

Mazak

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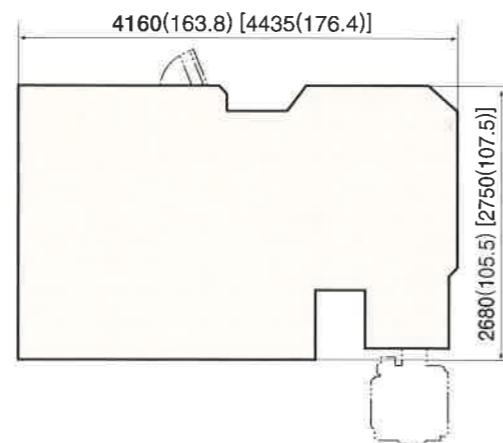
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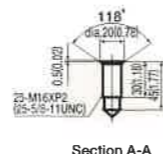
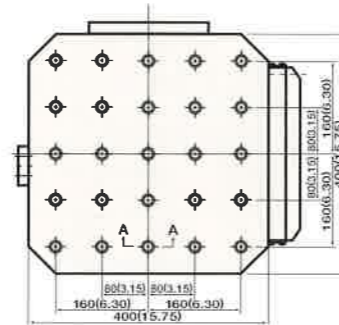
Floor layout

FH-4800[FH-5800]

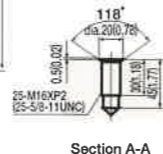
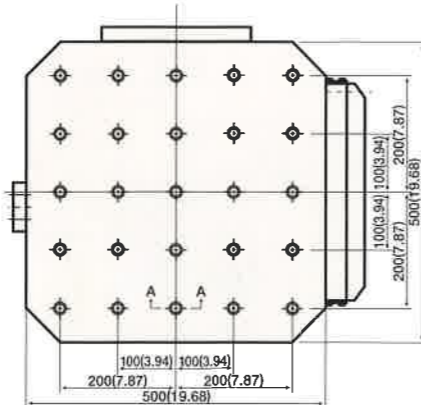


Pallet dimensions

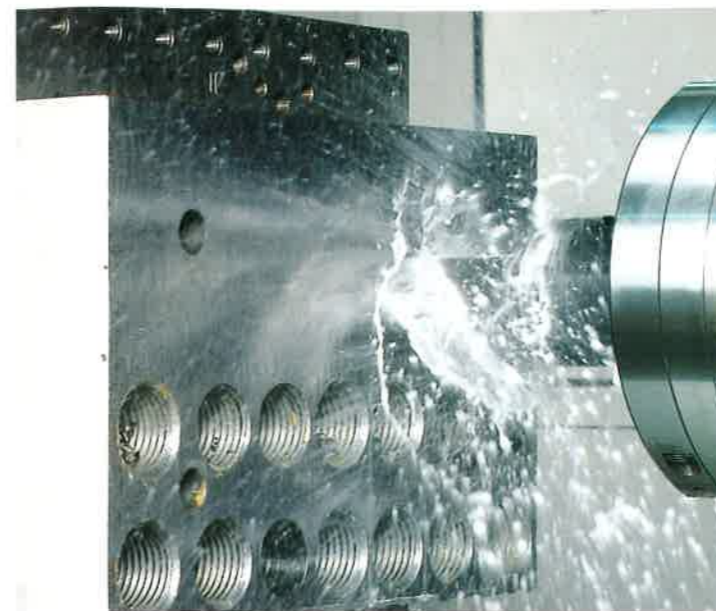
FH-4800



FH-5800



unit:mm(in.)



MAZATECH FH-4800 & FH-5800

High-Speed Horizontal Machining Centers

* Specifications are subject to change without notice.
 * This product is subject to all applicable export control laws and regulations.
 * The accuracy data and other data presented in this catalog were obtained under specific conditions. They may not be duplicated under different conditions (room temperature, workpiece material, tool material, cutting conditions, etc.)

MAZAK SYSTEM INTEGRATION

Mazak

The fastest machining center in its class - Designed for the maximum profitability in producing a wide variety of workpieces in small to medium size lots

The high-speed FH-4800/FH-5800 can be used to machine any kind of workpiece material. It can be configured for three typical types of machining: general machining, machining of aerospace components, and die machining. Mazak can deliver the machine best suited to your plant by selecting the specifications based on your requirements.

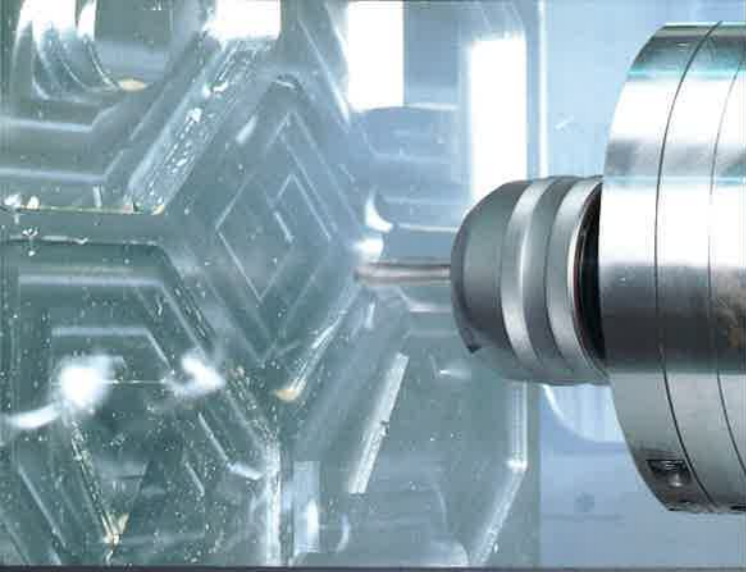
The FH-4800/FH-5800 is also designed to be integrated with a wide variety of factory automation equipment - including a 6-pallet changer system, the Palletech manufacturing cell and the Mazatrol FMS with a vertical pallet stocker.

Axis acceleration	: 0.7 G
Rapid feedrate and maximum cutting feedrate	: 50 m/min. (1969 IPM)
Maximum spindle speed	: 12000 rpm
Spindle motor output	: 22 kW (30 HP)
Spindle torque	: 31 kgf-m (224 ft-lbs)
High-speed spindle acceleration	: 0.23 sec. (0 to 3000 rpm)
High-speed tool change time (Chip-to-chip)	: 3.0/3.2 sec. (FH-4800/FH-5800)



MAZATECH FH-4800 & FH-5800

High-speed Horizontal Machining Centers



Next-generation Spindle Unit Assures Faster and More Powerful Cutting.

Select the spindle that best fits your production requirements

In addition to the standard 12000 rpm spindle, a spindle with high-speed acceleration and 15000 rpm and an ultra-fast 25000 rpm spindle are also available. Options such as mist-coolant and various coolant systems are available which support high-speed cutting.

Standard 12000 rpm spindle

For general part machining

Maximum spindle speed
12000 rpm
 Spindle motor output (15-minutes rating)
22kW (30 HP)
 Spindle torque
31kgf-m (224 ft-lbs)

This is a high-speed, powerful spindle suitable for workpieces of all kinds of materials, from aluminum to steel. It also has a very fast acceleration time of 0.23 seconds to reach 3000 RPM to make high-speed synchronized tapping possible.



Machining time : 6 minutes, 35 seconds
 Material : Aluminum alloy
 Dimensions : 80 x 110 x 70 mm
 (3.15 x 4.33 x 2.76 in.)

Machining time : 3 hours, 40 minutes
 Material : S45C
 Dimensions : 400 x 180 x 30 mm
 (15.75 x 7.09 x 1.18 in.)



15000 rpm spindle (option)

For the high-speed cutting of aluminum

Maximum spindle speed
15000 rpm
 Spindle motor output (15-minutes rating, 25%ED)
30kW (40 HP)
 Spindle acceleration time (to top speed)
1.7 sec.

This is a high-speed spindle with an acceleration time of 1.7 seconds (0 to 15000 rpm) which provides greater power both for normal machining of steel and high-speed cutting of aluminum. In addition, even though it has high-speed specifications, it features a new spindle cooling system to minimize the expansion of the spindle due to thermal displacement to ensure high machining accuracy.



Machining time : 2 minutes, 8 seconds
 Material : A5052
 Dimensions : 120 x 120 x 150 mm
 (4.72 x 4.72 x 5.91 in.)



Machining time : 2 hours, 16 minutes
 Material : A5052
 Dimensions : 100 x 100 x 100 mm
 (3.94 x 3.94 x 3.94 in.)

25000 rpm spindle (option)

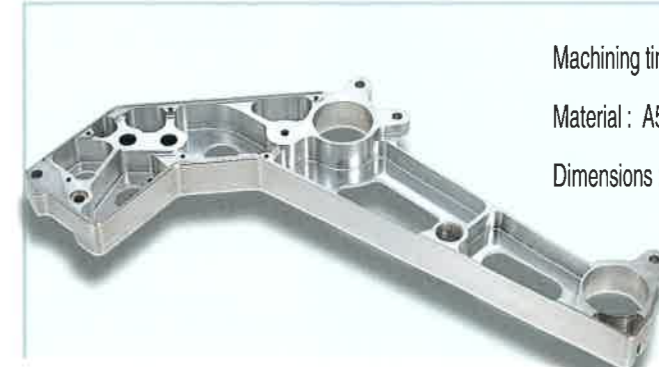
For high-speed, high-efficiency aerospace components and die machining

Maximum spindle speed
25000 rpm
 Spindle motor output (10-minutes rating)
30kW (40 HP)
 Spindle acceleration time (to top speed)
2.2 sec.

The newly designed spindle unit features a new tool clamping system. The new clamping system has considerably improved dynamic balancing for minimum vibration during high-speed operation which provides excellent surface finishes and extended tool life.



Machining time : 3.5 hours
 Material : SKD61 (HRC55)
 Dimensions : 26 x 40 x 12 mm
 (1.02 x 1.57 x 0.47 in.)



Machining time : 28 minutes, 15 seconds
 Material : A5052
 Dimensions : 440 x 260 x 35 mm
 (17.32 x 10.24 x 1.38 in.)

Mazak's Advanced Mechanical and Electronic Technology Provides High Accuracy from the Cutting of Steel Castings the to High-speed Cutting of Aluminum



MAZATROL 640M PC-FUSION-CNC



By fusing a personal computer with the CNC system, the next generation of machine controllers is born.

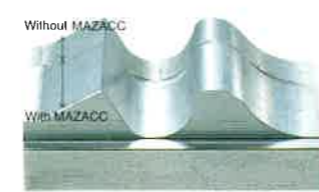
The Mazatrol CNC, which has earned a reputation as the most advanced conversational programming CNC system, has been fused with a personal computer while retaining the exceptional Mazatrol functions. The result is a controller that can respond to inquiries from external locations. It can also make suggestions, such as for faster cutting conditions, and report the operation record. These features give it a level of unexcelled performance and versatility.

High-speed, High-precision Feed Axis System

High-speed Control CNC System

The combination of low-mass, rigid moving elements (column, spindle, head) and a feed system with high-power servo motors provides rapid acceleration and deceleration. Since the effects of the reaction to high-speed acceleration are minimized, high-accuracy positioning is possible over the entire range of feedrates.

The smooth high-gain control of the Mazatrol Fusion 640 together with the MAZACC-3D high-speed, high-precision follow-up software, and high-speed feedrate with fine spline function, greatly improve machining accuracy when machining contoured surfaces at high speed.



Cycle time
With MAZACC 4 min. 8 sec.
Without MAZACC 6min. 45 sec.

Minimization of Heat and Micro-vibration Effects

High-accuracy Specifications for Optional Spindles



In order to minimize distortion of the machine body due to heat and micro-vibration, which can both influence accuracy, the hydraulic unit and spindle cooling unit - which are the sources of heat and vibration during machine operation - have been made separate units. In addition, machined chips, which are a source of heat during machining, are prevented from accumulating on the workpiece and pallet by The Niagara coolant discharge from the top cover while spiral conveyors at each side of the Z-axis cover rapidly carry chips away to a separately installed coolant tank, keeping the effects of heat from hot chips to a minimum.

The 15000 rpm and 25000 rpm spindles available as options achieve high-accuracy machining by minimizing spindle distortion due to thermal expansion in the Z-axis direction with the new cooling unit. The time required by the warm-up operation to protect the spindle bearings is also shortened. An X, Y, Z-axis ball screw cooling system and coolant temperature control system are also available and are effective in maintaining accuracy.

Innovative Mazatrol Functions and more

- Programming is carried out in the Mazatrol conversational format. The programming time and program length for difficult programs is considerably shorter when compared to EIA/ISO code.
- A program written in EIA/ISO code prepared for another manufacturer's CNC machine tool can be used with only slight editing according to differences in the machine specifications. (Depending on the manufacturer of the CNC, it may not be possible to use some programs. Please consult Mazak for details.)
- EIA/ISO programs used as subprograms of Mazatrol programs used with the Mazatrol Fusion 640 can be used in tandem with Mazatrol programs. This means that existing EIA/ISO programs can still be used.

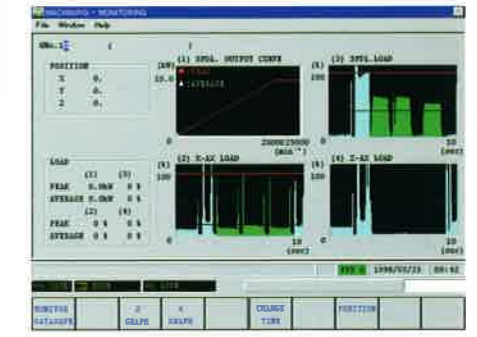
Unique New Mazatrol Fusion 640 Functions

- **Fast Control Using the World's Fastest 64-bit RISC Processor**
 - Machining time greatly reduced by using the world's fastest 64-bit RISC processor and compact, low inertia servo motors
 - First controller to approach the problems of reducing non-cutting time close to the absolute limit and speeding up cutting time from both the software and hardware perspectives
- **New Functions Achieved by Fusing a PC with a CNC**
 - Machining navigation.... Displays graphically the machining time, the expected spindle load, and the load during machining, for each tool, enabling the cutting conditions to be improved.
 - Operating status management Displays the number of parts machined in one day or one week, along with the spindle load, in order to improve operating efficiency.
 - New cutting condition automatic determination function Allows selection of high-efficiency machining according to workpiece material and the latest tool information.
 - Cutting condition learning function records high efficiency machining that has been performed in the past and these cutting conditions can be automatically selected in subsequent machining.
 - Tool path solid model.... A 3D representation of the tool path clearly shows the machining process to minimize test cutting
 - Tapping tornado cycle, boring tornado cycle and high-speed fine boring tornado cycle.... Allows tapping or boring of different dimensions using the same tool.
 - MAZACC 3D high-speed contouring software - for the high-speed machining of contoured surfaces with high accuracy (internal calculation baseline is 135 m/min ((5315 IPM) for contours defined in 1 mm (0.039 in.) program increments)

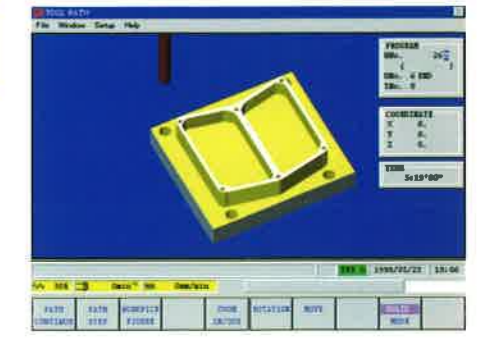
Communication Between Mazatrol Fusion 640 and the Mazak Production Center

The CNC is accessible through an intranet, through a telephone line, or through the Internet, from the office or any external location. The following can be performed by connecting the Mazatrol Fusion 640 and the optional Mazak production in a LAN:

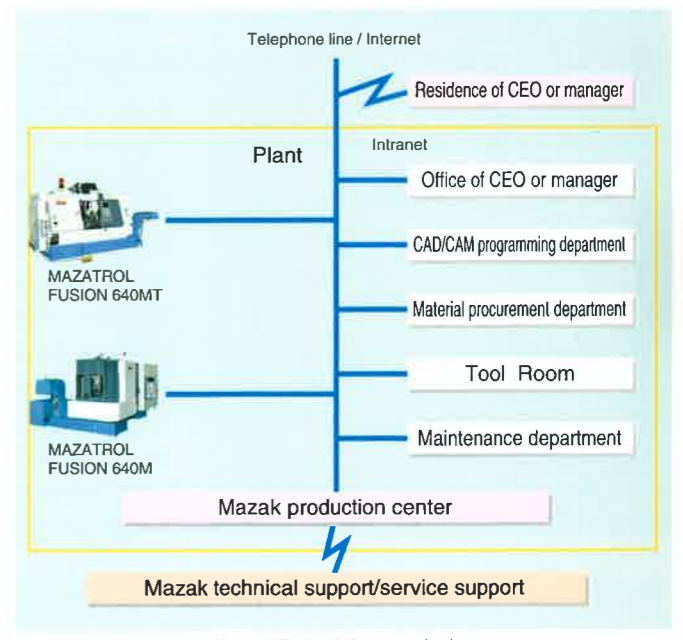
- ① Generating programs
- ② Required tool preparation suggestion
- ③ Required fixture preparation suggestion
- ④ Production management (production record management, schedule management)
- ⑤ Network, remote control function
- ⑥ Online technical support, office support



Machining navigation monitor screen



Tool path solid model screen



Mazatrol Fusion 640 communication

Providing exceptional productivity with ease of expansion through extensive experience

Mazak has delivered more than 200 FMSs throughout the world

Palletech Manufacturing Cell Features Outstanding Expandability

The modular construction means that the system can be expanded as required according to increases in production requirements. Large scale systems comprising up to 8 machines, 100 pallets, and 4 loading stations can be constructed. And if the optional FMS computer is included, more sophisticated production management functions can be utilized.



Cell Controller with Exceptional Ease of Use Allows a Flexible Response to Machining Schedule Changes

The controller features a schedule screen, pallet data screen, and system monitor screen. The production schedule can be completed just by inputting the pallet machining sequence. Whatever the kind of machining schedule - for standard jobs, rush jobs, or re-machining, etc. - the production schedule can be completed by inputting the number of times machining is to be done for each pallet (the number of times the pallet is used). Rush jobs which require an immediate response can be inserted at the front of the schedule for standard jobs. This can be done just by setting the selector switch on the loading station operation panel to the RUSH position. Even if one machining center goes down during scheduled operation, the controller automatically reassigns the pallet to another machining center and the schedule is continued. By means of this dynamic assignment function, it is possible to deal flexibly even with sudden changes in the production schedule. By skipping the program unit for a particular face in a machining program using the unit skip function (only available for Mazatrol programs), air cutting can be avoided. There is also a function for executing the machining of different processes in different machines. Using these functions provides high productivity.



Space-efficient Vertical Pallet Stacker

The pallet stacker is a two or three-level vertical type which takes up little floor space and can be installed even in restricted areas. The stacker configuration is modular and based on units of 15-pallet stackers accommodating pallets in five columns of three levels each. Expansion is possible up to a total of 8 modules (120 pallets).



FMS Computer for Controlling an Entire System

A machining schedule can be completed just by inputting the "work numbers" and "planned machining quantity" in the required processing sequence. According to the schedule data, the machining center that will carry out the machining is automatically determined and pallet transport instructions are given to the stacker crane robot. At the same time, setup instructions are sent to the loading stations. In this way, total system management is carried to finish parts according to the schedule. In addition, the operation record and log messages can be displayed, simplifying production management. The NC programs used by the system are stored in the FMS computer, and are automatically downloaded to the machining centers as required.



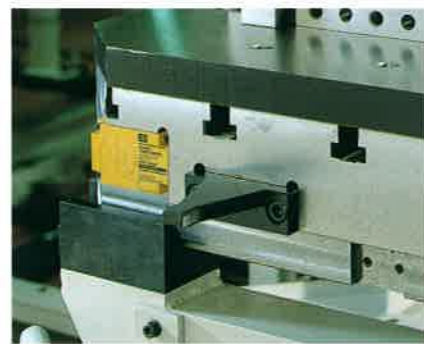
Palletech Manufacturing Cell

MAZATROL FMS

FA Options for increased unmanned operation efficiency



Tool management



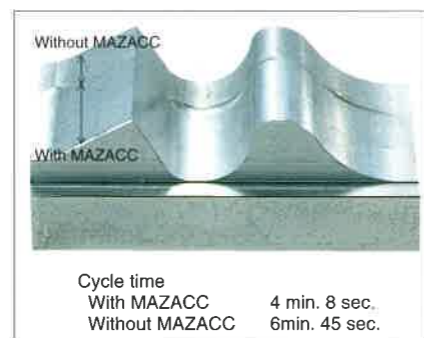
Pallet management



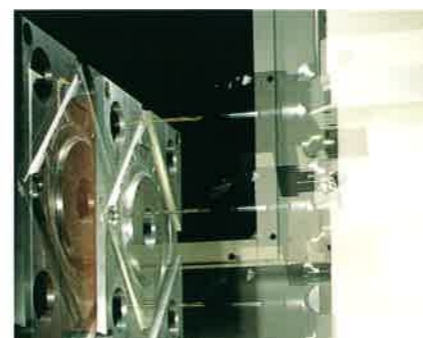
Scale feedback



MAZACC-2D



MAZACC-3D



Workpiece measurement



Niagara coolant



Coolant -through spindle system



Mist collector



Chip conveyor



Chip bucket

Factory automation equipment and other optional accessories

● Standard ○ Option

		Contents	
FMS	Mazatrol FMS	Space-efficient vertical pallet stocker for unmanned operation over extended periods of time.	○
	PALLETECH manufacturing cell	The system can easily be expanded in accordance with the production volume.	○
	Pallet management system	Pallet No., workpiece No., pallet offset data, etc. are stored in read/write chip mounted in each pallet and read by a sensor and registered in the CNC system.	○
	Tool management system	Tool data stored in read/write chip mounted in tool retention stud are automatically read and registered in the CNC system.	○
Unmanned operation	2-pallet changer	Next workpiece can be set up during machining.	●
	6-pallet changer	Setup during machining and unmanned operation can be performed.	○
	Pallet machining management	Pallet scheduling can be performed by using the NC machining management screen.	○
	80 / 120-tool ATC (chain type)	Allows permanent set tools to meet the requirements of a wide variety of workpieces.	○
	Absolute position	X, Y, Z axes. (Not available with scale feedback system.)	○
	Automatic power-off	Main power is automatically turned off on receipt of the "program-end" machining completion signal from the NC.	●
	Automatic power ON/OFF + warm up operation	After the power has been automatically turned ON in accordance with a timer setting, the machine warm-up operation is executed.	○
	Automatic power-on/off	Power is automatically turned on at time set by the digital timer. It is turned off by the "program-end" machining completion signal.	○
High-accuracy	NC rotary table	0.001" x 360,000 positions	○
	Scale feedback system (X, Y, Z axes)	Closed loop system which measures the actual amount of motion of the X, Y and Z axes and compensates according to the command value.	○
	MAZACC-2D high-speed software package	Maintains accuracy when high-speed feedrates are used.	●
	MAZACC-3D high-speed contouring software package	High speed plus high-accuracy machining for contours defined in very small program increments.	○
Status indicator	Coolant temperature control	Coolant temperature is maintained to a pre-set limit to minimize thermal distortion of the machine and workpiece.	○
	Machining completion light (single)	Indicates completion of machining by a rotating yellow light.	○
	Alarm indicator light (single)	Indicates a machine or CNC alarm by a rotating red light.	○
	3-color machine status light,	Shows 3 statuses: Run (green), Machining completed (yellow), Alarm (red)	○
Safety	Workpiece measurement and printout function (no printer)	Automatic workpiece measurement by touch sensor according to one of a variety of measuring patterns, and tool compensation according to measurement results, and print out of results.	○
	Splash guard	The splash guard encloses the working area to maintain a clean environment.	●
Coolant and chip disposal	Safety cover for 2-pallet changer	Machining area and pallet staging area enclosed.	●
	Flood coolant	Flood coolant with 1.5 kW pump	●
	Niagara coolant (0.75 kW)	Large volume of coolant is discharged from nozzles mounted on the ceiling to remove chips from the pallet & workpiece.	●
	Coolant through spindle type A	Coolant supply pressure: 8kgf/cm ² (115 PSI)	○
	Coolant through spindle type B	Coolant supply pressure: 15 kgf/cm ² (215 PSI)	○
	Coolant through spindle type C	Coolant supply pressure: 70 kgf/cm ² (995 PSI)	○
	Mist collector	Separates and recycles the coolant mist inside the machine.	○
	Oil skimmer (separate tanks for oil and water)	Removes oil on the surface of coolant in coolant tank.	○
Spindle	Chip conveyor	Chip disposal direction can be selected from machine side and machine rear. Two types are available: scraper type and CONSEP type.	○
	15000 rpm spindle (#40)	Spindle speed: 15000 rpm spindle motor: 30 kW (40 HP)	○
	25000 rpm spindle (#40)	Spindle speed: 25000 rpm spindle motor: 30 kW (40 HP)	○

MAZATROL FUSION 640M SPECIFICATIONS

Standard Specifications

Mazatrol Specifications

*EIA/ISO Specifications

Number of controlled axes	3 (Simultaneously controlled axes: 3)	
Additional controlled axes	3 (Max. number of simultaneously controlled axes: 4, including standard controlled axes)	
Least input increment	0.001 mm, 0.0001 inch	
Max. programmable value	±99999.999 mm, ±9999.9999 inch	
High precision control	Smooth high gain control, *Scale feedback	
MAZACC-2D MAZACC-3D	*Linear acceleration/deceleration before interpolation, *Optimum corner deceleration, *Precision Vector interpolation, *Feed forward control	*Shape error designation
Interpolation	Positioning(Independent axes control, Linear interpolation), Linear interpolation, Circular interpolation, Synchronized tapping	
Feed functions	Rapid traverse, Cutting feed(per revolution, per minute), Feedrate clamp, Override, Override cancel, Automatic acceleration/deceleration feedrate, Constant tangential speed control, Dry run, Exact stop, Dwell(specified length of time or number of revolutions), Interlock, Second feed override, Continuous cutting blocks, Automatic corner override, Buffer register	
Program registration	Number of programs: 256, *512, *960/ 8 digit workpiece number	
Display	10.4 inch color TFT	
NC display languages	English, German, French, Italian, Spanish, Dutch, Norwegian, Swedish, Finnish, Danish, Portuguese, Chinese, Japanese, (One touch language switching)	
Windows languages	English, Japanese, Chinese(Selection)	
Data Input / Output	IC memory card I/F, Mouse, *Micro disk, *PCMCIA I/F, *Keyboard I/F, *Printer I/F, *Tool ID, *Pallet ID	
Protocol	*Mazak protocol, *Mazak data transfer protocol, Net work protocol (Windows 95)* ¹	
Interface	RS-232C, Ethernet* ¹	
Main functions	S code output(8-digit binary output, Analog output, Actual revolution speed binary output), Spindle revolution control(RPM clamp, High speed RPM confirm/speed change detection, Rotary speed display), *Multiple points spindle orientation, Spindle override(0 - 150%), Spindle output change over (for electrical supply fluctuations)	
Tool function	T 3-digit tool number management, Next tool output, Tool life monitoring, Spare tool replacement, Tool name designation	
Tool compensation	Tool position compensation, Tool length compensation, Tool diameter compensation	
Number of registered tools	Max. 960	
Tool offset pairs	128, *512	
Miscellaneous functions	M code output(M3 - digit), Simultaneous output of four 3-digit M codes, Second miscellaneous functions(B 3 - digit output), High speed MSTB interface	
Coordinate system control	Machine coordinate system, Work coordinate system, Local coordinate system, Mazatrol coordinate system, External work coordinate system, Machine coordinate system shift, Work coordinate system shift, Absolute position detection(2 types), Origin setting	
Manual operation control	Rapid traverse, Cutting feed, Manual pulse generator, Original point detection, Random points feed	
Automatic operation control	Memory operation, MDI operation, Cycle start, Single block, Feed hold, Reset, Optional stop, Program end, Dry run, Manual interruption, Manual step-handle interruption, Tool path storage, restart	
Background function	During automatic operation: Programming, Data input /output, Tool path check	
Machine compensation	*Backlash compensation, Pitch error compensation(Linear axis, Rotational axis), Straightness compensation, Thermal distortion compensation, Uni-directional positioning	
Protection function	Emergency stop, Interlock (Block start, Cutting start, Axis interlock), Machine lock, Auxiliary function lock, Data protection key, Stored stroke check, synchronized tapping dry run	
Diagnosis/maintenance	Alarm, Monitor(memory, servo, spindle, ladder), Programmable logic controller(PLC), Alarm menu	
Measuring	Manual measuring(Tool length measurement, Work offset measurement, *Straightness measurement), Automatic measuring(MMS coordinate measuring), MDI measuring(Semi-automatic, full-automatic tool length measuring)	

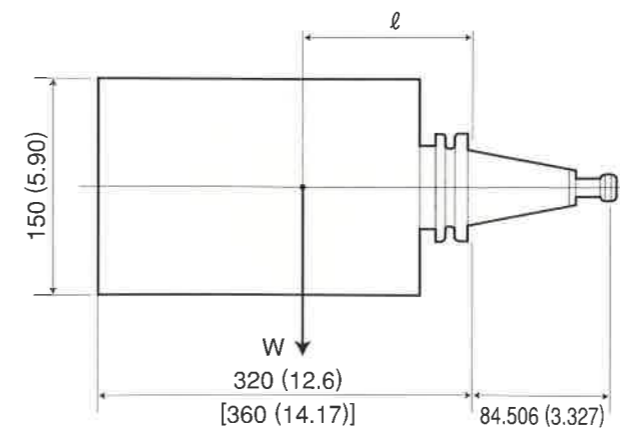
*Indicates optional.
*¹ LAN card is required.

MACHINE SPECIFICATIONS

	FH-4800	FH-5800	
Axis motion	X-axis (column travel left/right)	560 mm (22.05")	710 mm (27.95")
	Y-axis (spindle head travel up/down)	610 mm (24.02")	
	Z-axis (pallet forward/backward)	560 mm (22.05")	660 mm (25.98")
	Distance from pallet top to spindle center	50~660 mm (1.96~ 25.98")	
	Distance from pallet center to spindle nose	150~710 mm (5.90~27.95")	150~810 mm (5.90~31.89")
Table	Pallet size	400 mm x 400 mm (15.74 x 15.74")	500 mm x 500 mm (19.68 x 19.68")
	Pallet load capacity (evenly distributed)	3920N (881 lbs)	4900N (1102 lbs)
	Pallet top surface	M16 (5/8-11UNC) tap 25 places, pitch : 80 mm (3.15")	M16 (5/8-11UNC) tap 25 places, pitch : 100 mm (3.94")
	Minimum indexing angle increment	1°	
	Indexing time	1.6 sec for each 90°	1.7 sec for each 90°
Spindle	Speed	35~12000 rpm	
	Gear range	1	
	Spindle taper	No. 40	
*Feedrate	Rapid traverse rate	50000 mm/min (1968 IPM)	
	Cutting feedrate	1~50000 mm/min (0.04~1968 IPM)	
Automatic tool changer	Tool taper	CAT NO. 40	
	Tool magazine capacity	40	
	Maximum tool diameter/length (from gauge line)/weight	95mm / 320 mm /117.6N (3.74"/12.59"/26.4 lbs)	95mm / 360 mm /117.6N (3.74"/14.17"/26.4 lbs)
	Maximum tool diameter (when adjacent pockets empty)	150 mm (5.9")	
	Tool selection method	Random selection/shortest path	
Automatic pallet changer	Tool change time (chip to chip)	3.0 sec	3.2 sec
	Number of pallets	2	
	Change system	Rotary	
Motors	Pallet change time	5 sec	6 sec
	Spindle motor (15-minute/continuous rating)	AC 22 kW (30 HP) / 15 kW (20 HP)	
Electrical and air requirement	Coolant pump	0.75kW	
	Electrical power supply (15-minute/continuous rating)	52.0kVA / 42.0 kVA	
Tank capacity	Air supply pressure	0.5MPa (72 PSI) 440L/min (19.4 ft ³ /min)	
Machine size	Coolant tank capacity	500L (132 gal)	
	Height	2638 mm (103.8") (from floor)	2648 mm (104.3") (from floor)
	Required floor space	2680 x 4160 mm (105.5 x 163.8")	2750 x 4435 mm (107.5 x 174.6")
	Machine weight	9400 kg (20723 lbs)	10200 kg (22440 lbs)

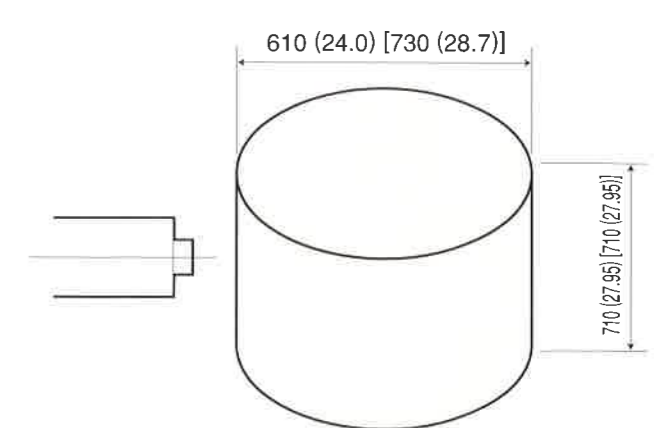
*limited feedrate with continuous axis movement.

Maximum tool length and maximum tool diameter
FH-4800[FH-5800]



• Max. moment 6N·m(4.4 ft-lbs) (W × ℓ)

Maximum workpiece dimensions
FH-4800[FH-5800]



Unit: mm (in.)