Make same to different

KAOMING

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H E P H A E S T U S

KAOMING

H M A & H Series

Box Way Series Machining Center

M I N E R V A

CONTENTS

KAOMING

Rigorous Craftsmanship • Unshakable Quality

An ancient civilization that had not yet discovered the wheel, iron, or even writing, managed to build countless massive stone fortresses. On the stone walls of the Inca ruins, blocks weighing tens or even hundreds of tons fit together so precisely that not even a piece of paper could be inserted between them—without any paint or adhesive.

Through ingenious interlocking joinery, the wisdom of the Inca civilization enabled stones to support one another with extraordinary strength. Their remarkable durability has withstood centuries of earthquakes, remaining steadfast to this day.

Inheriting a Pure Lineage • The Art of Scraping

The origin of a civilization, the prosperity of an era, and the foundation of a nation are rooted in the birth of machine tools and the growth of industry. Through generations of evolution and innovation, machine tools have advanced into today’s gantry-type machining centers.

Every meticulous stroke creates a smooth, seamless sliding motion. Forged through more than half a century of refinement, they perfectly inherit the pure lineage of the double-column tradition. The precise flatness and alignment breathe new life into Kaoming’s spirit and enduring craftsmanship.

High-Rigidity Structure & High Positioning Accuracy

Dual Guideway Base

For models with a width of 2.1 meters or less, a dual-guideway base design is adopted. The slideways are lined with Turcite-B wear-resistant material, providing excellent vibration absorption. Precision hand-scraping ensures dynamic rigidity during heavy cutting. The mechanical structure is fully planned and designed, and validated through FEA (Finite Element Analysis), offering outstanding rigidity. This makes it suitable for high-speed, high-load operations and ensures an extended service life.

Hand-Scraping Technology

To ensure the machine achieves the highest precision standards, hand-scraping technology is an essential process. The geometric accuracy between structural components—including verticality, parallelism, and flatness—is achieved through the meticulous skill of experienced hand-scraping technicians, who carefully carve each stroke by hand. The contact ratio of scraping points per unit area fully meets the highest standards for precision machinery. Combined with advanced precision measuring instruments, the hand-scraping process fine-tunes both static and dynamic accuracy, bringing the machine to its optimal performance state.

Four-Guideway Base

For machining large workpieces, extremely high load-bearing capacity is required. Machines with a gantry width of 2.3 meters or more adopt a four-rail base design, featuring a special combination of sliding and rolling mechanisms to support heavier and larger workpieces.

The central two rails use square hard-rail sliding surfaces as the main support, with Turcite-B wear-resistant liners for superior vibration damping. Precision hand-scraping ensures excellent dynamic rigidity during heavy cutting.

The two side guideways also feature box-type hardened rails, paired with roller-type adjustable self-aligning track bearings as auxiliary supports, reducing transmission load and improving efficiency. Additionally, track bearings are installed at the front and rear ends of the worktable slideways, allowing fine adjustments of the table's geometric accuracy and facilitating after-sales service. To meet the hardness requirement of HRC 58 ° or higher for the track bearing mounting surface, the hardened rails are either bolted steel guideways fixed to the cast base, or copper-inlaid hardened rails welded onto the base.

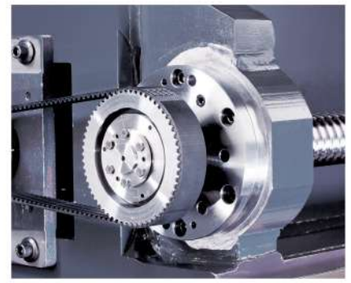
01. Precision hand-scraped sliding surfaces.

02. Roller-type recirculating bearing.

03. Optimized new column design increases contact area with the floor, significantly enhancing support stability and ensuring the machine's overall rigid structure.

Integrated Ball Screw Support

The installation of the Y- and Z-axis ball screws adopts a design where both the front and rear support seats are cast integrally with the crossbeam and saddle. This ensures maximum rigidity and precision.

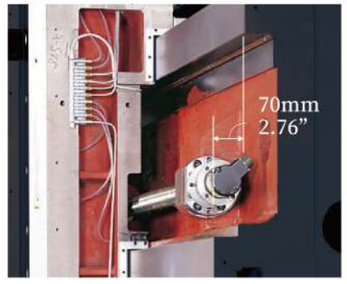


Torque Overload Safety Device

The mechanical torque limiter ensures that in the event of accidental collisions or operator error, critical machine components are protected from damage.

85 mm Minimum Spindle Center Distance Design

The distance between the spindle center and Z-axis slideway is minimized to just 85 mm, effectively reducing thermal deformation from spindle heat and cutting-induced torque. This enhances machining accuracy and structural stability. (Available on H7 / H8 / HA8 models only)



Y-Axis Stepped Guideway Design

The upper and lower Y-axis box ways are offset by 70mm in a stepped design. This prevents the spindle head from tilting forward and distributes part of the Y-axis thrust to the column. This optimized arrangement ensures the spindle head remains highly stable under heavy cutting loads.

Inner-cooled Ballscrew

All models adopt high-precision, preloaded, dual-nut ball screws. For X-axes of 2–5 meter models, ineer-coooled ballscrews are used, allowing cooling oil to circulate and reduce thermal deformation caused by spindle heat, thereby improving positioning accuracy. Additionally, the head and tail supports of each X-axis ball screw feature a special design with air-cooled bearing outer rings. This dual cooling method is unique among all integrated machining centers.

(Note: For 6- and 8-meter models, X-axis ball screws use nut cooling, reducing thermal expansion and ensuring optimal positioning accuracy.)

Ball Screw Support System

For machines with longer X-axis travel (5 to 8 meters), a specialized support mechanism is adopted to counterbalance the ball screw's own weight, ensuring optimal feed performance. (Standard accessory)

Three-Axes External Encoder

For 2-meter models, the X-axis feed system uses direct-drive transmission: the servo motor connects directly to the ball screw via a coupling. For X-axis feed systems of 3-meter and larger models, the servo motor connects to the hollow ball screw through a reducer, with the encoder mounted externally on one end of the ball screw. This design ensures positioning accuracy during high-speed repeatable movements without being affected by thermal deformation. The Y- and Z-axis feed systems of all models also feature external encoders, with reducers using a 2:3 ratio pulley and timing belt transmission.

(Note: HA11 series does not include 2-meter version)

Minerva series

The owl of Minerva spreads its wings only with the falling of the dusk.

KMC-HMA

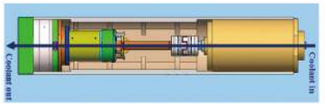
The ultimate in box way systems — a new era beyond traditional production lines. Its superior rigidity enables both elegant and flexible machining, compatible with various auxiliary heads for diverse processing modes. Like a battlefield titan, the KMC MINERVA SERIES leads you into the next age of industrial evolution.

Main Machine Features

400x400RAM

Optimal Spindle System Design

- Rigidity and stability improved by 32%.
- The spindle head is made of high-strength, square-column cast iron, ensuring rigidity and stability during heavy cutting. The uniquely designed spindle head features thermal symmetry, minimizing thermal displacement.



IDD Integrated Spindle Motor Design

- The spindle and spindle motor adopt an isolated design to reduce heat transfer and enhance spindle performance.

  Spindle speed: 6000 rpm / 8000 rpm

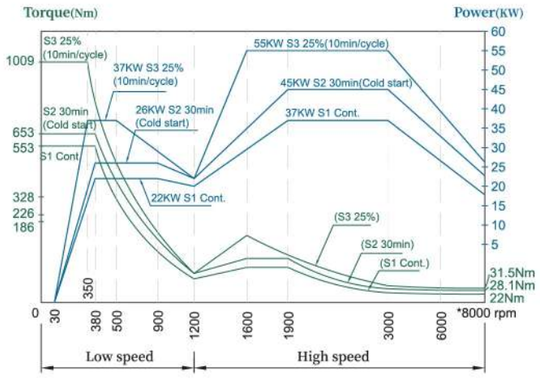
  Max torque: 653 Nm

  Spindle power: 30 / 35 HP

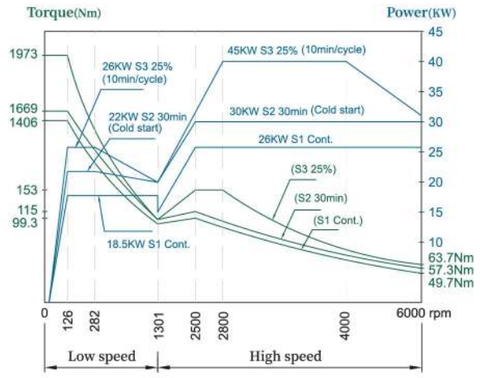
High-Performance Head Magazine

- The optional configuration can accommodate up to seven additional heads, achieving the machining efficiency of an entire production line with a single machine.

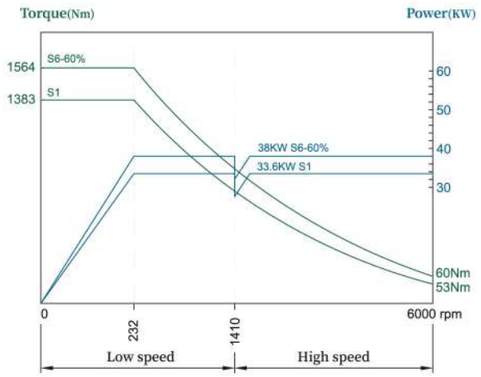
KMC-HMA15/HMA11 Spindle Torque Diagram



6000/*8000rpm

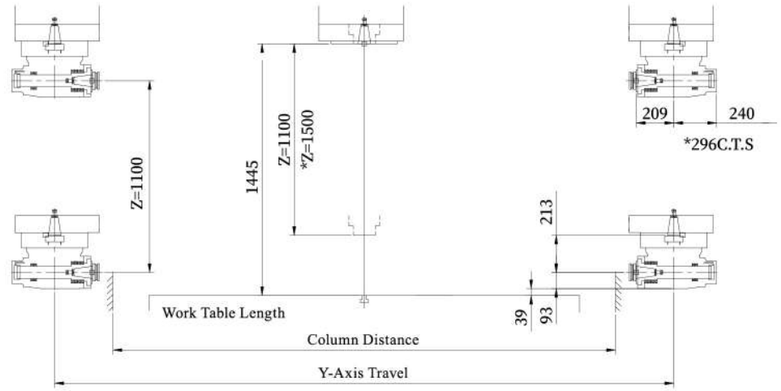


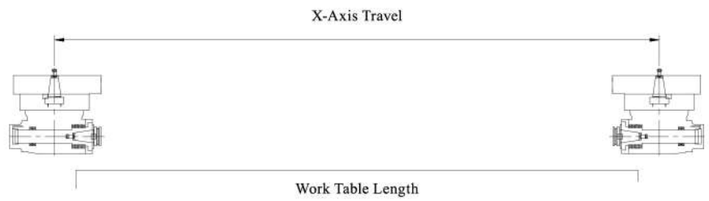
6000rpm – Equipped with two-speed gearbox (OPT.)



6000rpm – Equipped with Siemens motor & two-speed gearbox (OPT.)

KMC-HMA15/HMA11 Machining Range





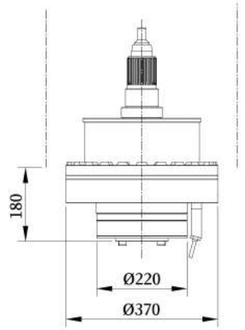
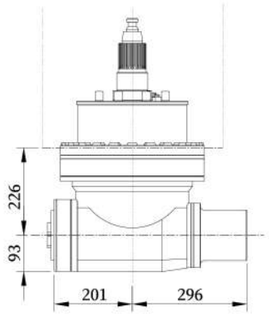
Unit : mm

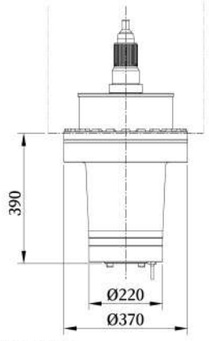
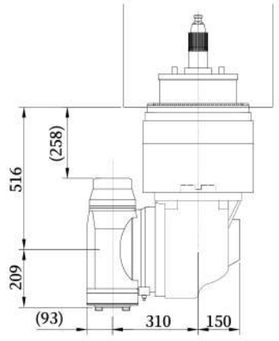
Column Distance	1800	2100	2300	2500	2800	3200	3600
Y-Axis Travel	2450	2750	2950	3150	3450	3850	4250

Unit : mm

Table Length	3000	4000	5000	6000	8000
X-Axis Travel	3230	4230	5230	6230	8230

Attachment Head Applications (Overview)

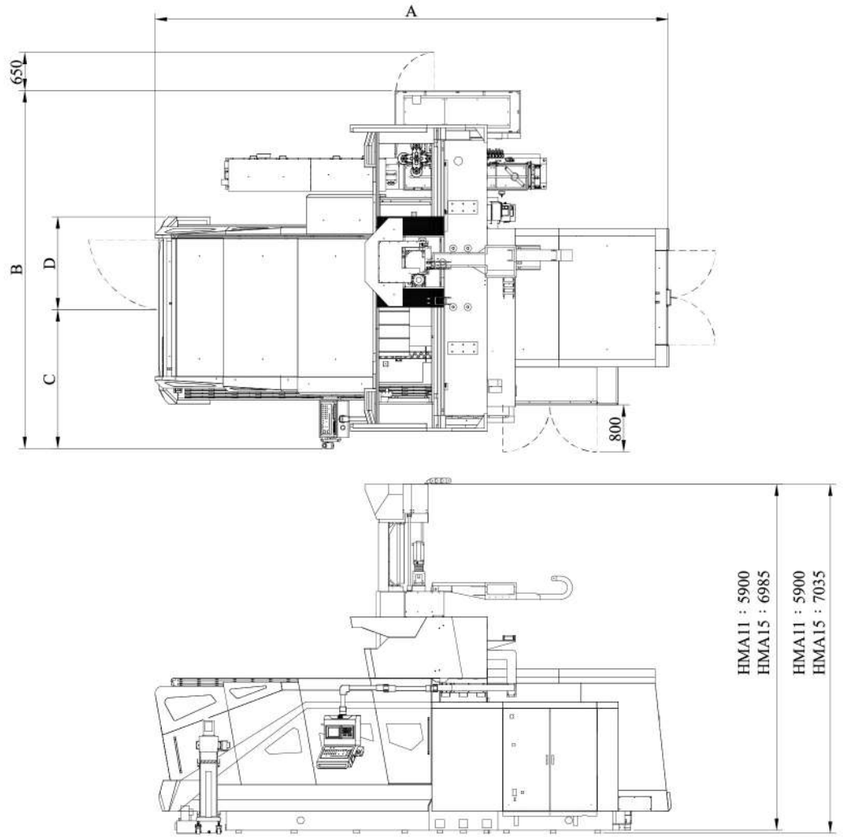
Item	Vertical Head	Horizontal Head
Appearance		
Max Speed	6000/*8000 rpm	3500 rpm
Max. Power	22/25kw	18.5/22kw
Application	Powerful vertical cutting	Powerful horizontal cutting
Dimensional Drawing		

Item	*Extension Head	*Automatic Indexing Universal Head
Appearance		
Max Speed	4000 rpm	3500 rpm
Max. Power	22/26kw	25kw
Application	For narrow processing with deep cutting	For tilting surface cutting
Dimensional Drawing		

* Optional Accessory

Unit : mm

KMC-HMA15/HMA11 Floor Space Diagram



Model		A	B	C	D
HMA15 / HMA11 series	318	9125	5746	2200	1430
	321		6046	2350	1580
	323		6246	2450	1680
	325		6446	2550	1780
	328		6746	2820	1860
	332		7146	3020	2060
	418	11145	5746	2200	1430
	421		6046	2350	1580
	423		6246	2450	1680
	425		6446	2550	1780
	428		6746	2820	1860
	432		7146	3020	2060
	436		7546	3220	2260
	518	13195	5746	2200	1430
	521		6046	2350	1580
	523		6246	2450	1680
	525		6446	2550	1780
	528		6746	2820	1860
	532		7146	3020	2060
	536		7546	3220	2260

Model		A	B	C	D
HMA15 / HMA11 series	618	15445	5746	2200	1430
	621		6046	2350	1580
	623		6246	2450	1680
	625		6446	2550	1780
	628		6746	2820	1860
	632		7146	3020	2060
	636		7546	3220	2260
	818	20245	5746	2200	1430
	821		6046	2350	1580
	823		6246	2450	1680
	825		6446	2550	1780
	828		6746	2820	1860
	832		7146	3020	2060
	836		7546	3220	2260

Unit : mm

HMA15/HMA11 Machine Specifications

Item	Model No.	318 HMA	321 HMA	323 HMA	325 HMA	328 HMA	332 HMA	418 HMA	421 HMA	423 HMA	425 HMA	428 HMA	432 HMA	436 HMA	518 HMA	521 HMA	523 HMA	525 HMA	528 HMA	532 HMA	536 HMA
Working Table	Distance between Columns (mm)	1800	2100	2300	2500	2800	3200	1800	2100	2300	2500	2800	3200	3600	1800	2100	2300	2500	2800	3200	3600
	Working Table Surface (mm) Width	1650		2000		2400	2600	1650		2000		2400	2600	3000	1650		2000		2400	2600	3000
	Working Table Surface (mm) Length	3000						4000							5000						
	Max. Load Capacity (t)	11	12	15/*20				13	14	16/*20					15	18/*22					
Travel	X-axis (Table, Longitudinal) (mm)	3230						4230							5230						
	Y-axis (Spindle, Lateral) (mm)	2450	2750	2950	3150	3450	3850	2450	2750	2950	3150	3450	3850	4250	2450	2750	2950	3150	3450	3850	4250
	Z-axis (Spindle, Vertical) (mm)	1500(HMA15)/1100(HMA11)																			
	Distance from Vertical Spindle Nose to Table Surface (mm)	346~1846(HMA15)/346~1446(HMA11)																			
	Distance from Horizontal Spindle Center to Table Surface (mm)	300~1800(HMA15)/300~1400(HMA11)																			
Spindle	Spindle Speed Vertical	6000 (*8000)rpm																			
	Spindle Speed Horizontal	3500rpm																			
	No. of Spindle Speed	IDD																			
	Spindle Taper (Vertical / Horizontal)	ISO 50																			
	Spindle Motor (Continuous / 30 min / S3 10 min)	AC 22/26/37kw (30/35/50HP)																			
	Max. Spindle Torque (Continuous / 30 min / S3 10 min)	553/653/1009Nm																			
Feed rate	Rapid Feed rate (m/min) X	12						10							8						
	Rapid Feed rate (m/min) Y	12			10			12			10	8			12				10	8	
	Rapid Feed rate (m/min) Z	10																			
	Cutting Feed (mm/min)	1-8000													1-5000						
Automatic Tool Changing System (ATC) (V/H)	Tool Shank Shape	MAS403-BT50																			
	Pull Stud	MAS-P50T-1																			
	Tool Magazine Capacity	30 (*40, *50, *60, *90)																			
	Max. Tool Diameter (Without Adjacent Tools)	Ø130mm, ((Ø200))mm																			
	Max. Tool Length (V/H)	350mm/300mm																			
	Max. Tool Weight (V/H)	20kg/15kg																			
Automatic Horizontal Indexing Head	Indexing	90°×4 (*5°×72)																			
	Indexing Repeatability	±3sec																			
Mechanical Dimensions	Machine Height (mm)	6985(HMA15)/5900(HMA11)																			
	Floor Space (L × W) (mm) Lengt	9125						11145							13195						
	Floor Space (L × W) (mm) Width	5746	6046	6246	6446	6746	7146	5746	6046	6246	6446	6746	7146	7546	5746	6046	6246	6446	6746	7146	7546
	Net Weight (t) HMA15	38.5	40.5	46.5	47.5	48.5	50.1	44.5	45.5	51.5	52.5	53.5	54.8	61	48.5	49.5	58.5	59.5	60.5	62	66.5
	Net Weight (t) HMA11	32.5	34.5	40.5	41.5	42.5	44.1	38.5	39.5	45.5	46.5	47.5	48.8	55	42.5	43.5	52.5	53.5	54.5	56	60.5
Others	Power Supply	70KVA (*80KVA)																			
	Air Supply	5~7kg/cm²																			
	CNC Controller	FANUC 0i (*31i) series , *HEIDENHAIN , *SIEMENS ,*MITSUBISHI																			

*Special Specification (()) Max. tool diameter (withouth adjacent tools)

KAOMING reserves the right to modify the above specifications at any time.

HMA15/HMA11 Machine Specifications

Item	Model No.	618 HMA	621 HMA	623 HMA	625 HMA	628 HMA	632 HMA	636 HMA	818 HMA	821 HMA	823 HMA	825 HMA	828 HMA	832 HMA	836 HMA
Working Table	Distance between Columns (mm)	1800	2100	2300	2500	2800	3200	3600	1800	2100	2300	2500	2800	3200	3600
	Working Table Surface (mm) Width	1650		2000		2400	2600	3000	1650		2000		2400	2600	3000
	Working Table Surface (mm) Length	6000							8000						
	Max. Load Capacity (t)	16		20/*25					18		22/*28				
Travel	X-axis (Table, Longitudinal) (mm)	6230							8230						
	Y-axis (Spindle, Lateral) (mm)	2450	2750	2950	3150	3450	3850	4250	2450	2750	2950	3150	3450	3850	4250
	Z-axis (Spindle, Vertical) (mm)	1500(HMA15)/1100(HMA11)													
	Distance from Vertical Spindle Nose to Table Surface (mm)	346~1846(HMA15)/346~1446(HMA11)													
	Distance from Horizontal Spindle Center to Table Surface (mm)	300~1800(HMA15)/300~1400(HMA11)													
Spindle	Spindle Speed Vertical	6000 (*8000)rpm													
	Spindle Speed Horizontal	3500rpm													
	No. of Spindle Speed	IDD													
	Spindle Taper (Vertical / Horizontal)	ISO 50													
	Spindle Motor (Continuous / 30 min / S3 10 min)	AC 22/26/37kw (30/35/50HP)													
	Max. Spindle Torque (Continuous / 30 min / S3 10 min)	553/653/1009Nm													
Feed rate	Rapid Feed rate (m/min) X	7													
	Rapid Feed rate (m/min) Y	12			10	8		12				10	8		
	Rapid Feed rate (m/min) Z	10													
	Cutting Feed (mm/min)	1-5000													
Automatic Tool Changing System (ATC) (V/H)	Tool Shank Shape	MAS403-BT50													
	Pull Stud	MAS-P50T-1													
	Tool Magazine Capacity	30 (*40, *50, *60, *90)													
	Max. Tool Diameter (Without Adjacent Tools)	Ø130mm, ((Ø200))mm													
	Max. Tool Length (V/H)	350mm/300mm													
	Max. Tool Weight (V/H)	20kg/15kg													
Automatic Horizontal Indexing Head	Indexing	90°×4 (*5°×72)													
	Indexing Repeatability	±3sec													
Basic Specifications	Machine Height (mm)	6985(HMA15)/5900(HMA11)													
	Floor Space (L × W) (mm) Lengt	16165							21320						
	Floor Space (L × W) (mm) Width	5746	6046	6246	6446	6746	7146	7546	5746	6046	6246	6446	6746	7146	7546
	Net Weight (t) HMA15	53.5	54.5	63.5	64.5	65.5	68.5	72.5	67	69	76.5	78	80	84	90
	Net Weight (t) HMA11	47.5	48.5	57.5	58.5	59.5	62.5	66.5	61	63	70.5	72	74	78	84
Others	Power Supply	70KVA (*80KVA)													
	Air Supply	5~7kg/cm²													
	CNC Controller	FANUC 0i (*31i) series , *HEIDENHAIN , *SIEMENS ,*MITSUBISHI													

*Special Specification (()) Max. tool diameter (withouth adjacent tools)

KAOMING reserves the right to modify the above specifications at any time.

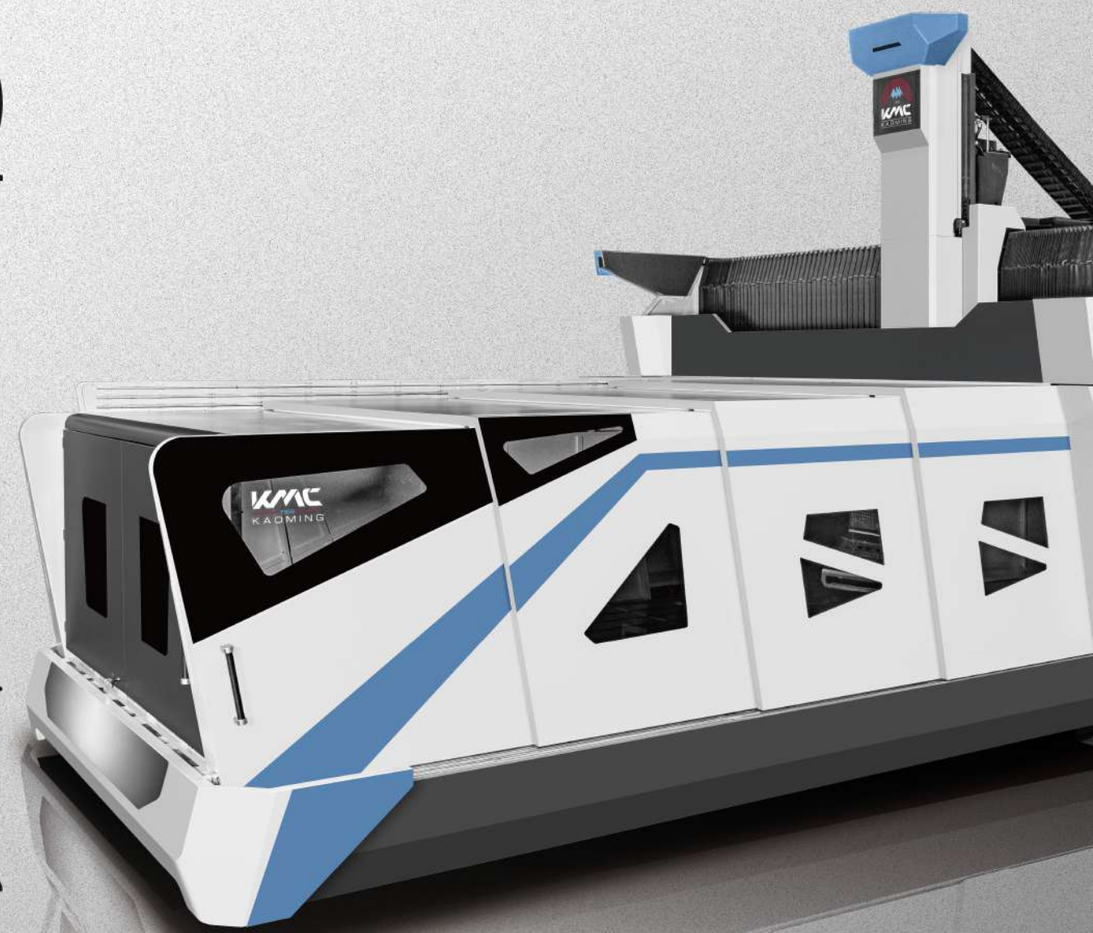
Hephaestus

Year by year, our product has become a spirited life, which is connected with quality, steadfastness, and excellence, simple but perfect craftsmanship.

KMC

HA14 / HA11

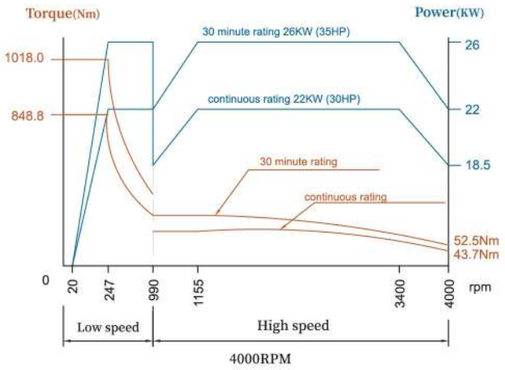
The upgraded spindle interface enhances compatibility with multiple attachment heads, delivering greater flexibility and efficiency in multi-face machining of large-scale components.



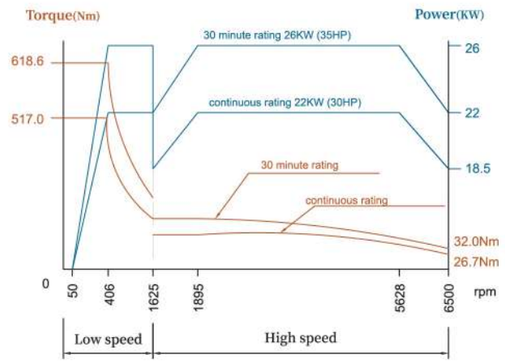
KMC-HA14/HA11 Spindle Torque Diagram

FANUC Spindle Motor

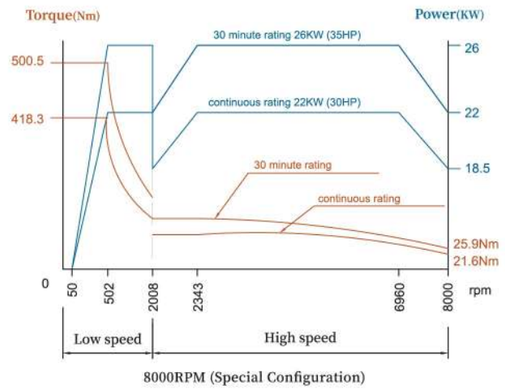
α22i, 22/26KW（30/35HP）



4000RPM



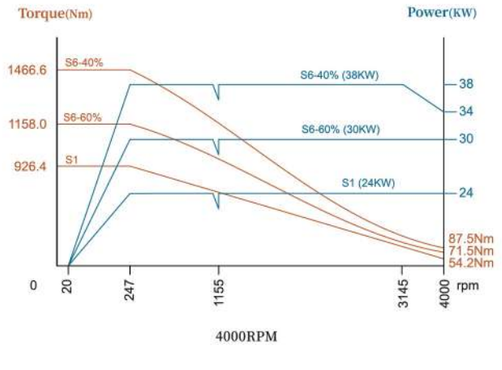
6500RPM (Special Configuration)



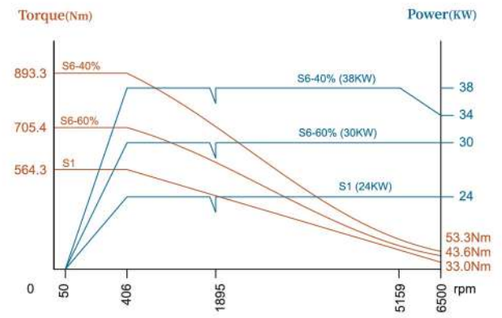
8000RPM (Special Configuration)

HEIDENHAIN Spindle Motor

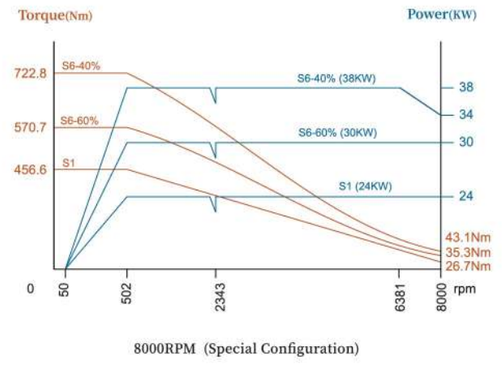
QAN260U, 24/30/38KW



4000RPM



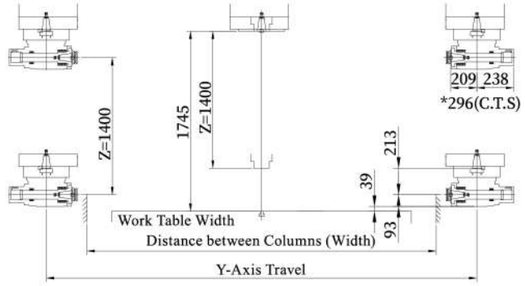
6500RPM (Special Configuration)

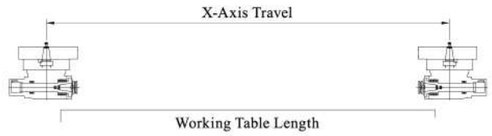


8000RPM (Special Configuration)

KMC –HA14/HA11 Machining Range

KMC-HA14





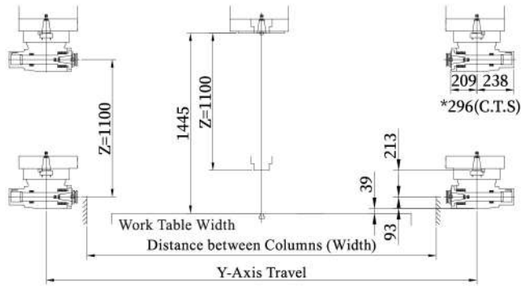
Unit : mm

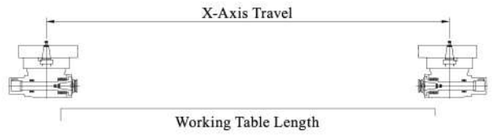
Distance between Columns	2800	3200	3600
Working Table Width	2400	2600	3000
Y-Axis Travel	3450	3850	4250

Unit : mm

Working Table Length	3000	4000	5000	6000	8000
X-Axis Travel	3230	4230	5230	6230	8230

KMC-HA11





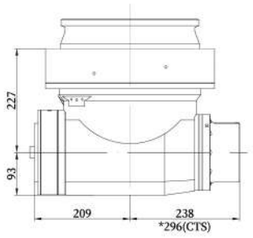
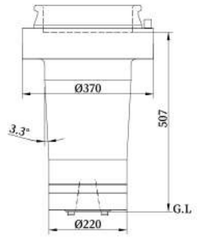
Unit : mm

Distance between Columns (Width)	1800	2100	2300	2500
Y-Axis Travel	2450	2750	2950	3150

Unit : mm

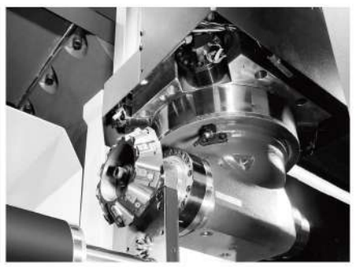
Working Table Length	3000	4000	5000	6000	8000
X-Axis Travel	3230	4230	5230	6230	8230

Attachment Head Application (Overview)

Item	Horizontal Head	*Extension Head
Appearance		
Max Speed	3500 rpm	4000 rpm
Max. Power	18.5/22kw	22/26kw
Application	Powerful horizontal cutting	For Narrow Processing with Deep Cutting
Dimensional Drawing		

* Optional Accessory

Unit : mm



High-Speed and Powerful ATC System

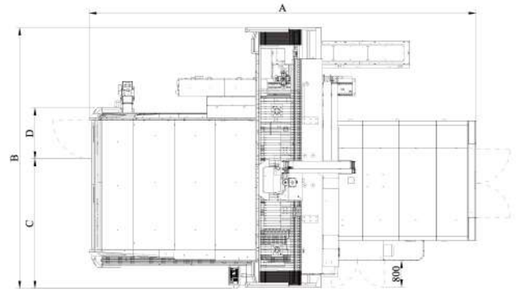
The large tool magazine normally holds 30 tools, and can be optionally expanded to 40, 50, 60, or 90 tools upon request. Tool changes are executed via a uniquely designed dual-arm ATC mechanism. Fast tool storage and retrieval are achieved through high-quality, high-performance hydraulic indexing and swing motors, ensuring efficiency and precision.

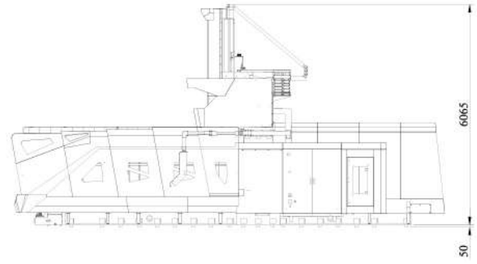
Easy Tool Loading and Unloading

Tools can be manually loaded or unloaded simply by stepping on the foot pedal to open the magazine door, allowing tool access. At the same time, tool unloading can also be done using the handheld operator panel along with the foot pedal

KMC-HA14/HA11 Floor Space Diagram

KMC-HA14

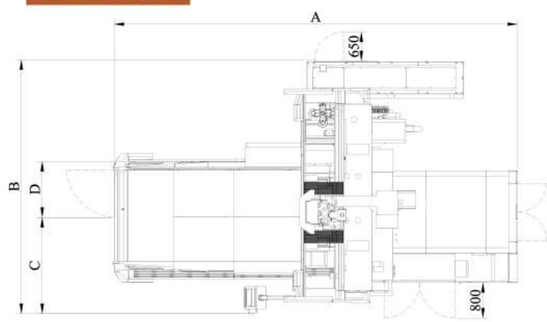


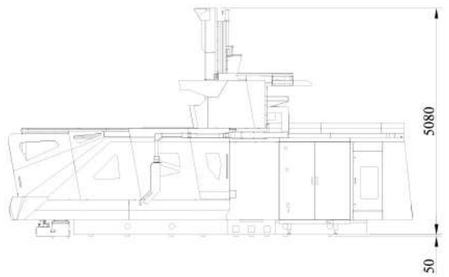


Model		A	B	C	D
HA14 series	328	9840	7202	3432	1162
	332		7602	3632	1362
	336		8002	3832	1562
	428	11890	7202	3432	1162
	432		7602	3632	1362
	436		8002	3832	1562
	528	13940	7202	3432	1162
	532		7602	3632	1362
	536		8002	3832	1562

Model		A	B	C	D
HA14 series	628	16190	7202	3432	1162
	632		7602	3632	1362
	636		8002	3832	1562
	828	20990	7202	3432	1162
	832		7602	3632	1362
	836		8002	3832	1562

KMC-HA11





機型		A	B	C	D
HA11 series	318	9125	5746	2200	1430
	321		6046	2350	1580
	323		6246	2450	1680
	325		6446	2550	1780
	418	11145	5746	2200	1430
	421		6046	2350	1580
	423		6246	2450	1680
	425		6446	2550	1780
	518	13195	5746	2200	1430
	521		6046	2350	1580
	523		6246	2450	1680
	525		6446	2550	1780

機型		A	B	C	D
HA11 series	618	15445	5746	2200	1430
	621		6046	2350	1580
	623		6246	2450	1680
	625		6446	2550	1780
	818	20245	5746	2200	1430
	821		6046	2350	1580
	823		6246	2450	1680
	825		6446	2550	1780

HA14 Machine Specifications

Item \ Model No.			328 HA14	332 HA14	336 HA14	428 HA14	432 HA14	436 HA14	528 HA14	532 HA14	536 HA14
Working Table	Distance between Columns (mm)		2800	3200	3600	2800	3200	3600	2800	3200	3600
	Working Table Surface (mm)	Width	2400	2600	3000	2400	2600	3000	2400	2600	3000
		Length	3000			4000			5000		
	Max. Load Capacity (t)		12/*18			13/*20			14/*22		
Travel	X-axis (Table, Longitudinal) (mm)		3230			4230			5230		
	Y-axis (Spindle, Lateral) (mm)		3450	3850	4250	3450	3850	4250	3450	3850	4250
	Z-axis (Spindle, Vertical) (mm)		1400								
	Distance from Vertical Spindle Nose to Table Surface (mm)		345~1745								
	Distance from Horizontal Spindle Center to Table Surface (mm)		132~1532								
Spindle	Spindle Speed	Vertical	4000 (*6500,*8000)rpm								
		Horizontal	3500rpm								
	No. of Spindle Speed		Two-Speed Gear Transmission								
	Spindle Taper (Vertical / Horizontal)		ISO 50								
	Spindle Motor (Continuous / 30 min / S3 10 min)		AC 22/26kw (30/35HP)								
	Max. Spindle Torque		1018Nm(104kg-m)								
Feed rate	Rapid Feed rate (m/min)	X	12			10			8		
		Y	12	10	8	12	10	8	12	10	8
		Z	10								
	Cutting Feed (mm/min)		1-5000								
Automatic Tool Changing System (ATC) (V/H)	Tool Shank Shape		MAS403-BT50								
	Pull Stud		MAS-P50T-1								
	Tool Magazine Capacity		30 (*40, *50, *60, *90)								
	Max. Tool Diameter (Adjacent Tool)		Ø130mm, ((Ø200))mm								
	Max. Tool Length (V/H)		350mm/300mm								
	Max. Tool Weight (V/H)		20kg/15kg								
Automatic Horizontal Indexing Head	Indexing		90°×4 (*5°×72)								
	Indexing Repeatability		±3sec								
Mechanical Dimensions	Machine Height (mm)		6065								
	Floor Space (L × W) (mm)	Lengt	9840			11890			13940		
		Width	7202	7602	8002	7202	7602	8002	7202	7602	8002
	Net Weight (t)		56	58	62	60.8	62.3	68	65.5	67	74
Others	Power Supply		70KVA (*80KVA)								
	Air Supply		5~7kg/cm²								
	CNC Controller		FANUC 0i (*31i) series , *HEIDENHAIN , *SIEMENS , *MITSUBISHI								

*Special Specification (()) Max. tool diameter (withouth adjacent tools)

KAOMING reserves the right to modify the above specifications at any time.

Item \ Model No.			628 HA14	632 HA14	636 HA14	828 HA14	832 HA14	836 HA14
Working Table	Distance between Columns (mm)		2800	3200	3600	2800	3200	3600
	Working Table Surface (mm)	Width	2400	2600	3000	2400	2600	3000
		Length	6000			8000		
	Max. Load Capacity (t)		15/*25			22/*25		
Travel	X-axis (Table, Longitudinal) (mm)		6230			8230		
	Y-axis (Spindle, Lateral) (mm)		3450	3850	4250	3450	3850	4250
	Z-axis (Spindle, Vertical) (mm)		1400					
	Distance from Vertical Spindle Nose to Table Surface (mm)		345~1745					
	Distance from Horizontal Spindle Center to Table Surface (mm)		132~1532					
Spindle	Spindle Speed	Vertical	4000 (*6500,*8000)rpm					
		Horizontal	3500rpm					
	No. of Spindle Speed		Two-Speed Gear Transmission					
	Spindle Taper (Vertical / Horizontal)		ISO 50					
	Spindle Motor (Continuous / 30 min / S3 10 min)		AC 22/26kw (30/35HP)					
	Max. Spindle Torque		1018Nm(104kg-m)					
Feed rate	Rapid Feed rate (m/min)	X	7					
		Y	12	10	8	12	10	8
		Z	10					
	Cutting Feed (mm/min)		1-5000					
Automatic Tool Changing System (ATC) (V/H)	Tool Shank Shape		MAS403-BT50					
	Pull Stud		MAS-P50T-1					
	Tool Magazine Capacity		30 (*40, *50, *60, *90)					
	Max. Tool Diameter (Adjacent Tool)		Ø130mm, ((Ø200))mm					
	Max. Tool Length (V/H)		350mm/300mm					
	Max. Tool Weight (V/H)		20kg/15kg					
Automatic Horizontal Indexing Head	Indexing		90°×4 (*5°×72)					
	Indexing Repeatability		±3sec					
Mechanical Dimensions	Machine Height (mm)		6065					
	Floor Space (L × W) (mm)	Lengt	16190			20990		
		Width	7202	7602	8002	7202	7602	8002
	Net Weight (t)		70	71.8	80	87	94	99
Others	Power Supply		70KVA (*80KVA)					
	Air Supply		5~7kg/cm²					
	CNC Controller		FANUC 0i (*31i) series , *HEIDENHAIN , *SIEMENS , *MITSUBISHI					

*Special Specification (()) Max. tool diameter (withouth adjacent tools)

KAOMING reserves the right to modify the above specifications at any time.

HA11 Machine Specifications

Item \ Model No.			318 HA11	321 HA11	323 HA11	325 HA11	418 HA11	421 HA11	423 HA11	425 HA11	518 HA11	521 HA11	523 HA11	525 HA11	618 HA11	621 HA11	623 HA11	625 HA11	818 HA11	821 HA11	823 HA11	825 HA11
Working Table	Distance between Columns (mm)		1800	2100	2300	2500	1800	2100	2300	2500	1800	2100	2300	2500	1800	2100	2300	2500	1800	2100	2300	2500
	Working Table Surface (mm)	Width	1650		2000		1650		2000		1650		2000		1650		2000		1650		2000	
		Length	3000				4000				5000				6000				8000			
	Max. Load Capacity (t)		11	12	14		13	14	15		14		17		16		19		18		21	
Travel	X-axis (Table, Longitudinal) (mm)		3230				4230				5230				6230				8230			
	Y-axis (Spindle, Lateral) (mm)		2450	2750	2950	3150	2450	2750	2950	3150	2450	2750	2950	3150	2450	2750	2950	3150	2450	2750	2950	3150
	Z-axis (Spindle, Vertical) (mm)		1100																			
	Distance from Vertical Spindle Nose to Table Surface (mm)		345~1445																			
	Distance from Horizontal Spindle Center to Table Surface (mm)		132~1232																			
Spindle	Spindle Speed	Vertical	4000 (*6500,*8000)rpm																			
		Horizontal	3500rpm																			
	No. of Spindle Speed		Two-Speed Gear Transmission																			
	Spindle Taper (Vertical / Horizontal)		ISO 50																			
	Spindle Motor (Continuous / 30 min / S3 10 min)		AC 22/26kw (30/35HP)																			
	Max. Spindle Torque		1018Nm(104kg-m)																			
Feed rate	Rapid Feed rate (m/min)	X	15				12				8				8				7			
		Y	12																			
		Z	12																			
	Cutting Feed (mm/min)		1-8000								1-5000											
Automatic Tool Changing System (ATC) (V/H)	Tool Shank Shape		MAS403-BT50																			
	Pull Stud		MAS-P50T-1																			
	Tool Magazine Capacity		30 (*40, *50, *60, *90)																			
	Max. Tool Diameter (Adjacent Tool)		Ø130mm, ((Ø200))mm																			
	Max. Tool Length (V/H)		350mm/300mm																			
	Max. Tool Weight (V/H)		20kg/15kg																			
Automatic Horizontal Indexing Head	Indexing		90°×4 (*5°×72)																			
	Indexing Repeatability		±3sec																			
Mechanical Dimensions	Machine Height (mm)		5080																			
	Floor Space (L × W) (mm)	Lengt	9125				11145				13195				15445				20245			
		Width	5746	6046	6246	6446	5746	6046	6246	6446	5746	6046	6246	6446	5746	6046	6246	6446	5746	6046	6246	6446
	Net Weight (t)		35	37	43	44	41	42	48	49	45	46	55	56	50	51	60	61	63	64.5	73	74
Others	Power Supply		70KVA (*80KVA)																			
	Air Supply		5~7kg/cm²																			
	CNC Controller		FANUC 0i (*31i) series , *HEIDENHAIN , *SIEMENS , *MITSUBISHI																			

*Special Specification (()) Max. tool diameter (withouth adjacent tools)

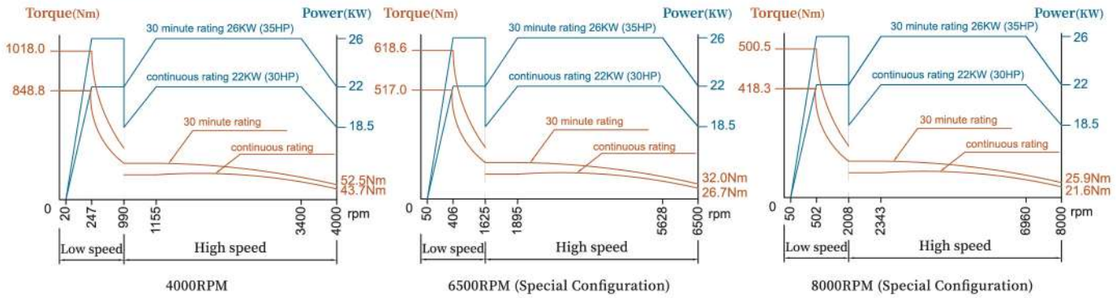
KAOMING reserves the right to modify the above specifications at any time.

Specifically designed for large and tall workpieces, the extended Z-axis travel and increased spindle power provide greater flexibility and efficiency in machining.

KMC-H11 Spindle Torque Diagram

FANUC Spindle Motor

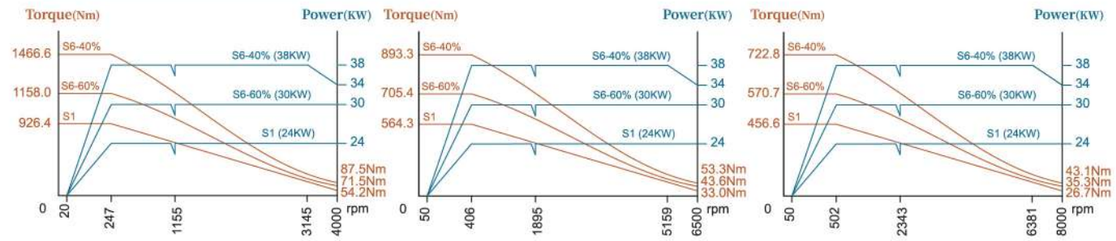
α22i, 22/26KW（30/35HP）



4000RPM　　6500RPM (Special Configuration)　　8000RPM (Special Configuration)

HEIDENHAIN Spindle Motor

QAN260U, 24/30/38KW

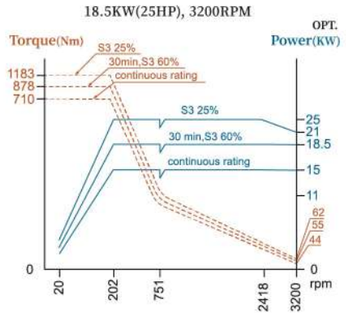


4000RPM　　6500RPM (Special Configuration)　　8000RPM (Special Configuration)

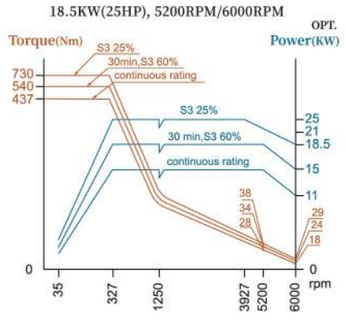
KMC-H8/H7 Spindle Torque Diagram

FANUC Spindle Motor

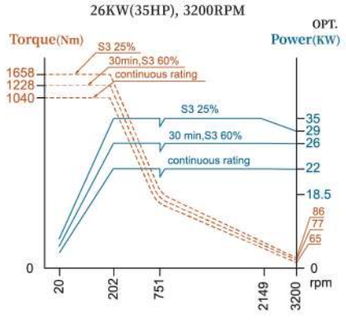
18.5KW(25HP), 3200RPM



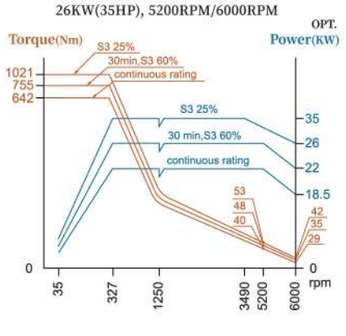
18.5KW(25HP), 5200RPM/6000RPM



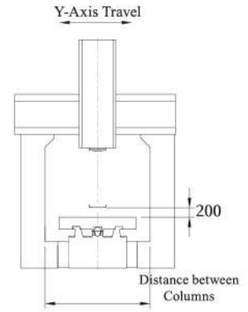
26KW(35HP), 3200RPM

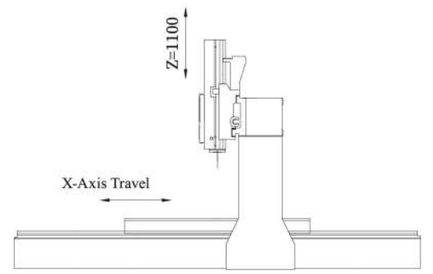


26KW(35HP), 5200RPM/6000RPM



KMC-H11 Machining Range





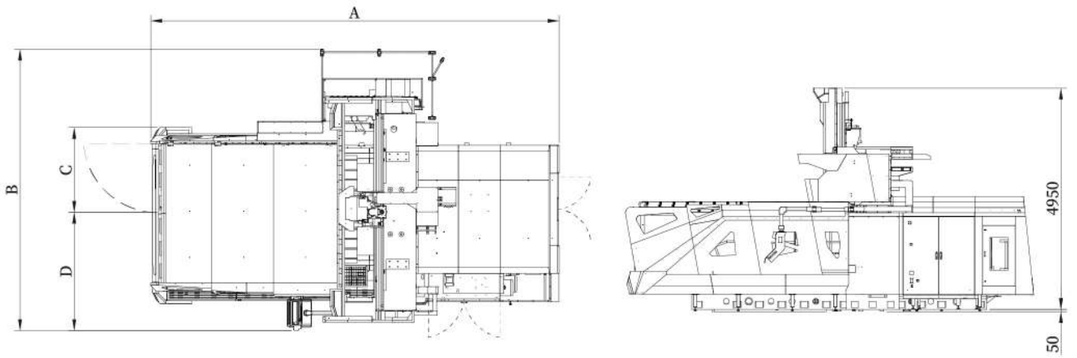
Distance between Columns	1800	2100	2300	2500	2800
X-Axis Travel	1700	2000	2200	2400	2700

Unit : mm

Working Table Length	2000	3000	4000	5000	6000	8000
X-Axis Travel	2230	3230	4230	5230	6230	8230

Unit : mm

KMC-H11 Floor Space Diagram

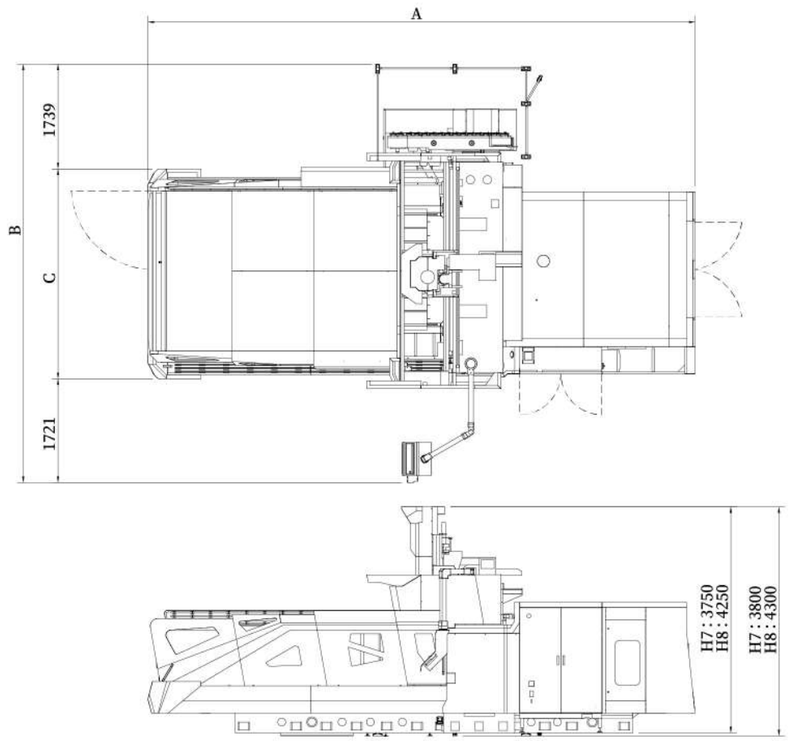


	218 H11	221 H11	318 H11	321 H11	323 H11	325 H11	328 H11	418 H11	421 H11	423 H11	425 H11	428 H11	518 H11	521 H11	523 H11	525 H11	528 H11
A	7245		9125					11145					13195				
B	5295	5595	5295	5595	5795	5995	6295	5295	5595	5795	5995	6295	5295	5595	5795	5995	6295
C	1250	1550	1250	1550	1650	1750	1900	1250	1550	1650	1750	1900	1250	1550	1650	1750	1900
D	2145	2295	2145	2295	2395	2495	2645	2145	2295	2395	2495	2645	2145	2295	2395	2495	2645

	618 H11	621 H11	623 H11	625 H11	628 H11	818 H11	821 H11	823 H11	825 H11	828 H11
A	15445					20245				
B	5295	5595	5795	5995	6295	5295	5595	5795	5995	6295
C	1250	1550	1650	1750	1900	1250	1550	1650	1750	1900
D	2145	2295	2395	2495	2645	2145	2295	2395	2495	2645

Unit : mm

KMC- H8/H7 Floor Space Diagramt



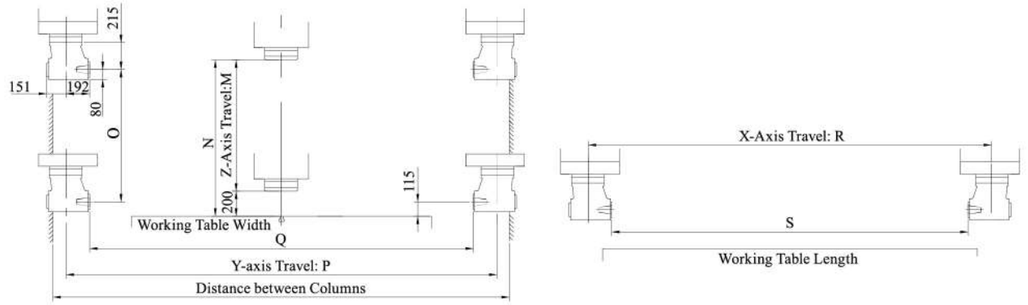
KMC-H8/H7

	215 H8/H7	218 H8/H7	221 H8/H7	315 H8/H7	318 H8/H7	321 H8/H7	323 H8/H7	325 H8/H7	328 H8/H7	415 H8/H7	418 H8/H7	421 H8/H7	423 H8/H7	425 H8/H7	428 H8/H7
A	7245			9125						11145					
B	5420	5720	6020	5420	5720	6020	6220	6470	6870	5420	5720	6020	6220	6470	6870
C	2430	2730	3030	2430	2730	3030	3230	3480	3830	2430	2730	3030	3230	3480	3830

	515 H8/H7	518 H8/H7	521 H8/H7	523 H8/H7	525 H8/H7	528 H8/H7	615 H8/H7	618 H8/H7	621 H8/H7	623 H8/H7	625 H8/H7	628 H8/H7	815 H8/H7	818 H8/H7	821 H8/H7	823 H8/H7	825 H8/H7	828 H8/H7
A	13195						15445						20245					
B	5420	5720	6020	6220	6470	6870	5420	5720	6020	6220	6470	6870	5420	5720	6020	6220	6470	6870
C	2430	2730	3030	3230	3480	3830	2430	2730	3030	3230	3480	3830	2430	2730	3030	3230	3480	3830

Unit : mm

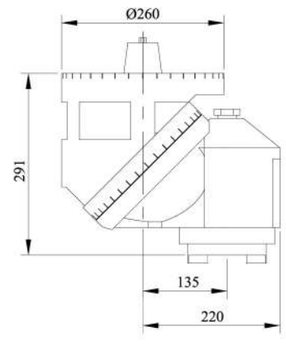
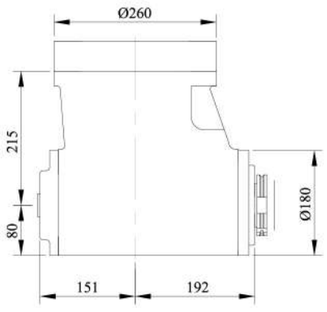
KMC- H8/H7 Machining Range



Model / Dimension	M	N	O	P	Q	R	S
H8	Z-Axis Travel	1050	720(*850)	Y-axis Travel	Y-axis Travel-384	X-Axis Travel	X-Axis Travel-384
H7	Z-Axis Travel	900	570	Y-axis Travel	Y-axis Travel-384	X-Axis Travel	X-Axis Travel-384

Unit : mm

Attachment Head Application (Overview)

Item	*Manual Universal Head	*Manual 90-Degree Head
Appearance		
Max Speed	1500 rpm	1500 rpm
Max. Power	-	-
Application	Inclined Surface Machining	Inclined Surface Machining
Dimensional Drawing		

* Optional Accessory

Unit : mm

H11 Machine Specifications

Item \ Model No.			218 H11	221 H11	318 H11	321 H11	323 H11	325 H11	328 H11	418 H11	421 H11	423 H11	425 H11	428 H11
Working Table	Distance between Columns (mm)		1800	2100	1800	2100	2300	2500	2800	1800	2100	2300	2500	2800
	Working Table Surface (mm)	Width	1650				2000		2400	1650		2000		2400
		Length	2000		3000					4000				
	Max. Load Capacity (t)		8	9	11	12	14		15	13	14	15		16
Travel	X-axis (Table, Longitudinal) (mm)		2230		3230					4230				
	Y-axis (Spindle, Lateral) (mm)		1700	2000	1700	2000	2200	2400	2700	1700	2000	2200	2400	2700
	Z-axis (Spindle, Vertical) (mm)		1100											
	Distance from Spindle Nose to Table Surface (mm)		200~1300											
Spindle	Spindle Speed		4000 (*6500,*8000)rpm											
	No. of Spindle Speed		Two-Speed Gear Transmission											
	Spindle Taper (Vertical / Horizontal)		ISO 50											
	Spindle Motor (Continuous / 30 min / S3 10 min)		AC 22/26kw (30/35HP)											
	Max. Spindle Torque		1018Nm(104kg-m)											
Feed rate	Rapid Feed rate (m/min)	X	15							12				
		Y	15				12			15		12		
		Z	12											
	Cutting Feed (mm/min)		1-8000											
Automatic Tool Changing System (ATC) (V/H)	Tool Shank Shape		MAS403-BT50											
	Pull Stud		MAS-P50T-1											
	Tool Magazine Capacity		30 (*40, *50, *60, *90)											
	Max. Tool Diameter (Adjacent Tool)		Ø130mm, ((Ø200))mm											
	Max. Tool Length (V/H)		350mm											
	Max. Tool Weight (V/H)		20kg											
Mechanical Dimensions	Machine Height (mm)		4950											
	Floor Space (L × W) (mm)	Lengt	7245		9125					11145				
		Width	5295	5595	5295	5595	5795	5995	6295	5295	5595	5795	5995	6295
	Net Weight (t)		24	25.5	28	30	36	37	38	34	35	41	42	44
Others	Power Supply		70KVA (*80KVA)											
	Air Supply		5~7kg/cm²											
	CNC Controller		FANUC 0i (*31i) series , *HEIDENHAIN, *SEIMENS,*MITSUBISHI											

*Special Specification (()) Max. tool diameter (withouth adjacent tools)

KAOMING reserves the right to modify the above specifications at any time.

Item \ Model No.			518 H11	521 H11	523 H11	525 H11	528 H11	618 H11	621 H11	623 H11	625 H11	628 H11	818 H11	821 H11	823 H11	825 H11	828 H11
Working Table	Distance between Columns (mm)		1800	2100	2300	2500	2800	1800	2100	2300	2500	2800	1800	2100	2300	2500	2800
	Working Table Surface (mm)	Width	1650		2000		2400	1650		2000		2400	1650		2000		2400
		Length	5000					6000					8000				
	Max. Load Capacity (t)		14		17		18	16		19		20	18		21		22
Travel	X-axis (Table, Longitudinal) (mm)		5230					6230					8230				
	Y-axis (Spindle, Lateral) (mm)		1700	2000	2200	2400	2700	1700	2000	2200	2400	2700	1700	2000	2200	2400	2700
	Z-axis (Spindle, Vertical) (mm)		1100														
	Distance from Spindle Nose to Table Surface (mm)		200~1300														
Spindle	Spindle Speed		4000 (*6500,*8000)rpm														
	No. of Spindle Speed		Two-Speed Gear Transmission														
	Spindle Taper (Vertical / Horizontal)		ISO 50														
	Spindle Motor (Continuous / 30 min / S3 10 min)		AC 22/26kw (30/35HP)														
	Max. Spindle Torque		1018Nm(104kg-m)														
Feed rate	Rapid Feed rate (m/min)	X	8										7				
		Y	15		12		15		12				15		12		
		Z	12														
	Cutting Feed (mm/min)		1-5000														
Automatic Tool Changing System (ATC) (V/H)	Tool Shank Shape		MAS403-BT50														
	Pull Stud		MAS-P50T-1														
	Tool Magazine Capacity		30 (*40, *50, *60, *90)														
	Max. Tool Diameter (Adjacent Tool)		Ø130mm, ((Ø200))mm														
	Max. Tool Length (V/H)		350mm														
	Max. Tool Weight (V/H)		20kg														
Mechanical Dimensions	Machine Height (mm)		4950														
	Floor Space (L × W) (mm)	Lengt	13195					15445					20245				
		Width	5295	5595	5795	5995	6295	5295	5595	5795	5995	6295	5295	5595	5795	5995	6295
	Net Weight (t)		39	40	49	50	53	44	45	54	55	58	55	56.5	63	67	69
Others	Power Supply		70KVA (*80KVA)														
	Air Supply		5~7kg/cm²														
	CNC Controller		FANUC 0i (*31i) series , *HEIDENHAIN, *SEIMENS,*MITSUBISHI														

*Special Specification (()) Max. tool diameter (withouth adjacent tools)

KAOMING reserves the right to modify the above specifications at any time.

H8/H7 Machine Specifications

Item \ Model No.			215 H8/H7	218 H8/H7	221 H8/H7				315 H8/H7	318 H8/H7	321 H8/H7	323 H8/H7	325 H8/H7	328 H8/H7	415 H8/H7	418 H8/H7	421 H8/H7	423 H8/H7	425 H8/H7	428 H8/H7
Working Table	Distance between Columns (mm)		1500	1800	2100	-	-	-	1500	1800	2100	2300	2500	2800	1500	1800	2100	2300	2500	2800
	Working Table Surface (mm)	Width	1250	1650		-			1250	1650		2000		2400	1250	1650		2000		2400
		Length	2000			-			3000						4000					
	Max. Load Capacity (t)		6			-			9			12			11			14		
Travel	X-axis (Table, Longitudinal) (mm)		2230						3230						4230					
	Y-axis (Spindle, Lateral) (mm)		1400	1700	2000	-	-	-	1400	1700	2000	2200	2400	2700	1400	1700	2000	2200	2400	2700
	Z-axis (Spindle, Vertical) (mm)		850(H8) / 700(H7)																	
	Distance from Spindle Nose to Table Surface (mm)		200~1050(H8) / 200-900(H7)																	
Spindle	Spindle Speed		20-3200 (*35 - 6000rpm)																	
	No. of Spindle Speed		Two-Speed Gear Transmission																	
	Spindle Taper (Vertical / Horizontal)		ISO 50																	
	Spindle Motor (Continuous / 30 min / S3 10 min)		AC 20 /25 HP (*30/35HP)																	
Feed rate	Rapid Feed rate (m/min)	X	15												12					
		Y	15						15			12			15			12		
		Z	12																	
	Cutting Feed (mm/min)		1-8000																	
	Minimum Input Unit		0.001mm																	
Automatic Tool Changing System (ATC) (V/H)	Tool Shank Shape		MAS403-BT50																	
	Pull Stud		MAS-PS0T-1																	
	Tool Magazine Capacity		30 (*40, *50, *60, *90)																	
	Max. Tool Diameter (Adjacent Tool)		Ø130mm, ((Ø200))mm																	
	Max. Tool Length (V/H)		350mm																	
	Max. Tool Weight (V/H)		20kg																	
	Tool Selection Method		Two-Way Tool Selection																	
Mechanical Dimensions	Machine Height (mm)		4250(H8) / 3750(H7)																	
	Floor Space (L × W) (mm)	Lengt	7245			-			9125						11145					
		Width	5420	5720	6020	-	-	-	5420	5720	6020	6220	6470	6870	5420	5720	6020	6220	6470	6870
	Net Weight (t)	H8	22.95	24	25.75	-	-	-	27.95	28.95	29.95	33.95	35.45	36.45	33.45	33.95	35.45	40.95	41.95	43.45
		H7	20.15	21.6	22.95	-	-	-	25.65	26.65	27.65	31.65	33.15	34.15	31.15	32.65	33.15	38.65	39.65	41.15
Others	Power Supply		55KVA																	
	CNC Controller		FANUC 0i (*31i) series , *HEIDENHAIN, *SEIMENS,*MITSUBISHI																	

*Special Specification (()) Max. tool diameter (withouth adjacent tools)

KAOMING reserves the right to modify the above specifications at any time.

Item \ Model No.			515 H8/H7	518 H8/H7	521 H8/H7	523 H8/H7	525 H8/H7	528 H8/H7	615 H8/H7	618 H8/H7	621 H8/H7	623 H8/H7	625 H8/H7	628 H8/H7	815 H8/H7	818 H8/H7	821 H8/H7	823 H8/H7	825 H8/H7	828 H8/H7
Working Table	Distance between Columns (mm)		1500	1800	2100	2300	2500	2800	1500	1800	2100	2300	2500	2800	1500	1800	2100	2300	2500	2800
	Working Table Surface (mm)	Width	1250	1650		2000		2400	1250	1650		2000		2400	1250	1650		2000		2400
		Length	5000						6000						8000					
	Max. Load Capacity (t)		13		16				15		18				17		20			
Travel	X-axis (Table, Longitudinal) (mm)		5230						6230						8230					
	Y-axis (Spindle, Lateral) (mm)		1400	1700	2000	2200	2400	2700	1400	1700	2000	2200	2400	2700	1400	1700	2000	2200	2400	2700
	Z-axis (Spindle, Vertical) (mm)		850(H8) / 700(H7)																	
	Distance from Spindle Nose to Table Surface (mm)		200~1050(H8) / 200-900(H7)																	
Spindle	Spindle Speed		20-3200 (*35 - 6000rpm)																	
	No. of Spindle Speed		Two-Speed Gear Transmission																	
	Spindle Taper (Vertical / Horizontal)		ISO 50																	
	Spindle Motor (Continuous / 30 min / S3 10 min)		AC 20 /25 HP (*30/35HP)																	
Feed rate	Rapid Feed rate (m/min)	X	8												7					
		Y	15		12		15		12						15		12			
		Z	12																	
	Cutting Feed (mm/min)		1-5000																	
	Minimum Input Unit		0.001mm																	
Automatic Tool Changing System (ATC) (V/H)	Tool Shank Shape		MAS403-BT50																	
	Pull Stud		MAS-PS0T-1																	
	Tool Magazine Capacity		30 (*40, *50, *60, *90)																	
	Max. Tool Diameter (Adjacent Tool)		Ø130mm, ((Ø200))mm																	
	Max. Tool Length (V/H)		350mm																	
	Max. Tool Weight (V/H)		20kg																	
	Tool Selection Method		Two-Way Tool Selection																	
Mechanical Dimensions	Machine Height (mm)		4250(H8) / 3750(H7)																	
	Floor Space (L × W) (mm)	Lengt	13195						15445						20245					
		Width	5420	5720	6020	6220	6470	6870	5420	5720	6020	6220	6470	6870	5420	5720	6020	6220	6470	6870
	Net Weight (t)	H8	37.95	40.45	41.95	50.45	51.45	51.95	41.45	43.95	45.45	55.95	56.45	57.45	52.45	55.45	56.95	66.45	67.45	69.45
		H7	35.15	37.65	39.65	47.65	48.55	49.15	38.65	41.15	42.65	52.85	53.85	54.65	50.15	53.15	54.65	63.85	64.85	66.65
Others	Power Supply		55KVA																	
	CNC Controller		FANUC 0i (*31i) series , *HEIDENHAIN, *SEIMENS,*MITSUBISHI																	

*Special Specification (()) Max. tool diameter (withouth adjacent tools)

KAOMING reserves the right to modify the above specifications at any time.

Standard and Special Accessories

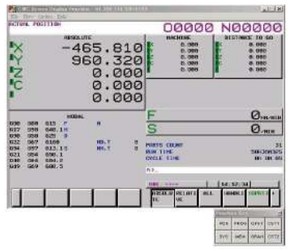

01.


02.

Standard Accessories

01. Electrical Cabinet Air Conditionin Cooling System

02. Spindle Chiller



Feature Introduction: CNC Remote Diagnostic Function (Optional)

Machines can be accessed remotely via a PC using their IP address, allowing direct connection to switch and view the user's machine interface. Through the controller's software link, machining programs, PLC programs, machine parameters, and tool data tables can be transmitted and modified at the user's end for remote diagnostics, operation, and monitoring. This function cannot be used in LCD/MDI mode and must be operated via PC with a network connection.


01.


02.


03.


04.

Optional Accessories

01. NC Rotary Table

02. Chain-Type Chip Conveyor

03. Automatic Tool Length Measurement System

04. Automatic Probe Workpiece Centering System

Conveyor

This series can be equipped with link-type chip conveyor, scraper-type chip conveyor, and dual-type chip conveyor

	Iron Chip	Metal Chip	Non-Rolled Chip	Cast Iron Chip	Aluminum Chip
Link-Type Chip Conveyor	✓	✓			
Scraper-Type Chip Conveyor			✓	✓	✓
Dual-Type Chip Conveyor	✓	✓	✓	✓	✓

			HMA	HA14	HA11	H11	H8	H7
Standard Accessories	1	Cooling Pump Device	○	○	○	○	○	○
	2	Centralized Automatic Lubrication System	○	○	○	○	○	○
	3	Rigid Tapping	○	○	○	○	○	○
	4	Splash Guard	○	○	○	○	○	○
	5	Fully Enclosed Sheet Metal Covering	-	-	-	-	-	-
	6	Adjustment Tools (one set)	○	○	○	○	○	○
	7	Operation and Maintenance Manual with Electrical Diagram (one set)	○	○	○	○	○	○
	8	Foundation Bolts and Horizontal Adjustment Bolts (one set)	○	○	○	○	○	○
	9	Working Lights	○	○	○	○	○	○
	10	Spindle Cooling Device	○	○	○	○	○	○
	11	Warning Lights	○	○	○	○	○	○
	12	Air Blast	○	○	○	○	○	○
	13	Automatic Power Off Function	○	○	○	○	○	○
	14	Cycle Completion Warning Light	○	○	○	○	○	○
	15	Screw-type Chip Conveyor	○	○	○	○	○	○
	16	Transformer (Excluding 220V Power Supply)	○	○	○	○	○	○
	17	Feed Axis Protective Cover	○	○	○	○	○	○
	18	Tool Magazine Side Safety Net	○	○	○	○	○	○
	19	Electrical Cabinet Work Light	○	○	○	○	○	○
	20	Manual Tool Release Device	○	○	○	○	○	○
	21	Front and Rear Worktable Foot Pedals	○	○	○	○	○	○
	22	Electrical Cabinet Cooling System (Air Conditioner)	○	○	○	○	○	○
	23	Vertical and Horizontal Auxiliary Head	○	○	○	-	-	-
Optional Accessories	1	Chip Conveyor System	○	○	○	○	○	○
	2	Mist Coolant Unit	○	○	○	○	○	○
	3	NC Rotary Table	○	○	○	○	○	○
	4	CAT, DIN, ISO, BBT, HSK-A Tool Handles	○	○	○	○	○	○
	5	Oil Hole Drill Interface	○	○	○	○	○	○
	6	Axial Linear Guideway	○	○	○	○	○	○
	7	Linear Scale Feedback Position Detection System	○	○	○	○	○	○
	8	Automatic Tool Length Measuring System	○	○	○	○	○	○
	9	Automatic Touch Probe Centering System	○	○	○	○	○	○
	10	Coolant through Spindle System	○	○	○	○	○	○
	11	Enlarged Water Tank	○	○	○	○	○	○
	12	Coolant Purification & Recycling System (Deodorization & Cleaning)	○	○	○	○	○	○
	13	Coolant Cooling System	○	○	○	○	○	○
	14	Hydraulic Cooling System	○	○	○	○	○	○
	15	Coolant Paper Filter System	○	○	○	○	○	○
	16	Oil-Water Separator	○	○	○	○	○	○
	17	Customized Sub-Table, T-Slot and Machine Color Options	○	○	○	○	○	○
	18	Enlarged Working Table Load Capacity	○	○	○	○	○	○
	19	Centering-Type Leveling Block	○	○	○	○	○	○
	20	Electrical Cabinet Cooling System (For Ambient Temp. Below 45°C)	○	○	○	○	○	○
	21	3 to 7 Position Automatic Attachment Changer (AAC)	○	○	○	-	-	-
	22	90° Head (Manual Tool Change)	-	-	-	○	○	○
	23	Manual Universal Head (Manual Tool Change)	-	-	-	○	○	○
	24	Automatic universal head	○	○	○	-	-	-
	25	Extension Head	○	○	○	-	-	-

Optional AI Smart Feature

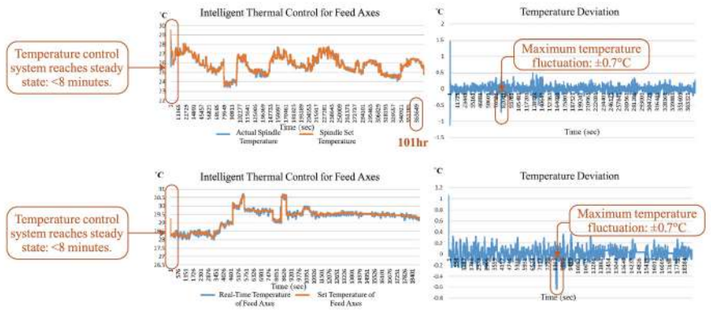
Intelligent Temperature Control System for Spindle and Feed Axes

Controls temperature rise caused by internal heat sources during long machining operations, reducing warm-up time and quickly reaching a stable operating state.

Project Results

As-Is	To-Be
Warm-Up Time over 30 Minutes and Not Yet Stable	To-Be: Warm-Up Time: < 8 minutes Steady-State Temperature Drift: ≤ ±0.7 °C

01. Spindle Intelligent Temperature



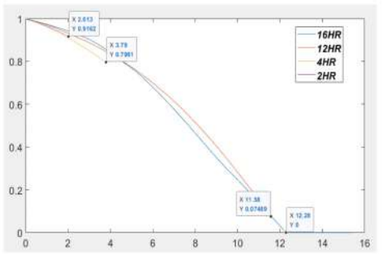
02. Temperature Deviation

Real-Time Monitoring of Cutting Tool Condition During Long Machining

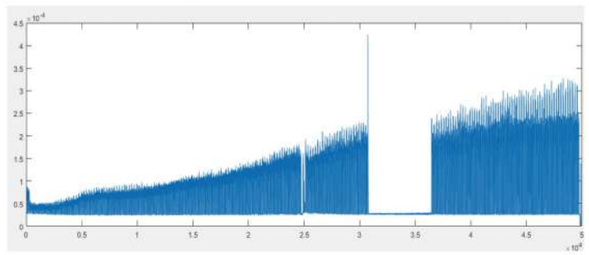
Using real-time monitoring technology to detect potential tool wear or damage early, minimizing the risk of lost machining time and material during extended operations.

Project Results

01. Tool Life Curve



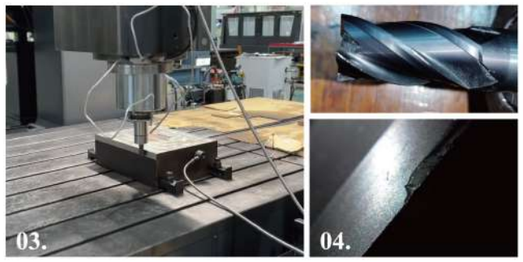
02. Tool Machining Characteristics



Enhancing the regression model with LSTM deep learning, then integrating it into an RUL model to express remaining life as a percentage.

03. Tool Aging Test

04. Tool Aging Condition



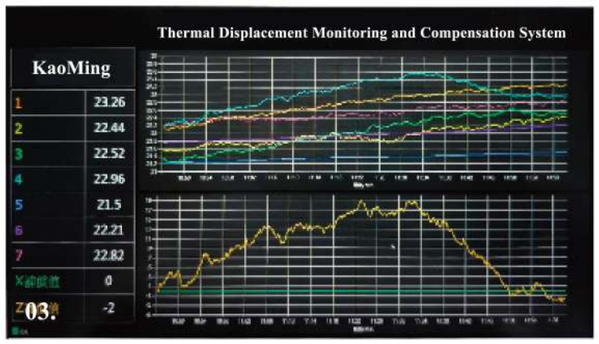
Tool Life Warning Timing: 19.88% before the end of full tool life.

Gantry Machining Center Tool Tip Thermal Displacement Compensation Technology

Compensates for spindle tool tip displacement caused by external heat sources. By correcting thermal displacement errors, it maintains stable machining quality during long operations.

Project Results

As-Is	To-Be
Tool Cutting Depth Error Without Tool Tip Compensation: 46 μm	Tool Cutting Depth Error With Tool Tip Compensation: 18 μm



01. Thermal Displacement Measurement

02. Thermal Displacement Compensation during Cutting

03. Thermal Displacement Compensation System

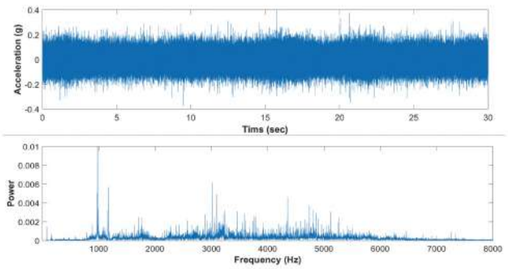
Online Spindle Monitoring and Anomaly Diagnosis Guidance Technology

Multi-Faced Gantry Machining Center Development

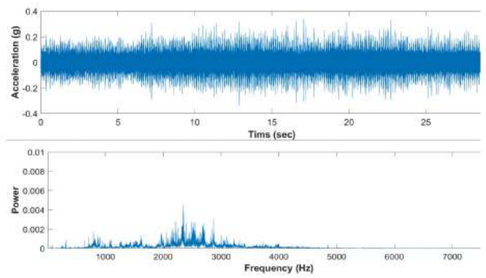
A3.5 completed implementation and integration testing of spindle run-in and operation monitoring diagnosis system.

Bearing Aging Condition Identification Test Results

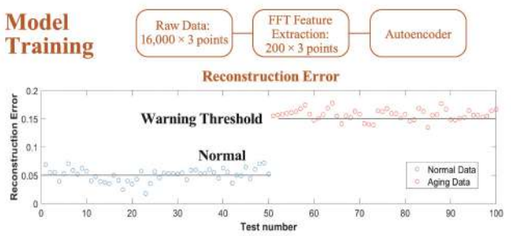
Bearing Aging Data



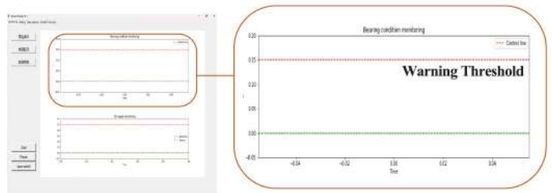
Bearing Normal Data



Model Training

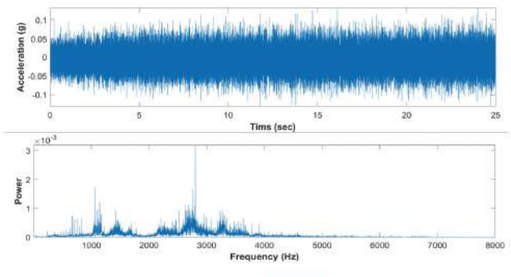


System Screenshots

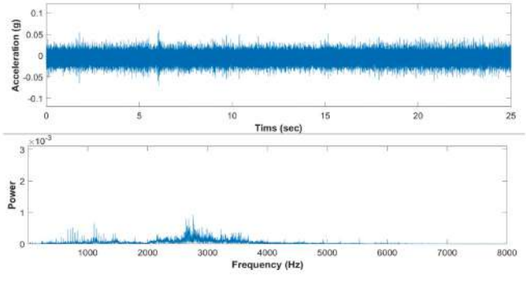


Lubrication Status Identification Test Results

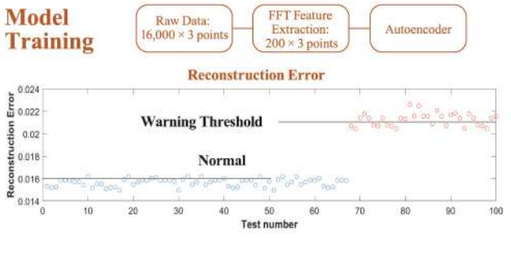
Abnormal Lubrication Data



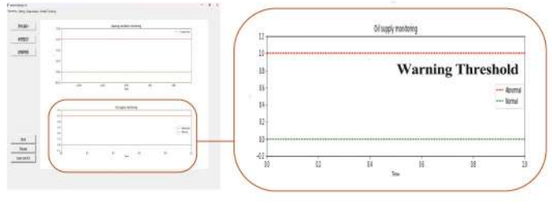
Normal Lubrication Data



Model Training

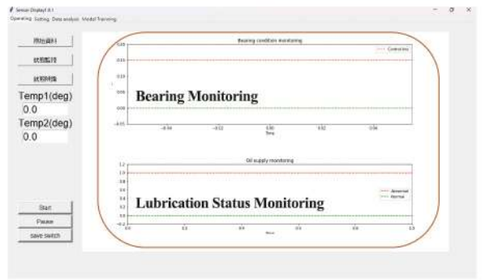


System Screenshots

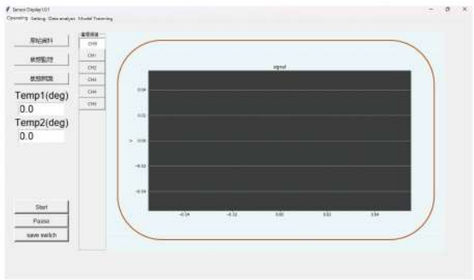


Spindle Run-In Test System Interface Development

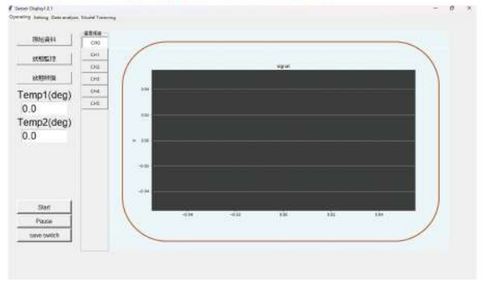
Health Status History Curve



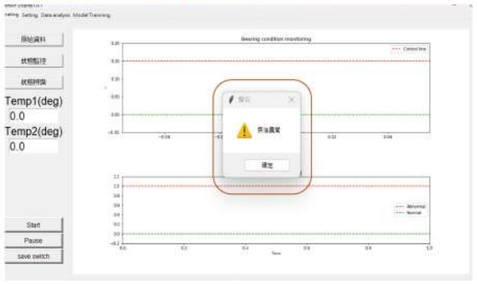
Real-Time Vibration Information Display



Operation Temperature Display



Abnormal Alert Function



Machine Spindle No-Load Testing Execution

- Low-Speed Range: 500 → 1000 rpm, 30 seconds at each speed, 5-second intervals
- High-Speed Range: 2000 → 3000 rpm, 30 seconds at each speed, 5-second intervals

Execute Test Procedure

Notify ITRI's IPC to start data reception via I/O

Inside: Test Procedure: Inside

I/O

I/O

ITRI IPC

Online Monitoring Algorithm: Inside

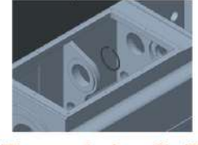
Detection calculations begin after IPC data reception

Alarm Code

Display

Spindle Drive

Gear

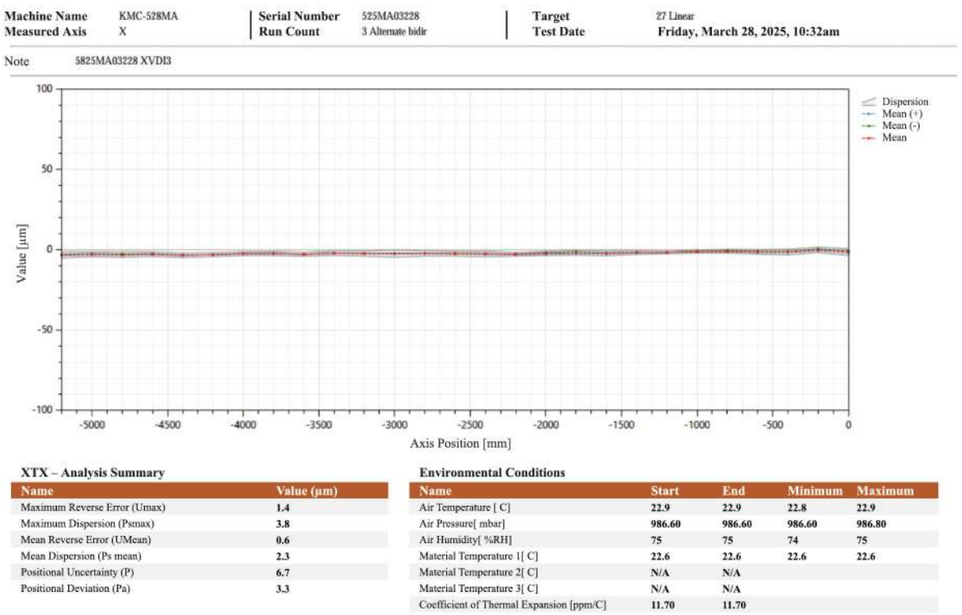


Transmission Quill

Online Spindle Monitoring and Anomaly Diagnosis Guidance Technology

Customized Function Options

High-Precision VDI Accuracy Standard



XTX – Analysis Summary

Name	Value (µm)
Maximum Reverse Error (Umax)	1.4
Maximum Dispersion (Psmax)	3.8
Mean Reverse Error (UMean)	0.6
Mean Dispersion (Ps mean)	2.3
Positional Uncertainty (P)	6.7
Positional Deviation (Pa)	3.3

Environmental Conditions

Name	Start	End	Minimum	Maximum
Air Temperature [C]	22.9	22.9	22.8	22.9
Air Pressure[mbar]	986.60	986.60	986.60	986.80
Air Humidity[%RH]	75	75	74	75
Material Temperature 1[C]	22.6	22.6	22.6	22.6
Material Temperature 2[C]	N/A	N/A		
Material Temperature 3[C]	N/A	N/A		
Coefficient of Thermal Expansion [ppm/C]	11.70	11.70		

Titanium Alloy Cutting Test

01. Spindle Speed: 175 rpm

02. Cutting Width: 100 mm

03. Cutting Depth: 6 mm

04. Y-Axis Forward

05. Feed Rate: 295 mm/min

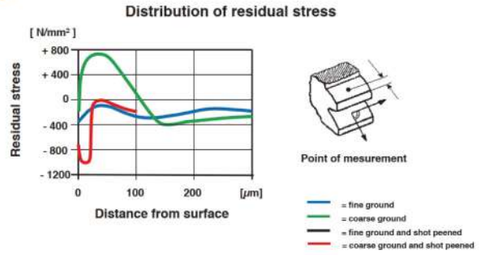
Gear Tooth Surface Hardening (Shot Peening)

01. Gear Tooth Surface Hardening (Shot Peening)

02. Without Shot Peening: Greater than -400 MPa (as shown in Figure 1)

03. With Shot Peening: -828 MPa to -1254 MPa

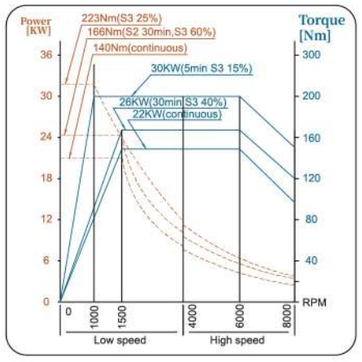
Figure 1
Shot peening and coarse grinding

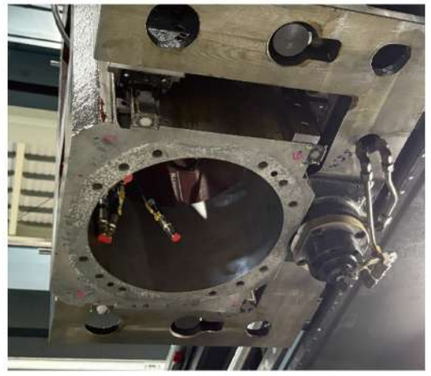


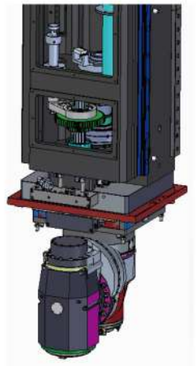
	Item Name	Number of Teeth	Material	Illustration	R.stress (MPa)	FWHM (deg)
1	861506011MA3	Gear 61T	SCM415		-1233	6.67
2	861506012MA3	Gear 30T	SCM440		-828	5.53
3	861506013MA3	Gear 53T	SCM415		-1252	6.87
4	861506009MA3	Gear 75T	SCM21		-1212	6.38
5	861506010MA3	Gear 44T	SCM21		-1223	6.18
6	863706009MA3	Gear 28T	SCM21		-1211	6.19
7	933817051-5MA3	Gear 37T	SCM415		-1170	6.38
8	933817052-2MA3	Gear 36T	SCM21		-1254	6.43

Customized Linear Guide Four-Column Spindle Head

FANUC αiI22/8000
22/26/35KW(30/35/47HP)6000rpm





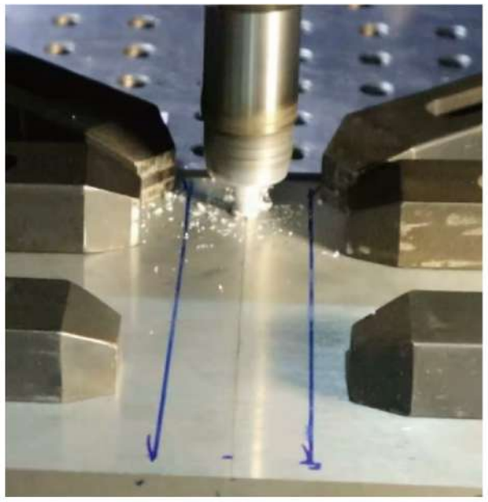


Customized Function Options

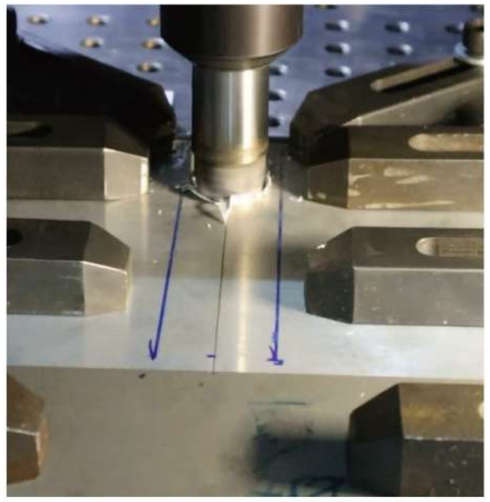
Customized Function Options

Friction Stir Welding (FSW)

Friction Stir Welding (FSW) is a solid-state welding technique used for joining metals, mainly aluminum alloys, copper alloys, and titanium alloys.



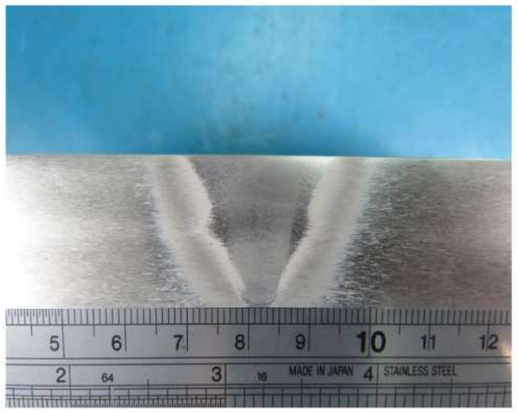
Aluminum plate thickness 20mm/welding depth 19.11mm
Cutting down

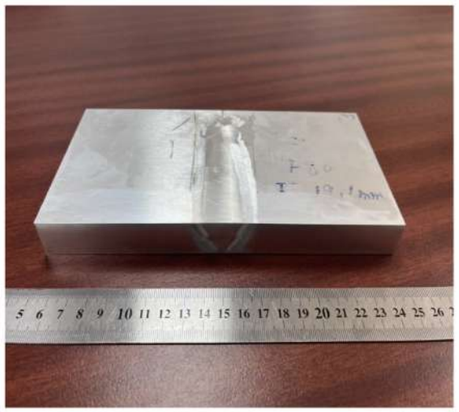


Aluminum plate thickness 20mm/welding depth 19.1 mm
Cutting in

20 mm Aluminum Alloy Plate Welding

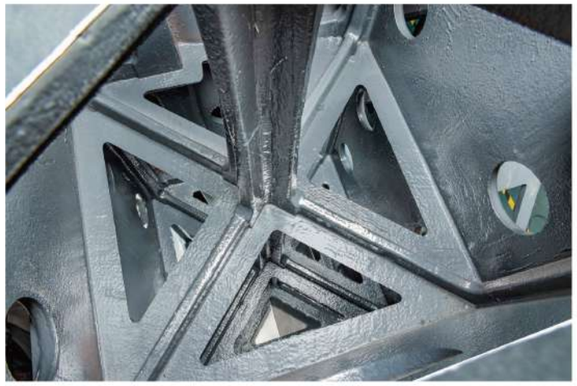
Welding quality complies with ISO 25239 Standard





High-Rigidity Gantry Structure, Enhanced Bending and Torsional Resistance

The machine column is one of the core components of the machine structure. By adopting a reinforced gantry design, the overall bending and torsional rigidity are significantly improved, ensuring excellent stability and machining accuracy during axis operations.



Design Concept Combining the Rigidity of Hardened Guides with the Flexibility of Linear Guides

To meet the application requirements of adding linear guides, the machine design balances high rigidity with high stability. While maintaining the excellent rigidity of hardened guides, design optimization reduces friction, increases travel speed, and improves positioning accuracy, allowing machines with hardened guides to achieve the fast response and stable performance typically associated with linear guide systems.

Application Industries

Mold Industry

During rough machining, the rigidity of hardened guides provides essential support, while finishing operations rely on the sensitivity and stability of linear guides, meeting both machining requirements simultaneously.

Aerospace and Automotive Parts Machining

Facing diverse materials and complex workpiece structures, high speed, high rigidity, and high precision performance are essential.

Multi-Purpose Machining Facility

Enables both roughing and finishing operations on a single machine, effectively reducing equipment investment and floor space requirements.