

**Mazak**

# VARIAXIS i-800 NEO

[ 5-axis vertical machining center ]



# VARIAXIS i-800 NEO

**Manufacturing innovation – a 5-axis machining center with AI, digital twin technology and automation**



Shown with optional equipment

The transformation of production processes utilizing data and digital technology is progressing rapidly in the manufacturing sector. Mazak's new VARIAXIS i-800 NEO has been developed to take production to the next level. The evolution of this 5-axis machining center provides highly efficient digital manufacturing solutions that incorporate AI and digital twin technology to respond quickly to ever-changing production demands.

## MAZATROL SMOOTH*Ai*



Shown with optional MAZATROL SmoothAi dual monitor



2-pallet changer (option)

## Ai

- Optimum compensation for vibration control and heat displacement control by AI analysis
- Stable high-accuracy and high-quality machining

## DIGITAL TWIN

- MAZATROL TWINS software utilizes digital twin technology to replicate the digital screen in your office setup
- Provides reduced setup time for machines and improves the efficiency of machining initial products and prototypes

## AUTOMATION

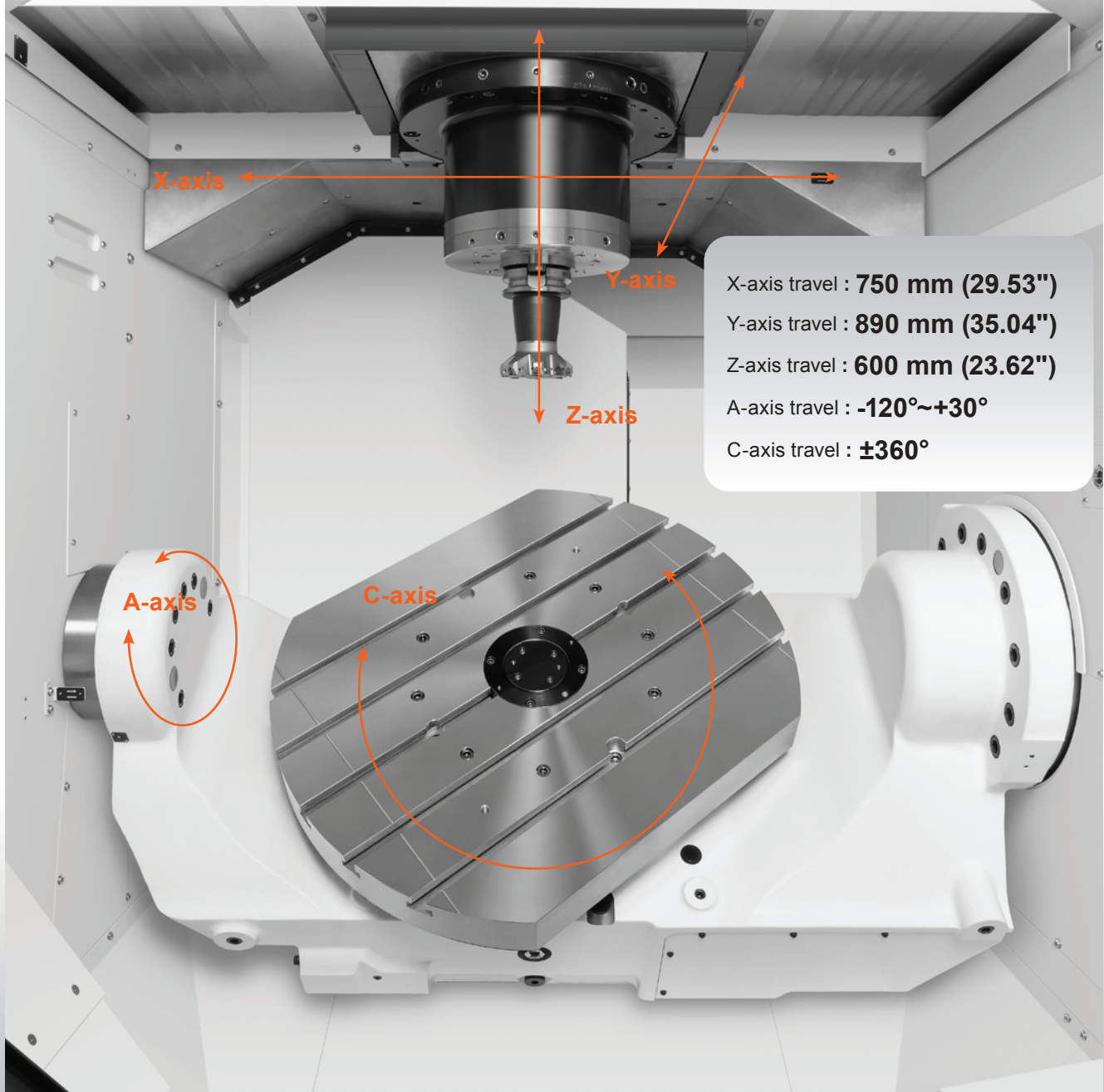
- Wide variety of automation equipment available - such as a 2-pallet changer, MPP (Multi-Pallet Pool), modular PALLETECH flexible manufacturing system and a robot system



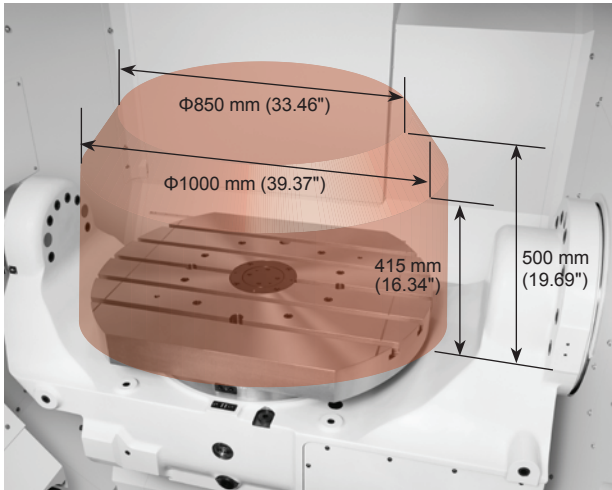
# Enhanced Performance

## Enlarged workpiece size and machining area compared to previous machines

- The maximum workpiece size is increased for a single table model while the maximum table weight for a 2-pallet changer model is also increased by 40% to meet machining requirements of complex and large workpieces and fixtures
- The accessibility of the tool to the workpiece is improved thanks to an extra 40 mm added to the Z-axis stroke
- The X-axis and Y-axis strokes are extended by 20 and 40 mm to maximize the machining envelope for multiple workpiece and fixture set-ups
- A newly designed roof enclosure with a steel accordion cover ensures excellent access and durability



## High-rigidity table



Maximum workpiece size

Single table

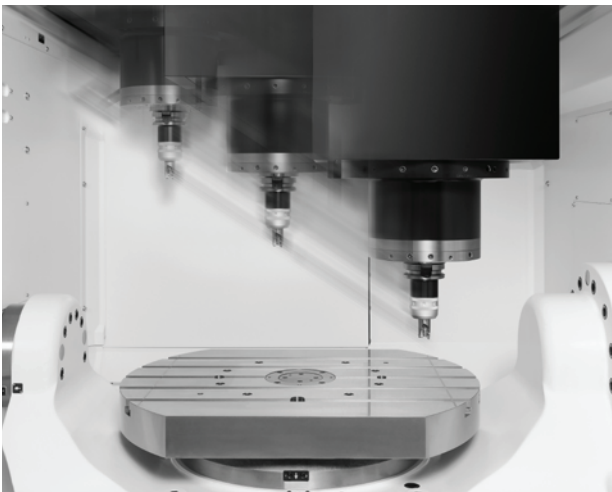
**Φ1000 × 415 mm, 1000 kg  
(Φ39.37\"×16.34\", 2205 lbs)**

**Φ850 × 500 mm, 1000 kg  
(Φ33.46\"×19.69\", 2205 lbs)**

2-pallet changer

**Φ730 × 500 mm, 700 kg  
(Φ28.74\"×19.69\", 1543 lbs)**

The tilting rotary table can accommodate large workpieces and fixtures. The A-axis features a fully-supported trunnion design to ensure high rigidity and high accuracy machining.



**World's fastest rapid traverse rate for its class**

Rapid traverse rate **48 m/min (1890 IPM)**

The rapid traverse rate is increased by 14% in comparison to the previous model.

Thanks to high-speed positioning, cycle time can be reduced even when machining large workpieces.

Low-friction, high-rigidity linear roller guides enable high-speed feedrate and ensure stable machining accuracy for prolonged periods of operation.

## ■ Effective process integration by 5-axis to reduce cycle times



Industry: Construction machinery  
Parts: Housing  
Material: S45C



Industry: Semiconductor  
Parts: Vacuum Chamber  
Material: Aluminum



Industry: Aerospace  
Parts: Helicopter flapping hinge  
Material: Stainless steel



Industry: Aerospace  
Parts: Blisk  
Material: Stainless steel

# Higher Productivity

## Spindle specifications to meet a wide variety of machining requirements



### Standard spindle

Standard spindle designed for high efficiency machining of a wide variety of applications such as steel and non ferrous material.

Speed	10000 rpm
Output [40 % ED (30 min. rating) ]	37 kW (50 HP)
Max. torque [40 % ED (30 min. rating) ]	350 N·m (258 ft·lbs)
Tool shank	BT-50 / BBT-50 / HSK-A100

### High torque spindle OPTION

High torque spindle for powerful machining of steel, cast iron, alloy steel and other difficult-to-cut materials.

Speed	7000 rpm
Output [40 % ED (30 min. rating) ]	30 kW (40 HP)
Max. torque [40 % ED (30 min. rating) ]	442 N·m (326 ft·lbs)
Tool shank	BT-50 / BBT-50 / HSK-A100

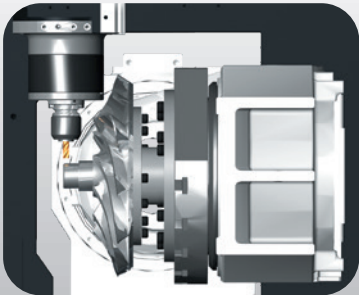
### High-speed spindle OPTION

Highly suitable for profiling complex contours in steel, drilling small diameters and machining non-ferrous material at high speed.

Speed	18000 rpm	18000 rpm	25000 rpm
Output [40 % ED (30 min. rating) ]	55 kW (74 HP)	35 kW (47 HP)	23 kW (31 HP)
Max. torque [40 % ED (30 min. rating) ]	105 N·m (77 ft·lbs)	134 N·m (99 ft·lbs)	22 N·m (16 ft·lbs)
Tool shank	HSK-A100	BT-40 / BBT-40 / HSK-A63	HSK-A63

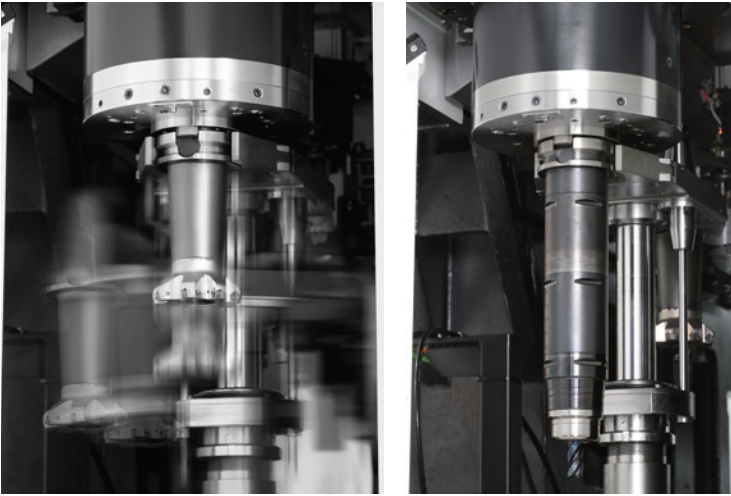
## Compact spindle cartridge

The slim-nose spindle design reduces interference within the working area. Additionally, this allows shorter gauge length tools to be used to maximize the cutting conditions during machining.





## High-speed automatic tool changer



Newly adopted ATC system can reduce tool waiting time for the next tool by up to 58%.

The cycle time can be reduced even when the machining operation requires frequent tool changes. Chip-to-chip is 4.3 seconds.

**Maximum tool length  
(available with ATC): 415 mm (16.34")**

Can store long tools for deep boring and reaming operations.

## Tool magazine for a wide variety of component production



Standard tool magazine has a storage capacity of 30 tools.

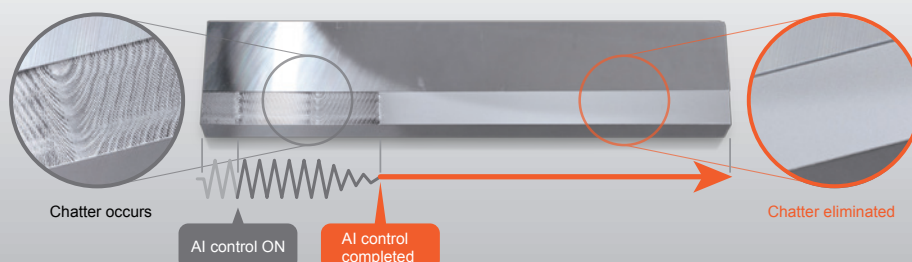
Optional: 40, 80 and 120 tools

The generous magazine capacity provides ample tool storage for complex workpieces and high-mix production as well as spare tools for prolonged continuous operations.

## Smooth Ai Spindle

OPTION

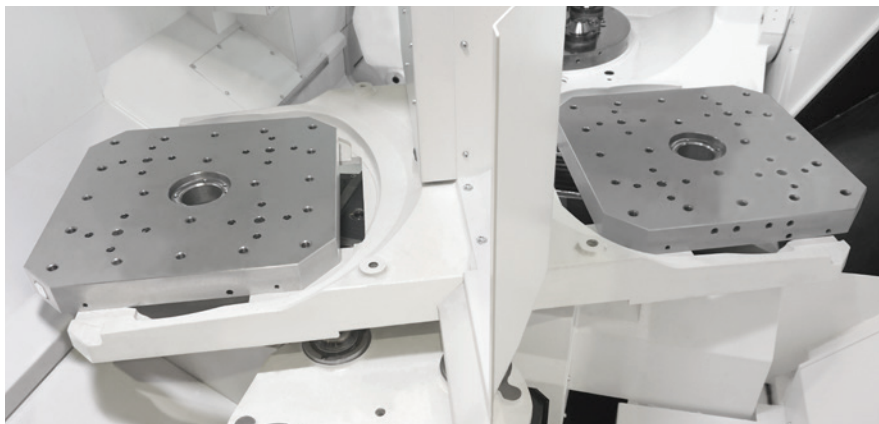
Using AI technology, milling spindle vibration is detected and machining conditions are automatically changed to produce unsurpassed surface finishes and high productivity. Thanks to AI, adjustments can be easily made in a short time without a skilled operator.



# Automation

## 2-pallet changer

OPTION



The pallet changer option provides rapid changeover of workpieces for continuous machining operation. To achieve higher productivity, the next workpiece can be set-up while the current operation is being machined. The maximum table weight for a 2-pallet changer model is increased by 40% in comparison to previous machines to meet machining requirements of complex and large workpieces and fixtures.



Pallet size	□ 500 mm (□19.69")
Max. workpiece size	Φ730 mm × 500 mm (Φ28.74"×19.69")
Max. load	700 kg (1543 lbs)

## MPP (Multi-Pallet Pool)

OPTION

The MPP (Multi-Pallet Pool) system can store 6, 12 or 18 pallets in the compact pallet stocker. Same pallet and workpiece size for 2-pallet changer specifications.



MPP (18 PC) + VARIAXIS i-800 NEO

## PALLETECH SYSTEM

OPTION

The PALLETECH system offers the highest flexibility with a wide range of configurations according to the required production demand. VARIAXIS i Series machines can be integrated with other machines such as horizontal machining centers using the PALLETECH system. Same pallet and workpiece size for 2-pallet changer specifications.



PALLETECH + HCN-6800 NEO



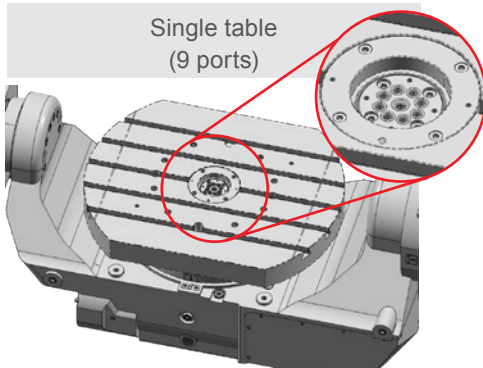
## Preparation for hydraulic fixtures

OPTION

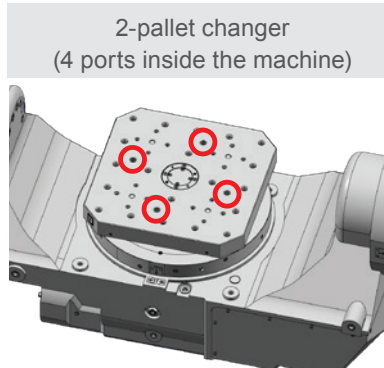
Hydraulic power is continuously supplied through the pallet for hydraulic fixtures. Pneumatic fixtures are also available.

Maximum number of ports: 9 ports (single table)

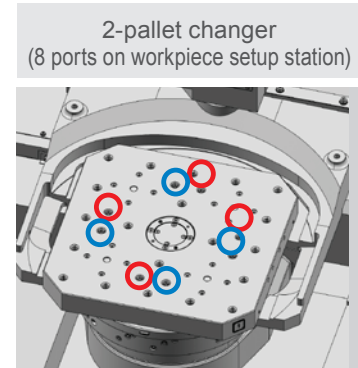
- 4 ports inside the machine (2-pallet changer)
- 8 ports on workpiece setup station



Single table  
(9 ports)



2-pallet changer  
(4 ports inside the machine)



2-pallet changer  
(8 ports on workpiece setup station)

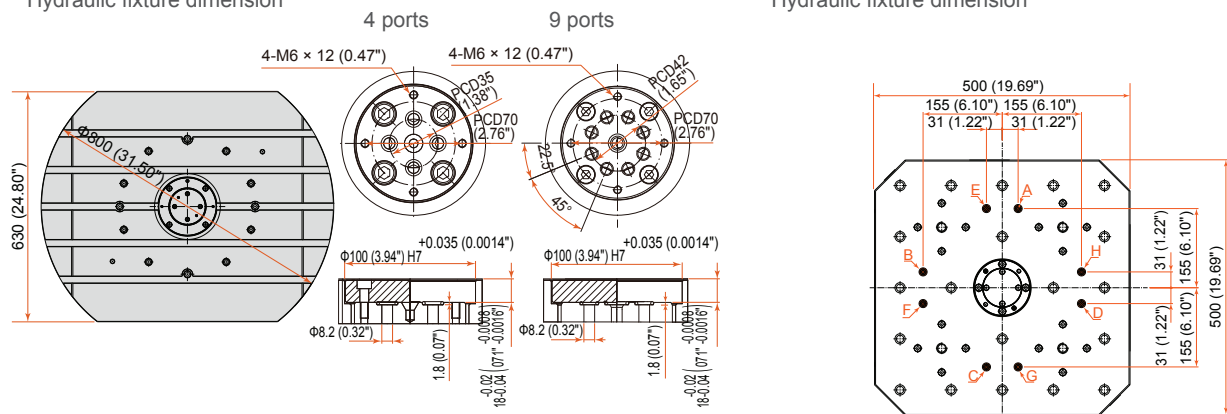
○ Hydraulic pressure supply port (retain continuously)    ○ Hydraulic pressure supply port (retain at only setup station)

■ Single table  
Hydraulic fixture dimension

Details

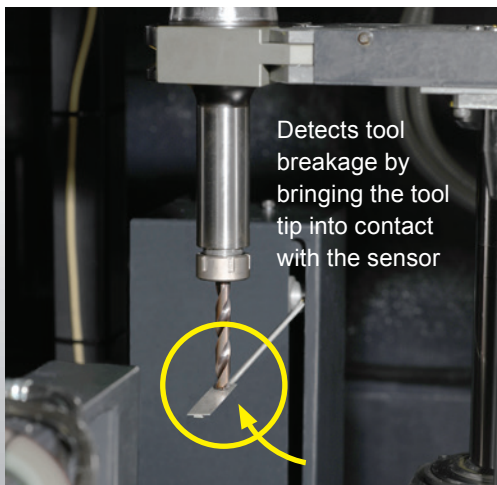
■ 2-pallet changer  
Hydraulic fixture dimension

Unit: mm (inch)



## Tool breakage detection (detection in ATC area)

OPTION



Automatically detects broken tools in the ATC area and changes over to a spare tool, enabling continuous operation over an extended period as well as preventing scrapped components.

# CNC System

## Innovation for Higher Productivity

New MAZATROL Smooth CNC system

# MAZATROL *SMOOTH*Ai

Designed to provide unsurpassed productivity through even faster and higher precision control while elevating your production to the next level with AI and digital twin technology

### Ease of operation

- Touch screen operation — similar to using your smartphone and tablet
- MAZATROL Smooth graphical user interface for unsurpassed ease of operation

### High-performance programming

Advanced programming and simulation provide extensive support at every step of the process, from programming to machining

### AI

Vibration control and heat displacement compensation utilizing AI ensure an improved machining surface as well as stable, high-accuracy machining

### Digital Twin

Digital Twin - Create a virtual machine on your office PC for efficient set-up and to further enhance productivity

### Automation

Equipped with a support function that will allow you to easily configure an automated system



Shown with optional MAZATROL SmoothAi dual monitor

## Simulation, test cutting (machining analysis, optimization)

### Cutting Adviser

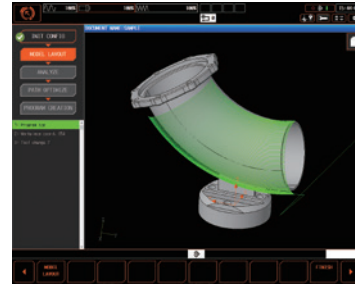
Cutting Adviser optimizes machining conditions by simulating machining and visualizing the machining process from accumulated machining results.



### SMC PLUS

OPTION

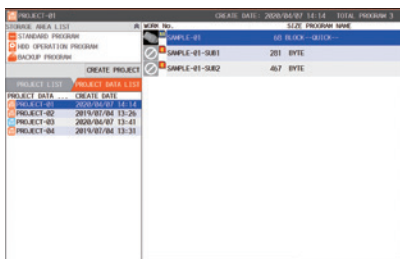
Compares the cutting point of the EIA program with the 3D model so the correct command point can be changed to ensure correct tool path and high-accuracy finished surfaces.



## Set up

### Project function

Data required to execute machining is managed as project data. Project data can be exported to the machine, drastically reducing the time it takes to input data.



## Machining

### Ai Thermal Shield

Ai Thermal Shield ensures enhanced heat displacement compensation. New algorithms automatically determine the amount of compensation to be applied, according to changes in the temperature, to ensure even higher machining accuracy.



## MAZATROL TWINS software for high productivity

OPTION

### Efficient machining set-up in an office utilizing digital twin technology

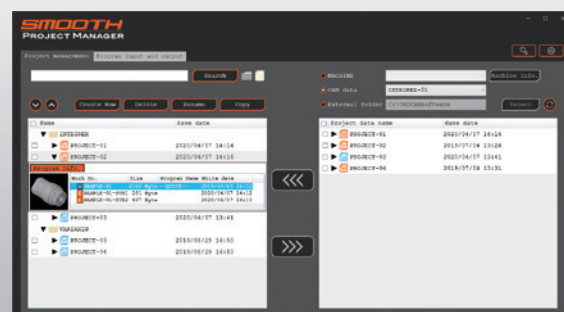
### Smooth CAM Ai

Programs can be created and edited and simulation and analysis can be performed on the Smooth CAM Ai for multiple machines. The data is then sent to machines in the factory for fast and accurate machine setups.



### Smooth Project Manager

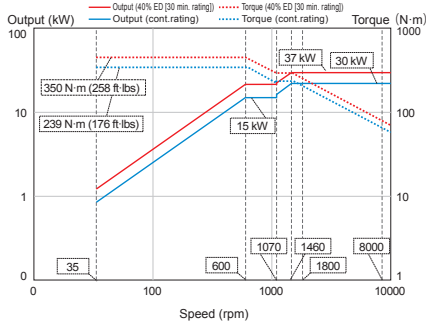
Smooth Project Manager is used to manage the project data. The data can be synchronized between the machine in the factory and the PC in the office.



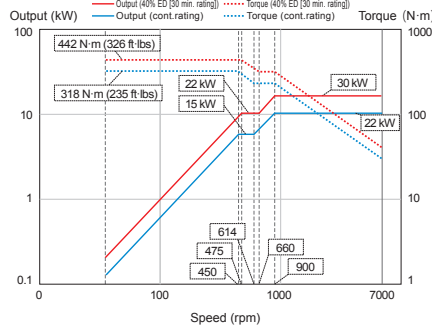


## Spindle Output / Torque Diagram

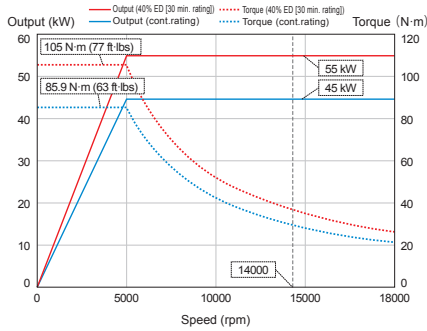
10000 rpm spindle, 37 kW  
(40% ED [30 min. rating]) [BT-50, BBT-50, HSK-A100]



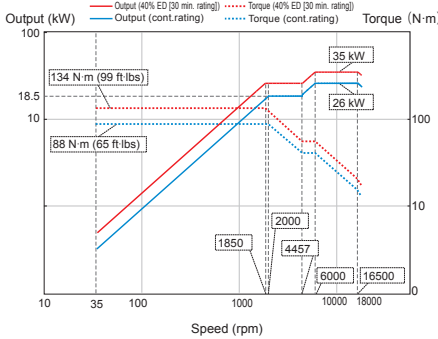
High torque 7000 rpm spindle **OPTION**  
30 kW(40% ED [30 min. rating]) [BT-50, BBT-50, HSK-A100]



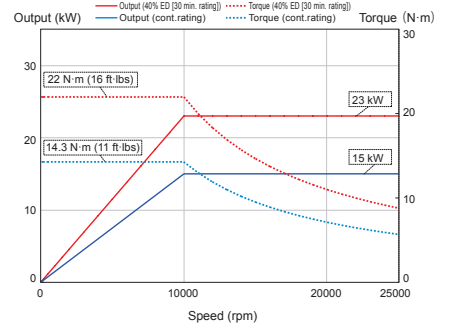
High speed 18000 rpm spindle **OPTION**  
55 kW (40% ED [30 min. rating]) [HSK-A100]



High speed 18000 rpm spindle **OPTION**  
35 kW (40% ED [30 min. rating]) [BT-40, BBT-40, HSK-A63]

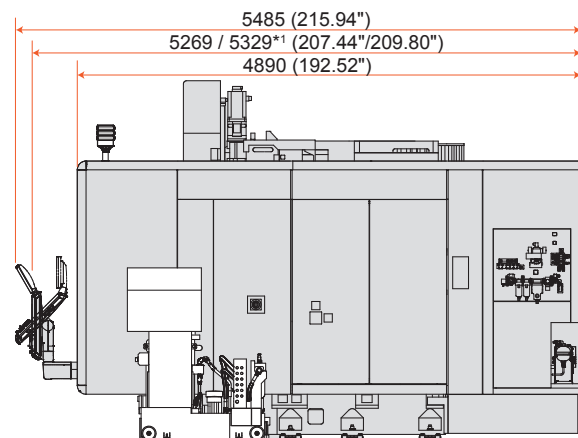
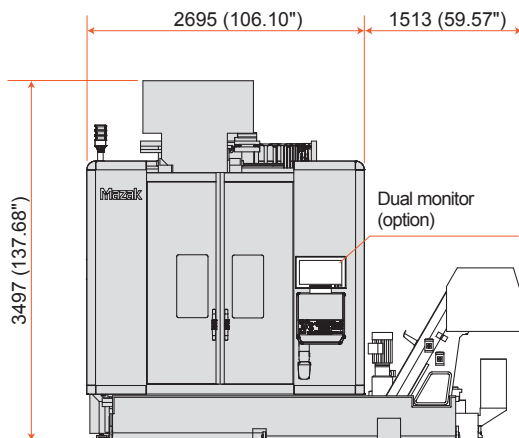


High speed 25000 rpm spindle **OPTION**  
23 kW (40% ED [30 min. rating]) [HSK-A63]



## Machine Dimensions

Unit: mm (inch)



Shown with optional ConSep chip conveyor (side discharge)

\*1 Optional dual monitor specification

## Standard Machine Specifications

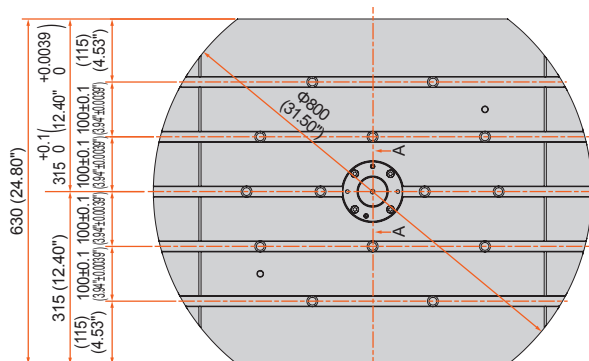
		VARIAXIS i-800 NEO
Stroke	X-axis travel (spindle head left / right)	750 mm (29.53")
	Y-axis travel (spindle head back / forth)	890 mm (35.04")
	Z-axis travel (spindle head up / down)	600 mm (23.62")
	A-axis travel (table tilt)	-120° ~ +30°
	C-axis travel (table rotation)	±360°
Table	Distance from table top to spindle nose	190 mm ~ 790 mm (7.48"~31.10") (table horizontal)
	Table size	Φ800 mm × width 630 mm (Φ31.50"×24.80")
	Max. workpiece size	Φ1000 mm × 415 mm (Φ39.37"×16.34") [Φ850 mm × 500 mm (Φ33.46"×19.69")]
	Table load capacity (evenly distributed)	1000 kg (2205 lbs)
	Table surface configuration	18 mm (0.71") T-slot × 5 100 mm (3.94") pitch
Milling Spindle	Max. spindle speed	10000 rpm
	Spindle taper	7/24 taper No.50
	Spindle bearing I.D.	Φ100 mm (Φ3.94")
Feedrate	Rapid traverse rate (X-, Y-, Z-axis)	48 m / min (1890 IPM)
	Rapid traverse rate (A- / C-axis)	10800°/min / 18000°/ min
	Cutting feedrate*1 (X-, Y-, Z-axis)	48 m/min (1890 IPM)
	Cutting feedrate*1 (A-, C-axis)	9000°/ min
	Simultaneously controlled axes	5
	Min. indexing increment (A-, C-axis)	0.0001°
Automatic tool changer	Indexing time (A-axis) (clamp / unclamp time not included)	0.71 sec. / 90°
	Tool shank configuration	BT-50
	Tool storage capacity	30
	Max. tool diameter / length (from gauge line) / weight	Φ125 mm / 415 mm / 20 kg (Φ4.92" / 16.34" / 44 lbs)
	Max. tool diameter with adjacent tool pockets empty	Φ210 mm (Φ8.27")
	Tool selection method	Random selection, shortest path (fixed pocket assignment)
Power requirement	Tool change time (chip-to-chip)	4.3 sec.
	Spindle motor [40% ED (30 min. rating) / cont. rating]	37 kW (50 HP) / 30 kW (40 HP)
	Electrical power requirement [40% ED (30 min. rating) / cont. rating]	72.62 kVA / 62.87 kVA
Coolant	Air supply	300 L / min (ANR) (10.59 ft <sup>3</sup> /min)
	Coolant tank capacity	400 L (105.68 gal)
Machine size	Height	3497 mm (137.68")
	Width*2	2695 mm (106.10")
	Length	4890 mm (192.52")
	Machine weight *3	18080 kg (39859 lbs)

\*1 Limited feedrate with continuous axis movement

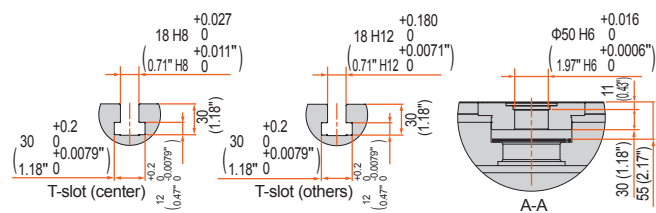
\*2 Chip conveyor and coolant tank not included

\*3 Chip conveyor not included

## Table Dimensions



Unit: mm (inch)



## ■ Standard and Optional Equipment

● : Standard □ : Option

		VARIAXIS i-800 NEO
Table	Φ800 mm × 630 mm (Φ31.50"×24.80") T-slot table	●
Machine	Work light	●
	Ai Thermal Shield	●
	7000 rpm high torque spindle	○
	10000 rpm	●
	18000 rpm (HSK-A100)	○
	18000 rpm (BT-40 / BBT-40 / HSK-A63)	○
	25000 rpm (HSK-A63)	○
Automation	Automatic tool length measurement (RENISHAW PRIMO LTS)	●
	Laser tool measurement system (RENISHAW NC4)	○
	Tool breakage detection (detection in ATC area)	○
	30 tool magazine	●
	40 tool magazine	○
	80 tool magazine	○
	120 tool magazine	○
	Workpiece measurement printout (printer not included)	○
	Absolute positioning system	●
	Remote manual pulse generator	○
	Automatic front door	○
	Automatic power ON / OFF + warm-up operation	●
	Operation end buzzer	○
	Status light (3 colors)	○
	2-pallet changer	○
	Wireless touch probe RMP600	○
	PMC application	○
	MPP application	○
	Magazine operation panel for tool ID	○
	Preparation for hydraulic fixtures	○
Safety Equipment	Operator door interlock	●
High Accuracy	MAZA-CHECK (software, reference sphere) *1	●
	Ball screw core cooling (X-, Y-, Z-axis)	●
	Scale feedback (X-, Y-, Z-axis)	○
	Scale feedback (A-, C-axis)	○
Coolant / Chip disposal	Coolant system	●
	Workpiece air blast	○
	Oil skimmer (RB-200)	○
	Mist collector	○
	Coolant temperature control	○
	Hand held coolant nozzle	○
	Coolant through spindle system 0.5 MPa (73 PSI)	○
	Workpiece washing coolant	○
	High pressure coolant through spindle 1.5 MPa (218 PSI)	○
	High pressure coolant through spindle 7.0 MPa (1015 PSI)	○
	SUPERFLOW coolant system 7.0 MPa (218 PSI)	○
	Flood coolant	●
	Coolant through spindle pressure switch	○
	Top cover	●
	Chip conveyor (hinge) right-side discharge	○
	Chip conveyor (ConSep) right-side discharge	○
	Chip bucket (swing type)	○
	Chip bucket (fixed type)	○
Tooling	Pull stud bolt	○
Others	Manual	●
	Additional manuals	○
	MAZATROL SmoothAi dual monitor	○

\*1 MAZA-CHECK requires optional RMP600 wireless touch probe.



## MAZATROL SmoothAi Specifications

	MAZATROL	EIA
Number of controlled axes	Simultaneous 2 ~ 4 axes	Simultaneous 5 axes
Least input increment	0.0001 mm, 0.00001 inch, 0.0001 deg	
High-speed, high-precision control	Shape compensation, Smooth corner control, Rapid traverse overlap, Rotary axis shape compensation	Shape compensation, Smooth corner control, Rapid traverse overlap, Rotary axis shape compensation, High-speed machining mode, High-speed smoothing control, 5-axis spline*, Path error suppression control*, Tool path optimization*
Interpolation	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Cylindrical interpolation, Polar coordinate interpolation, Synchronous tapping*	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Spiral interpolation, Helical interpolation, Cylindrical interpolation*, Involute interpolation*, Fine spline interpolation*, NURBS interpolation*, Polar coordinate interpolation*, Synchronous tapping*
Feedrate	Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Dwell (time / rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate limitation, Variable acceleration control, G0 slope constant*	Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Inverse time feed, Dwell (time / rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate limitation, Time constant changing for G1, Variable acceleration control, G0 slope constant*
Program registration	Number of programs: 256 (Standard) / 960 (Max.), Program memory: 2 MB, Program memory expansion: 8 MB*, Program memory expansion: 32 MB*	
Control display	Display: 19" touch panel, Resolution: SXGA	
Spindle functions	S code output, Spindle speed limitation, Spindle speed override, Spindle speed reaching detection, Multiple position orient, Constant surface speed, Spindle speed command with decimal digits, Synchronized spindle control, Spindle speed range setting	
Tool functions	Number of tool offset: 4000, T code output for tool number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces)	Number of tool offset: 4000, T code output for tool number, T code output for group number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces)
Miscellaneous functions	M code output, Simultaneous output of multiple M codes	
Tool offset functions	Tool position offset, Tool length offset, Tool diameter / tool nose R offset, Tool wear offset	
Coordinate system	Machine coordinate system, Work coordinate system, Local coordinate system, Additional work coordinates (300 set)	
Machine functions	-	Rotary axis prefilter, Tilted working plane, Hobbing   *, Shaping function*, Dynamic compensation   *, Tool center point control*, Tool radius compensation for 5-axis machining*, Workpiece positioning error compensation*
Machine compensation	Backlash compensation, Pitch error compensation, Geometric deviation compensation, Ai Thermal shield, Volumetric compensation*	
Protection functions	Emergency stop, Interlock, Pre-move stroke check, SAFETY SHIELD (manual mode), SAFETY SHIELD (automatic mode), VOICE ADVISER	
Automatic operation mode	Memory operation	Memory operation, Tape operation, MDI operation, EtherNet operation*
Automatic operation control	Optional stop, Dry run, Manual handle interruption, MDI interruption, TPS, Restart, Single process, Machine lock	Optional block skip, Optional stop, Dry run, Manual handle interruption, MDI interruption, TPS, Restart, Restart 2, Collation stop, Machine lock
Manual measuring functions	Tool length teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine	Tool length teach, Tool offset teach, Touch sensor coordinates measurement, Workpiece offset measurement, Measurement on machine
Automatic measuring functions	WPC coordinate measurement, Automatic tool length measurement, Sensor calibration, Tool breakage detection, External tool breakage detection*	Automatic tool length measurement, Sensor calibration, Tool breakage detection, External tool breakage detection*
MDI measurement	Semi automatic tool length measurement, Full automatic tool length measurement, Coordinate measurement	
Interface	PROFIBUS-DP*, EtherNet/IP*, CC-Link*, CC-Link IE Field Basic	
Card interface	SD card interface, USB	
EtherNet	10 M / 100 M / 1 Gbps	

\*Option



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