

Mazak

VARIAXIS i

SERIES



Exceptional versatility thanks to
high-accuracy machining of multiple surfaces
plus simultaneous 5-axis machining

Tilting / rotary table plus high rigidity machine construction ensure
high-accuracy machining of complex workpiece contours

Variety of spindle specifications available for high-speed machining of
aluminum or machining of difficult-to-cut materials such as stainless steel,
nickel-alloys and titanium

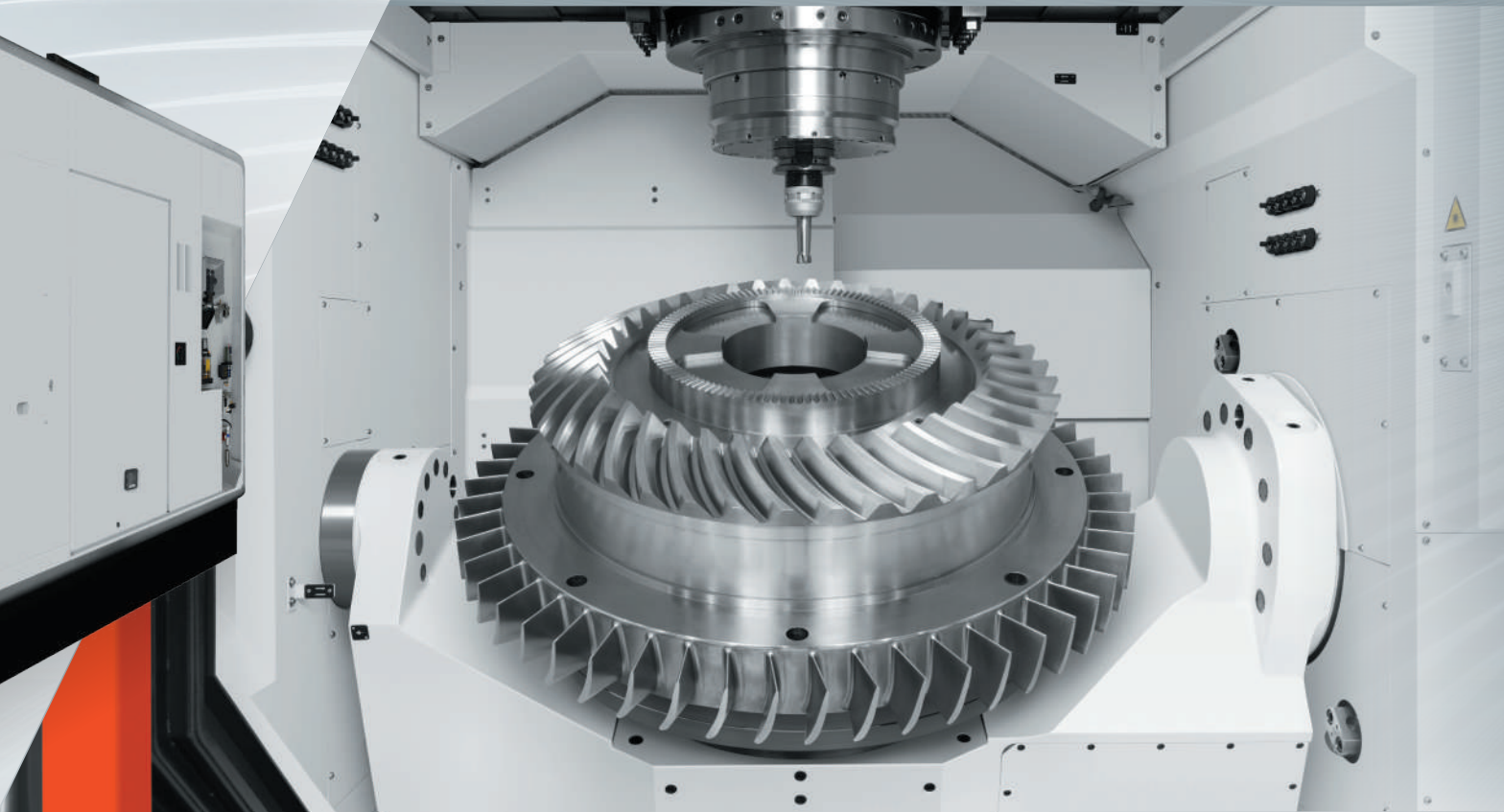
For increased versatility, models are available with turning
capability in addition to simultaneous 5-axis machining



VARIAXIS i-700
Shown with optional equipment



VARIAXIS i-800T
Shown with optional equipment



Simultaneous 5-axis Machining Center

VARIAXIS i SERIES

VARIAXIS i-T series adds turning operation to the simultaneous 5-axis performance of the VARIAXIS i series

	Simultaneous 5-axis	turning		Simultaneous 5-axis	turning
VARIAXIS i-500	●	—	VARIAXIS i-800	●	—
VARIAXIS i-600	●	—	VARIAXIS i-800T	●	●
VARIAXIS i-700	●	—	VARIAXIS i-1050	●	—
VARIAXIS i-700T	●	●	VARIAXIS i-1050T	●	●

Extensive Series Range



Compact model for small complex workpieces

VARIAXIS i -500

Table size: $\Phi 500$ mm × Width 400 mm
Max. workpiece size: $\Phi 500$ mm × 350 mm
Max. load: 300 kg

Spindle	Tool storage capacity
12000 rpm (Standard)	30 tools (Standard)
12000 rpm High torque (Option)	40, 60, 80, 120 tools (Option)
18000 rpm (Option)	
25000 rpm (Option)	
30000 rpm (Option)	



High-accuracy, high-speed machining of multiple surfaces

VARIAXIS i -600

Table size: $\Phi 600$ mm × Width 500 mm
Max. workpiece size: $\Phi 700$ mm × 450 mm
Max. load: 500 kg

Spindle	Tool storage capacity
12000 rpm (Standard)	30 tools (Standard)
12000 rpm High torque (Option)	40, 80, 120 tools (Option)
18000 rpm (Option)	
25000 rpm (Option)	
30000 rpm (Option)	



No. 50 taper spindle for heavy-duty machining of large / heavy workpieces

VARIAXIS i -800

Table size: $\Phi 800$ mm × Width 630 mm
Max. workpiece size: $\Phi 1000$ mm × 375 mm
 $\Phi 800$ mm × 500 mm

Max. load: 1000 kg

Spindle	Tool storage capacity
10000 rpm (Standard)	30 tools (Standard)
18000 rpm (Option)	40, 80, 120 tools (Option)
7000 rpm High torque (Option)	
18000 rpm (HSK-A63) (Option)	
25000 rpm (HSK-A63) (Option)	



5-axis machining center with No. 50 taper spindle plus turning

VARIAXIS i -800T *Multi-Tasking*

Table size: $\Phi 800$ mm
Max. workpiece size: $\Phi 1000$ mm × 375 mm
 $\Phi 800$ mm × 500 mm

Max. load: 1000 kg

Spindle	Tool storage capacity
10000 rpm (Standard)	30 tools (Standard)
15000 rpm (Option)	40, 80, 120 tools (Option)
5000 rpm High torque (Option)	



High-accuracy, high-speed machining of multiple surfaces

VARIAXIS i -700

Table size: $\Phi 700$ mm × Width 500 mm
Max. workpiece size: $\Phi 850$ mm × 500 mm
Max. load: 700 kg

Spindle	Tool storage capacity
12000 rpm (Standard)	30 tools (Standard)
12000 rpm High torque (Option)	40, 80, 120 tools (Option)
18000 rpm (Option)	
25000 rpm (Option)	
30000 rpm (Option)	



Turning capability for additional process integration

VARIAXIS i -700T *Multi-Tasking*

Table size: $\Phi 630$ mm
Max. workpiece size: $\Phi 850$ mm × 500 mm
Max. load: 700 kg

Spindle	Tool storage capacity
18000 rpm (Standard)	30 tools (Standard)
Note: spindle specifications for this machine are different from that of the VARIAXIS i-700 18000rpm - see pages 12, 32 and 40 for details.	
	40, 80, 120 tools (Option)



No. 50 taper spindle for large / heavy workpieces

VARIAXIS i -1050

Table size: $\Phi 1050$ mm × Width 800 mm
Max. workpiece size*: $\Phi 1250$ mm × 900 mm
Max. load: 2000 kg

Spindle	Tool storage capacity
10000 rpm (Standard)	30 tools (Standard)
18000 rpm (Option)	40, 80, 120 tools (Option)
7000 rpm High torque (Option)	
18000 rpm (HSK-A63) (Option)	
25000 rpm (HSK-A63) (Option)	



No. 50 taper spindle for large / heavy workpieces with turning requirements

VARIAXIS i -1050T *Multi-Tasking*

Table size: $\Phi 1050$ mm
Max. workpiece size*: $\Phi 1250$ mm × 900 mm
Max. load: 2000 kg

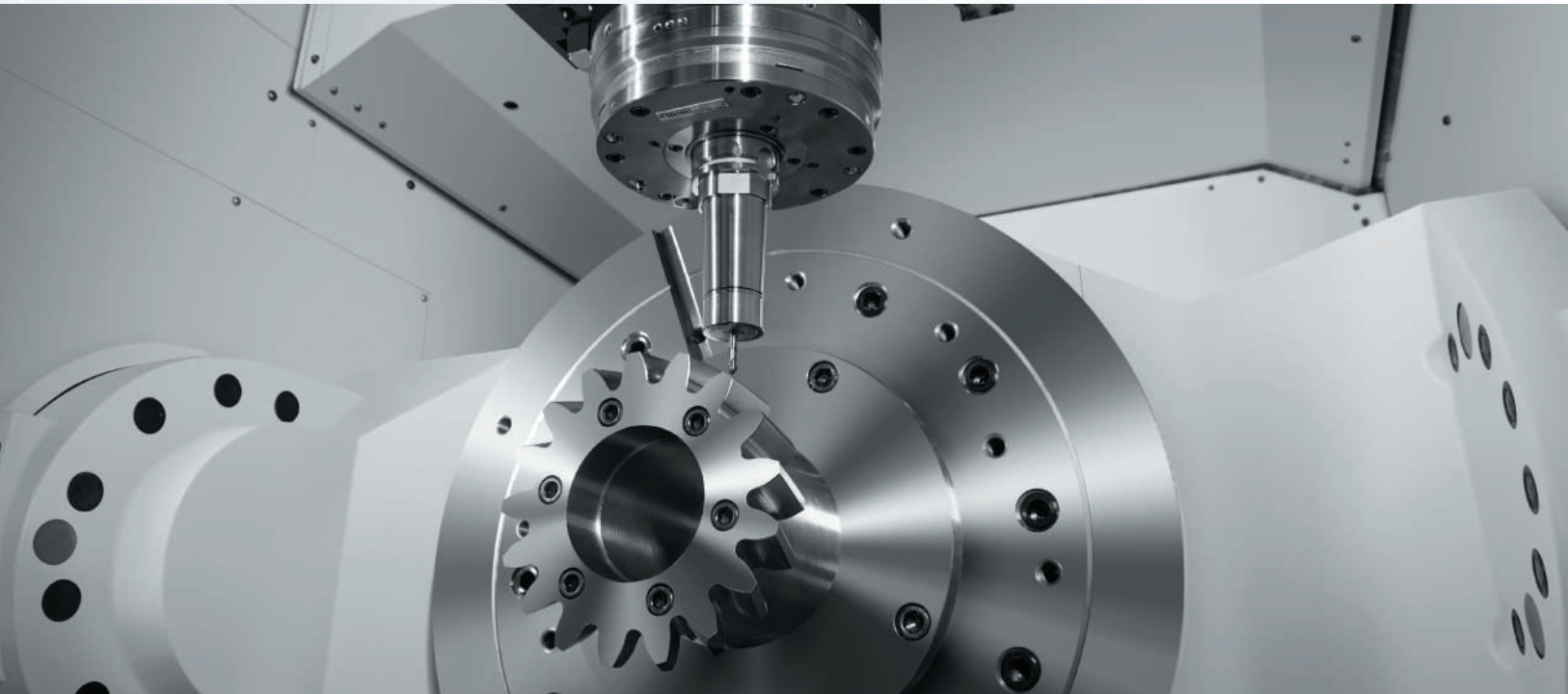
Spindle	Tool storage capacity
10000 rpm (Standard)	30 tools (Standard)
15000 rpm (Option)	40, 80, 120 tools (Option)
5000 rpm High torque (Option)	

* : Max. workpiece size is limited by A-axis angle

Applications

Advanced process integration

Tools are changed to / from the spindle with minimum interference. Since the same tool can be used for the machining of top surfaces, side surfaces and angled surfaces - a wide range of machining can be performed using a small number of tools. Additionally, the compact spindle with minimum interference with the tilting table provides a large machining area which further enhances the versatility of the VARIAXIS.



Smooth Gear Milling

Thanks to conversational input, gear machining programs can be easily made without expensive CAD / CAM software. Gear machining can be performed with standard endmills, expensive gear tooling is not required. Machining time and cost are considerably reduced for the production of gears in small size lots.


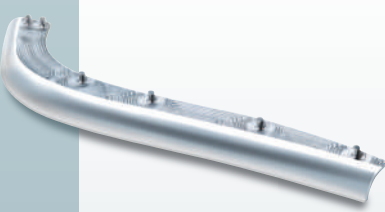
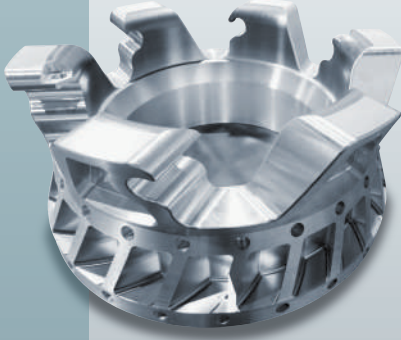


Smooth Gear Hobbing

By the simultaneous control of the tool axis and workpiece axis rotation, gear hobbing can be performed. Gear hobbing programs are quickly and easily made by conversational programming. In addition, hob shifting as well as tool retraction increase safety and ensure longer tool life which is very important for large volume production of gears.



VARIAXIS i series designed for multiple surface machining in a single setup

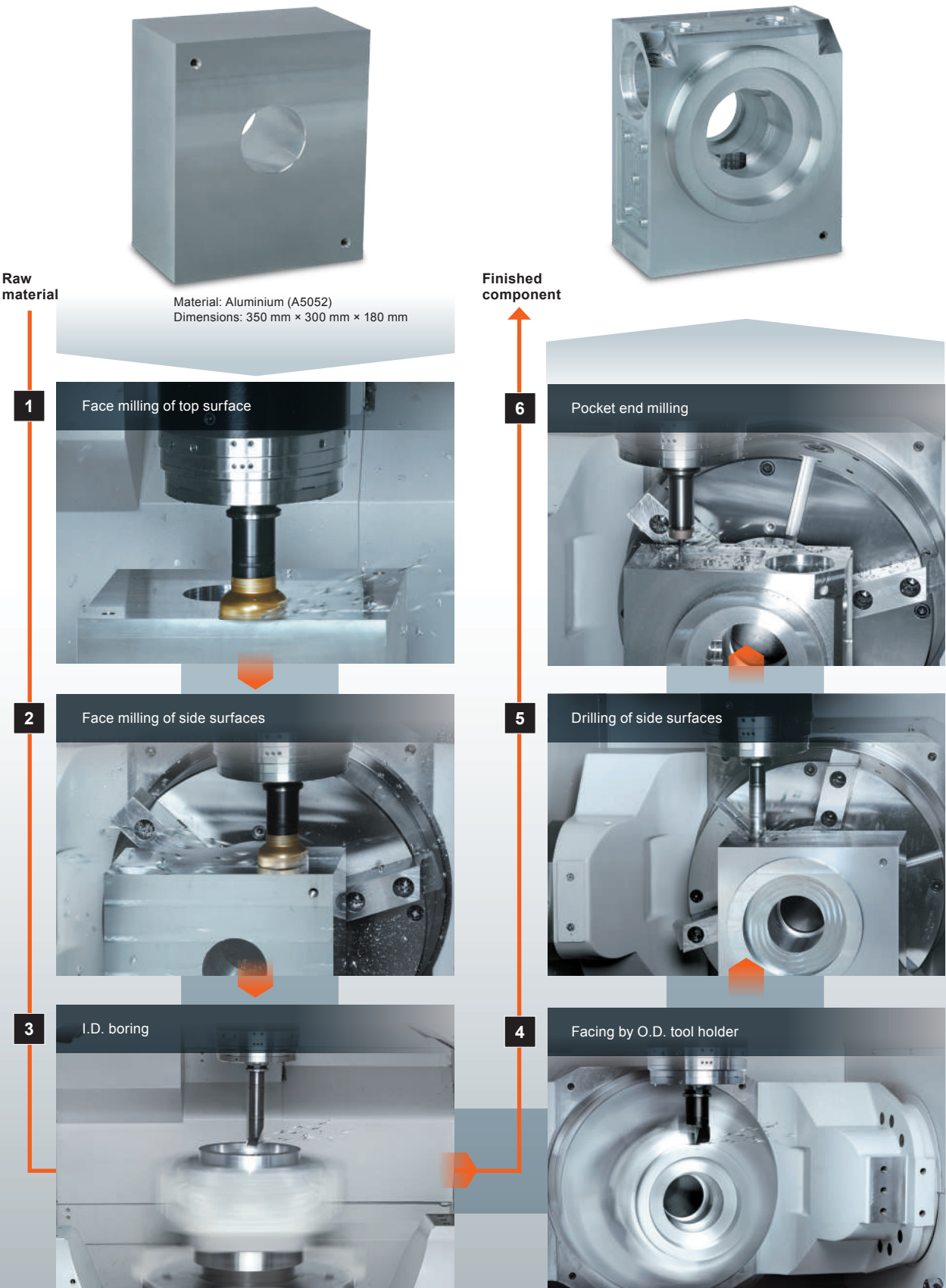
Multiple surface machining		Simultaneous 5-axis machining	
Transportation industry component Workpiece: Bracket Machine: VARIAXIS i-600		Automotive component Workpiece: Control arm Machine: VARIAXIS i-700	
Automotive component Workpiece: Arm Machine: VARIAXIS i-500		Aerospace component Workpiece: Air duct Machine: VARIAXIS i-600	
Motorcycle component Workpiece: Caliper support bracket Machine: VARIAXIS i-500		Aerospace component Sample workpiece Machine: VARIAXIS i-800	
		Aerospace component Sample workpiece Machine: VARIAXIS i-1050T	

Process Integration

The VARIAXIS i series incorporates all machining processes from raw material input through final machining - in just one machine. It provides the ability to reduce production lead time, improve machining accuracy, reduce floor space and initial cost, lower operating expenses, reduce operator requirements and improve the work environment.



Machining example of gear box by VARIAXIS i-T series

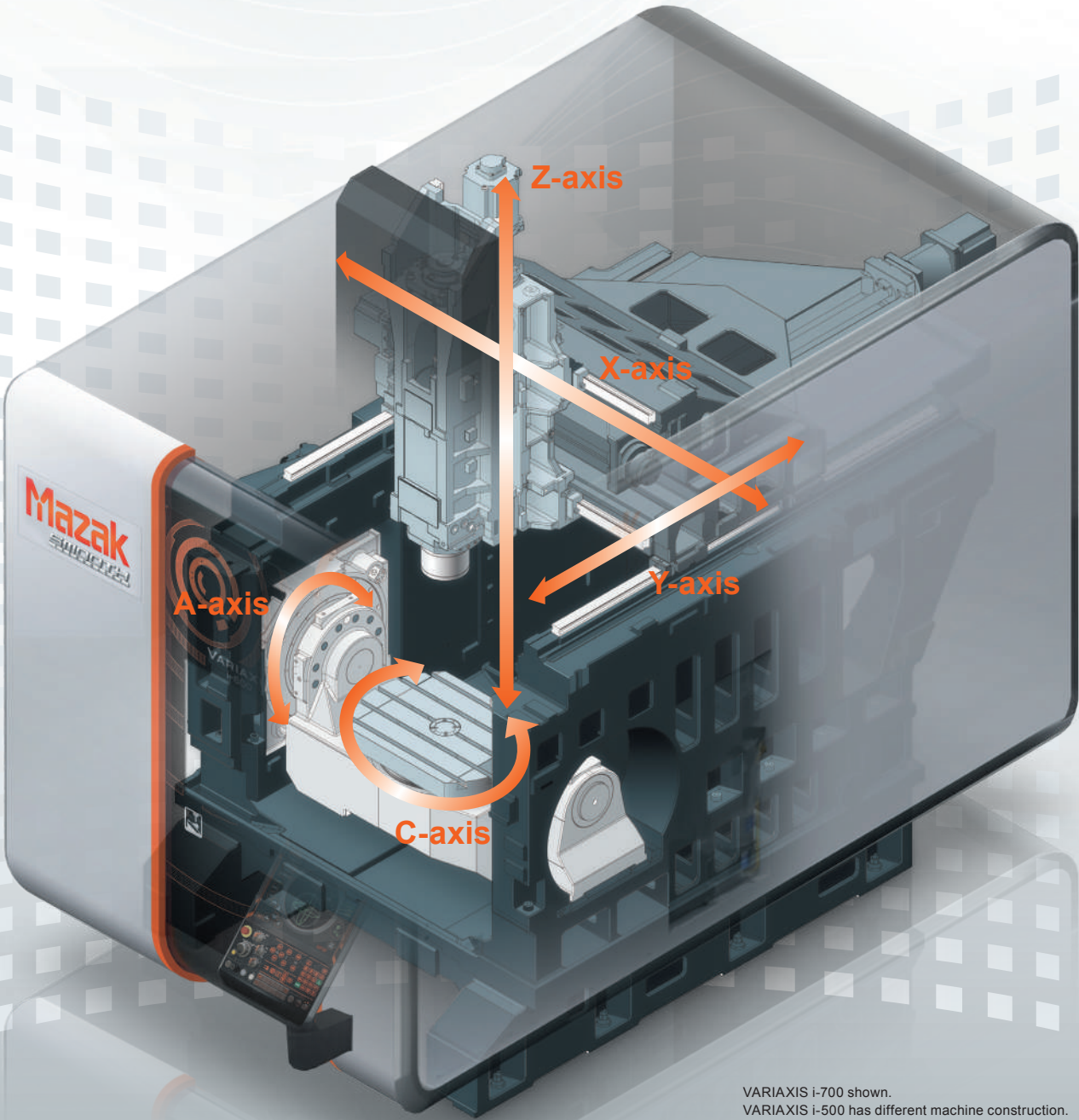


Machine Design

High-rigidity construction ensures high-speed machining with high-accuracy over extended periods of operation

Full gantry construction without overhang

Machine construction was designed utilizing FEM analysis. Vibration is minimized during acceleration / deceleration to ensure high-accuracy machining stability.



VARIAXIS i-700 shown.
VARIAXIS i-500 has different machine construction.

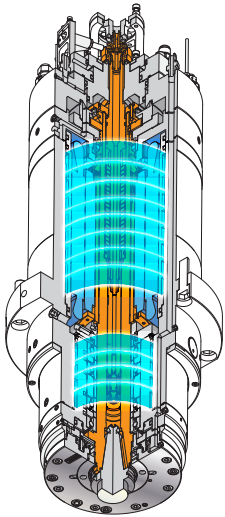
Spindle

Integral spindle / motor

Thanks to the integral spindle / motor design, vibration is minimized during high-speed operation to ensure exceptional surface finishes and maximum tool life.

Spindle temperature control

For high-accuracy machining, temperature controlled cooling oil is circulated around the spindle bearings and headstock to minimize any thermal change to the spindle.



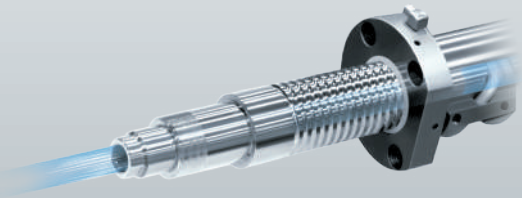
High-rigidity table

The A-axis features a trunnion design to provide high-rigidity for high-accuracy machining.



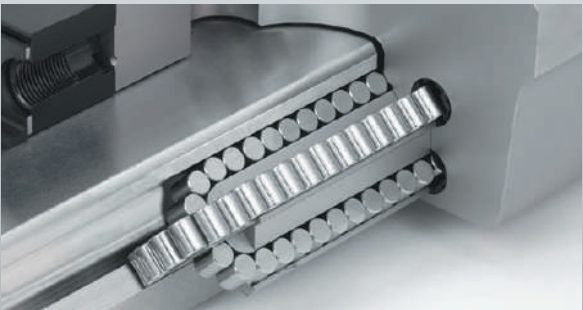
Ball screw core cooling

Temperature controlled cooling oil circulates through the ball screw cores to ensure stable machining accuracy over extended periods of high-speed operation.



Linear roller guides

The linear roller guides on the X-, Y- and Z-axis utilized by the VARIAXIS i series provide high-accuracy positioning. Additionally, with their high-rigidity and considerably lower friction, high-speed feedrates can be used over a wide range of machining, from heavy duty to high-speed cutting.



Higher Productivity

Spindle specifications to meet a wide variety of machining requirements

The high-rigidity spindle can perform heavy-duty machining of steel as well as high-speed machining of non-ferrous materials such as aluminum. High-speed, high-torque and turning specifications are available.



► VARIAXIS i-500, i-600, i-700

Speed	Standard	High-torque <small>OPTION</small>	High-speed <small>OPTION</small>		
	12000 rpm	12000 rpm	18000 rpm	25000 rpm	30000 rpm
Output (40% ED)	22 kW (30 HP)	22 kW (30 HP)	35 kW (47 HP)	23 kW (31 HP)	23 kW (31 HP)
Max. torque (40% ED)	71.6 N·m	118 N·m	134 N·m	22 N·m	22 N·m
Tool shank	CAT No.40 / BBT-40 / HSK-A63	CAT No.40 / BBT-40 / HSK-A63	CAT No.40 / BBT-40 / HSK-A63	HSK-A63	HSK-F63

► VARIAXIS i-800, i-1050

Speed	Standard	High-torque <small>OPTION</small>	High-speed <small>OPTION</small>		
	10000 rpm	7000 rpm	18000 rpm	18000 rpm	25000 rpm
Output (40% ED)	37 kW (50 HP)	30 kW (40 HP)	55 kW (74 HP)	35 kW (47 HP)	23 kW (31 HP)
Max. torque (40% ED)	350 N·m	442 N·m	105 N·m	134 N·m	22 N·m
Tool shank	CAT No.50 / BBT-50 / HSK-A100	CAT No.50 / BBT-50 / HSK-A100	HSK-A100	HSK-A63	HSK-A63

► VARIAXIS i-700T (turning)

Speed	Standard
	18000 rpm
Output (40% ED)	30 kW (40 HP)
Max. torque (40% ED)	122 N·m
Tool shank	CAT No.40 / BBT-40 / HSK-T63 / CAPTO C6

► VARIAXIS i-800T, i-1050T (turning)

Speed	Standard	High torque <small>OPTION</small>	High speed <small>OPTION</small>
	10000 rpm	5000 rpm	15000 rpm
Output (40% ED)	37 kW (50 HP)	37 kW (50 HP)	56 kW (75 HP)
Max. torque (40% ED)	302 N·m	715 N·m	142 N·m
Tool shank	CAT No.50 / BBT-50 / HSK-T100 / CAPTO C8	CAT No.50 / BBT-50 / HSK-T100 / CAPTO C8	HSK-T100

See P31, 32 and 33 for spindle output / torque diagram

Compact spindle cartridge

The spindle is designed to provide an increased machining area and features a compact spindle cartridge for excellent workpiece accessibility with minimum interference. Additionally, the compact spindle cartridge allows workpieces to be efficiently machined at the optimum cutting conditions.

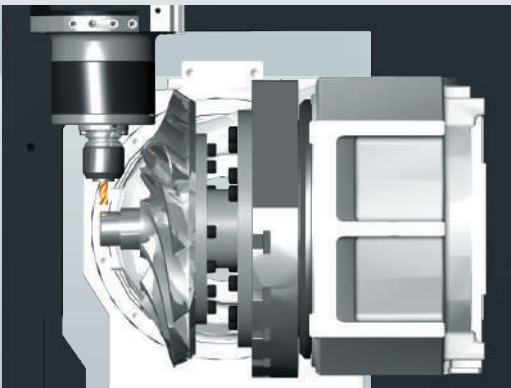
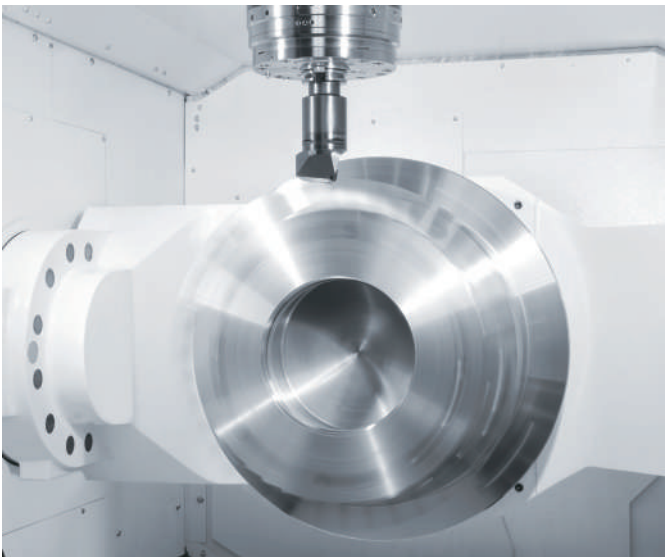
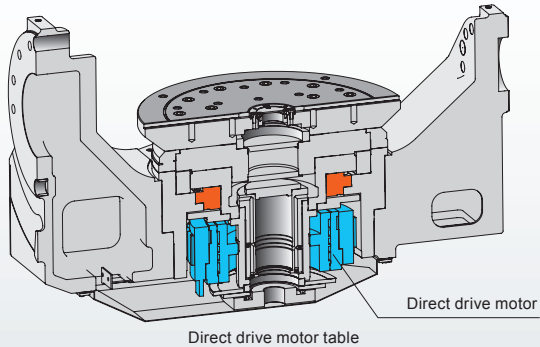


Table (VARIAXIS i-700T, i-800T, i-1050T)

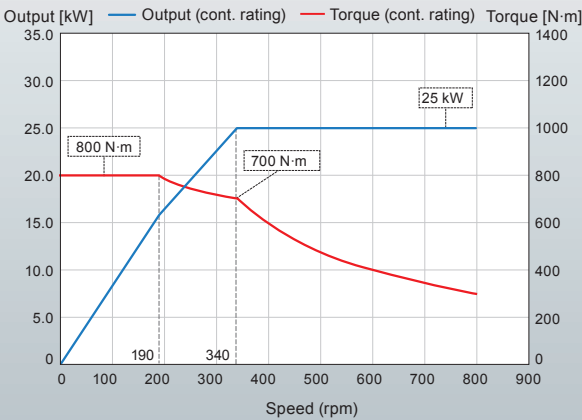


Direct drive motor

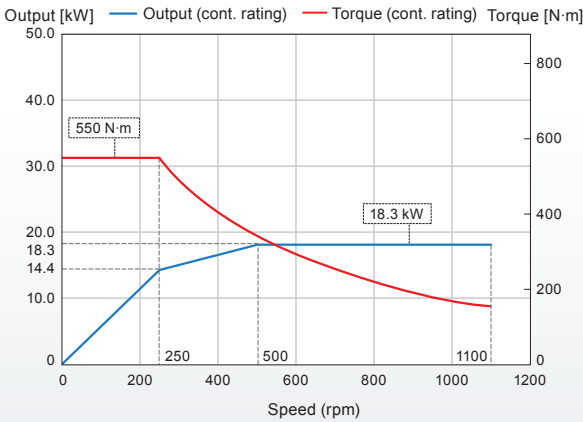
The rotary table (C-axis) is driven by a direct drive motor for both C-axis positioning and turning operation. Turning is performed with the A-axis in the 0 degree position or 90 degree position. Since the A-axis is rigidly clamped on a coupling in the 0 or 90 degree position for turning operations, high-accuracy machining over extended periods of operation is ensured.



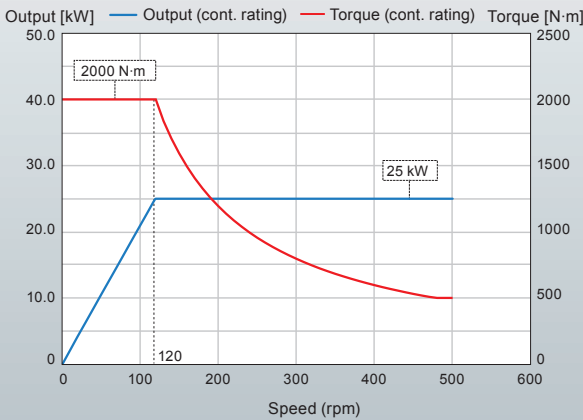
VARIAXIS i-800T
800 rpm direct drive motor output / torque diagram



VARIAXIS i-700T
1100 rpm direct drive motor output / torque diagram



VARIAXIS i-1050T
500 rpm direct drive motor output / torque diagram

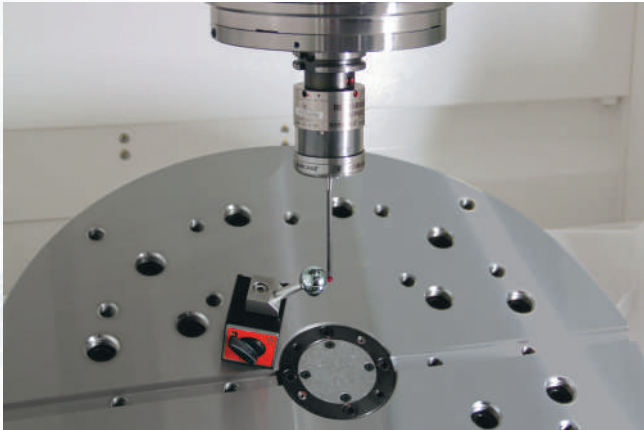


Higher Accuracy

For high-accuracy 5-axis machining

High-accuracy 5-axis calibration - MAZA-CHECK

Position misalignment and incline of the rotary axes can automatically be measured and compensated to realize high-accuracy 5-axis machining. The centers of rotation of both the C and B axes can be automatically measured and compensated.

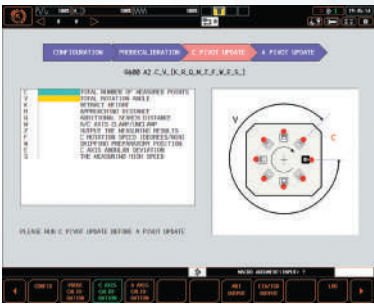


Wireless touch probe RMP600 is optional equipment.

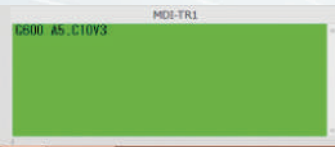
Measurement item selection



Measurement information setting



Automatic measurement program generation

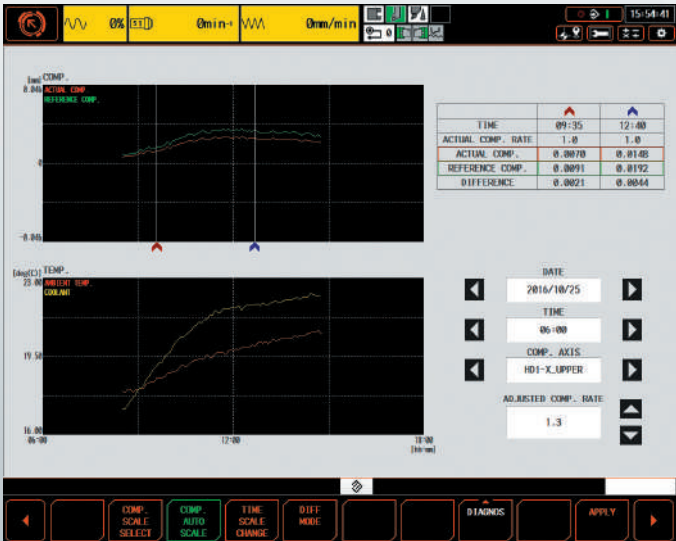


Convenient screen display assists measurement operation.

Heat displacement control - THERMAL SHIELD

The THERMAL SHIELD is an automatic compensation for room temperature changes, which realizes enhanced continuous machining accuracy. Mazak has performed extensive testing in a variety of environments in a temperature controlled room and has used the results to develop a control system that automatically compensates for temperature changes in the machining area. Changes in the room temperature and compensation data are shown visually.

Temperature and compensation are displayed on MAZATROL SmoothX screen. Operator can adjust compensation by looking at the data.



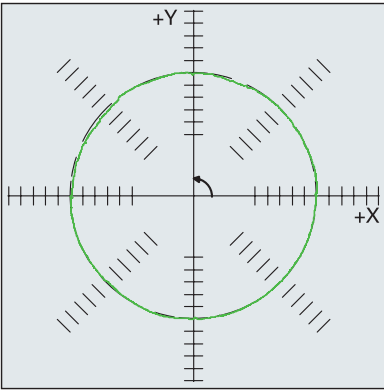
High-rigidity construction and the MAZATROL SmoothX ensure high-accuracy machining

DBB of VARIAXIS i-700

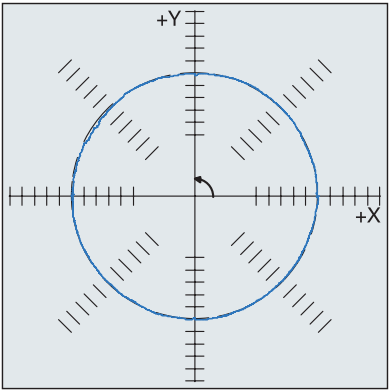
X-Y plane measured results

3.0 μm (CW)
2.6 μm (CCW)

Machine	VARIAXIS i-700
Diameter	200 mm
Feedrate	560 mm/min



CW 3.0 μm 5.0 $\mu\text{m}/\text{div}$



CCW 2.6 μm 5.0 $\mu\text{m}/\text{div}$

Positioning accuracy and positioning repeatability of VARIAXIS i-700

Mazak precision results

Positioning accuracy	X-axis	4.01 μm
	Y-axis	4.62 μm
	Z-axis	3.81 μm

Positioning repeatability	X-axis	1.41 μm
	Y-axis	2.27 μm
	Z-axis	1.45 μm

Note: The inspection is conducted according to ISO-230 on a recommended foundation with room temperature controlled to 22°C±1°C after machine has reached operation temperature.

A- and C-axis roller gear cam

High-accuracy and high-efficiency machining without backlash.
(VARIAXIS i-700T, i-800T, i-1050 and i-1050T C-axis use direct drive motor)

Sub-micron control

Both A-axis and C-axis table can be programmed in 0.0001° increments for 5-axis machining of multiple, complex and surfaces.

X,Y-and Z-axis on scale feedback

OPTION

Positioning accuracy is improved for high-accuracy machining.

Ergonomics

Design focus on ergonomics provides unsurpassed ease of operation

Excellent Accessibility

The operator has excellent access to the table from the front of the machine for convenient workpiece loading / unloading and machine setup.



Convenient operation when using an overhead crane

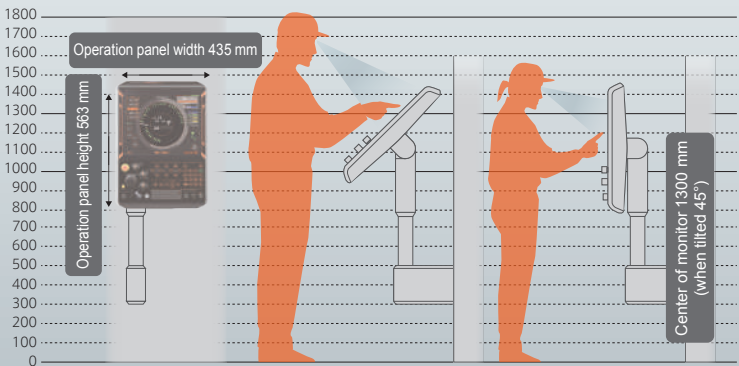
The VARIAXIS i series has unsurpassed access to the machine table for convenient workpiece loading / unloading. An overhead crane can be easily used for the loading / unloading of heavy workpieces and fixtures thanks to the automatic retractable top cover.

(Note : VARIAXIS i-500 top cover opens separately)



Adjustable CNC touch panel

Operation touch panel can be tilted and rotated to the optimum position for any operator's height to ensure ease of operation.



Automation

2-pallet changer OPTION

The next workpiece can be setup during the machining of the current workpiece for higher productivity.

The 2-pallet changer system for the VARIAXIS i-600 / i-700 / i-700T / i-800T / i-1050 / i-1050T provides excellent operator working space inside the 2-pallet changer.



VARIAXIS i-500 (2-pallet changer)



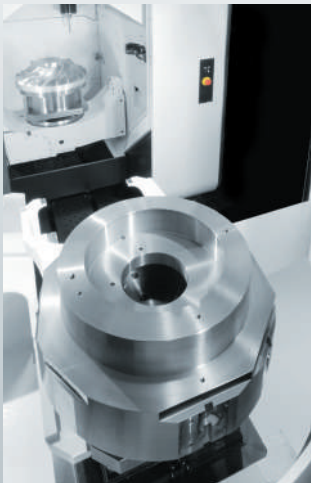
VARIAXIS i-700T (2-pallet changer)



VARIAXIS i-800 (2-pallet changer)



VARIAXIS i-1050 (2-pallet changer)



	VARIAXIS i-500 (2-pallet changer)	VARIAXIS i-600 (2-pallet changer)	VARIAXIS i-700 (2-pallet changer)	VARIAXIS i-700T (2-pallet changer)
Pallet size	□400 mm	□400 mm	□500 mm	Φ610 mm
Max. workpiece size	Φ500 mm × 350 mm	Φ600 mm × 425 mm	Φ730 mm × 500 mm	Φ730 mm × 500 mm
Max. load	300 kg	300 kg	600 kg	600 kg

	VARIAXIS i-800 (2-pallet changer)	VARIAXIS i-800T (2-pallet changer)	VARIAXIS i-1050 (2-pallet changer)	VARIAXIS i-1050T (2-pallet changer)
Pallet size	□500 mm	Φ610 mm	□800 mm	Φ1000 mm
Max. workpiece size	Φ730 mm × 500 mm	Φ730 mm × 500 mm	Φ1250 mm × 700 mm	Φ1250 mm × 700 mm
Max. load	500 kg	600 kg	1500 kg	1500 kg

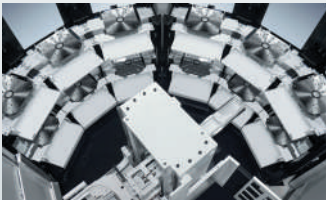
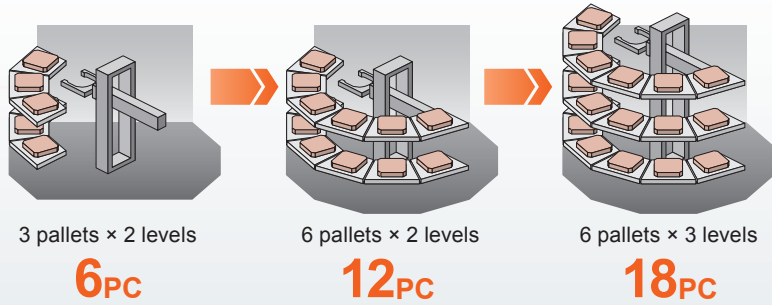
MPP (MULTI PALLET POOL)

The MPP (MULTI PALLET POOL) is a new system to meet the increasing worldwide demand for automation. It is designed to provide high productivity in the production of a wide variety of parts in small size lots.



Flexible pallet stocker capacity

6, 12 and 18 pallet storage capacities are available after initial installation.



MPP (VARIAXIS i-600, i-700, i-700T)

	VARIAXIS i-600	VARIAXIS i-700	VARIAXIS i-700T
Number of pallets	6 / 12 / 18		
Pallet size	400 mm × 400 mm	500 mm × 500 mm	Φ610 mm
Max. load (without pallet)	300 kg	600 kg	
Max. workpiece size (without pallet)	Φ600 mm × H425 mm	Φ730 mm × H500 mm	

SMOOTH
M P P

Once the production schedule is input, operation will be performed automatically. Production results, system utilization and other data can be checked on the MAZATROL SmoothX and SmoothG CNC. If connected to a network (prepared by user), system data are accessible on office PCs, tablets and smart phones.



Automation

PALLETECH SYSTEM
the automation system designed for higher productivity



The PALLETECH MANUFACTURING CELL has a single level pallet stocker and the PALLETECH HIGH-RISE SYSTEM features a two level or three level pallet stocker. This system can also have HCN horizontal machining center series integrated into the same system. Additionally, the system is designed for future expansion after the initial installation in response to increased production requirements.

	Minimum	Maximum
Machine(s)	1	15
Number of pallets	1 level	6
	2 levels	12
	3 levels	18
Loading stations(s)	1	8
Loading robot	1	1



PALLETECH HIGH-RISE SYSTEM
(3-level stocker with 18 pallets and one loading station)

SMOOTH
PMC

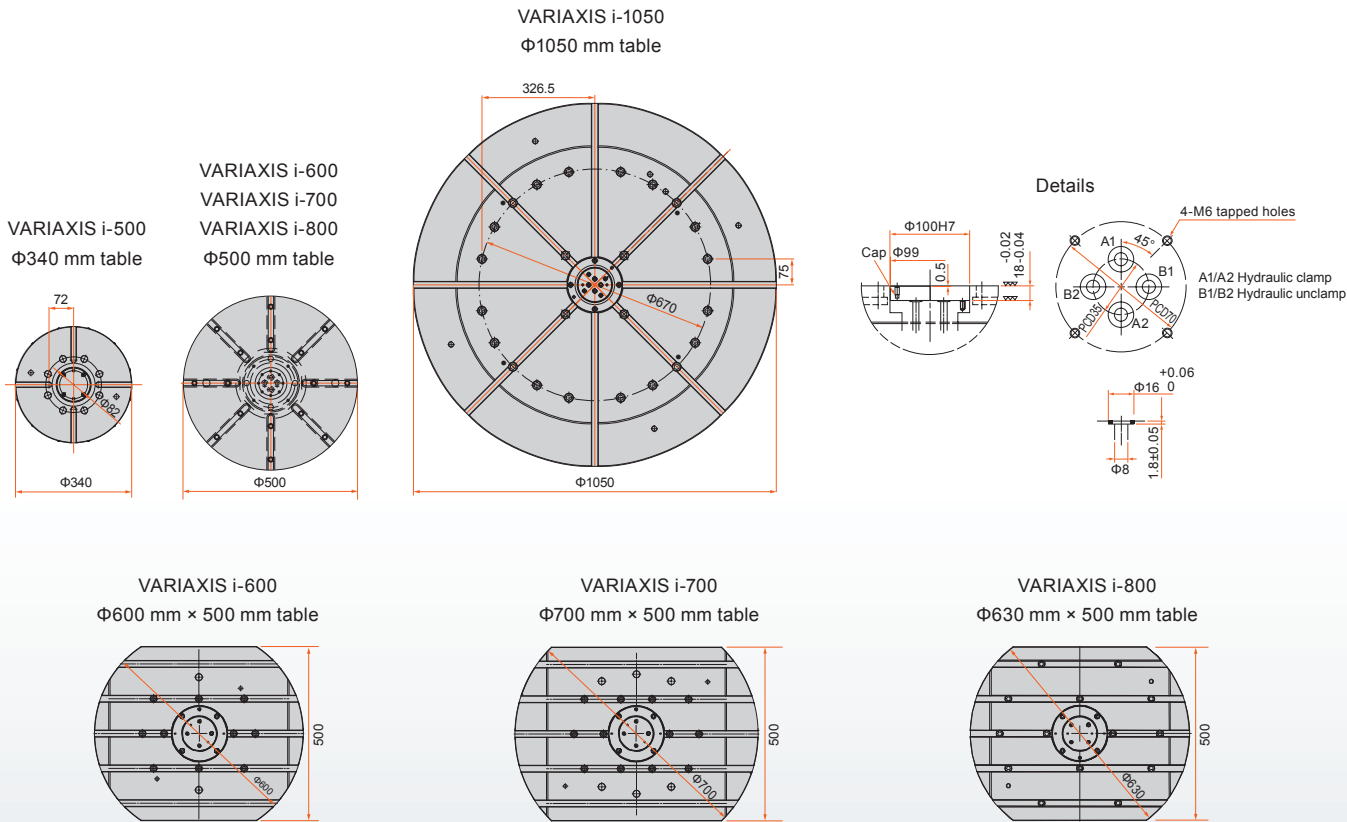
FMS control / management software - unsurpassed ease of system operation to meet sudden changes in schedule.



Preparation for hydraulic fixtures **OPTION**

For hydraulic power supply from the machine to hydraulic fixtures.

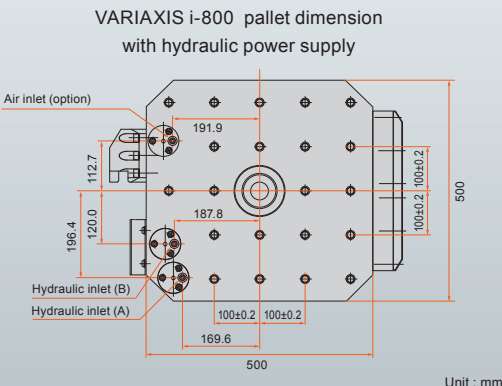
Single table



Unit : mm

2 pallet changer

For machines equipped with the 2 pallet changer, hydraulic power is only available at the setup position.



Unit : mm

MAZATROL CNC System



Three color status indicator

19" touch panel

USB port

SD card slot

Operation switches

Dials

Unsurpassed ease of operation with touch screen

5 process home screens

Programming, confirmation, editing and tool data registration



Convenient Parameter Setting and Fine Tuning Function SMOOTH MACHINING CONFIGURATION

Machining features including cycle time, finished surface and machining shape can be adjusted by slider switches on the display according to material requirements and machining methods. This is especially effective for complex workpiece contours defined in small program increments. Once the desired results are obtained, the settings can be stored in memory so that they can be easily used again in the future.

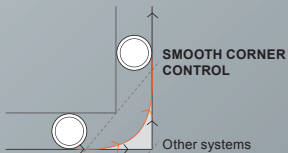


Variable Acceleration Control Function •VARIABLE ACCELERATION CONTROL

Variable acceleration control is a new function which permits the faster acceleration capability of linear axes to be used whenever possible. The slower acceleration of the rotary axes is not used for all program commands, resulting in faster machining cycle times.

Seamless Corner Control •SMOOTH CORNER CONTROL

Improved finished surfaces and reduced cycle times by optimized acceleration / deceleration when machining corners.



Cycle time reduced by **10~20%**
(Test results for reference only)



MAZATROL **SMOOTHX**

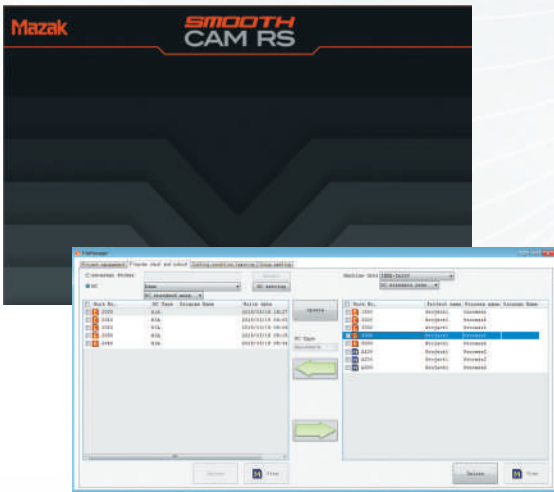
Ease of Programming

Easy programming of 5-axis machining

A variety of programming and simulation functions provide support from programming to the finished component.

Smooth CAM RS OPTION

- Tool path check (VIEW SURF)
- Interference check, time study (virtual machining)



Send program over network

CNC operation panel on machine

- Check and edit program (QUICK EIA)

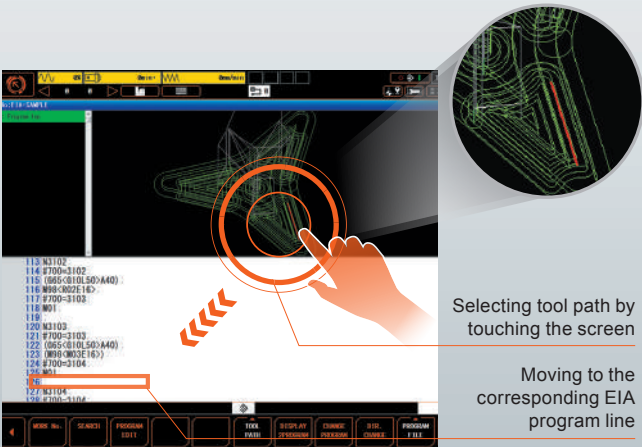


- File manager
[Data transfer to CNC on network]
Program made with Smooth CAM RS can be sent to the machine.

(QUICK EIA, VIEW SURF and virtual machining can be used on the machine CNC operation panel and on the Smooth CAM RS.)

QUICK EIA

Program, process list and 3D tool path display are linked to each other. Visible search on touch screen can reduce the time for program checking.

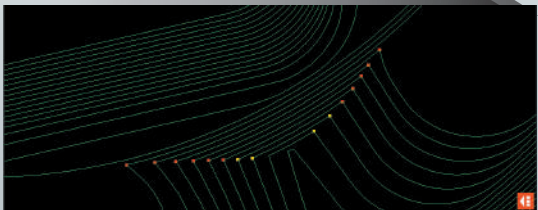
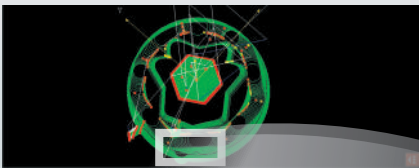


Selecting tool path by touching the screen

Moving to the corresponding EIA program line

VIEW SURF

By analyzing the tool path, any predictable failure on the finished surface can be visualized. Program modification can be done before machining to minimize the time for test cutting.



MAZATROL conversational programming

In MAZATROL conversational programming, machining programs are easily made and edited by inputting data in response to questions on the CNC display.

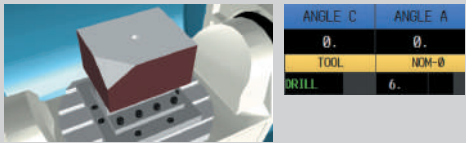
Easy programming

• Multiple-surface machining

Easy programming of multiple-surface machining which normally requires complex machining programs.

LINE	UNIT	ADD. WPC	X	Y	1st	Z	C	A	
1	WPC	1	-315.	-315.	0.	-400.	0.	0.	Setting coordinate
LINE	UNIT	TURN POS. X	TURN POS. Y	TURN POS. Z	ANGLE C	ANGLE A			
2	INDEX			0.	0.	0.			Setting index angle

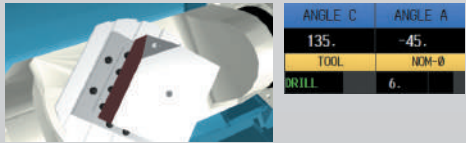
The same home position and coordinate system can be used for the top surface and angled surfaces without requiring any complicated programming for the angled surfaces.



• Program origin automatic calculation workpiece coordinate shift

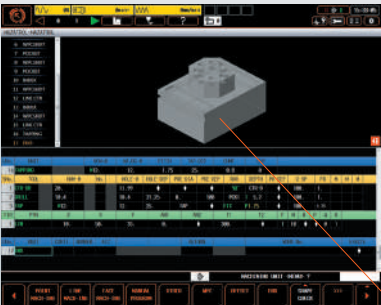
LINE	UNIT	TURN POS. X	TURN POS. Y	TURN POS. Z	ANGLE C	ANGLE A	
4	INDEX				135.	-45.	Setting index angle
LINE	UNIT	SHIFT-X	SHIFT-Y	SHIFT-Z	SHIFT-C	SHIFT-A	COORD. 1st
5	WPCSHIFT	-150.	-100.	0.	135.	-45.	Coordinate shift

No complicated calculations required when changing program coordinate system.



QUICK MAZATROL

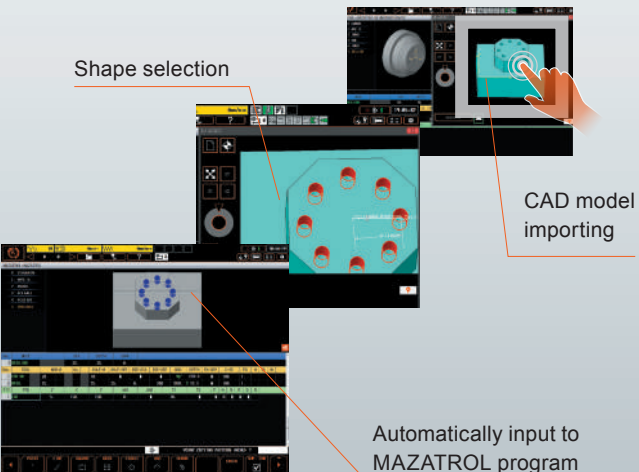
MAZATROL program, unit list and 3D workpiece shape are linked to each other. After defining a machining unit in a MAZATROL program, the 3D shape is immediately displayed to easily and quickly check for any programming error.



3D model in the process list is displayed with updated programming in real time.

3D ASSIST

Workpiece and coordinates data can be imported from 3D CAD data to a MAZATROL program. No coordinate value inputs are required. Can reduce input errors and time for program checking.



Shape selection

CAD model importing

Automatically input to MAZATROL program

Standard and Optional Equipment

Automation

TOOL HIVE

The TOOL HIVE can store more than 180 tools in a small space. Operation and tool data editing can be performed on the TOOL HIVE TERMINAL control panel to reduce the time required for tool setup. The TOOL HIVE tool storage capacity can be expanded after the initial installation.

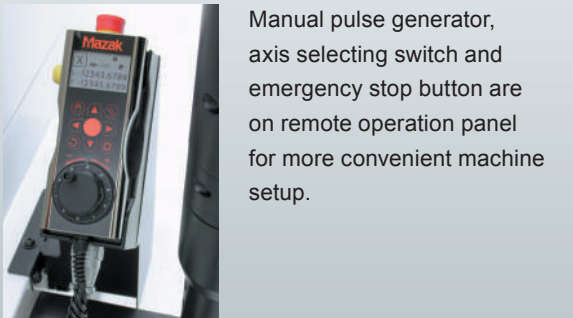
Tool storage	No.40	160, 200, 240, 280, 320, 360 tools
	No.50	180, 216, 252, 288, 324, 360, 396, 432 tools
Magazine	Rack type	
Tool selection method	Random selection, shortest path	



Scale feedback system

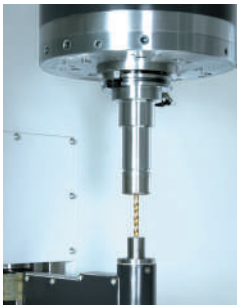
Detects absolute machine position - especially suitable for high speed operation over extended periods.

Remote manual pulse generator



Automatic tool length measurement & tool breakage detection

Tool length is automatically measured and registered in the CNC system. Tool breakage can be detected during automatic operation.



Laser type tool length measurement

Tool length measurement can be performed on extremely small tools which can not be measured with touch type tool length measurement. Thanks to non-contact measurement by laser beam, tool length and diameter can be measured with the tool rotating to provide stable accuracy.

Automatic power ON / OFF + warm-up operation (standard)

The setting of a self-timer is used to automatically turn on and turn off the machine.

Status light (3 colors) (square)

Indicates operational status.
Red : alarm
Yellow : operation end
Green : in automatic operation



Tool ID

Tool ID allows automatic input and update of tool data into the CNC for machines in a network. It eliminates mistakes when loading tools into the magazine and tool data input, reducing setup time. (requires retention bolt with tool ID and tool presetter)



Coolant

Automatic workpiece washing

By discharging a large volume of coolant from nozzles, machined chips are efficiently removed from the workpiece and fixture. This option is effective for machines equipped with the pallet changer or robot to minimize the accumulation of machined chips during automatic operation.



Flood coolant (standard)

Coolant is discharged from nozzles on the spindle housing to cool the workpiece and remove chips.

Coolant through spindle

Coolant is fed to the tool tip by passages through the tool. 3 pump pressure specifications are available : 0.5 MPa (5 kgf/cm²), 1.5 MPa(15 kgf/cm²) and 7.0 MPa(70 kgf/cm²).



SUPERFLOW coolant system

The SUPERFLOW coolant system features improved chip-control, lower tool tip temperatures, and longer tool life with faster spindle speeds and feedrates to realize higher productivity.

- Diaphragm Pump with exceptional energy efficiency.
- Coolant pressure easily set by M-code (pressure range from 0 to 7 MPa (70 kgf/cm²))

Coolant temperature control

Maintains the coolant temperature to be the same as the room temperature to prevent thermal displacement which can affect machining accuracy.

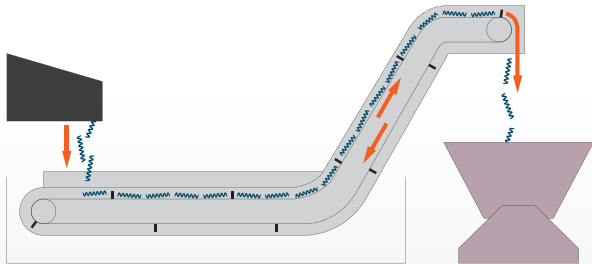
Mist collector

Coolant mist generated by machining is removed from the machining area in order to maintain a safe and clean working environment.

Chip disposal

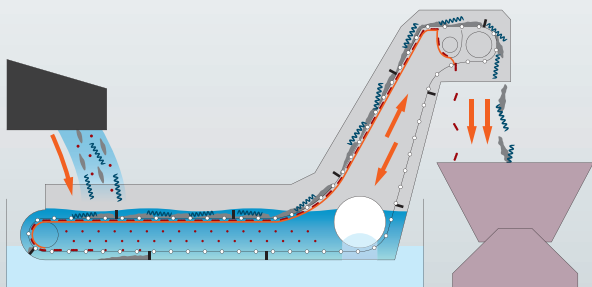
Chip conveyor (Hinge)

Chips are removed by a hinge-plate belt and discharged from the rear or side of machine. Very suitable for curly shaped steel chips from 30 mm ~ 50 mm long.



Chip conveyor (ConSep 2000 II WS)

Chip conveyor with internal coolant filtration that is effective for removing small chips as well as long, curly chips.



	ConSep 2000 II WS	Hinge
Sludge-like chips (0.25 mm ~ 1 mm)	○	×
Needle-like chips (~0.5 mm)	○	×
1 - 5 mm (max. 5 mm)	○	×
5 - 30 mm (max. 30 mm)	○	(Not recommended)
30 - 70 mm (max. 70 mm)	○	○
70 mm -	○	○

Standard and Optional Equipment

		● : Standard ○ : Option — : N / A			
		i-500	i-600	i-700	i-700T
Table	Φ500 mm × 400 mm T-slot table	●	—	—	—
	Φ600 mm × 500 mm T-slot table	—	●	—	—
	Φ700 mm × 500 mm T-slot table	—	—	●	—
	Φ630 mm table	—	—	—	●
Machine	Work light	●	●	●	●
	THERMAL SHIELD	●	●	●	●
	12000 rpm	●	●	●	—
	12000 rpm high torque spindle	○	○	○	—
	18000 rpm	○	○	○	● ^{*4}
	25000 rpm (HSK-A63)	○	○	○	—
	30000 rpm ^{*1} (HSK-F63)	○	○	○	—
Factory Automation	Tool length measurement & tool breakage detection	○	○	○	—
	Laser tool measurement system	○	○	○	○
	Ball screw core cooling (X-, Y-, Z-axis)	●	●	●	●
	30 tool magazine	●	●	●	●
	40 tool magazine	○	○	○	○
	60 tool magazine	○	—	—	—
	80 tool magazine	○	○	○	○
	120 tool magazine	○	○	○	○
	Work measurement printout (printer not included)	○	○	○	○
	Scale feedback	○	○	○	○ ^{*5}
	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	○	○	○	○
	Tool eye (manual)	—	—	—	●
	Preparation for hydraulic fixtures	○	○	○	○
	Operator door interlock	●	●	●	●
High Accuracy	MAZA-CHECK (software, reference sphere) ^{*2}	●	●	●	●
Coolant / Chip Disposal	Coolant system	●	●	●	●
	Work air blast	○	○	○	○
	Oil skimmer (RB-200)	○	○	○	○
	Mist collector	○	○	○	○
	Coolant temperature control	○	○	○	○
	Hand held coolant nozzle ^{*3}	○	○	○	○
	Coolant through spindle system (5 kgf/cm ²)	○	○	○	○
	Work washing coolant	○	○	○	○
	High pressure coolant through spindle (15 kgf/cm ²)	○	○	○	○
	High pressure coolant through spindle (70 kgf/cm ²)	○	○	○	○
	SUPERFLOW coolant system	○	○	○	○
	Flood coolant (1.5 kgf/cm ² 30 L/min)	●	—	—	—
	Flood coolant (4.5 kgf/cm ² 30 L/min)	○	●	●	●
	Coolant through spindle pressure switch	○	○	○	○
	Top cover	●	●	●	●
	Chip conveyor (Hinge) side discharge	○	—	—	—
	Chip conveyor (ConSep II WS) side discharge	○	—	—	—
	Chip conveyor (Hinge) rear discharge	○ ^{*6}	○	○	○
	Chip conveyor (ConSep II WS) rear discharge	○ ^{*6}	○	○	○
	Chip bucket (swing type)	○	○	○	○
	Chip bucket (fixed type)	○	○	○	○
Tooling	Pull stud bolt	○	○	○	○
Others	Manual (CD)	●	●	●	●
	Additional manuals	○	○	○	○

^{*1} 30000 rpm spindle not available with coolant through spindle and air through spindle system.
^{*2} MAZA-CHECK requires optional RMP600 wireless touch probe.
^{*3} Not available with the 2-pallet changer i-600, i-700 and i-700T.
^{*4} Spindle specifications for this machine are different from that of the VARIAXIS i-700 18000 rpm. See pages 12, 32 and 40 for details.
^{*5} Standard for C-axis
^{*6} Rear discharge chip conveyor not available for machines with 2-pallet changer.

		● : Standard ○ : Option — : N / A			
		i-800	i-800T	i-1050	i-1050T
Table	Φ800 mm × 630 mm T-slot table	●	—	—	—
	Φ800 mm tapped table	—	●	—	○
	Φ1050 mm × 800 mm T-slot table	—	—	●	—
	Φ1050 mm tapped table	—	—	—	●
Machine	Work light	●	●	●	●
	THERMAL SHIELD	●	●	●	●
	5000 rpm high torque spindle	—	○	—	○
	7000 rpm high torque spindle	○	—	○	—
	10000 rpm	●	●	●	●
	15000 rpm (HSK-T100)	—	○	—	○
	18000 rpm (HSK-A100)	○	—	○	—
	18000 rpm (HSK-A63)	○	—	○	—
	25000 rpm (HSK-A63)	○	—	○	—
Factory Automation	Tool length measurement & tool breakage detection	○	—	○	—
	Laser tool measurement system	○	○	○	○
	Ball screw core cooling (X-, Y-, Z-axis)	●	●	●	●
	30 tool magazine	●	●	●	●
	40 tool magazine	○	○	○	○
	80 tool magazine	○	○	○	○
	120 tool magazine	○	○	○	○
	Work measurement printout (printer not included)	○	○	○	○
	Scale feedback (A-, C-axis)	○	○ ^{*2}	●	●
	Scale feedback (X-, Y-, Z-axis)	○	○	○	○
	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	○	○	○	○
	Tool eye (manual)	—	●	—	●
	Preparation for hydraulic fixtures	○	○	○	—
Safety Equipment	Operator door interlock	●	●	●	●
High Accuracy	MAZA-CHECK (software, reference sphere) ^{*1}	●	●	●	●
Coolant / Chip Disposal	Coolant system	●	●	●	●
	Work air blast	○	○	○	○
	Oil skimmer (RB-200)	○	○	○	○
	Mist collector	○	○	○	○
	Coolant temperature control	○	○	○	○
	Hand held coolant nozzle	○	○	○	○
	Coolant through spindle system (5 kgf/cm ²)	○	○	○	○
	Work washing coolant	○	○	○	○
	High pressure coolant through spindle (15 kgf/cm ²)	○	○	○	○
	High pressure coolant through spindle (70 kgf/cm ²)	○	○	○	○
	SUPERFLOW coolant system	○	○	○	○
	Flood coolant (4.5 kgf/cm ² 30 L/min)	●	●	●	●
	Coolant through spindle pressure switch	○	○	○	○
	Top cover	●	●	●	●
Tooling	Chip conveyor (Hinge) side discharge	○	○	○	○
	Chip conveyor (ConSep) side discharge	○	—	—	—
	Chip conveyor (ConSep II WS) side discharge	—	○	○	○
	Chip bucket (swing type)	○	○	○	○
	Chip bucket (fixed type)	○	○	○	○
	Pull stud bolt	○	○	○	○
Others	Manual (CD)	●	●	●	●
	Additional manuals	○	○	○	○

^{*1} MAZA-CHECK requires optional RMP600 wireless touch probe.
^{*2} Standard for C-axis

Environmentally Friendly

Designed with environmental considerations

The environment and our impact on natural surroundings have always been important concerns of Yamazaki Mazak. This is shown by the fact that all factories in Japan where Mazak machine tools are produced are ISO 14001 certified, an international standard confirming that the operation of our production facilities does not adversely affect air, water or land.



Extended coolant service life

Reduction of lubrication consumption

Reduction of electrical power consumption

Auto-power off

When the machine is not operated for a pre-registered period of time, the machine worklights and the CNC backlight are turned off automatically. They are automatically turned on when the motion sensor detects the return of the operator.

Chip conveyor stop

After the passing of a pre-registered period of time after automatic machine operation stops, the chip conveyor automatically stops to reduce electrical power consumption. (Chip conveyor is optional equipment)

Grease lubrication

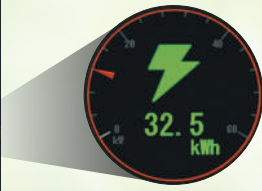
The linear roller guides and ball screws are lubricated by grease which eliminates tramp oil in the coolant resulting in a much longer service life for the coolant.

Energy Dashboard OPTION

The Energy Dashboard provides a convenient visual monitoring of energy consumption and analysis.

Process screen display

- Total energy consumption (of workpiece in operation)
- Current energy consumption

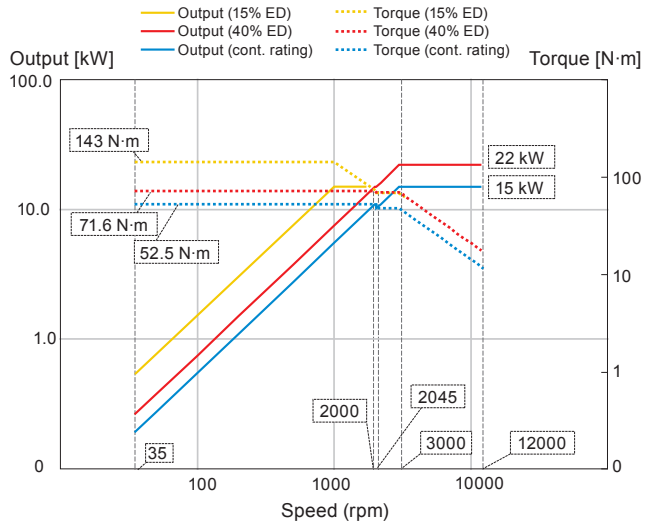


Spindle Output / Torque Diagram

VARIAXIS i-500, i-600, i-700

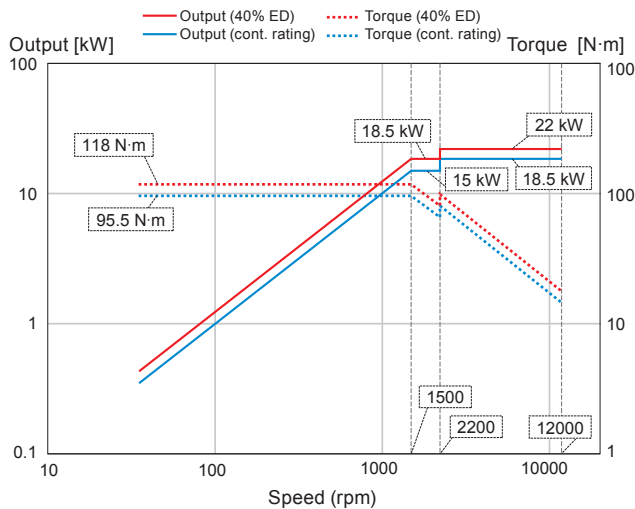
12000 rpm spindle

Output	Torque
AC 22 kW (30 HP) (40% ED)	71.6 N·m (40% ED) 52.5 N·m (cont. rating)



12000 rpm High-torque spindle OPTION

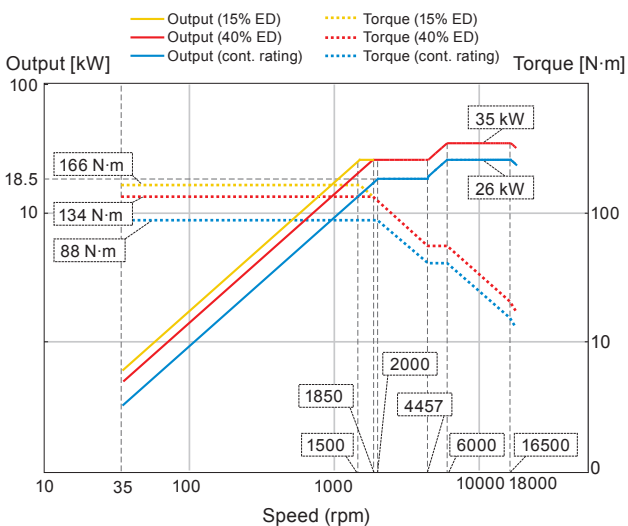
Output	Torque
AC 22 kW (30 HP) (40% ED)	118 N·m (40% ED) 95.5 N·m (cont. rating)



VARIAXIS i-500, i-600, i-700, i-800 (HSK-A63), i-1050 (HSK-A63)

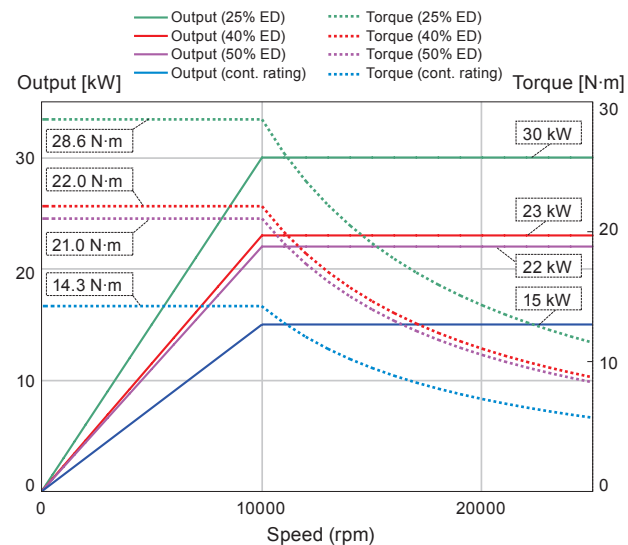
18000 rpm spindle OPTION

Output	Torque
AC 35 kW (47 HP) (40% ED)	134 N·m (40% ED) 88 N·m (cont. rating)



25000 rpm spindle OPTION

Output	Torque
AC 23 kW (31 HP) (40% ED)	22 N·m (40% ED) 14.3 N·m (cont. rating)

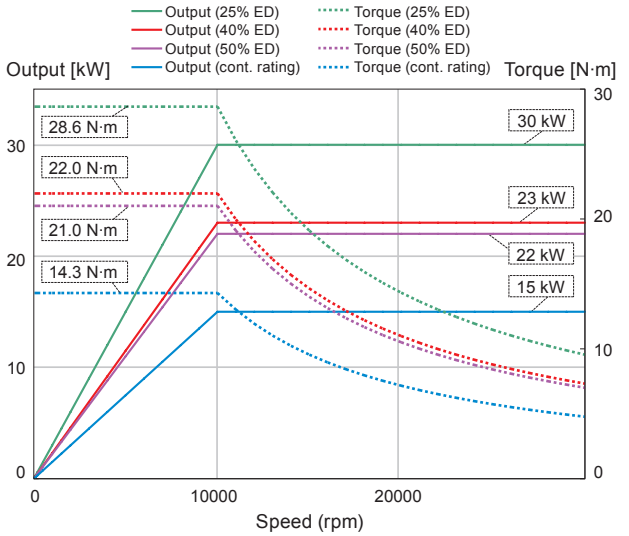


Spindle Output / Torque Diagram

VARIAXIS i-500, i-600, i-700

30000 rpm spindle **OPTION**

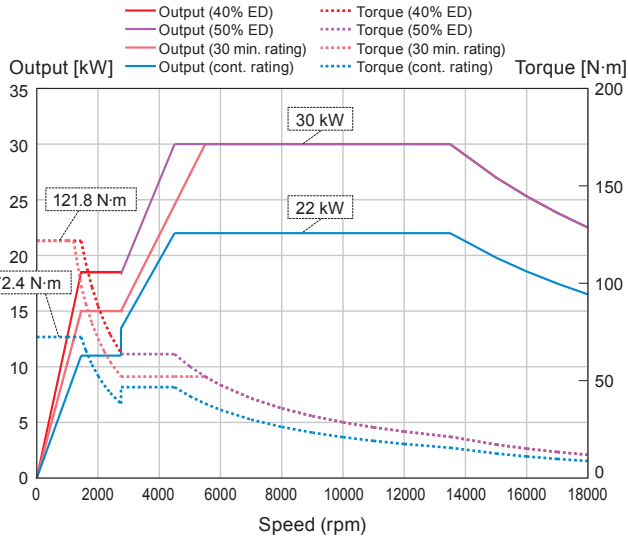
Output	Torque
AC 23 kW (31 HP) (40% ED)	22 N·m (40% ED)
	14.3 N·m (cont. rating)



VARIAXIS i-700T

18000 rpm spindle

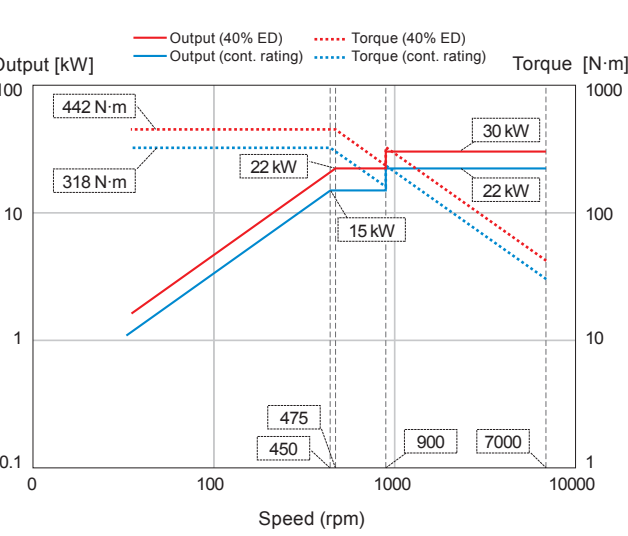
Output	Torque
AC 30 kW (40 HP) (40% ED)	122 N·m (40% ED)
	72.4 N·m (cont. rating)



VARIAXIS i-800, i-1050

7000 rpm High-torque spindle **OPTION**

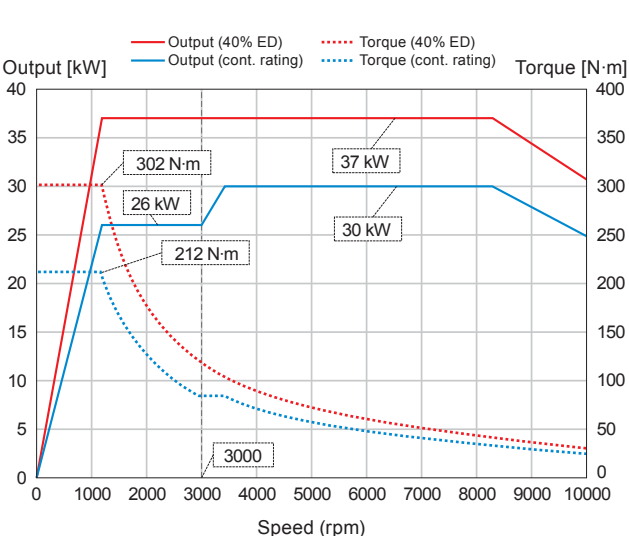
Output	Torque
AC 30 kW (40 HP) (40% ED)	442 N·m (40% ED)
	318 N·m (cont. rating)



VARIAXIS i-800T, i-1050T

10000 rpm spindle

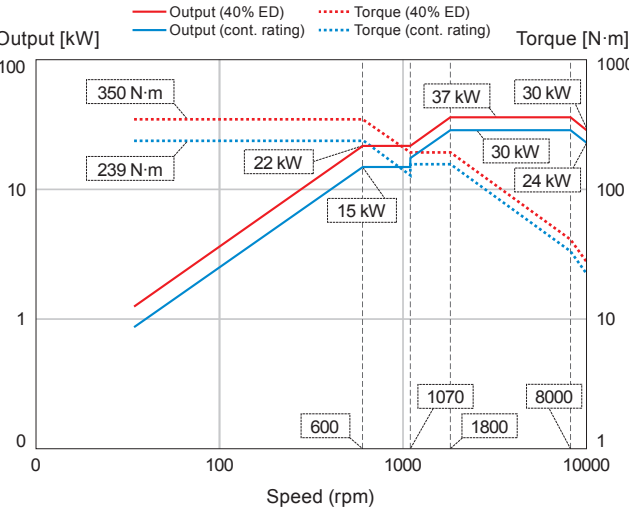
Output	Torque
AC 37 kW (50 HP) (40% ED)	302 N·m (40% ED)
	212 N·m (cont. rating)



VARIAXIS i-800, i-1050

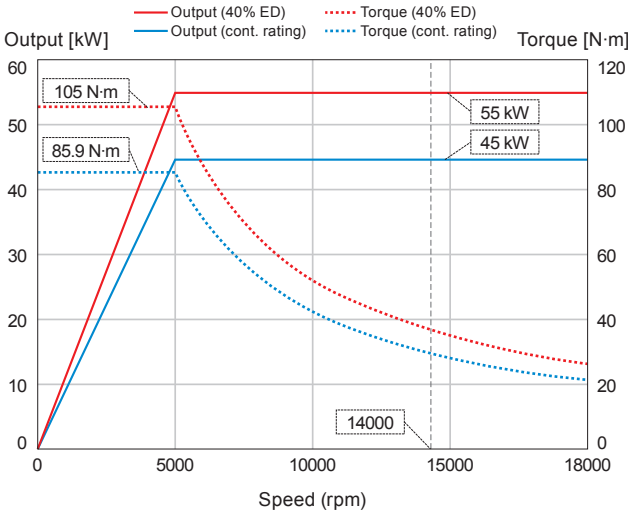
10000 rpm spindle

Output	Torque
AC 37 kW (50 HP) (40% ED)	350 N·m (40% ED)
	239 N·m (cont. rating)



18000 rpm spindle (HSK-A100) **OPTION**

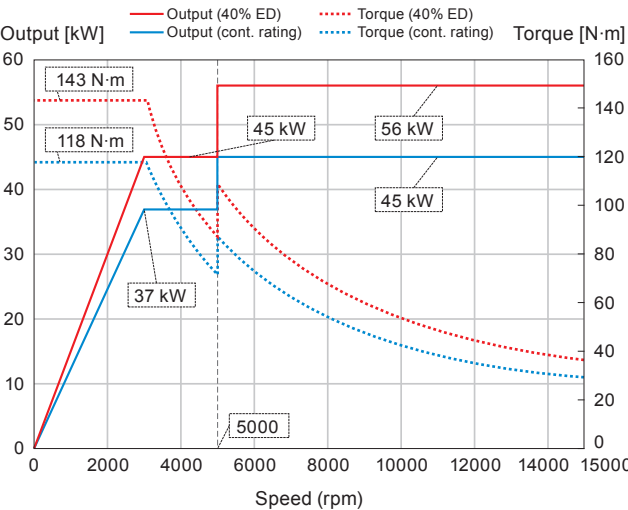
Output	Torque
AC 55 kW (74 HP) (40% ED)	105 N·m (40% ED)
	85.9 N·m (cont. rating)



VARIAXIS i-800T, i-1050T

15000 rpm spindle **OPTION**

Output	Torque
AC 56 kW (75 HP) (40% ED)	143 N·m (40% ED)
	118 N·m (cont. rating)



5000 rpm High-torque spindle **OPTION**

Output	Torque
AC 37 kW (50 HP) (40% ED)	715 N·m (40% ED)
	525 N·m (cont. rating)

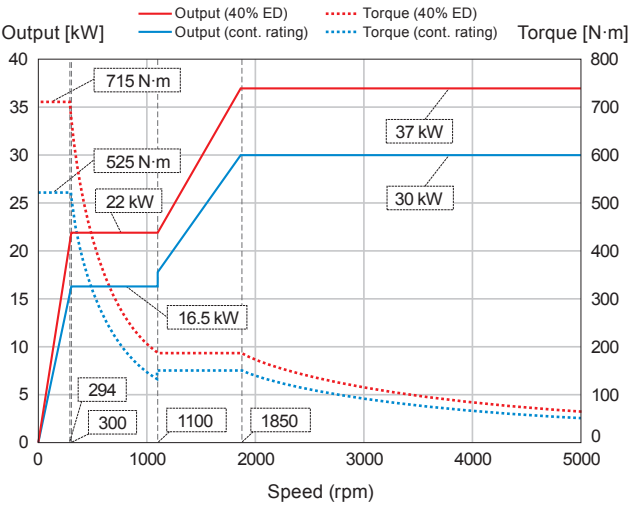
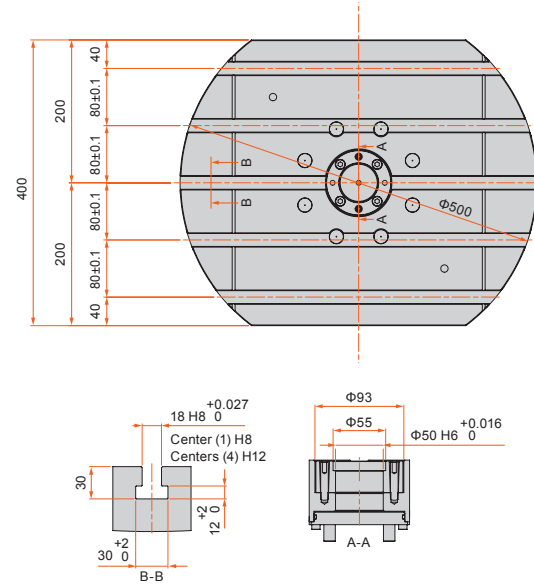


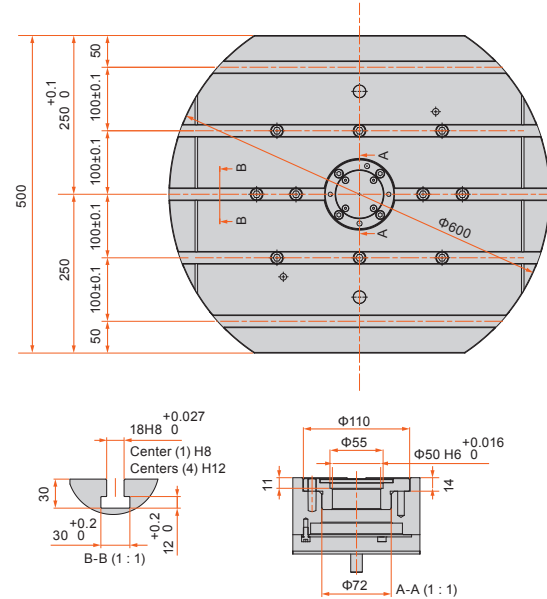
Table Dimensions

Unit: mm

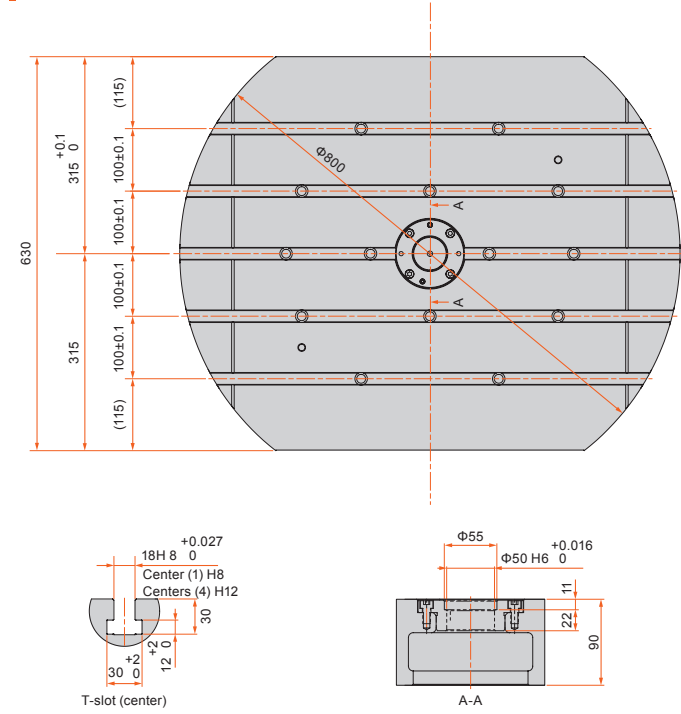
VARIAXIS i-500



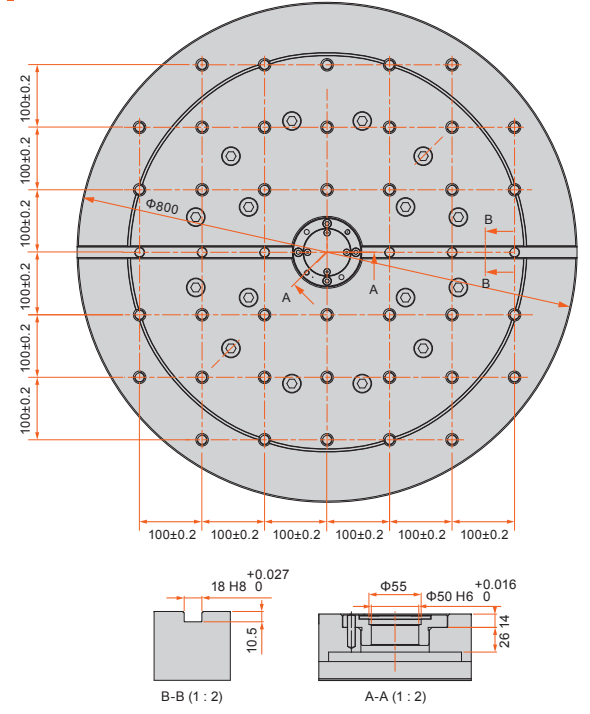
VARIAXIS i-600



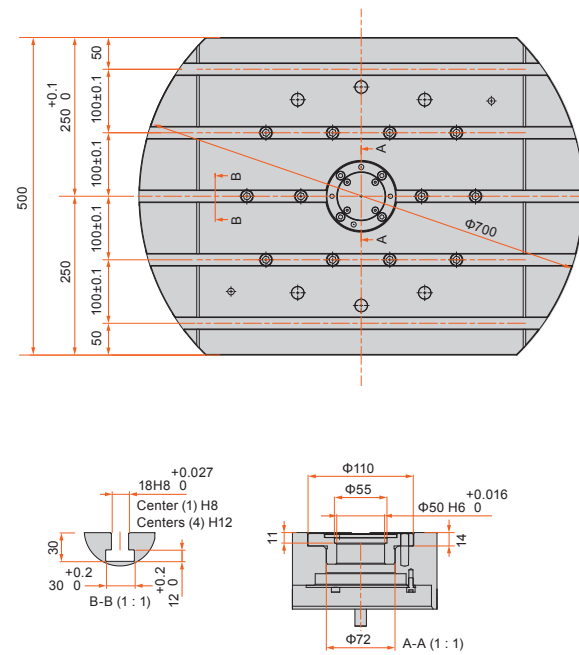
VARIAXIS i-800



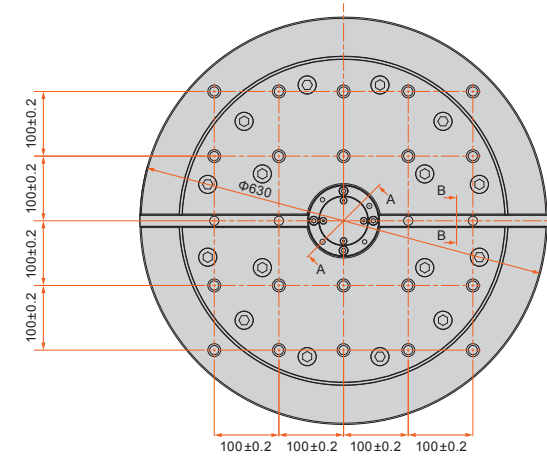
VARIAXIS i-800T



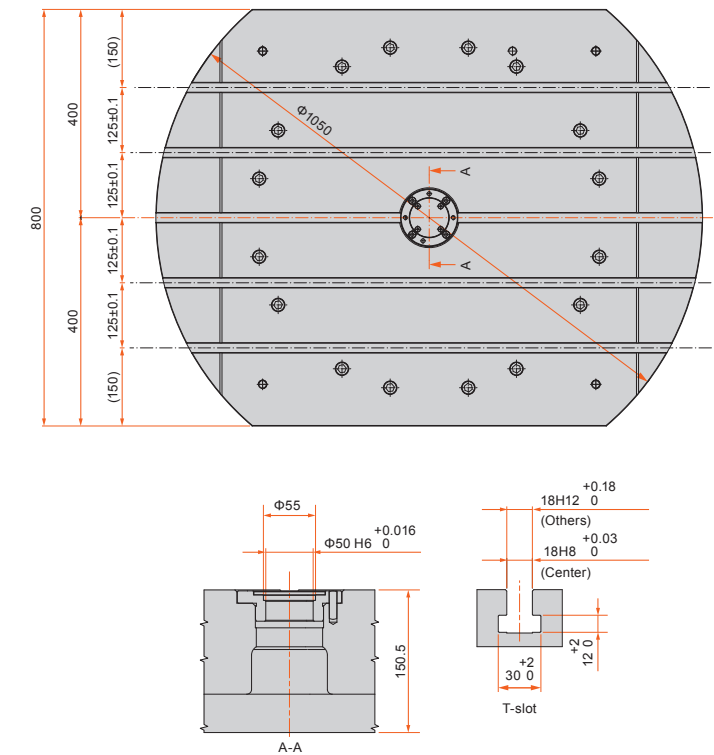
VARIAXIS i-700



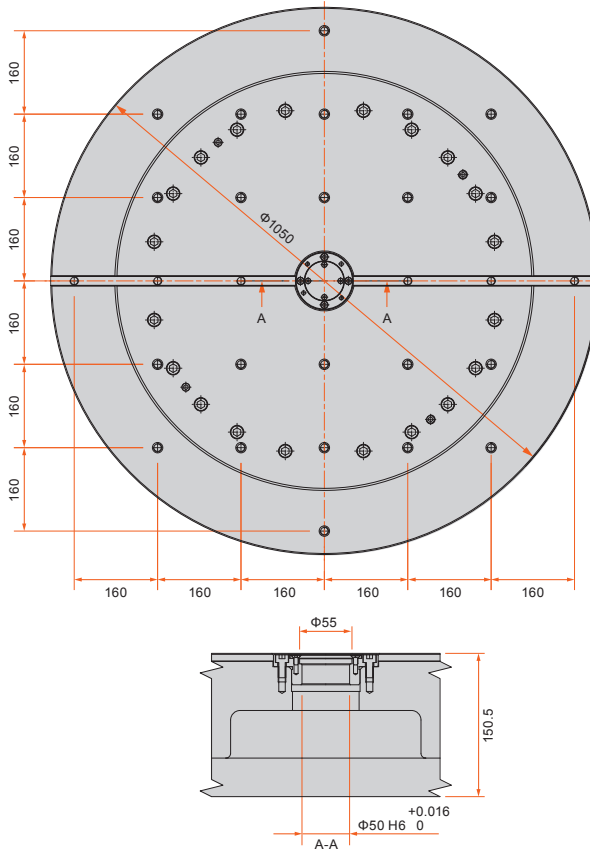
VARIAXIS i-700T



VARIAXIS i-1050



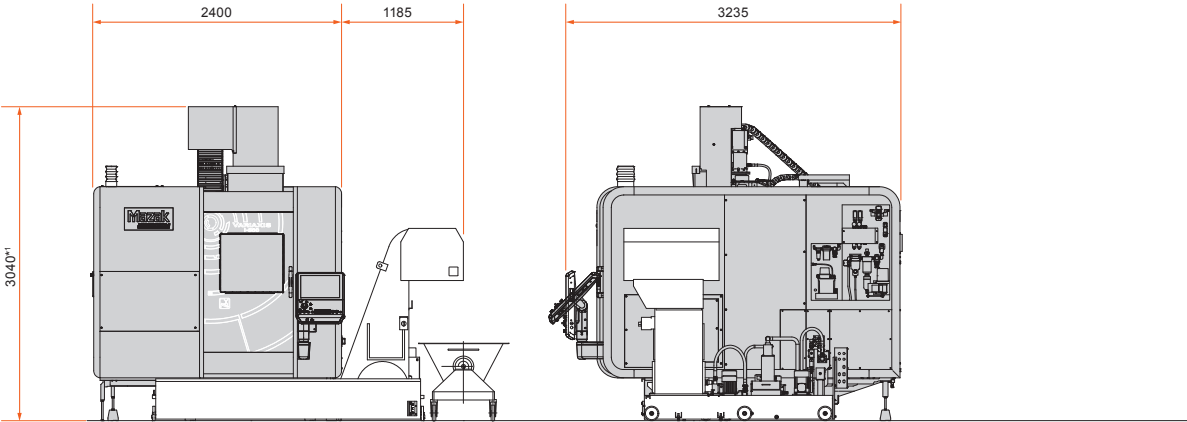
VARIAXIS i-1050T



Machine Dimensions

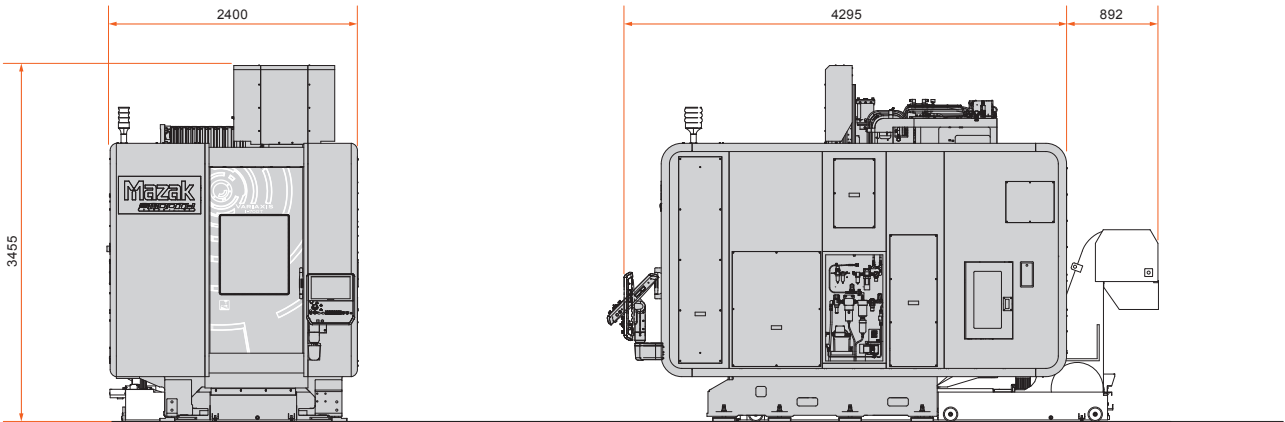
Unit: mm

VARIAXIS i-500



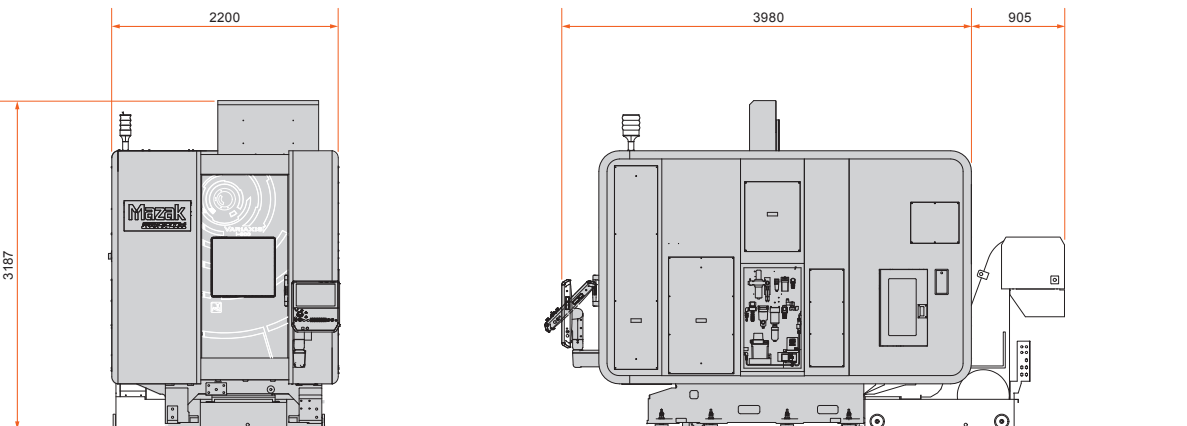
* Shown with optional ConSep II WS chip conveyor side discharge and status light
* Standard specification is 2975 mm

VARIAXIS i-700T



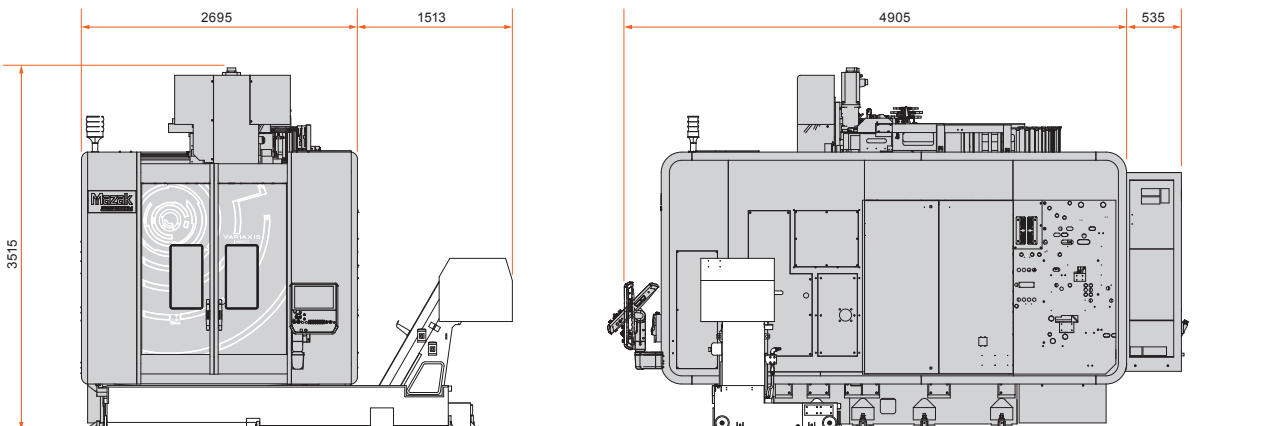
* Shown with optional ConSep II WS chip conveyor rear discharge and status light

VARIAXIS i-600



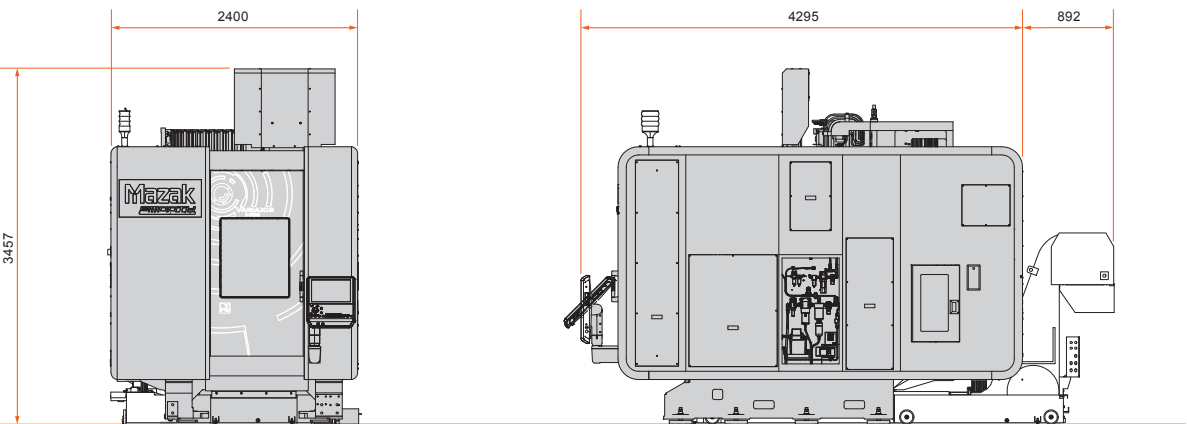
* Shown with optional ConSep II WS chip conveyor rear discharge and status light

VARIAXIS i-800



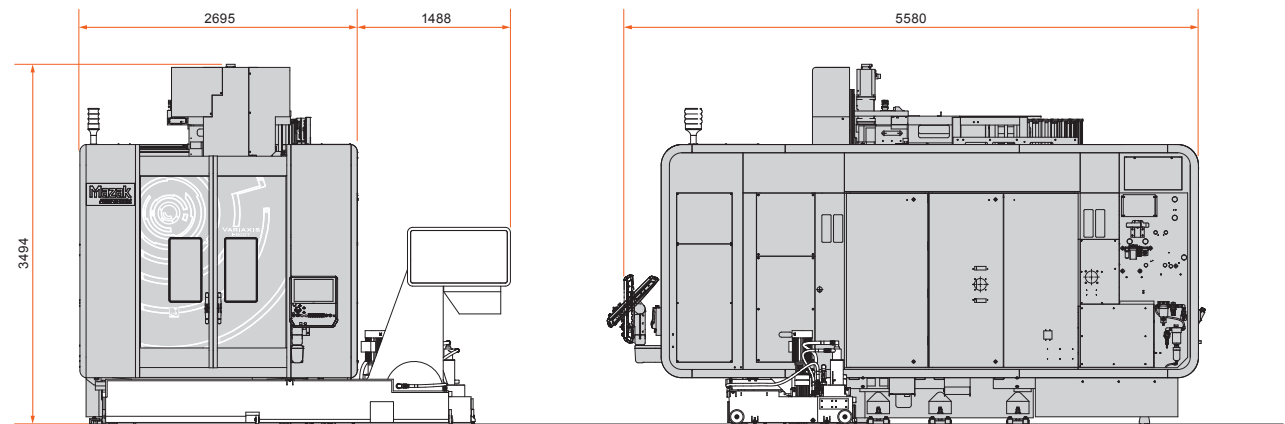
* Shown with optional ConSep chip conveyor side discharge and status light

VARIAXIS i-700



* Shown with optional ConSep II WS chip conveyor rear discharge and status light

VARIAXIS i-800T

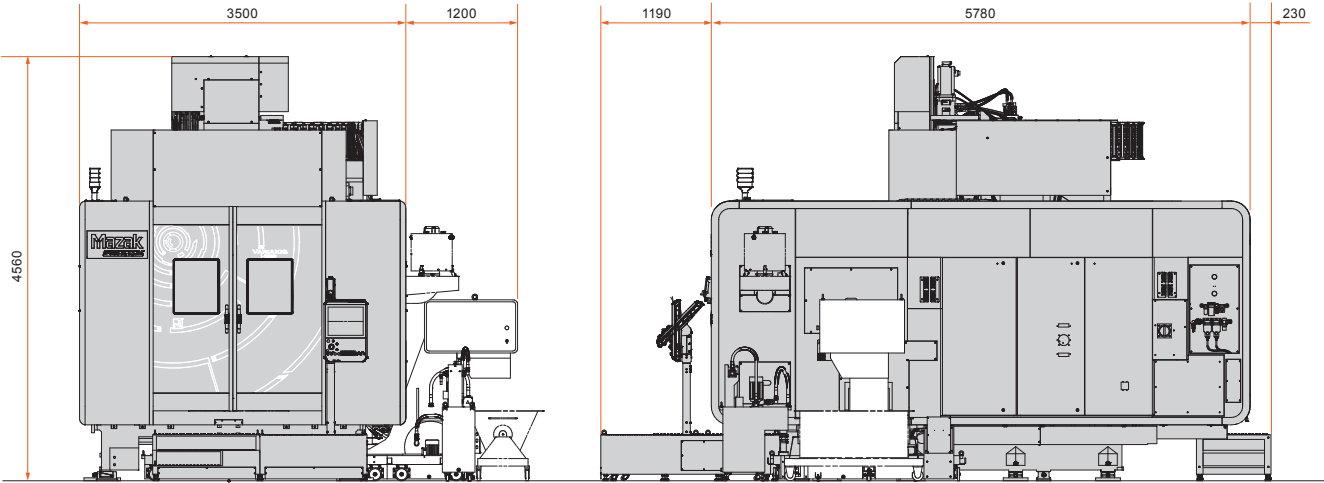


* Shown with optional ConSep II WS chip conveyor side discharge and status light

Machine Dimensions

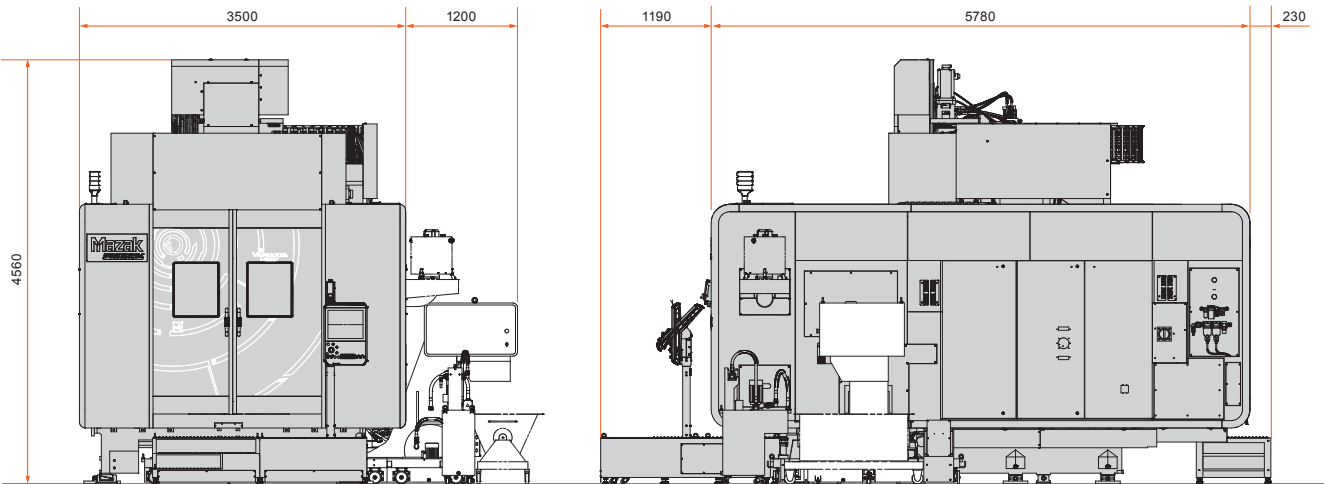
Unit: mm

VARIAXIS i-1050



* Shown with optional ConSep II WS chip conveyor side discharge and status light

VARIAXIS i-1050T



* Shown with optional ConSep II WS chip conveyor side discharge and status light

Standard Machine Specifications

		VARIAXIS i-500	VARIAXIS i-600
Stroke	X-axis travel (spindle head left / right)	350 mm	510 mm
	Y-axis travel (spindle head back / forth)	550 mm	910 mm
	Z-axis travel (spindle head up / down)	510 mm	
	A-axis travel (table tilt)	-120° ~ +30°	
	C-axis travel (table rotation)	±360°	
Table	Distance from table top to spindle nose	50 mm ~ 560 mm (table horizontal)	70 mm ~ 580 mm (table horizontal)*1
	Table size	Φ500 mm × Width 400 mm	Φ600 mm × Width 500 mm
	Max. workpiece size	Φ500 mm × 350 mm	Φ700 mm × 450 mm
	Table load capacity (evenly distributed)	300 kg	500 kg
	Table surface configuration	18 mm T-slot × 5 80 mm pitch	18 mm T-slot × 5 100 mm pitch
Milling Spindle	Max. spindle speed	12000 rpm	
	Spindle taper	No. 40	
	Spindle bearing I.D.	Φ80 mm	
Feedrate	Rapid traverse rate (X-, Y-axis / Z-axis)	60 m/min / 56 m/min	
	Rapid traverse rate (A-, C-axis)	18000°/min	
	Cutting feedrate*2 (X-, Y-, Z-axis)	56 m/min	
	Cutting feedrate*2 (A-, C-axis)	18000°/min	
	Simultaneously controlled axes	5	
	Min. indexing increment (A-, C-axis)	0.0001°	
	Indexing time (A-axis) (clamp / unclamp time not included)	0.50 sec. / 90°	0.55 sec. / 90°
Automatic tool changer	Tool shank configuration	No. 40	
	Tool storage capacity	30	
	Max. tool diameter / length (from gauge line) / weight	Φ90 mm / 300 mm / 8 kg	
	Max. tool diameter with adjacent tool pockets empty	Φ130 mm	
	Tool selection method	Random selection, shortest path	
	Tool change time (chip-to-chip)	4.5 sec.	3.4 sec.
Motors	Spindle motor (40% ED / cont. rating)	22 kW (30 HP) / 15 kW (20 HP)	
	Electrical power requirement (40% ED / cont. rating)	51.07 kVA / 41.17 kVA	61.04 kVA / 51.3 kVA
	Air supply	200 NL/min	360 NL/min
Coolant	Coolant tank capacity	300 L	500 L
Machine size	Height	2975 mm	3187 mm
	Width	2400 mm	2200 mm
	Length	3235 mm	3980 mm
	Machine weight	8000 kg	13000 kg
Sound	Equivalent continuous sound pressure level at operator position (depend on equipment options)	Less than 80 dB (A)	

*1 Specifications are different for 2 pallet changer

*2 Limited feedrate with continuous movement

Standard Machine Specifications

		VARIAXIS i-700	VARIAXIS i-700T
Stroke	X-axis travel (spindle head left / right)	630 mm	
	Y-axis travel (spindle head back / forth)	1100 mm	
	Z-axis travel (spindle head up / down)	600 mm	
	A-axis travel (table tilt)	−120° ~ +30°	
	C-axis travel (table rotation)	±360°	
Table	Distance from table top to spindle nose	100 mm ~ 700 mm (table horizontal)	
	Table size	Φ700 mm × Width 500 mm	Φ630 mm
	Max. workpiece size	Φ850 mm × 500 mm	
	Table load capacity (evenly distributed)	700 kg	
	Table surface configuration	18 mm T-slot × 5 100 mm pitch	M16 × P2 tapped holes
Turning	Turning table speed	—	1100 rpm
Milling Spindle	Max. spindle speed	12000 rpm	18000 rpm
	Spindle taper	No. 40	
	Spindle bearing I.D.	Φ80 mm	Φ70 mm
Feedrate	Rapid traverse rate (X-, Y-axis / Z-axis)	60 m/min / 56 m/min	60 m/min / 56 m/min
	Rapid traverse rate (A- / C-axis)	18000°/min / 18000°/min	18000°/min / 36000°/min
	Cutting feedrate** (X-, Y-, Z-axis)	56 m/min	56 m/min
	Cutting feedrate** (A- / C-axis)	18000°/min / 18000°/min	18000°/min / 36000°/min
	Simultaneously controlled axes	5	
	Min. indexing increment (A-, C-axis)	0.0001°	
	Indexing time (A-axis) (clamp / unclamp time not included)	0.55 sec. / 90°	0.75 sec. / 90°
Automatic tool changer	Tool shank configuration	No. 40	
	Tool storage capacity	30	
	Max. tool diameter / length (from gauge line) / weight	Φ90 mm / 360 mm / 8 kg	
	Max. tool diameter with adjacent tool pockets empty	Φ130 mm	
	Tool selection method	Random selection, shortest path	
	Tool change time (chip-to-chip)	3.6 sec.	4.1 sec.
Motors	Spindle motor (40% ED / cont. rating)	22 kW (30 HP) / 15 kW (20 HP)	30 kW (40 HP) / 22 kW (30 HP)
	Electrical power requirement (40% ED / cont. rating)	62.70 kVA / 52.95 kVA	78.93 kVA / 67.58 kVA
	Air supply	360 NL/min	450 NL/min
Coolant	Coolant tank capacity	500 L	
Machine size	Height	3457 mm	3455 mm
	Width	2400 mm	
	Length	4295 mm	
	Machine weight	15000 kg	16000 kg
Sound	Equivalent continuous sound pressure level at operator position (depend on equipment options)	Less than 80 dB (A)	

** Limited feedrate with continuous movement

		VARIAXIS i-800	VARIAXIS i-800T
Stroke	X-axis travel (spindle head left / right)	730 mm	
	Y-axis travel (spindle head back / forth)	850 mm	
	Z-axis travel (spindle head up / down)	560 mm	
	A-axis travel (table tilt)	−120° ~ +30°	−130° ~ +30°
	C-axis travel (table rotation)	±360°	
Table	Distance from table top to spindle nose	230 mm ~ 790 mm (table horizontal)	
	Table size	Φ800 mm × Width 630 mm	Φ800 mm
	Max. workpiece size	Φ1000 mm × 375 mm (Φ800 mm × 500 mm)	
	Table load capacity (evenly distributed)	1000 kg	
	Table surface configuration	18 mm T-slot × 5 100 mm pitch	M16 × P2 tapped holes
Turning	Turning table speed	—	800 rpm
Milling Spindle	Max. spindle speed	10000 rpm	
	Spindle taper	No. 50	
	Spindle bearing I.D.	Φ100 mm	
Feedrate	Rapid traverse rate (X-, Y-, Z-axis)	42 m/min	42 m/min
	Rapid traverse rate (A- / C-axis)	18000°/min / 18000°/min	10800°/min / 36000°/min
	Cutting feedrate** (X-, Y-, Z-axis)	42 m/min	42 m/min
	Cutting feedrate** (A-, C-axis)	9000°/min	10800°/min
	Simultaneously controlled axes	5	
	Min. indexing increment (A-, C-axis)	0.0001°	
	Indexing time (A-axis) (clamp / unclamp time not included)	0.76 sec. / 90°	0.72 sec. / 90°
Automatic tool changer	Tool shank configuration	No. 50	
	Tool storage capacity	30	
	Max. tool diameter / length (from gauge line) / weight	Φ125 mm / 400 mm / 20 kg	
	Max. tool diameter with adjacent tool pockets empty	Φ210 mm	
	Tool selection method	Random selection, shortest path	
	Tool change time (chip-to-chip)	4.5 sec.	5.1 sec.
Motors	Spindle motor (40% ED / cont. rating)	37 kW (50 HP) / 30 kW (40 HP)	
	Electrical power requirement (40% ED / cont. rating)	89.82 kVA / 78.62 kVA	106.80 kVA / 96.88 kVA
	Air supply	300 NL/min	500 NL/min
Coolant	Coolant tank capacity	400 L	
Machine size	Height	3515 mm	3494 mm
	Width	2695 mm	2695 mm
	Length	5440 mm	5580 mm
	Machine weight	19600 kg	20000 kg
Sound	Equivalent continuous sound pressure level at operator position (depend on equipment options)	Less than 80 dB (A)	

** Limited feedrate with continuous movement

Standard Machine Specifications

		VARIAXIS i-1050	VARIAXIS i-1050T
Stroke	X-axis travel (spindle head left / right)	1200 mm	
	Y-axis travel (spindle head back / forth)	1385 mm	
	Z-axis travel (spindle head up / down)	900 mm	
	A-axis travel (table tilt)	-150° ~ +130°	
	C-axis travel (table rotation)	±360°	
Table	Distance from table top to spindle nose	180 mm ~ 1080 mm (table horizontal)	
	Table size	Φ1050 mm × Width 800 mm	Φ1050 mm
	Max. workpiece size*1	Φ1250 mm × 900 mm	
	Table load capacity (evenly distributed)	2000 kg	
	Table surface configuration	18 mm T-slot × 5 125 mm pitch	M16 × P2 tapped holes
Turning	Turning table speed	—	500 rpm
Milling Spindle	Max. spindle speed	10000 rpm	
	Spindle taper	No. 50	
	Spindle bearing I.D.	Φ100 mm	
Feedrate	Rapid traverse rate (X-, Y-, Z-axis)	40 m/min	
	Rapid traverse rate (A- / C-axis)	5400°/min / 10800°/min	
	Cutting feedrate*2 (X-, Y-, Z-axis)	40 m/min	
	Cutting feedrate*2 (A-, C-axis)	5400°/min	
	Simultaneously controlled axes	5	
	Min. indexing increment (A-, C-axis)	0.0001°	
	Indexing time (A-axis) (clamp / unclamp time not included)	1.09 sec. / 90°	
Automatic tool changer	Tool shank configuration	No. 50	
	Tool storage capacity	30	
	Max. tool diameter / length (from gauge line) / weight	Φ125 mm / 500 mm / 20 kg	
	Max. tool diameter with adjacent tool pockets empty	Φ210 mm	
	Tool selection method	Random selection, shortest path	
Motors	Tool change time (chip-to-chip)	7.0 sec.	
	Spindle motor (40% ED / cont. rating)	37 kW (50 HP) / 30 kW (40 HP)	
	Electrical power requirement (40% ED / cont. rating)	111.04 kVA / 101.11 kVA	111.71 kVA / 101.79 kVA
	Air supply	480 NL/min	500 NL/min
Coolant	Coolant tank capacity	580 L	
Machine size	Height	4560 mm	
	Width	3500 mm	
	Length	7200 mm	
	Machine weight	31000 kg	
Sound	Equivalent continuous sound pressure level at operator position (depend on equipment options)	Less than 80 dB (A)	

*1 Limited by A-axis angle
*2 Limited feedrate with continuous movement

MAZATROL SmoothX 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*
Interpolation	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Cylindrical interpolation, Polar coordinate interpolation, Constant lead threading*1, Re-threading**1, Thread start point compensation**1, Thread cut-speed override**1, Synchronous tapping*	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Spiral interpolation, Helical interpolation, Constant lead threading*1, Variable lead threading*1, Threading (C-axis interpolation type)*1, Cylindrical interpolation*, Involute interpolation*, Fine spline interpolation*, NURBS interpolation*, Polar coordinate interpolation*, Re-threading**1, Thread start point compensation**1, Thread cut-speed override**1, 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 function	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)*1, Tool life monitoring (wear)*1	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)*1, Tool life monitoring (wear)*1
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 nose shape offset*1, Tool wear offset, Fixed amount offset*1, Simple wear offset*1	Tool position offset, Tool length offset, Tool diameter / tool nose R offset, Tool wear offset, Fixed amount offset*1, Simple wear offset*1
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 II*, Shaping function*, Dynamic compensation II*, 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, 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, Machine lock	Optional block skip, Optional stop, Dry run, Manual handle interruption, MDI interruption, TPS, Restart, Restart 2, Collation stop, Machine lock
Manual measuring function	Tool length teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine, Tool eye measurement*1	Tool length teach, Tool offset teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine, Tool eye measurement*1
Automatic measuring function	WPC coordinate measurement, Automatic tool length measurement, Workpiece measurement*1, Sensor calibration, Tool eye auto tool measurement*1, Tool breakage detection	Automatic tool length measurement, Workpiece measurement*1, Sensor calibration, Tool eye auto tool measurement*1, Tool breakage detection
MDI measurement	Semi automatic tool length measurement, Full automatic tool length measurement, Coordinate measurement	
Peripheral network	PROFIBUS-DP*, EtherNet/IP*, CC-Link*	
Interface	SD card interface, USB	
EtherNet	10 M / 100 M / 1 Gbps	

* Option
*1 Turning only

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