

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

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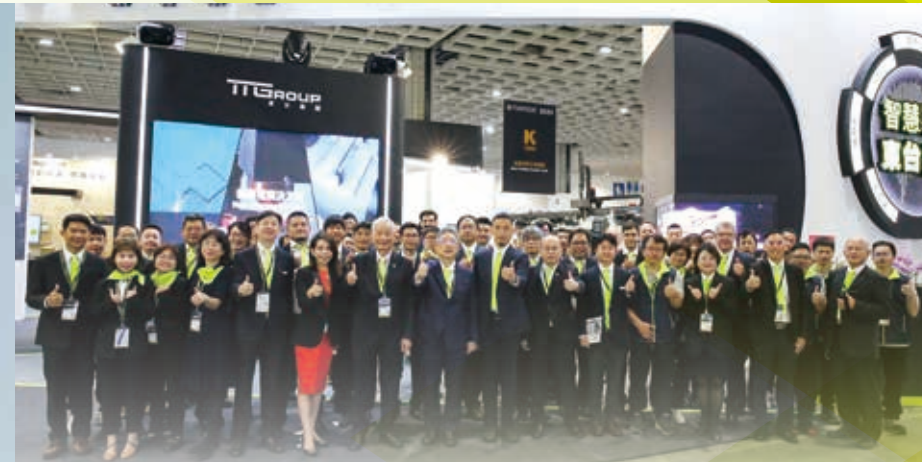


MEMBER OF
TITANIUM GROUP
2024/01

HIGH TENSILE
TITANIUM & SUPER ALLOY
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.



HIGH TENSILE TITANIUM & SUPER ALLOY SOLUTIONS



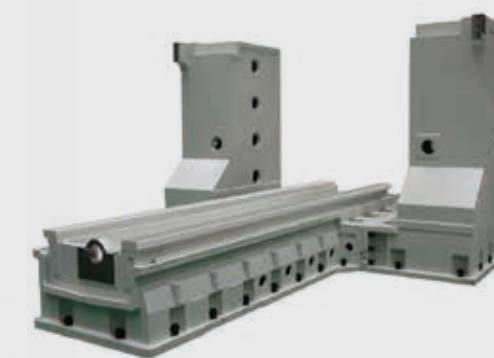
Tool Wear Improvement - High Pressure-cutting Fluid System

Titanium alloys thermal conductivity is very low. It makes the tool temperature up to 1000°C and tool wear appears rapidly during cutting. So we provide high-pressure cutting fluid to prevent hot shortness.



High-efficiency and High-quality Cutting - Special Spindle and Milling Head For High-torque Cutting

The torque of special spindle for titanium alloy is up to 1,000 Nm. The torque of fork type milling head is up to 500 Nm.



Stable Machining Quality - One Piece Casting Made Column & Bridge

Increase the span of X / Y axis rails to improve the rigidity. The Duo-Block design has an integrated beam and column structure to provide the rigidity of the machine structure.



Productivity Optimization - Programming Solutions for Difficult Cutting Processes

We provide the best cutting method and programming optimization solutions for difficult-to-cut materials.



G800-TR / 800-T
5-axis Vertical / 5-axis Mill-Turn Vertical
Machining Center

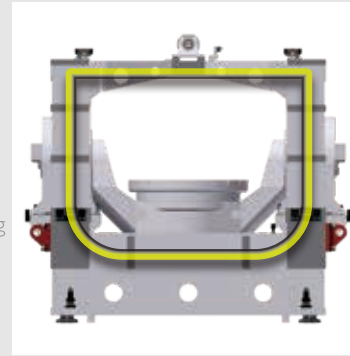
The Direct Drive Motor directly drives the rotary table to provide high-precision machining.

The A/C-axis are driven by direct drive motor. The power can be completely transmitted and provides high-precision machining capabilities.



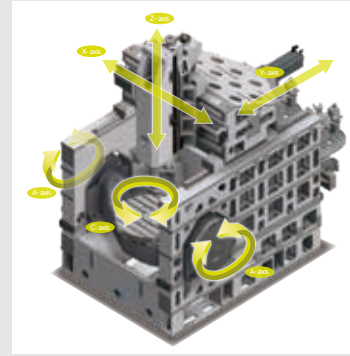
High rigidity U-frame structure

The saddle and column form a closed structure. High rigidity machine can reduce vibration effectively, increase processing stability and improve machining accuracy.



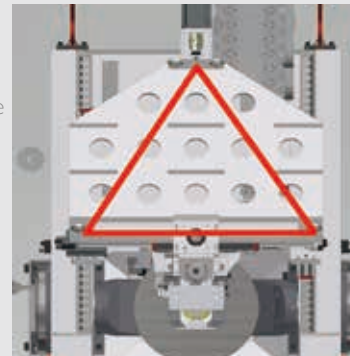
Three axis driven at center of gravity(DCG)

The driven centers of three axis are all on these gravity centers, which greatly improves the dynamic stability of the structure.



Compact trunnion rotary table

X/Y/Z axis movement and table rotation work individually to make sure machining is free from 3 axis inertia influences. Perfect servo driven design gives excellent machining stability.



Specification	Unit	G800-TR	G800-T
Travel			
X-axis	mm	800	
Y-axis	mm	830	
Z-axis	mm	560	
A-axis	deg	±120	
C-axis	deg	±360(continuous)	
Distance from spindle end to table	mm	210-770 (with std. spindle)	
A/C-axis			
Speed for A-axis	rpm	70	70
Speed for C-axis	rpm	70	1,000
Torque for A-axis(SI/max)	Nm	4,240 / 6,920	4,240 / 6,920
Torque for C-axis(SI/max)	Nm	2,120/3,460	1,490/2,460
Brake torque(A/C)	Nm	8,000/8,000	
Disk diameter	mm	Ø800	
Load	tons	1.3	
Feedrate			
Rapid traverse	m/min	XYZ=48	
XYZ axis acceleration	m/sec ²	4	
Accuracy			
Positioning (VDI3441)	mm	X / Y / Z=0.008	
Repeatability (VDI3441)	mm	X / Y / Z=0.005	
Spindle (Std.)			
Spindle taper		HSK63A	HSK63T
Spindle speed	rpm	20,000	20,000
Spindle power(SI/S6)	kW	20/24	30/38
Spindle torque(SI/S6)	Nm	45.5/55	88/123
Automatic tool changer (Std.)			
Tool shank	pcs	32 (opt.64)	
Max. tool length	mm	300	
Max. tool diameter with adjacent tool	mm	Ø75	
Max. tool diameter without adjacent tool	mm	Ø120	
Others			
Machine weight	tons.	15.5	

● Standard accessories ○ Optional accessories

Item	Specification	
Controller	HEIDENHAIN TNC640 MPG HR510	●
	HEIDENHAIN TNC640 MPG HR520 / HEIDENHAIN TNC640 MPG HR550	○
	SIEMENS SINUMERIK ONE	○
Spindle-G800-TR	AGA HSK63A 20,000rpm 20/24 kW	●
Spindle-G800-T	AGA HSK63T 20,000rpm 30/38 kW	●
Drive system	XYZ axis with high speed ball screw driving / AC axis with direct drive motor	●
Automatic tool changer	32T	●
	64T	○
Chip removal system	Complex chip conveyer / Coolant tank	●
Cutting coolant	Coolant through spindle 20bar	○
	Coolant through spindle 70bar	○
System coolant	Chiller for spindle / Chiller for A/C axis / Air conditioner for electrical cabinet	●
Workpiece measurement system	BLUM workpiece measurement system-TC-60+RC66	○
	Renishaw workpiece measurement system-RMP600	○
Tool measurement system	BLUM tool measurement system-NT-A4	○
	Renishaw tool measurement system-NC4-F230	○
Smart factory	TIMS system	○
	TLMsystem	○
Others	Security door interlocks / Fully enclosure splash guard	●
	Oil mist collecting system / Air dryer / Isolation transformer Stabilizer / Oil separator	○



(The pictures are for reference only, and different equipment may have other appearances.)

MTH-RT

5-axis Aircraft Turbine Engine Casing Machining Center

Duo-Block structure design

Enhance the machine rigidity and stability.

Auto pallet change system (APC)

□1,250x1,250 mm rotary table can carry max. loading 4,000kg of workpiece. With auto pallet change system, efficiency and productivity can be increased.



Span of linear guideways

Span of linear guideways on cross beam ensures high rigidity and high stability performance during heavy-duty machining.



Self-developed high torque swivel head

APEC self-developed, swivel head with high torque and clamping force is suitable for machining different kinds of aerospace components.

Precisely scrapped surface

80% of the surface is scrapped so that the best machine accuracy can be achieved.



Specification	Unit	MTH15-RT	MTH20-RT
Travel			
X-axis	mm	-800 ~ 1,300	-800 ~ 1,800
Y-axis	mm	-1,000 ~ 1,000	
Z-axis	mm	850	
Distance between two columns	mm	1,500	2,000
Distance from spindle end to table	mm	-175 ~ 675 (Vertical Std.) 185 ~ 1035 (Horizontal Std.)	-300 ~ 550 (Vertical Std.) 60 ~ 910 (Horizontal Std.)
Rotary table			
Table size	mm	Ø1,000	
Max. processing diameter	mm	Ø1,400	
Max. table load	kg	2,000	
C-axis max. rotation angle	deg	±360°	
C-axis max. rotation speed	rpm	80	
C-axis torque (continuous/intermittent)	Nm	2,134 / 3,777	
Feedrate			
X,Y,Z axis acceleration	m/min	X/Y/Z=30	
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		HSK-100A	
Spindle speed	rpm	12,000	
Spindle power(S1/Max.)	kW	50 / 78.5	
Spindle torque(S1/Max.)	Nm	318 / 500	
Milling Head(Std.)			
B-axis torque (S1/S6)	Nm	1,344 / 2,420	
B-axis clamping torque	Nm	6,000	
Swivel angle	deg	±120°	
Automatic tool changer			
Tool shank	pcs	32	
Max. tool length	mm	400	
Max. tool diameter with adjacent tool	mm	125	
Max. tool diameter without adjacent tool	mm	250	

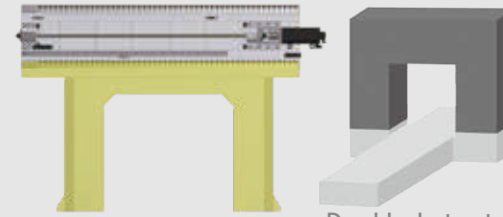
● Standard accessories ○ Optional accessories

Item	Specification	
Controller	HEIDENHAIN TNC640 MPG HR520	●
Spindle	AGA HSK100A 12,000rpm, 318/500 Nm	●
Drive System	XYZ axis with high speed ball screw driving	●
	A / C-axis are driven by direct drive motor	●
Automatic tool changer	32T	●
	64T	○
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	●
	Coolant tank	●
Workpiece measurement system	BLUM workpiece measurement system(TC60-RC66)	○
	Renishaw workpiece measurement system(RMP600)	○
	BLUM tool measurement system(NT-A4)	○
Tool measurement system	Renishaw tool measurement system(NC4-F230)	○
	Security door interlocks	●
Others	Isolation transformer / Air dryer / Oil mist collecting system	●
	Fully enclosure splash guard	●
	Stabilizer / Oil separator / 5 axis with Heidenhain optical scale	○



MTH1530-5S

5-axis Heavy Duty Double Column Machining Center



● Duo block structure

Duo block structure design

Strengthened MTH structure provides machine rigidity for hard-to-cut material machining.

Specially designed saddle and ram for heavy duty machining

We enlarge the size of head from 400mm X 450mm to 540mm x 540mm. Machining stability is enhanced by increasing the sectional area.

Powerful driving system

Servo motor and ball screw driving system are specially equipped for heavy duty machining.

High torque 2-axis milling head

The torque of fork type spindle designed for titanium reaches up to 400Nm.

Unequal thickness of Ram

Special structure design of ram helps remain light and rigidity.

Complex chip removal system

Large water tank equipped provides stable coolant fluid and helps removing chip efficiently.

Specification	Unit	MTH1530-5S
Travel		
X-axis	mm	3,000
Y-axis	mm	2,000
Z-axis	mm	850 / 1,000(opt.)
Distance between two columns	mm	1,500
Distance from spindle end to table	mm	-70-780
Table		
Table size	mm	3,100 X 1,200
Load	tons	5
Feedrate		
Rapid traverse	m/min	XYZ=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(Std.)		
Spindle taper		HSK100A
Spindle speed	rpm	12,000
Spindle power(SI/Max.)	kW	50/78.5
Spindle torque(SI/Max.)	Nm	318/500
Two-axis head (Std.)		
Type		Fork Type Milling Head
Swivel/Rotation torque	Nm	B=1,344/2,420
	Nm	C=1,610/2,940
Swivel/Rotation speed	rpm	B=C=30(cont)/60(max)
Swivel/Rotation angle	deg	B=±120° C=±360°
Clamping torque	Nm	B=6,000 C=6,000
Automatic tool changer (Std.)		
Tool shank	pcs	32T
Max. tool length	mm	400
Max. tool diameter with adjacent tool	mm	Ø125
Max. tool diameter without adjacent tool	mm	Ø250
Others		
Machine weight	tons.	27

● Standard accessories ○ Optional accessories

Item	Specification	
Controller	HEIDENHAIN TNC640 MPG HR510	●
	HEIDENHAIN TNC640 MPG HR520 / HEIDENHAIN TNC640 MPG HR550	○
	SIEMENS SINUMERIK ONE	○
Spindle	AGA HSK100A 12,000rpm 318/500Nm	●
Drive system	XYZ axis with high speed ball screw driving	●
Chip removal system	Complex chip conveyer / Coolant tank	●
	Coolant around spindle	●
Cutting coolant	Coolant through spindle 20bar	●
	Coolant through spindle 70bar	○
System coolant	Chiller for spindle / Air conditioner for electrical cabinet	●
Workpiece measurement system	BLUM workpiece measurement system-TC-60+RC66	○
	Renishaw workpiece measurement system-RMP600	○
Tool measurement system	BLUM tool measurement system-NT-A4	○
	Renishaw tool measurement system-NC4-F230	○
Smart factory	TIMS system	○
	TLMsystem	○
Others	Security door interlocks / Fully enclosure splash guard / Air dryer / Isolation transformer / Oil mist collecting system	●
	Stabilizer / Oil separator	○
	Automatic Kinematics measuring and calibration system	○



MTH_{24 / 28 -55}

5-axis Heavy Duty Double Column Machining Center

Special machine for aerospace superalloy processing

Equipped with a high-power and high-torque spindle, it is suitable for super alloys such as titanium alloys and nickel-based alloys. This can greatly improve the machining removal rate and shorten the machining time.

Special spindle for aerospace super alloys processing

With high torque specifications up to 500Nm, it is especially suitable for super alloys processing.

Z axis is driven by double ball screws and double servo motor

X/Y/Z axis are driven by precious ball screw, which gives machine the characteristic of high acceleration, high deceleration.



The beam adopts special rib design

The beam adopts high rigidity design and the distribution of star-shaped rib brings more stability during cutting.



Heavy-duty saddle and high-rigidity machine structure design

The whole machine design can correspond to any kinds of materials for efficient processing.

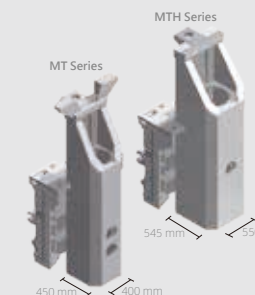
The shortest force flow bed design

The V-shaped rib bed structure of the bottom bed makes the structure strong and ensure processing stability. The shortest configuration of the force flow between the guide rail and the anchor bolts meets the demand for high rigidity.



Specially designed saddle and ram for heavy duty machining

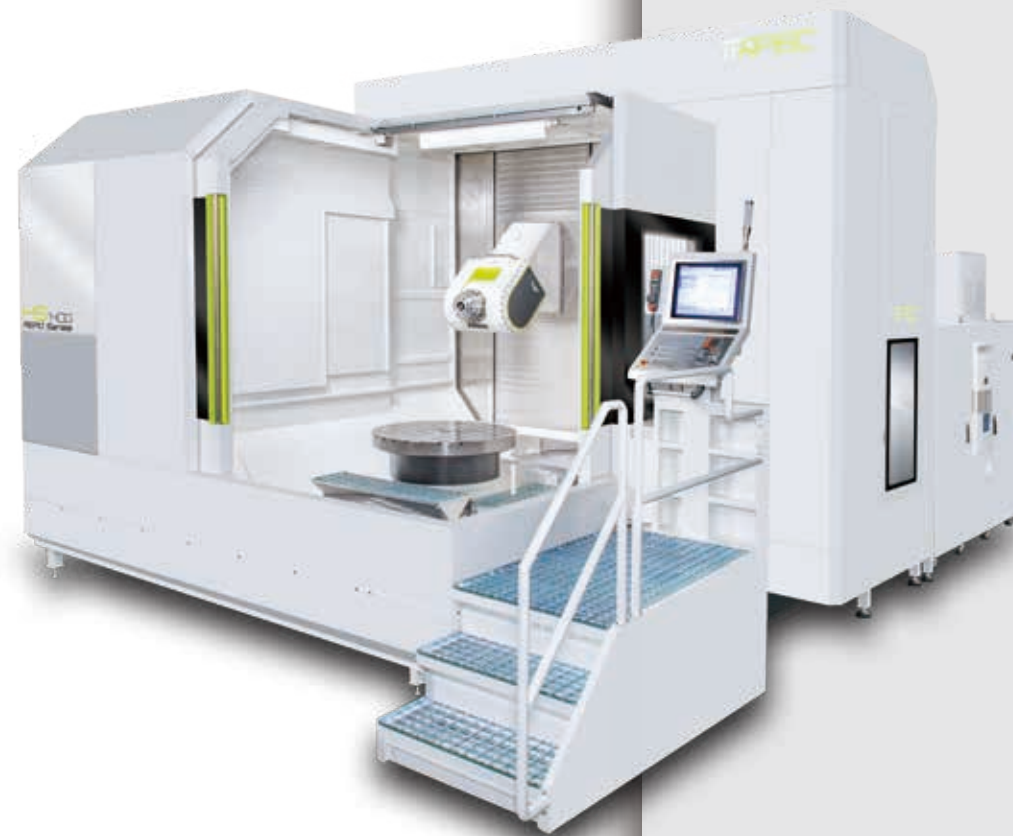
We enlarge the size of the head from 400mm x 450mm to 545mm x 550mm. Machining stability is enhanced by increasing the sectional area.



Specification	Unit	MTH2442/62-5S	MTH2842/62-5S		
Travel					
X-axis	mm	4,200 / 6,200	4,200 / 6,200		
Y-axis	mm	3,000	3,500		
Z-axis	mm	1,000			
Distance between two columns	mm	2,400	2,800		
Distance from spindle end to table	mm	60-1,060	60-1,260		
Table					
Table size - length	mm	4,000 / 6,000	4,000 / 6,000		
Table size - width	mm	2,060	2,500		
Load	tons	14	16		
Feedrate					
Rapid traverse	m/min	XYZ=20			
Accuracy					
Positioning (VDI3441)	mm	X=0.035 Y=0.012 Z=0.008	X=0.045 Y=0.012 Z=0.008	X=0.035 Y=0.012 Z=0.010	X=0.045 Y=0.012 Z=0.010
Repeatability (VDI3441)	mm	X=0.028 Y=0.008 Z=0.005	X=0.030 Y=0.008 Z=0.005	X=0.028 Y=0.008 Z=0.008	X=0.030 Y=0.008 Z=0.008

Spindle(Std.)			
Spindle taper		HSK100A	
Spindle speed	rpm	12,000	
Spindle power(SI/Max.)	kW	50/78.5	
Spindle torque(SI/Max.)	Nm	318/500	
Two-axis head (Std.)			
Type		Fork Type Milling Head	
Swivel/Rotation torque	Nm	B=1,344/2,420	
	Nm	C=1,610/2,940	
Swivel/Rotation angle	deg	B=±120° C=±360°	
Clamping torque	Nm	B=6,000 C=6,000	
Automatic tool changer (Std.)			
Tool shank	pcs	32T	
Max. tool length	mm	400	
Max. tool diameter with adjacent tool	mm	Ø125	
Max. tool diameter without adjacent tool	mm	Ø200	

Item	Specification	Standard accessories	
		●	○
Controller	HEIDENHAIN TNC640 MPG HR510	●	
	HEIDENHAIN TNC640 MPG HR520 / HEIDENHAIN TNC640 MPG HR550		○
	SIEMENS SINUMERIK ONE		○
Spindle	AGA HSK100A 12,000rpm 318/500Nm	●	
Drive system	XYZ axis with high speed ball screw driving	●	
Automatic tool changer	32T	●	
	64T		○
Chip removal system	Complex chip conveyor / Coolant tank	●	
	Coolant around spindle	●	
Cutting coolant	Coolant through spindle 20bar	●	
	Coolant through spindle 70bar		○
System coolant	Chiller for spindle / Air conditioner for electrical cabinet	●	
Workpiece measurement system	BLUM workpiece measurement system-TC-60+RC66		○
	Renishaw workpiece measurement system-RMP600		○
Tool measurement system	BLUM tool measurement system-NT-A4		○
	Renishaw tool measurement system-NC4-F230		○
Smart factory	TIMS system		○
	TLMsystem		○
Others	Security door interlocks / Fully enclosure splash guard / Air dryer / Isolation transformer / Oil mist collecting system	●	
	Stabilizer / Oil separator		○
	Automatic Kinematics measuring and calibration system		○



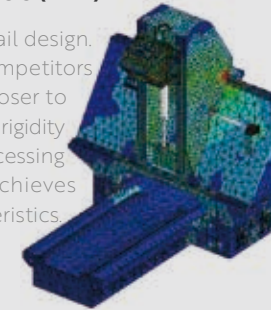
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HS1400 / 1400-T

5-axis Horizontal / 5-axis Mill-Turn Horizontal Machining Center

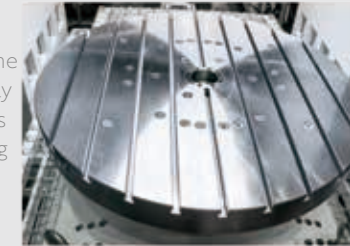
The base structure is optimized through Finite Element Analysis (FEA)

The X-axis adopts high and low rail design. The L1 size is larger than other competitors and driving center of gravity is closer to the tool tip point, which improves rigidity and stability. It is suitable for processing difficult-to-cut materials and achieves perfect cutting dynamic characteristics



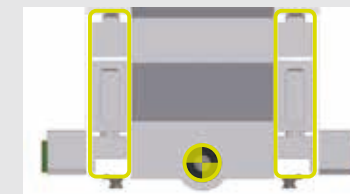
The Direct Drive Motor directly drives the rotary table to provide high-precision machining capability

The A / C-axis are driven by direct drive motor. The power can be completely transmitted and provides high-precision machining capabilities.



Double-wall structure designed column

Increase structure rigidity and minimize the possibilities of thermal deformation.



The shortest force flow bed design

The V-shaped rib structure of the bottom bed makes the structure strong and ensure processing stability. The shortest configuration of the force flow between the guide rail and the anchor bolts meets the demand for high rigidity.



High rigidity T-shaped structure design

Inverted dual V-shaped rib structure applied in basement achieves the best force flow path. The whole travel of X-axis is supported, and this is to avoid gravitational dropping and deformed into guarantee workpiece makes machining more accurate.

Specification	Unit	HSI400	HSI400-T
Travel			
X-axis	mm	1,800	
Y-axis	mm	1,250 / 1,550(opt.)	
Z-axis	mm	1,320	
Distance from spindle end to table	mm	-165 ~ 1,085 (Vertical Std.) 185 ~ 1,435 (Horizontal Std.)	-5 ~ 1,245 (Vertical Std.) -65 ~ 1,185 (Horizontal Std.)
Rotary table -Without APC			
Table size (Diameter)	mm	Ø1,000	Ø1,250
Max. processing diameter	mm	Ø1,800	
Max. table load	kg	2,000	3,200
B-axis max. rotation angle	deg	continuous	
B-axis max. rotation speed	rpm	80	500
B-axis torque (Rated/ Max.)	Nm	2,134 / 3,777	3,200 / 5,280
B-axis clamping torque	Nm	10,000	15,000
Feedrate			
X,Y,Z axis acceleration	m/min	50	
Accuracy			
Positioning (VDI3441)	mm	X / Y / Z = 0.010	
Repeatability (VDI3441)	mm	X / Y / Z = 0.008	
Spindle(Standard)			
Spindle taper		HSK-100A	HSK-100T
Spindle speed	rpm	12,000	
Spindle power(S1/Max.)	kW	50 / 76	
Spindle torque(S1/Max.)	Nm	200 / 302	
Clamping torque	Nm	-	1,000
Milling Head(Std.)		Aero	Uver
A-axis torque (S1/S6)	Nm	1,192 / 1,980	1,610 / 2,940
A-axis clamping torque	Nm	4,000	6,000
Swivel angle	deg	-100° ~ +70°	+185° ~ -185°
Automatic tool changer			
Tool shank	pcs	40	
Max. tool length	mm	450	
Max. tool diameter with adjacent tool	mm	Ø120	
Max. tool diameter without adjacent tool	mm	Ø250	

● Standard accessories ○ Optional accessories

Item	Specification	
Controller	HEIDENHAIN TNC640 MPG HR510	●
Spindle (HSI400)	AGA HSK100A 12,000rpm, 200/302 Nm	●
	AGA HSK100A 12,000rpm, 318/500 Nm	○
	AGA HSK63A 24,000 rpm 60/75kW	○
	AGA HSK100A 15,000 rpm 45/54kW	○
Spindle (HSI400-T)	AGA HSK100T 12,000 rpm 200/302 Nm	●
Drive System	XYZ axis with high rigidity roller type linear guide way / AB axis with direct drive motor	●
Automatic tool changer	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 / 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)	○
Others	Security door interlocks / Air dryer / Isolation transformer / Fully enclosure splash guard	●
	Oil mist collecting system / 5 axis with Heidenhain optical scale	●
	Automatic pallet change system (APC)	○
	Oil separator / Coolant temperature control system	○



Standard Fork Type Milling Head (Dyna)



Aerospace High Power Fork Type Milling Head (Aero)



High Torque Fork Type Milling Head (Titan)



45° Universal milling head (Uver)



Gear Drive Fork Type 2-Axis Milling Head (VMS)

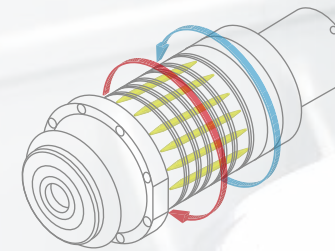


AGA ultra-high speed & power spindle

- **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.

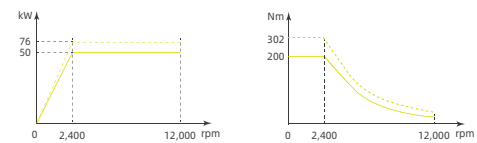
Milling Head	Dyna	Aero	Titan	Uver	VMS
Max. speed (rpm)	60	60	60	60	9
A-axis torque (SI/S6)(Nm)	1,192 / 1,980	1,192 / 1,980	1,344 / 2,420	1,610 / 2,940	32,00 / 4,400
A-axis clamping torque(Nm)	4,000	4,000	6,000	6,000	4,000

Spindle		12,000rpm	12,000rpm	15,000rpm	24,000rpm	6,000rpm	
Spindle taper	HSK-100A	Spindle taper	HSK-100A	Spindle taper	HSK-100A	Spindle taper	HSK-100A
Lubrication	Oil air	Lubrication	Oil air	Lubrication	Oil air	Lubrication	Oil air
Power(kW)	SI 50 S6 76	Power(kW)	SI 50 S6 78.5	Power(kW)	SI 45 S6 54	Power(kW)	SI 60 S6 75
Torque(Nm)	SI 200 Max. 302	Torque(Nm)	SI 318 Max. 500	Torque(Nm)	SI 119 S6 143	Torque(Nm)	SI 48.2 S6 60.5
						Torque(Nm)	Max. 1,000

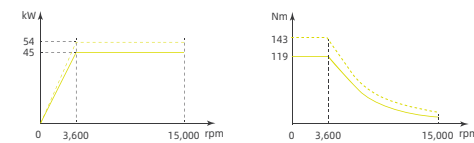


Cooling circuit and Heat pipes

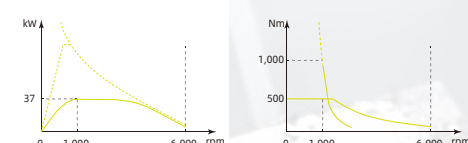
HSK100A / 12,000rpm



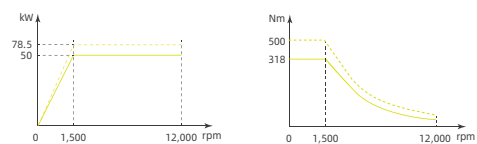
HSK100A / 15,000rpm



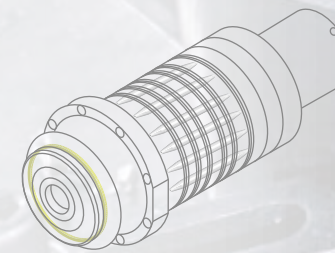
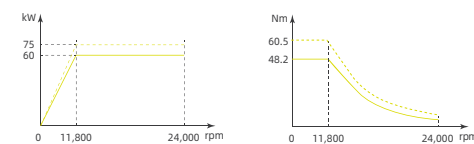
HSK100A / 6,000rpm



HSK100A / 12,000rpm



HSK63A / 24,000rpm



Labyrinth seal and Brush seal

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