AW MILLER
TECHNICAL SALES, INC.

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DUAL TURN 200

[2-Spindle/2-Turret CNC Turning Center]

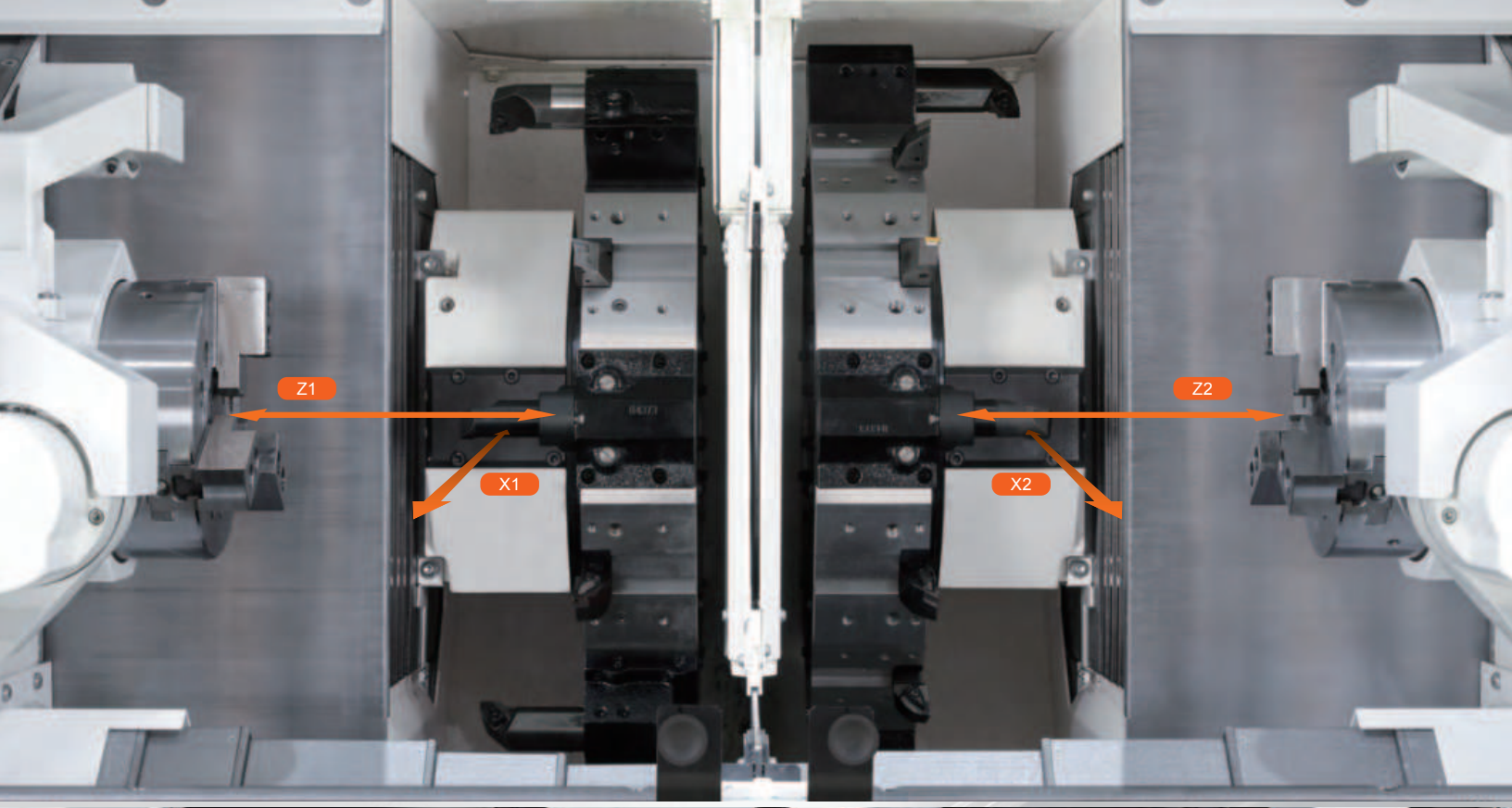
Mazak

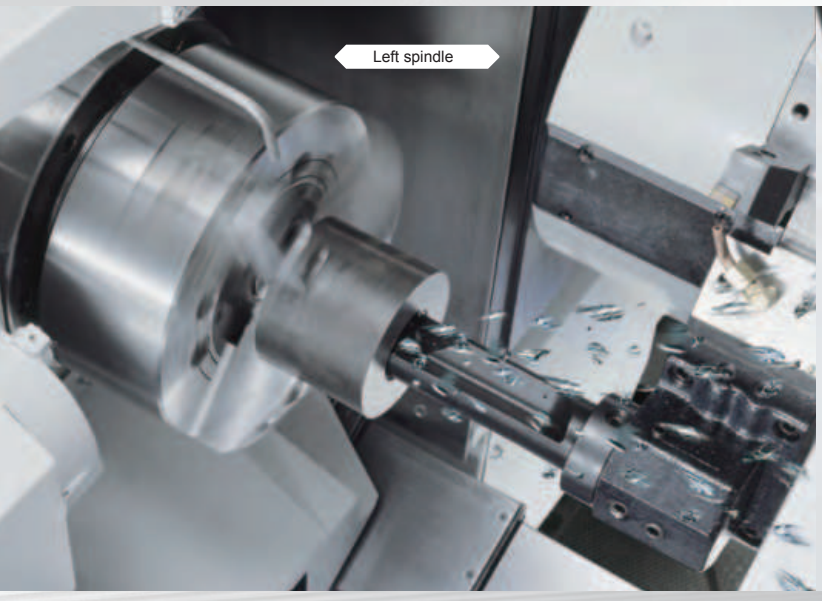
Twin-spindle/twin-turret turning center

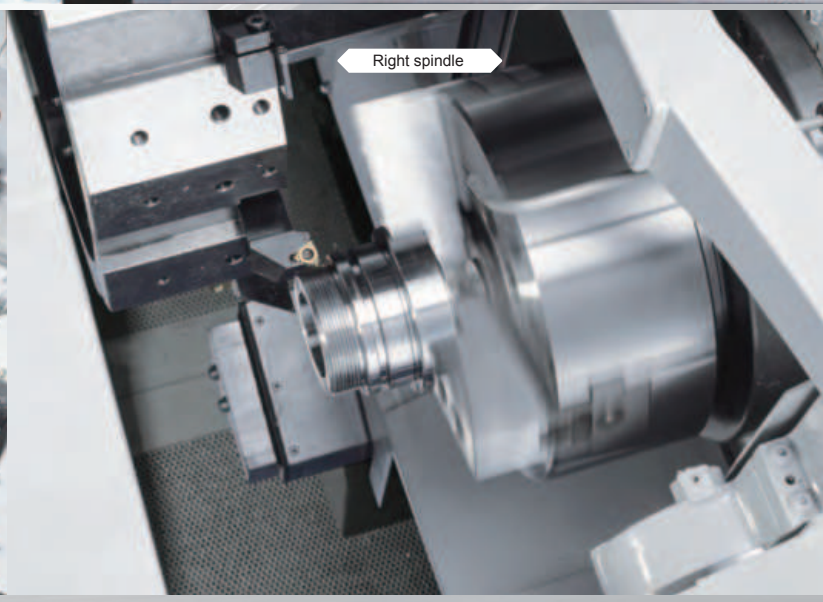
DUAL TURN 200

Two 2-axis CNC Turning Centers integrated into a single machine tool

- 2 machining areas for continuous machining
- Automatic workpiece transfer 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**
- **ø65 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) reduces non-cutting time**
- **Wide range of factory automation equipment available, such as gantry robots, 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

First process

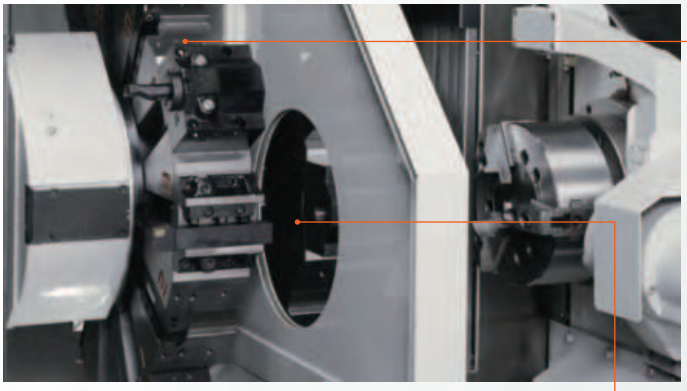
Load raw material

Turn outer diameter and facing (rough)

Boring (rough)

Turn outer diameter and facing (finish)

Boring (finish)



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

Non-lift rotary indexing enables high-speed turret clamping/unclamping with minimum interference. Additionally, random selection/shortest path indexing makes chip-to-chip time extremely fast when changing tools. These turrets use bolt-on tool holders.

- **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)

Perform continuous machining with automatic high-accuracy workpiece transfer from left to right spindles – and eliminate in-process inventory of workpieces between the first and second processes.

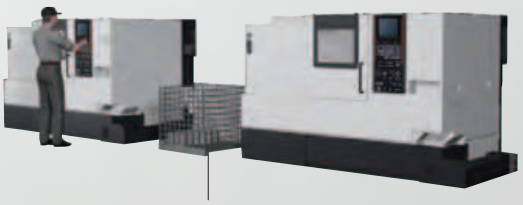
Automatic partition (standard)

The automatic partition completely isolates the two machining areas, so one spindle can machine while the other is set up for a new workpiece. (Shown with automatic partition open)

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

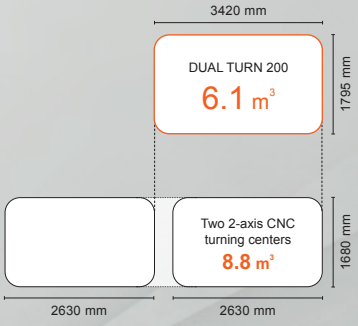
- No in-process inventory between first and second processes
- Smaller working area for operator
- **30%** smaller floor space
- Reduces floor space requirements considerably compared to two 2-axis CNC turning centers. No more dead space between machines or maintenance and storage of workpieces between processes, and less space required for chip conveyors.

1st and 2nd process separation with two 2-axis CNC turning centers



In-process inventory between processes

DUAL TURN 200



Second process

Turn outer diameter and facing (rough)

Turn outer diameter and facing (finish)

Boring

Groove machining

Threading

Unload finished workpiece

Higher Accuracy

Integral spindle/motors (L & R)

Integral spindle/motors provide high-accuracy machining, and minimize both vibration during spindle acceleration and heat generation.

Linear roller guides on all axes

The DUAL TURN 200 uses linear roller guides on all axes for high rigidity and long service life.

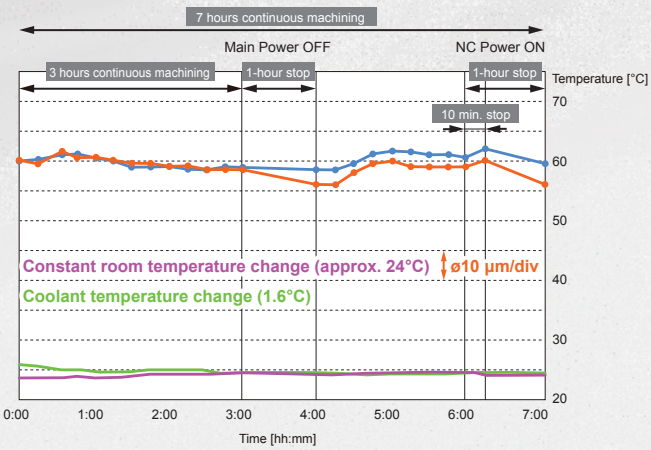
Machine design

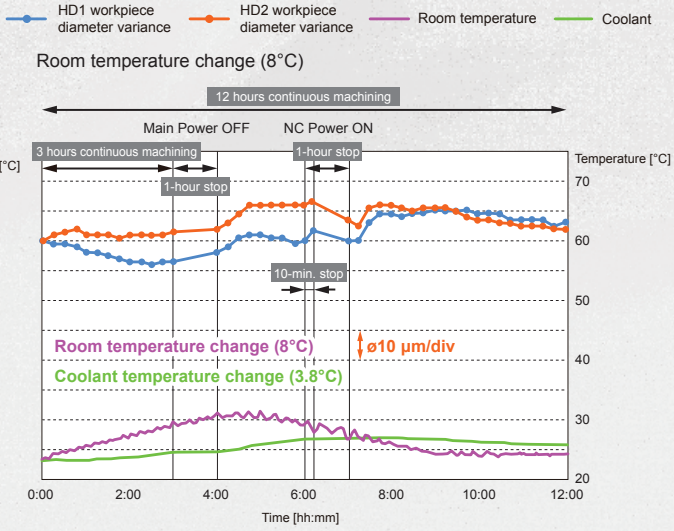
Main machine components – including the bed and column – are designed with CAD FEA to withstand the forces generated during heavy-duty cutting and high-speed operation.

Heat Displacement Control **THERMAL SHIELD**

To enhance continuous machining accuracy, the THERMAL SHIELD system automatically compensates for room temperature changes in the machining area. Mazak has performed extensive testing in a variety of environments in a temperature-controlled room to develop this system. Changes in room temperature and compensation data are shown visually.

Constant room temperature



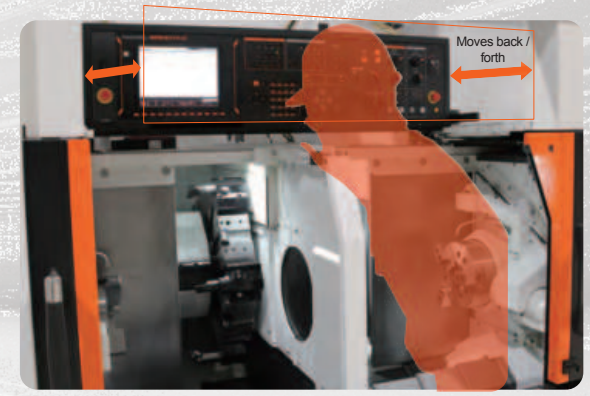


Ergonomics

Convenient operation and maintenance through ergonomic machine design

CNC operation panel

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



550 mm door opening width (both left and right sides)

The wide overhead door opening enables convenient workpiece loading/unloading with an overhead crane. (Opening width is 525 mm when equipped with gantry loader)

Detachable cover

Enables smooth chip disposal

Smooth chip flow

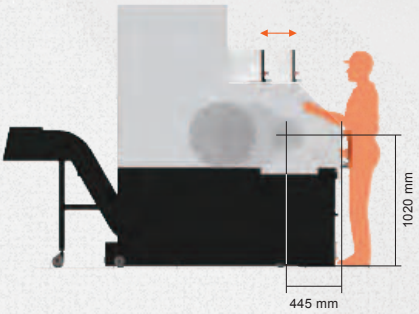
In the machining area, slanted or vertical surfaces – such as the Z-axis covers – prevent the accumulation of hot machined chips. To ensure consistent, high-accuracy operation and simplified machine cleaning, smooth chip flow prevents heat built-up in the machine.

Easy maintenance

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

Convenient setup

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



Color-coded cables

Electric cables are color coded for convenient maintenance.

Factory Automation

Automation equipment (option)

Unload system

Perform continuous machining of chuck work.
The operator loads the workpiece into the chuck
and the unloading hand unloads the finished workpiece.

Bar feeder + Unloading hand

Perform continuous machining of bar material. The unloading hand removes finished workpieces from the right spindle chuck.
Bar work capacity is ø65 mm.

Gantry loader system

Perform automatic and continuous machining from first to second process
for chuck/shaft workpieces. The material is loaded in the machine
automatically and the gantry robot unloads the finished workpiece.

Rotary conveyor

Pitch-feed conveyor

(2-pallet workpiece conveyor)

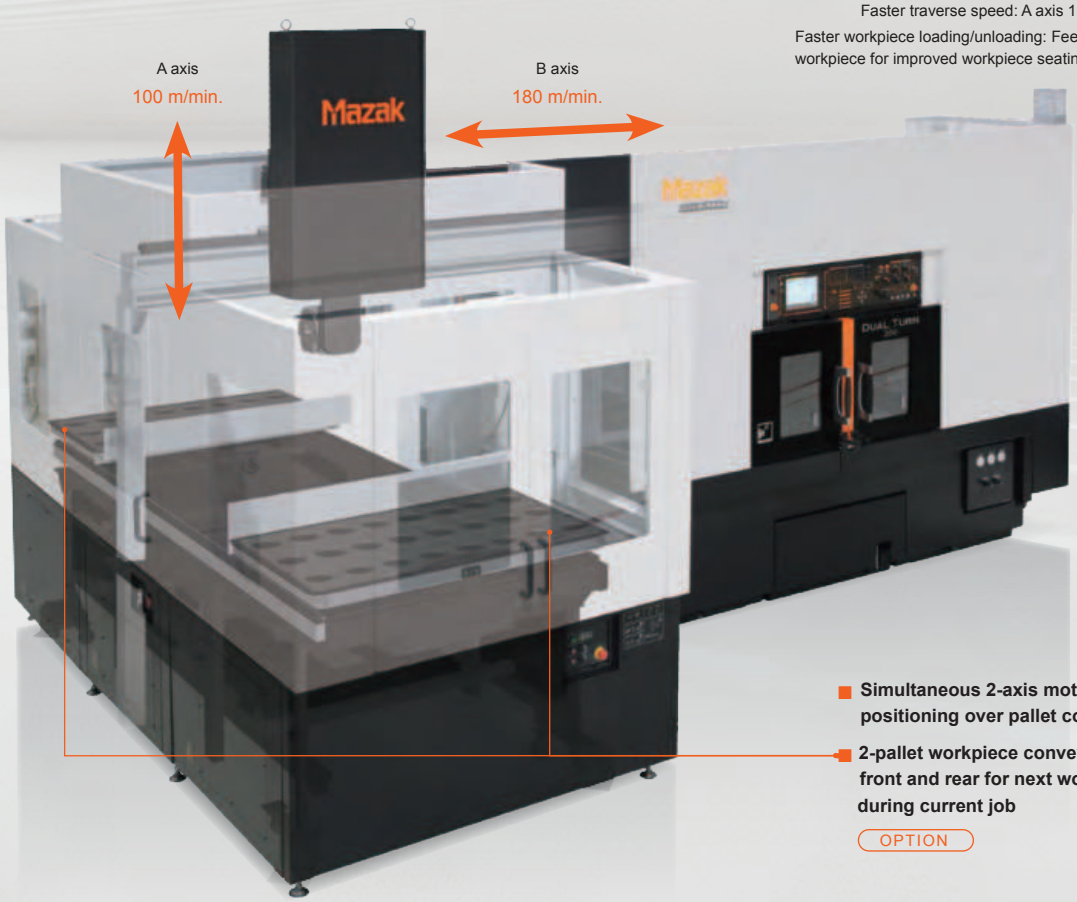
Improved gantry loader system performance

(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: Feed headstock against workpiece for improved workpiece seating in chuck.

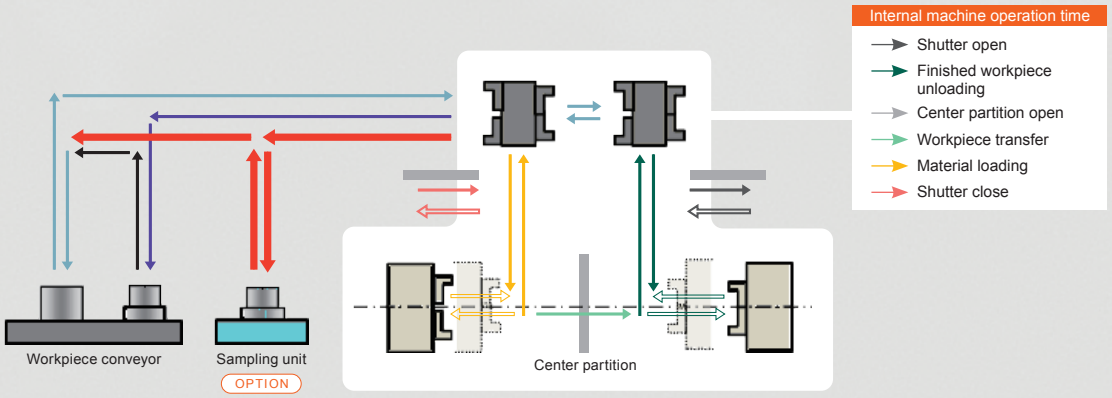


- **Simultaneous 2-axis motion performs positioning over pallet conveyor**
- **2-pallet workpiece conveyor positioned at front and rear for next workpiece setup during current job**

OPTION

Motion pattern editing

Optional system additions, including measuring/cleaning/sampling processes, available at the customer's location



Ease of Programming

MAZATROL SmoothC

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

Process home screen

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

USB memory port

SD card slot

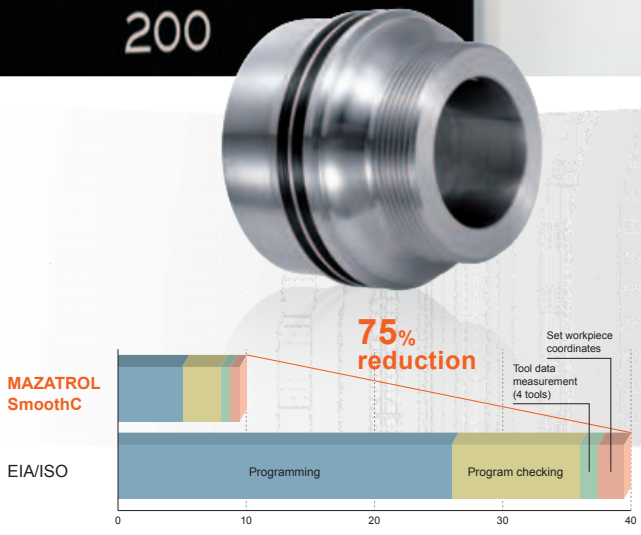
Press menu keys under the display to go to other pages for program data input and editing

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, reduce first workpiece setup time – from programming to tool path check, tool setup and work coordinate setup – by as much as 75% compared with other CNC systems. Short setup times are especially effective for production of a wide variety of parts in small lots. Additionally, MAZATROL programs are easy to check, save and edit because they are smaller than EIA/ISO programs.

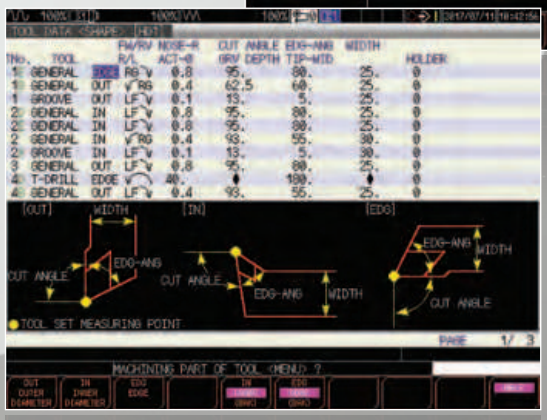


Easy programming

MAZATROL conversational programming simplifies programming tasks

Tool path check

Obtain accurate machining cycle times quickly through tool path simulation



Tool data

Graphical help display for easy input of tool data

Position screen

Easily input data such as Z offset • C offset

EIA/ISO program compatibility

The MAZATROL SmoothC CNC uses the same G-codes as conventional EIA CNC system machines. Use programs made for other manufacturers' machines 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	
Minimum input increment	0.0001 mm , 0.00001", 0.0001°	
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: 2MB, Program storage expansion : 8MB*, Program storage expansion: 32MB*	
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	10M/100M/1Gbps	

* Option

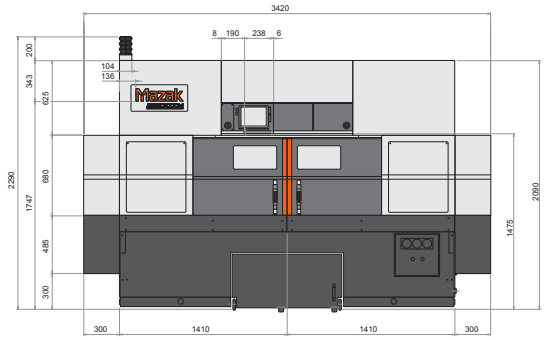
3D machine model

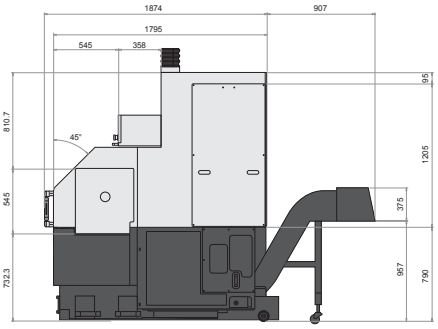
A 3D machine model is available to perform program interference checks with other CAD/CAM simulation software.

Machine Dimensions

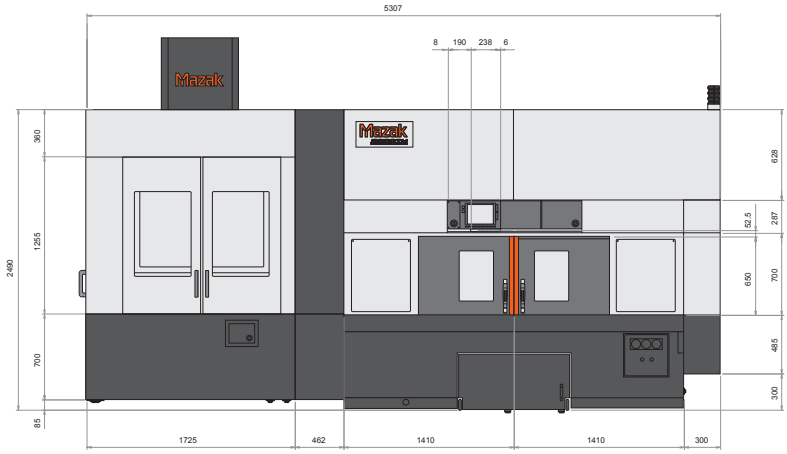
Unit: mm

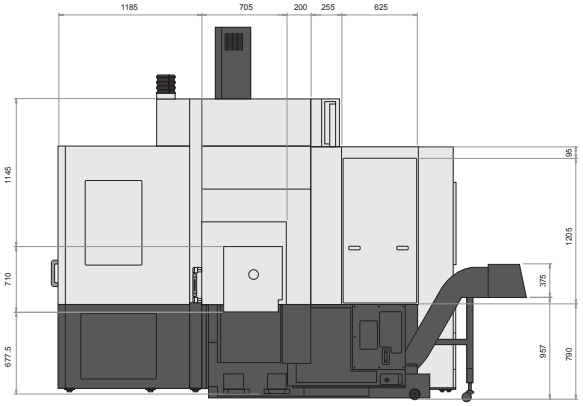
Standard





Gantry Loader

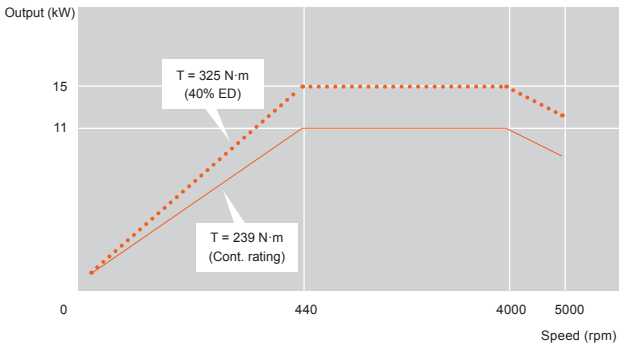




Power/Torque Output Diagram

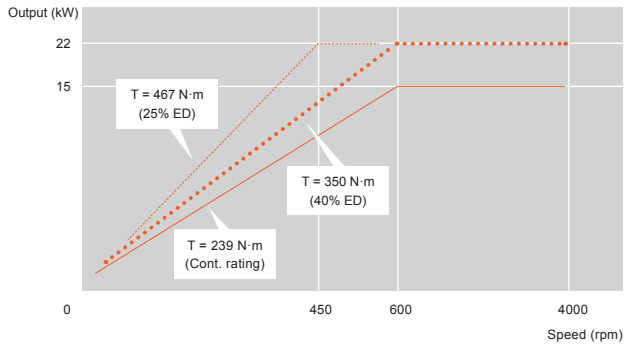
5000 rpm 15 kW (standard)

Speed range: 35 ~ 5000 rpm
Output: AC 15 kW (40% ED)



4000 rpm 22 kW (option)

Speed range: 35 ~ 4000 rpm
Output: AC 22 kW (40% ED)



Automation • Safety

1 Tool eye (standard)

Program the tool eye for automatic tool measurement and compensation as well as to inspect for tool breakage. Simply bring the tool tip into contact with the tool eye to perform tool setup, which speeds up tool setup considerably.

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

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

3 High/low chuck pressure L & R

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

4 Double foot-pedal switch L & R

The double foot-pedal switch opens/closes the chucks of the left and right spindles separately.

5 Automatic open/close front door (L & R)

The automatic opening/closing front door operates in 3 speed steps. Operation stops automatically if the door contacts the operator's hand in the opening.

6 Automatic power ON/OFF + warm-up operation

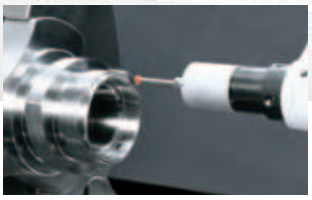
Use the timer setting to turn power on and off automatically and perform warm-up operations.

7 Spindle orientation function

Orients the spindle to a fixed position to process square or hexagonal material with a bar feeder, and to load/unload arbitrary-shaped workpieces with a robot system.

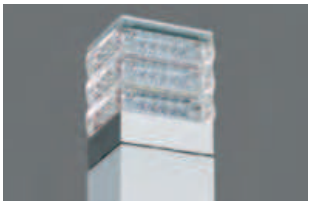
8 Automatic workpiece measurement

Turret-mounted touch sensor automatically measures the inside and outside diameters, surface irregularity, etc. of the machined workpiece, to perform tool compensation and to maintain machining accuracy during unattended operation. Swing-arm automatic workpiece-measuring unit also enables highly accurate machining with a test-cutting macro (NC option) started with 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

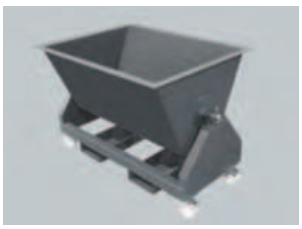
Machine operation stops automatically if the pressure switch detects hydraulic pressure anomalies.

Chip disposal

11 Chip conveyor (rear disposal)

Chips are discharged smoothly outside the machine.

12 Chip bucket (rotary or fixed type)



Coolant

13 Coolant system (standard: 180 W × 2)

Supplies coolant directly to cutting tool tips to remove chips and heat generated by machining.

14 Chuck jaw air blast L & R (standard)

Air discharge from a nozzle over the rotating chuck removes chips 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 to maintain a safe and clean working environment.

16 Coolant temperature control

Heat generated during machining transfers to coolant and may cause thermal displacement of machine components that can limit machining accuracy. The chiller unit maintains coolant at room temperature for high-accuracy machining over extended periods of operation.

17 Additional coolant nozzle for headstock

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

18 High-pressure SUPERFLOW coolant system

SUPERFLOW improves chip control, lowers tool tip temperatures and lengthens tool life with faster spindle speeds and feedrates for higher productivity.

- Diaphragm pump with exceptional energy efficiency
- High performance cyclone filter with minimum maintenance requirements
- Use M-code to set coolant pressure easily (0 to 7 MPa)

Standard Machine Specifications

Capacity	Max. swing	ø320 mm
	Max. machining diameter	ø320 mm
	Distance between spindles with Z axis at home	1250 mm
	Maximum weight capacity*1: Chuck work	300 kg
	Maximum work transfer diameter	ø254 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^{-1}
	Number of spindle speed ranges	1-Stepless
	Spindle nose/spindle bore	JIS A2-6/ø76 mm
	Bar work capacity*2	ø65 mm (Optional 10" through-hole chuck)
Turret	Number of turrets	2
	Turret type	12-position turret
	Number of tools	12 x 2
	Turning tool shank size	25 mm
	Boring bar shank diameter	ø40 mm
	Turret indexing time	0.5 s/1 step; 1.4 s/full step
Feedrate	Rapid traverse rate: X axis (X1/X2)	30.5 m/min; 30.5 m/min
	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	180 W × 2
Power requirement	Electrical power requirement (Cont. rating)	38.9 kVA
	Air supply	0.5 ~ 1.0 MPa (5 ~ 10 kgf/cm^2), 500 L/min
Coolant	Tank capacity	235 L
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 (dependent 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^2 coolant	○
	Chip conveyor (rear/hinge type)	○
	Preparation for chip conveyor (rear)	●

Mazak

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