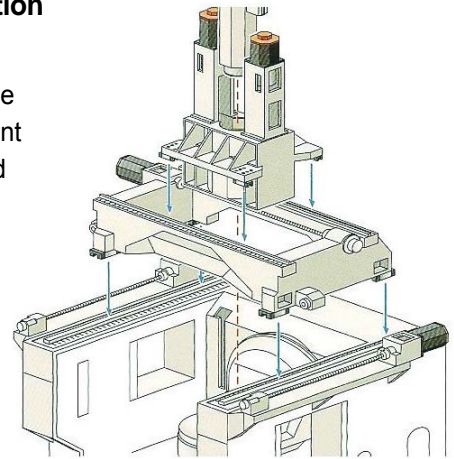
High Speed & Productivity 5-Axis Machining Center

It minimizes vibration at the beginning of acceleration with a twin drive using 2 ballscrews

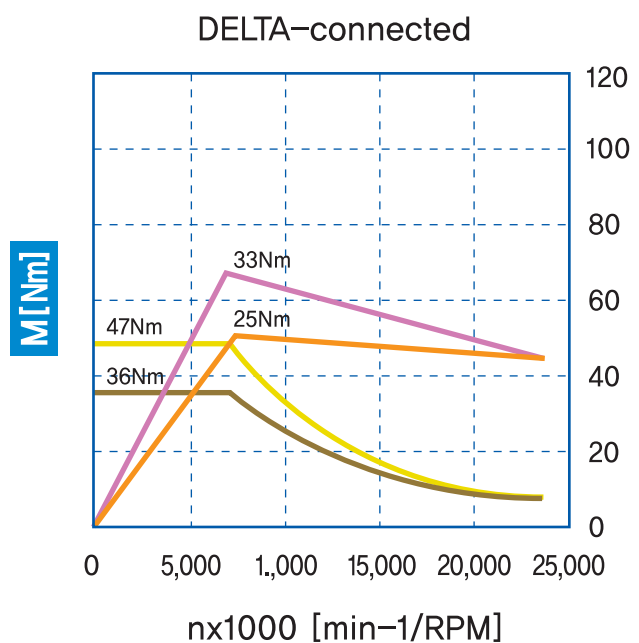
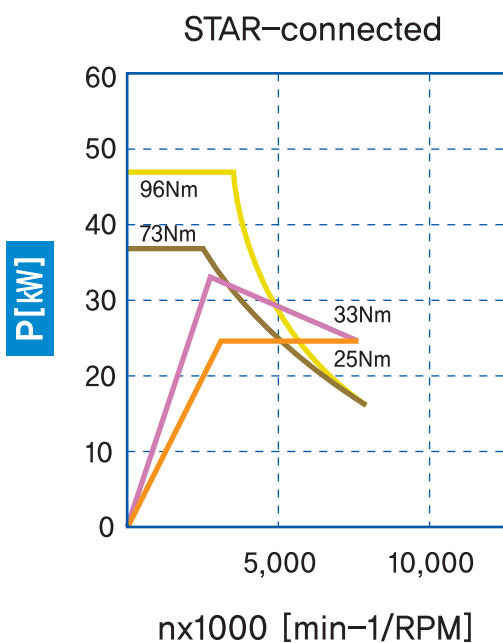


Box-in-Box Construction

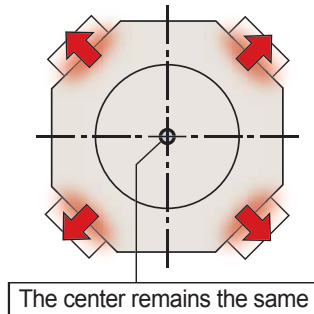
We used the Box-in-Box construction on the top of the machine. It provides excellent balance of moving parts and it also improves the traceability of the servo motor, offering unprecedented high speed and high acceleration. In addition, the guideway is located above all of covers, they are not affected by temperature changes caused by swarfs and coolant. What's more, unlike other 5-axis control machines, there is no overhang. This achieves stable feed even at high speeds, and excellent thermal stability thanks to its heat-symmetrical design.



Spindle Torque Chart



The best performance, the fastest speed

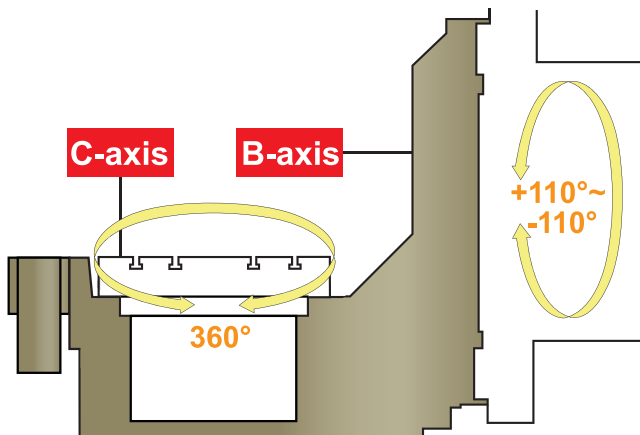


■ Octagonal Ram Construction

- This unique structure controls thermal displacement and offers outstanding straightness. The 4 slideways are located diagonally from each other, so they distort symmetrically in response to the heat generated by high speed travel. It means that the center stays in the same position, offering high-speed, high-precision feed.

■ High accuracy, High rigidity Spindle

- Powerful Built-in spindle with speed of 12,000 rpm adopted high speed ceramic ball bearings to maintain heat stability and high accuracy even during high speed machining.
- Spindle water cooling system was adopted for spindle to minimize heat distortion of spindle, also, accomplish high accuracy machining.
- Grease lubrication design was adopted to maximize efficiency of operation, accomplish super accurate machining.



■ High speed, High rigidity more reliable feed system

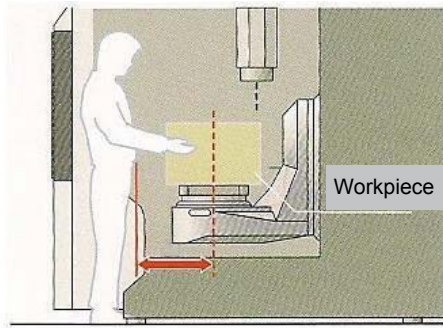
- X,Y and Z axes are driven by a digital AC servo motor which is well known for its durability and credibility. This motor is directly connected to the screw without the intermediated gear in order to ensure highly responsive and smooth movements without backlash.
- B and C axes are driven by torque motors from ETEL. Location determining, contour line control precision, and the rigidity of movements are greatly enhanced.
- Accurate preload ballscrews prevent expansion and contraction caused by heat. The ballscrew core cooling system circulates cooling oil through the support bearings, maintaining high-precision machining.
- The linear scale can be used for the X,Y and Z axes.

	X-axis	Y-axis	Z-axis	B-axis	C-axis
Travel	1,020mm	620mm	630mm	+110 ~ -110mm	360 deg.
Lapid	40m/min	40m/min	32m/min	30rpm	300rpm
B/S dia.	40mm	40mm	40mm	—	—
Pitch	32mm	32mm	32mm	—	—
Servo motor -rated	Heidenhain 9.6kW	Heidenhain 7.2kW	7.2kW	ETEL 826Nm	ETEL 344Nm

■ Table tilting (B-axis) +110° ~ -110° Table rotation (C-axis) 360°

- High precision location determining is realized by torque motor and Heidenhain rotary encoder. The backlash has been completely resolved because it is directly driven by the torque motor.
- After long hours of operation, there is no need to compensate backlash because the turning speed of the index table was improved greater for high speed manufacturing.
- The table-in-table construction, in which the C-axis table is placed within the B-axis table, has been adopted. Its highly rigid structure allows stable machining accuracy.
- There is no overhang with supporting construction in front of table.

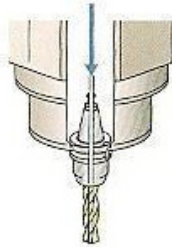
- Easy access to the workpiece because B-axis table turns CW or CCW, giving easier setup and better visibility



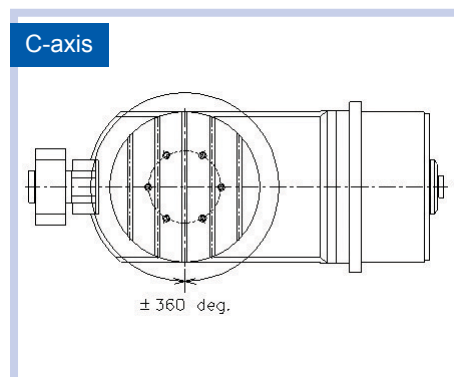
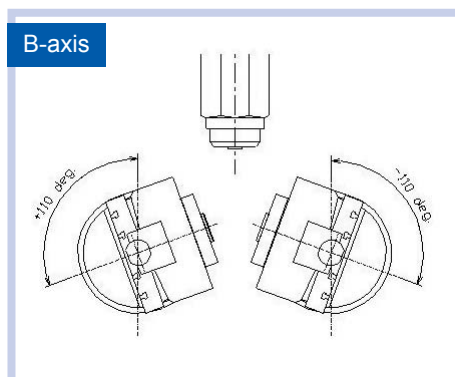
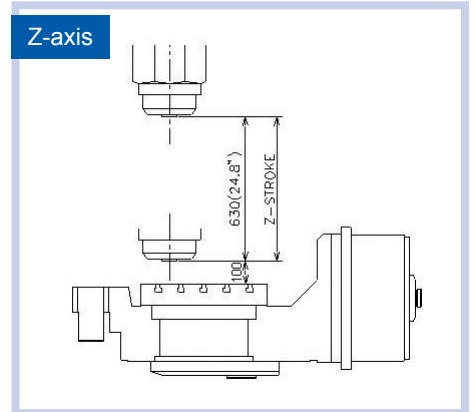
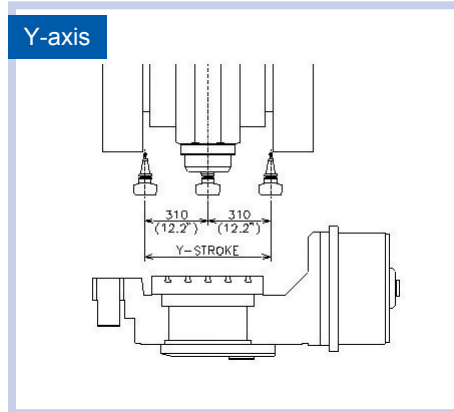
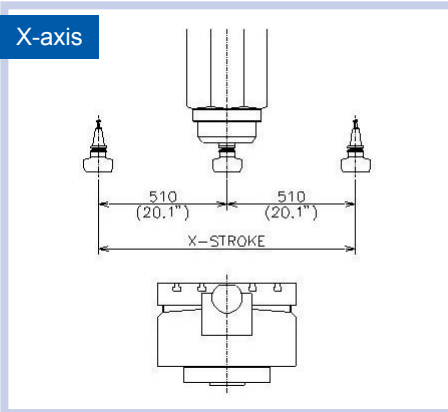
■ Automatic Tool Changer

- Max. tool length : 300 mm
- Max. tool weight : 8 kg
- Magazine driven : Servo motor
- Tool No. in magazine : Fixed pocket number
- Tool changing time (tool to tool) : 2.5 sec.
- Shank type : HSK-T63
- Tool storage capacity : 30 tools
- Max. tool diameter :
 - 90 mm <with adjacent tools>
 - 150 mm <without adjacent tools>

- The through-spindle coolant system effectively eliminates swarfs, cooling the machine point and prolonging the lives of your tools



■ Wide machining range in its class





Specifications

TABLE	Table size	φ550mm
	Max. workpiece height	450mm
	Max. workpiece swing diameter	φ800mm
	Max. workpiece cutting diameter	φ600mm
	Max. loading weight	500kg (Equal distribution)
TRAVEL	X-Axis	1,020mm
	Y-Axis	620mm
	Z-Axis	630mm
	B-Axis	+110° ~ -110°
	C-Axis	360°
	Distance from table surface to spindle tip	100mm ~ 730mm
SPINDLE	Spindle taper	HSK-T63
	Spindle motor power (30m/cont.)	33 / 25kW
	Spindle speed	12,000rpm
	Max. spindle torque	96Nm
	Spindle driven	Built-in motor
	Spindle bearing	Ceramic ball bearing
FEEDRATE	Rapid traverse X,Y and Z axes	XY 40, Z 32m/min
	Rapid traverse B and C axes	B 30rpm, C 300rpm
	Max. Cutting feed rate	10m/min
	Guideway X,Y	Linear guideway
ATC	Tool type	HSK-T63
	Tool capacity (Magazine)	30 tools
	Max. tool length	300mm
	Max. tool diameter	90mm
	Max. tool weight	8kg
	Tool change time (tool to tool)	2.5 sec.
ACCURACY	Axis positioning accuracy (X,Y,Z)	±0.009mm
	Repeatability (X,Y,Z)	±0.005mm
	Tilting accuracy	±5 seconds
	Rotating accuracy	±5 seconds
DIMENSION	Width x Depth	2,860 x 3,500mm
	Machine height	3,400mm
	Machine weight	12,000kg
CONTROLLER	HEIDENHAIN iTNC530	

※ Specifications subject to change without notice

■ STANDARD

- Full enclosed splash guard
- Coolant tank & chip pan
- Operator call lamp
- Portable MPG
- Foundation kit
- Work light
- Coolant system

■ OPTION

- Linear glass scales (X,Y,Z axis) HEIDENHAIN
- TCS (Through Coolant Spindle) 20bar
- Chip conveyor (Hinged type)
- Automatic Tool Diameter Measurement
- Simple turning operation (C-axis : 300 rpm)
- Work measuring
- Mist collector
- Spindle probing
- Spindle for TCS
- Oil skimmer

■ Controller (HEIDENHAIN iTNC-530)

Program entry	With smarT.NC, in HEIDENHAIN conversational and according to ISO
Position data Coordinates	Nominal positions for lines and arcs in Cartesian coordinates or polar coordinates, Incremental or absolute dimensions, Display and input in mm or inches, Display of the handwheel path during machining with handwheel superimposition
Tool compensation	Tool radius in the working plane and tool length, Radius-compensated contour look-ahead for up to 99 blocks (M120), 3D tool-radius compensation for changing tool data without having to recalculate an existing program
Tool tables	Multiple tool tables with any number of tools
Constant contour speed	Relative to the path of the tool center, Relative to the tool s'cutting edge
Contour elements	Straight line, Chamfer, Circular path, Circle center, Circle radius, Tangentially connecting circular arc, Corner rounding
Program jumps	Subroutines, Program section repeats, Calling any program as subroutine
Fixed cycles	Cycles for boring, and conventional and rigid tapping, Drilling cycles for pecking, reaming, boring, counterboring, centering, Cycles for milling internal and external threads, Multioperation machining of rectangular and circular pockets, Cycles for clearing level and inclined surfaces, Multioperation machining of straight and circular slots, Linear and circular point patterns, Contour train, contour pocket-also with contour-parallel machining, OEM cycles (special cycles developed by the machine tool builder) can be integrated
Coordinate transformation	Datum shift, rotation, mirror image, scaling factor (axis-specific)
Q parameters Programming with variables	Mathematical functions =, +, -, *, /, sin α , cos α , tan α , arc sin, arc cos, arc tan, an, en, ln, log, \sqrt{a} , $\sqrt{a^2 + b^2}$ Logical operations (=, \neq , <, >), Parentheses, Absolute value of a number, constant h, negation, truncation of digits before or after the decimal point Functions for calculation of circles, Functions for text processing
Programming aids	Calculator, Complete list of all current error messages, Context-sensitive help function for error messages, TNCguide: The integrated help system. User information available directly on the iTNC 530 (only with at least 256MB RAM), Graphical support for programming cycles, Comment and structure blocks in the NC program
Program verification graphics display modes	Graphic simulation before a program run, even while another program is running, Plan view / projection in 3 planes / 3-D view, also in tilted working plane, Detail enlargement
Programming graphics	In the Programming and Editing mode, the contour of the NC blocks is drawn on screen while the blocks are being entered (2-D pencil-trace graphics), even while another program is running
Program-run graphics display modes	Graphic simulation during real-time machining, Plan view / projection in 3 planes / 3-D view
Machining time	Calculation of machining time in the Test Run operating mode Display of the current machining time in the Program Run operating mode
Returning to the contour	Mid-program startup in any block in the program, returning the tool to the calculated nominal position to continue machining. The graphic support in smarT.NC also lets you return to a point pattern. Program interruption, contour departure and reapproach
Preset tables	One preset table per traverse range for storing reference points
Datum tables	Several datum tables for storing workpiece-related datums



HEAD OFFICE



ASSEMBLY FACTORY



MANJUNG METAL CO. LTD.



N.S MACHINERY CO. LTD.,

 **NAMSUN**
MACHINERY CORPORATION
www.namsuntool.com

■ **Head Office**
450-10, Umnae-dong, Daeduk-Gu,
Daejeon, Korea
TEL +82-42-625-5561
FAX +82-42-622-9921

■ **Seoul Office**
C-1745 STEELAND Jeongwang-dong,
Siheung-si, Gyeonggi-do, Korea
TEL +82-2-713-3991
FAX +82-2-712-8662