

專注航太·品質·創造未來
Aiming At Aerospace Solutions

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MEMBER OF
T GROUP
2023/08

Aluminum



AERO Series
Complete Machining Solutions

AIMING AT AEROSPACE SOLUTIONS



ASIA PACIFIC ELITE CORP. (APEC) IS A SUBSIDIARY OF **TTGroup**, THE **BIGGEST MACHINE TOOLS GROUP** IN TAIWAN

APEC aims at "Aerospace manufacturing process" and defines ourselves as a resources integrator, solutions provider and customers' best strategic partner of OEM, Tier1 to Tier3.

APEC has the world's most complete medium and large aerospace structure and engine parts processing solutions.

Besides, we also have 20 years of professional practical experience in die & mold and precision machining.

Our clients are all over the world, like Canada, the USA, Germany, Japan, Mainland China and Taiwan, etc. Furthermore, we offer comprehensive customer services including factory planning, intelligent manufacturing, technical training, process upgrades and Turnkey solutions.



High-end facility & Smart manufacturing



Training program & Talent supply



Turnkey solution & Process level up



After - sales service



Factory planning



TIMS

- Production management
- Intelligent monitoring
- RFID tool management
- Workpiece management
- Order management



TLM

- Machine status
- Utilization analysis
- Alarm history
- Operation history
- Program upload/download



AGA key components

- Spindle
- Milling Head
- Trunnion Table



Aerospace Gebert APEC is a brand which provide key components of aerospace processing. It is developed by APEC and Dr.Gebert's team from Germany.AGA provides the brilliant components such as high power high speed Spindle, Milling Head and Trunnion Table which are especially designed for APEC machines. This allows us to provide after-sales service more effcently and accurately.

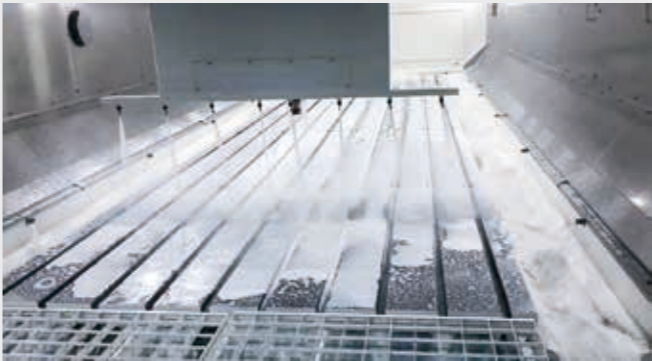


Aluminum alloy

Aluminum alloy has the characteristics of light weight, low temperature resistance, high strength, low cost, etc., and has good ductility. Since the aerospace industry became popular, it has been widely used in the aerospace industry.

Characteristics

The material removal rate of aluminum alloy structural parts is as high as 93%-97%. The processing machine must have a high-speed spindle and a large number of chip removal configurations in order to have the best cutting quality and production efficiency and achieve the best high removal rate in the industry.



Cross beam flushing system

High pressure pump with groups of powerful nozzles can quickly remove the chips.



Automatic top-roof cover

Movable beam design of top-roof cover could prevent spreading of chips and coolant liquid.



Complex chip removal system

Dual chip removal system with a large-capacity water tank could make coolant and chip removal stable and efficient.



Automatic attachment head exchange system

Different angle heads could be mounted to match various applications and it is best for machining in narrow spaces.



5-Axis High Speed Gantry Machining Center

Box-in-Box structure

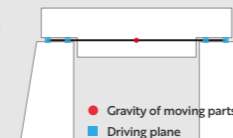
Symmetrical geometry design with Box-in-Box structure features full force flow and thermal symmetry and DCG(Driving at the center of gravity)
Benefits of DCG: Excellent dynamics, improved surface finish, reduced manual polishing time.

Unequal thickness of Ram

Ram equipped with honeycomb structure performs the best balancing design and better geometry.

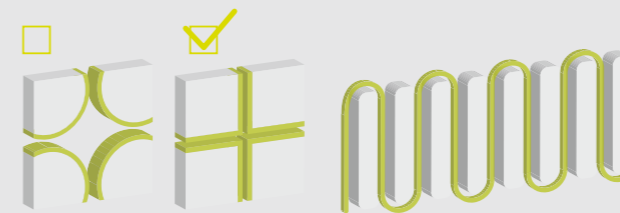
The lowest gravity center in the world

Zero distance between gravity of the moving parts and the driving plane makes the gravity center closer to the driving plane. The machining stability could then be improved and the best machine rigidity could be ensured.



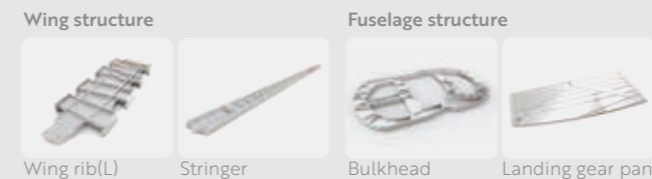
APEC linear motor can save 32% of energy thanks to special magnet and cooling design.

Motor drive system energy-saving up to 32%, the thrust increases by 10% because of internal coil of the motor adopts a special winding and magnets increase the interactive response area through different arrangements.



Large gap in ordinary magnet Small gap in special magnet (Great interactive response) Special type for coil winding

Suitable workpieces



Specification	Unit	SK M 27-5L	SK M 32-5L	SK M 40-5L
Travel		SKM 2740/50/60/80	SKM 3240/50/60/80	SKM 4040/50/60/80
X-axis	mm	4,000/5,000/6,000/8,000		
Y-axis	mm	2,700	3,200	4,000
Z-axis	mm	1,000		
Distance from spindle end to table	mm	According to the selected model, the configuration will be different, Please contact our sales for more details.		
Table				
T-slot size	mm	28		
Length	mm	4,000 /5,000/6,000/8,000		
Width	mm	2,200	2,700	3,500
Max. table load	kg/m ²	8,000		
Feedrate				
Rapid traverse	m/min	XYZ=60		
X.Y.Z axis acceleration	m/sec ²	5~8		
Accuracy				
Positioning (VDI3441)	mm	X=0.015~0.030, Y=0.012,Z=0.008	X=0.015~0.030, Y=0.012,Z=0.008	X=0.015~0.030, Y=0.015,Z=0.008
X-axis changes according to different stroke specifications.				
Repeatability (VDI3441)	mm	X=0.010~0.015, Y=0.008,Z=0.005	X=0.010~0.015, Y=0.008,Z=0.005	X=0.010~0.015, Y=0.010,Z=0.005
X-axis changes according to different stroke specifications.				
Spindle(Standard)				
Spindle taper		HSK63A		
Spindle speed	rpm	24,000		
Spindle power(SI/S6)	kw	60/75		
Spindle torque(SI/S6)	Nm	48.2/60.5		
Automatic tool changer(Standard)				
Tool shank	pcs	30T		
Max. tool length	mm	300		
Max. tool diameter with adjacent tool	mm	Ø100		
Max. tool diameter without adjacent tool	mm	Ø130		
Max. tool weight	kg	7		
Others				
Machine weight	tons.	67	84	99

Item	Specification	Standard accessories	Optional accessories
Controller	HEIDENHAIN TNC640 MPG HR520	<input checked="" type="radio"/>	<input type="radio"/>
	HEIDENHAIN TNC640 MPG HR550/SIEMENS SINUMERIK ONE	<input type="radio"/>	<input checked="" type="radio"/>
Spindle	AGA HSK63A 24,000rpm 60/75 kW	<input checked="" type="radio"/>	<input type="radio"/>
	AGA HSK100A 15,000rpm 45/54 kW#1	<input type="radio"/>	<input checked="" type="radio"/>
	AGA HSK100A 20,000rpm 120/128 kW#1	<input type="radio"/>	<input checked="" type="radio"/>
	AGA HSK63A 30,000rpm 100/124 kW	<input type="radio"/>	<input checked="" type="radio"/>
Drive System	XYZ axis driven by linear motor	<input checked="" type="radio"/>	<input type="radio"/>
Automatic tool changer	30T	<input checked="" type="radio"/>	<input type="radio"/>
	40T / 60T	<input type="radio"/>	<input checked="" type="radio"/>
Cutting coolant	Coolant around spindle / Coolant through spindle 20bar	<input checked="" type="radio"/>	<input type="radio"/>
	Coolant through spindle 70bar	<input type="radio"/>	<input checked="" type="radio"/>
System coolant	Chiller for spindle / Air conditioner for electrical cabinet	<input checked="" type="radio"/>	<input type="radio"/>
Chip removal system	Complex chip conveyor / Enlarged coolant tank	<input checked="" type="radio"/>	<input type="radio"/>
Workpiece measurement system	BLUM workpiece measurement system(TC60+RC66)	<input type="radio"/>	<input checked="" type="radio"/>
Tool measurement system	Renishaw workpiece measurement system(RMP600)	<input type="radio"/>	<input checked="" type="radio"/>
	BLUM tool measurement system(NT-A4)	<input type="radio"/>	<input checked="" type="radio"/>
Smart factory	Renishaw tool measurement system(NC4-F230)	<input type="radio"/>	<input checked="" type="radio"/>
	TIMSsystem / TLMsystem	<input type="radio"/>	<input checked="" type="radio"/>
Others	Security door interlocks / Air dryer / Isolation transformer	<input checked="" type="radio"/>	<input type="radio"/>
	Spindle oil / air lubrication system / Oil mist collecting system	<input checked="" type="radio"/>	<input type="radio"/>
	5 axis with Heidenhain optical scale / Waterproof working lamps	<input checked="" type="radio"/>	<input type="radio"/>
	Brake system for linear motors	<input checked="" type="radio"/>	<input type="radio"/>
	Automatic open / close top roof sliding cover / Stabilizer	<input type="radio"/>	<input checked="" type="radio"/>
	Automatic Kinematics measuring and calibration system	<input type="radio"/>	<input checked="" type="radio"/>

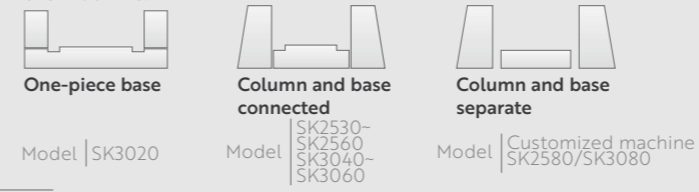
#1 If HSK 100A spindle is chosen, ATC standard would be 20T.Opt.would be 40T/60T



SK
5-Axis High Speed Gantry
Machining Center

U-shape structure

U-shape structure can be completely shipped with one container without disassembly. Rework time could be reduced when installing the machine.

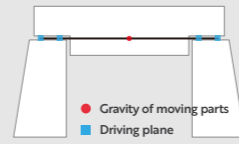


X/Y axis driven by linear motor

Max. feedrate : 60 m/min
Max. acceleration : 5 m/sec²

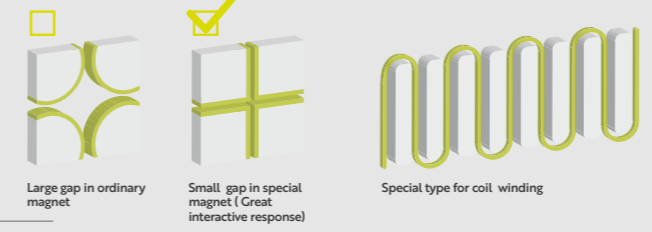
The lowest gravity center in the world

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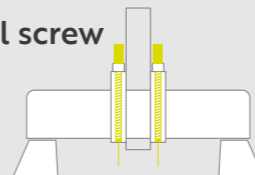
APEC linear motor can save 32% of energy thanks to special magnet and cooling design.

Motor drive system energy-saving up to 32% and thrust increases by 10% thanks to internal coil of the motor adopts a special winding and magnets increase the interactive response area through different arrangements.

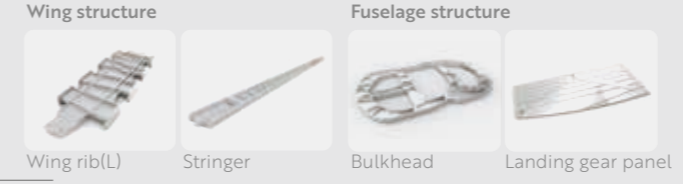


2 axis driven by double ball screw

Double ball screws with twin servo motor provides high dynamic and makes cutting accuracy stable.



Suitable workpieces



Specification	Unit	SK 25-5L	
		SK 2530/40/50/60/80	SK 30-5L SK 3020/40/50/60/80
Travel			
X-axis	mm	3,000/4,000/5,000/6,000/8,000	2,000/4,000/5,000/6,000/8,000
Y-axis	mm	2,500	3,000
Z-axis	mm	1,000	
Distance from spindle end to table	mm	According to the selected model, the configuration will be different. Please contact our sales for more details.	
Table			
T-slot size	mm	28	
Length	mm	3,000/4,000/5,000/6,000/8,000	2,000/4,000/5,000/6,000/8,000
Width	mm	2,000	3,000/2,500/2,500/2,500/2,500
Max. table load	kg/m ²	8,000	
Feedrate			
Rapid traverse	m/min	X/Y/Z==60/60/40	
X.Y.Z axis acceleration	m/sec ²	5	
Accuracy			
Positioning(VDI3441)	mm	X=0.012-0.030(Depending on the travel), Y=0.012, Z=0.008	
Repeatability(VDI3441)	mm	X=0.008-0.015(Depending on the travel), Y=0.008, Z=0.005	
Spindle(Standard)			
Spindle taper		HSK63A	
Spindle speed	rpm	24,000	
Spindle power(S1/S6)	kW	60/75	
Spindle torque(S1/S6)	Nm	48.2/60.5	
Automatic tool changer(Standard)			
Tool shank	pcs	30T	
Max. tool length	mm	300	
Max. tool diameter with adjacent tool	mm	Ø100	
Max. tool diameter without adjacent tool	mm	Ø130	
Max. tool weight	kg	7	
Others			
Machine weight	tons.	35~65	

Item	Specification	Standard accessories	Optional accessories
Controller	HEIDENHAIN TNC640 MPG HR520	●	
	HEIDENHAIN TNC640 MPG HR550 / SIEMENS SINUMERIK ONE		○
Spindle	AGA HSK63A 24,000rpm 60/75 kW	●	
	AGA HSK100A 15,000rpm 45/54 kW#1		○
Drive System	XY axis with linear motor drive, Z axis with ball screw drive	●	
Automatic tool changer	30T	●	
	40T / 60T		○
Cutting coolant	Coolant around spindle / Coolant through spindle 20bar	●	
	Coolant through spindle 70bar		○
System coolant	Chiller for spindle / Air conditioner for electrical cabinet	●	
Chip removal system	Complex chip conveyor / Enlarged coolant tank	●	
Workpiece measurement system	BLUM workpiece measurement system(TC60+RC66)		○
	Renishaw workpiece measurement system(RMP600)		○
Tool measurement system	BLUM tool measurement system(NT-A4)		○
	Renishaw tool measurement system(NC4-F230)		○
Smart factory	TIMSystem / TLMsystem		○
Others	Security door interlocks / Air dryer / Isolation transformer	●	
	Spindle oil / air lubrication system / Oil mist collecting system	●	
	5 axis with Heidenhain optical scale / Waterproof working lamps	●	
	Waterproof working lamps / Brake system for linear motors	●	
	Automatic open / Stabilizer / close top roof sliding cover #2		○
	Automatic Kinematics measuring and calibration system		○

#1 If HSK 100A spindle is chosen, ATC standard would be 20T. Opt. would be 40T/60T
#2 SK2530/SK2540/SK3020 are standard, others are option.

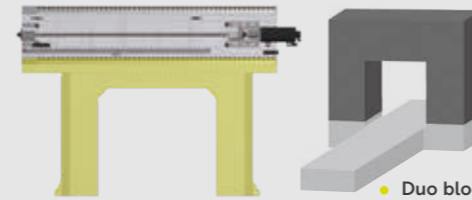


MT¹⁵

5-axis High Speed
Double Column Machining Center

Duo block structure design

Machine rigidity and working stability could be enhanced via duo block structure design.



• Duo block structure

Larger machining area

Despite the smallest footprint in its class, this compact model features a wide machining area and complete functions.

Suitable workpieces

Wing structure



Wing rib(S/M)



Spar

Fuselage structure



Cross beam

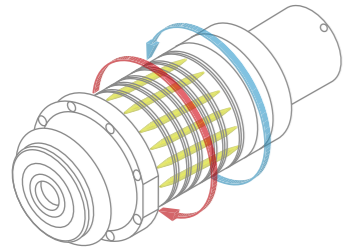


Pylon

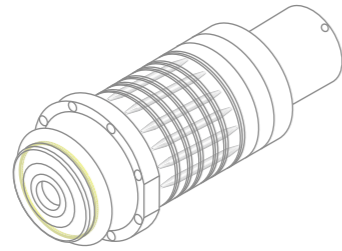
Specification	Unit	MT15	
		MT1520-5S	MT1530-5S
Travel			
X-axis	mm	2,000	3,000
Y-axis	mm	2,000	
Z-axis	mm	850(1,000 opt)	
Distance from spindle end to table	mm	-100-750	
Table			
T-slot size	mm	20x125	
Length	mm	2,100	3,100
Width	mm	1,200	
Max. table load	tons.	3	5
Feedrate			
Rapid traverse	m/min	X/Y/Z=30	
X.Y.Z axis acceleration	m/sec ²	5	
Accuracy			
Positioning(VDI3441)	mm	X=0.030 , Y=0.010 , Z=0.008	
Repeatability(VDI3441)	mm	X=0.025 , Y=0.008 , Z=0.005	
Spindle(Standard)			
Spindle taper		HSK63A	
Spindle speed	rpm	24,000	
Spindle power(S1/S6)	kW	60/75	
Spindle torque(S1/S6)	Nm	48.2/60.5	
Automatic tool changer			
Tool shank	pcs	32T	
Max. tool length	mm	300	
Max. tool diameter with adjacent tool	mm	Ø75	
Max. tool diameter without adjacent tool	mm	Ø130	
Max. tool weight	kg	8	
Others			
Machine weight	tons.	20	24

● Standard accessories ○ Optional accessories

Item	Specification	
Controller	HEIDENHAIN TNC640 MPG HR510	●
	HEIDENHAIN TNC640 MPG HR520 / HR550	○
	SIEMENS SINUMERIK ONE	○
Spindle	AGA HSK63A 24,000rpm 60/75 kW	●
Drive System	XYZ with high speed ball screw driving	●
Automatic tool changer	32T	●
	40T / 60T	○
Cutting coolant	Coolant around spindle	●
	Coolant through spindle 20bar	●
	Coolant through spindle 70bar	○
System coolant	Chiller for spindle	●
	Air conditioner for electrical cabinet	●
Chip removal system	Complex chip conveyer	●
	Enlarged coolant tank	●
Workpiece measurement system	BLUM workpiece measurement system(TC60-RC66)	○
	Renishaw workpiece measurement system(RMP600)	○
Tool measurement system	BLUM tool measurement system(NT-A4)	○
	Renishaw tool measurement system(NC4-F230)	○
Smart factory	TIMSystem / TLMsystem	○
Others	Security door interlocks / Air dryer / Isolation transformer	●
	Spindle oil / air lubrication system / Oil mist collecting system	●
	5 axis with Heidenhain optical scale / Waterproof working lamps	●
	Fully enclosure Splash Guard	●
	Automatic Kinematics measuring and calibration system / Stabilizer	○



Cooling circuit and Heat pipes

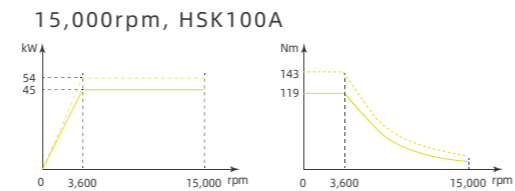
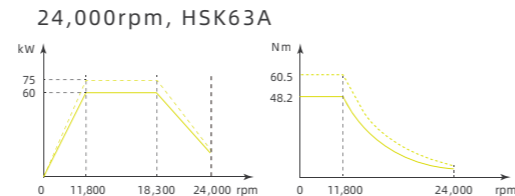


Labyrinth seal and Brush seal

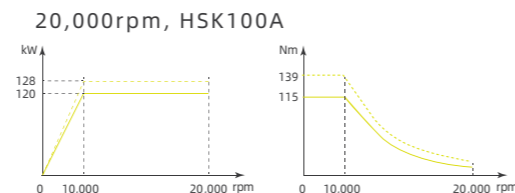
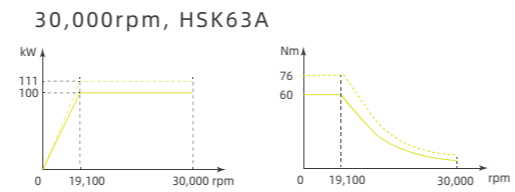
AGA ultra-high speed & power spindle

- Heat pipes for efficient heat transfer
AGA Heat pipes have 1000x better heat conductivity than comparable sticks made of copper which also cause a homogenous temperature inside the components.
- Dustproof and waterproof design :
Use of brush seals for aircraft engines
 - Maximal gap (≤ 0.003 mm) for best protection against fluid (≤ 10 bar) and aggressive particles. (carbon fibers or ceramic materials)
 - Protection can be provided even if purge air fails or air is very humid.
 - Electrostatic discharge protection of the shaft can be provided if drive currents are not perfectly symmetric.
 - Damping of vibrations.

High power spindle			
24,000rpm		15,000rpm	
Spindle taper	HSK-63A	Spindle taper	HSK-100A
Lubrication	Oil air	Lubrication	Oil air
Power(kW)	S1 60 S6 75	Power(kW)	S1 45 S6 54
Torque(Nm)	S1 48.2 S6 60.5	Torque(Nm)	S1 119 S6 143



Ultra-high power spindle			
30,000rpm		20,000rpm	
Spindle taper	HSK-63A	Spindle taper	HSK-100A
Lubrication	Oil air	Lubrication	Oil air
Power(kW)	S1 100 S6 111	Power(kW)	S1 120 S6 128
Torque(Nm)	S1 60 S6 76	Torque(Nm)	S1 115 S6 139



Standard Fork Type Milling Head (Dyna)



Aerospace High Power Fork Type Milling Head (Aero)



High Torque Fork Type Milling Head (Titan)



Mono Support Milling Head (Mono)



45° Universal Milling Head (Uver)

Spindle Taper	HSK63A/HSK100A	HSK63A/HSK100A	HSK63A/HSK100A	HSK63A/HSK100A	HSK100A
Swivel/Rotation Torque	B=1,192/1,980Nm C=1,050/1,740Nm	B=1,192/1,980Nm C=1,050/1,740Nm	B=1,344/2,420Nm C=1,610/2,940Nm	A=529/869Nm C=783/1,300Nm	A=1,610/2,940Nm C=1,070/2,090Nm
Swivel/Rotation Speed	B=C=30(cont)rpm B=C=60(max)rpm	B=C=30(cont)rpm B=C=60(max)rpm	B=C=30(cont)rpm B=C=60(max)rpm	A=C=30(cont)rpm A=C=60(max)rpm	A=C=30(cont)rpm A=C=60(max)rpm
Swivel/Rotation Angle	HSK63A: B=±120° C=±360°	HSK63A: B=±115° C=±360°	B=±120° C=±360°	A=±125° C=±360°	A=±185° C=±360°
Clamping Torque	B=4,000Nm C=4,000Nm	B=4,000Nm C=4,000Nm	B=6,000Nm C=6,000Nm	A=4,000Nm C=4,000Nm	A=6,000Nm C=4,000Nm

- Please contact with our sales if you have special requirement.
- All specifications and design are subject to change without notice.