KAO MING

ONE MORE STEP TO EXCELLENCE

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KMC-EP

KAO MING Scientific and technological giant of the most humane intention!

Careful Work
Precise Technology

In the modern time, the more complex a mechanical device was, and the more highly trained its operators were. The enterprise promotes the industrial value by the accumulation of technical knowledge. KAO-MING Machinery Co. adopts the strict standard to the products' research and development, and manufactures the high value added product toward to the market strategy. As time went by, KAO-MING insists on the "Artisan spirit" working hard all the time, and let the enterprise shines on the international stage.

one more step to excellence

KMC-EP SERIES

PLANO-MACHINING CENTER↗

MAIN FEATURES

1.The new machine model is equipped with moveable crossbeam (W-axis). The 4-axis control provides the machine with 5-face(multi-face) machining capability.
2.Optimized and minimized machining ranges can be made under the mutual movement function between Z (700mm) and W(1100mm) axes for varied workpieces.
3.Roller-type recirculating bearing for the movement of carriages are used on X、Y-axis insert-boxways.
4.The mounting brackets for the W axis ballscrews are integrated with the columns to maximize the rigidity further.
5.FEA has been adopted to check the deformation and vibration mode of the machine structure to ensure getting best rigidity and optimum design.
6.The crossbeam with strong ribs layout provide optimum bending and torsional stress.
7.A ram-type casted spindle head with a cross section of 400x400mm ensures high rigidity and stability under heavy-duty cutting.
8.The spindle and motor are symmetrically put on the center line of the ram. Max spindle speed: 6000rpm, max spindle Output: 30/35HP and max spindle torque: 600Nm.
9.Coolant through spindle system (option) can clean chips from high speed cutting and restrain heat.
10.Horizontal spindle has high-precision hardened and ground spiral bevel gears that can reduce shock and noises effectively to ensure running stability.
11.2-station AAC(Automatic Attachment Changer) is standard; V-head/H-head change and ATC(V/H) change.
12.Automatic universal head, 30-degree angle head, extension head are optionally available for versatile applications.

DIRECT-DRIVE OF THE Y, Z, W AXIS

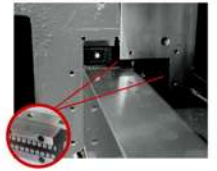
The servo motors are coupled directly to the ball-screw end to maximize the efficiency further.

INTEGRAL BALLSCREW MOUNTING BRACKETS

The mounting brackets for the W axis ballscrews are integrated with the columns to maximize the rigidity further.

POWERFUL CLAMPING

Powerful clamping devices on both sides of the crossbeam ensure high accuracy even for heavy cutting.



SLIDING ROLLING COMBINED DESIGN

Roller packs for the movement of carriages are adopted to use on X、Y-axis insert-boxways to increase the feed and rigidity. Thanks to the right choice of material and good solution for the machining process,We can make the machine have the better performance of high rigidity and accuracy.

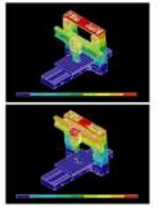
400 x 400 RAM

BEST LAYOUT OF SPINDLE SYSTEM

One piece with square shape headstock.
Unique design of spindle head features that the spindle and motor are symmetrically put on the center line, and then reduces the thermal growth.

INNER COOLED BALLSCREW

Cooled oil continuously flows through the center of the ballscrew. The temperature of the oil is cooled, circulating through an external heat exchanger. This greatly enhances the machine's performance and accuracy by practically eliminating thermal growth of the axis especially when using the full traverse. Both support end of the X-axis ballscrew are equipped with a special design device to cool bearings by air. This superior design is unique to Kao Ming.



FOUR GUIDEWAY HIGH RIGIDITY STRUCTURE

Machine base has four-boxway to support by sliding and rolling combined design.Central boxway for main support is hardened and ground , covered with Turcite-B which features strong absorb ability enhancing dynamic rigidity.Moreover , 2-side boxway is as same as central boxway but further employs extra roller-type recirculating bearing to strengthen support. This design can get less loading and more tolerance.

EXTERNAL AXIS POSITION FEEDBACK

The ballscrew is driven by a motor and gear box with a gear ratio of 1:2 for added strength to the axis feed system. The external position feedback pulse coder is coupled directly to the opposite end of the ballscrew. This allows for high positioning accuracy to be maintained by measuring the true rotation of the ballscrew.

FINITE ELEMENT ANALYSIS

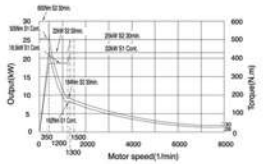
Optimized design of main structure through the Finite Element Method (FEM) analysis , to ensure excellent rigidity , suitable for both high speed and heavy-duty cutting.

HEAVY-DUTY CUTTING

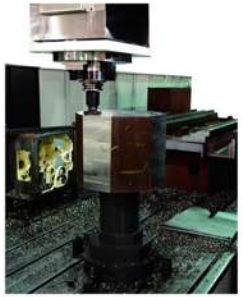
V-HEAD CUTTING EXAMPLE
(TEST IN THE BEST ENVIRONMENT)

Face mill cutter (mm)	ø125
Work material	S45C
Spindle speed(rpm)	400
Cutting width (mm)	100
Cutting depth (mm)	7
Feedrate (mm/min)	1000
Cutting capacity(cm³/min)	700

SPINDLE OUTPUT AND TORQUE
FANUC SPINDLE MOTOR:22/25KW(30/35HP)



POWERFUL VERTICAL CUTTING



POWERFUL HORIZONTAL CUTTING

IDD SPINDLE IN-LINE DESIGN

Spindle and spindle motor are arranged in the connection of an IDD(Isolated Direct Drive) system. This arrangement can reduce the heat transfer , and increase the performance of the machine.
Powerful 22/25kw spindle motor is adopted to make the spindle have maximum output torque 600Nm and maximum speed 6000rpm/8000rpm.
IN-LINE design for 2-speed gear spindle head is optionally available. This system can make the coolant flow straightly through motor · reducer · spindle and attached head.

STANDARD HEADS

VERTICAL HEAD

Max. Speed : 6000rpm/8000rpm
Max. Power : 22/25kw

HORIZONTAL HEAD

Max. Speed : 3500rpm
Max. Power : 18.5/22kw

OPTIONAL HEADS

EXTENSION HEAD

Max. Speed : 4000rpm
Max. Power : 22/25kw

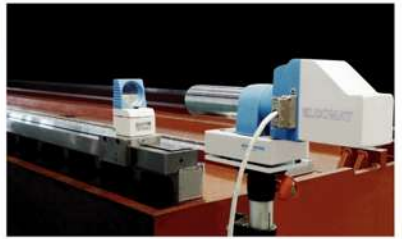
30-DEGREE ANGLE HEAD

Max. Speed : 3500rpm
Max. Power : 18.5/22kw

UNIVERSAL HEAD

Max. Speed : 3500rpm
Max. Power : 18.5/22kw

GEOMETRIC ACCURACY INSPECTION



STRAIGHTNESS MEASUREMENT

THERMAL COMPENSATION TEST

LIGHTING MEASUREMENT

RIGIDITY TEST

KINEMATIC OPT

LASER POSITIONING ACCURACY INSPECTION

ATC

AAC

AUTOMATIC TOOL CHANGER AND AUTOMATIC ATTACHMENT CHANGER

ATC-H (Horizontal) is integrated into original ATC-V(vertical) which features simple construction and innovative design.

2-position AAC (Automatic Attachment Changer) is designed for improving productivity.

Angular attachment and vertical head cap are put in AAC magazine which has upper and lower seat and moves back and forth - separately or together. The unique design of AAC magazine can be allowed to extend more stations for application.

Automatic angular attachment can be indexed 72 positions in 5° increment, and has ±3 sec. index repeatability accuracy.

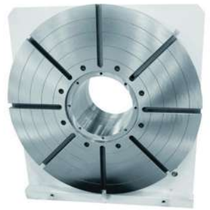
COOLANT THROUGH SPINDLE SYSTEM

The optional, Coolant Through the Spindle feature utilizes a complete pump/filtration system, rather than a single auxiliary pump as commonly used by our competition. This system is equipped with a large 600/1000L capacity reservoir. High pressure pump, and two precision filters, with a choice of various output pressures.

COOLANT THROUGH SPINDLE SYSTEM

	Medium pressure	High pressure
Pressure(Kg / cm^2)	20bar(284psi)	45bar(639psi)
Quantity(ℓ / min)	30L/min(7.92gal/min)	30L/min(7.92gal/min)

MACHINE STANDARD & OPTIONAL ACCESSORIES



NC ROTARY TABLE

AUTOMATIC TOOL LENGTH MEASURING SYSTEM

OIL COOLING SYSTEM

LINK-TYPE CHIP CONVEYOR

AUTOMATIC TOUCH PROBE CENTERING SYSTEM

CONTROL CABINET COOLING SYSTEM(AIR CONDITIONER)

KMTCS-KAO MING THERMAL COMPENSATION SYSTEM (OPT.)

KMTCS is the unique integrated techniques of inverter thermostat spindle cooler, thermo-compensation card and PLC software. The system features to make the spindle always have the constancy of temperature by quickly changing the power factor of frequency compressor while spindle temperature rises up or down due to spindle speed change. For the necessity of high speed machining all day at maximum or fixed spindle revolution, such as finish-machining of die/mold, KMTCS is considerable due to it's stable and accurate performance. In this case, to control the deviations of the spindle elongation within 0.02mm, even 0.01mm is possible under the conditions of neglecting the influences of environments from practical experiences. Furthermore, the other thermo-compensation system PMC-M is optionally available. PMC-M features intelligent use of shift function and the integration techniques of NC, PLC and thermo-compensation card.

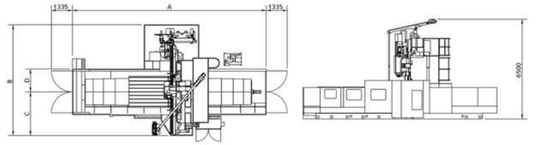
STANDARD ACCESSORIES

- Vertical and horizontal attachment head
- Coolant equipment
- Centralized automatic lubrication system
- Rigid tapping
- Splash guard
- Adjusting tools and box(1 set)
- Manual and electrical drawing(1 set)
- Leveling and foundation fittings
- Work light
- Spindle cooling system(Chiller unit)
- Alarm lamp
- Air blast
- Automatic power off
- Operation finish lamp
- Screw-type chip conveyor
- Transformer(except 220v)
- Inner cooled ballscrew
- Control cabinet cooling system(Air conditioner)
- Table side foot stand
- Sideway covers
- Crossbeam handrail and ladder
- ATC magazine safety guard
- Electrical cabinet light
- Manual tool change device

OPTIONAL ACCESSORIES

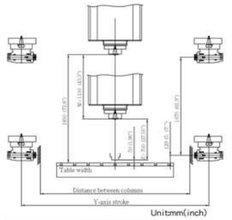
- Link-type chip conveyor
- NC rotary table
- CAT50,DIN50,ISO50 tool shank
- Linear scale feedback system
- Linear scale feedback system for W-axis
- Automatic tool length measuring system
- Automatic tool touch probe centering system
- Multi-stations AAC magazine
- Coolant through spindle system (A,B type),include larger capacity coolant tank.
- KMTCS-Kao Ming Thermal Compensation System
- Vibration isolation system (Machinery Mounts)
- Mist coolant unit
- Fully enclosed splash guard
- Coolant purifying system
- Coolant cooling system
- Hydraulic cooling system
- Paper(Belt) filter system
- CRT cooling system(Air conditioner)
- Oil skimmer system
- Custom sub table
- Custom T-slot
- Custom color
- 30-DEGREE ANGLE HEAD
- EXTENSION HEAD,UNIVERSAL HEAD

FLOOR SPACE



	325EP	331EP	337EP	425EP	431EP	437EP	525EP	531EP	537EP	625EP	631EP	637EP	825EP	831EP	837EP
A	8400(330.7")			10400(409.4")			12400(488.1")			14400(566.9")			18400(724.4")		
B	7050 (277.5")	7650 (301.1")	8250 (324.8")	7050 (277.5")	7650 (301.1")	8250 (324.8")	7050 (277.5")	7650 (301.1")	8250 (324.8")	7050 (277.5")	7650 (301.1")	8250 (324.8")	7050 (277.5")	7650 (301.1")	8250 (324.8")
C	2775 (109.2")	3075 (121.0")	3375 (132.8")	2775 (109.2")	3075 (121.0")	3375 (132.8")	2775 (109.2")	3075 (121.0")	3375 (132.8")	2775 (109.2")	3075 (121.0")	3375 (132.8")	2775 (109.2")	3075 (121.0")	3375 (132.8")
D	1460 (57.4")	1760 (69.3")	2060 (81.1")	1460 (57.4")	1760 (69.3")	2060 (81.1")	1460 (57.4")	1760 (69.3")	2060 (81.1")	1460 (57.4")	1760 (69.3")	2060 (81.1")	1460 (57.4")	1760 (69.3")	2060 (81.1")

MACHINING RANGE



Unit:mm(inch)

Distance between columns	F	G	H
Table width	2000 (78.74")	2600 (102.4")	3000 (118.1")
Y-axis stroke	3200 (125.9")	3800 (149.6")	4400 (173.2")

Unit:mm(inch)

Table length	3000 (118.1")	4000 (157.5")	5000 (118.1")	6000 (236.2")	8000 (314.9")
X-axis stroke	3230 (127.2")	4230 (166.5")	5090 (118.1")	6090 (245.3")	8290 (324.0")

SPECIFICATIONS

Unit:mm(inch)

	ITEM		KMC-325EP	KMC-331EP	KMC-337EP	KMC-425EP	KMC-431EP	KMC-437EP	KMC-525EP	KMC-531EP	KMC-537EP	KMC-625EP	KMC-631EP	KMC-637EP	KMC-825EP	KMC-831EP	KMC-837EP
Travels	Distance between columns	F G H	2550 (100.4")	3150 (124.0")	3750 (147.6")	2550 (100.4")	3150 (124.0")	3750 (147.6")	2550 (100.4")	3150 (124.0")	3750 (147.6")	2550 (100.4")	3150 (124.0")	3750 (147.6")	2550 (100.4")	3150 (124.0")	3750 (147.6")
	X-axis (table longitudinal)		3230 (127.2")			4230 (166.5")			5230 (205.9")			6230 (245.3")			8230 (324.0")		
	Y-axis (spindle lateral)	F G H	3200 (125.9")	3800 (149.6")	4400 (173.2")	3200 (125.9")	3800 (149.6")	4400 (173.2")	3200 (125.9")	3800 (149.6")	4400 (173.2")	3200 (125.9")	3800 (149.6")	4400 (173.2")	3200 (125.9")	3800 (149.6")	4400 (173.2")
	Z-axis		700 (27.55") *1100(43.3")			700 (27.55") *1100(43.3")			700 (27.55") *1100(43.3")			700 (27.55") *1100(43.3")			700 (27.55") *1100(43.3")		
	W-axis		1100 (43.3") *1500(59.1")			1100 (43.3") *1500(59.1")			1100 (43.3") *1500(59.1")			1100 (43.3") *1500(59.1")			1100 (43.3") *1500(59.1")		
	Distance from table surface to spindle nose		50~1850 (1.96"~72.8")*50~2650 (1.96"~104.3")			50~1850 (1.96"~72.8")*50~2650 (1.96"~104.3")			50~1850 (1.96"~72.8")*50~2650 (1.96"~104.3")			50~1850 (1.96"~72.8")*50~2650 (1.96"~104.3")			50~1850 (1.96"~72.8")*50~2650 (1.96"~104.3")		
	Distance from table surface to horizontal spindle center		129~1804(5.07"~71.02")*129~2604(5.07"~102.5")			129~1804(5.07"~71.02")*129~2604(5.07"~102.5")			129~1804(5.07"~71.02")*129~2604(5.07"~102.5")			129~1804(5.07"~71.02")*129~2604(5.07"~102.5")			129~1804(5.07"~71.02")*129~2604(5.07"~102.5")		
Table	Table working surface	F G H	2000×3000(78.74"×118.1")	2600×3000(102.4"×118.1")	3000×3000(118.1"×118.1")	2000×4000(78.74"×157.7")	2600×4000(102.4"×157.7")	3000×4000(118.1"×157.7")	2000×5000(78.74"×196.6")	2600×5000(102.4"×196.6")	3000×5000(118.1"×196.6")	2000×6000(78.74"×236.2")	2600×6000(102.4"×236.2")	3000×6000(118.1"×236.2")	2000×8000(78.74"×314.9")	2600×8000(102.4"×314.9")	3000×8000(118.1"×314.9")
	Table configuration	F G H	24 H8 mmX9X230mm	28 H8 mmX13X200mm	28 H8 mmX15X200mm	24 H8 mmX9X230mm	28 H8 mmX13X200mm	28 H8 mmX15X200mm	24 H8 mmX9X230mm	28 H8 mmX13X200mm	28 H8 mmX15X200mm	24 H8 mmX9X230mm	28 H8 mmX13X200mm	28 H8 mmX15X200mm	24 H8 mmX9X230mm	28 H8 mmX13X200mm	28 H8 mmX15X200mm
	Max. table load		11000kg(24200 lb)/*18000kg(39600 lb)			13000kg(28600 lb)/*22000kg(44000 lb)			14000kg(30800 lb)/*22000kg(48400 lb)			15000kg(33000 lb)/*25000kg(55000 lb)			15000kg(33000 lb)/*25000kg(55000 lb)		
Spindle	Spindle speed	Vertical	6000rpm/*8000rpm			6000rpm/*8000rpm			6000rpm/*8000rpm			6000rpm/*8000rpm			6000rpm/*8000rpm		
		Horizontal	3500rpm			3500rpm			3500rpm			3500rpm			3500rpm		
	Spindle taper		ISO 50			ISO 50			ISO 50			ISO 50			ISO 50		
	Spindle motor (cont./30min)		AC 22/25kw			AC 22/25kw			AC 22/25kw			AC 22/25kw			AC 22/25kw		
	Max. spindle torque		600Nm (60kg-m)			600Nm (60kg-m)			600Nm (60kg-m)			600Nm (60kg-m)			600Nm (60kg-m)		
Feed rate	Rapid traverse (X, Y, Z, W)		12, 10, 10, 3(m/min)	12, 10, 10, 3(m/min)	12, 8, 10, 3(m/min)	10,10,10,3(m/min)	10, 10,10,3(m/min)	10, 8,10,3(m/min)	8, 10, 10, 3(m/min)	8,10,10,3(m/min)	8, 8,10,3(m/min)	7, 10,10,3(m/min)	7,10,10, 3(m/min)	7, 8,10, 3(m/min)	7, 10,10,3(m/min)	7,10,10, 3(m/min)	7, 8,10, 3(m/min)
			472,393,393,118(ipm)	472,393,393,118(ipm)	472,315,393,118(ipm)	393,393,393,118(ipm)	393,393,393,118(ipm)	393,315,393,118(ipm)	315,393,393,118(ipm)	315,393,393,118(ipm)	315,315,393,118(ipm)	276,393,393,118(ipm)	276,393,393,118(ipm)	276,315,393,118(ipm)	276,393,393,118(ipm)	276,393,393,118(ipm)	276,315,393,118(ipm)
	Cutting feed rate		1~5000mm/min (0.1~196 ipm)			1~5000mm/min (0.1~196 ipm)			1~5000mm/min (0.1~196 ipm)			1~5000mm/min (0.1~196 ipm)			1~5000mm/min (0.1~196 ipm)		
Automatic tool changer	Tool shank shape		MAS403-BT50			MAS403-BT50			MAS403-BT50			MAS403-BT50			MAS403-BT50		
	Pull stud		MAS-P50T-1			MAS-P50T-1			MAS-P50T-1			MAS-P50T-1			MAS-P50T-1		
	Tool magazine capacity		60 (*90)			60 (*90)			60 (*90)			60 (*90)			60 (*90)		
	Max. tool diameter((without adjacent tools))		Ø125(4.92"), ((Ø250/9.84"))			Ø125(4.92"), ((Ø250/9.84"))			Ø125(4.92"), ((Ø250/9.84"))			Ø125(4.92"), ((Ø250/9.84"))			Ø125(4.92"), ((Ø250/9.84"))		
	Max. tool length		350 (13.8")			350 (13.8")			350 (13.8")			350 (13.8")			350 (13.8")		
	Max. tool weight		25kg (55 lb)			25kg (55 lb)			25kg (55 lb)			25kg (55 lb)			25kg (55 lb)		
Power sources	Electrical power supply		80 KVA			80 KVA			80 KVA			80 KVA			80 KVA		
	Compressed air supply		5~7 kg/cm2			5~7 kg/cm2			5~7 kg/cm2			5~7 kg/cm2			5~7 kg/cm2		
Accuracy	Positioning accuracy		±0.01mm/1000(±0.0004"/39.37")			±0.01mm/1000(±0.0004"/39.37")			±0.01mm/1000(±0.0004"/39.37")			±0.01mm/1000(±0.0004"/39.37")			±0.01mm/1000(±0.0004"/39.37")		
	Repeatability		X,Y,Z:±0.003(±0.0001") W:±0.005(±0.0002")			X,Y,Z:±0.003(±0.0001") W:±0.005(±0.0002")			X,Y,Z:±0.003(±0.0001") W:±0.005(±0.0002")			X,Y,Z:±0.003(±0.0001") W:±0.005(±0.0002")			X,Y,Z:±0.003(±0.0001") W:±0.005(±0.0002")		
Machine size	Machine height		6500(255.9")			6500(255.9")			6500(255.9")			6500(255.9")			6500(255.9")		
	Floor space	L x W	8400X7050(330.7"×227.5")	8400×7650(330.7"×301.1")	8400×8250(330.7"×324.8")	10400X7050(409.4"×277.5")	10400×7650(330.7"×301.1")	10400×8250(330.7"×324.8")	12400X7050(488.1"×277.5")	12400×7650(488.1"×301.1")	12400×8250(488.1"×324.8")	14400X7050(566.9"×277.5")	14400×7650(566.9"×301.1")	14400×8250(566.9"×324.8")	18440X7050(724.4"×277.5")	18440×7650(724.4"×301.1")	18440×8250(724.4"×324.8")
	Machine net weight		42000kg(92400 lb)	44000kg(96800 lb)	48000kg (105600 lb)	46800kg(102960 lb)	48300kg(106260 lb)	54000kg (118800 lb)	50000lg (110000 lb)	53000lgkg(116600 lb)	63000lgkg (132000lb)	56000kg (123200 lb)	57800kg(127160 lb)	66000kg (145200 lb)	65600kg (123200 lb)	67200kg (127160 lb)	75400kg (150800 lb)
CNC controll	FANUC-18i(31i) series (*HEIDENHAIN)																

*Option Design specifications are subject to change without notice. (( ))Max. tool diameter(without adjacent tools)

Distance between two columns F=2550mm(100.4") G=3150mm(124.0") H=3750mm(147.6")