

### Standard Machine Specifications

Capacity	Max. swing	Φ320 mm
	Max. machining diameter	Φ320 mm
	Distance between spindles with Z-axes at home	1250 mm
	Maximum weight capacity*1 : Chuck work	300 kg
	Maximum work transfer diameter	Φ254 mm
Travel	X-axis travel (turrets in / out) X1 / X2	230 mm / 230 mm
	Z-axis travel (headstocks left / right) Z1 / Z2	500 mm / 500 mm
	Chuck size	8"
Spindle	Number of spindles	2
	Spindle speed*3	5000 min <sup>-1</sup>
	Number of spindle speed ranges	1-Stepless
	Spindle nose / spindle bore	JIS A2-6 / Φ76 mm
	Bar work capacity*2	Φ65 mm (Optional 10" through-hole chuck)
Turret	Number of turrets	2
	Turret type	12 position turret
	Number of tools	12 × 2
	Turning tool shank size	25 mm
	Boring bar shank diameter	Φ40 mm
	Turret indexing time	0.5 s / 1 step / 1.4 s / full step
	Feedrate	Rapid traverse rate : X-axis (X1 / X2)
Rapid traverse rate : Z-axis (Z1 / Z2)		33.0 m/min / 33.0 m/min
Motors	Spindle motor (40% ED / Cont. rating)	15 kW (20 HP) / 11 kW (15 HP)
	Coolant pump motor	180W × 2
Power requirement	Electrical power requirement (Cont. rating)	38.9 kVA
	Air supply	0.5 ~ 1.0 MPa (5 ~ 10 kgf/cm <sup>2</sup> ), 500 L/min
Coolant	Tank capacity	235 L
	Machine size	
Machine size	Machine height	2090 mm
	Floor space requirement	3420 mm × 1795 mm
	Weight	6800 kg
Sound	Equivalent continuous sound pressure level at operator position (dependant on equipment options)	Less than 80 db (A)

\*1 Chuck weight is included \*2 Maximum bar work capacity varies according to type of chuck \*3 Spindle speed and maximum machining length depend on chuck specifications □ □ □

### Standard and Optional Equipment

		● : Standard equipment	○ : Optional equipment	
Machine	5000 rpm, 15 kW spindle	●		
	5000 rpm, 22 kW spindle	○		
	Spindle orientation	○		
	12D turret	●		
	Automatic partition	●		
	Z-axis synchronization	●		
	Work light	●		
	Foundation kit	●		
	Chucks	8" non through-hole chuck	○	
		8" through-hole chuck	●	
10" through-hole chuck		○		
Chuck jaws opening / closing position sensor		○		
Safety	Operator door interlock	●		
	Overload detection system	○		
	Hydraulic pressure interlock	○		
	Double foot pedal switch for chuck	●		
High-accuracy	Coolant temperature control system	○		
Factory automation	Unloading system	○		
	Bar feeder interface kit (L side)	○		
	Gantry loader system (GL-100)	○		
	Gantry loader system	2 pallet work conveyor	○	
		Pitch-feed work conveyor	○	
		Rotary work conveyor	○	
	Automatic workpiece transfer system	●		
	Factory automation	Automatic chuck jaw open / close	●	
		Automatic opening / closing front door (L, R)	○	
		Automatic opening / closing front door (L)	○	
Automatic power off		●		
Automatic power ON / OFF + warm-up operation		○		
Tool life management		●		
Tool eye		●		
Absolute position detection		●		
Machining end buzzer		○		
Status light (3 colors)		○		
Status light (1 color)	○			
Coolant / Chip disposal	Coolant system (180 W × 2)	●		
	Chuck jaw air blast	●		
	Workpiece transfer air blast	○		
	Mist collector	○		
	Turret air blast	○		
	Powerful coolant (520 W × 2)	○		
	Powerful coolant (1.1 kW × 2)	○		
	Additional Coolant nozzle (head side)	○		
	SUPERFLOW V30C-J	○		
	15 kg/cm <sup>2</sup> coolant	○		
Chip conveyor (rear / hinge type)	○			
Preparation for chip conveyor (rear)	●			

# DUAL TURN 200

[ 2 Spindle, 2 Turret CNC Turning Center ]

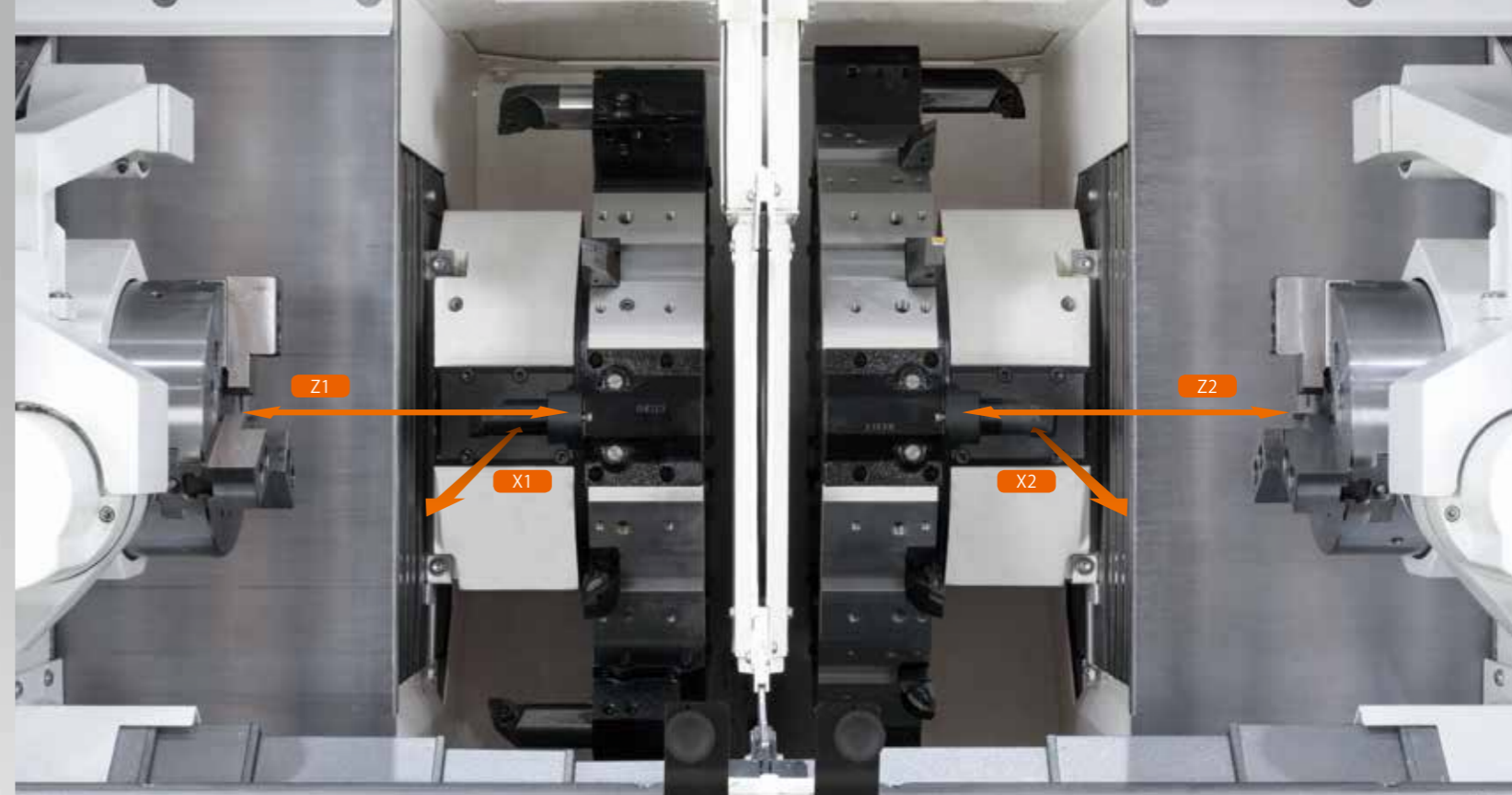


Twin spindle / twin turret turning center

# DUAL TURN 200

Integration of two 2-axis CNC Turning Centers into a single machine tool

- 2 machining areas for continuous machining
- Automatic transfer of workpiece from left to right spindles
- Reduced floor space, in-process inventory and operator requirements

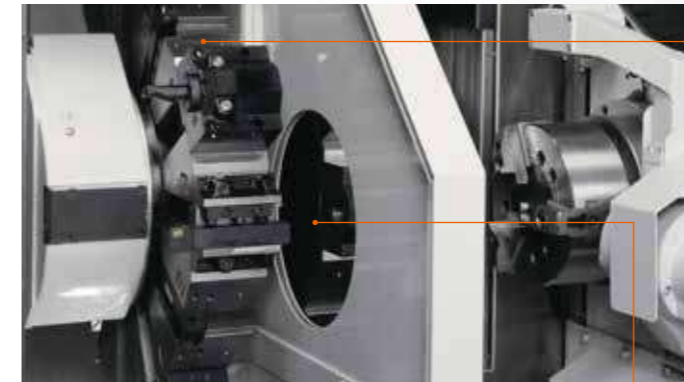


- 2 spindle / 2 turret configuration ensures higher machining capacity
- 15 kW (20HP) [40% ED] integral spindle / motors with minimum vibration and heat generation for high-accuracy machining  
Φ65 mm bar work capacity
- Non-lift indexing 12 position turrets with fast 1.4 second chip-to-chip tool change time
- Rapid traverse rate of 30.5 m/min for turrets (X-axis) , 33 m/min for headstocks (Z-axis) reduce non-cutting time
- Wide range of factory automation equipment available, such as gantry robot, for improved productivity
- Ergonomic design for convenient operation

# Higher Productivity

Both left and right spindles utilize 15 kW (20 HP) [40% ED] integral spindle / motors

Integral spindle / motors minimize vibration and heat generation to ensure high-accuracy machining



### Non-lift indexing 12 position turrets (L & R)

With the non-lift rotary indexing, high speed turret clamping / unclamping can be performed with minimum interference. Additionally, thanks to random selection / shortest path indexing, chip-to-chip time when changing tools is extremely fast. Bolt-on tool holders are used by these turrets.

- Smooth acceleration / deceleration and high-gain servo control
- Rapid traverse rate of 30.5 m/min (X-axis), 33 m/min (Z-axis)
- High speed non-lift turret indexing of 0.5 sec (1 step), 1.4 sec (full step)

### Automatic workpiece transfer (standard)

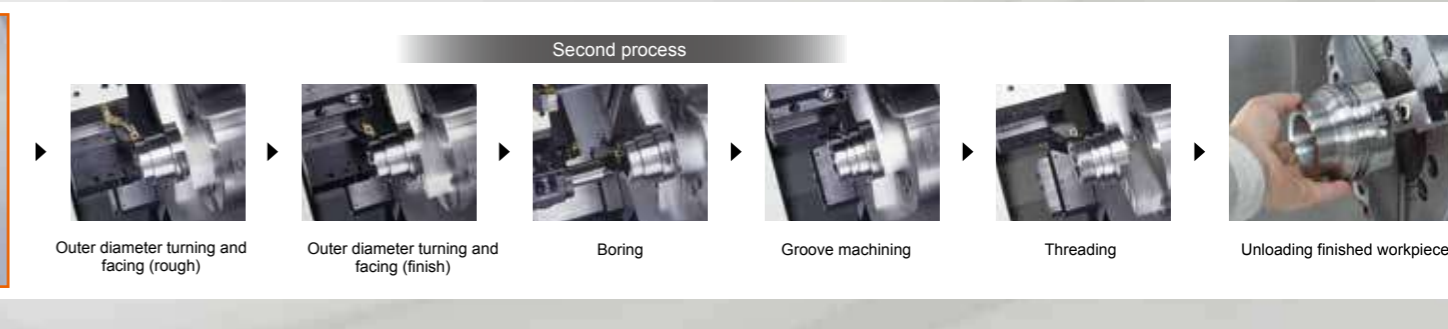
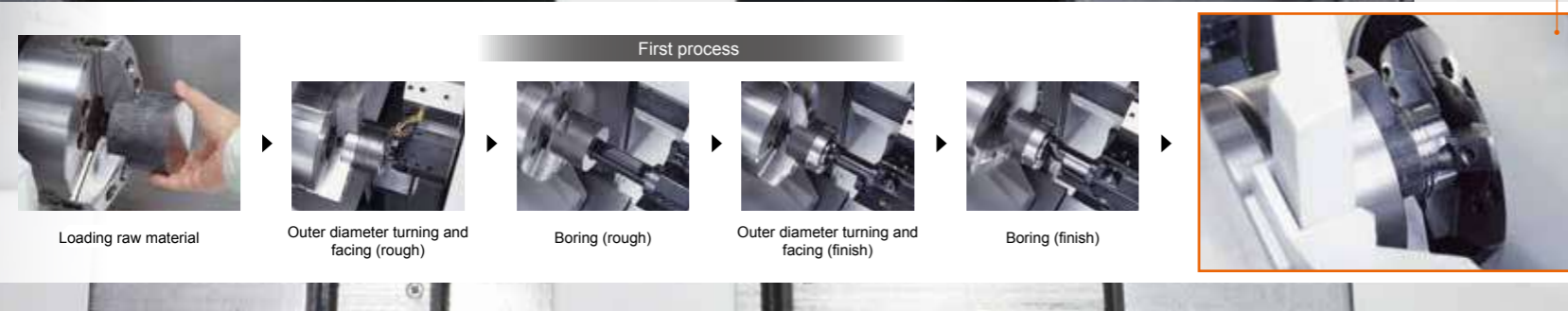
Automatic and high accuracy workpiece transfer from left to right spindles makes it possible to perform continuous machining. As a result, there is no in-process inventory of workpieces between the first and second processes.

### Automatic partition (standard)

The automatic partition completely isolates the two machining areas - allowing machining to be performed by one spindle while the other one is being setup for new workpiece. (Shown with automatic partition open)

## Integration of two 2-axis CNC turning centers into a single machine tool

- No in-process inventory between first and second processes
- Smaller working area for operator
- **30%** smaller floor space
- When compared to two 2-axis CNC turning centers, these is a considerable difference in floor space requirements due to the dead space between machines, space required for chip conveyors and maintenance and storage for in-process workpieces between processes.



# Higher Accuracy

# Ergonomics

## Integral spindle / motors (L & R)

The integral spindle / motors provide high accuracy machining and minimum vibration during spindle acceleration as well as minimum heat generation.

## Linear roller guides on all axes

Linear roller guides are utilized on all axes by the DUAL TURN 200 for high rigidity and a long service life.



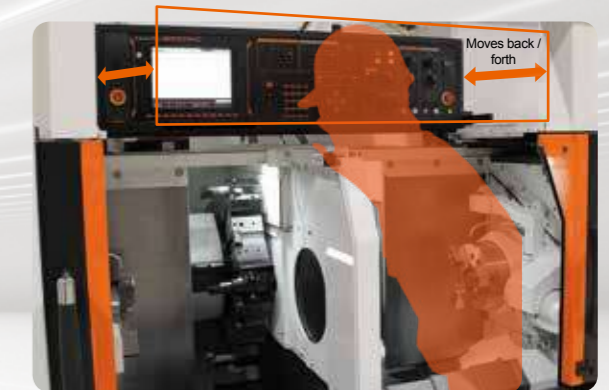
## Machine design

Using CAD FEA, main machine components such as the bed and column are designed to withstand the forces generated by heavy duty cutting and high-speed operation.

## Convenient operation and maintenance thanks to the ergonomic machine design

### CNC operation panel

MAZATROL SmoothC operation panel is easily adjusted to the operator's desired position.



### 550 mm wide door opening (both left and right sides)

The wide overhead door opening provides convenient workpiece loading / unloading when using an overhead crane. (Opening width 525 mm when equipped with Gantry loader)

### Detachable cover

Thanks to detachable cover, chips are disposed smoothly.

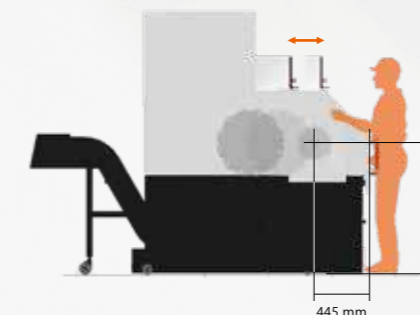
### Smooth chip flow

Surface such as the Z-axis covers in the machining area are either slanted or vertical to prevent the accumulation of hot machined chips. The smooth chip flow prevents heat built-up in the machine to ensure consistent, high accuracy operation plus simplifies machine cleaning.



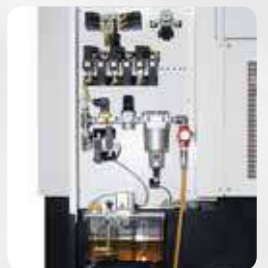
### Convenient setup

The distance from the front cover to the spindle center line is small for convenient setup and workpiece loading / unloading.



### Ease of maintenance

All the items that require frequent access, such as hydraulic and pneumatic valves and lubrication inlets, are at one central location for convenient daily maintenance.



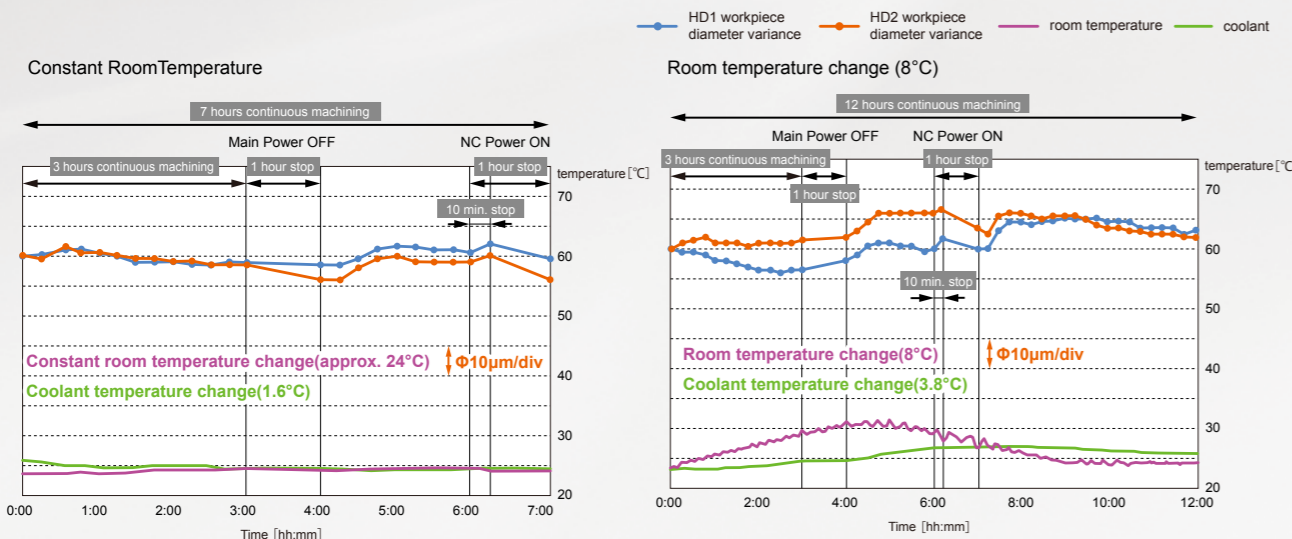
### Color-coded cables

Electric cables are color-coded for convenient maintenance.



## Heat Displacement Control THERMAL SHIELD

The THERMAL SHIELD is an automatic compensation system 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.



# Factory Automation

## Automation equipment(option)



### Unload system

Continuous machining of chuck work can be performed. Operator loads workpiece into chuck and then finished workpiece is unloaded by unloading hand.

Workpiece conveyor

### Bar Feeder + Unloading hand

Perform continuous machining of bar material - finished workpieces are removed from right spindle chuck by unloading hand. Bar work capacity is  $\Phi 65$  mm.



### Gantry Loader system

Automatic and continuous machining from first to second process for chuck / shaft workpieces can be performed. The material is automatically loaded in the machine and the finished workpiece unloaded by the gantry robot.



Rotary conveyor

Pitch-feed conveyor



(2 pallet workpiece conveyor)

## Improved Gantry Loader system performance

(2 pallet workpiece conveyor)

Workpiece loading / unloading time\* **reduced 20%** compared to previous system  
 (\* Internal machine operation)

Previous Gantry loader : **25.1 sec.** ▶ GL-100 : **20.7 sec.**

Faster traverse speed : A-axis 100 m/min, B-axis 180 m/min  
 Faster workpiece loading / unloading : Improved workpiece seating in chuck by feeding headstock against workpiece

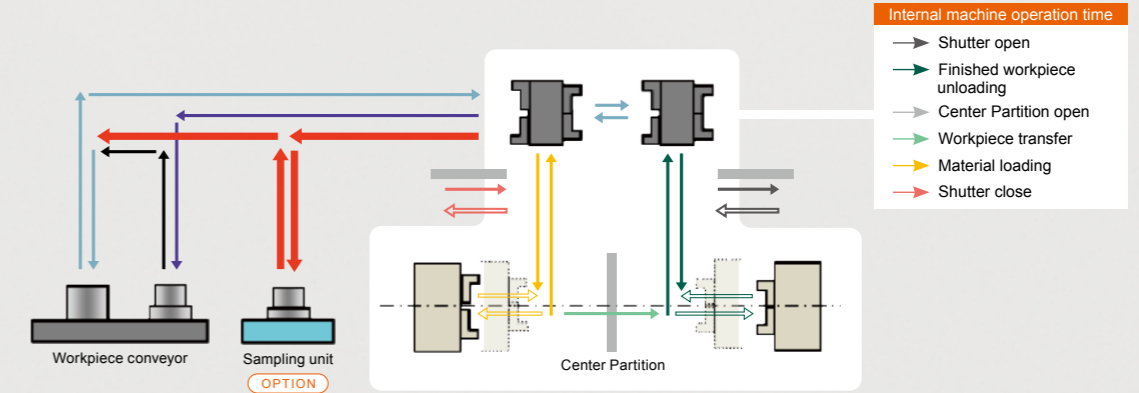


- Positioning over pallet conveyor now done by simultaneous 2-axis motion
- 2-pallet workpiece conveyor positioned at front and rear for next workpiece setup during current job

OPTION

### Motion pattern editing

System changes such as an addition of measuring / cleaning / sampling process available at the customer's field



# Ease of Programming

## MAZATROL *SMOOTHC*

The MAZATROL SmoothC CNC incorporates the latest advanced hardware and software as well as the expertise accumulated in the production of MAZATROL CNC systems for more than 35 years. It is designed to provide high productivity performance in the machining of your production requirements.

### Process home screen

The home screen displays overall process status in an easy to understand manner.



USB memory port

SD card slot

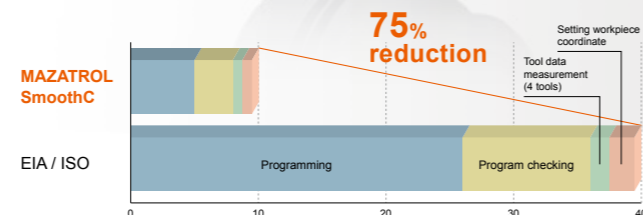
Menu keys under the display can be pressed to go to other pages for program data input and editing

Home screen key goes to the home screen from any display

Compact keypad with unique design for ease of input

### 75% reduction of setup time for the first workpiece

With the MAZATROL SmoothC, setup of the first workpiece from programming to tool path check, tool setup and work coordinate setup can be conducted in a very short period of time. Compared with other CNC systems, setup of the first workpiece can be reduced by as much as 75%. Short setup times are especially effective for the production of a wide variety of parts in small size lots. Additionally, MAZATROL programs are smaller than EIA / ISO programs, so that checking, saving and editing can be done easily.



### Programming

Ease of programming by MAZATROL conversational programming



### Tool path check

By tool path simulation an accurate machining cycle time is quickly obtained



### Tool data

Tool data can be easily input by using the graphical help display

### Position screen

Data such as Z offset • C offset can be easily input

### EIA / ISO program compatibility

The MAZATROL SmoothC G-codes are the same as used by conventional EIA CNC system machines. This allows programs made for other manufacturers' machines to be used after editing M-codes and T-codes and confirming axis-strokes and cutting conditions.

## MAZATROL SmoothC Specifications

	MAZATROL	EIA
Number of controlled axes	Simultaneous 4 axes	
Least input increment	0.0001 mm , 0.00001inch, 0.0001deg	
High speed, high precision control	Rapid traverse overlap	
Interpolation	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Constant lead threading, Re-threading*, Thread start point compensation*, Thread cut-speed override*	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Spiral interpolation, Constant lead threading, Variable lead threading, NURBS interpolation*, Re-threading*, Thread start point compensation*, Thread cut-speed override*
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, G00 slope constant*	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, Time constant changing for G1, G00 slope constant*
Program registration	Max. number of programs : 960, Program storage : 2 MB, Program storage expansion : 8 MB*, Program storage expansion : 32 MB*	
Control display	Display : 10.4" touch panel, Resolution : VGA	
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, Max. speed control for spindle	
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 nose shape offset, Tool wear offset, Fixed amount offset, Simple wear offset	
Coordinate system	Machine coordinate system, Work coordinate system, Local coordinate system, MAZATROL coordinate system, Additional work coordinates (300 set)	
Machine compensation	G0 / G1 independent backlash compensation, Pitch error compensation	
Protection functions	Emergency stop, Interlock, Stroke check before travelling, Barrier	
Automatic operation mode	Memory operation	Memory operation, Tape operation, MDI operation, EtherNet operation*
Automatic operation control	Optional stop, Dry run, Automatic handle control, MDI control, TPS, Restart, Single process, Machine lock	Optional block skip, Optional stop, Dry run, Automatic handle control, MDI control, TPS, Restart, Restart 2, Collation stop, Machine lock
Manual measuring functions	Tool-setting data teach, Tool length teach, Touch sensor coordinates measurement, Workpiece offset measurement, Tool eye measurement	Tool-setting data teach, Tool length teach, Tool offset teach, Touch sensor coordinates measurement, Workpiece offset measurement, Tool eye measurement
Automatic measuring functions	Workpiece measurement, Sensor calibration, Tool eye auto tool measurement, Tool breakage detection	
Interface	PROFIBUS-DP*, EtherNet I/P*, CC-Link*	
Card interface	SD card interface, USB	
EtherNet	10 M / 100 M / 1 Gbps	

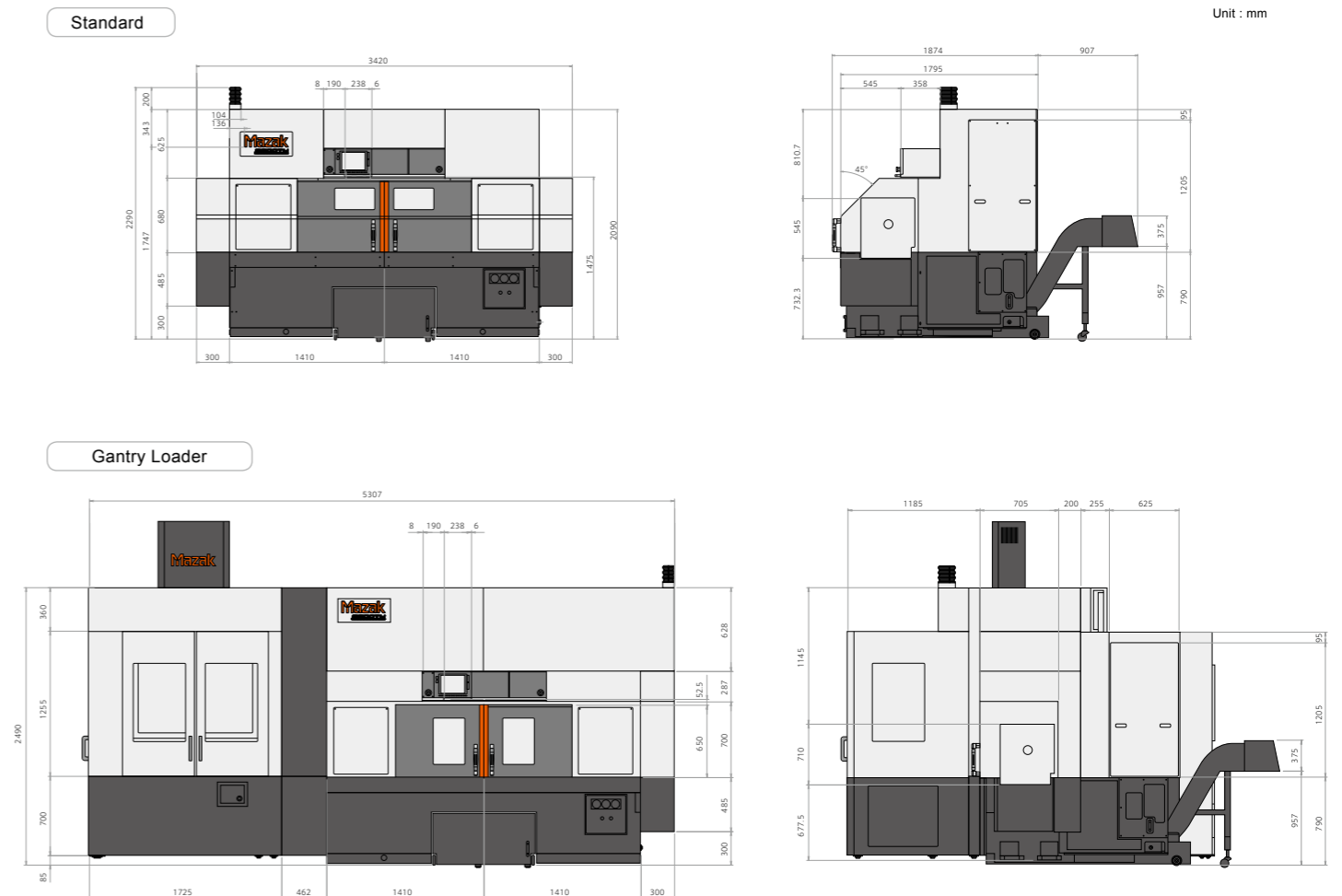
\* Option

### 3D machine model

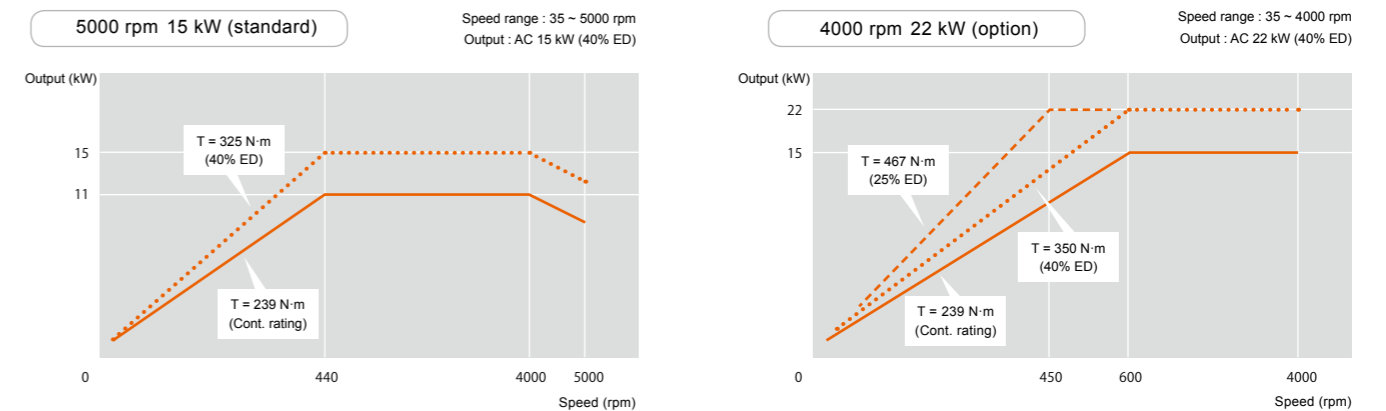
A 3D machine model is available to perform program interference checks with other CAD / CAM simulation software.



## Machine Dimensions



## Power / Torque Output Diagram



Standard and Optional Equipment

Automation • Safety

1 Tool eye (standard)

The tool eye can be programmed for automatic tool measurement and compensation as well as inspection for tool breakage. In addition, since tool setup is done by simply bringing the tool tip into contact with the tool eye, tool setup time is considerably reduced.



2 Automatic chuck jaw open / close L & R (standard)

This option automatically opens / closes the chuck jaws by program M-code such as when the machine is equipped with a bar feeder system or gantry robot.

3 High / low chuck pressure L & R

Chuck pressure can be automatically changed by program M-codes, which is effective for machining various kinds of workpieces that need frequent chuck clamping pressure changes.

4 Double foot-pedal switch L & R

The double foot-pedal switch is used to open / close the chucks of the left and right spindles separately.



5 Automatic opening / closing front door L & R

The automatic opening / closing front door operates in 3 speed steps. If an operator inadvertently places a hand in the opening, operation will automatically stop when the door contacts his hand.

6 Automatic power ON / OFF + warm-up operation

Using timer setting, power can be automatically turned on and off, as well as perform warm-up operation.

7 Spindle orientation function

This function orients the spindle to a fixed position. It is required when processing square or hexagonal shaped material with a bar feeder and for loading / unloading arbitrary shaped workpieces by a robot system.

8 Automatic workpiece measurement

This function uses a turret-mounted touch sensor to automatically measure the inside and outside diameters, surface irregularity, etc. of the machined workpiece, to perform tool compensation and to maintain machining accuracy during unattended operation. The swing arm type of automatic workpiece-measuring unit also allows highly accurate machining with a test-cutting macro (NC option) to be started from the first workpiece.



9 Status light (3 colors)

Consists of three lights : red for alarm, yellow for machining completion and green for automatic operation.



10 Hydraulic pressure interlock

Machine operation is automatically stopped after hydraulic pressure anomalies are detected by pressure switch.

Chip disposal

11 Chip conveyor (rear disposal)

Chips are smoothly discharged outside of the machine.

12 Chip bucket (rotary or fixed type)



Coolant

13 Coolant system (standard : 180 W × 2)

The coolant system supplies coolant directly to the cutting tool tips to remove the heat generated by machining as well as removing machined chips.



14 Chuck jaw air blast L & R (standard)

By discharging air from a nozzle over the chuck while it rotates, chips are removed from the chuck jaws and workpieces. This function is used during automatic operation with a bar feeder or robot system.

15 Mist collector

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

16 Coolant temperature control

Coolant will become hot due to the heat generated by machining and may cause thermal displacement to machine components that can negatively affect machining accuracy. The coolant chiller unit maintains the coolant temperature to be the same as the room temperature, ensuring high-accuracy machining over extended periods of operation.

17 Additional coolant nozzle for headstock

Coolant is discharged from a nozzle located in the upper part of the machining area to remove chips from the chuck and workpiece and to minimize heat generated by cutting.



18 High pressure coolant system SUPERFLOW V30C-J

SUPERFLOW V30C-J 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
- High performance cyclone filter with minimum maintenance requirements
- Coolant pressure easily set by M-code (pressure range from 0 to 7 MPa)

