

# H X Series

HMX630

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The new high-speed, high productivity horizontal machining center

HMX 630

#### 02 Product Preview

#### **Basic Information**

- 03 Basic Structure
- 05 Body Structure
- 07 Spindle
- 09 Feed Axes
- 11 Automatic Tool Change
- 13 APC & Pallet

#### **Machine Information**

- 17 User Convenience
- 19 Diagrams
- 21 Machine Specification

# CONTENTS



#### 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 50m/min provides maximum productivity.



#### **Excellent extendibility**

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





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



# **Basic Structure**



#### **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.



#### High speed, stable axis structure

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

### **APC system and pallet**

The HMX series provides flexibility with 6 pallet APC as option. Servo driven APC guarantees fast and precise pallet change.

# 02

#### **Superior thermal stability**

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



### ATC and magazine

2.5 second tool change time (T-T) is realized by servo motors. 60 tools are provided as standard, in addition to various options.





**50/50/50 m/min** Rapid traverse (X/Y/Z-axis)



**mm** Table size

# 1050/900/1020

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

0.7G/1.0G/0.9G

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





## **Τ**ΑΚυΜΙ

# 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.

#### tograted had frame ansures high rigidity

### Stepped-guide bed structure

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



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.



#### **Cooled spindle motor seat**

The motor seat is equipped with a cooling design that isolates the heat generated by the spindle motor and reduces thermal displacement.





## Spindle Power - Torque Curve



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

25/45 kW Power (Cont./S3-25%) 420/600 N.m Torque (15min/S3-15%)



## 8,000rpm Direct drive spindle (OP)

37/55 kW Power (Cont./S3-25%) 553/1202 N.m Torque (Cont./S3-10%)






#### **Roller-type LM guideway**

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

## HMX630

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**50/50/50 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. Oversize Ø50 mm ballscrews provide rigidity and accuracy during heavy cutting.

## HMX630

# 0.7G/1G/0.9G

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

### Thermal stability on ballscrews, bearings and Y-axis motor seat

Precision of the drive systems are achieved by using core-cooled ballscrew (TSUBAKI®). Speed and accuracy are enhanced with the cooled servo motor seat, ballscrew nut and bearings which minimizes thermal error of ballscrews.



# **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.

### 

5 SEC Tool change time (T-T)

Tool to tool time**5.8**Sec<br/>Tool change time (C-C)

Chip to chip time



### HMX630 tool storage capacity

The tool magazine can store up to 60 tools as standard and up to maximum 120 as option. Servo driven magazine ensures fast and reliable tool indexing. Magazine indexing is also available at high/low speed.



# Superior cutting performance

	E	
	Face milling	
4,800cc/min	2 2cc min	810cc/min
Aluminum 6061	Steel (S45C)	Steel (S45C)
10,000rpm	320rpm	6 rpm
Ф100mm x Т	Ф160mm x Т	Ф12 mm x Т
12,000mm/min	256mm/min	3,240mm/min
80mm/ 5.0mm	125mm/ 8.5mm	100mm/ 2.5mm
Rigid tapping		Drilling
Steel (S45C)		Steel (S45C)
58rpm		Orpm
M56 x 5.5P		Φ 0mm x 2T
319mm/min	- 4	188.4mm/min
	4,800cc/min Aluminum 6061 10,000rpm Φ100mm x T 12,000mm/min 80mm/ 5.0mm <b>Rigid tapping</b> Steel (S45C) 58rpm M56 x 5.5P 319mm/min	4,800cc/min 2 2cc min   Aluminum 6061 Steel (S45C)   10,000rpm 320rpm   Φ100mm x T Φ160mm x T   12,000mm/min 256mm/min   80mm/ 5.0mm 125mm/ 8.5mm   Rigid tapping   Steel (S45C) 58rpm   58rpm M56 x 5.5P   319mm/min 250mm/min

**HMX630** 

# Tool specifications



#### High accuracy pallet clamping system

Repeated accuracy of 3µm 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 6,400kgf clamping force.







#### High speed hydraulic motor driven APC system

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





#### **Rigid cutting with shorter tool**

The distance between spindle nose to the center of the pallet is minimized to 50mm. With this design, tool rigidity for heavy-duty machining can be increased. In addition, Z-axis displacement at high speed cutting will be minimized.



1°standard / 0.001 °option

B-axes indexing angle

#### 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.



#### Flexible APC systems option

HMX offers 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 hydraulic 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.

## HMX630 1140 mm width of the door

#### **Convenient Swivel Operation Panel**

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





#### **Powerful Shower Coolant**

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



### Minimum Interval Between Pallet and Operator

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

### **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.





6 spindle coolant nozzles

30 bar coolant through spindle



Spindle air blast

Spindle air blast (tool changing)

## **Z-axis Central Chip Disposal**

Chip removal efficiency is greatly enhanced thanks to the belt type chip conveyor which is located at center of the base.



- Distance to the center of the pallet: 610mm
- Distance from floor surface to pallet surface: 1,340mm
- Door opening:

1,140mm



#### **Flush Coolant System**

It flushes all cutting chips towards the central chip disposal.



# Table Dimension

– Unit : mm [inch]





# Working Area



Item	Spindle	10,000rpm	8,000rpm
у	Y-axes Travel	900mm [35.4"]	880mm [34.6"]
Х	X-axes Travel	1050	mm [41.3"]
Z	Z-axes Travel	1020mm [40.2"]	
Sz	Spindle Nose to Pallet Center	50mm [2.0"]	
Sy	Spindle Center to Pallet Surface	80mm [3.1"]	100mm [3.9"]
ly	Y-axes Interference	210mm [8.3"]	260mm [10.2"]
lz	Z-axes Interference	315mm [12.4"]	
Wh	Max. Workpiece Height	1300mm [51.2"]	
Wd	Max. Workpiece Diameter	1000mm [39.4"]	

# Tool Shank

Tool Restriction	BBT	CAT	DIN
Max. Tool Diameter		Φ115mm [4.53"]	
Max. Tool Length		600mm [23.62"]	
Max. Tool Weight		25kg [55lb]	
Max. Tool Diameter (no adjacent tools)		Ф300mm [11.81"	]
Pull Studs	JIS50P M24x3P	DIN 69872(UNC) 1"-8UNC	DIN69872 M24x3P

#### With adjacent tool(s)

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Without adjacent tool(s)







A= Height of chip conveyor; B= Height of chip outlet; C= Width of coolant tank and chip conveyor

### 6 APC with 60 Tool ATC



A= Height of chip conveyor; B= Height of chip outlet; C= Width of coolant tank and chip conveyor

# Machine Specification

Travel	HMX630
X/Y/Z-axis	1,050 / 900 / 1,020mm
Spindle center to pallet surface	80 - 980mm
Spindle nose to pallet center	50 - 1,070mm
Pallet top height (from the floor)	1,330mm
Table	
Table Size	630 × 630mm
Workpiece max. size	1,000mm x 1,300mm
Max. load	1,200kg
Configuration	M 16 × 30L, P=125mm
Min. Indexing degree [UP]	1 [U.UU1] 2 2soc/00°[2 0soc/00°]
B-axis clamping torque	49 000Nm
Pallet clamping system	Mechanical Lock
Pallet clamping force	16kN x 4 cones
Spindle	
Spindle speed	20 ~ 10,000rpm
Spindle rated torque	600Nm (15% ED) / 420Nm (15 min.)
Spindle acceleration/deceleration	5.5sec
Spindle taper	ISO 7/24 Taper NT No. 50
I hrough spindle coolant	3.0Mpa
Feed	
Rapid feed (X/Y/Z)	50,000mm/min
Cutting feed (X/Y/Z)	1~50,000mm/min
Table rotating speed	Parkson: 16.6rpm / Tsudakoma: 22.2rpm
Guide ways $(X/Y/Z)$	Roller ways
Acceleration (X/Y/Z)	0.7671.0670.96
ATC	
Type of tool shank [OP]	BB150 [CA150]
Number of tools	JIS [CAI 50] 60
Max tool diameter	00
(Adjacent pots full/empty)	Ø115mm / Ø300mm
Max. tool length	600mm
Max. tool weight	25kg
Tool selection system	Random
lool to tool	2.5sec [3.5sec, heavy tool]
	5.8Sec [6.8Sec, neavy tool]
APC	0.[4]
Number of pallets [UP]	2 [6] Potation
APC exchange rotating time	15sec
Mataza	
Spindle motor	15/37L/M
Feed axes motors (X/V/7/B)	43/37KW 5 5/5 0/5 5/4 0kW
Lubrication pump motor	18W
Spindle coolant pump	1.62kW
Through spindle coolant pump	2.03kW
Chips flush (base) coolant pump	2.24kW
Overhead shower flush coolant pump	2.35kW
Hydraulic pump	2.23kW
Supply	200 2201/
Electric voltage	200 ~ 230V 7∩kVΔ
Air pressure	0.6Mpa
Air volume	660L/min
Tank	
Hydraulic unit tank	60L
Lubrication unit tank	3.0L
Coolant tank	1,000L
Size	
Machine dimension (L×W×H)	6,877 × 4,105 × 3,364mm
Required floor space (L×W×H)	7,677 x 5,595 x 3,364mm
Machine weight	18,200kg

# Standard & Optional

●: Standard : ○: Option × : Non Applicable

Spindle		HMX630
10,000rpm		•
8,000rpm		0
ATC		
	60T	•
ATC EXternion	120T	0
Tool Charly Type	BBT50	•
тоог знанк туре	CAT50	0

#### Table, APC & Pallet

ADC	2 APC	•
AFC	6 APC	0
Pallet Size	630mm x 630mm	•
DA : T	1°	•
B Axis Table	0.001°	0
		-

#### **Coolant System**

Spindle Through Coolant	JUDAI	•
Spinule milough Coolant	70bar	0
Spindle Air Blast		•
Spindle Thermal Compensation		٠
Cutting Air Blast		•
Coolant Shower (14 Nozzles)		•
Chiller for Coolant Tank		0

#### **Chip Disposal**

	Steel Belt Type	0
Chip conveyor	Scraper Type	•
	Magnetic Scraper Type	0
	Dual Belt Roller Type	0
Coolant Tank		•
Full Chip Enclosure		•
Enclosed Guideway Covers		•
Dual Chip Augers		•

#### Feed Axes

Linear Scales (X/Y/Z/B)	0

#### **Electric Device**

3-Color Signal light	•
Working Light	•
Sealed Electric Cabinet	•
Heat Exchanger for Electric Cabinet	•
A/C for Heat Exchanger of Electric	0

#### **Measuring Device**

•	
Coolant Tank Detection	•
Laser Tool Measurement	0
Tool Breakage Detection	0
Workpiece Measurement	0
Tool Measurement	0

#### Environment

Oil Skimmer	•
Oil Mist Collector	0

#### **Fixture & Automation**

Hydraulic Overhead Arms for Fixtures	0
Air Sealing Detection for Fixture	0
Hydraulic Thru Pallet for Fixtures	0
Additional Hydraulic Thru Pallet	0
Automatic Pallet Indexing at Loading Zone	0

#### **Safety Device**

Safety Door	•
Control	

Fanuc 0iF-Plus (15" Color LCD with iHMI)	٠
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EIC	
Leveling Block and Screws	•
Maintenance Tools	•
Manuals	•
Window Spinner	0
Automatic power on/off and warm-up	•
within 7 days	•
CE Certified	0

21





## **TAKUMI** When Precision Matters





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





