SMOOTH
TECHNOLOGY

SVC
SERIES

2000L/120
2000L/200

Mazak

Advanced features of
the MAZATROL SmoothG CNC

Touch screen operation—Operates similar to your smart phone / tablet

PC with Windows® 8 embedded OS

Fastest CNC in the world—Latest hardware and software for unprecedented speed and precision

Easy conversational programming

Smooth graphical user interface and support functions for unsurpassed ease of operation

Fine tuning functions—Easily configure machine parameters for different workpiece materials and application requirements

Windows is a registered trademark of Microsoft Corporation in the United States and other countries. MTConnect is a registered trademark of AMT in the United States and other countries.

MAZATROL
SMOOTHG

High speed feedrate and
long table for higher productivity
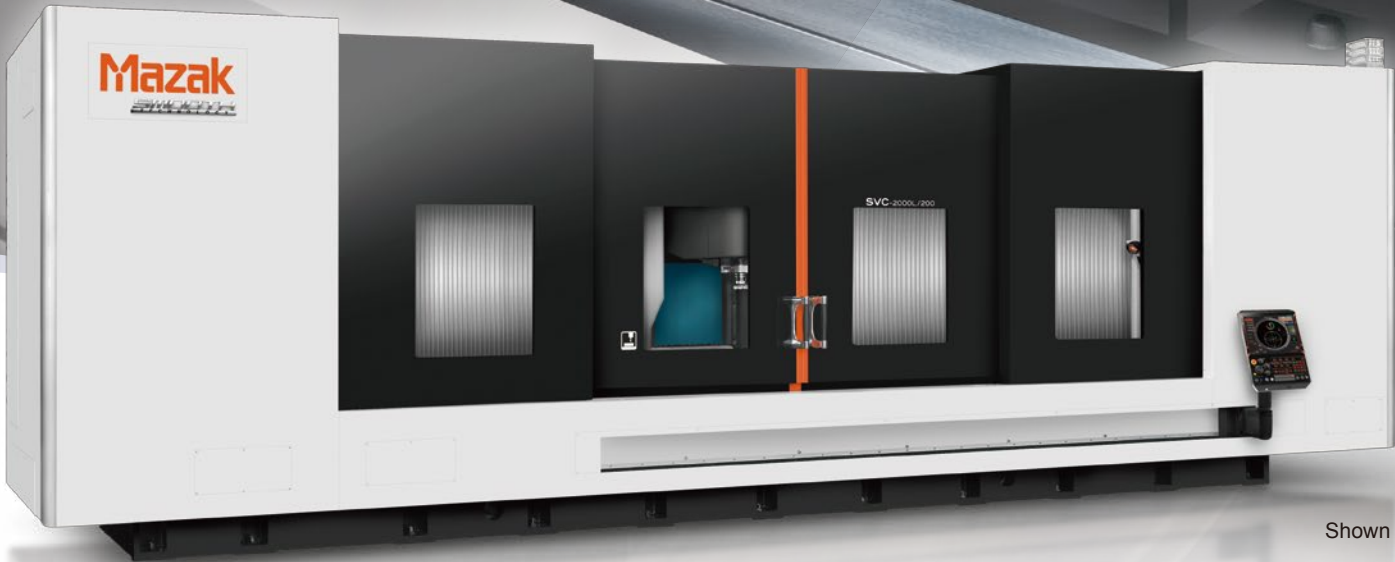
SVC-2000L/200
Shown with optional status light

Table size		X-axis rapid traverse rate	Max. cutting speed

3400 mm × 510 mm
(133.86" × 20.08")
〔2000L/120〕

5400 mm × 510 mm
(212.6" × 20.08")
〔2000L/200〕

120 m/min (4724 IPM)   30 m/min (1181 IPM)

Spindle speed

15000 rpm / 25000 rpm (O P T I O N)

Spindle output (40 % ED / 30 min. rating)

22 kW (30 HP) / 23 kW (31 HP) (O P T I O N)

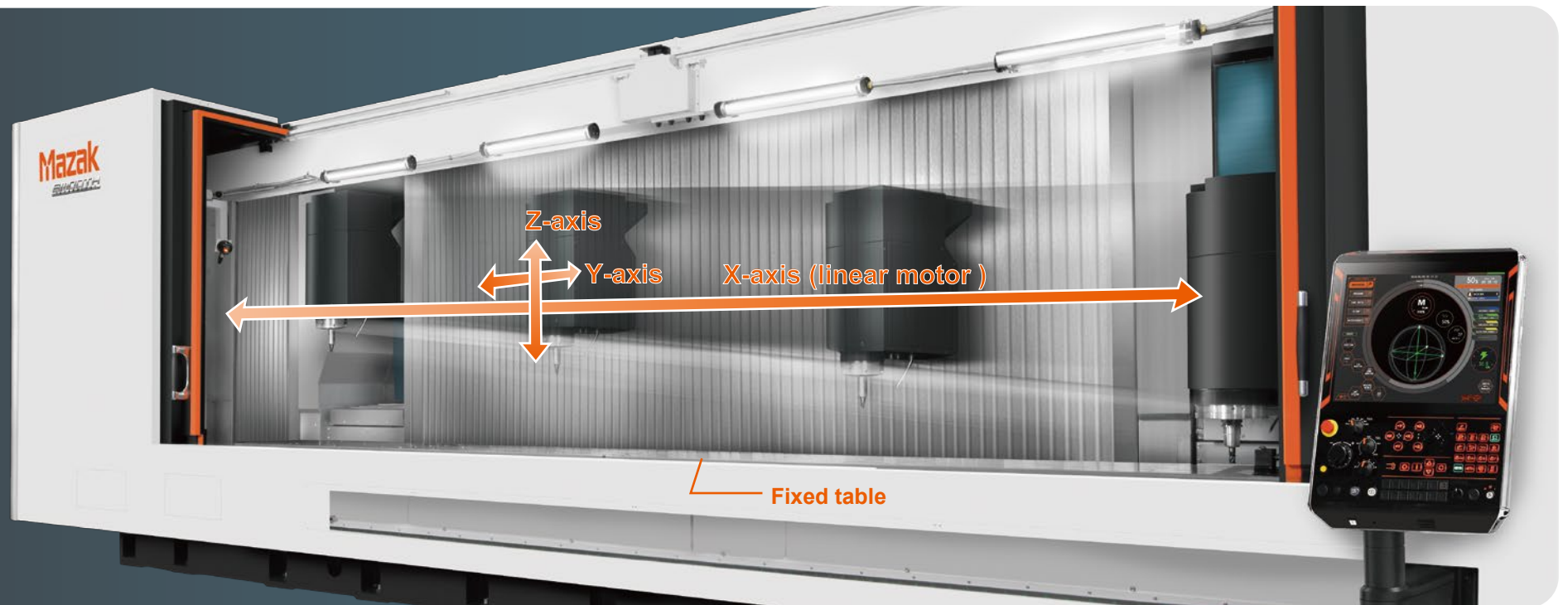**Linear motor drive
vertical machining center**

SVC
S E R I E S

Higher Productivity

X-axis linear motor provides high speed, high accuracy machining of long workpieces

Thanks to the traveling column construction with a fixed table, long, large workpieces can be easily machined. The X-axis linear motor drive delivers high speed and high productivity machining.

Z-axis
Y-axis
X-axis (linear motor)
Fixed table

Increased productivity thanks to linear motor

Designed for improved productivity thanks to high speed positioning, high speed feedrate and a high output spindle. Machining cycle time is reduced by 35 % when compared to comparable machines.

Workpiece : Aerospace component
Material : A7071
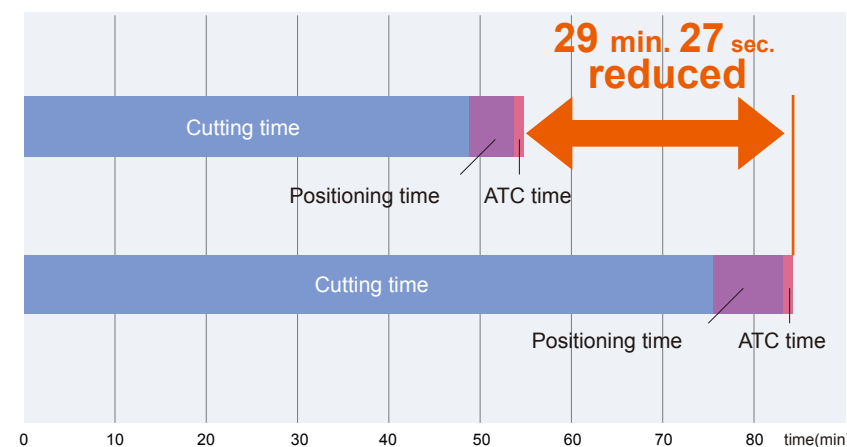Size : 1500 mm × 500 mm × 61.5 mm (59.06" × 19.69" × 2.42")
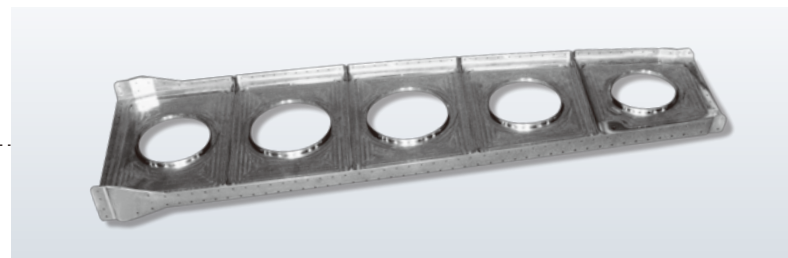
SVC-2000L

Max. spindle speed : 15000 rpm
Spindle output (40 % ED / 30 min. rating) : 22 kW〔30 HP〕
Rapid traverse rate (X, Y, Z-axes) :
120 / 50 / 50 m/min (4724 / 1969 / 1969 IPM)

Machining center with ball screws

Max. spindle speed : 10000 rpm
Spindle output (10 min. rating) : 15 kW〔20 HP〕
Rapid traverse rate (X, Y, Z-axes) :
30 / 30 / 50 m/min (1181 / 1181 / 1969 IPM)

29 min. 27 sec. reduced

Cutting time — Positioning time — ATC time

Cutting time — Positioning time — ATC time

0 10 20 30 40 50 60 70 80 time(min)

High speed, high output spindle

Designed for high speed machining of non-ferrous materials

Spindle speed		15000 rpm	25000 rpm OPTION
Spindle output	40 % ED (30 min. rating)	22 kW (30 HP)	23 kW (31 HP)
	Cont. rating	15 kW (20 HP)	15 kW (20 HP)
Torque (40 % ED / 30 min. rating)		70.7 N·m (52 ft·lbs)	22.0 N·m (16 ft·lbs)
Spindle taper		No.40	HSK A-63
Spindle acceleration to top speed		1.15 sec. (0→15000 rpm)	2.23 sec. (0→25000 rpm)
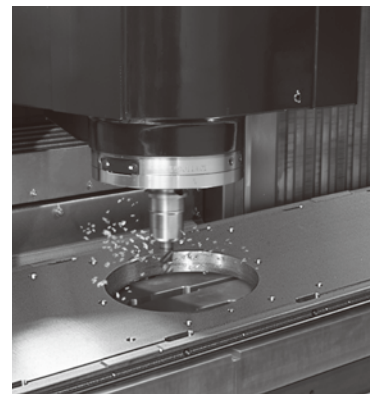
High speed tool change, tool-to-tool time : 1.5 sec.

The cam-driven automatic tool changer ensures reliable high speed tool changes over a long service life.

Tool shank	No.40
Max. tool diameter	Φ80 mm (Φ3.15")
Max. tool dia (with adjacent tool pockets empty)	Φ110 mm (Φ4.33")
Max. tool length (from gauge line)	350 mm (13.78")
Max. tool weight	8 kg (18 lbs)

Higher Productivity & Higher Accuracy

Long table provides exceptional versatility

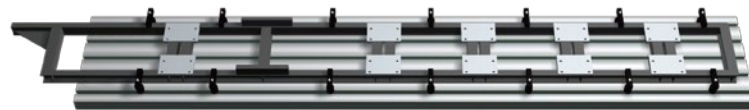Large, long workpieces can be machined - even those that overhang the large stationary table.

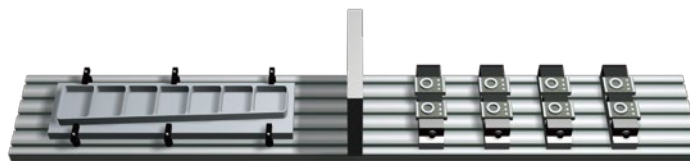Large, long workpiece

Large, long workpieces

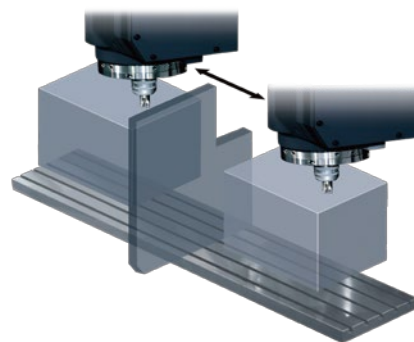Workpiece overhanging the table

Multiple parts setup

2 pallet changer type operation

↑ Center partition

Center partition (OPTION)

The optional center partition allows the SVC series to be used as two separate machines. Setups can be performed as well as workpiece loading / unloading on one side while machining is being performed on the other.

Roundness

Result : **3.6** μm   Feedrate : 560 mm/min (22 IPM)

Cutting conditions

Tool : Endmill (Φ20 mm (0.79") carbide tool with two teeth)

Cutting speed : V＝628 m/min (25 IPM) (10000 rpm)
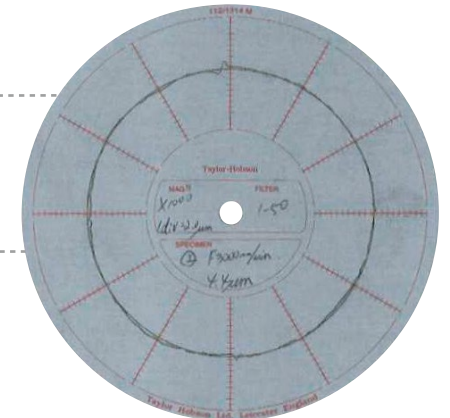
Feedrate : F＝560 mm/min (22 IPM) (0.028 mm / tooth)

Result : **4.4** μm   Feedrate : 3000 mm/min (118 IPM)

Cutting conditions

Tool : Endmill (Φ20 mm (0.79") carbide tool with two teeth)
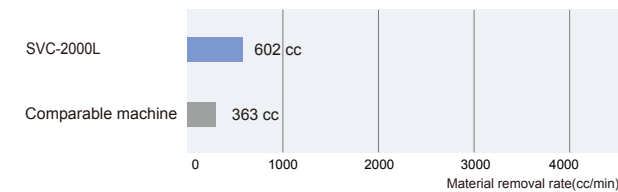
Cutting speed : V＝628 m/min (25 IPM) (10000 rpm)
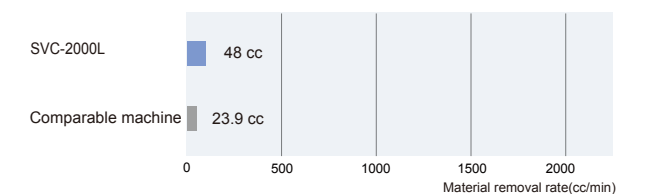
Feedrate : F＝3000 mm/min (118 IPM) (0.15 mm / tooth)

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.

Machining capability comparison

Milling (S45C) **602** cc/min (37 in³/min)
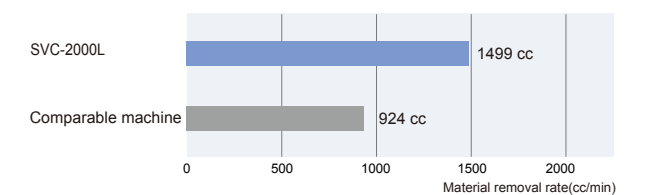
	Material removal rate(cc/min)
SVC-2000L	602 cc
Comparable machine	363 cc

Endmill groove machining (S45C) **48** cc/min (3 in³/min)

	Material removal rate(cc/min)
SVC-2000L	48 cc
Comparable machine	23.9 cc

Milling (aluminum) **3691** cc/min (225 in³/min)

	Material removal rate(cc/min)
SVC-2000L	3691 cc
Comparable machine	2160 cc
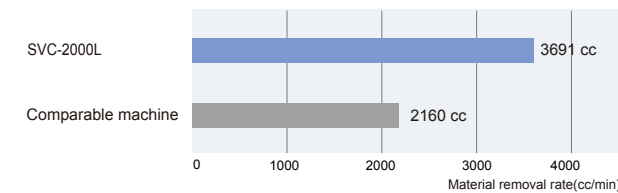
Endmill groove machining (aluminum) **1499** cc/min (91.5in³/min)

	Material removal rate(cc/min)
SVC-2000L	1499 cc
Comparable machine	924 cc

▌Higher Productivity

SMOOTH MACHINING CONFIGURATION

Machining time, finished surface smoothness and machining shape can be adjusted for improved productivity
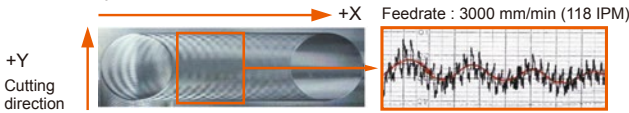

VARIABLE ACCELERATION CONTROL

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.
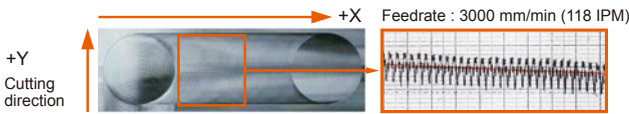
ACTIVE VIBRATION CONTROL

Minimized vibration function for high speed, high accuracy machining and longer tool life.

▶ Other systems

+X   Feedrate : 3000 mm/min (118 IPM)

+Y
Cutting
direction

▶ ACTIVE VIBRATION CONTROL

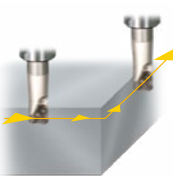+X   Feedrate : 3000 mm/min (118 IPM)

+Y
Cutting
direction

SMOOTH CORNER CONTROL

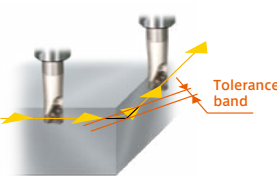Improved finished surfaces and reduced cycle times by optimized acceleration / deceleration when machining corners.

▶ Other systems

Move to next command position after reaching current command position

▶ SMOOTH CORNERCONTROL

Move to next command position within tolerance band

Tolerance
band

▌Higher Accuracy

Heat Displacement Control - THERMAL SHIELD

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.

Temperature and compensation is displayed on screen.
Operator can adjust compensation by looking at the data.

▌Ease of Maintenance

Comprehensive Spindle Monitoring - PERFORMANCE SPINDLE

The PERFORMANCE SPINDLE monitors a variety of properties such as temperature with sensors housed in the spindle and provides useful information to the operator. Thanks to this monitoring,production loss due to machine down time can be minimized.

▲ Condition check
Temperature as well as the motor load can be displayed.

▲ Running recorder
Operation status of milling spindle (rpm / motor load)can be recorded for up to one year.

Comprehensive Maintenance Monitor - MAINTENANCE SUPPORT

Useful information for improved preventative maintenance to prevent unexpected machine downtime.

Ergonomics

Designed for convenient operation

Excellent operator accessibility

The machine construction with fixed table and traveling column construction features excellent operator accessibility for convenient setup.

Excellent accessibility to table

The operator has excellent access to the table from the front of the machine for convenient workpiece loading / unloading and machine setup.
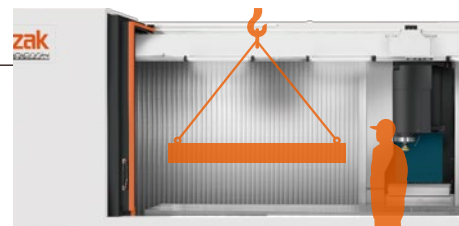
| Table top height | 800 mm (31.5") [120] / 890 mm (35.04") [200] |
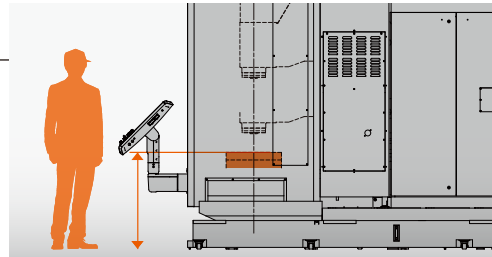
Wide door opening and convenient access for overhead crane

For ease of operation when loading / unloading workpieces when using overhead crane.

| Door opening | 3401 mm (133.9") [120] / 5402 mm (212.68") [200] |

Large windows

The large front door windows allow workpiece machining to be easily monitored by the operator.

Movable CNC operation panel

For ease of operation during setup and automatic operation

MAZATROL SMOOTH G

Movable, adjustable CNC touch panel

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

Tilt 45°
Rotate 120°

Machine Interference Prevention - SAFETY SHIELD

When an operator manually moves the machine axes for setup, tool measurement or changing inserts, the CNC shows a synchronized 3D model on the display for checking machine interference. If any machine interference occurs, the machine motion automatically stops.
This function for use during automatic operation is optionally available.

Verbal Message System - VOICE ADVISER

Verbal support for machine setup and safe conditions confirmation

MAZATROL CNC System

MAZATROL SMOOTH G

4 axes simultaneous CNC

Fastest CNC in the world
— Latest hardware and software for unprecedented speed and precision

Smooth graphical user interface
PC with Windows® 8 embedded OS
MAZATROL Smooth graphical user interface for unsurpassed ease of operation
Touch screen operation — operates similar to your smart phone / tablet

Ease of operation
Designed for unsurpassed ease of operation with advanced Functions

Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

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.
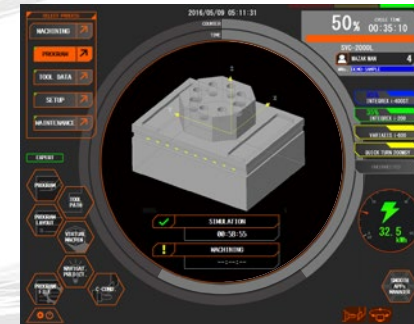
Programming
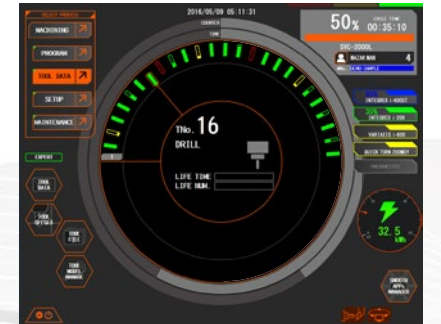
Tool data
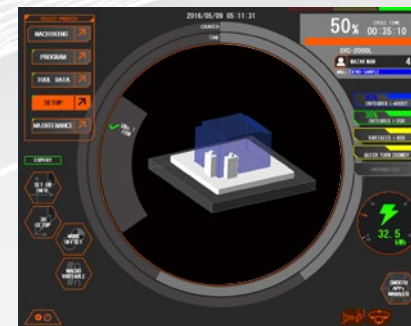
Set up
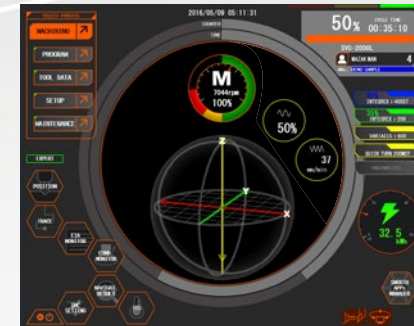
Machining

Maintenance

Programming screen links tool path, workpiece shape and programming to reduce programming time

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.

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

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.
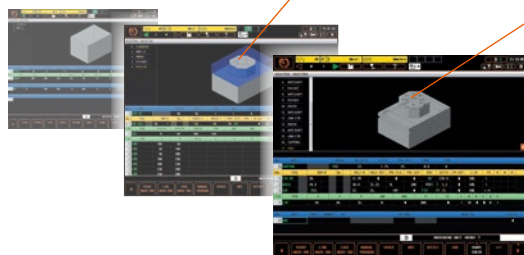
CAD model importing

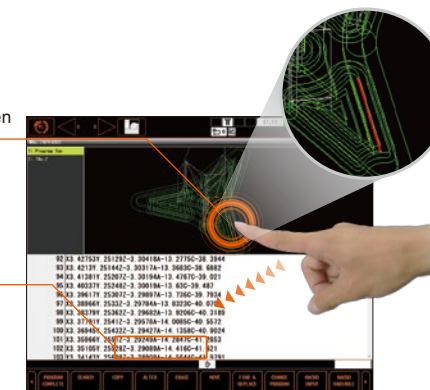Shape selection

Automatically input to MAZATROL program

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.
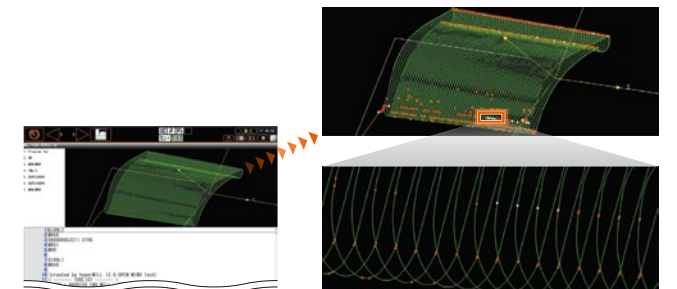
Selecting tool path by touching the screen

Moving to the corresponding EIA program line

VIEW SURF

By analyzing 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.

Environmentally Friendly

Designed with environmental considerations

The environment and our impact on our 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.

eco-friendly

Reduction of lubricant consumption

The roller guides and ball screws are lubricated by a grease lubrication system instead of oil. With this system, tramp oil in the coolant is considerably reduced, resulting in a longer coolant service life.

Reduction of electrical power consumption

Power consumption is reduced when the machine is in the stand-by state by automatically turning off the worklights and the optional chip conveyor.

SVC-2000L/200

Table Dimensions

Unit : mm (inch)
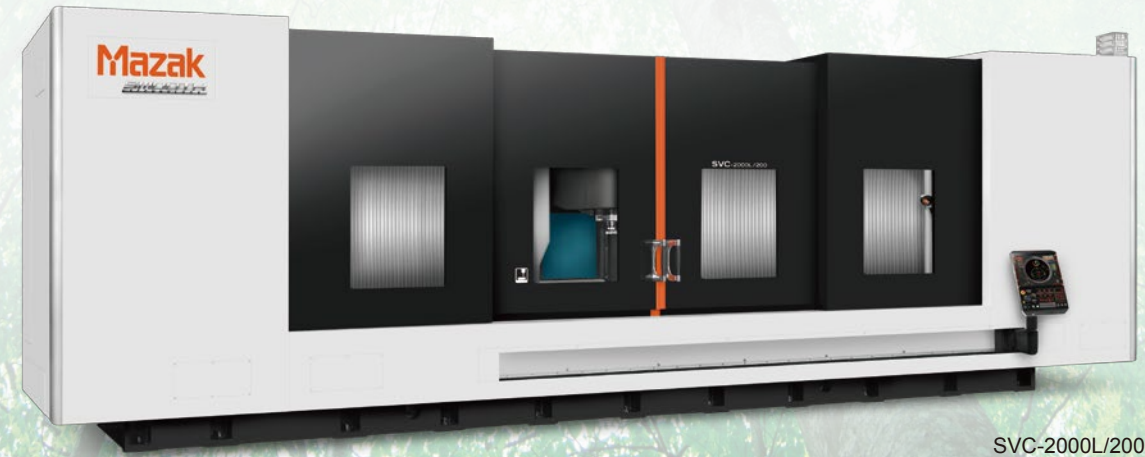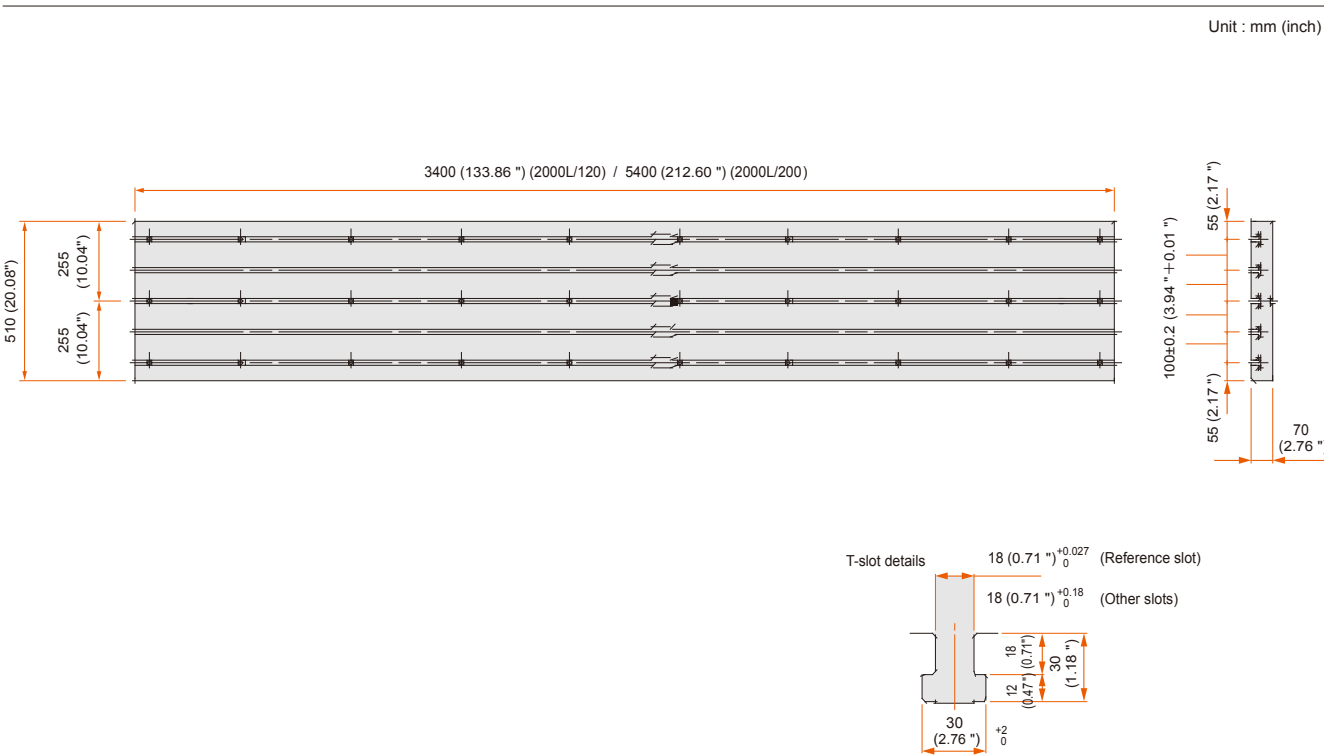
Spindle output / torque diagrams

15000 rpm spindle

Output	Torque
AC 22 kW(30 HP)(40 % ED)(30 min. rating)	70.7 N·m (52 ft·lbs)(40 % ED)(30 min. rating)
	57.3 N·m (42 ft·lbs)(cont. rating)

— Output (40 % ED)(30 min. rating) ···· Torque (40 % ED)(30 min. rating)
— Output (cont. rating) ---- Torque (cont. rating)
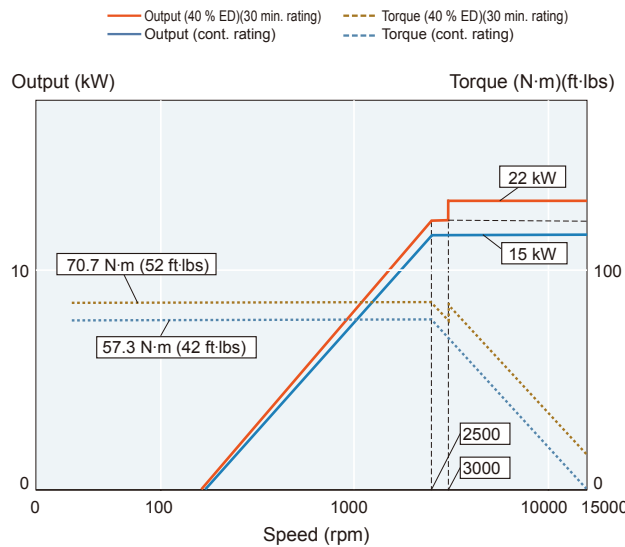
25000 rpm spindle (OPTION)

Output	Torque
AC 23 kW(31 HP)(40 % ED)(30 min. rating)	22.0 N·m (16 ft·lbs)(40 % ED)(30 min. rating)
	14.3 N·m (11 ft·lbs)(cont. rating)

— Output (40 % ED)(30 min. rating) ···· Torque (40 % ED)(30 min. rating)
— Output (cont. rating) ---- Torque (cont. rating)
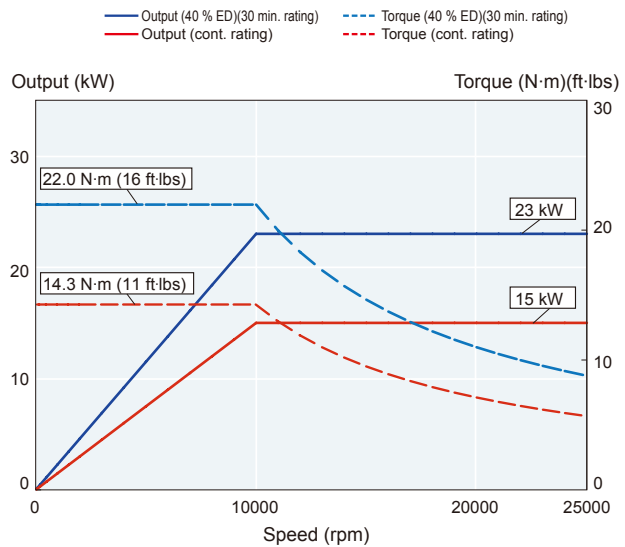
Standard Machine Specifications

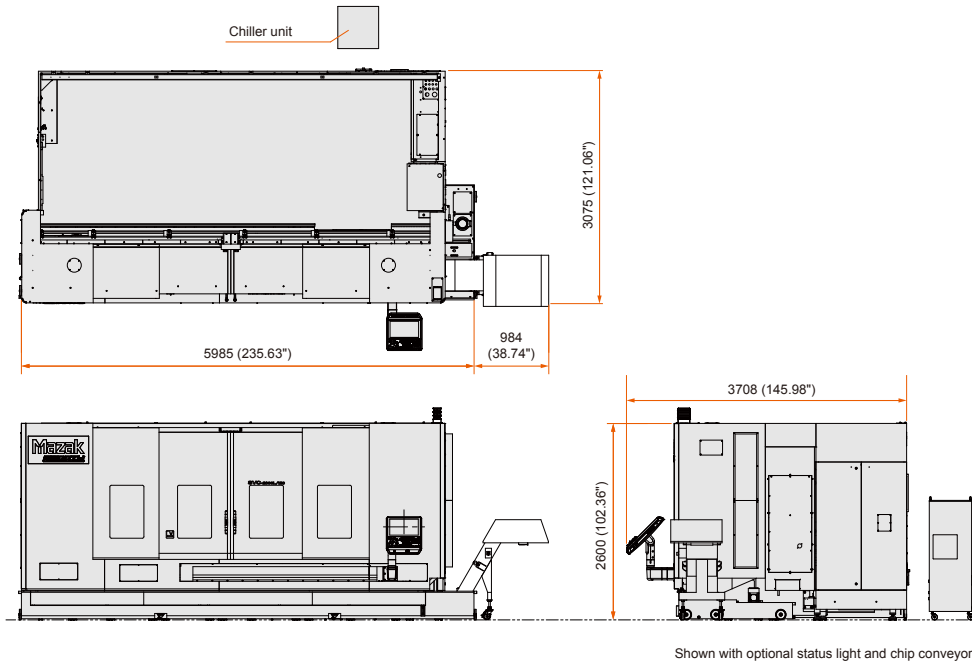|		2000L/120	2000L/200
Travel	X-axis (saddle left / right)	3048 mm (120.0")	5080 mm (200.0")
	Y-axis (column up / down)	510 mm (20.08")	
	Z-axis (spindle head up / down)	510 mm (20.08")	
	Distance from table top to spindle nose	180 ～ 690 mm (7.09 ～ 27.17")	
	Effective width between columns	510 mm (20.08 ")	
Table	Table size	3400 mm × 510 mm (133.86"× 20.08")	5400 mm × 510 mm (212.60"× 20.08")
	Table load capacity (evenly distributed)	2400 kg (5291 lbs)	3400 kg (7496 lbs)
	Table top surface	18 mm (0.71") T-slot × 5 100 mm (3.94") (pitch)	
Spindle	Speed	50 ～ 15000 rpm	
	Gear ranges	1-Stepless	
	Spindle taper	No.40	
	Spindle bearing ID	Φ70 mm (2.76")	
	Acceleration time to top speed	1.15 sec.（0→15000 rpm）	
Feedrate	Rapid traverse rate (X / Y-, Z-axes)	120000 mm/min (4724 IPM) / 50000 mm/min (1969 IPM)	
	Cutting feedrate*¹ (X-, Y-, Z-axes)	1 ～ 30000 mm/min (0 ～ 1181 IPM)	
Automatic tool changer	Tool shank	No.40	
	Tool storage capacity	30	
	Max. tool diameter / length (from gauge line) / weight	Φ80 mm / 350 mm / 8 kg (Φ3.15" / 13.78" / 17.6 lbs)	
	Max. tool diameter with adjacent pockets empty	Φ110 mm (4.33")	
	Tool selection method	MAZATROL random memory	
	Tool change time (chip-to-chip)	1.5 sec.	
Motors	Spindle motor (40 % ED (30 min. rating) / cont. rating)	AC 22 kW（30 HP）/ 15 kW（20 HP）	
	Flood coolant motor	330 W	
Power requirement	Required power capacity (15 min. rating / cont. rating)	75.1 kVA / 65.1 kVA	78.2 kVA / 68.2 kVA
	Air supply (pressure / flow rate)	0.5 MPa (73 PSI) or more / 460 L/min (16.2 ft³/min) or more	
Machine size	Height (from floor)	2600 mm (102.36")	2870 mm (112.99")
	Floor space requirement	5985 mm × 3708 mm (235.63"× 145.98")	10460 mm × 4433 mm (411.81"× 174.53")
	Weight (including CNC)	13000 kg (28660 lbs)	26000 kg (57320 lbs)

*¹ Limited feedrate with continuous axis movement

Standard and Optional Equipment

● : Standard ○ : Option — : N/A

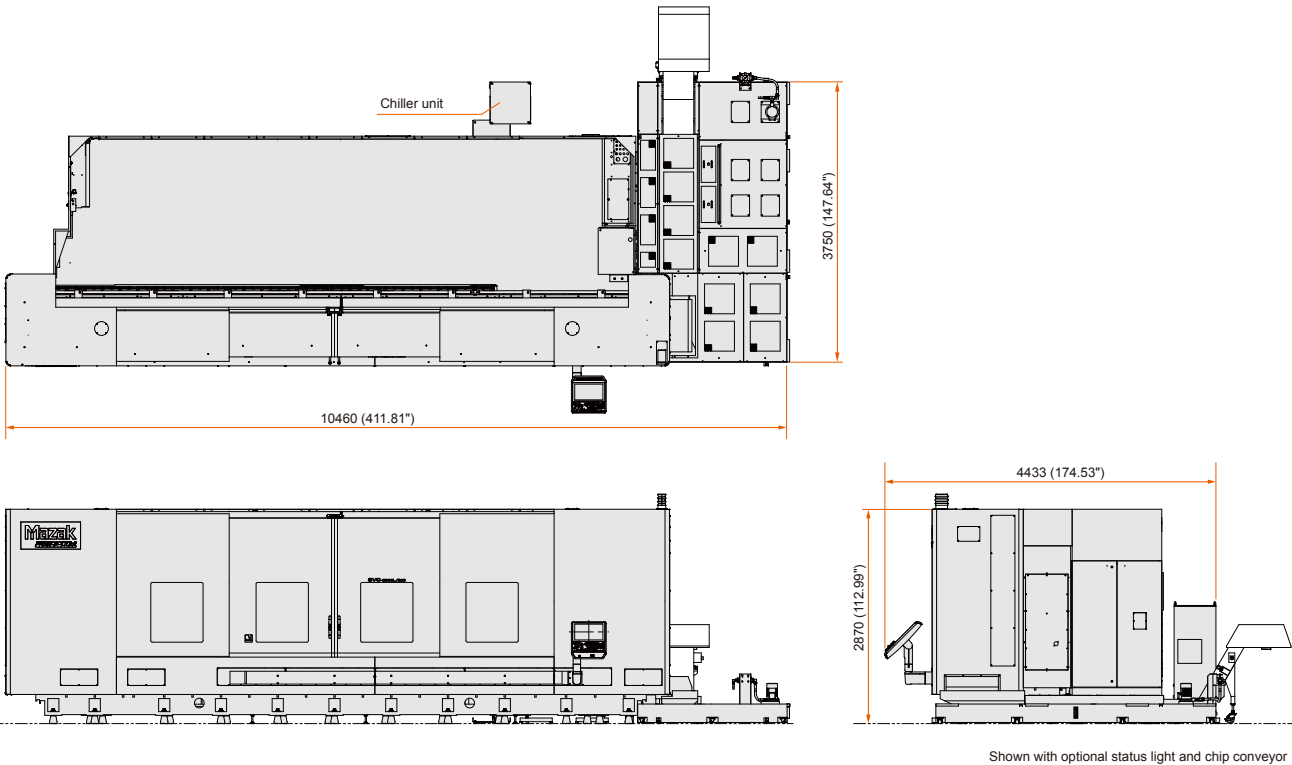|		SVC-2000L/120	SVC-2000L/200
Machine	Work light (4 locations)	●	●
	15000 rpm spindle (#40)	●	●
	25000 rpm spindle (HSK A-63)	○	○
	Multiple spindle orient (M code / 1°)	○	○
	Big-Plus spindle	○	○
	Foundation kit (dry-pit type)	●	●
Automation	Auto tool length measurement & tool breakage detection	○	○
	Ball screw core cooling (Y-, Z-axes)	●	●
	Scale feedback (X-axis)	●	●
	Scale feedback (Y-, Z-axes)	○	○
	Absolute position detection (Y-, Z-axes)	●	●
	Manual pulse generator (wired or wireless)	○	○
	Mazak monitoring system B (optical) OMP60	○	○
	Preparation for Mazak monitoring system B / OMP60	○	○
	Hydraulic fixture preparation	○	○
	Pneumatic fixture preparation	○	○
	Machining end buzzer	○	○
	Status light (3 colors)	○	○
	Status light (machining end : yellow)	○	○
	Status light (alarm : red)	○	○
	Center partition	○	○
	Magazine operation panel (Tool ID not compatible)	●	●
	Tool ID magazine operation panel (touch panel)	○	○
Safety equipment	Operator door interlock	●	●
Coolant	Coolant system	●	●
	Work air blast	○	○
	Oil skimmer (RB-200)	○	○
	Oil hole holder mounting unit (holder not included)	○	○
	Oil mist coolant	○	○
	Handheld coolant nozzle	○	○
	Flood coolant 4.5 kg/cm² (64 PSI) , 30 L/min (7.9 gal/min)	○	○
	Air through spindle	○	○
	Coolant through spindle (5 kg/cm²) (71 PSI)	○	○
	High pressure coolant through spindle (15 kg/cm²)(213 PSI)	○	○
	High pressure coolant through spindle (70 kg/cm²)(995 PSI)	○	○
	SUPERFLOW coolant system	○	○
	Mist collector (GP1000) 2	○	—
	Mist collector (GP3000) 2	—	○
	Pressure switch for through-coolant	○	○
	Cover coolant	●	●
Chip disposal	Internal chip conveyor	—	●
	Chip conveyor (side discharge, HINGE / ConSep)	○	—
	Chip conveyor (rear discharge, HINGE / ConSep)	—	○
	Chip bucket (rotary / fixed)	○	○
Others	Manual	●	●

Machine Dimensions

Unit : mm (inch)

SVC-2000L/120

Chiller unit

3075 (121.06")

5985 (235.63") 984 (38.74")

3708 (145.98")

2600 (102.36")

Shown with optional status light and chip conveyor

SVC-2000L/200

Chiller unit

3750 (147.64")

10460 (411.81")

4433 (174.53")

2870 (112.99")

Shown with optional status light and chip conveyor

MAZATROL SmoothG Specifications

	MAZATROL	EIA
Number of controlled axes	Simultaneous 4 axes	
Least input increment	0.0001 mm, 0.00001 inch, 0.0001 deg	
High speed, high precision control	Shape error designation, Smooth corner control, Rapid traverse overlap, Rotary axis shape compensation	Shape error designation, Smooth corner control, Rapid traverse overlap, Rotary axis shape compensation, High-speed machining mode, High-speed smoothing control function
Interpolation	Positioning (Linear interpolation), Positioning (Independent interpolation), Linear interpolation, Circular interpolation, Synchronized milling spindle tapping *	Positioning (Linear interpolation), Positioning (Independent interpolation), Linear interpolation, Circular interpolation, Spiral interpolation, Helical interpolation, Cylindrical coordinate interpolation *, Fine spline interpolation *, NURBS interpolation *, Polar coordinate interpolation *, Synchronized milling spindle tapping *
Feedrate	Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Dwell (specified time, specified number of rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate clamp, Variable acceleration / deceleration control, Constant control for G0 tilting *	Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Inverse time feed, Dwell (specified time, specified number of rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate clamp, Time constant changing for G1, Variable acceleration / deceleration control, Constant control for G0 tilting *
Program registration	Max. number of programs : 960, Program storage : 2 MB, Program storage expansion : 8 MB *, Program storage expansion : 32 MB *	
Control display	Display : 19" touch panel, Resolution : SXGA	
Spindle functions	S code output, Spindle speed clamp, 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	Tool offset pairs : 4000, T code output for tool number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces)	Tool offset pairs : 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	G0 / G1 independent backlash compensation, Pitch error compensation	
Protection functions	Emergency stop, Interlock, Stroke check before travelling, Retraction function for the vertical axis, 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, Automatic handle control, MDI control, TPS, Restart, 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 length and tip teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine	Tool length and tip 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	Partial auto tool length measurement, Auto 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

Mazak

YAMAZAKI MAZAK CORPORATION

1-131 Takeda, Oguchi-cho, Niwa-gun, Aichi-pref., Japan
TEL : +(81)587-95-1131   FAX : +(81)587-95-2717

www.mazak.com

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