

Y AXIS STEP DESIGN

The Y axis utilizes a superior design with a 70 mm (2.76") offset between the lower and upper slide ways. This greatly enhances the rigidity of the headstock by bringing the center of gravity back into the upper support, which rests on the top massive columns. This design provides an extremely stable foundation for the spindle head to travel and further enhances the machine performance when





All three axes utilize an external feedback pulse coder for positioning. For machine models over 3000m, the ball screw is driven by a motor and a gearbox with a gear ratio of 1:2 for adding strength to the axis feed system. The external position feedback pulse coder is coupled directly to the opposite end of the ball screw. This allows for high positioning accuracy by measuring the true rotation of the ball screw.

DOUBLE GUIDE WAY

its combined sliding and rolling design.



AXIS SAFETY PROTECTION

Safety couplings are used where the drive motors and the ball screws get connected. These devices greatly minimize damage that may occur during a collision or overload condition.

New column design increases contact surface with crossbeam and also with the ground foundation

The machine is stable because this



ITEGRAL BALL SCREW MOUNTING BRACKETS

The ball screws are supported by a double anchored system, which greatly improves the rigidity of the axis by minimizing vibration during feeding. The mounting brackets for the Y and Z-axis ball screw are integrated with the saddle and cross beam castings to further maximize the rigidity.



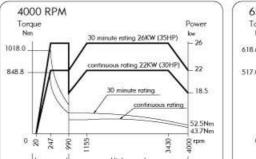
NNER COOLING SYSTEM FOR BALL SCREWS

A properly pre-loaded and pre-tensioned, large diameter ball screw with a double recirculating ball nut is used for each axis throughout the entire machine series. For the machine models KMC-3000~KMC-5000 with the longer X-axis travels, a hollow state-of-the-art ball screw is used. Cooled oil continuously flows through the center of the ball screw. The oil temperature is cooled down, circulating through an external heat exchanger. This greatly enhances the machine performance and accuracy by practically eliminating thermal growth of the axis especially when using the full traverse. Both supporting ends of the X-axis ball screw are equipped with an air cooling system for the bearings. This superior design is unique to Kao Ming.



The machine base is designed with four box ways to support FANUC SPINDLE MOTOR: α 22i, 22/26 KW (30 / 35 HP)

PRECISION SCRAPING



INNOVATIVE TECHNOLOGY THE COMBINATION OF POWER AND FLEXIBILITY

SUPERIOR ARRANGEMENT FOR **Z-AXIS SPACE & SPINDLE**

- The Z-axis design is saving space for having an extra long stroke of 1100 mm (43.3") with a machine height saves only 5080 mm (200").
- The center of spindle and spindle motor are symmetrically designed to prevent against Y-axis thermal displacement.
- The spindle is driven by a powerful 26KW (35HP) spindle motor and through a two-speed transmission by gears. The maximum spindle torque is 1018Nm (104kg-m), which is sufficient to make heavy duty cutting.
- Three various range of spindle speeds 4000, 6500, 8000 rpm are integrated into the same, commonly used, spindle motor. KMTCS Kao Ming thermal compensation system (Optional) is beneficial with 8000 rpm high speed spindle for large die/mold workpiece machining, controlling the thermal elongation for better stability.
- Spindle can make vertical and horizontal cutting through automatic attachment changer.
- Automatic 30-degree angle head, extension head and universal indexing head are optional accessories for wider applications of 3 & 5-axis control.

The spindle also untilizes a "state-of-the-art" designed hydraulic cylinder. This special design allows the cylinder to slightly float thereby eliminating any outside forces from being applied to the spindle bearings when changing tools.

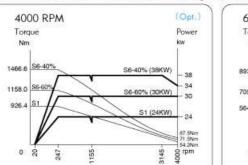
High Pressure Pressure (kg/cm²)

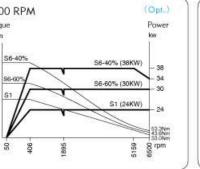
/ 30 (7.92 gal/min) / 30 (7.92 gal/min) / 30 (7.92 gal/min)

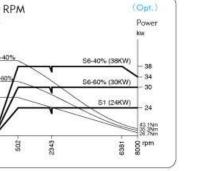
SPINDLE OUTPUT AND TORQUE

HEIDENHAIN SPINDLE MOTOR: OAN260U, 24 / 30 / 38 KW













CTS (optional) comes with 600L coolan tank, high pressure pump, dual filtration and unique design for coolant hose. The system can tool effectively to minimize machining temperature and chip stuck.





HIGH EFFICIENCY ATC

POWERFUL, HIGH SPEED ATC

The standard tool magazine is equipped with 30 tool capacity, and can be upgraded to a 40,50,60, or 90

tool capacity. The unique double-arm tool change design, powered by a durable, high speed motor ,greatly reduces tool change time to less than 6 sec.(T to T). The tool change storage and retrieval system is accomplished by a high quality, high performance, bi-directional hydraulic index motor which further enhances the ATC.

AUTOMATIC ATTACHMENT CHANGER



Horizontal

construction and innovative design.



Max. Speed: 3500 rpm

Max. Power: 18.5 / 22 kw

and has ± 3 seconds indexing repeatability accuracy.

AUTOMATIC TOOL CHANGER

The ATC-H (Horizontal) is integrated into the original ATC-V (Vertical), which features simple

The 2-position AAC (Automatic Attachment Changer) is designed to improve productivity.

The angular attachment and vertical head cap are put into the AAC magazine, which has

The automatic angular attachment can be indexed into 72 positions with 5° increment

of AAC magazine can be extended with more stations for various applications.

upper and lower seats and moves back and forth - separately or together. The unique design





| Extension Max. Speed: 4000 rpm

Max. Power: 22 / 26 kw

Optional

Head

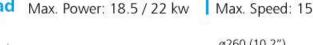
Angle Head Max. Power: 18.5 / 22 kw



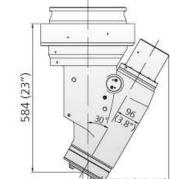
Max. Speed: 3500 rpm

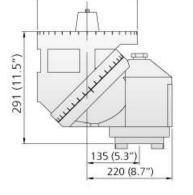






Optional





CONVENIENT TOOL LOADING SYSTEM

Tool loading and unloading can be performed at either the spindle or tool storage magazine. A foot pedal is provided at both locations allowing for easy handling of even larger tools.



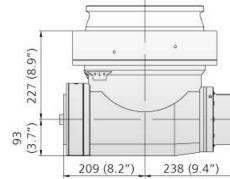


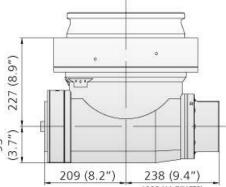




CUTTING EXAMPLE

	(I TOTAL DISTINCT OF IT
Face Mill Cutter	/ Ø125
Work Material	S45C
Spindle Speed (rpm)	500
Cutting Width (mm)	/ 105 (4.13"
Cutting Depth (mm)	6 (0.23")
Feedrate (mm/min)	1300 (51.1
Cutting Capacity (cm³/r	nin) 693 (27.3"





KMTCS - Kao Ming Thermal Compensation System (Optional)

KMTCS is using unique integrated techniques for the intelligent spindle cooler with thermo-compensation card and PLC software. The system is keeping the spindle at a constant temperature by program when the spindle temperature rises or falls at different working speeds. For high speed machining at fixed spindle revolution, such as for finish machining of die/mold, KMTCS is essential to offer stable and accurate performance. Moreover, in this case, it is possible to control the spindle elongation deviations within 0.02mm or even 0.01mm under specific conditions. The other thermo-compensation system PMC-M is available as option. PMC-M features an intelligent use of the shift function and the integration techniques from NC, PLC and thermocompensation card.



COMPENSATION TEST RESULTS ON LONG-TERM PERIOD

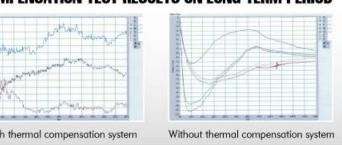
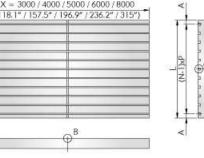


TABLE DIMENSIONS

								or markets
Distance between columns	L	Α	Ν	Р	W	Т	Н	K
2800 (110.2")	2400 (94.5")	100 (3.9")	11	220 (8.7")	24H8 (0.9")	42 ⁺³ (1.7")	42 (1.7")	18 ² (0.7")
3200 (126")	2600 (102.4")	100 (3.9")	13	200 (7.9")	28H8 (1.1")	46 ⁺⁴ (1.8")	52 (2.1")	20 ¹³ (0.8")
3600 (141.7")	3000 (118.1")	100 (3.9")	15	200 (7.9")	28H8 (1.1")	46 ¹⁴ (1.8")	52 (2.1")	20 ¹³ (0.8")



CHIP CONVEYORS SELECTION (OPTIONAL)

LINK-TYPE CHIP CONVEYORS









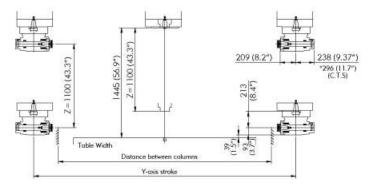


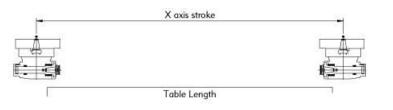






MACHINING RANGE



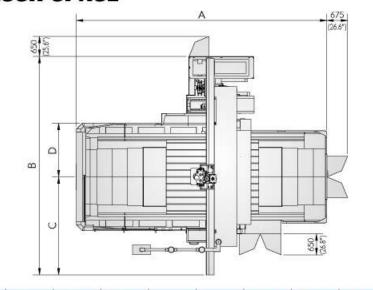


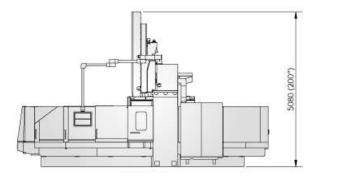
	Unit	mm	(inch)
3/	SOO	1141	7")

2800 (110.2")	3200 (126")	3600 (141.7")	Table length	3000 (118")	4000 (157.5")	5000 (196.9")	6000 (236.2")	8000 (315")
2400 (94.5")	2600 (102.4")	3000 (118.1")	X axis stroke	3230 (127.2")	4230 (166.5")	5230 (205.9")	6230 (245.3")	8230 (324")
3450 (135.8")	3850 (151.6")	4250 (167.3")		W				

FLOOR SPACE

Distance between columns





Hn	it-	mr	n fi	inc	6.6

	328M	332M	336M	428M	432M	436M	528M	532M	536M	628M	632M	636M	828M	832M	836M	
Α	A 8130 (320.1")				10130 (398.8	")	12130 (477.6")			1	14330 (564.2	")	19080 (751.2")			
В	7078	7493	7913	7078	7493	7913	7078	7493	7913	7078	7493	7913	7078	7493	7913	
	(278.7")	(295")	(311.5*)	(278.7")	(295")	(311.5°)	(278.7°)	(295")	(311.5")	(278.7")	(295")	(311.5")	(278.7")	(295")	(311.5*)	
С	3175	3390	3610	3175	3390	3610	3175	3390	3610	3175	3390	3610	3175	3390	3610	
	(125°)	(133.5")	(142.1")	(125")	(133.5")	(142.1")	(125*)	(133.5")	(142.1")	(125")	(133.5")	(142.1")	(125*)	(133.5*)	(142.1*)	
D	1740	1940	2140	1740	1940	2140	1740	1940	2140	1740	1940	2140	1740	1940	2140	
	(68.5°)	(76.4*)	(84.3")	(68.5")	(76.4°)	(84.3°)	(68.5″)	(76.4°)	(84.3")	(68.5")	(76.4*)	(84.3")	(68.5")	(76.4")	(84.3")	

Specifications

	ITEM				KMC-328M	KMC-332M	KMC-336M	KMC-428M	KMC-432M	KMC-436M	KMC-528M	KMC-532M	KMC-536M	KMC-628M	KMC-632M	KMC-636M	KMC-828M	KMC-832M	KMC-836M
	Distance between col	lumns	FG	Н	2800 (110.2")	3200 (126")	3600 (141.7")	2800 (110.2")	3200 (126")	3600 (141.7")	2800 (110.2")	3200 (126")	3600 (141.7")	2800 (110.2")	3200 (126")	3600 (141.7")	2800 (110.2")	3200 (126")	3600 (141.7")
TRAVEL	X axis (Table, longitu	ıdinal)			7.00	3230 (127.2")	***************************************	30 50	4230 (166.5")			5230 (205.9")	200 000		6230 (245.3")			8230 (324")	3.0
	Y axis (Spindle, latera	ol)	F G	Н	3450 (135.8")	3850 (151.6")	4250 (167.3")	3450 (135.8")	3850 (151.6")	4250 (167.3")	3450 (135.8")	3850 (151.6")	4250 (167.3")	3450 (135.8")	3850 (151.6")	4250 (167.3")	3450 (135.8")	3850 (151.6")	4250 (167.3")
	Z axis (Spindle, vertic	al)				1100 (43.3")			1100 (43.3")			1100 (43.3")			1100 (43.3")			1100 (43.3")	
	Distance from table surface		o spindle	e nose	345 ~	1445 (13.6" ~	56.9")	345 ~	1445 (13.6" ~	56.9")	345 ~	1445 (13.6" ~	56.9")	345 ~	1445 (13.6" ~	56.9")	345 ~	1445 (13.6" ~	56.9")
	Distance from table surface	e to horizo	ontal spind	le center	132 ~	- 1232 (5.2" ~ ·	48.5")	132 -	- 1232 (5.2" -	48.5")	132 -	- 1232 (5.2" ~ 4	18.5")	132 -	- 1232 (5.2" ~	48.5")	132 -	~ 1232 (5.2" ~ -	48.5")
	Table working surface	F	G	Н	2400 x 3000 (94.5" x 118.1")	2600 x 3000 (102.4" x 118.1")	3000 x 3000 (118.1" x 118.1")	2400 x 4000 (94.5" x 157.5")	2600 x 4000 (102.4" x 157.5")	3000 x 4000 (118.1" x 157.5")	2400 x 5000 (94.5" x 196.9")	2600 x 5000 (102.4" x 196.9")	3000 x 5000 (118.1" x 196.9")	2400 x 6000 (94.5" x 236.2")		3000 x 6000 (118.1" x 236.2")	2400 x 8000 (94.5" x 315")	2600 x 8000 (102.4" x 315")	3000 x 8000 (118.1" x 315")
TABLE	Table configuration	F	G	Н	220 mm	200 mm	200 mm	220 mm	200 mm	28 ^{H8} mm x 15 x 200 mm (1.1" x 15 x 7.87")	24 ^{H8} mm x 11 x 220 mm (0.94" x 11 x 8.66")	200 mm	28 ^{H8} mm x 15 x 200 mm (1.1" x 15 x 7.87")	220 mm	200 mm	200 mm	24 ^{H8} mm x 11 x 220 mm (0.94" x 11x 8.66")	200 mm	200 mm
	Max. table load	- 10			12000 kg (24	600 lb) / *18000	(39600 lb) kg	13000 kg (28600 lb) / *20000 kg (44000 lb)			14000 kg (308	00 lb) / *22000	kg (48400 lb)	15000 kg (330	000 lb) / *2500	0 kg (55000 lb)	22000 kg (48400 lb) /*25000 kg (55000 lb)		
	e i ii i		Vertical		4000	0 (*6500, *8000)	rpm	4000	(*6500, *8000)) rpm	4000	(*6500, *8000)	rpm	4000	(*6500, *8000)) rpm	4000	(*6500, *8000) rpm
	Spindle speed		Horizon	tal		3500 rpm			3500 rpm			3500 rpm			3500 rpm			3500 rpm	
SPINDLE	No. of spindle speed	4			Infin	nite variable, two s	steps	Infin	ite variable, two	steps	Infin	ite variable, two s	steps	Infin	ite variable, two	steps	Infin	ite variable, two	steps
SPINDLE	Spindle taper				ISO 50			ISO 50			ISO 50			ISO 50			ISO 50		
	Spindle motor (Cont./30min)		Cont./30min) AC 22/26 kw (30/35 HP)					AC 22/26 kw (30/35 HP)			AC 22/26 kw (30/35 HP)			AC 22/26 kw (30/35 HP)			AC 22/26 kw (30/35HP)		HP)
	Max. spindle torque				1018 Nm (104 kg-m)			1018 Nm (104 kg-m)		1018 Nm (104 kg-m)		1018 Nm (104 kg-m)		1018 Nm (104 kg-m)		m)			
FEED RATE	Rapid traverse (X, Y,	Rapid traverse (X, Y, Z)				The Control of the Co	A STATE OF THE PARTY OF THE PAR			THE PARTY STREET, STRE	(8, 12, 10) m/min (315,472,393) ipm			DODONE INFRIDE UNIT PROCESSION IN					
	Cutting feed rate				1 - 5000 mm/min (0.1 - 196 ipm)			1 ~ 5000 mm/min (0.1 ~ 196 ipm)		1 - 5000 mm/min (0.1 - 196 ipm)		1 - 5000 mm/min (0.1 - 196 ipm)			1 ~ 5000 mm/min (0.1 ~ 196 ipm)				
	Tool shank shape				MAS403-BT50			MAS403-BT50		MAS403-BT50		MAS403-BT50				MAS403-BT50	10 10161		
ALITOMATIC	Pull stud				MAS-P50T-1			MAS-P50T-1		MAS-P50T-1		MAS-P50T-1		MAS-P50T-1					
AUTOMATIC	Tool magazine capac	Tool magazine capacity			30 (*4	0, *50, *60, *90)) tools	30 (*40, *50, *60, *90) tools			30 (*40, *50, *60, *90) tools			30 (*40, *50, *60, *90) tools			30 (*40, *50, *60, *90) tools		
TOOL CHANGER	Max. tool diameter (V	Without	ut adjacent tools)			ø130, ((ø200)) [ø5.7", ((ø7.87"))]			ø130, ((ø200)) [ø5.7", ((ø7.87"))]			ø130, ((ø200)) [ø5.7", ((ø7.87"))]			ø130, ((ø200)) [ø5.7", ((ø7.87"))]				
(V/H)	Max. tool length (V/H	1)			350 (13.8") / 300 (11.8")			350 (13.8") / 300 (11.8")			350 (13.8") / 300 (11.8")			350 (13.8") / 300 (11.8")			350 (13.8") / 300 (11.8")		
(*//-1)	Max. tool weight (V/h	H)			20 kg	(44 lb) / 15 kg (33 lb)	20 kg (44 lb) / 15 kg (33 lb)			20 kg (44 lb) / 15 kg (33 lb)			20 kg (44 lb) / 15 kg (33 lb)			20 kg	(44 lb) / 15 kg (33 lb)
POWER	Electrical power suppl	ly				70 KVA		70 KVA				70 KVA		70 KVA				70 KVA	
SOURCE	Compressed air suppl	ly			5 ~ 7	kg/cm ² (70 ~ 9	8 psi)	5 ~ 7	′ kg/cm² (70 ~ 9	8 psi)	5 ~ 7	kg/cm² (70 ~ 9	8 psi)	5 - 7	kg/cm² (70 ~ '	98 psi)	5~7	kg/cm^2 (70 \sim 9	8 psi)
+ CCUD+CV	Positioning accuracy				±0.005	/300 (±0.0002	2" / 12")	±0.005	5/300 (±0.0002	2" / 12")	±0.005	/ 300 (±0.0002	" / 12")	±0.005	/ 300 (±0.000	2" / 12")	±0.005	/300 (±0.000)	2" / 12")
ACCURACY	Repeatability				±1	0.003 (±0.0001	")	±	0.003 (±0.000)	1")	±	±0.003 (±0.0001")		±0.003 (±0.0001")			±1	0.003 (±0.000	")
ANGULAR	Indexing				9	0° x 4 (*5° x 72	2)	9	90° x 4 (*5° x 72	2)	9	0° × 4 (*5° × 72)	9	90° x 4 (*5° x 7:	2)	5	90° x 4 (*5° x 72	2)
ATTACHMENT	Indexing repeatability	/				±3 sec		±3 sec		±3 sec		±3 sec		±3 sec					
	Machine height			5080 (200")				5080 (200")		5080 (200")			5080 (200")				5080 (200")		
MACHINE SIZE	Floor space	F	G	Н	8130 x 7078 (320.1" x 278.7")	8130 x 7493 (320.1" x 295")	8130 x 7913 (320.1" x 311.5")		10130 x 7493 (398.8" x 295")	10130 x 7913 (398.8" x 311.5")	12130 x 7078 (477.6" x 278.7")	12130 x 7493 (477.6" x 295")	12130 x 7913 (477.6" x 311.5")	14330 x 7078 (564.2" x 287.7")	14330 x 7493 (564.2" x 295")		19080 x 7078 (751.2" x 287.7")	THE REAL PROPERTY OF THE PROPE	
SIZE	Machine net weight	F	G	Н	42000 kg (92400 lb)	44000 kg (96800 lb)	48000 kg (105600 lb)	46800 kg (102960 lb)	48300 kg (106260 lb)	54000 kg (118800 lb)	51500 kg (113300 lb)	53000 kg (116600 lb)	60000 kg (132000 lb)	56000 kg (123200 lb)	57800 kg (127160 lb)	66000 kg (145200 lb)	73000 kg (160600 lb)	80000 kg (176000 lb)	85000 kg (187000)

CNC CONTROLLER FANUC SERIES, (*SIEMENS), (*HEIDENHAIN)

STANDARD ACCESSORIES

- Coolant equipment
- Centralized automatic lubrication system
- Rigid tapping
- Splash guard
- Adjusting tools and box (1set)
- Manual and electrical drawing (1set)
- Leveling and foundation fittings
- Work light
- Spindle cooling system (Chiller unit)
- Alarm lamp
- M Air blast
- Automatic power off
- Operation finish lamp
- Screw type chip conveyor
- M Transformer (Except for 220V)
- M Inner Cooled Ballscrew
- Slideway Covers
- Magazine Safety Guard
- M Electrical Cabinet Light
- Manual Tool Change and Foot Switch
- Neinforced Foot-Stand at Both Table-End
- M Electrical Cabinet Cooling System (Air Conditioner)

OPTIONAL ACCESSORIES

- O Chip conveyor (Link type or Scraper type)
- Mist coolant unit
- NC rotary table

Unit: mm (inch)

- O CAT50, DIN50, ISO50, HSK-A100 tool shank Hydraulic Cooling System
- Oil hole drill interface
- Linear scale feedback system
- Automatic tool length measuring system
- Automatic touch probe centering system
- Ocolant through spindle system (A, B type)
- March Kao Ming thermal compensation system Universal Head
- Larger Capacity Coolant Tank
- Fully Enclosed Splash Guard

- O Coolant Purifying System
- O Coolant Cooling System
- Paper(Belt)filter System
- Electrical Cabinet Cooling System (Up to 45°C Capacity) Specified Sub Table, T-slot, Machine Color
- Extra Load Capacity
- Manchoring Alignment System
- Three or four-station AAC system
- 30°Angle Head

^{*}Option: Design specifications are subject to change without prior notice. (()) Max. tool diameter (without adjacent tools) Distance between two columns F=2800 mm, G=3200 mm, H=3600 mm



KAO MING MACHINERY INDUSTRIAL CO., LTD.



HEAD OFFICE

No.861, Sanfong Rd., Fongyuan District, Taichung City, 42073 Taiwan.

CTSP

No.53, Houke S. Rd., Houli District, Taichung City, 42152 Taiwan. TEL: +886-4-25577650 FAX: +886-4-25577630 E-MAIL: km@kaoming.com.tw





DOUBLE COLUMN MULTI CENTER

KAO MING MACHINERY INDUSTRIAL CO., LTD.