

TAKUMI When Precision Matters

TAKUMI

HMX Series

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The new high-speed, high productivity
horizontal machining center

HMX 400
HMX 500
HMX 550

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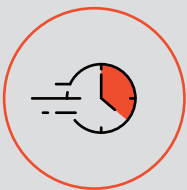
25 Machine Specification

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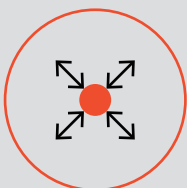
High rigidity one-piece bed

HMX series are designed with one-piece bed structure with dual wall design on X-axis column and stepped traveling column.



High speed

Best-in-class rapid traverse rate of 60m/min provides maximum productivity.



Excellent extendibility

Superior pallets extension and diverse tool changer provide user with maximized productivity and rapid installation.

HMX Series

The HMX series exceeds all of your expectations for it provides high speed, high performance and maximum productivity.



Applications & Parts

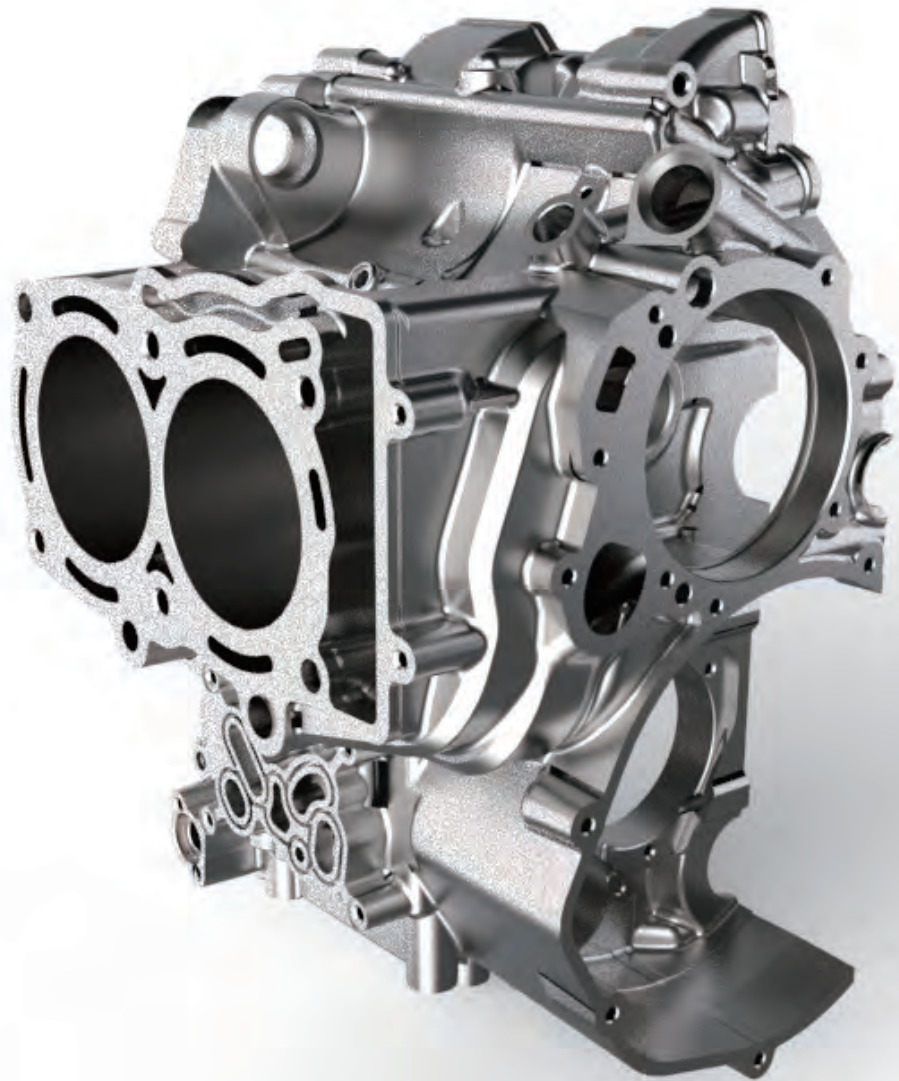
Basic Information

Machine Information

03 Applications & Parts

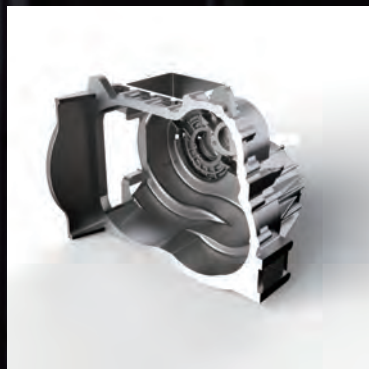
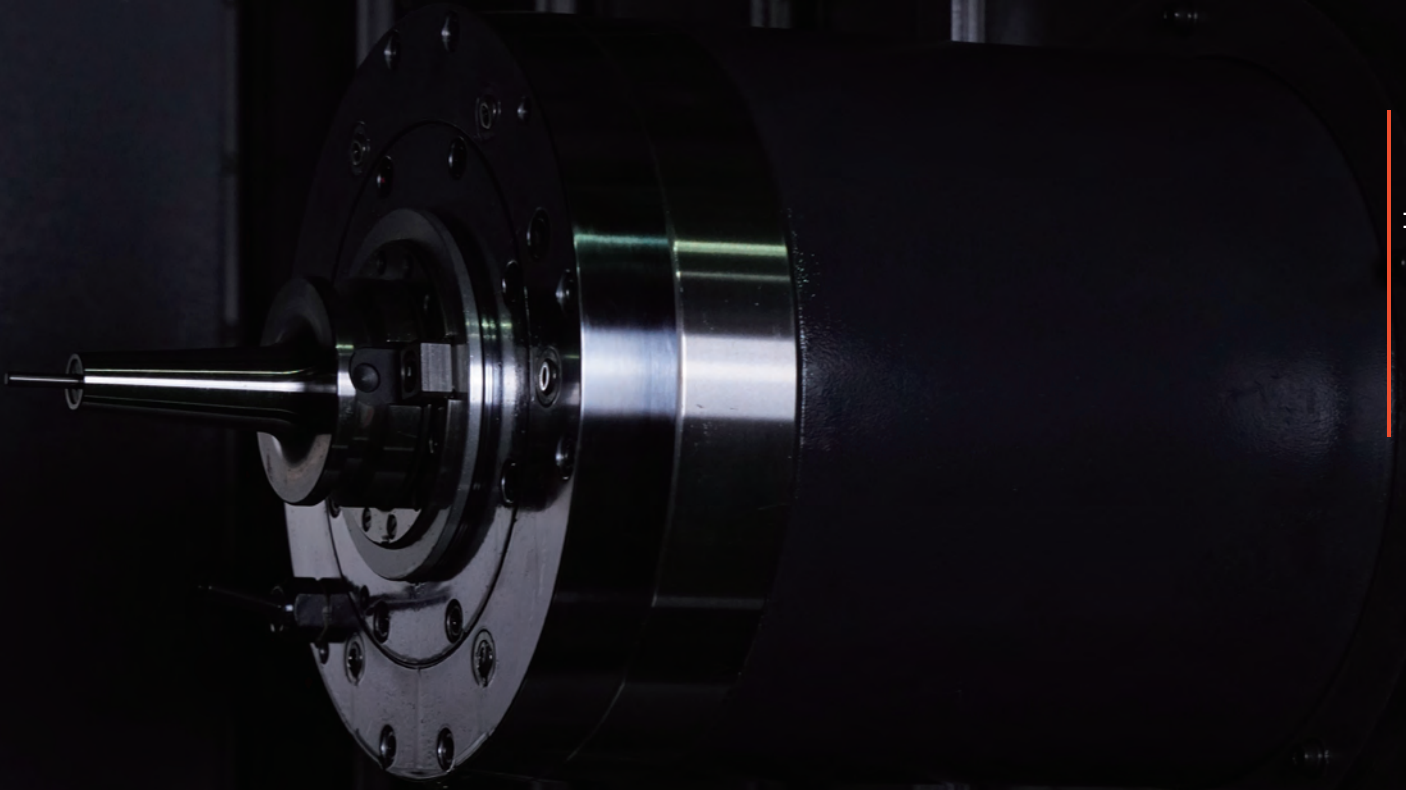
HMX Series

**Rigid and powerful
for every applications**



Automotive

Cylinder head made of cast iron



Gear housing made of aluminum



Fixture made of aluminum

Basic Structure

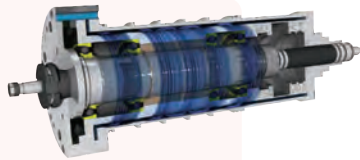
01



One-piece bed structure

High rigidity one-piece bed providing excellent stability. With stepped-guide bed structure, travel stability is increased by column weight optimization.

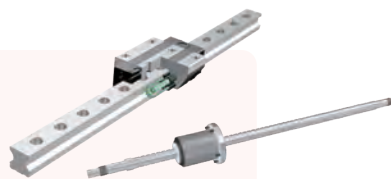
02



Superior thermal stability

High precision is achieved by ceramic ball bearings. Heat shielding and oil cooler system is designed for minimize thermal impact.

03



High speed, stable axis structure

The HMX series are equipped with roller type LM guideway providing fast acceleration and high precision ball screws.

04



ATC and magazine

1.2 second tool change time (T-T) is realized by servo motors. 40 tools are provided as standard, in addition to various options.

05

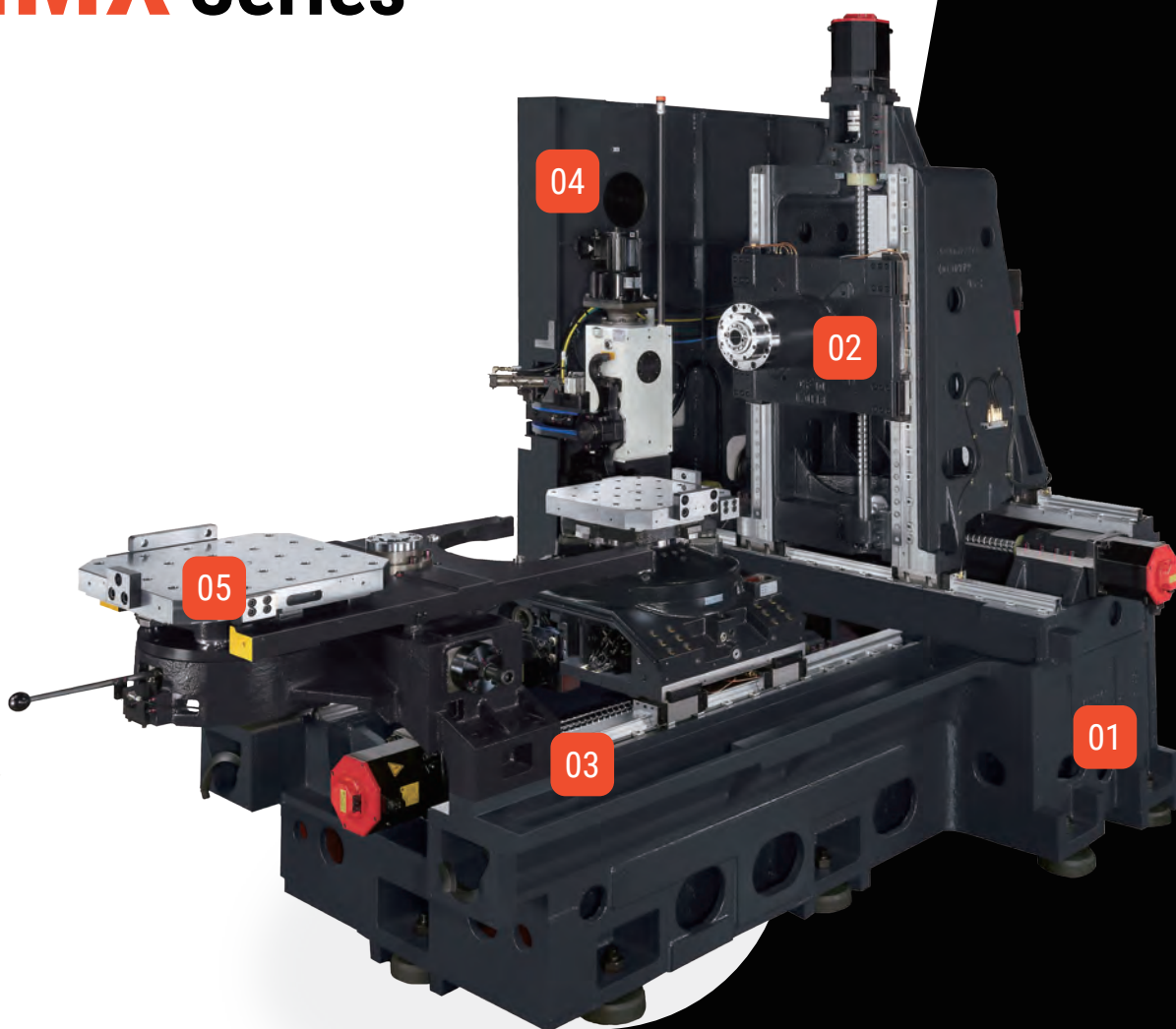


APC system and pallet

The HMX series provides flexibility with both 400mm and 500mm pallet in one machine. Servo driven APC guarantees fast and precise pallet change within 5 second.

HMX Series

TAKUMI



06 Basic Structure

HMX400

60/60/60

m/min Rapid traverse (X/Y/Z-axis)

640/610/680

mm Travel (X/Y/Z-axis)

**HMX500
HMX550**

60/60/60

m/min Rapid traverse (X/Y/Z-axis)

800/800/800

mm Travel (X/Y/Z-axis)

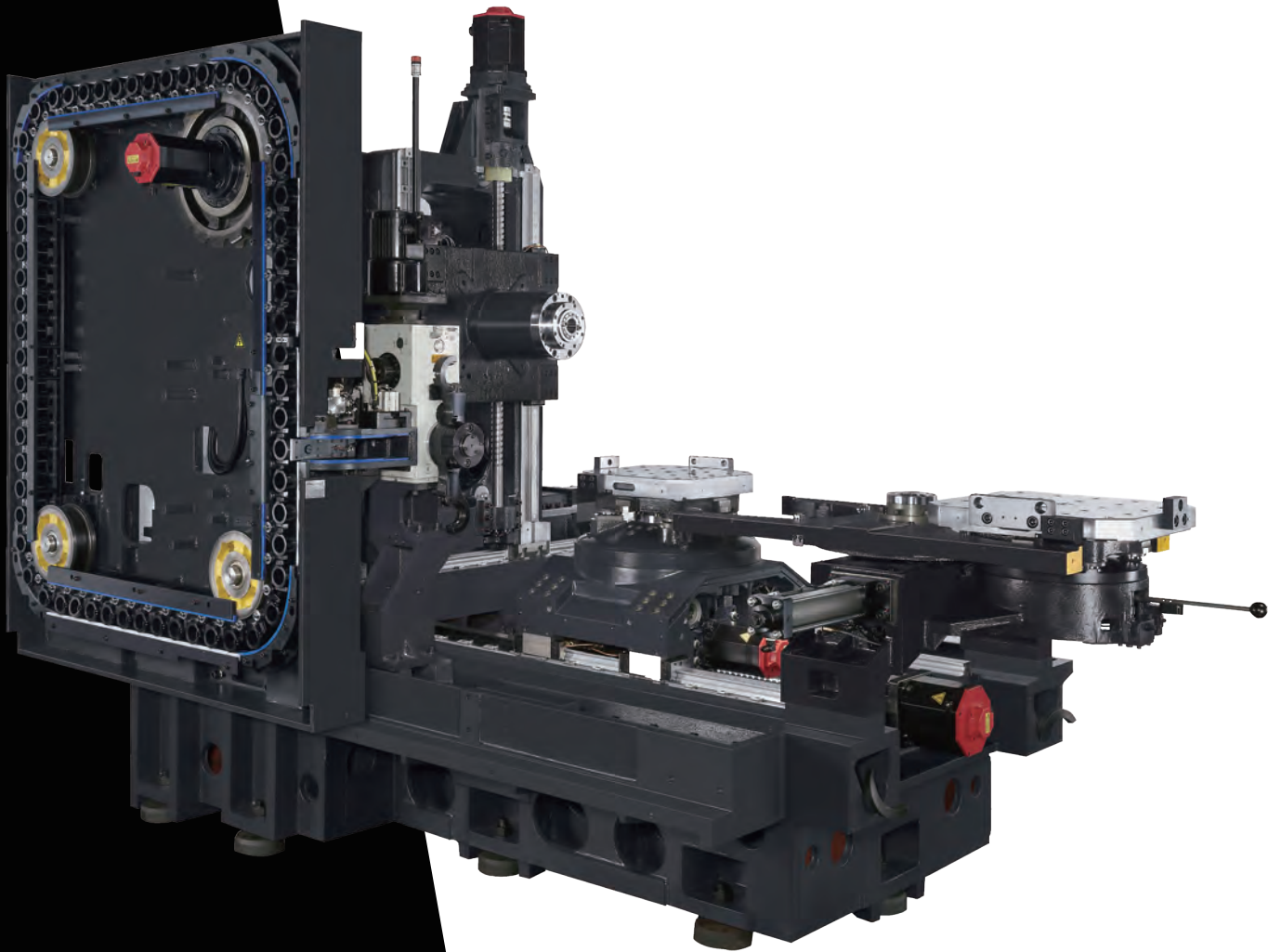
Applications and Parts

Basic Information

- Body Structure

Machine Information

07 Body Structure



01

HMX Series

Body Structure

Optimal body structure design is the foundation of machining perfection



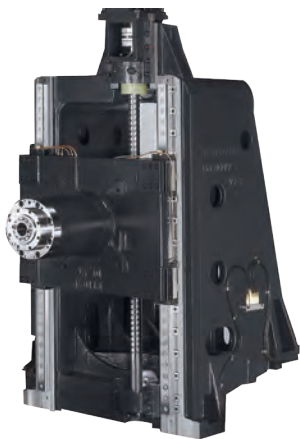
High rigidity one-piece bed

Integrated bed frame ensures high rigidity and excellent vibration absorption compare with separate structure providing excellent surface finishes.



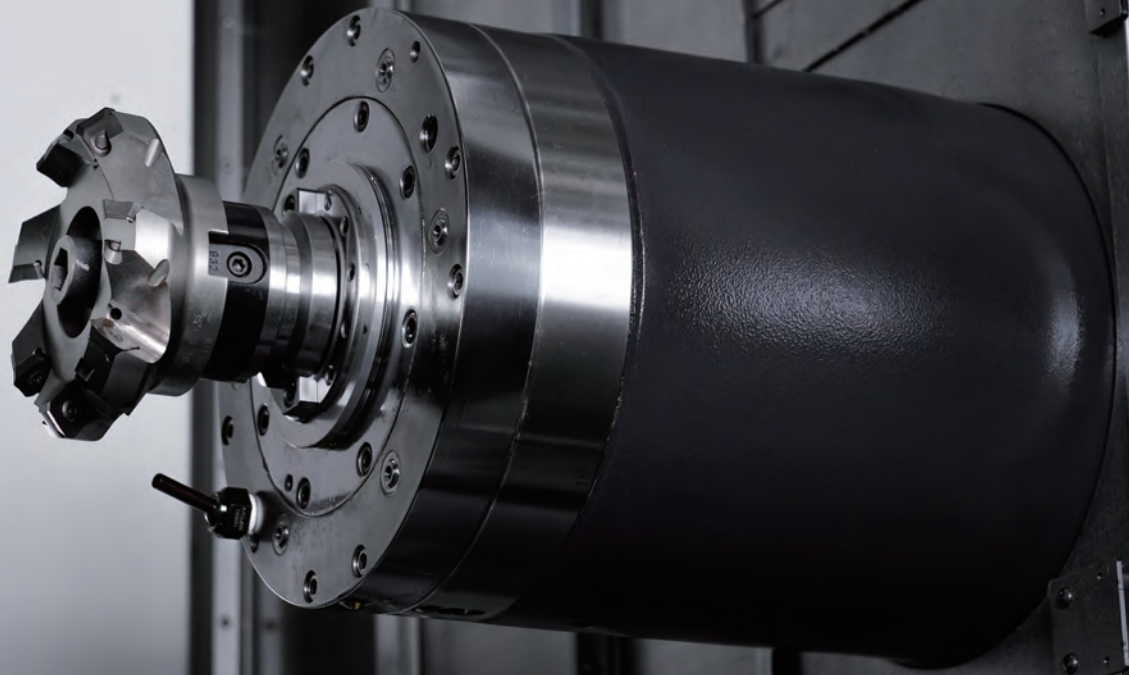
Stepped-guide bed structure

With the support of step structure design, high stability is guaranteed while accelerating and decelerating.



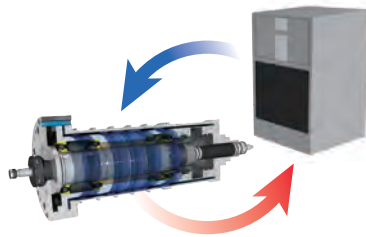
Dual-wall machine column

Structure of the machine column is dual-wall and symmetrical designed to eliminate thermal deformation. It maintains geometrical precision during prolonged operation.



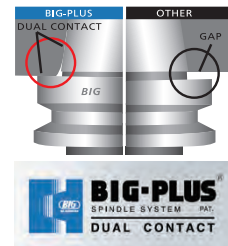
High precision ceramic ball bearing

Higher bearing stiffness, reduced thermal expansion and lower vibration excitation allows maximum machining accuracy.



Spindle cooling system

Spindle temperature is constantly controlled by oil chiller which minimizes thermal displacement during continuous operation at high speed.



Dual surface contact design

The BIG-PLUS spindle system ensures superior finish thanks to simultaneous fit of taper and flange spindle.

02 HMX Series Spindle

Spindle Power - Torque Curve

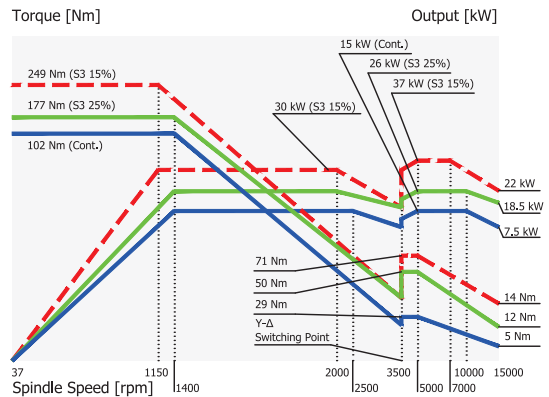
15,000rpm Direct drive spindle (ST)

15/37

kW Power (Cont./Max.)

102/249

N.m Torque (Cont./Max.)



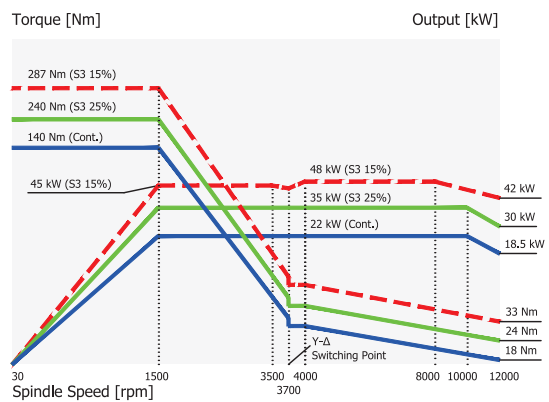
12,000rpm Direct drive spindle (OP)

22/48

kW Power (Cont./Max.)

140/287

N.m Torque (Cont./Max.)



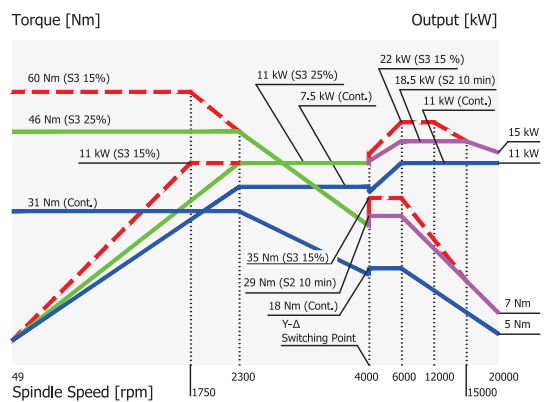
20,000rpm Built-in spindle (OP)

11/22

kW Power (Cont./Max.)

31/60

N.m Torque (Cont./Max.)



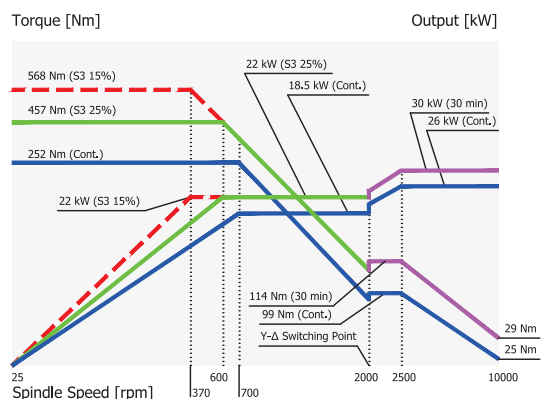
10,000rpm Direct drive spindle (ST)

26/22

kW Power (Cont./Max.)

252/568

N.m Torque (Cont./Max.)



Applications and Parts

Basic Information

- Feed Axes

Machine Information

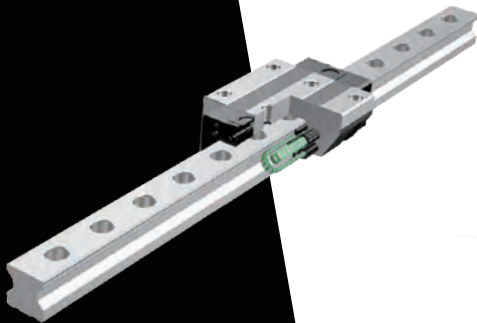
11 Feed Axes



03 HMX Series Feed Axes

Roller-type LM guideway

All axes are equipped with LM roller guideway. It features higher load capacity and greater rigidity even at high acceleration.



HMX400

60/60/60

m/min Rapid traverse rate (X/Y/Z-axis)

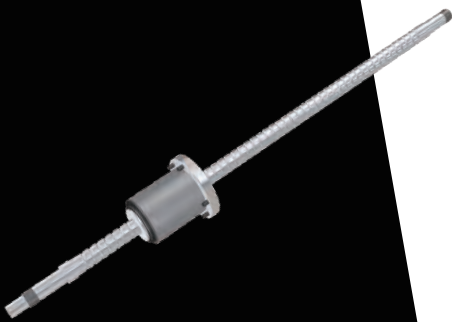
HMX500
HMX550

60/60/60

m/min Rapid traverse rate (X/Y/Z-axis)

TSUBAKI high precision ball screw

HMX series are equipped with high precision ball screws featuring high load capacity while also providing high durability and rigidity.

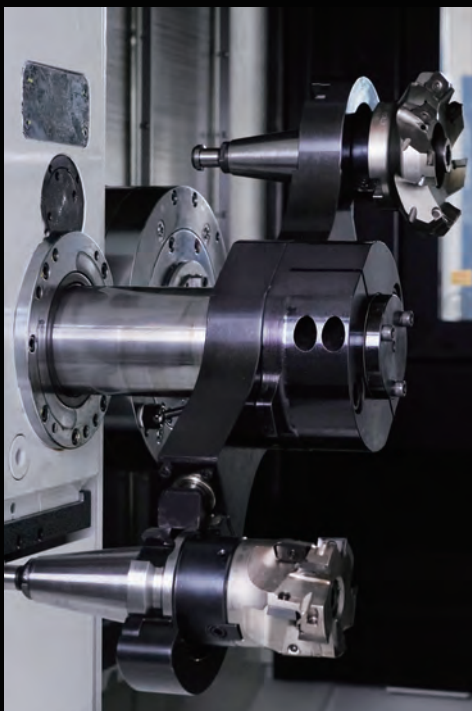


HMX400
HMX500
HMX550

1G/1G/1G

Feed axis acceleration/deceleration (X/Y/Z-axis)

04 HMX Series Automatic Tool Changer



ATC

The servo driven ATC ensures fast and reliable tool change. Tool change time is optimized to reduce non-cutting time. Diverse solution is tailored to your need and realized by programmable ATC speed. Lower speed is for heavy tools, special over size boring tools and probe for workpiece measurement.

HMX400 | HMX500

1.2 sec
Tool change time (T-T)

Tool to Tool time

Other machine 2s

★ HMX400 | 500 1.2s **40%** reduction

HMX550

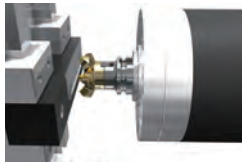
2.2 sec
Tool change time (T-T)



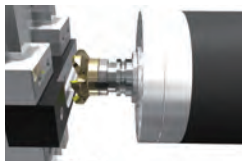
HMX 400/500 (550) tool storage capacity

The tool magazine can store up to 40 tools as standard and up to maximum 120 as option depending on the model. Servo driven magazine ensures fast and reliable tool indexing. Magazine indexing is also available at high/low speed.

Superior cutting performance



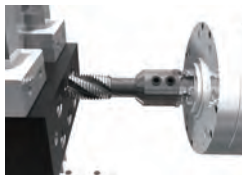
	HMX400	HMX500	HMX550
	Face milling		
Removal rate	2,520cc/min	2,600cc/min	5,100cc/min
Material	Aluminum 6061/7075	Aluminum 6061/7075	Aluminum 6061/7075
Spindle speed	12,000rpm	12,000rpm	10,000rpm
Tool diameter	Φ63mm x 6T	Φ63mm x 6T	Φ100mm x 7T
Feed rate	20,000mm/min	20,000mm/min	12,000mm/min
Cut width/depth	50.4mm/ 2.5mm	52mm/ 2.5mm	80mm/ 5.0mm



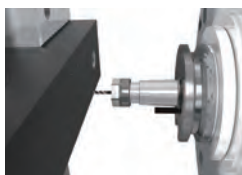
	HMX400	HMX500	HMX550
	Face milling		
Removal rate	630cc/min	660cc/min	891cc/min
Material	Steel S45C	Steel S45C	Steel S45C
Spindle speed	1,000rpm	2,000rpm	675rpm
Tool diameter	Φ80mm x 6T	Φ80mm x 7T	Φ125mm x 8T
Feed rate	1,800mm/min	8,000mm/min	3,240mm/min
Cut width/depth	70mm/ 5.0mm	55mm/ 1.5mm	100mm/ 2.4mm



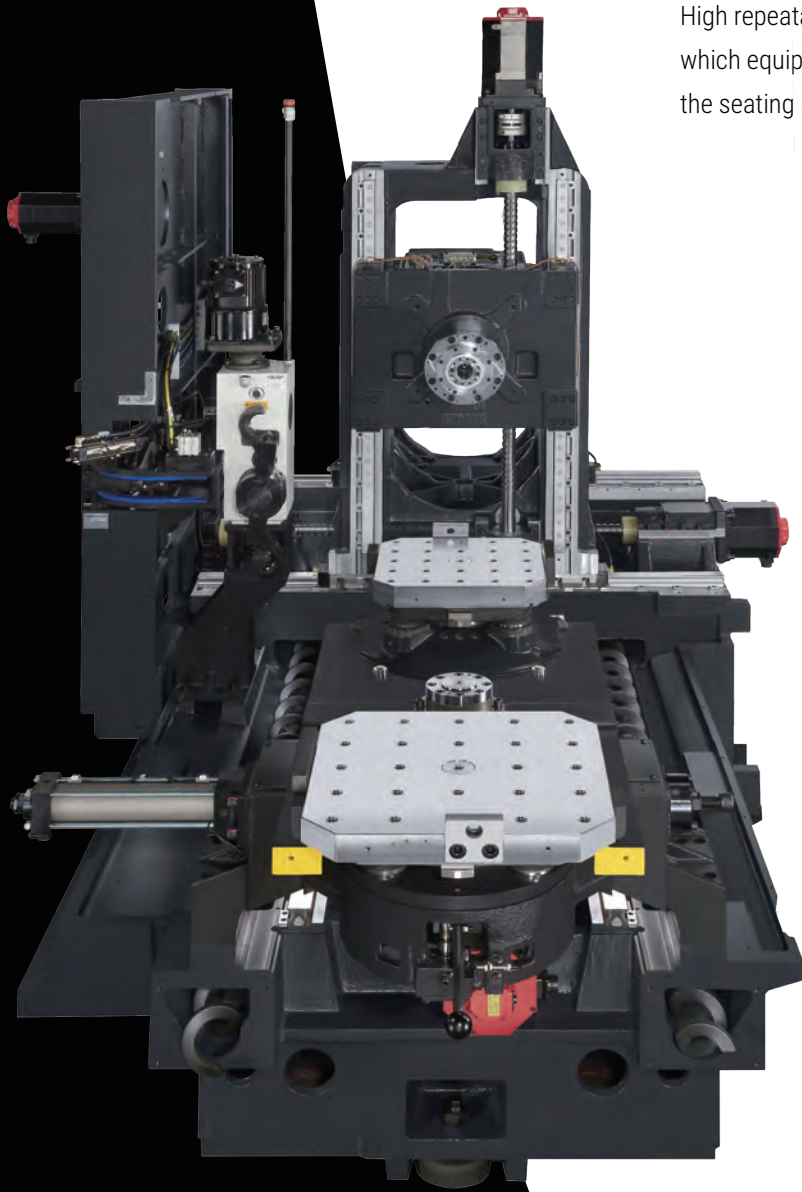
	HMX400	HMX500	HMX550
	Drilling		
Removal rate	451cc/min	451cc/min	527cc/min
Material	Steel S45C	Steel S45C	Steel S45C
Spindle speed	1,150rpm	1,150rpm	750rpm
Tool diameter	Φ50mm x 2T	Φ50mm x 2T	Φ80mm x 2T
Feed rate	230mm/min	230mm/min	118.4mm/min



	HMX400	HMX500	HMX550
	Tapping		
Material	Steel S45C	Steel S45C	Steel S45C
Spindle speed	76rpm	76rpm	58rpm
Tool diameter	M42 x 4.5P	M42 x 4.5P	M56 x 5.5P
Feed rate	342mm/min	342mm/min	319mm/min

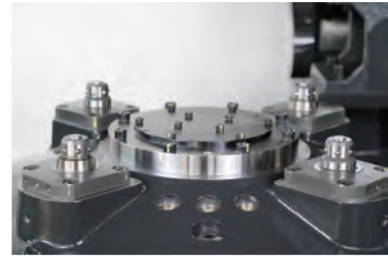


	HMX400	HMX500	HMX550
	Rigid tapping		
Material	Aluminum 6061	Aluminum 6061	Steel S45C
Spindle speed	3,000rpm	3,000rpm	3,000rpm
Tool diameter	0#-80UNF	0#-80UNF	0#-80UNF
Feed rate	952.5mm/min	952.5mm/min	952.5mm/min

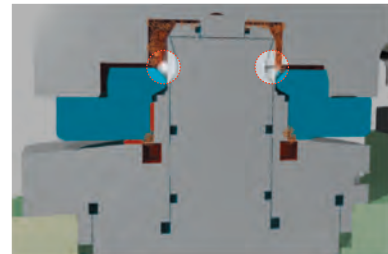


High accuracy pallet clamping system

High repeatability accuracy $3\mu\text{m}$ is achieved by 4 cones which equipped air blower to remove chips from the seating surface.



In addition, the pallet clamping system is equipped with air sensor that ensures the seat is securely seated and accurately positioned.

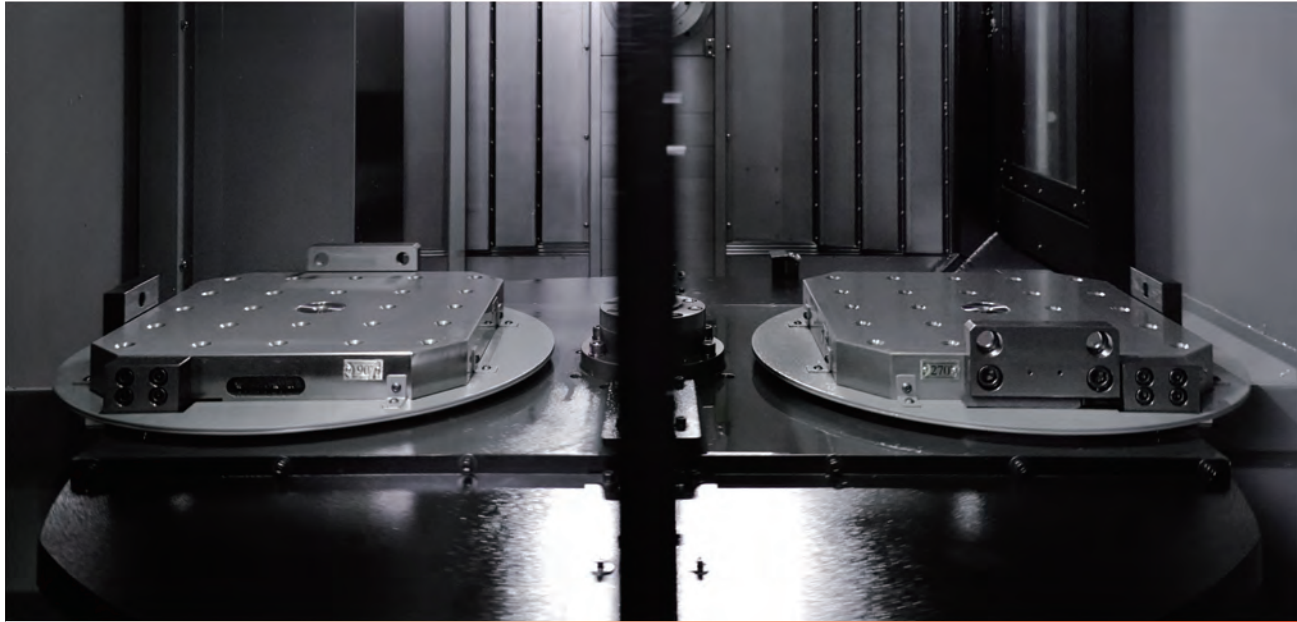


Pallets are mechanically clamped by a ball locking system which generates a powerful 4,000kgf clamping force.

High speed servo driven APC system

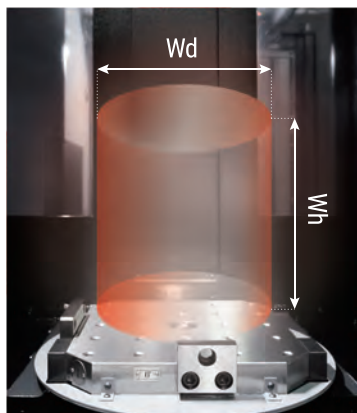
Thanks to the servo driven APC for it provides fast and accurate pallet change. It realizes high productivity.

The HMX series are as flexible as needed for two different sizes of table can be both installed in one machine.



5 sec Pallet changing time	550 kg Max. payload/each pallet	400×400 mm 500×500 Table size
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Pallet changing time



Maximum workpiece size Maximum workpiece size (Wd x Wh)

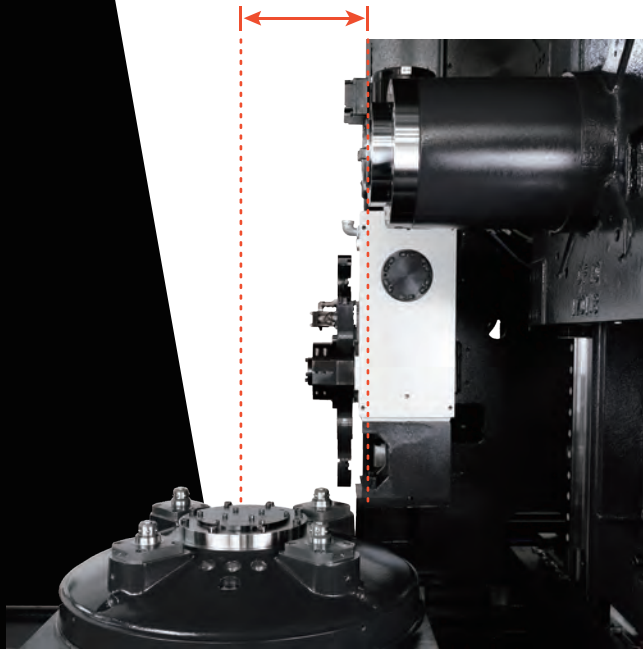
HMX400	∅ 785 x 1000mm
HMX500	∅ 800 x 1000mm
HMX550	∅ 800 x 1000mm

Maximum workpiece weight

HMX400 | 500 | 550 ∅ 550kg

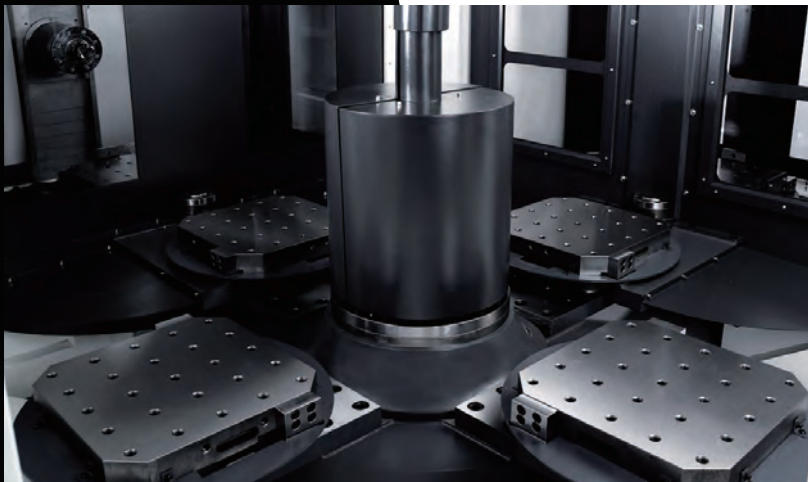
Work piece size





Rigid cutting with shorter tool

The distance between spindle nose to the center of the pallet is minimized to 100mm. With this design, tool rigidity for heavy-duty machining can be increased. In addition, Z-axis displacement at high speed cutting will be minimized.



One-piece casting APC system **option**

The base of 6 APC expansion unit is made of integrated one-piece casting, providing superior stability and rigidity.



1° standard / 0.001° option

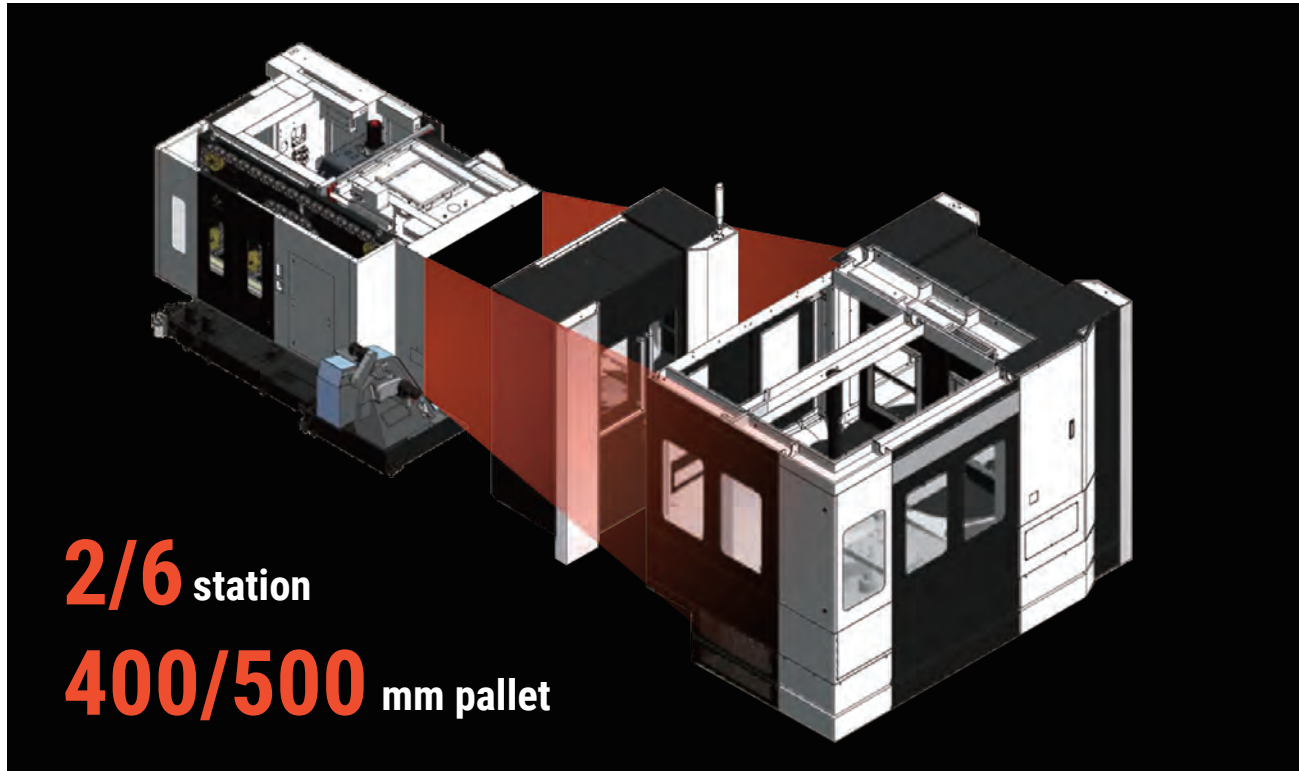
B-axes indexing angle

High precision indexing

1° index table as standard and 0.001° as option apply high precision coupling for accurate indexing.

Flexible APC systems **option**

HMX offers 2 pallets as standard and flexible APC 6-station pallet pool as option. The system is design for small quantity batch production under a scheduled operation, achieving the optimal productivity.



APC system achieves higher accuracy and minimizes the heat with a servo motor driven rotatory index.

Identification system is integrated in each APC 6-station pallet. Each pallet can call its own part program, work coordinates and tool offsets. Up to 99 identification numbers can be set up, providing a high level of automation.

APC & Pallet

The HMX series are built ergonomically for operators, simple operating and uncomplicated maintenance.



Optimal Ergonomic Design

Large door opening to the working area gives the operator impressive freedom and handling space.

HMX400 **760**mm
width of the door

HMX500
HMX550 **790**mm
width of the door

06

HMX Series

User Convenience

Powerful Shower Coolant

14 nozzles in the working envelope can flush the chips away perfectly.



Effective Chip Removal Solutions

High pressure coolant through spindle and other chip removal solutions help wash away chips from hole drilling, tapping and other machining in the cavity. In addition, machining points can be cooled and extend the life of the tool.

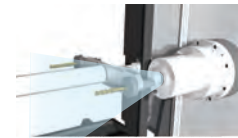


30 bar coolant through spindle

6 spindle coolant nozzles



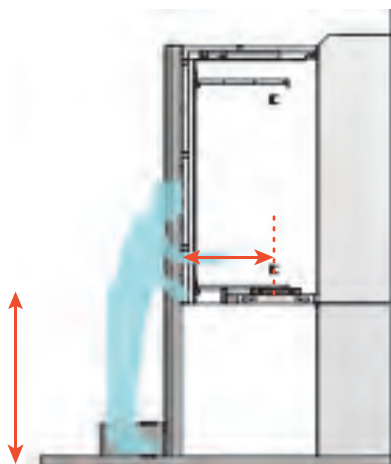
Spindle air blast



Spindle air blast (tool changing)

Minimum Interval Between Pallet and Operator

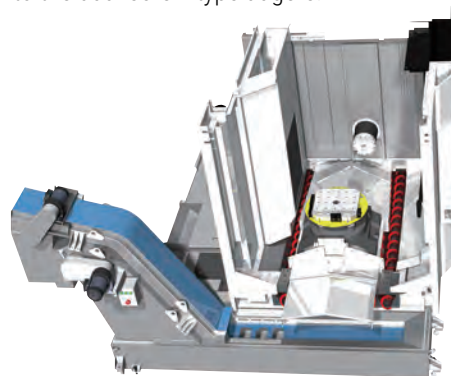
Perfect access distance and height to the working area facilitates faster set-up of workpieces and fixtures.



- **Distance to the center of the pallet:**
50cm (HMX400/500/550)
- **Distance from floor surface to pallet surface:**
1,100cm (HMX400) /
1,070cm (HMX500/550)
- **Door opening:**
760mm (HMX400) /
790mm (HMX500/550)

Dual Chip Auger

Chip removal efficiency greatly enhanced thanks to the dual screw type augers.

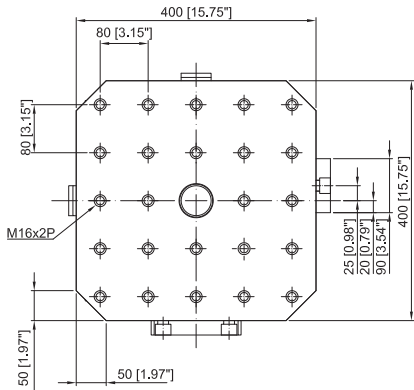


Convenient Swivel Operation Panel

The operation panel can swivel 90°, and the height is design from the operator's viewpoint.

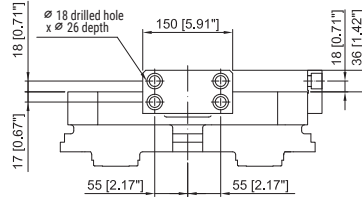


Table Dimension

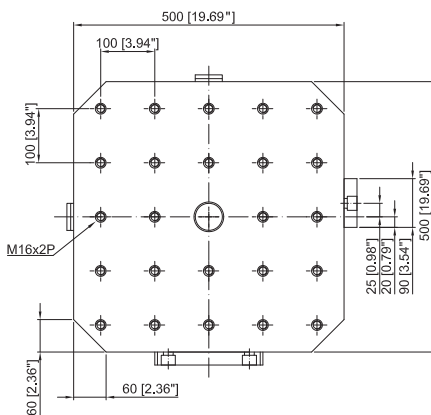


400mm Pallet

Unit : mm [inch]

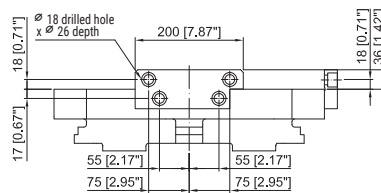


400 x 400 mm
[15.7" x 15.7"]



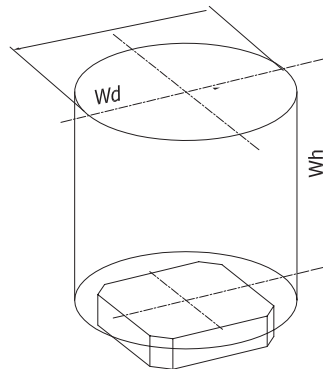
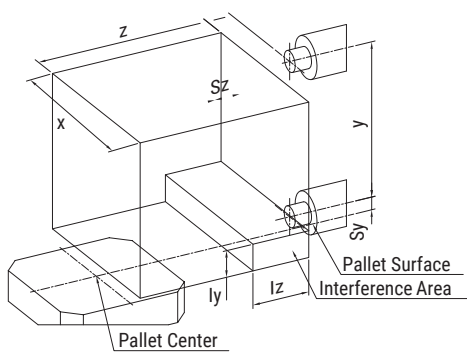
500mm Pallet

Unit : mm [inch]



500 x 500 mm
[19.7" x 19.7"]

Working Area

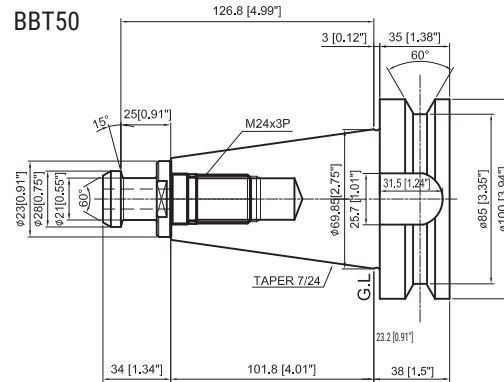
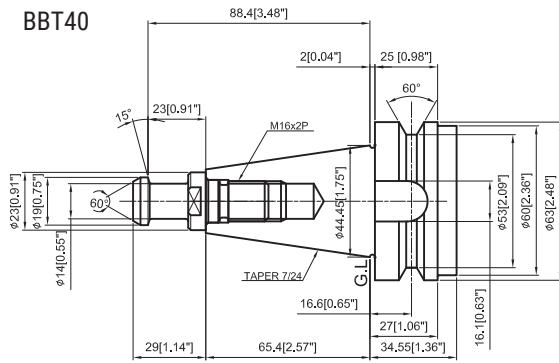


		HMX400	HMX500	HMX550
x	X-axes Travel	640 mm [25.2"]		
y	Y-axes Travel	610 mm [24.0"]	800 mm [31.5"]	
z	Z-axes Travel	680 mm [26.8"]		
Sy	Spindle Center to Pallet Surface	50 mm [2.0"]	40 mm [1.57"]	
Sz	Spindle Nose to Pallet Center	100 mm [3.9"]		
ly	Y-axes Interference	115 mm [4.5"]	140 mm [5.5"]	
lz	Z-axes Interference with 400 Pallet	180 mm [7.1"]		
	Z-axes Interference with 500 Pallet	225 mm [8.9"]		
Wh	Max. Workpiece Height	1000 mm [39.4"]		
Wd	Max. Workpiece Diameter	785 mm [30.9"]	800 mm [31.5"]	

Tool Shank

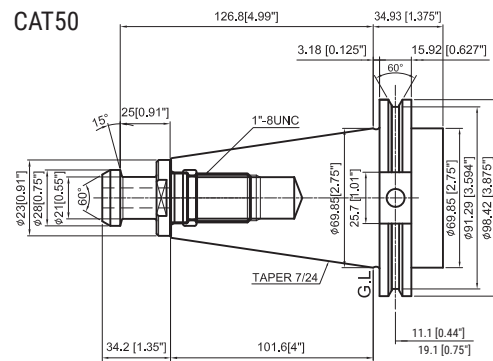
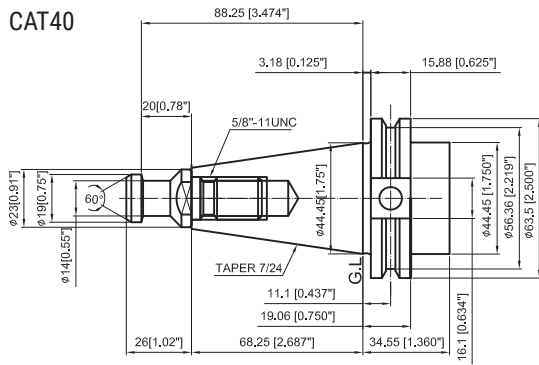
BBT40/50

Unit : mm [inch]



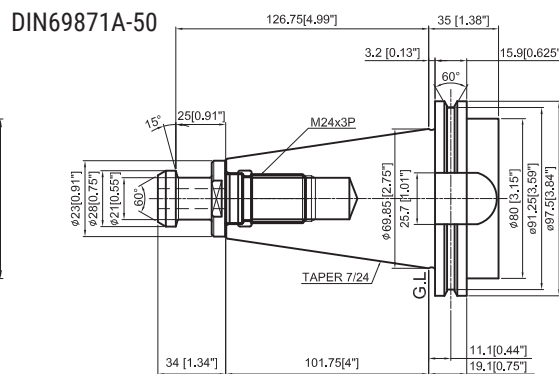
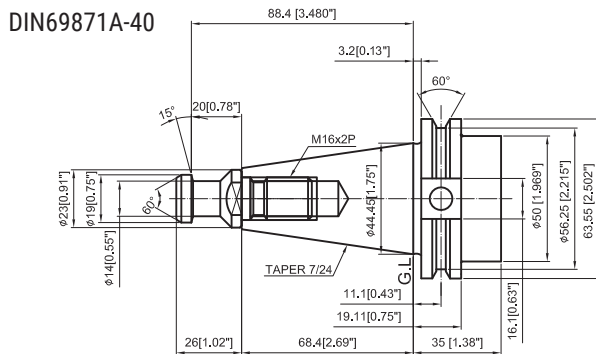
CAT40/50

Unit : mm [inch]



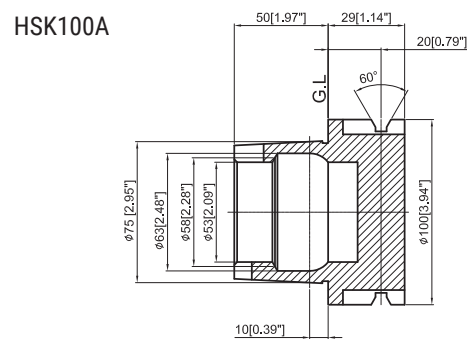
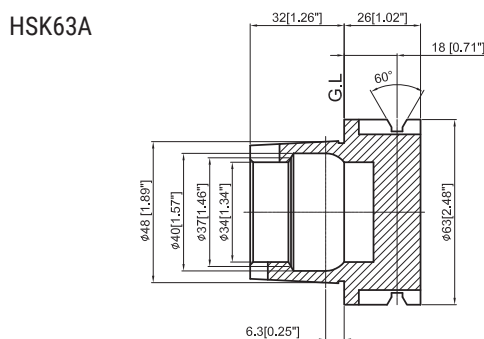
DIN69871A-40/DIN69871A-50

Unit : mm [inch]



HSK63A/HSK100A

Unit : mm [inch]

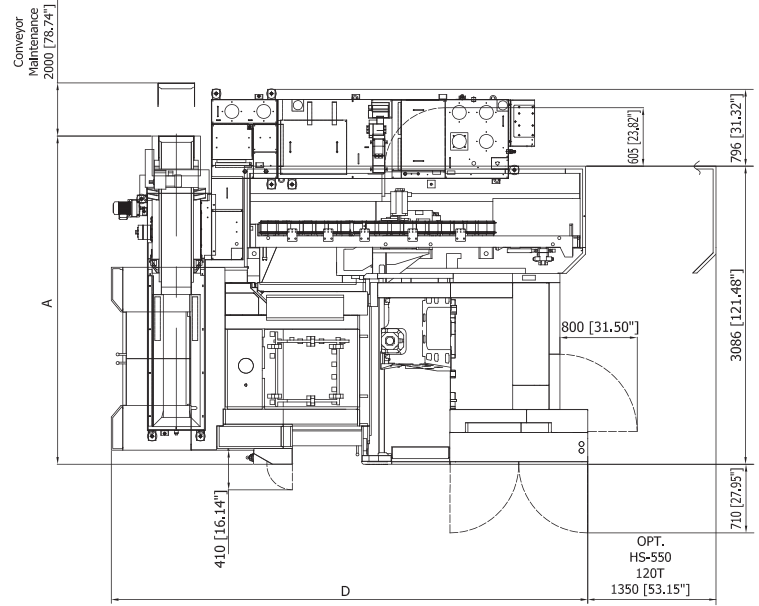


External Dimension

2 APC Machines

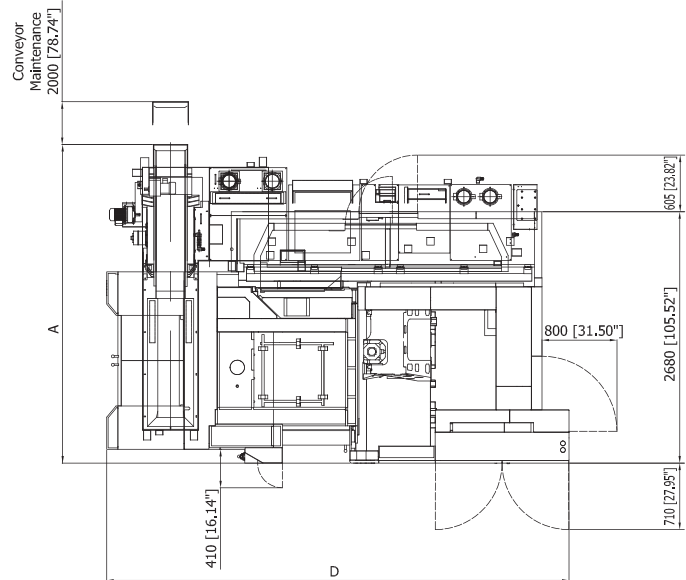
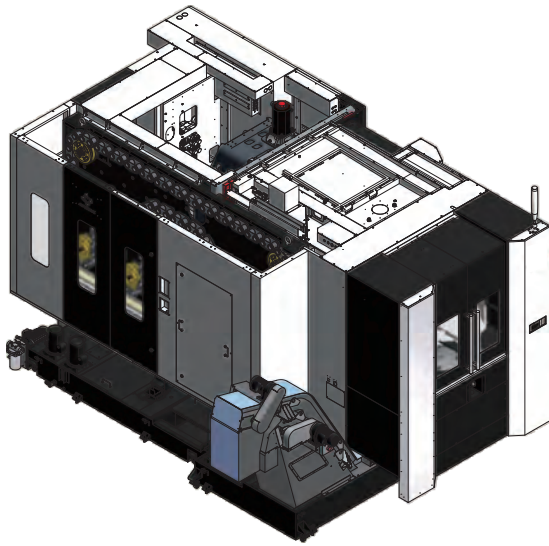
HMX550
Unit : mm [inch]

Item	Position	HMX400	HMX500	HMX550
A	Dual Belt Roller Type	3554 mm [139.92"]		
	Steel Belt Type	3133 mm [123.35"]		
	Scraper (Magnetic) Type	2867 mm [112.87"]		
B	Machine to Chip Conveyor	1514 mm [59.61"]		
C	Chips Collection	953 mm [37.52"]		
D	Machine Dimension: L	4730 mm [186.22"]	4931 mm [194.13"]	
E	Machine Dimension: H	2600 mm [102.36"]	2706 mm [106.54"]	2942 mm [115.83"]



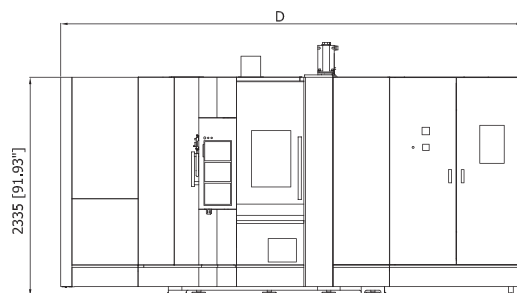
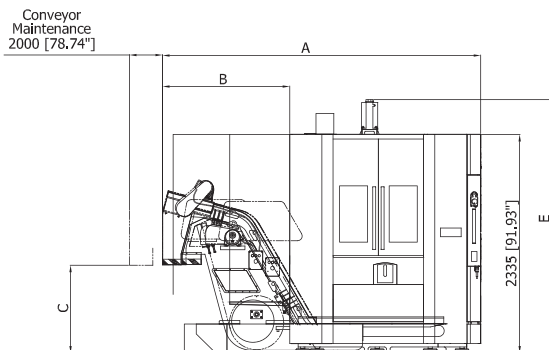
HMX400 / HMX 500

Unit : mm [inch]



HMX400 / HMX 500 / HMX550

Unit : mm [inch]

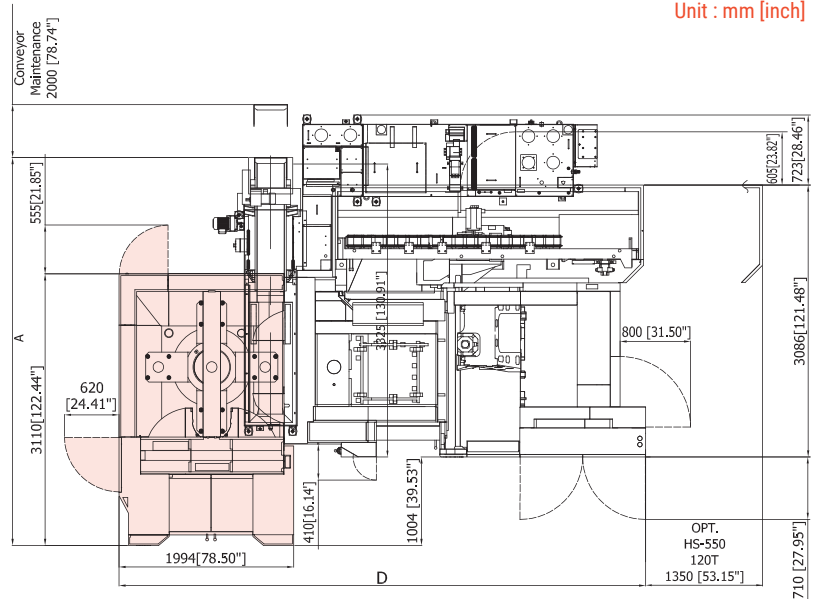


6 APC Machines

HMX550

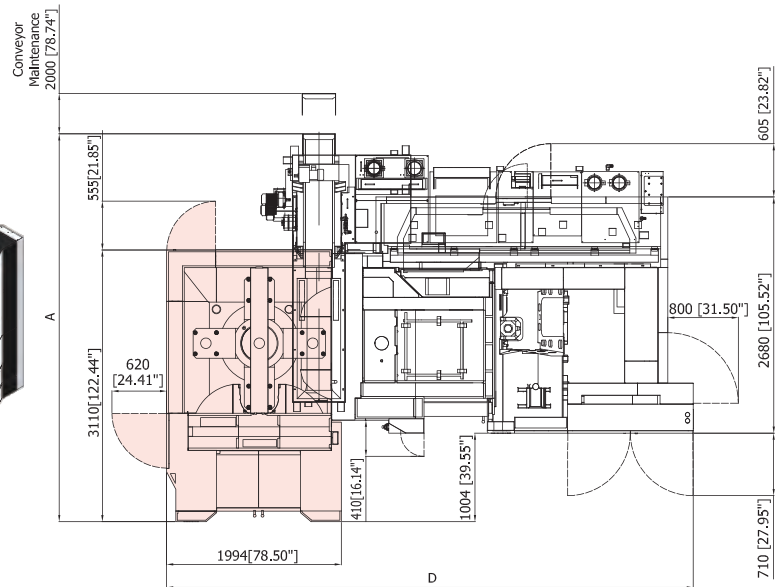
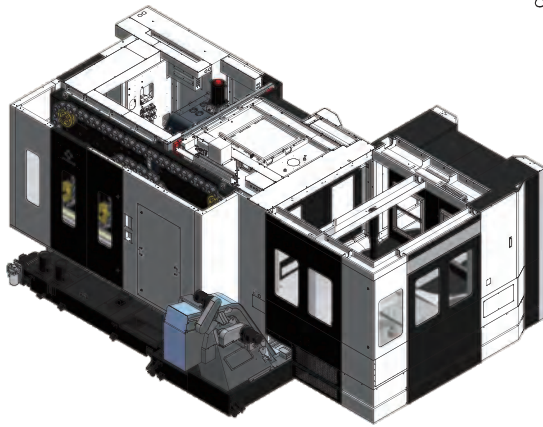
Unit : mm [inch]

Item	Position	HMX400	HMX500	HMX550
A	Dual Belt Roller Type	4690 mm [184.65"]		
	Steel Belt Type	4269 mm [168.07"]		
	Scraper (Magnetic) Type	4003 mm [157.60"]		
B	Machine to Chip Conveyor	1514 mm [59.61"]		
C	Chips Collection	953 mm [37.52"]		
D	Machine Dimension: L	5788 mm [227.87"]	5980 mm [235.43"]	
	Machine Dimension: H	2600 mm [102.36"]	2706 mm [106.54"]	2942 mm [115.83"]



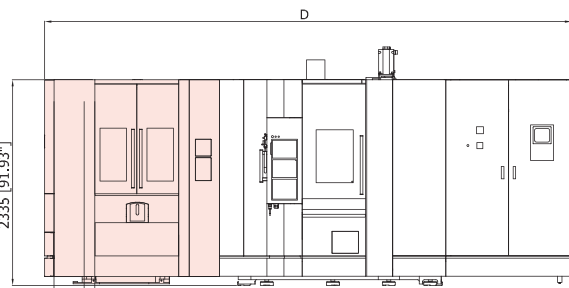
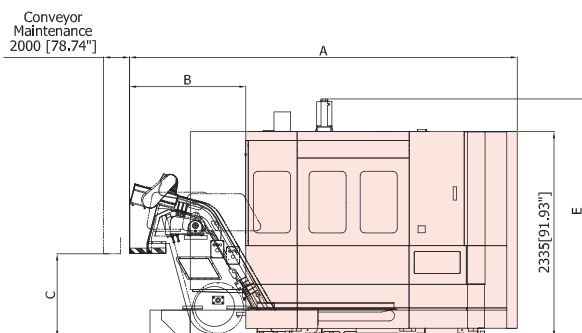
HMX400 / HMX 500

Unit : mm [inch]



HMX400 / HMX 500 / HMX550

Unit : mm [inch]



Machine Specification

Travel	HMX400	HMX500	HMX550
X/Y/Z-axis	640 / 610 / 680mm		800 / 800 / 800mm
Spindle center to pallet surface	50 - 660mm		40 - 840mm
Spindle nose to pallet center	100 - 780mm		100 - 900mm
Pallet top height (from the floor)	1,100mm		1,070mm
Table			
Table Size [OP]	400 × 400mm [500 × 500mm]		500 × 500mm [400 × 400mm]
Workplace max. size	Ø785 × 1,000mm		Ø800 × 1,000mm
Max. load	550kg		550kg
Configuration [OP]	M16 × 25L, P=80mm [P=100mm]		M16 × 25L, P=100mm [P=80mm]
Min. Indexing degree [OP]	1° [0.001°]		1° [0.001°]
Indexing speed [OP]	2.0 sec/90° [1.1 sec/90°]		2.0 sec/90° [1.1 sec/90°]
B-axis clamping torque	3,500 Nm		3,500 Nm
Pallet clamping system	Mechanical Lock		Mechanical Lock
Pallet clamping force	4,000kgf		4,000kgf
Spindle			
Spindle speed [OP]	37 ~ 15,000 rpm [12,000 rpm ~ 20,000 rpm]	37 ~ 15,000 rpm [12,000 rpm, 20,000 rpm]	25 rpm ~ 10,000 rpm
Spindle rated torque	102 Nm (Cont.) / 249 Nm (S3-15%)	102 Nm (Cont.) / 249 Nm (S3-15%)	252 Nm (Cont.) / 568 Nm (S3-15%)
Spindle acceleration/deceleration	3.2 sec (0-15k rpm) / 3.3 sec (15k-0 rpm)	3.2 sec (0-15k rpm) / 3.3 sec (15k-0 rpm)	3.6 sec (0-10k rpm) / 3.7 sec (10k-0 rpm)
Spindle taper [OP]	BBT 40 [CAT 40, DIN69871-40, HSK 63A]	BBT 40 [CAT 40, DIN69871-40, HSK 63A]	BBT 50 [CAT 50, DIN69871-50, HSK 100A]
Through spindle coolant [OP]	3.0 Mpa [7.0 Mpa]		3.0 Mpa [7.0 Mpa]
Feed			
Rapid feed (X/Y/Z)	60M/min	60M/min	60M/min
Cutting feed (X/Y/Z)	1 ~ 40M/min	1 ~ 40M/min	1 ~ 40M/min
Table rotating speed	33.3 rpm	33.3 rpm	33.3 rpm
Guide ways (X/Y/Z)	Roller ways	Roller ways	Roller ways
Acceleration (X/Y/Z)	1G	1G	1G
Ballscrews size	Ø40mm	Ø40mm	Ø40mm
ATC			
Type of pull-stud [OP]	JIS 40P [DIN69872-40]	JIS 40P [DIN69872-40]	JIS 50P [DIN69872-50]
Number of tools [OP]	40T [60T, 80T]	40T [60T, 80T]	60T [80T, 100T, 120T]
Max. tool diameter	Ø75 / 150mm [Ø95 / 185mm]	Ø75 / 150mm	Ø115 / 250mm
Max. tool length (Adjacent pots full/empty)	400mm	400mm	450mm
Max. tool weight	8kg	8kg	25kg
Tool selection system	Random	Random	Fixed / Random
Tool to tool	1.2 sec [2.1 sec, heavy tool]	1.2 sec [2.1 sec, heavy tool]	2.2 sec [3.1 sec, heavy tool]
Chip to Chip	3.4 sec [4.4 sec, heavy tool]	3.4 sec [4.4 sec, heavy tool]	5.3 sec [5.9 sec, heavy tool]
APC			
Number of pallets [OP]	2 [6]		2 [6]
Pallet change system	Rotation		Rotation
APC exchange rotating time	5 sec		5 sec
Motors			
Spindle motor (Cont./Max)	15/37 kW	15/37 kW	26/30 kW
Feed axes motors (X/Y/Z/B)	4.5/5.5/4.5/2.7 kW		5.5/5.5/4.5/2.7 kW
Lubrication pump motor	18W/60Hz		18W/60Hz
Spindle coolant pump	1.62 W/60Hz		1.62 W/60Hz
Through spindle coolant pump	2.24 W/60Hz		2.24 W/60Hz
Overhead shower flush coolant pump	1.62 W/60Hz		1.62 W/60Hz
Hydraulic pump	2.23 W/60Hz		2.23 W/60Hz
Spindle oil chiller	1.95 W/60Hz	1.95 W/60Hz	3.59 W/60Hz
Supply			
Electric voltage	200 ~ 230 V		200 ~ 230 V
Electric power supply	50 kVA	60 kVA	70 kVA
Air pressure	0.6 Mpa		0.6 Mpa
Air volume	500 L/min		500 L/min
Tank			
Hydraulic unit tank	60 L		60 L
Lubrication unit tank	1.8 L		1.8 L
Coolant tank	750 L	750 L	810 L
Size			
Machine dimension (L×W×H)	4,730 × 2,540 × 2,600 mm	4,931 × 2,628 × 2,706 mm	4,931 × 3,086 × 2,942 mm
Required floor space (L×W×H)	5,375 × 4,445 × 2,600 mm	5,442 × 4,445 × 2,706 mm	5,442 × 4,482 × 2,942 mm
Machine weight	11,450 kg	12,520 kg	15,000 kg

Standard & Optional

● : Standard ○ : Option ✕ : Non Applicable

Spindle		HMX400	HMX500	HMX550
10,000rpm		✕	✕	●
12,000rpm		○	○	✕
15,000rpm		●	●	✕
20,000rpm		○	○	✕
ATC				
40T		●	●	✕
60T		○	○	●
80T		○	○	○
100T		✕	✕	○
120T		✕	✕	○
BBT40		●	●	✕
BBT50		✕	✕	●
CAT40		○	○	✕
CAT50		✕	✕	○
DIN69871A-40		○	○	✕
DIN69871A-50		✕	✕	○
HSK63A		○	○	✕
HSK100A		✕	✕	○
Table, APC & Pallet				
2 APC		●	●	●
6 APC		○	○	○
400mm x 400mm		●	○	○
500mm x 500mm		○	●	●
1°		●	●	●
0.001°		○	○	○
Coolant System				
30bar		●	●	●
70bar		○	○	○
Spindle Air Blast		●	●	●
Spindle Thermal Compensation		●	●	●
Cutting Air Blast		●	●	●
Coolant Shower (14 Nozzles)		●	●	●
Chiller for Coolant Tank		○	○	○
Chip Disposal				
Dual Chip Augers		●	●	●
Coolant Tank		●	●	✕
750L		○	○	●
810L		✕	✕	●
Full Chip Enclosure		●	●	●
3-Axes Telescopic Way Covers		●	●	●
Steel Belt Type		○	○	○
Chip Conveyor		○	○	○
Scraper Type		○	○	○
Magnetic Scraper Type		○	○	○
Dual Belt Roller Type		○	○	○
Chip Wagon		○	○	○
Rear Side Chip Disposer		✕	○	○
Feed Axes				
Linear Scales (X/Y/Z/B)		○	○	○
Electric Device				
3-Color Signal light		●	●	●
Working Light		●	●	●
Sealed Electric Cabinet		●	●	●
Heat Exchanger for Electric Cabinet		●	●	●
A/C for Heat Exchanger of Electric		○	○	○
Measuring Device				
Coolant Level Detection		●	●	●
Tool Breakage Detection		○	○	○
Workpiece Measurement		○	○	○
Tool Measurement		○	○	○
Environment				
Oil Skimmer		●	●	●
Oil Mist Collector		○	○	○
Fixture & Automation				
Hydraulic Overhead Arms for Fixtures		○	○	○
Hydraulic Pallets Through for Fixtures		○	○	○
Automatic Pallet Indexing at Loading Zone		○	○	○
Pallets Pool		○	○	○
Matrix Tool Magazine		○	○	○
4+1 Axes Machining		○	○	○
Safety Device				
Safety Door		●	●	●
Safety Light Curtain		○	○	○
Control				
Fanuc OiMF-Plus		●	●	●
Fanuc 31iMB		○	○	○
ETC				
Leveling Block and Screws		●	●	●
Maintenance Tools		●	●	●
Manuals		●	●	●
Window Spinner		○	○	○
Energy Saving Function		○	○	○
CE Certified EN ISO 13849-1		○	○	○