

MX-520



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- Product specifications and dimensions are subject to change without prior notice.
- The photos may show optional accessories.

This product is subject to all applicable export control laws and regulations.



PC4

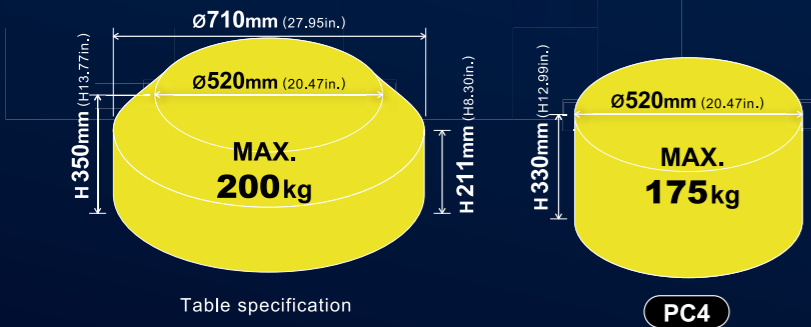
MAXIA
Innovation by  Matsuura

MX Series

A Wide Range of Product Lineup for
Entry-level 5-axis Machining and Automation Market

MX Series; our globally best-selling 5-axis machine delivering
a proven rapid return on investment for our customers

5 Reasons Why Customers Choose The MX Series



MX-520



MX Series

1 Productivity Improvement by 24 hours Continuous Operation
Proven Automation
Delivering Maximum Profit

2 Productivity Improvement by Efficient Machining Process
Smooth Transition
from 3-axis to 5-axis Machining

3 Productivity Improvement by Operator Workload Reduction
Ease-of-use Operability
for Beginners to Advanced

4 Productivity Improvement by Ensuring Stable and High Accurate Machining
Automation Specialized Functions
for Long Periods of Sustained Machining

5 Productivity Improvement by Reduction of Machine Downtime in Manufacturing
Visual Control and Remote Monitoring
for Unmanned Operations at Night and Weekends

1 Productivity Improvement by 24 hours Continuous Operation

Proven Automation

Delivering Maximum Profit

Automation Package

Compact-design automated system

Matsuura original designed **MX-520** 4 pallet system, combined with 90 tools, delivers optimized and unrivalled spindle utilization and unmanned performance. Matsuura's affordable excellence delivers our legendary & proven automated machining to within reach of all CNC machining companies.

PC4 (Floor pallet system)

Pallet storage: Memory random system

Option

90-tool magazine

Option

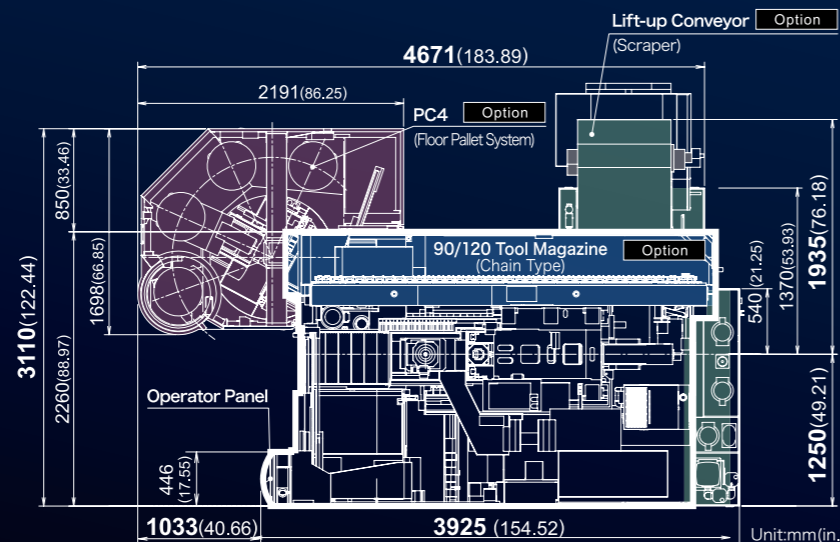


Work station

Large APC workstation access



Small footprint saving valuable factory space



Spiral chip conveyor

30% higher swarf evacuation capacity

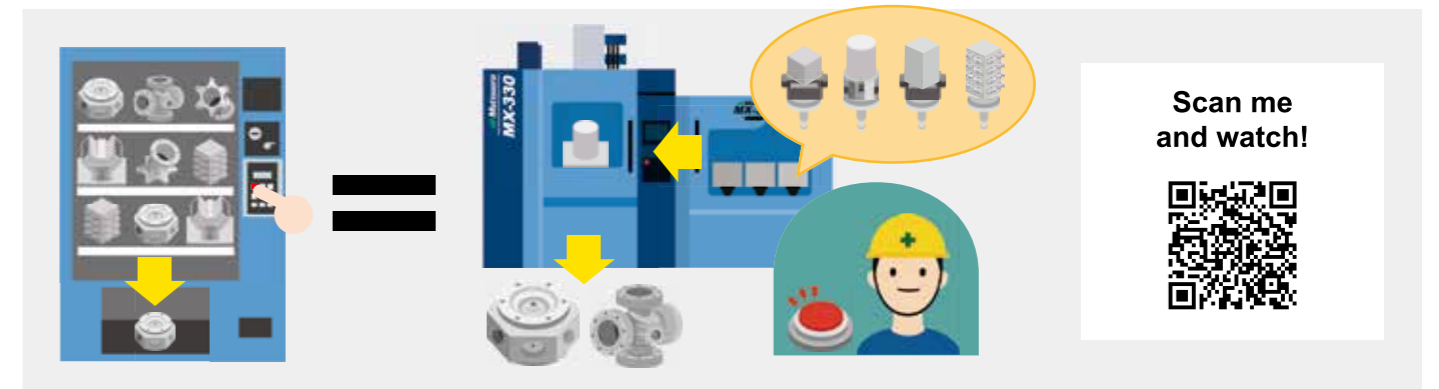
Option



Matsuura Original Multi-pallet System Solution

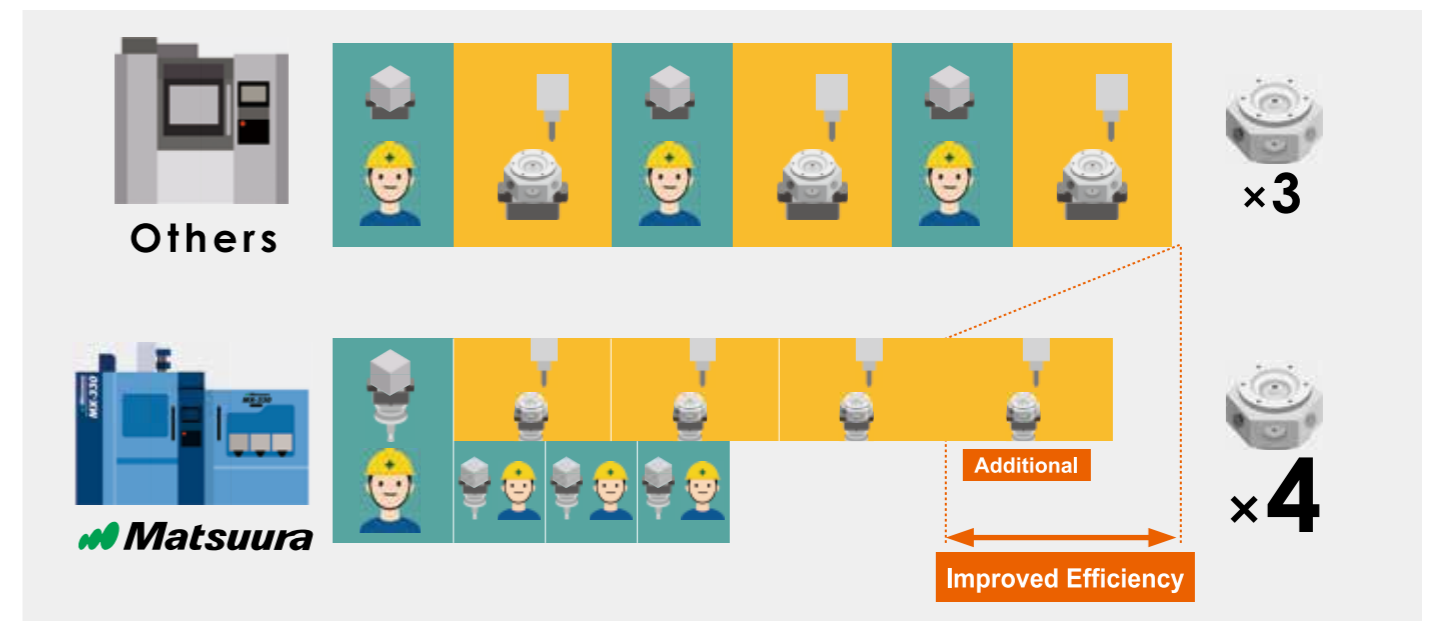
High-Mix, Low-Volume Production

Matsuura's multi-pallet solutions allow you leave fixtures on pallets, enabling you to produce the necessary products in the necessary quantity when they become necessary..., like a vending machine!

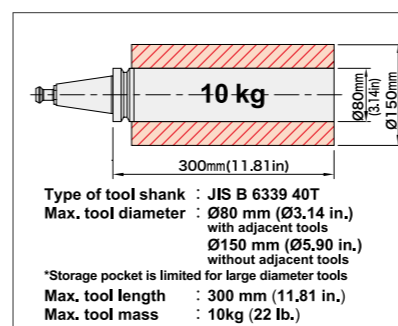


Maximize Your Operational Efficiency

Matsuura's multi-pallet solution has a work station, enabling you set up workpieces even during machining. Once you set up workpieces and leave them in the pallet pool, and the machine will automatically start machining in order.



Tool specification



60-tool magazine

Standard



120-tool magazine

Option



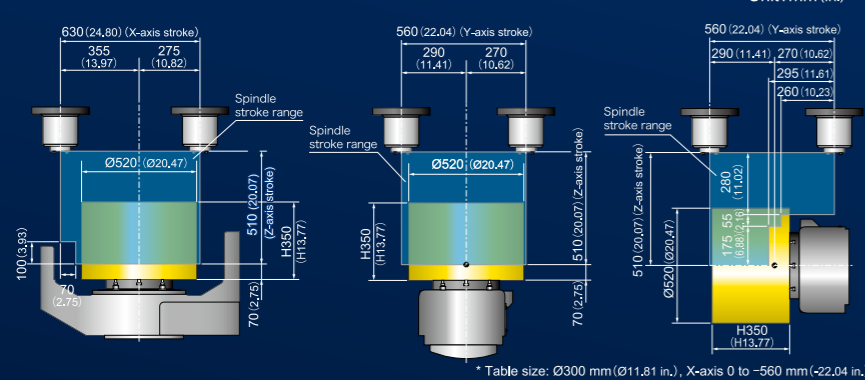
Floor plan is the same as 90-tool magazine

2 Productivity Improvement by Efficient Machining Process Smooth Transition from 3-axis to 5-axis Machining

Lower costs, fewer set-ups and eliminated accumulated load errors with 5-axis machining

4th-/5th-axis table of dedicated design. The headstock & trunnion configuration has been designed in such a way as to minimize the possibility of collision, whilst maximizing tool access & reach.

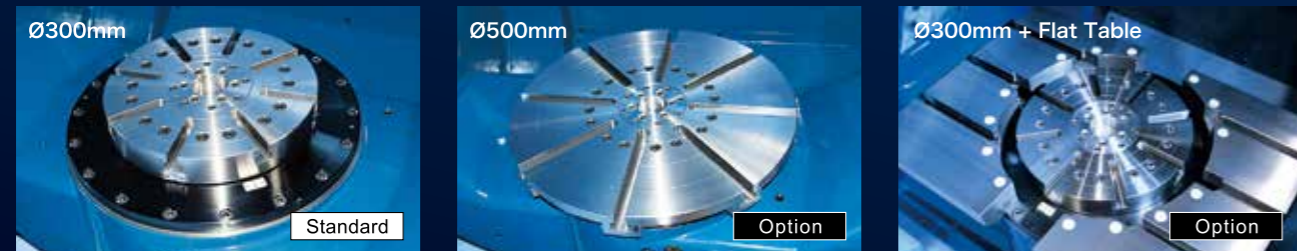
Spindle Stroke Diagram (Table specification)



Utilizing 3-axis machining knowhow is possible even during the transition to 5-axis machining

Select according to your application

Table specification



Productivity improvement by cycle time reduction; acceleration of machine movement

The newly-designed **MX-520** achieved a cycle time reduction of 10% or more (compared to conventional model) by improving the 4/5 axis raid traverse rate to 33/50min⁻¹ (conventional to 17/33min⁻¹) and machine movement performance.

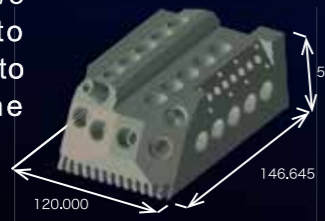


Fig.Cycle time comparison

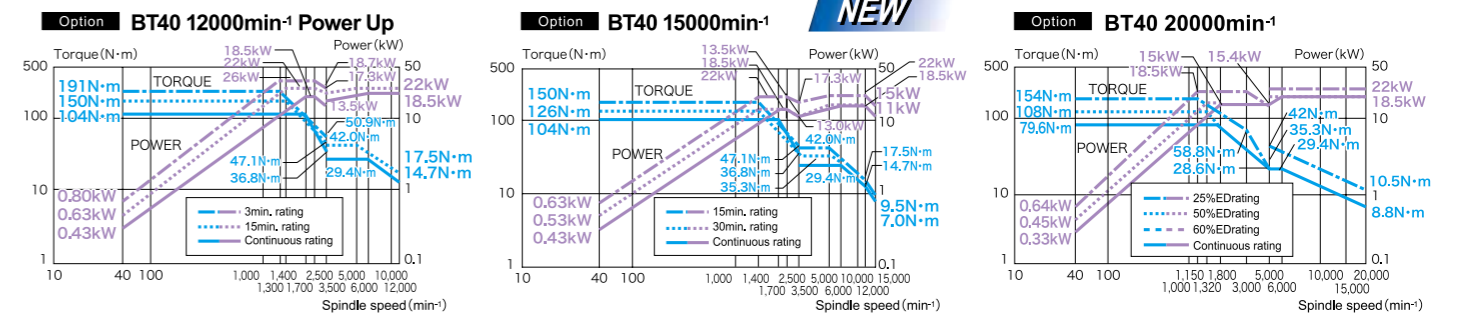
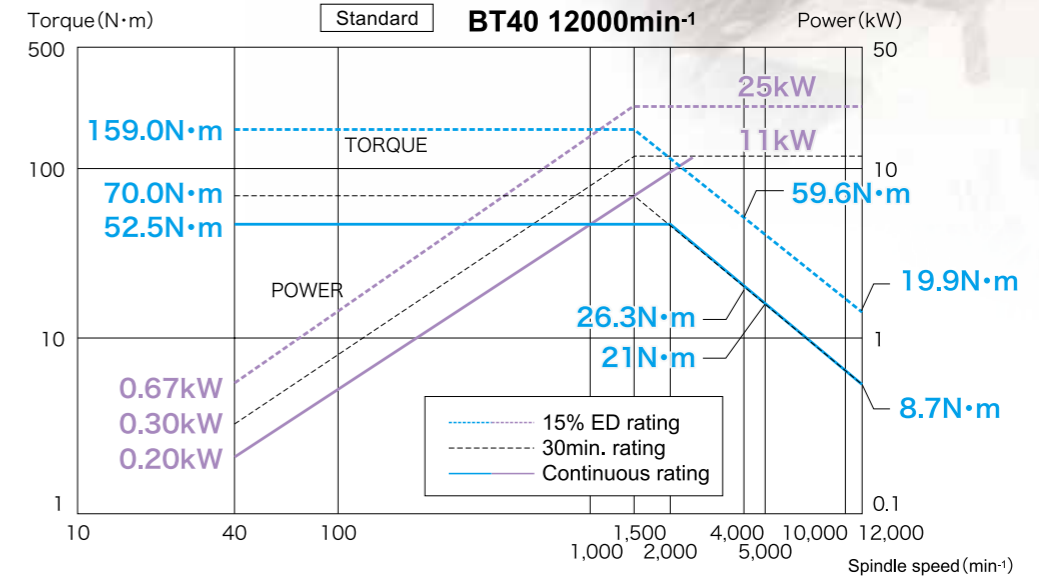
	Material	Aluminum(147x120x60mm)[5.78x4.72x2.36in.]
[Number of tools]	12 tools	
[Spindle speed]	2,000~12,000min ⁻¹	
Cycle time	Conventional	Model Change
4/5 axis indexing	56min 00sec	49min 56sec
Simultaneous 5 axis	37min 08sec	32min 24sec
Total	93min 08sec	82min 20sec

10% or more Reduction

Data is not intended to guarantee the performance.

High-rigidity, high-precision MAXIA BT40 Spindle

MAXIA Spindles – designed and built only by Matsuura, deliver maximum performance, accuracy and longevity of service for many, many years - even when continuously machining hard-to-cut materials. High torque, heavy duty and high speed are assured across the range of spindle options from Matsuura.



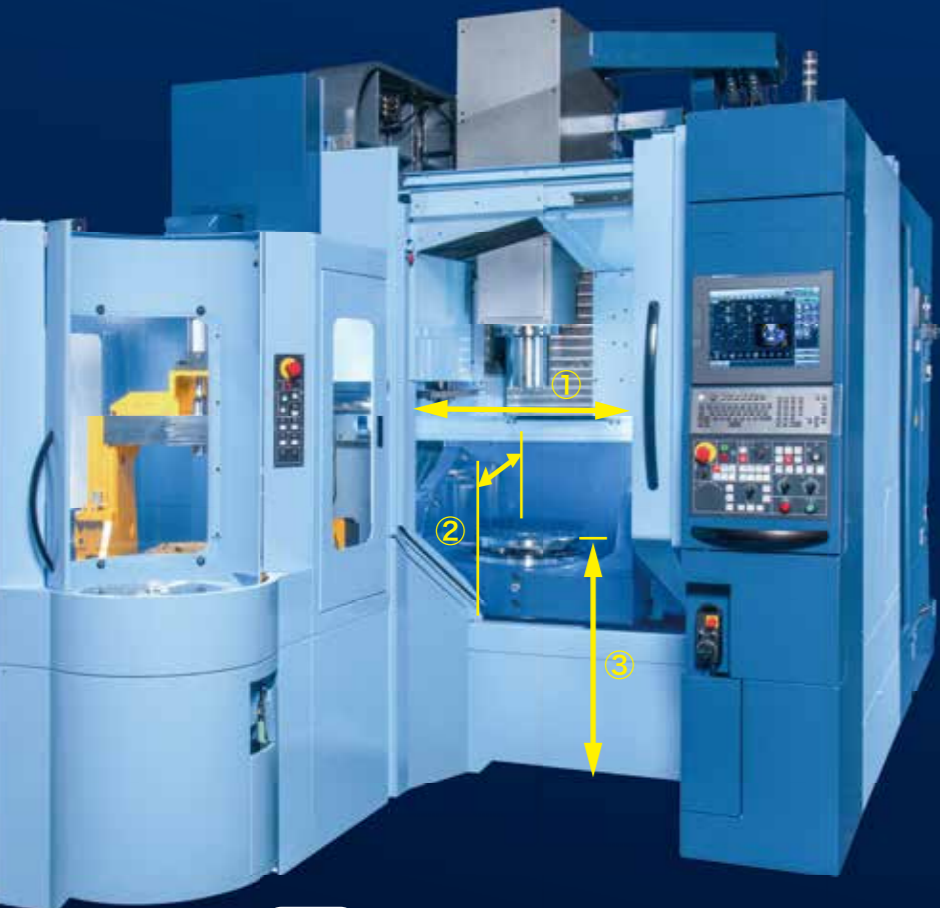
Machining test results

BT#40 12000min ⁻¹ (159N·m) Standard										BT#40 12000min ⁻¹ Power Up (191N·m) Option									
Part material	Tool size	Cutting width	Cutting depth	Spindle speed	Cutting feed rate	Cutting capacity	Part material	Tool size	Cutting width	Cutting depth	Spindle speed	Cutting feed rate	Cutting capacity	Part material	Tool size	Spindle speed	Cutting feed rate	Cutting capacity	
Face mill	A5052	Ø80mm (3,14)	W=70mm (2,75) D=4mm (0,15)	5,500 min ⁻¹	4,000 mm/min (157,48)	1,120 cc/min	U Drill	A5052	Ø33mm (1,29)	500 mm/min (19,68)	427 cc/min	Face mill	A5052	Ø80mm (3,14)	W=70mm (2,75) D=5mm (0,19)	5,500 min ⁻¹	2,450 mm/min (96,46)	769 cc/min	
	S45C	Ø80mm (3,14)	W=70mm (2,75) D=3mm (0,11)	900 min ⁻¹	1,800 mm/min (70,86)	378 cc/min		S45C	Ø33mm (1,29)	220 mm/min (8,66)	188 cc/min		S45C	Ø80mm (3,14)	W=70mm (2,75) D=3mm (0,11)	1,120 min ⁻¹	2,800 mm/min (110,23)	588 cc/min	
End mill	A5052	Ø25mm (0,98)	W=22mm (0,86) D=6mm (0,23)	12,000 min ⁻¹	7,000 mm/min (275,59)	924 cc/min	Tap	A5052	M30 ×P3.5	120 min ⁻¹	420 mm/min (16,53)	—	End mill	A5052	Ø25mm (0,98)	W=22mm (0,86) D=8mm (0,31)	10,000 min ⁻¹	10,000 mm/min (393,70)	1,760 cc/min
	S45C	Ø20mm (0,78)	W=3mm (0,11) D=30mm (1,18)	5,000 min ⁻¹	3,000 mm/min (118,11)	270 cc/min		S45C	M24 ×P3.0	100 min ⁻¹	300 mm/min (11,81)	—		S45C	Ø20mm (0,78)	W=3mm (0,11) D=35mm (1,37)	5,000 min ⁻¹	5,000 mm/min (196,85)	578 cc/min
BT#40 15000min ⁻¹ (150N·m) Option										BT#40 20000min ⁻¹ (108N·m) Option									
Face mill	A5052	Ø80mm (3,14)	W=70mm (2,75) D=5mm (0,19)	5,500 min ⁻¹	7,000 mm/min (275,59)	2,450 cc/min	U Drill	A5052	Ø35mm (1,37)	1,500 mm/min (58,47)	800 cc/min	Face mill	A5052	Ø80mm (3,14)	W=70mm (2,75) D=4mm (0,15)	5,500 min ⁻¹	9,000 mm/min (354,33)	2,520 cc/min	
	S45C	Ø80mm (3,14)	W=70mm (2,75) D=3mm (0,11)	1,120 min ⁻¹	2,800 mm/min (110,23)	588 cc/min		S45C	Ø35mm (1,37)	320 mm/min (12,59)	308 cc/min		S45C	Ø80mm (3,14)	W=70mm (2,75) D=2mm (0,07)	1,320 min ⁻¹	2,800 mm/min (110,23)	392 cc/min	
End mill	A5052	Ø25mm (0,98)	W=22mm (0,86) D=8mm (0,31)	12,000 min ⁻¹	10,000 mm/min (393,70)	1,870 cc/min	Tap	A5052	M36 ×P4.0	100 min ⁻¹	400 mm/min (15,74)	—	End mill	A5052	Ø25mm (0,98)	W=22mm (0,86) D=5mm (0,20)	20,000 min ⁻¹	13,000 mm/min (511,81)	1,716 cc/min
	S45C	Ø20mm (0,78)	W=3mm (0,11) D=30mm (1,18)	5,500 min ⁻¹	5,500 mm/min (216,53)	578 cc/min		S45C	M30 ×P3.5	100 min ⁻¹	350 mm/min (13,77)	—		S45C	Ø20mm (0,78)	W=3mm (0,11) D=35mm (1,37)	5,000 min ⁻¹	5,000 mm/min (196,85)	450 cc/min

3

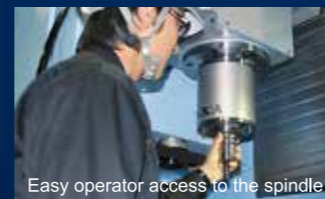
Productivity Improvement by Operator Workload Reduction

Ease-of-use Operability for Beginners to Advanced



Designed for sustained performance

Accessibility to workpiece and spindle



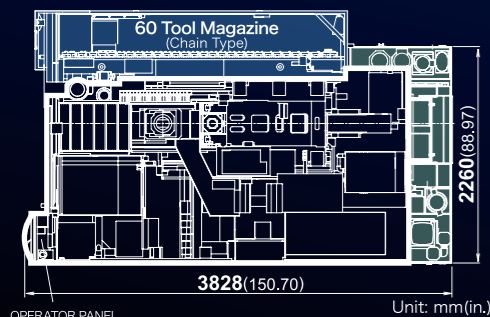
- ① Front door opening width:
800mm [31.49in.]
- ② Distance from machine front to table center:
385mm [15.15in.]
- ③ Distance from floor to table top surface:
850mm [33.46in.] (with table)
870mm [34.25in.] (with pallet)

PC4 Work station (rotary) Option

Assisting set-up by rotating the workstation by 90 degree increments.

Designed as installed even in the space of a 3-axis machine

Self-developed compact design



Designed for easy crane access

A sliding roof cover, incorporating a proven Matsuura design, affords the operator a spacious 360mm roof opening for loading billets safely by crane.



Designed for easy maintenance

Improved work efficiency by layout daily maintenance devices centrally in one place.



Upgrade

Easy Operation

Maximum functionality and optimized performance

MIMS

Matsuura Intelligent Meister System



- Secure**

Reliability Meister

Reduced machine downtime

 - Preventive maintenance support function
 - Machine recovery support function
 - Electronic manual function ■ E-mail transmission function
- Simple**

Operability Meister

Hassle-free, simple operation

 - Tool setup support
 - Workpiece setup support
- Accuracy**

Thermal Meister

Stable accuracy

 - Spindle thermal displacement compensation
 - Feed axis thermal displacement compensation Option
 - Environmental thermal displacement compensation Option
- Environment**

Eco Meister

Eco mode

Power savings

 - Power cut-off function
 - Energy-saving devices installed
 - Eco-operation

Tool/pallet management and Electronic manuals all managed on the NC screen

Operation panel

Matsuura G-Tech 31i

(iHMI, 15-inch touch panel type)

Usability is drastically upgraded with context-sensitive screen icons and quick screen displays.



User friendly tool management screen

Equipped with tool life management as standard, the unmanned capability of the machine is enhanced.

- ▶ By creating tool lists you can check and search specific tool data.
- ▶ With the load / unload function you can store tool data on a temporary basis.
- ▶ Time and frequency of usage is updated on the tool table after tool change. Once the current tool life value exceeds the set value a warning is displayed.
- ▶ Spare tools can be set using the same T number. A spare tool is automatically selected once a tool's life has expired.

Easy pallet management and scheduling

- ▶ Continuous operation is made possible by setting all necessary information into the schedule table.
- ▶ Order or priority of machining can be easily changed to meet production requirements. Pallet reserve, interrupt, priority and repeat can be set for each pallet.
- ▶ Pallet management screen is designed for easy operation and flexible production.



3 Productivity Improvement by Operator Workload Reduction Ease-of-use Operability for Beginners to Advanced

MX-520 Operability

Intelligent Protection System

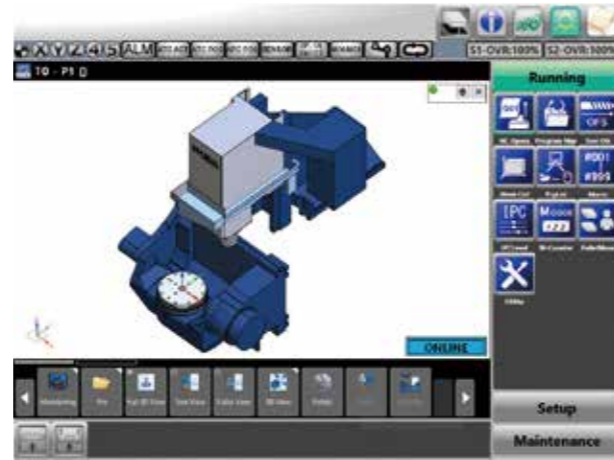
Standard

Collision prevention function

The collision prevention function developed solely by Matsuura. It prevents machine collisions due to programming errors in automatic operation, and also prevents human error in advance during manual operation and workpiece setup.

- * With **Intelligent Protection System**, interference check is available during cutting simulation.
- * The **Intelligent Protection System** simulates your programming components (tools, workpiece, fixtures, etc.) that match the machine model, alerting you to any possible interference or collision before actual machining takes place.
- * Model editing tool for model creation on an external PC is available as an option. Model data of stock, tools, etc. can be created in the office in advance.

Previously required an external PC
Now installed to the NC screen as standard **Upgrade**

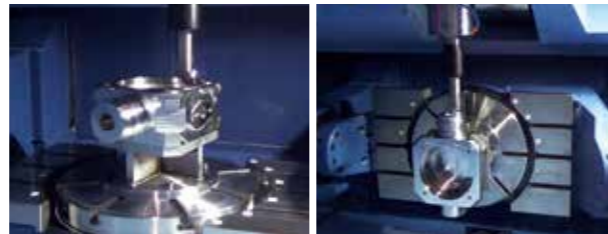


Synchro Tip + Orbit machining

Option Patent No. 5883535

Simple turning function combining orbit machining and C-axis rotation

Turning processes can also be performed on this machining center by using a synchro chip. Since turning and machining can now be done in one process no additional setup time is required for the turning process.



* **Synchro Tip**
(Orbit machining + C-axis rotation)

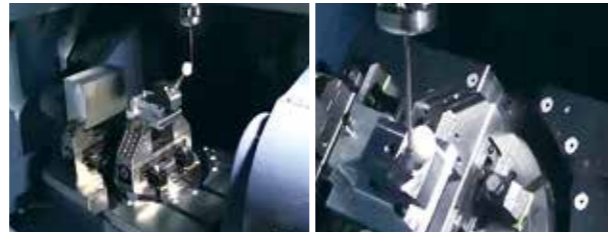
* Orbit function

eZ-5

Option

Advanced 5-axis error measurement and correction

Geometric error correction is essential for multi-axis machine tools. eZ-5 completes measurement, using a touch probe and calibration sphere, in a mere 3 minutes. The high accuracy of the machine is maintained through quick and simple operations.



Toward Full-spec. Automation Smooth step-up from MX-520 possible

NEW



5-axis Vertical Machining Center

MAM72-52V PC15

- The **MX-520** and our established **MAM72-52V** 5-axis machines both utilize the same pallet, by changing the pallet clamping method of **MX-520**, offering seamless interaction and deployment of pallets and fixtures between both machines.

* Refer to **MAM72-52V** Max. workpiece size and loading capacity.

- Not compatible with conventional **MX-520** pallets.

MX-520 Reliability

4

Productivity Improvement by Ensuring Stable and High Accurate Machining Automation Specialized Functions for Long Periods of Sustained Machining

Spindle

Environment

Option

Feed axes

Option

Thermal displacement compensation

The thermal displacement compensation monitors the temperature of major machine components, such as the spindle, ball screws, bed or column, automatically calculates the amount of compensation, and feeds it back to the NC controller.

* The feed axis thermal displacement compensation can be used on the machine with no scale feedback specification.

Stable machining accuracy is obtained by combining three kinds of thermal displacement compensation: spindle, environment, and feed axes (X/Y/Z).

Tool pre-check

Option

- ▶ Confirms tools are available before machining begins.
- ▶ Prevents alarms and unplanned stops during unmanned operation.

Upgrade

Tool breakage detection

Option

Improve measurement accuracy by adopting Integrated type mounted to C-axis frame.
Max. tool diameter: $\varnothing 150\text{mm}$ ($\varnothing 5.90\text{ in.}$)
Max. tool length: 300mm (11.81in.)



Contact type



Laser type

Automatic workpiece conveyors using robotics

- ▶ Robotic interface **Option**
* Enable connections to external workpiece conveying machines
- ▶ Automatic door **Option**
* Automatically opens and closes the operator door
- ▶ Pressure supply system for fixtures **Option**
* Supplies pressure to the auto clamping device for the workpiece

Environmental protection by power consumption reduction

NEW

- ▶ Power off function
- ▶ Auto power off function
- ▶ ECO drive function
- ▶ Lighting inside machine & Main screen turn-off function
- ▶ ECO mode



4

Productivity Improvement by Ensuring Stable and High Accurate Machining

Automation Specialized Functions for Long Periods of Sustained Machining

MX-520

Reliability

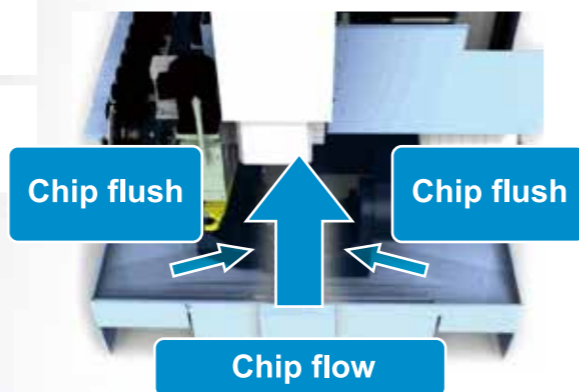
Reliable chip removal

Upgrade



Precision, stainless telescopic axis covers

No swarf traps, efficient design for low maintenance and optimum performance



Chip flush

Chip flush

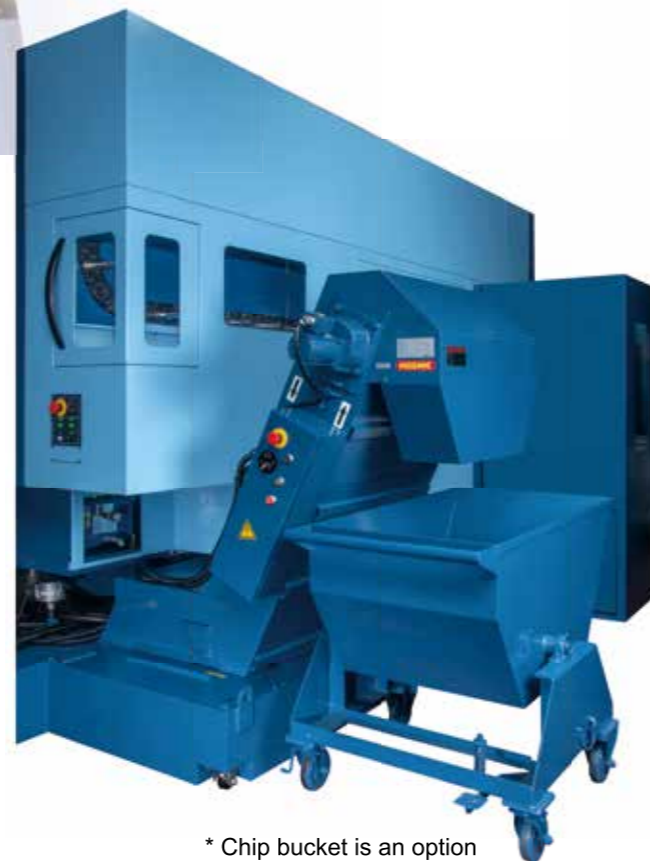
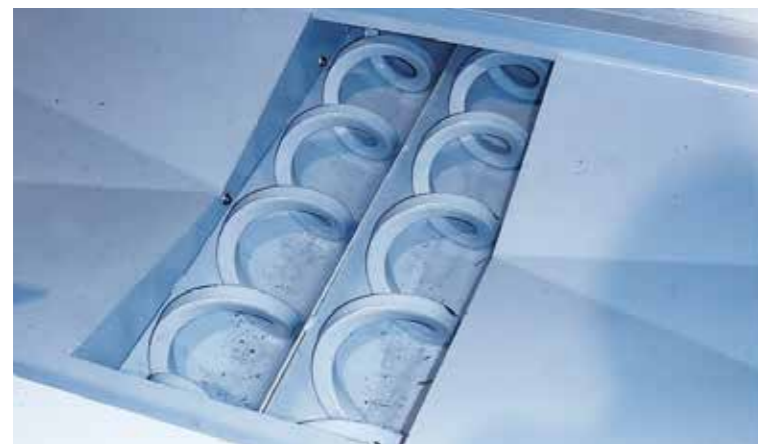
Chip flow

Lift-up chip conveyor with drum filter

Option

Spiral chip conveyor 2 sets

Option



* Chip bucket is an option

Coolant management system

Option

NEW

No need to manage or replenish coolant by visualizing the state of coolant in the machine (amount of coolant, temperature, concentration, pH value) and automatically supplying the required amount of coolant.



MX-520

Visual Control

5

Productivity Improvement by Reduction of Machine Downtime in Manufacturing

Visual Control and Remote Monitoring for Unmanned Operations at Night and Weekends

Operation Status Monitoring

Standard

Machine availability and performance can be monitored to improve process planning.

▶ Performance is monitored to check OEE.

* Overall equipment efficiency (OEE) = availability x performance x quality

* The storage period is one month. Data for one year can be saved as an option.



Operational state display



Overall operation ratio display

Matsura Remote Monitoring System

Option

NEW

- ▶ It is possible to monitor the operating status of multiple machines even from a distance.
- ▶ Machine operation history can be checked (both display or machine unit display).
- ▶ Pallet schedule can be edited even when away from the machine.



Multiple machines operating status



Individual machine operating status

MTConnect

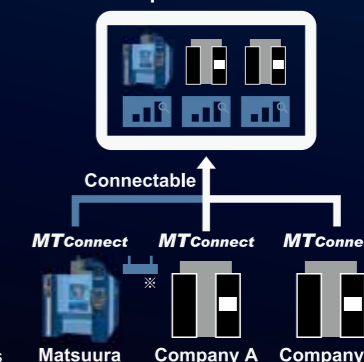
Option

MTConnect is an open communication protocol for the manufacturing industry. MTConnect enables low-cost visualization and oversight of all CNC machines in a factory, regardless of the machine manufacturer. Benefits include;

- ▶ Optimization of production schedule
- ▶ Identify and utilize free machine time
- ▶ Early detection of abnormalities

MTConnect compatible visualization system

NEW



* Support for both wireless and wired LANs

MX-520 Specification / Equipment

Standard Machine Specifications

Movement and Ranges		
X-axis travel	[mm (in.)]	630 (24.80)
Y-axis travel	[mm (in.)]	560 (22.04)
Z-axis travel	[mm (in.)]	510 (20.07)
A-axis rotation angle	[deg]	-125 ~ +10
C-axis rotation angle	[deg]	360
Table		
Working surface	[mm (in.)]	Ø300 (11.81)
Loading capacity	[kg (lb.)]	200 (440)
Max. workpiece size	[mm (in.)]	Ø520 × H350 (Ø20.47 × H13.77) Ø710 × H350 (Ø27.95 × H13.77) (with restrictions)
Spindle		
Spindle speed	[min ⁻¹]	40 - 12000 (grease lubrication)
Spindle speed change command		S5 digits direct command
Spindle taper		7/24 taper #40 (BT double contact type)
Spindle bearing inner diameter	[mm (in.)]	Ø80 (Ø3.14)
Max. spindle torque	[N·m]	159/1500min ⁻¹
Feedrate		
Rapid traverse rate X / Y / Z	[mm (in./min)]	40000/40000/40000 (1574.8)
A / C	[min ⁻¹]	33 / 50
Feedrate X / Y / Z	[mm (in./min)]	1 - 40000 / 1 - 40000 / 1 - 40000 (0.03 - 1574.8)
A / C	[min ⁻¹]	33 / 50
Automatic Tool Changer		
Type of tool shank		JIS B 6339 tool shank 40T
Pullstud		JIS B 6339 pullstud 40P
Tool storage capacity	[tools]	60 (chain type)
Max. tool diameter (With adjacent tools)	[mm (in.)]	Ø80 (Ø3.14)
(Without adjacent tools)		Ø150 (Ø5.90) Storage pocket is limited

List of Fittings

Spindle		○: Standard ▲: Option
12000min ⁻¹ (BT40 grease lubrication)		○
12000min ⁻¹ Power Up (BT40 grease lubrication)		▲
Spindle motor output	kW	18.5 / 22
Max. spindle torque	N·m	191
15000min ⁻¹ (BT40 grease lubrication)		▲
Spindle motor output	kW	18.5 / 22
Max. spindle torque	N·m	150
20000min ⁻¹ (BT40 auto grease lubrication)		▲
Spindle motor output	kW	15 / 18.5
Max. spindle torque	N·m	108
20000min ⁻¹ (BT40 Oil-air lubrication)		▲
Spindle motor output	kW	15 / 18.5
Max. spindle torque	N·m	108
Tool Storage Capacity		
60 tool (chain type, memory random)		○
90 tool (chain type, memory random)		▲
120 tool (chain type, memory random)		▲
Table		
Ø300mm		○
Ø500mm		▲
Ø300mm + Flat table		▲
Pallet Changer System		
PC4 (floor pallet system)**		▲
Work rotation system (manual) for PC4		▲
High Accuracy Control		
Scale feedback (X, Y, Z) Heidenhain		▲
Feed axis thermal displacement compensation		▲
Environmental thermal displacement compensation (12000min ⁻¹ spindle)		▲
Environmental thermal displacement compensation (15000min ⁻¹ spindle)		▲
Environmental thermal displacement compensation (20000min ⁻¹ spindle)		▲
Coolant		
Coolant unit		○
Vacuum type coolant through A 7MPa		▲
Vacuum type coolant through A 14MPa		▲
Vacuum type coolant through B 7MPa		▲
Vacuum type coolant through B 14MPa		▲
Vacuum type coolant through C 2MPa		▲
Vacuum type coolant through C 7MPa		▲
Mist separator unit (without fire damper)		▲
Mist separator unit (with fire damper)		▲

Max. tool length	[mm (in.)]	300 (11.81)
Max. tool mass	[kg (lb.)]	10 (22)
Method of tool selection		Memory random system
Power Sources		
Electrical power supply	[kVA]	44 (depends on the options provided)
Power supply voltage	[V]	AC 200/220±10%
Power supply frequency	[Hz]	50/60±1
Transformer is required for the voltage except above		
Tank Capacity		
Hydraulic oil tank capacity	[L]	10
Coolant tank capacity	[L]	560
Oil cooler tank capacity	[L]	14 (total capacity: 16)
	[L]	7 (total capacity: 9) (15000min ⁻¹ , 20000min ⁻¹ option)
Machine Size		
Machine weight	[kg (lb.)]	9450 (20833)
NC System		
Control system		Matsura G-Tech31i
Standard Accessories		
Auto grease supply unit for feed axes		Scale feedback (A/C axis)
AD-TAP function		M-code counter (9 kinds)
IPC function		Spindle thermal displacement compensation system
MIMS (Matsura Intelligent Meister System)		Intelligent Protection System
Integrating spindle run hour meter		Integrating auto run hour meter
Service tools and tool box		Machine color paint
Leveling bolts, leveling plates		Operation status monitoring
Optional block skip addition 2 to 9		* 2 years spindle warranty

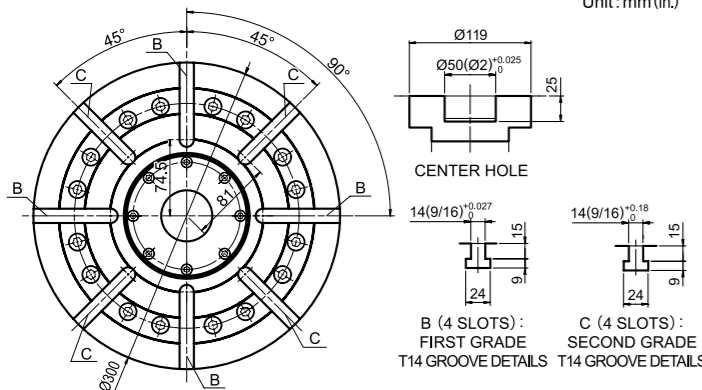
Coolant temperature controller with tank 100L		○: Standard ▲: Option
Automatic Measurement, Tool Breakage Detection		▲
I.p.measure/auto.centring(optic, Renishaw, Matsura macro)		▲
I.p.measure/auto.centring(optic, Renishaw, Renishaw macro)		▲
I.p.measure/auto.centring(Renishaw macro only)		▲
I.p.measure/auto.centring(optic, Blum, Matsura macro)		▲
I.p.measure/auto.centring(optic, Blum, Blum macro)		▲
I.p.measure/auto.centring(Blum macro only)		▲
Broken tool detection/mechanical, Metrol		▲
Broken tool detection/laser, Renishaw		▲
Broken tool detection/laser, Blum		▲
Broken tool detection in ATC(60/90/120tools, Metrol)		▲
Chip Removal		
Chip bucket		▲
Spiral chip conveyor		▲
Lift-up chip conveyor(scraper type, incl. drum filter) rear disposal		▲
Lift-up chip conveyor(scraper type, incl. drum filter) side disposal		▲
Air blow for chip swarf removal		▲
Workpiece cleaning gun (machine side)		▲
Workpiece cleaning gun (APC side)		▲
Operation/Maintenance Support		
Matsura remote monitoring system		▲
Machine information output: MT connect		▲
Additional eight M functions		▲
Spindle load monitoring function		▲
Weekly timer		▲
3 color signal light (red, yellow, green from top)		▲
AC100V outlet 3A		▲
External manual pulse generator		▲
eZ-5 (with calibration sphere)		▲
eZ-5 (without calibration sphere)		▲
Pressure supply system for fixtures (table spec., hydraulic, 6ports, max.19.6MPa)		▲
Pressure supply system for fixtures (pallet spec., hydraulic, 3ports, max.19.6MPa)		▲
Rotary wiper (air supply system)		▲
Rotary wiper (electrical system)		▲
Automation operator door		▲
Robot interface		▲
Optional Package		
High-speed, high-precision package		▲
5-axis package		▲
High-speed, high-precision 5-axis package		▲

*1 Max. workpiece size : Ø520 x H330(mm), 175kg

Ø300mm Table top view

Standard

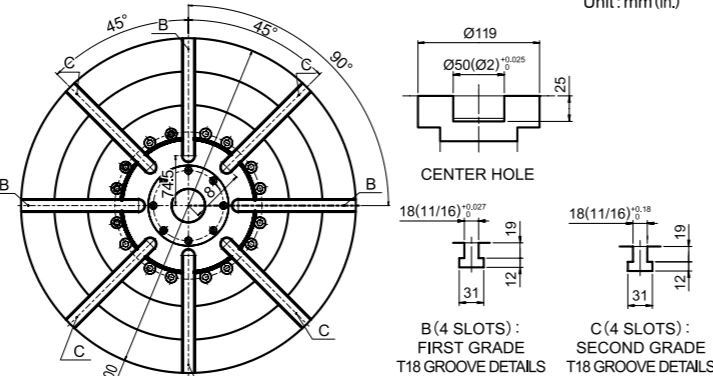
Unit: mm (in.)



Ø500mm Table top view

Option

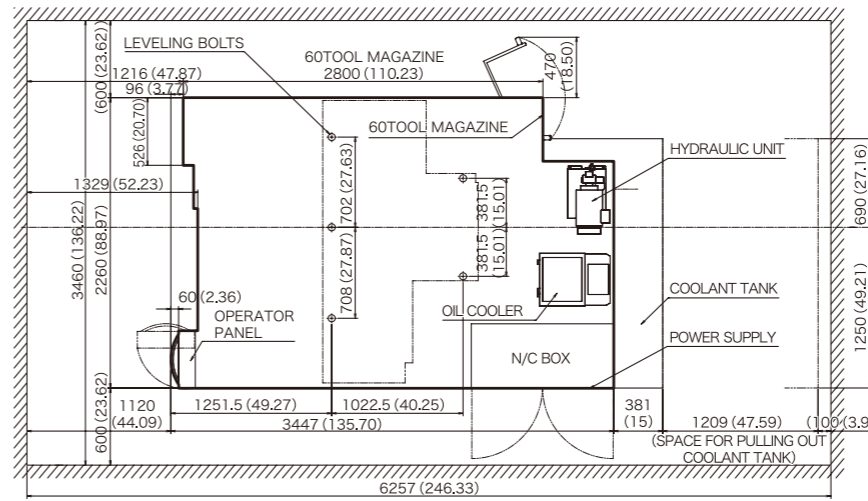
Unit: mm (in.)



MX-520 Floor plan

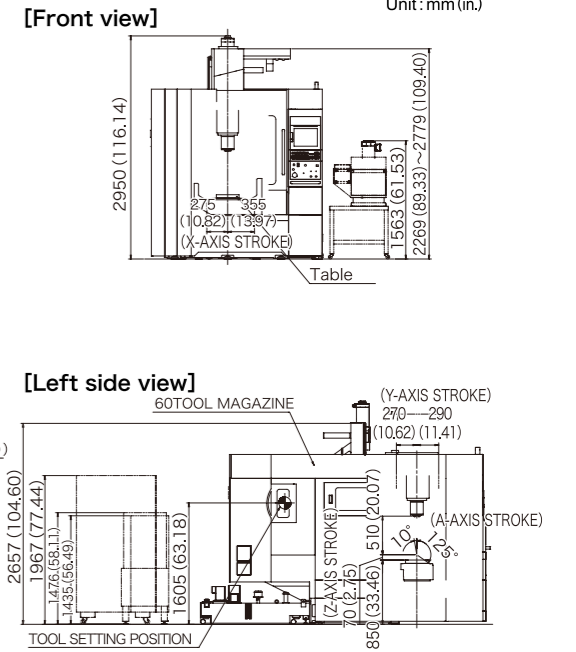
Standard

Unit: mm (in.)



MX-520 External view

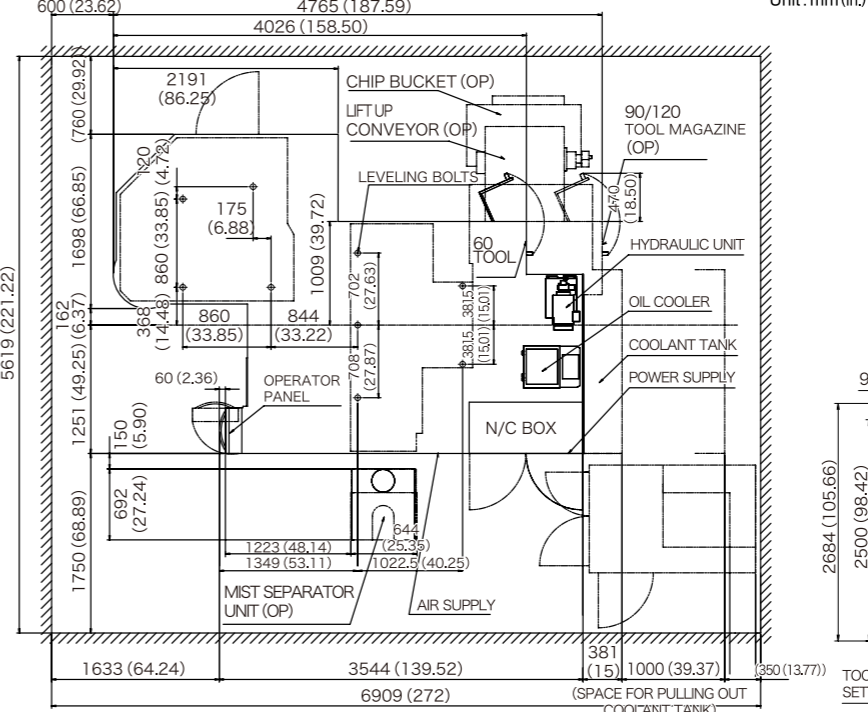
Unit: mm (in.)



MX-520 PC4 Floor plan

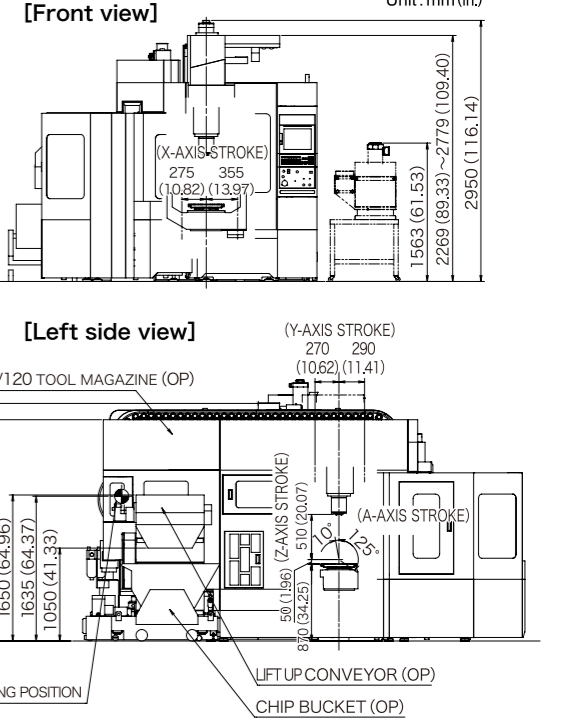
Option

Unit: mm (in.)



MX-520 PC4 External view

Unit: mm (in.)



Ø300mm + Flat Table top view

Option

Unit: mm (in.)

