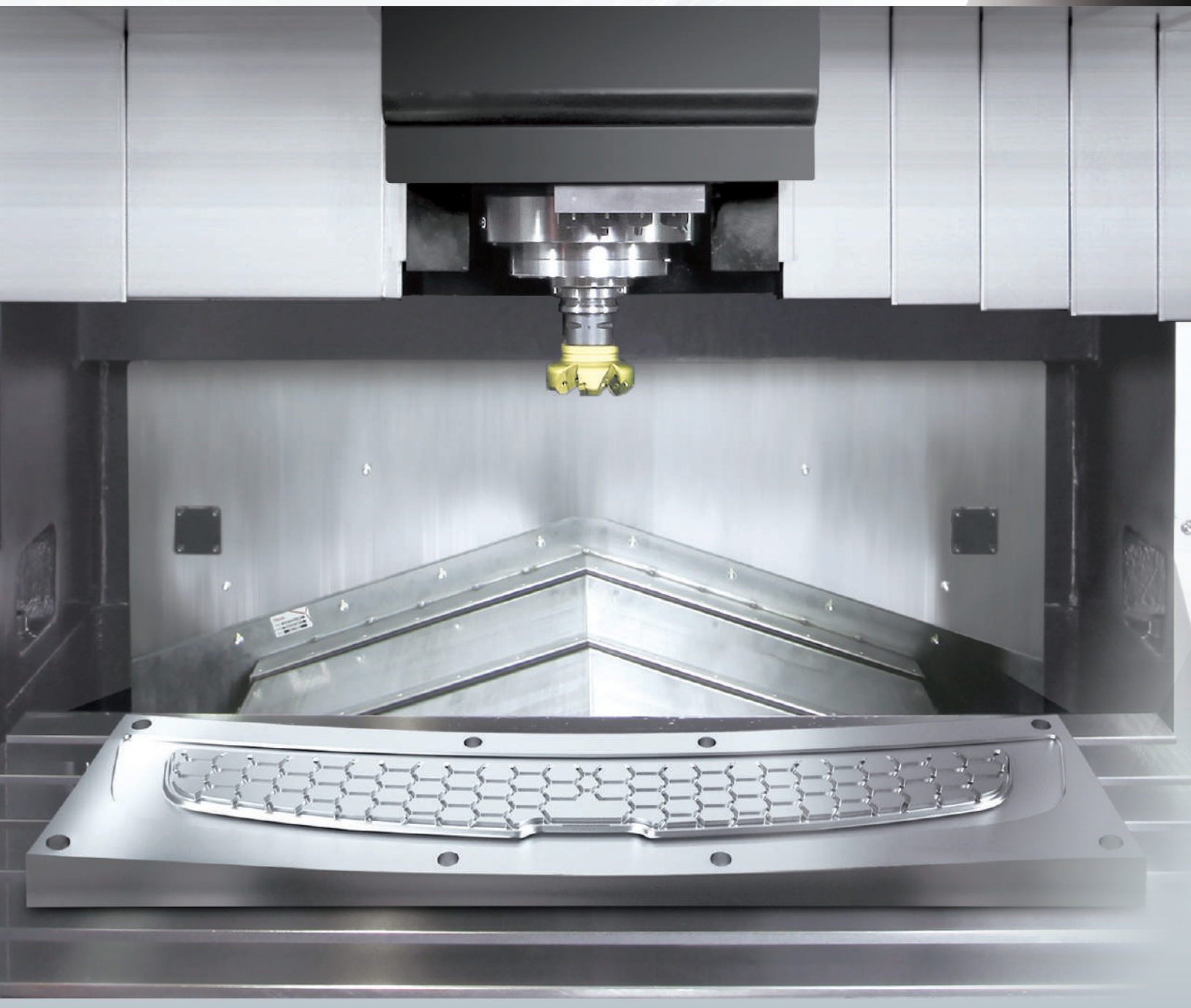
Mazak

FJV-200, 250

[Double Column Machining Centers]

No. 40 taper spindle double column machining centers designed for high accuracy and high productivity

Utilizing a basic design concept proven in the field over many years, these machining centers are equipped with a new high speed spindle and advanced CNC system. They are designed to efficiently machine workpieces such as die and molds and aerospace components at high speed with high accuracy.



High rigidity No.40 taper spindle

4 spindle specifications are available to meet a wide variety of workpiece material requirements

12000 rpm [Standard]	12000 rpm High torque [Option]
18000 rpm [Option]	25000 rpm [Option]

Double column construction

Designed for high accuracy machining over extended periods of operation

FJV-250 [MAZATROL SmoothG]
Shown with optional equipment

High accuracy, high productivity double column machining centers

FJV-200, 250

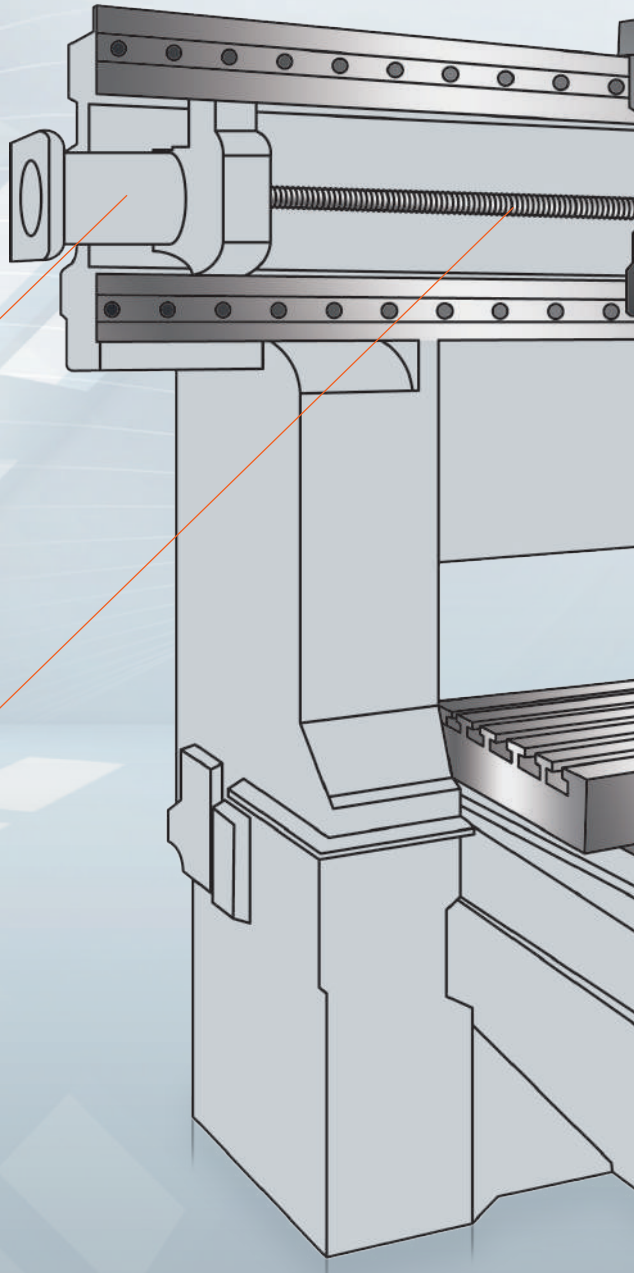
Higher Accuracy

Double column machine construction provides high speed and high accuracy performance

The symmetrical machine construction together with advanced technologies, such as integral spindle / motor, ball screw core cooling system, the THERMAL SHIELD and many others - provide unsurpassed performance.

High rigidity machine construction

The double column construction delivers high accuracy machining over extended periods of operation as well as assure that the spindle is used to its full potential.

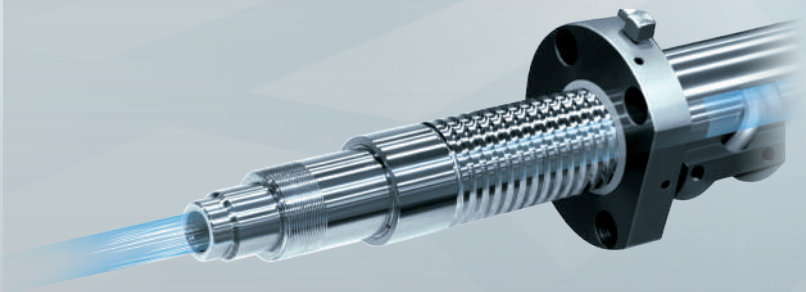


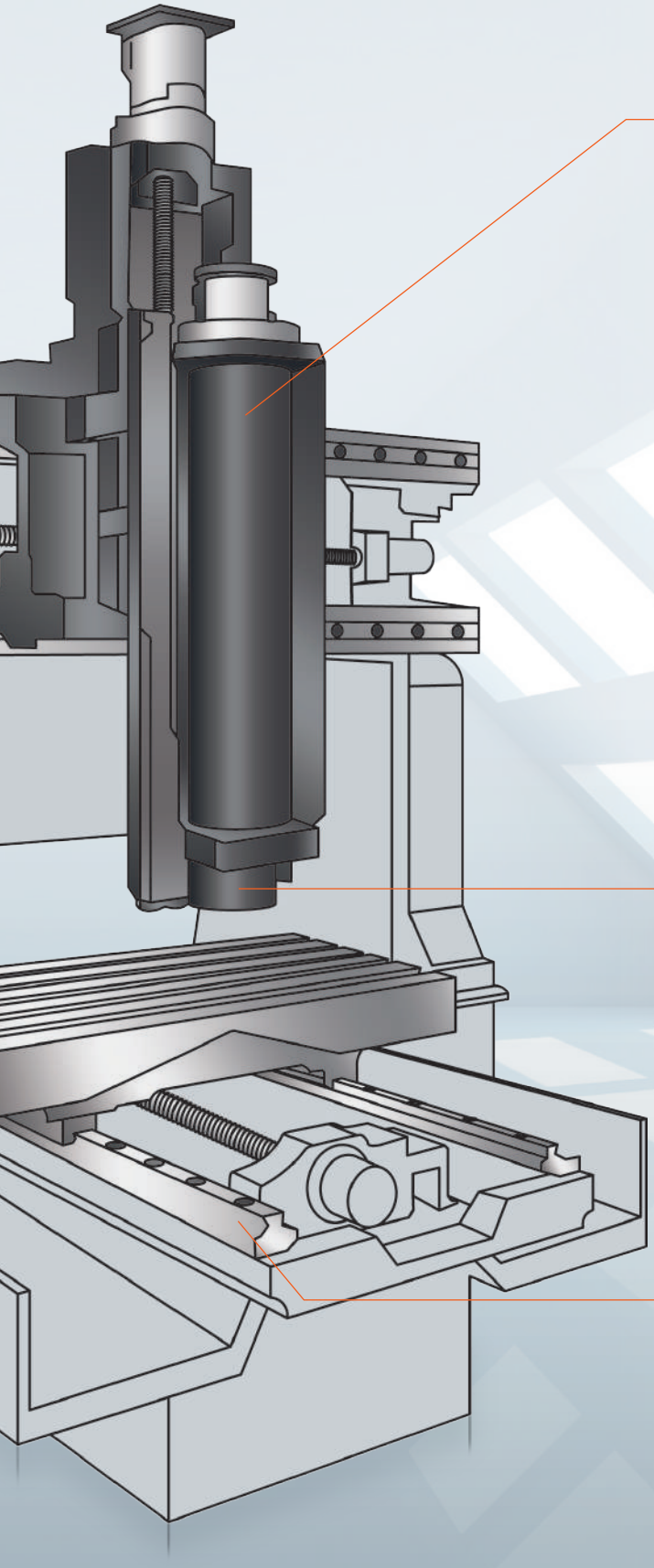
Direct servo mounting

Servo motors are directly mounted on the X-, Y- and Z-axes ball screws. By eliminating the transmission between the servo motor and ball screw, backlash is minimized for high accuracy positioning.

Ball screw core cooling

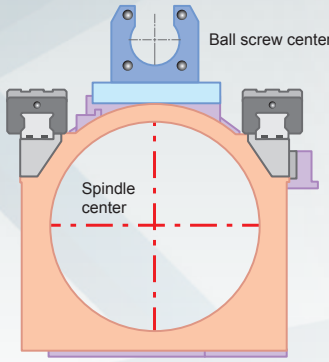
Temperature controlled cooling oil circulates through the ball screw cores to ensure stable machining accuracy over extended periods of high speed operation.





Symmetrical headstock design

The symmetrical headstock design together with the integral spindle / motor minimizes spindle displacement due to heat generated by the spindle operation.



Y-axis direction symmetry

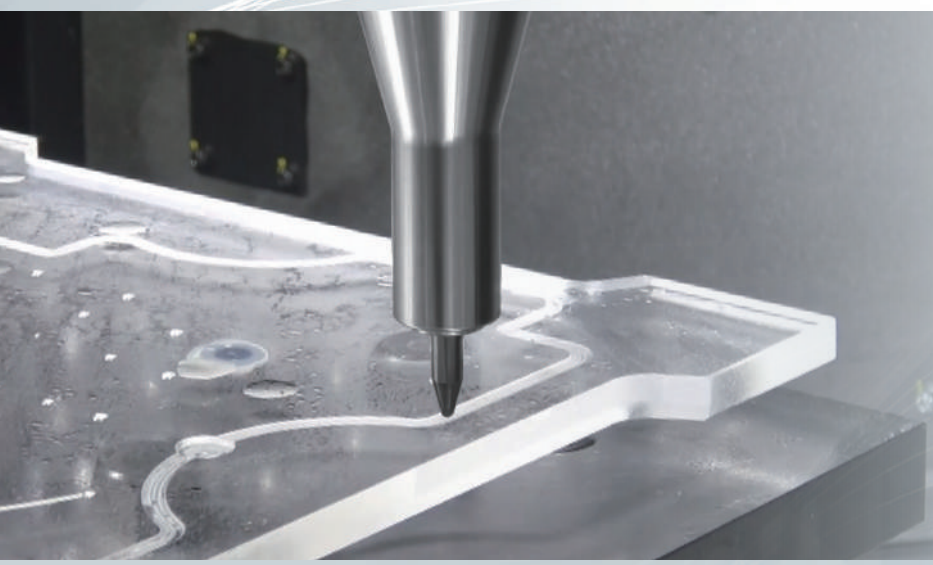
Prevention of temperature change — milling spindle cooling

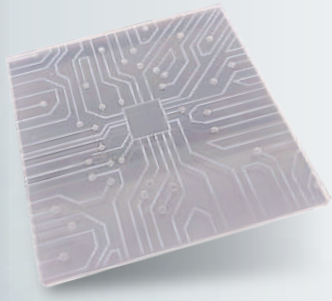
Temperature controlled cooling oil circulates through the milling spindle headstock to prevent heat displacement.

Linear roller guides utilized on the X-, Y- and Z-axes

Linear roller guides on the X-, Y- and Z-axes are utilized by the FJV-200 and FJV-250 in order to provide high accuracy and heavy duty machining.

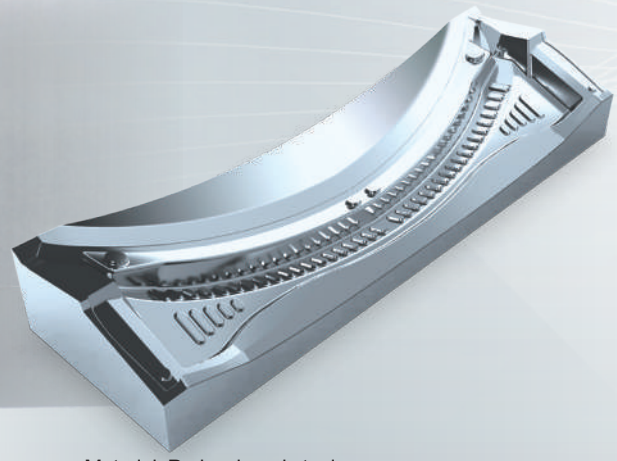
Higher Productivity





Material : Quartz
Sample workpiece

Material: Aluminium
Workpiece : Aerospace bracket



Material: Prehardened steel
Workpiece : Mold for automobile component

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.

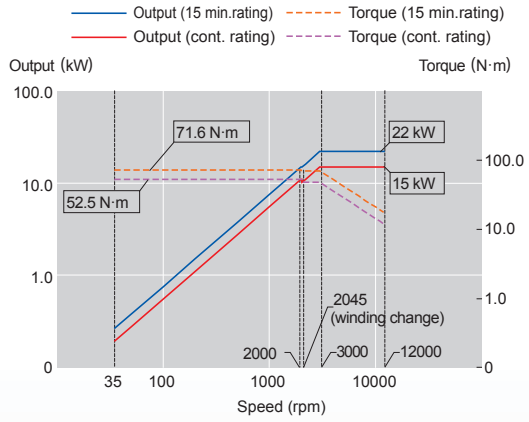
4 different integral spindle / motor specifications available to meet a wide variety of workpiece material machining requirements

12000 rpm Standard spindle

For the machining of a wide variety of workpiece materials from steel to nonferrous metals thanks to the maximum torque of 172 N·m (1 min. rating) from 35 –1000 rpm.

Max. spindle speed	12000 rpm
Spindle output	AC 22 kW (30 HP) [15 min.rating]
Torque	71.6 N·m [15 min.rating]
	52.5 N·m [cont. rating]

12000 rpm spindle output / torque diagram



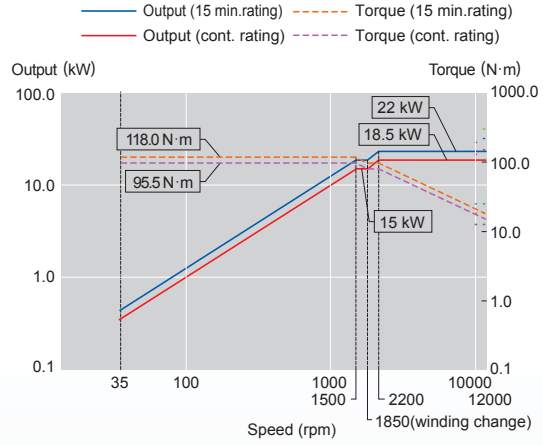
12000 rpm High torque spindle

OPTION

No.40 taper spindle with maximum torque of 252 N·m (1 min. rating) for heavy-duty, rough machining of steel and cast iron.

Max. spindle speed	12000 rpm
Spindle output	AC 22 kW (30 HP) [15 min.rating]
Torque	118.0 N·m [15 min.rating]
	95.5 N·m [cont. rating]

12000 rpm High torque spindle output / torque diagram



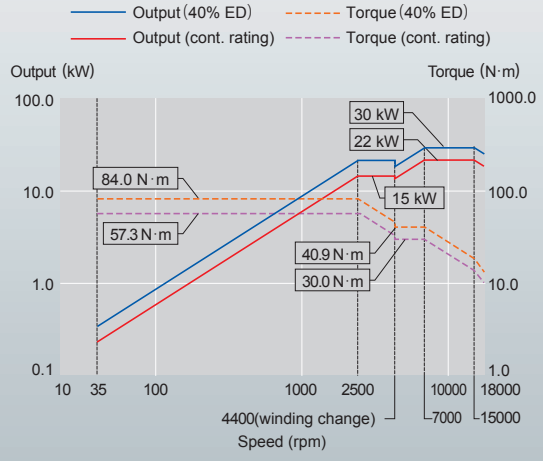
18000 rpm High speed spindle

OPTION

High speed No. 40 taper spindle for the machining of aluminum, copper and other similar materials.

Max. spindle speed	18000 rpm
Spindle output	AC 30 kW (40 HP) [40% ED]
Torque	84.0 N·m [40% ED]
	57.3 N·m [cont. rating]

18000 rpm High speed spindle output / torque diagram



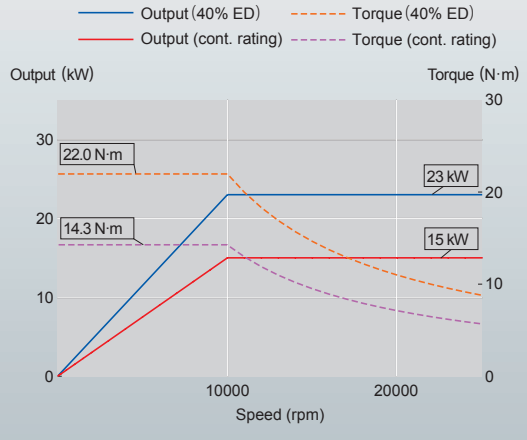
25000 rpm High speed spindle

OPTION

This 23 kW high-speed spindle specification uses 2 face contact tool holders and is effective for high speed die machining with small diameter end mills.

Max. spindle speed	25000 rpm
Spindle output	AC 23 kW (31 HP) [40% ED]
Torque	22.0 N·m [40% ED]
	14.3 N·m [cont. rating]

25000 rpm High speed spindle output / torque diagram



MAZATROL CNC System

MAZATROL SMOOTH G

Unsurpassed ease of operation with touch screen

MAZATROL SMOOTH C

Simplified display and key input operation

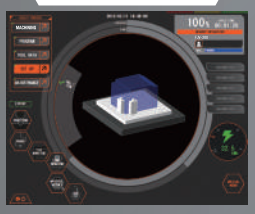
Process home screens

Five different home process screens — each home screen displays the appropriate data in an easy-to-understand manner. Icons can be touched in each process display for additional screen displays.

Programming

Tool data

Setup



Machining

Maintenance

Shown with MAZATROL SmoothG process home screens

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

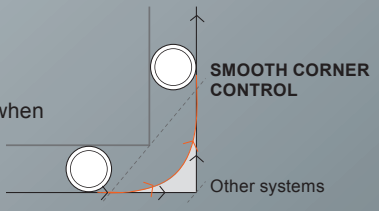
● VARIABLE ACCELERATION CONTROL

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 Function

● SMOOTH CORNER CONTROL

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



Ease of Programming

MAZATROL conversational programming

MAZATROL interactive programming uses conversational language and it is easy to make / edit programs by inputting data on workpiece drawings in response to questions displayed on the operation screen.
Even a beginner operator can quickly make programs with automatically determined cutting conditions and automatic creation of tool paths.

MAZATROL SmoothC shown

QUICK MAZATROL

MAZATROL SMOOTH G

Reduced time for conversational programming

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

Quickly move to the corresponding section in the MAZATROL program by touching a feature in the 3D model

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

3D ASSIST

MAZATROL SMOOTH G

Making a program directly from 3D CAD data

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.

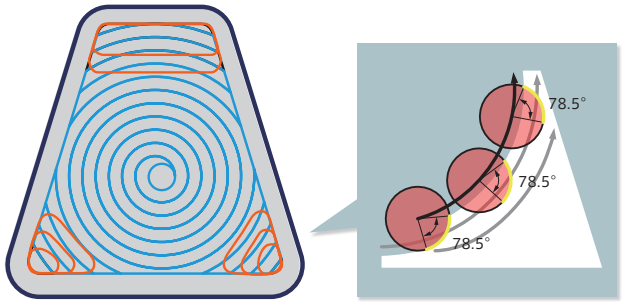
CAD model importing

Shape selection

Automatically input to MAZATROL program

Pocket milling

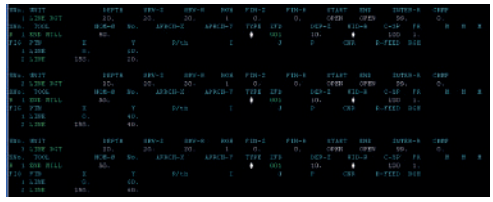
Pocket Milling is a new pocketing cycle for MAZATROL programming. This function maintains a constant angle of engagement between the cutter and material to create a high efficiency tool path, reduces chip load variation, extends tool life and allows tools to be used to their full potential.



Step over line machining

Previously, when programming line machining in a MAZATROL program, if the radial depth of cut was too small, multiple machining passes would have to be programmed. Programming of multiple machining passes is eliminated by this function to reduce the time required for programming.

Previous programming display



MAZATROL SmoothG programming display

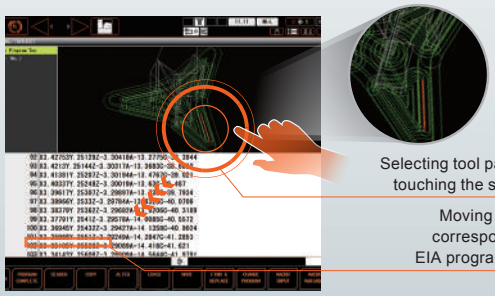
VFC function

By pushing the VFC key, the programmed cutting conditions can be overridden and changed in the machining program. The new cutting conditions data can be used when a new program is made.

Reduced checking time of EIA/ISO programs

QUICK EIA

MAZATROL SMOOTHG

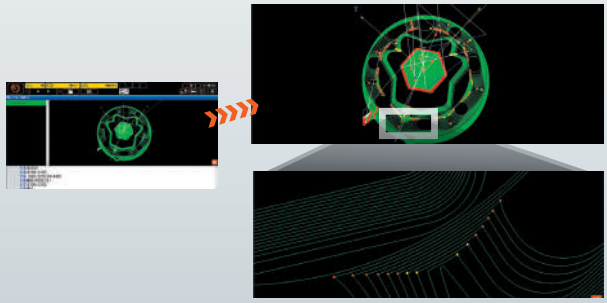


EIA program Visualization

By touching the tool path on the screen, it is possible to move to the corresponding EIA program, and check the program details.

VIEW SURF

MAZATROL SMOOTHG



Analyzing EIA programs

By analyzing 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.

Ergonomics

Designed for ease of operation and maintenance

1

Large window

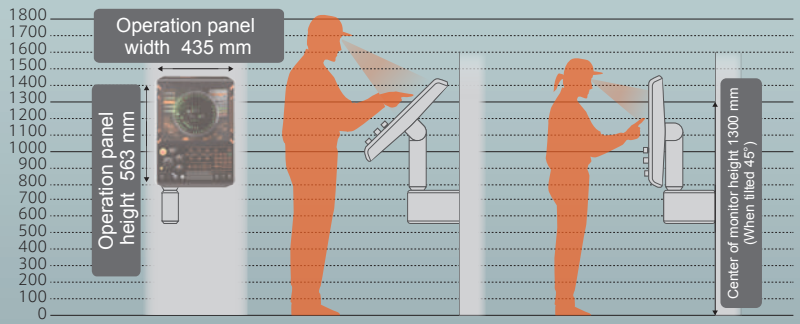
Large front window allows the operator to easily monitor workpiece machining.

2

MAZATROL SMOOTH G

Adjustable CNC touch panel

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



MAZATROL SMOOTH C

Rotating operation panel

The operation panel easily rotates to each operator's preferred position.

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

MAZATROL SMOOTH G

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

Energy consumption displayed on graph

Energy consumption by workpieces

Display approximate CO_2 emission and electrical power cost

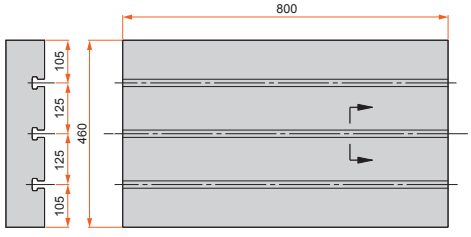
Standard Machine Specifications

		FJV-200	FJV-250
Travel	X-axis travel	560 mm	1020 mm
	Y-axis travel	410 mm	510 mm
	Z-axis travel	410 mm	460 mm
	Distance from table top to spindle nose	150 mm ~ 560 mm	200 mm ~ 660 mm
	Effective width between colums	955 mm	1380 mm
Table	Table size	800 mm × 460 mm	1200 mm × 550 mm
	Table load capacity (evenly distributed)	350 kg	1200 kg
	Table top surface	18 mm T-slot × 3 125 mm pitch	18 mm T-slot × 5 100 mm pitch
Spindle	Spindle speed	12000 rpm	
	Gear ranges	2 steps (electric)	
	Spindle taper	No.40	
	Spindle bearing I.D	Φ80 mm	
	Spindle acceleration time to top speed	1.86 sec	
Feedrate	Rapid traverse rate (X-, Y-, Z-axis)	52 m/min	
	Maximum cutting feedrate (X-, Y-, Z-axis)	52 m/min	
Automatic tool changer	Tool shank	No.40	
	Tool magazine capacity	30	
	Max. tool dia./length (from gauge line)/weight	Φ80 mm / 300 mm / 8 kg	
	Max. tool dia. with adjacent pockets empty	Φ125 mm	
	Tool selection method	Random selection, shortest path (fixed pocket assignment)	
	Tool change time (chip-to chip)	3.4 sec.	3.7 sec.
Motors	Spindle motor (15 min. / cont. rating)	22 kW (30 HP) / 15 kW (20 HP)	
	Flood coolant pump motor (50 /60 Hz)	0.23 kW / 0.37 kW	
Power requirement	Required power capacity (30 min.rating /cont.rating)	45 kVA / 35 kVA	
	Air source	More than 0.5 MPa / 300 L/min	
Machine size	Height	2826 mm	2926 mm
	Required floor space (MAZATROL SmoothC)	2440 mm × 2375 mm	2995 mm × 2475 mm
	Required floor space (MAZATROL SmoothG)	2440 mm × 2520 mm	2995 mm × 2615 mm
	Machine weight	6400 kg	8500 kg
Sound	Equivalent continuous sound pressure level at operator position (dependant on equipment options)	Less than 80 db (A)	

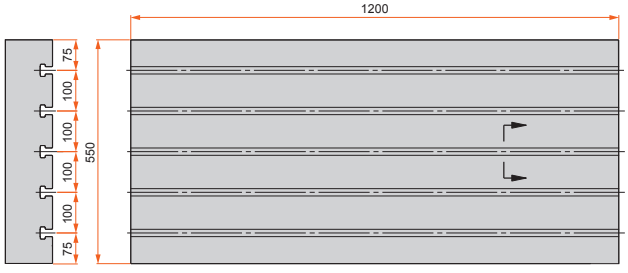
Table Dimensions

Unit : mm

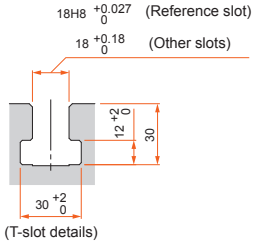
FJV-200



FJV-250



[FJV-200, FJV-250 Common]



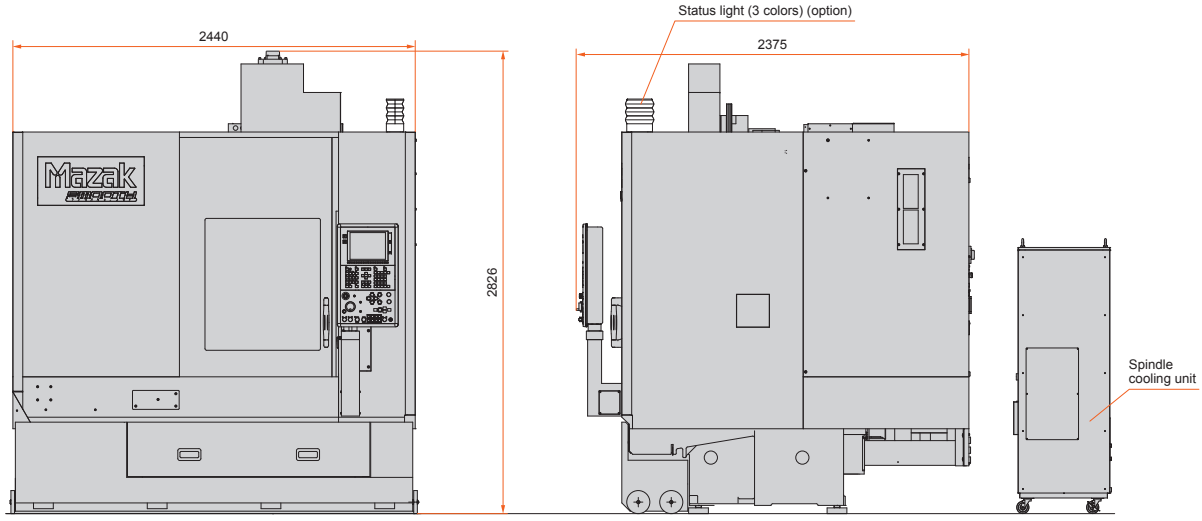
Standard and Optional Equipment

● : Standard ○ : Option — : N/A

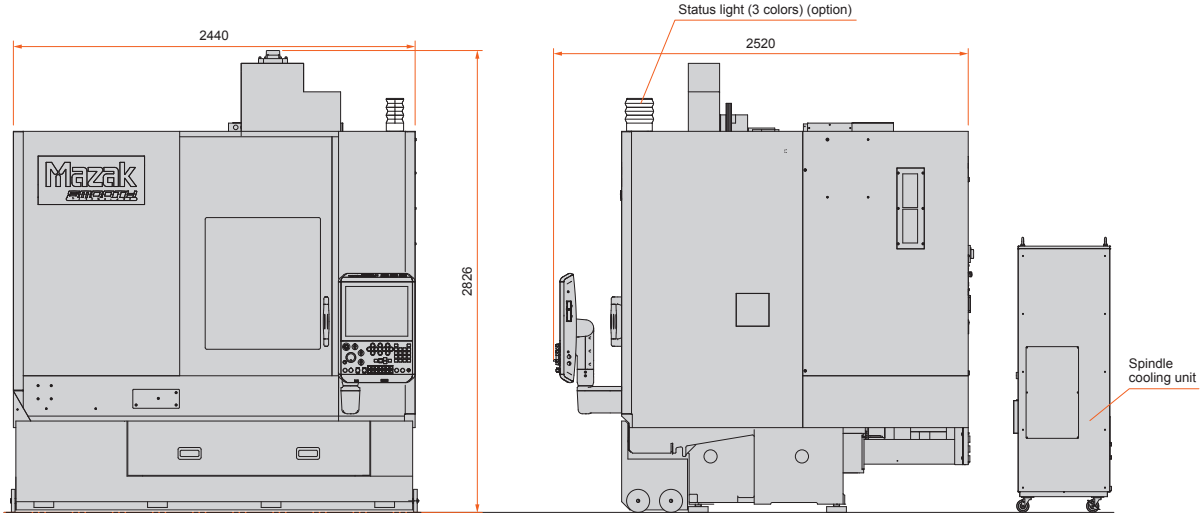
		FJV-200		FJV-250	
		MAZATROL SmoothC	MAZATROL SmoothG	MAZATROL SmoothC	MAZATROL SmoothG
Machine	Sub table	○	○	○	○
	Work light	●	●	●	●
	Additional work light	○	○	○	○
	Top cover	●	●	●	●
	Additional top cover	○	○	○	○
	Status light (3 colors)	○	○	○	○
	Status light (1 color)	○	○	○	○
	Additional axis	○	○	○	○
Spindle	12000 rpm□#40□	●	●	●	●
	12000 rpm High torque □#40 / BBT / HSK□	○	○	○	○
	18000 rpm□#40 / BBT / HSK□	○	○	○	○
	25000 rpm□HSK□	○	○	○	○
Tool magazine	30-tool magazine	●	●	●	●
	40-tool magazine	○	○	○	○
	60-tool magazine	○	○	○	○
Set up	Absolute position detection	●	●	●	●
	Automatic tool length measurement & tool breakage detection	○	○	○	○
	Laser tool measurement	○	○	○	○
	Automatic front door (with 2 hand switches)	○	○	○	○
	Tool ID magazine operation panel (touch panel)	—	○	—	○
	Pull stud with tool ID	○	○	○	○
	Mazak monitoring system B (optical) OMP60	○	○	○	○
	Preparation for Mazak monitoring system B / OMP60	○	○	○	○
	Manual pulse generator	○	○	○	○
Factory automation	Automatic power off	●	—	●	—
	Automatic power ON / OFF + warm-up operation	○	●	○	●
	Machining end buzzer	○	○	○	○
High accuracy	Ball screw core cooling (X-, Y-, Z-axes)	●	●	●	●
	Coolant temperature control*	○	○	○	○
	Scale feedback (X-, Y-, Z-axes)	○	○	○	○
Coolant	Coolant system	●	●	●	●
	Work air blast	○	○	○	○
	Oil skimmer	○	○	○	○
	Oil mist coolant	○	○	○	○
	Hand-held coolant nozzle	○	○	○	○
	Flood coolant 0.45 MPa (4.5 kgf/cm^2) , 30 L/min	○	○	○	○
	Air through spindle (can operate while spindle rotating)	○	○	○	○
	Coolant through spindle 0.5 MPa (5 kgf/cm^2)	○	○	○	○
	Niagara coolant*	○	○	○	○
	Niagara coolant & cover coolant*	○	○	○	○
	High pressure coolant through spindle 1.5 MPa (15 kgf/cm^2)	○	○	○	○
	High pressure coolant through spindle 7.0 MPa (70 kgf/cm^2)	○	○	○	○
	Mist collector	○	○	○	○
	Preparation for mist collector	○	○	○	○
	Cover coolant*	○	○	○	○
Chip disposal	Chip conveyor (side discharge / ConSep)	○	○	○	○
	Chip conveyor (side discharge / Hinge)	○	○	○	○
	Chip bucket (rotary)	○	○	○	○
	Chip bucket (fixed)	○	○	○	○
Safety equipment	Operator door interlock	●	●	●	●
Others	Manuals	●	●	●	●
	Additional manuals	○	○	○	○

*Includes subtank

FJV-200 [MAZATROL SmoothC]

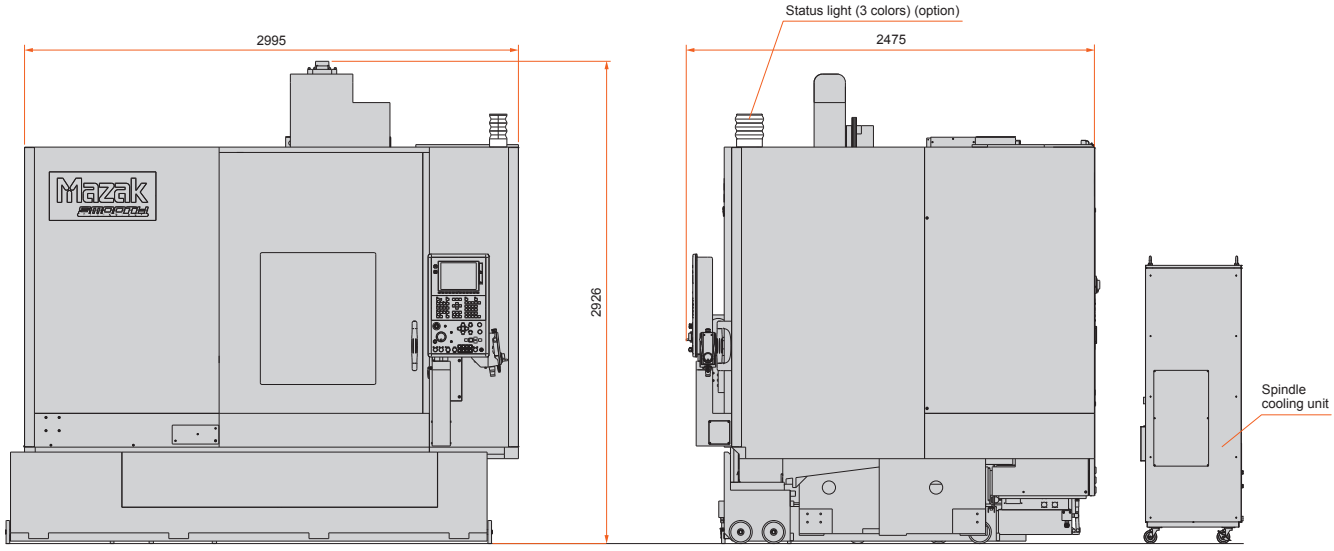


FJV-200 [MAZATROL SmoothG]

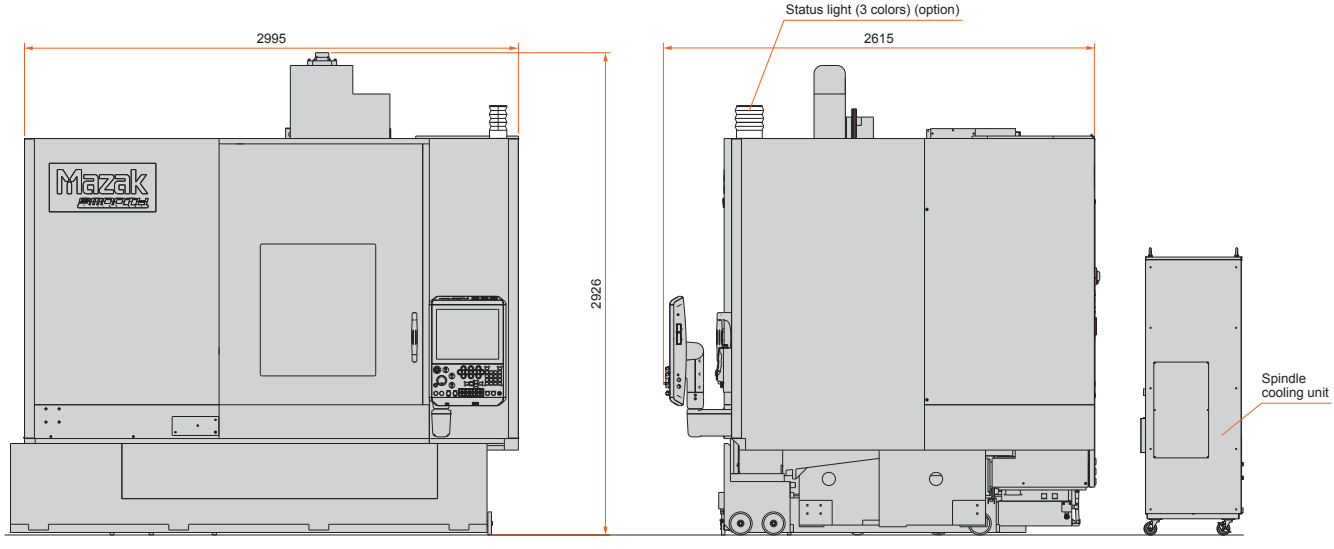


Unit:mm

FJV-250 [MAZATROL SmoothC]



FJV-250 [MAZATROL SmoothG]



MAZATROL SmoothC Specifications

	MAZATROL	EIA
Number of controlled axes	Simultaneous 2 ~ 4 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
Interpolation	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation , Circular interpolation , Synchronous tapping*	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Spiral interpolation, Helical interpolation, Cylindrical interpolation*, Fine spline interpolation*, NURBS interpolation*, Polar coordinate interpolation*, Synchronous tapping*
Feedrate	Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Dwell (time / rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate limitation, Variable acceleration control, G0 slope constant*	Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Inverse time feed, Dwell (time / rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate limitation,Time constant changing for G1, Variable acceleration control,G0 slope constant*
Program registration	Number of programs : 256 (Standard) / 960 (Max.), Program memory : 2 MB, Program memory expansion : 8 MB*, Program memory expansion : 32 MB*	
Control display	Display : 10.4", 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, Spindle speed range setting	
Tool functions	Number of tool offset : 4000, T code output for tool number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces)	Number of tool offset : 4000, T code output for tool number, T code output for group number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces)
Miscellaneous functions	M code output, Simultaneous output of multiple M codes	
Tool offset functions	Tool position offset, Tool length offset, Tool diameter / tool nose R offset, Tool wear offset	
Coordinate system	Machine coordinate system, Work coordinate system, Local coordinate system, Additional work coordinates (300 set)	
Machine functions	–	Shaping function*, Dynamic compensation II*
Machine compensation	Backlash compensation, Pitch error compensation	
Protection functions	Emergency stop, Interlock, Pre-move stroke check	
Automatic operation mode	Memory operation	Memory operation, Tape operation, MDI operation, SD card 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 functions	Tool length teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine	Tool length teach, Tool offset teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine
Automatic measuring functions	WPC coordinate measurement, Automatic tool length measurement, Sensor calibration, Tool breakage detection, External tool breakage detection*	Automatic tool length measurement, Sensor calibration, Tool breakage detection, External tool breakage detection*
MDI measurement	Semi automatic tool length measurement, Full automatic tool length measurement, Coordinate measurement	
Interface	PROFIBUS-DP*, EtherNet I/P*, CC-Link*	
Card interface	SD card interface, USB	
EtherNet	10 M / 100 M / 1 Gbps	

*Option

MAZATROL SmoothG Specifications

	MAZATROL	EIA
Number of controlled axes	Simultaneous 2 ~ 4 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
Interpolation	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation , Circular interpolation , Synchronous tapping*	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Spiral interpolation, Helical interpolation, Cylindrical interpolation*, Fine spline interpolation*, NURBS interpolation*, Polar coordinate interpolation*, Synchronous tapping*
Feedrate	Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Dwell (time / rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate limitation, Variable acceleration control, G0 slope constant*	Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Inverse time feed, Dwell (time / rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate limitation,Time constant changing for G1, Variable acceleration control,G0 slope constant*
Program registration	Number of programs : 256 (Standard) / 960 (Max.), Program memory : 2 MB, Program memory expansion : 8 MB*, Program memory expansion : 32 MB*	
Control display	Display : 19" touch panel, Resolution : SXGA	
Spindle functions	S code output, Spindle speed limitation, Spindle speed override, Spindle speed reaching detection, Multiple position orient, Constant surface speed, Spindle speed command with decimal digits, Synchronized spindle control, Spindle speed range setting	
Tool functions	Number of tool offset : 4000, T code output for tool number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces)	Number of tool offset : 4000, T code output for tool number, T code output for group number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces)
Miscellaneous functions	M code output, Simultaneous output of multiple M codes	
Tool offset functions	Tool position offset, Tool length offset, Tool diameter / tool nose R offset, Tool wear offset	
Coordinate system	Machine coordinate system, Work coordinate system, Local coordinate system, Additional work coordinates (300 set)	
Machine functions	–	Shaping function*, Dynamic compensation II*
Machine compensation	Backlash compensation, Pitch error 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 functions	Tool length teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine	Tool length teach, Tool offset teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine
Automatic measuring functions	WPC coordinate measurement, Automatic tool length measurement, Sensor calibration, Tool breakage detection, External tool breakage detection*	Automatic tool length measurement, Sensor calibration, Tool breakage detection, External tool breakage detection*
MDI measurement	Semi automatic tool length measurement, Full automatic tool length measurement, Coordinate measurement	
Interface	PROFIBUS-DP*, EtherNet I/P*, CC-Link*	
Card interface	SD card interface, USB	
EtherNet	10 M / 100 M / 1 Gbps	

*Option

FJV-200, 250

Mazak

YAMAZAKI MAZAK CORPORATION

1-131 Takeda, Oguchi-cho, Niwa-gun, Aichi-pref., Japan
TEL : +(81)587-95-1131

www.mazak.com

EE

FJV-200, 250 20.03.0 G 99J289220E0