

**TAKUMI** When Precision Matters

**TAKUMI**

# HMX Series



**TAKUMI**

No.10, Gong 10th Rd., Dajia Distr., Taichung City 437, Taiwan  
T +886 4 26811215  
F +886 4 26822803  
sales-os@takumi.com.tw  
www.takumi.com.tw



The new high-speed, high productivity  
horizontal machining center

HMX 400  
HMX 500  
HMX 550

HMX400-01-EN-202405

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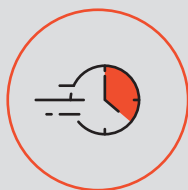
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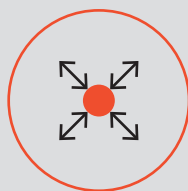
### **High rigidity one-piece bed**

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.



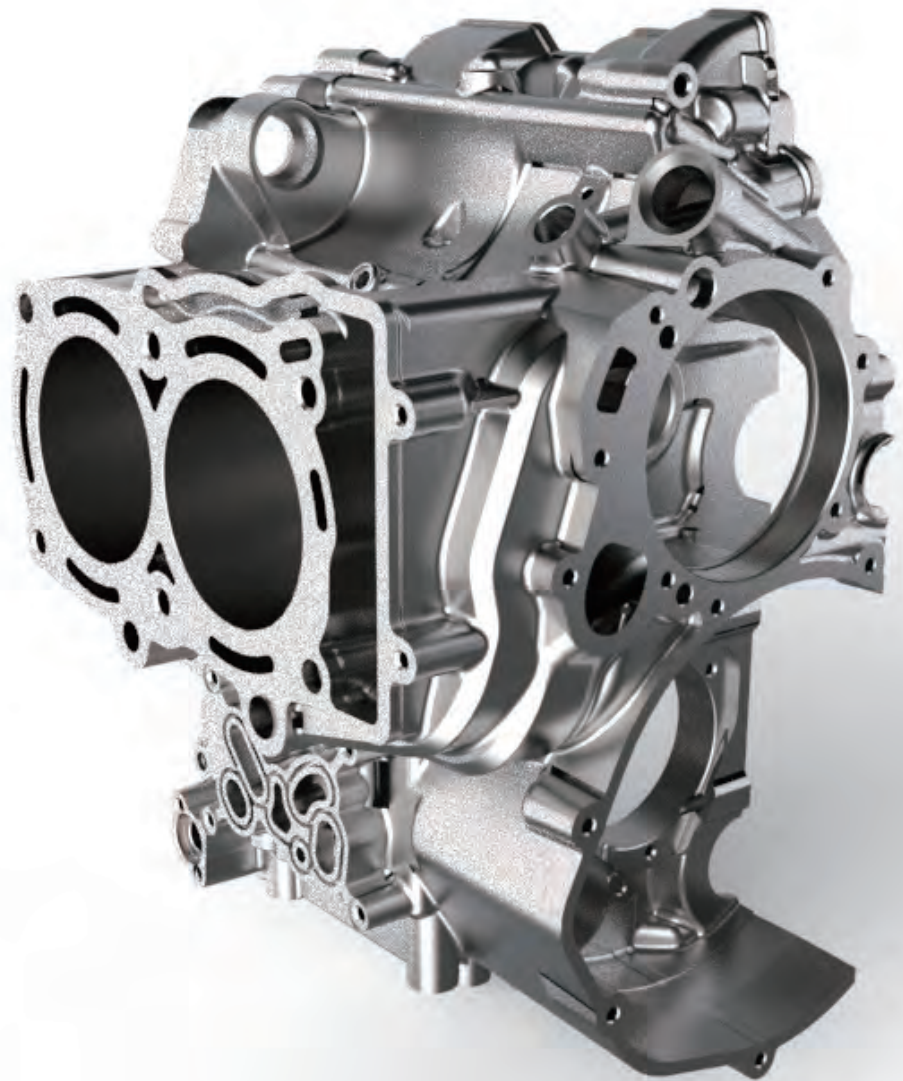
# HMX Series

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



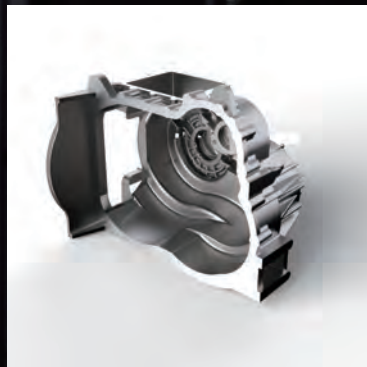
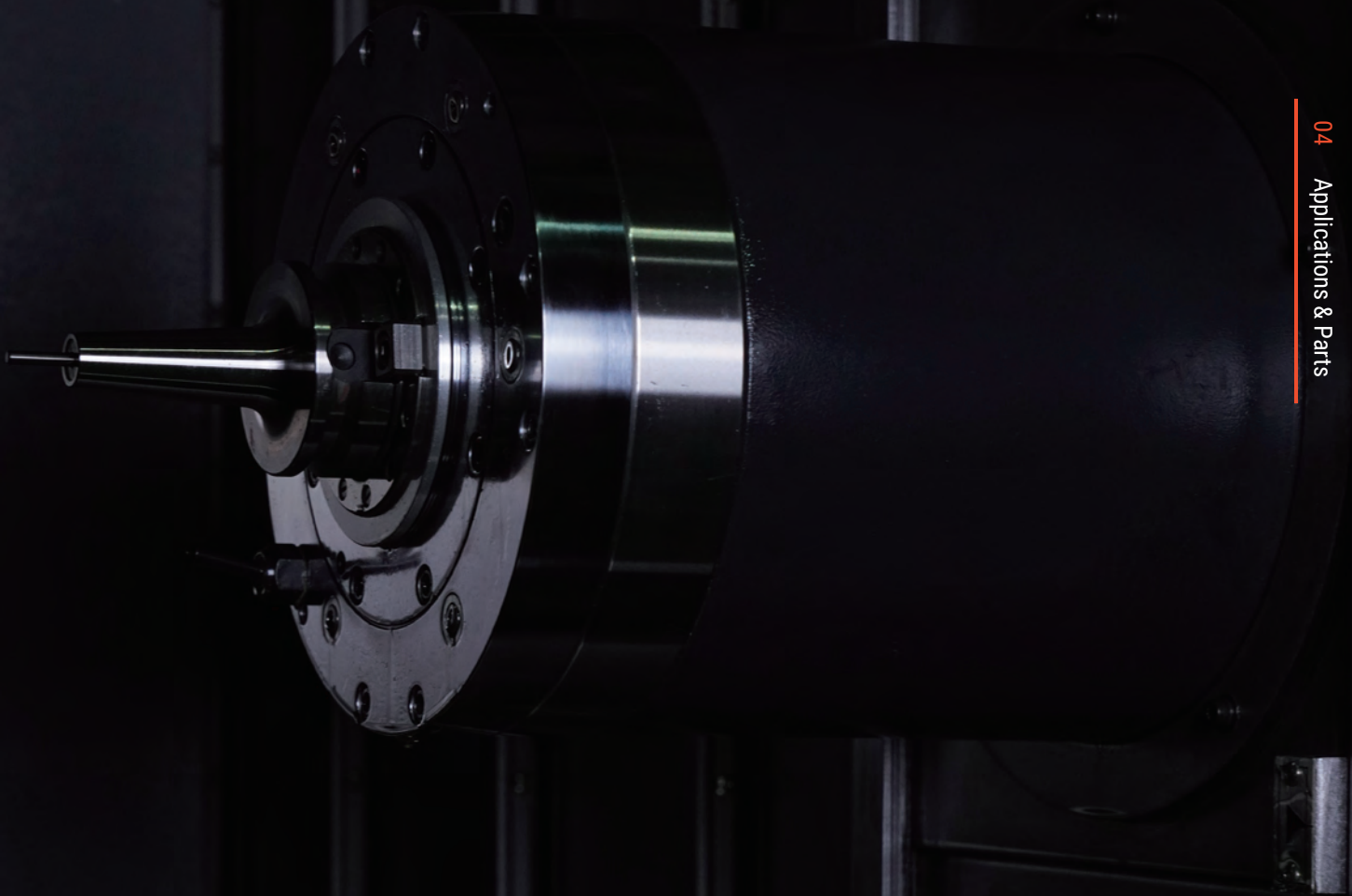
# HMX Series

**Rigid and powerful  
for every applications**



**Automotive**

Cylinder head made of cast iron



Gear housing made of aluminum



Fixture made of aluminum

# Basic Structure

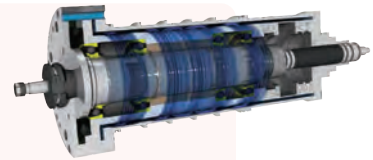
01



## 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.

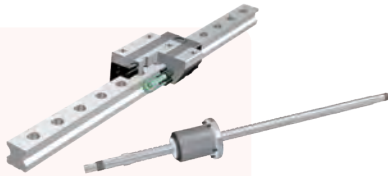
02



## 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

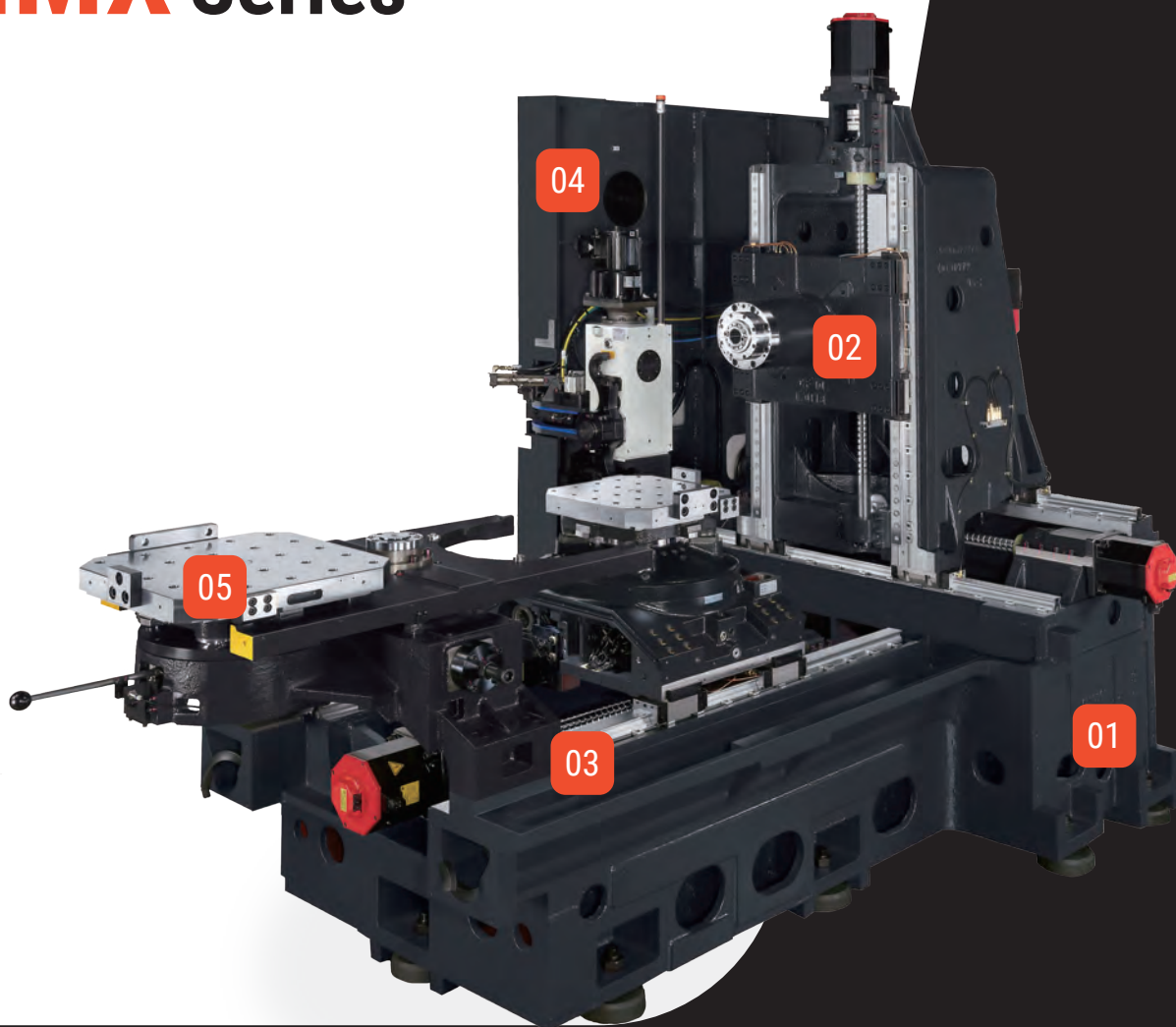


## APC system and pallet

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



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**

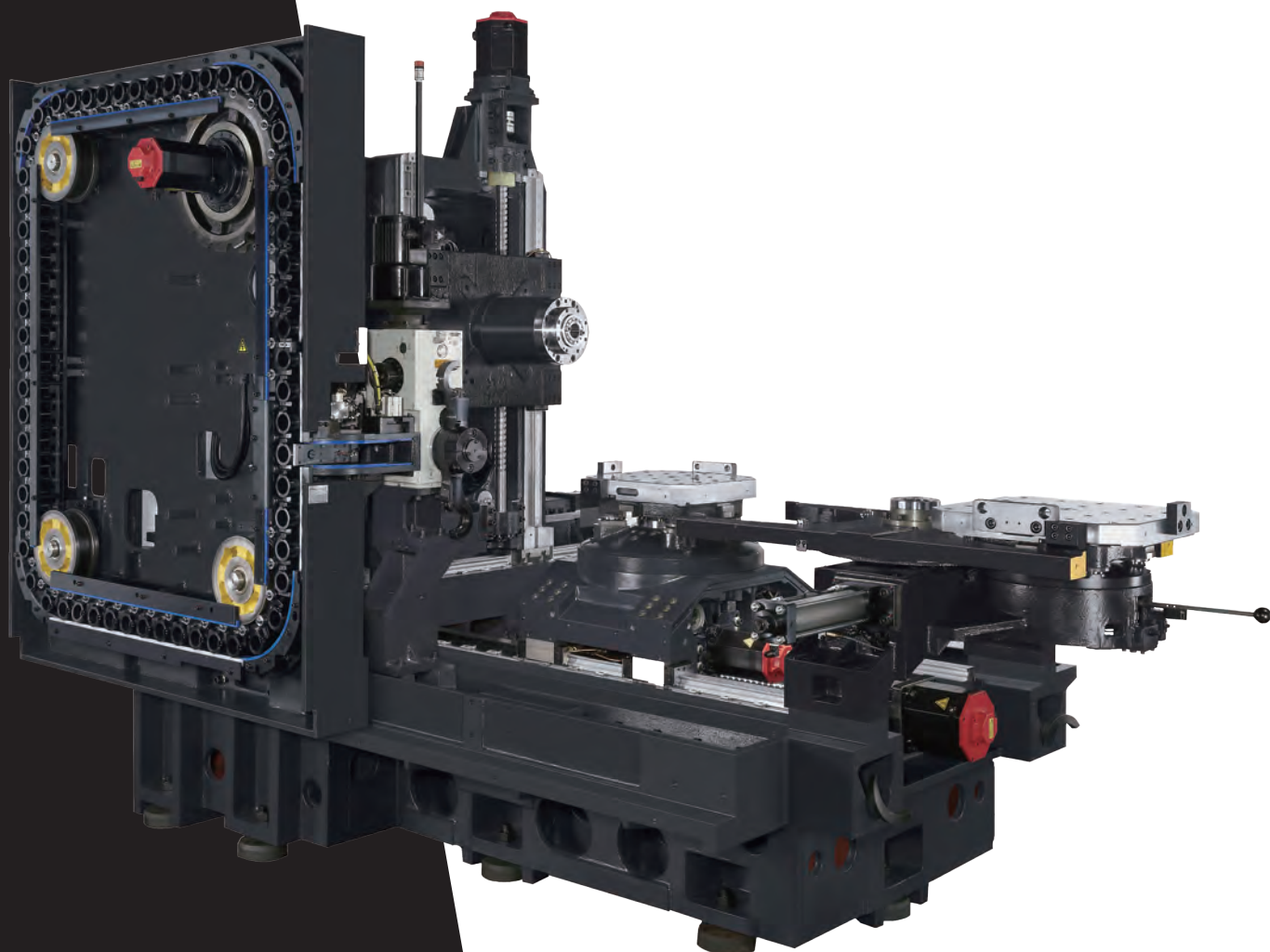
**mm** Travel (X/Y/Z-axis)

Applications and Parts

Basic Information

- Body Structure

Machine Information





# Optimal body structure design is the foundation of machining perfection



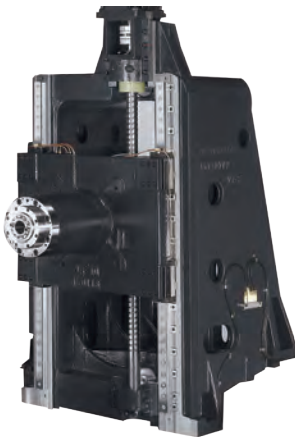
## High rigidity one-piece bed

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



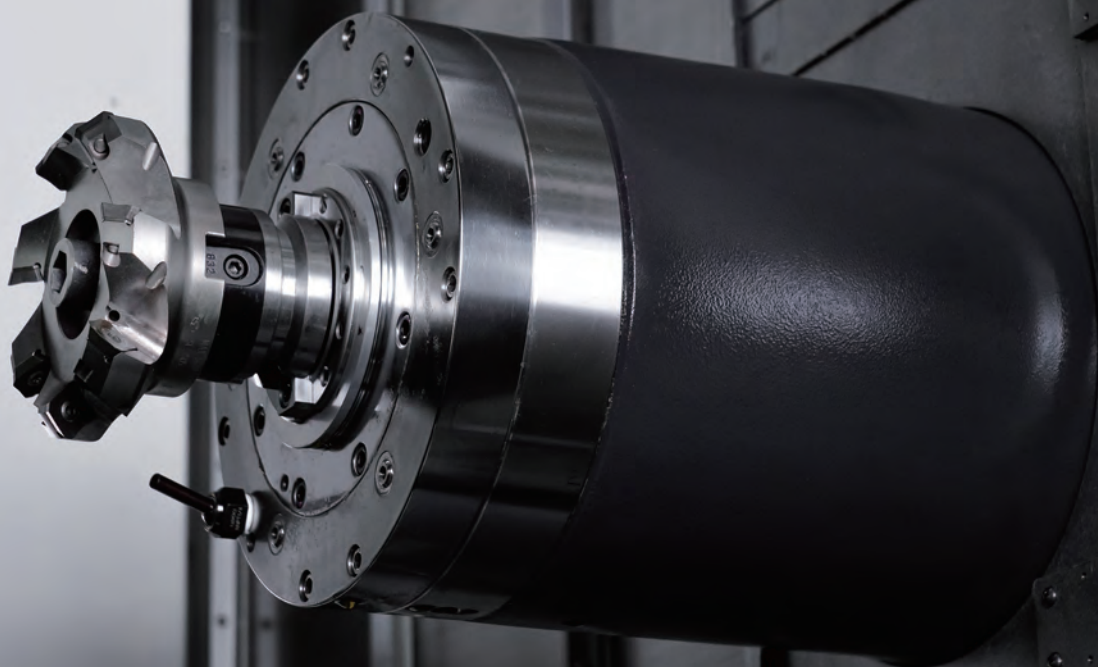
## Stepped-guide bed structure

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



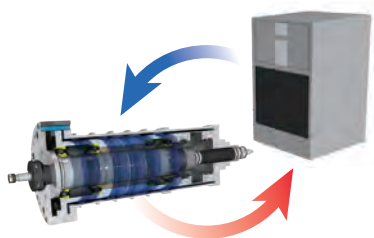
## Dual-wall machine column

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



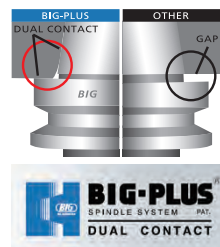
### High precision ceramic ball bearing

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

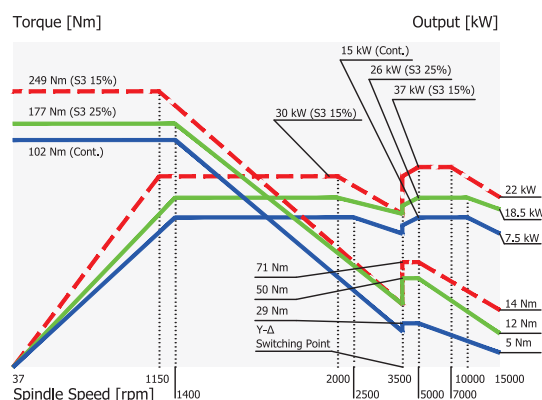
## 15,000rpm Direct drive spindle (ST)

**15/37**

**kW** Power (Cont./Max.)

**102/249**

**N.m** Torque (Cont./Max.)



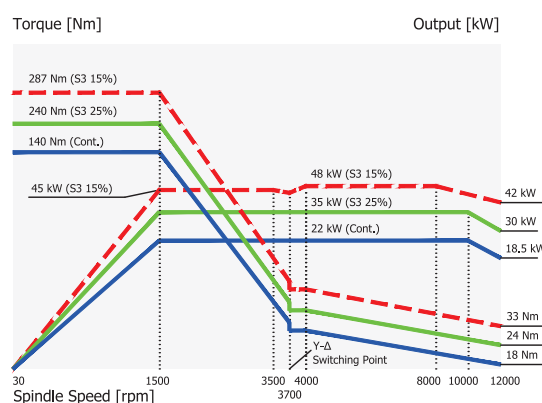
## 12,000rpm Direct drive spindle (OP)

**22/48**

**kW** Power (Cont./Max.)

**140/287**

**N.m** Torque (Cont./Max.)



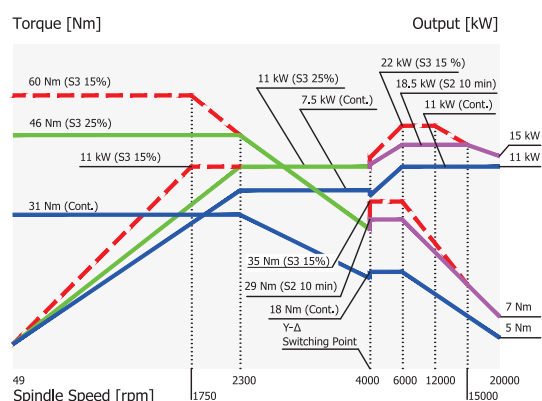
## 20,000rpm Built-in spindle (OP)

**11/22**

**kW** Power (Cont./Max.)

**31/60**

**N.m** Torque (Cont./Max.)



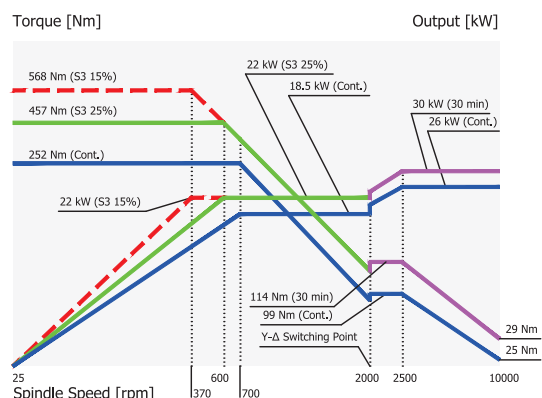
## 10,000rpm Direct drive spindle (ST)

**26/30**

**kW** Power (Cont./Max.)

**252/568**

**N.m** Torque (Cont./Max.)





Applications and Parts

Basic Information

- Feed Axes

Machine Information

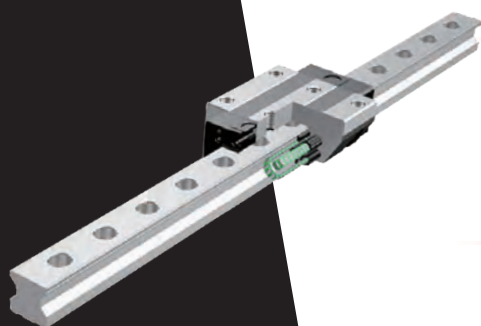
11 Feed Axes



# 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)

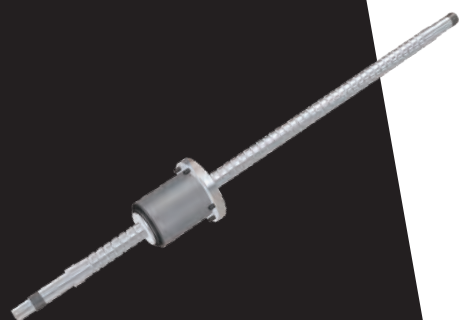
**HMX500  
HMX550**

**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.

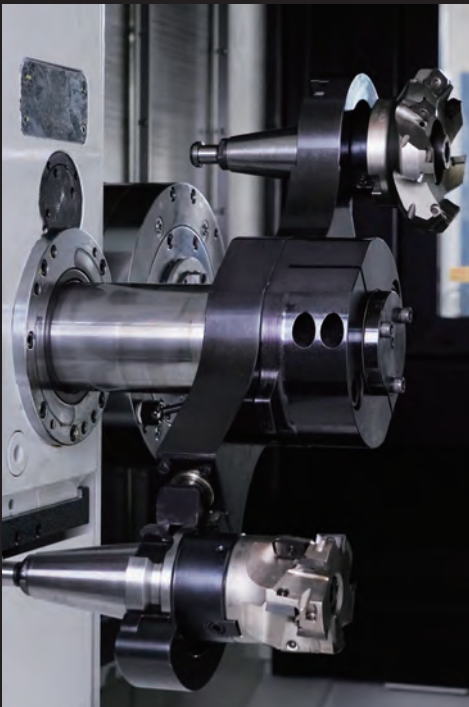


**HMX400  
HMX500  
HMX550**

**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

**2.5 sec**  
Tool change time (T-T)

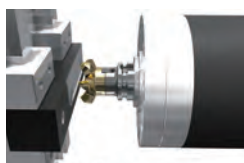


## HMX 400/500 (550) tool storage capacity

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



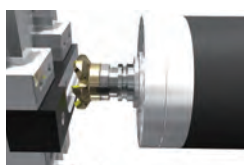
## HMX400

## HMX500

## HMX550

### Face milling

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



### Face milling

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



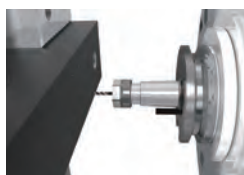
### Drilling

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



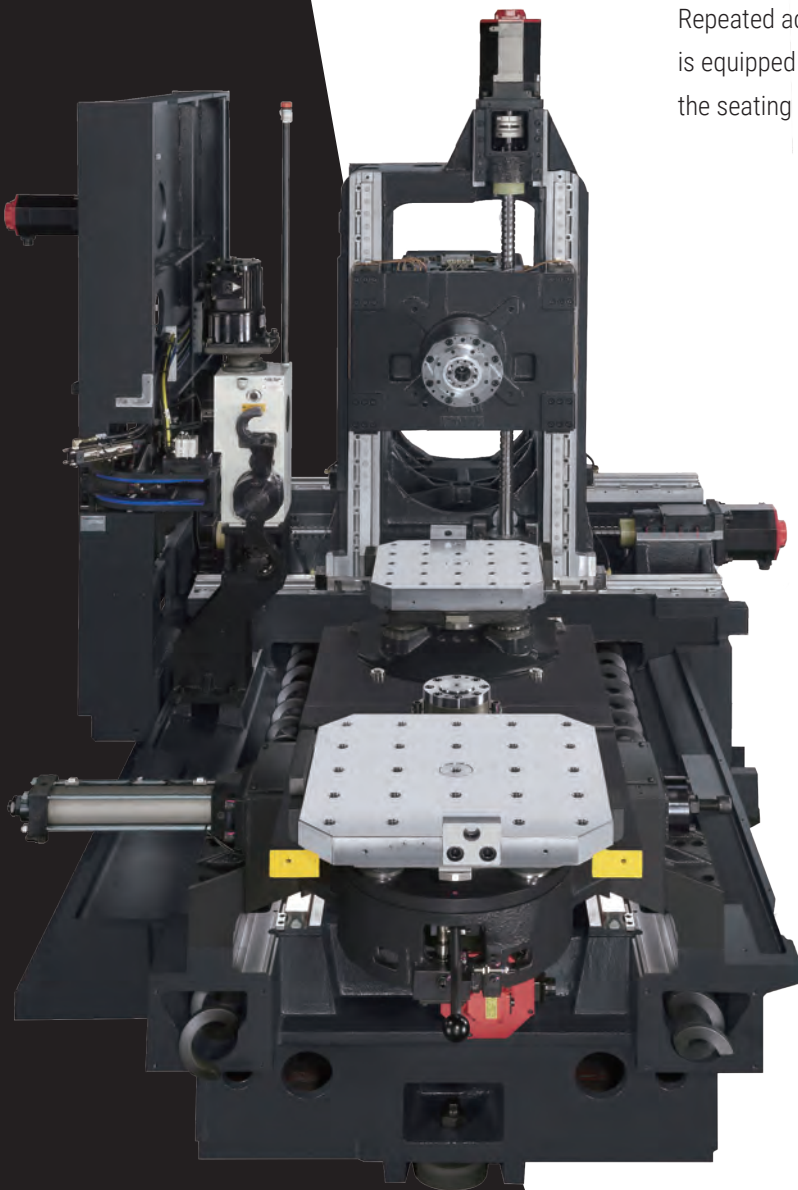
### Tapping

<b>Material</b>	Steel S45C	Steel S45C	Steel S45C
<b>Spindle speed</b>	76rpm	76rpm	58rpm
<b>Tool diameter</b>	M42 x 4.5P	M42 x 4.5P	M56 x 5.5P
<b>Feed rate</b>	342mm/min	342mm/min	319mm/min



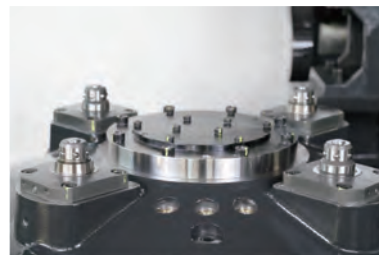
### Rigid tapping

<b>Material</b>	Aluminum 6061	Aluminum 6061	Steel S45C
<b>Spindle speed</b>	3,000rpm	3,000rpm	3,000rpm
<b>Tool diameter</b>	0#-80UNF	0#-80UNF	0#-80UNF
<b>Feed rate</b>	952.5mm/min	952.5mm/min	952.5mm/min



### High accuracy pallet clamping system

Repeated accuracy of  $3\mu\text{m}$  is achieved by 4 cones. System is equipped with air blower to remove chips from the seating surface.



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

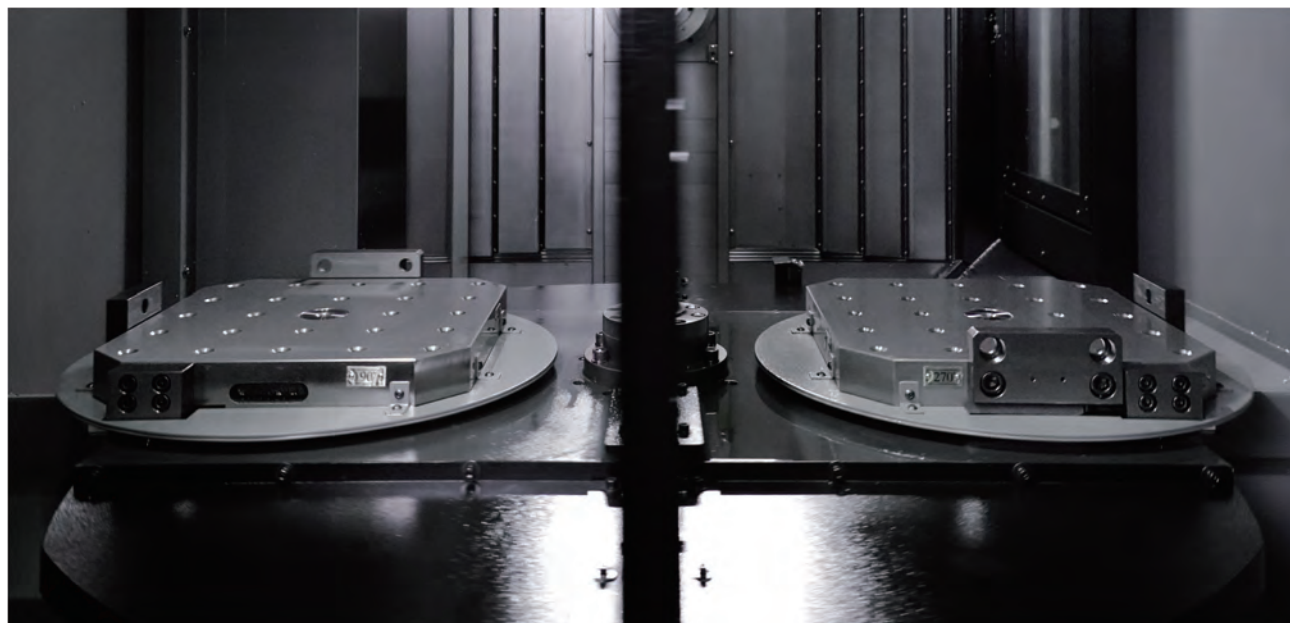


Pallets are mechanically clamped by a ball locking system which generates a powerful 4,000kgf clamping force.

## High speed servo driven APC system

Thanks to the servo driven APC, it provides fast and accurate pallet change to achieve high productivity.

The HMX series are as flexible as needed for two different size tables, which can be installed in one machine.



**5 sec**  
Pallet changing time

**550 kg**  
Max. payload/each pallet

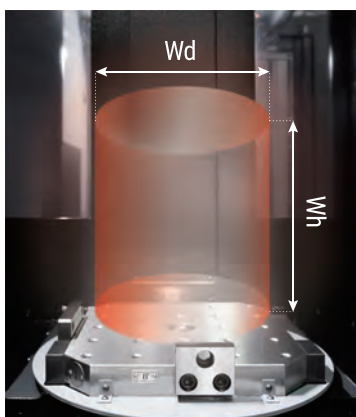
**400×400 mm**  
**500×500** Table size

### Pallet changing time

Other machine 7s

★ HMX Series 5s

**28% reduction**



### Maximum workpiece size

Maximum workpiece size (Wd x Wh)

HMX400 :  $\Phi$  785 x 1000mm

HMX500 :  $\Phi$  800 x 1000mm

HMX550 :  $\Phi$  800 x 1000mm

### Maximum workpiece weight

HMX400 | 500 | 550 : 550kg

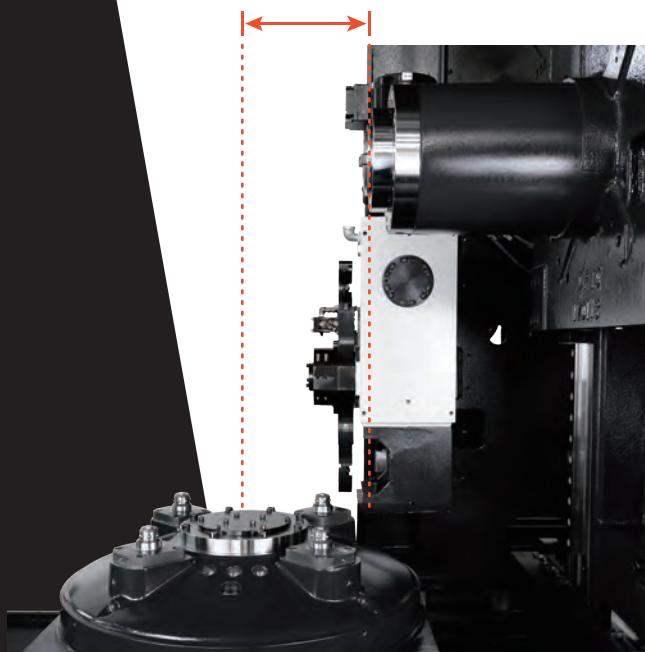
### Work piece size

Other machine 253.6L

★ HMX Series 483.9L

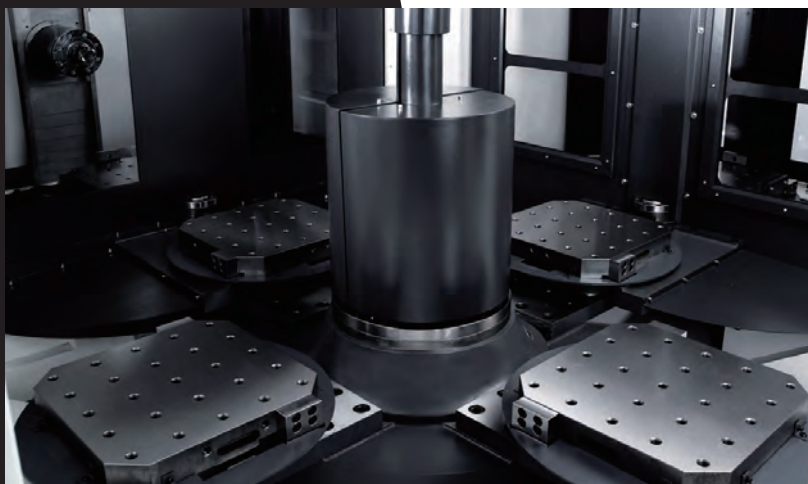
**90% more**





### 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.



### High precision indexing

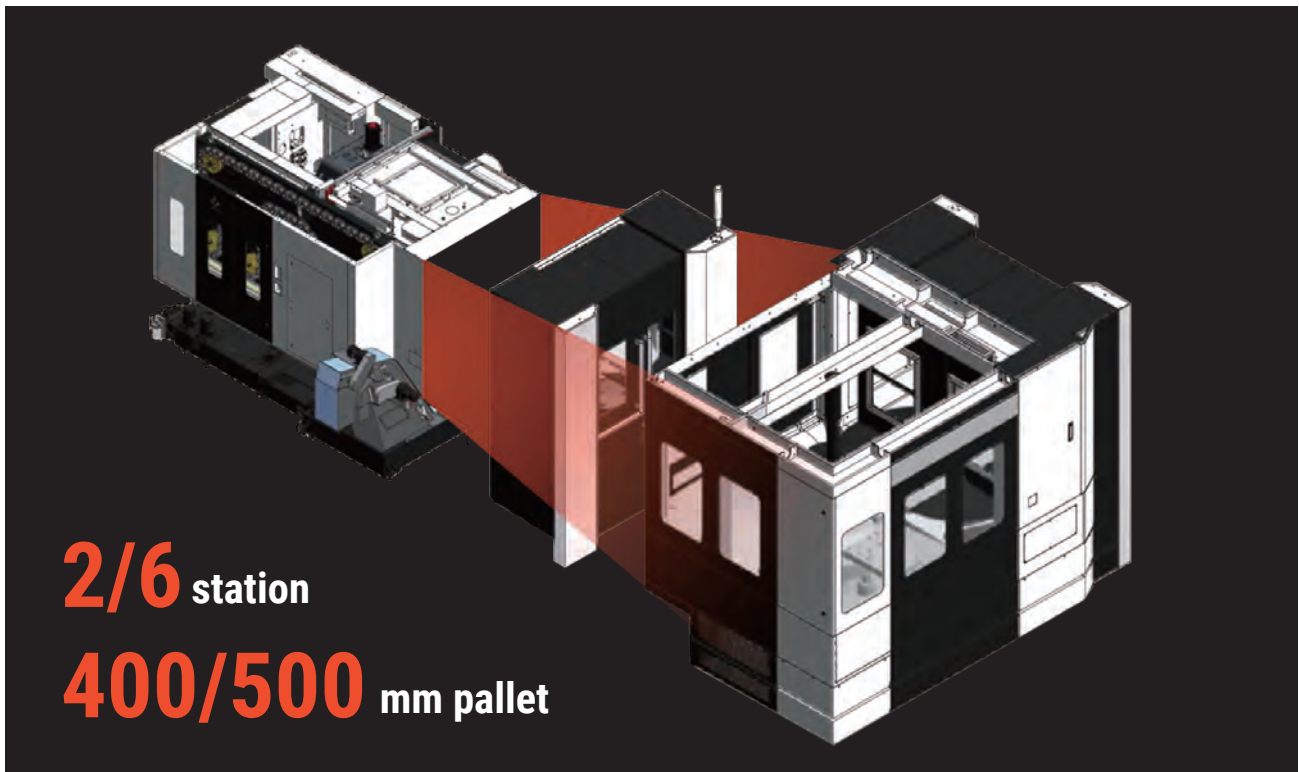
1° index table as standard and 0.001 ° as option apply high precision coupling for accurate indexing.

**1° standard / 0.001° option**

B-axes indexing angle

## 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



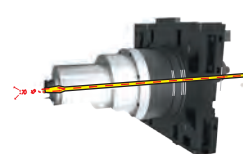
## Powerful Shower Coolant

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:

500mm (HMX400/500/550)

### Distance from floor surface to pallet surface:

1,100mm (HMX400) /

1,070mm (HMX500/550)

### Door opening:

760mm (HMX400) /

790mm (HMX500/550)

## Dual Chip Auger

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

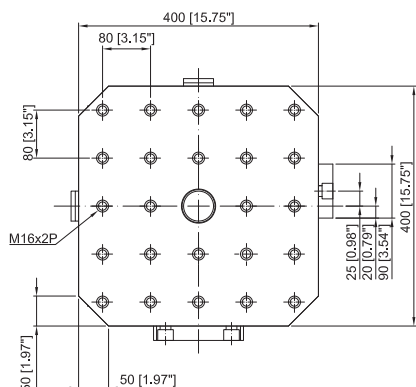


## Convenient Swivel Operation Panel

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

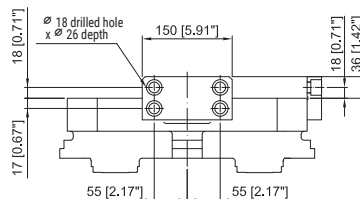


## Table Dimension

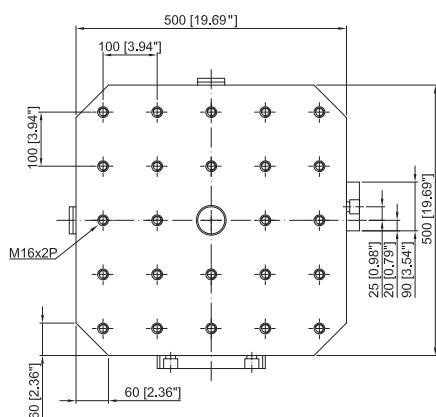


### 400mm Pallet

Unit : mm [inch]

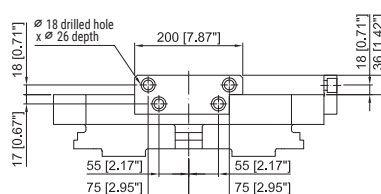


400 x 400 mm  
[15.7" x 15.7"]



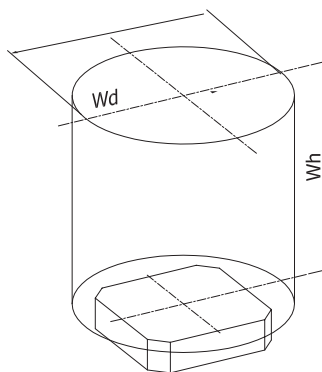
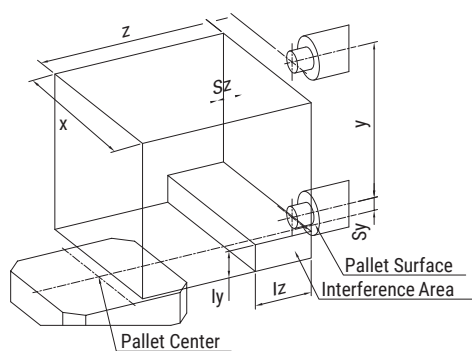
### 500mm Pallet

Unit : mm [inch]



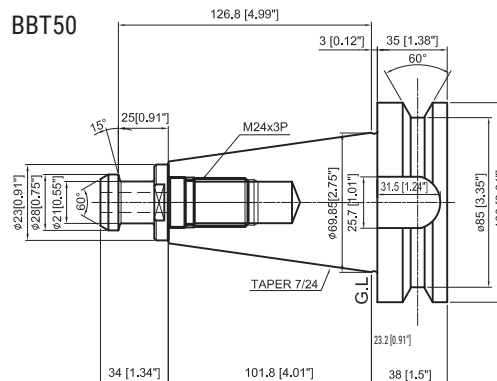
500 x 500 mm  
[19.7" x 19.7"]

## Working Area

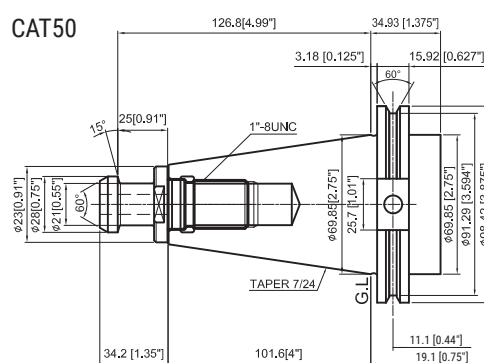
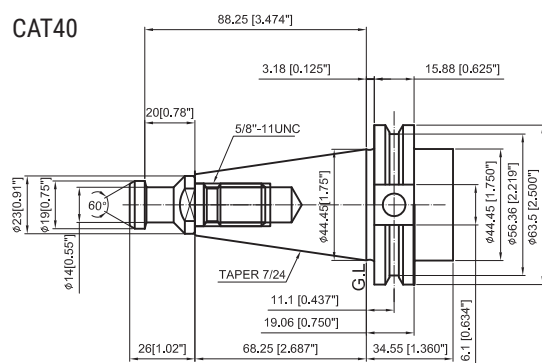


		HMX400	HMX500	HMX550
x	X-axes Travel	640 mm [25.2"]	800 mm [31.5"]	
y	Y-axes Travel	610 mm [24.0"]		
z	Z-axes Travel	680 mm [26.8"]		
Sy	Spindle Center to Pallet Surface	50 mm [2.0"]	40 mm [1.57"]	
Sz	Spindle Nose to Pallet Center	100 mm [3.9"]		
ly	Y-axes Interference	115 mm [4.5"]		140 mm [5.5"]
lz	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"]	

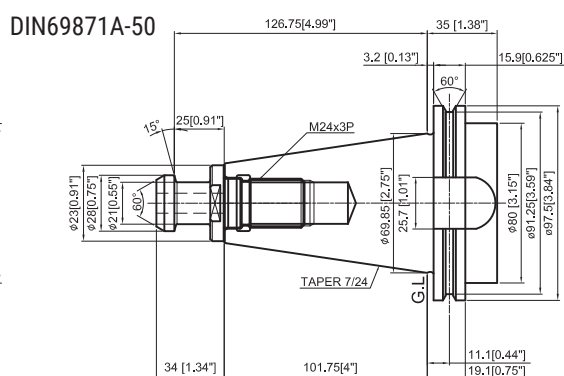
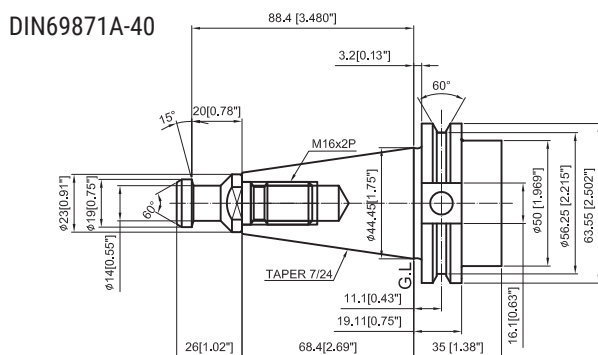
## Unit : mm [inch]



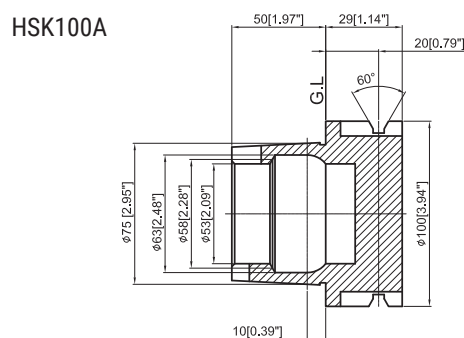
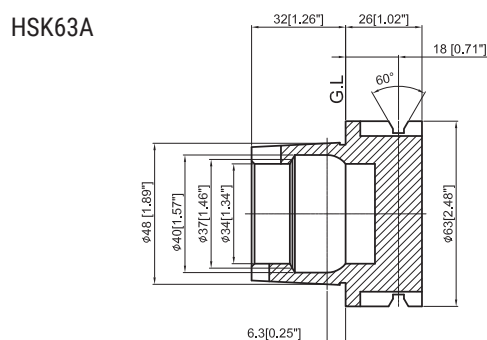
## Unit : mm [inch]



## Unit : mm [inch]



## Unit : mm [inch]

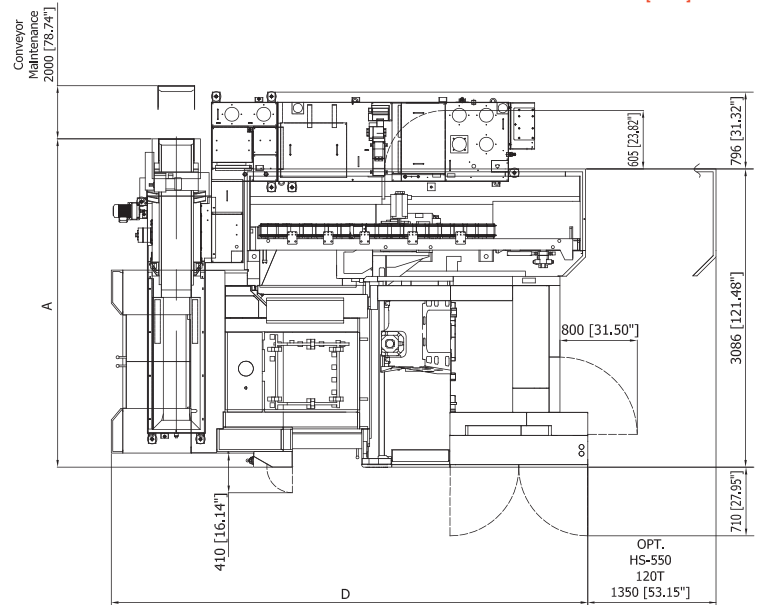


# External Dimension

## 2 APC Machines

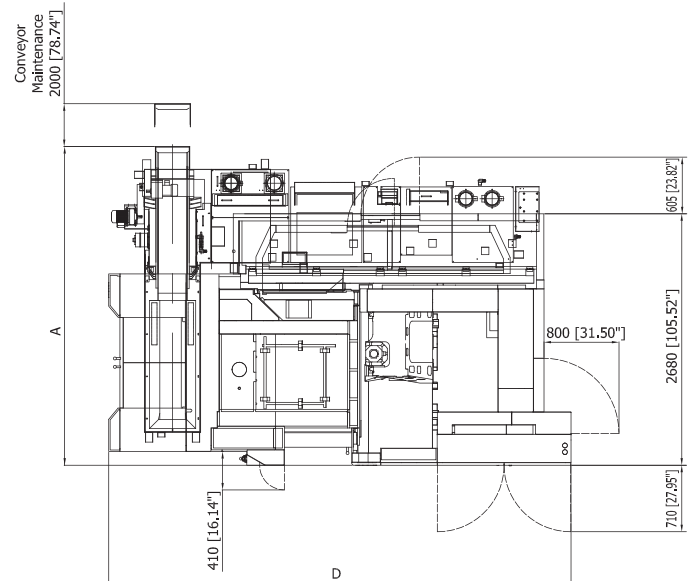
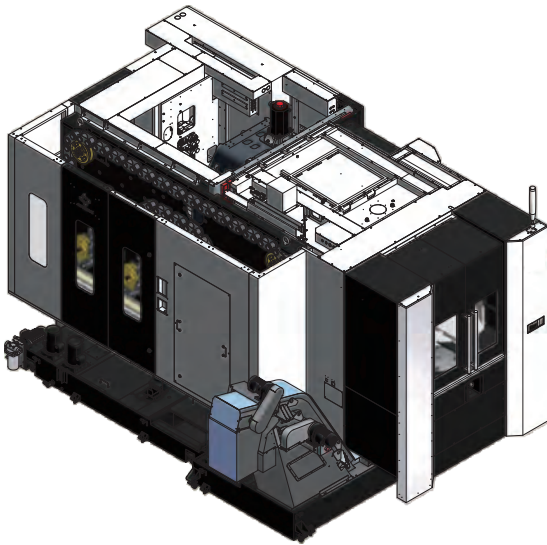
**HMX550**  
Unit : mm [inch]

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"]



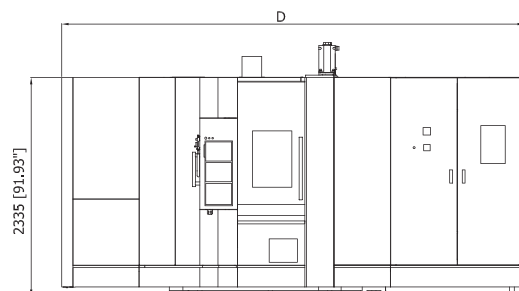
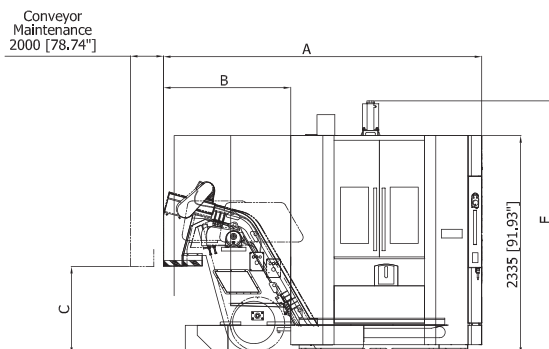
**HMX400 / HMX 500**

Unit : mm [inch]



**HMX400 / HMX 500 / HMX550**

Unit : mm [inch]



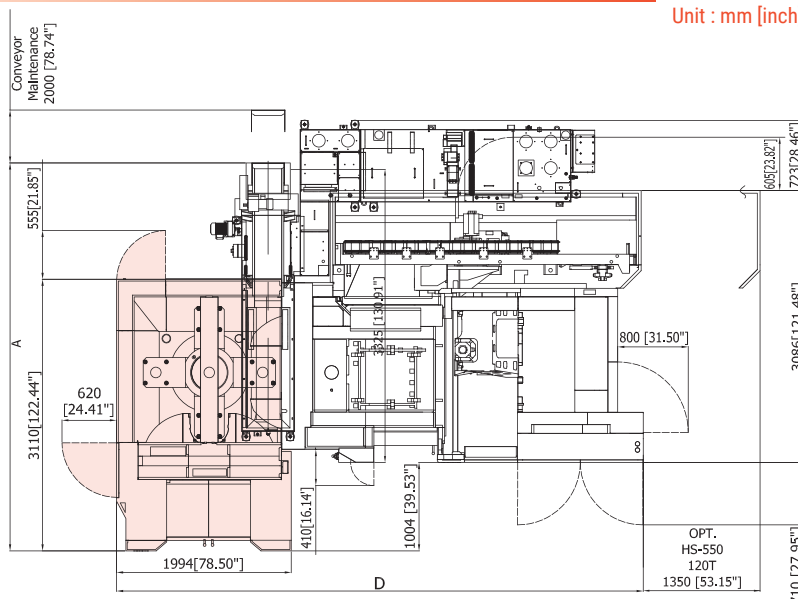


## 6 APC Machines

### HMX550

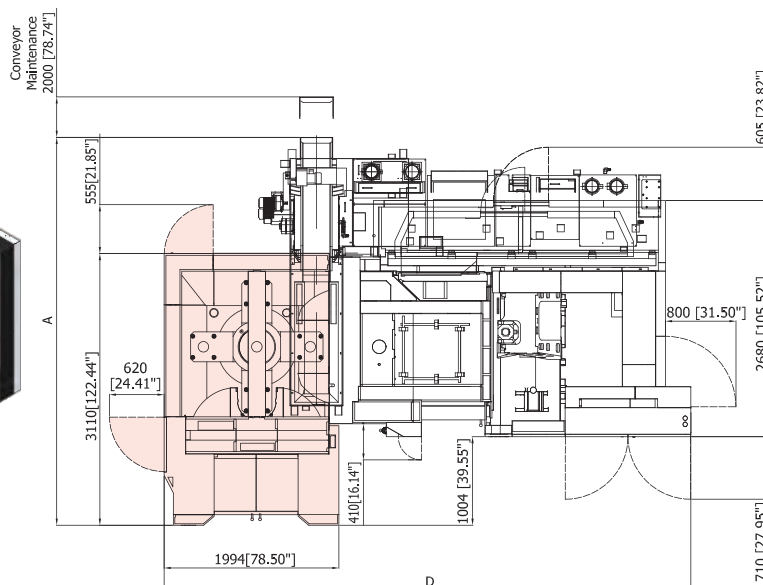
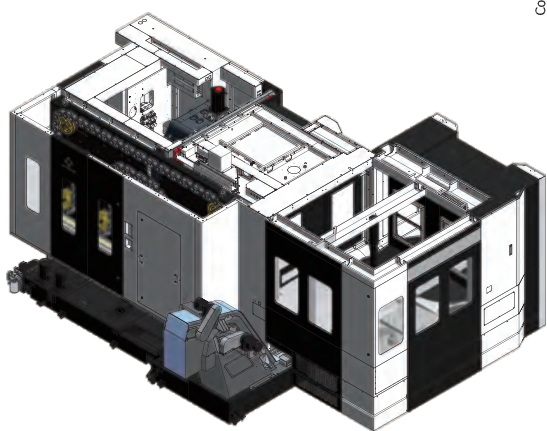
Unit : mm [inch]

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"]	
E	Machine Dimension: H	2600 mm [102.36"]	2706 mm [106.54"]	2942 mm [115.83"]



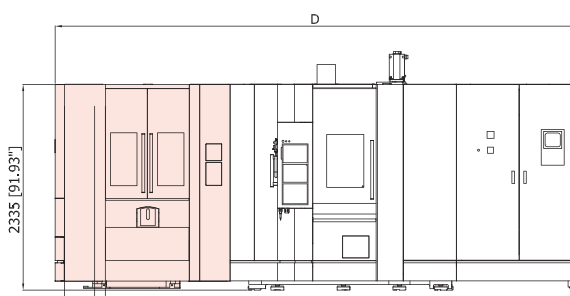
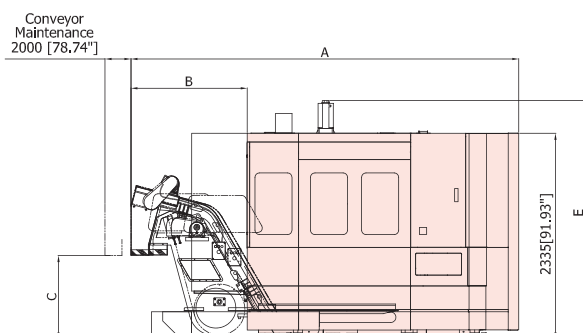
## HMX400 / HMX 500

Unit : mm [inch]



## HMX400 / HMX 500 / HMX550

Unit : mm [inch]



# 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]	
Workpiece 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]	2.5 sec [3.5 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				
ATC Extension	40T	●	●	✕
	60T	○	○	●
	80T	○	○	○
	100T	✕	✕	○
	120T	✕	✕	○
Tool Shank Type	BBT40	●	●	✕
	BBT50	✕	✕	●
	CAT40	○	○	✕
	CAT50	✕	✕	○
	DIN69871A-40	○	○	✕
	DIN69871A-50	✕	✕	○
	HSK63A	○	○	✕
	HSK100A	✕	✕	○
Table, APC & Pallet				
APC	2 APC	●	●	●
	6 APC	○	○	○
Pallet Size	400mm x 400mm	●	○	○
	500mm x 500mm	○	●	●
B Axis Table	1°	●	●	●
	0.001°	○	○	○
Coolant System				
Spindle Through Coolant	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		●	●	●
Chip Conveyor	Steel Belt Type	○	○	○
	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 OiF-Plus (15" Color LCD with iHMI)		●	●	●
Fanuc 31iMB		○	○	○
ETC				
Leveling Block and Screws		●	●	●
Maintenance Tools		●	●	●
Manuals		●	●	●
Window Spinner		○	○	○
Energy Saving Function		○	○	○
CE Certified EN ISO 13849-1		○	○	○