

# Intelligent

## Gantry type 5-axis machining center

### AERO Series

Smartcenter

- 5 - year warranty on guideway.
- Equipped with Germany 5 axis head.
- High precise 5 axis head.



Website



Facebook



Hartford has sold more than 50,000 machines to all over the world, accumulated more than 37,000 customers, who absolutely affirm Hartford's manufacturing experience and ingenious machine manufacture technology. We insist on providing customers with the best quality machining centers. We will devote more carefully, in order to continuously enhance the technical level of manufacture and applications.

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# Hartford

Hartrol · Smartcenter · Robocell

We manufacture intelligent machines only

# Join The Aerospace Revolution

## High Efficiency Solution for Aerospace Components



### ISO9001 & AS9100 Certified

The Hartford AERO 5-axis machining center builds on decades of excellent machining experience, it deliver the next generation solution for customers in the Aerospace components industry.

High tech structural components machined from aluminum and alloys with 3D contours are the standard requirement for aerospace parts and demand the very best in cutting efficiency and precision.

Hartford's 5-axis universal head delivers the versatility and flexibility you need on large complex components machining.



### Aerospace Part

Material : Aluminum 7050-T7451

Feature :

1. Aerospace aluminum be machined from rough workpiece (cutting volume up to **70%**).
2. Tolerance must be smaller than 0.5mm / accuracy require of hole: 0.03~0.05mm.



### Mould for vehicle's water tank front cover.

Material : P20

Feature:

1. Prevent vibration of cutting and overcut while path programming.
2. With stand continuous machining, stabilize tool worn.
3. Larger height drop with tool overhang can be avoided as well as vibration issue.



### Aerospace Part

Material : Aluminum 7050-T7451

Feature :

1. Aerospace aluminum be machined from rough workpiece (cutting volume up to **70%**).
2. Axial of tool setting, optimized machining.



### Automobile injection mold

Material : Die steel

Feature :

1. 5-axes tilting fixed axis rapping machining on recessed angle.
2. Uncoaxiality 5-axes machining, within tolerance.



### Automobile panel mold – Hood

Material : Medium carbon steel

Feature :

1. Display complex curve cutting ability.
2. One-piece curve mold and fine finishing.
3. Precisely central position of tool, contour accuracy.



### Aerospace Part A

Material : AL7075

Feature :

1. Aerospace aluminum be machined from rough workpiece (cutting volume up to **65%**).
2. Axial of tool setting, optimized machining.



### Leaf sphere body

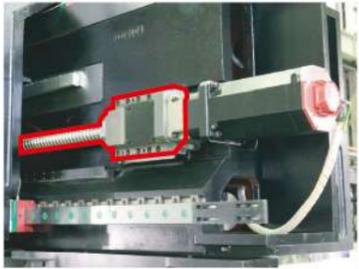
Material : 6061

Feature :

1. Five face CAM software- coordinate conversion\_ inclined 3-axis rough machining.
2. CAD/CAM software- cutting efficiency and rough fine machining of plunge machining will be greatly increased while adopt port tube machining.

# High rigidity structure design on AERO-2225B/5X,2232B/5X

AERO-2225B/5X,2232B/5X is designed with gantry type construction with rigid design so that it can provide a solid support for AERO-2225B/5X,2232B/5X



## 1. AERO three-axis direct-connected drive advantage

AERO series X-axis pair up with the planetary reducer, effectively enhancing the overall axial drive torque the machine.



## 2. Two axis heads

1. Main application in aviation and automotive industries, main processing face milling, drilling, and end milling, etc.
2. High precision axial and radial bearing available use.
3. Rotary axis use high precision angle to match high precision positioning.
4. Spindle can use CTS system to elevate processing efficiency and energy saving.



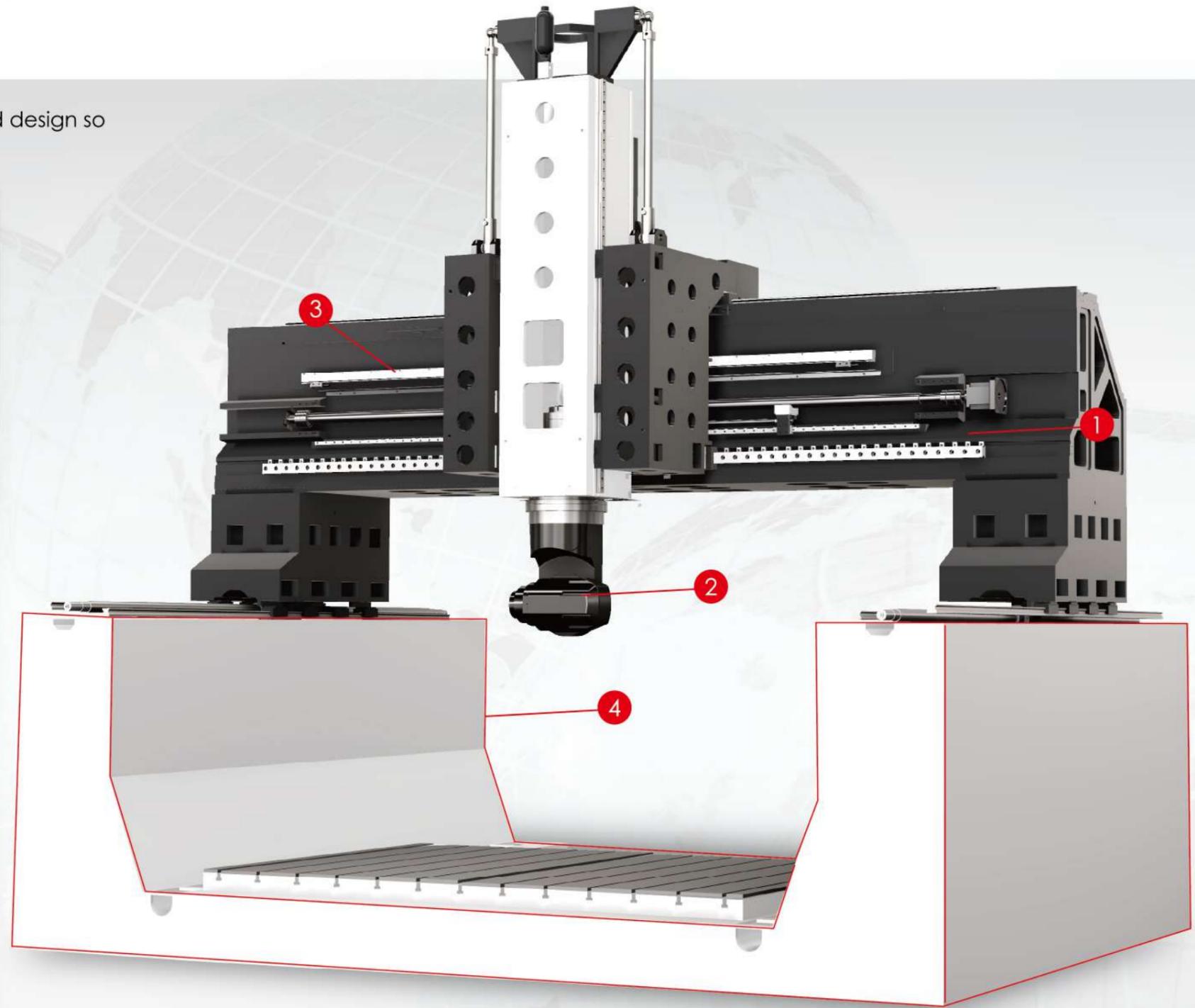
## 3. Z-axis nitrogen accumulator weight system

Reduce operating noise of hydraulic tank. Reduce hydraulic tank oil temperature by **50%** Effective energy - saving more than **20%**



## 4. One piece base design

High rigidity crane type of double column machine, one piece casting design of base and table, strong vibration absorbing capability, high precision and stable processing quality, provide you high speed and heavy processing.



## Grease Lubrication System

- Extend machinery components life time, reduce.
- Extend cutting fluid life time, reduce pollution around machines.
- Reduce work piece be polluted, prevent lubricant hardening.



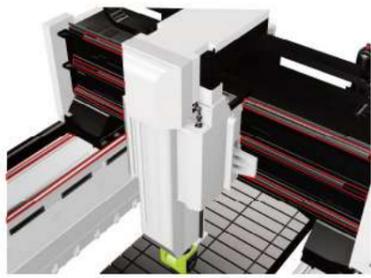
# Extra rigid & Stable of AERO-626L/5X

New AERO-626L/5X, from roughing to finishing, allows you to accomplish at one go.



### 1. HSK-A63 5-axis head

- Assembly with Germany made Cytec 5 axis head delivers highly precise.

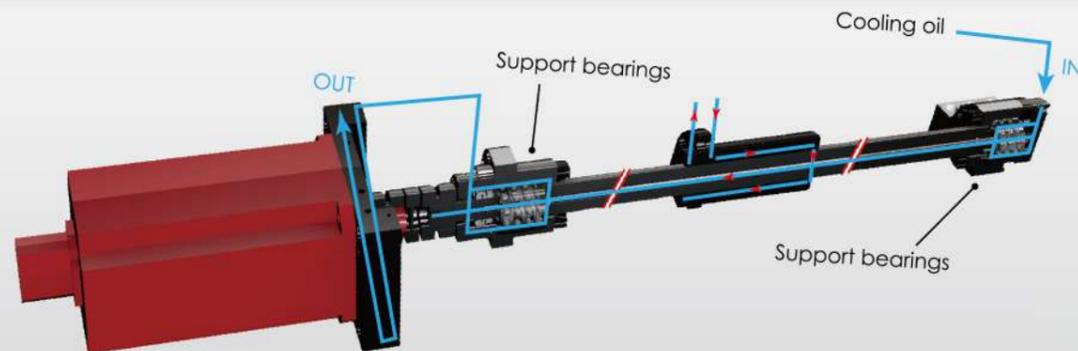
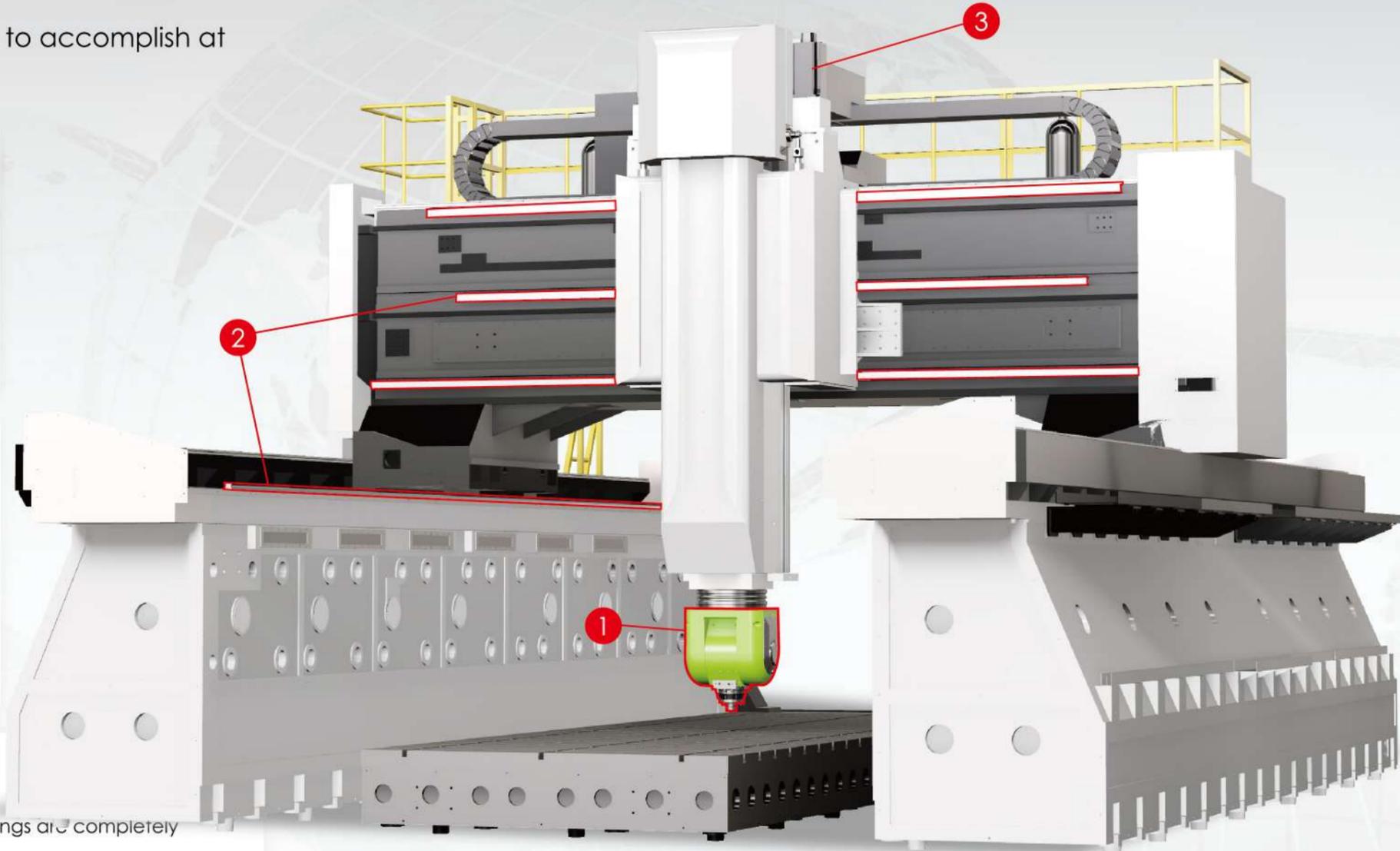


### 2. X / Y multi linear guideways with wide span design

- X axis with 4 linear guideways - 2 linear guideways on each side to maximize rigidity
- Y axis with 3 linear guideways

### 3. Thermal growth control on Z-axis

- The parts in Z-axis feeds, such as the motor base, ballscrews, nuts and bearings are completely cooled.
- Removes thermal deformation while ensuring the positioning accuracy of the machine.
- Machine dynamic rigidity is increased.
- Axis accuracy increased by **15%**
- Features may vary by models, please check with sales window.



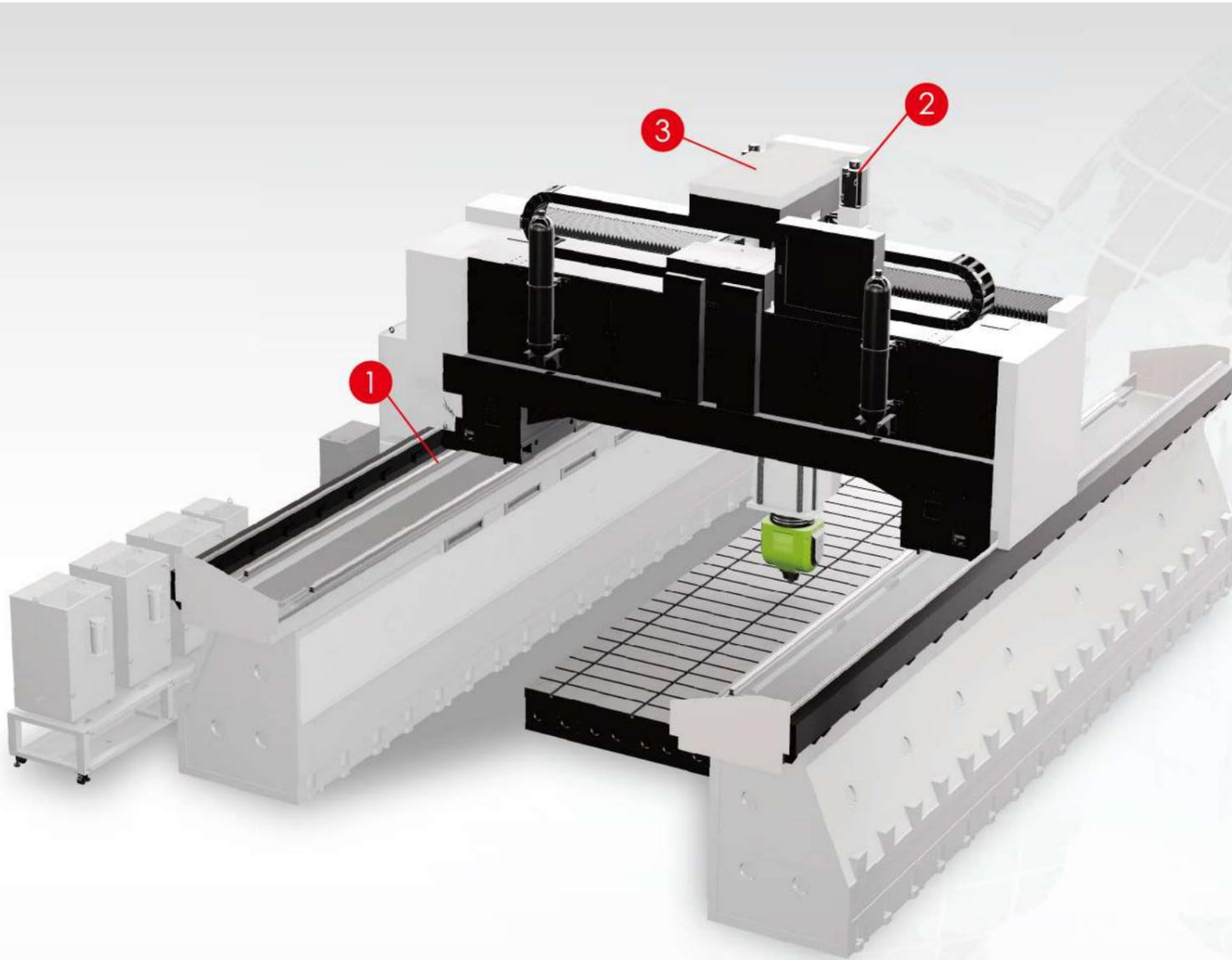
### Full range of linear guideway five - year warranty:

Warranty coverage will not apply under following conditions,

1. Improper operation (collision)
2. Lack of regular cleaning of accumulated debris causing damage to the linear rails & carriages.



# Key design of AERO-626L/5X



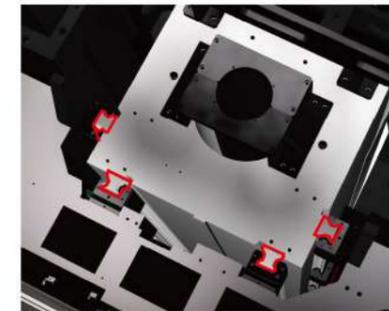
## 1. Roller type linear guideway on 3 axis

- This makes high accuracy, heavy load resistance and long lifespan possible.
- Linear Roller type on 3 axis: High accuracy & better life time.
- Compare with ball type : Increase **20%**



## 2. Twin ballscrew design for Z axis

- This design brings you highly stability.
- Double screws driven : High stability
- Advantages : Less vibration on Z axis



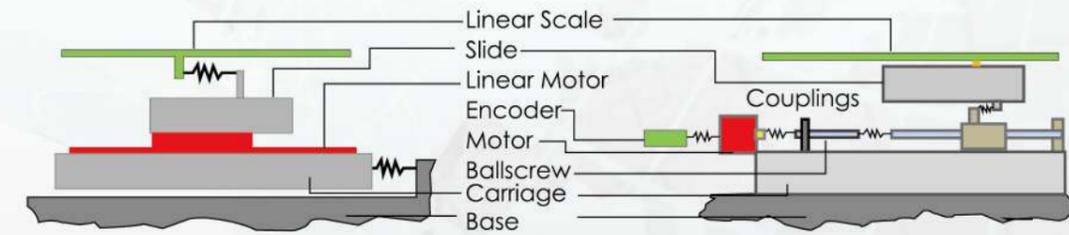
## 3. Z-axis four linear guideways three binding structure patented technology

The patented AERO four linear guideways three binding structure technology, two-way support provides high rigidity while cutting, bringing you excellent performance.

Patent No.1264343 machining center Z-axis head Z-axis four linear guideways.

## Linear Motor

There are two interfaces Linear motor driven, but four on screw type driven. Error, vibration, backlash will be caused by interface. In addition, linear motor has less spare parts on designing. It can have advantages on maintenance.



Linear Motor Drive

Motor+Ballscrew Drive

## Good :

- No backlash and wear.
- Good for high speed and high accuracy.
- Brand : BOSCH REXROTH
- Linear motor : No backlash & High speed & precision
- Better machining efficiency and accuracy



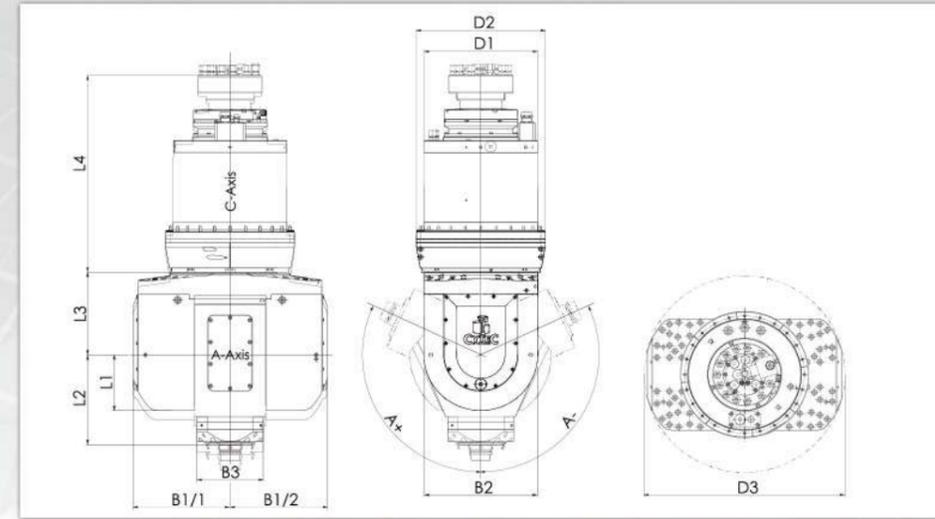
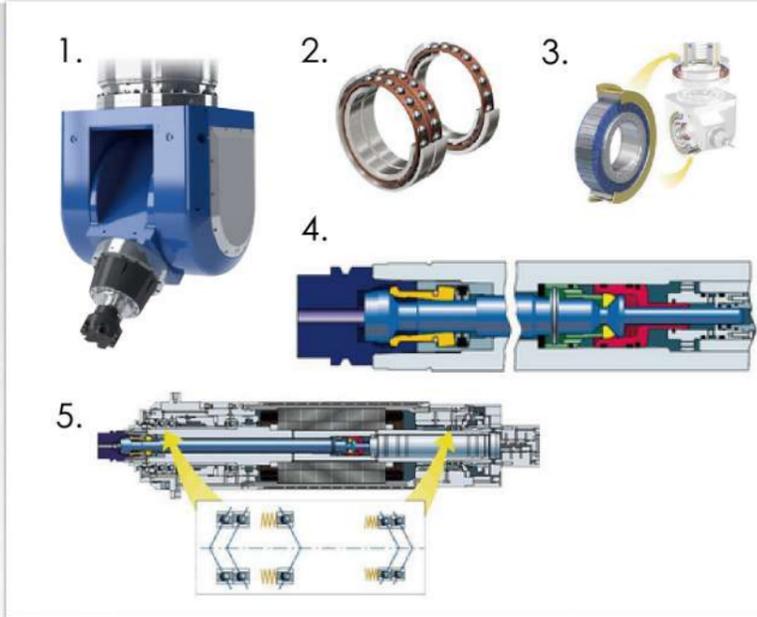
# The Spindles for AERO/5X series models

## Spindles for Aero/5X series models

### Key Feature

- 1.High rigidity FORK structure**  
 Torque motor Direct Drive  
 Non-mechanism transmission system  
 High rigidity positioning machining(hydraulic brake)  
 High resolution rotary encoder system
- 2.High rigidity hybrid-bearing**  
 High rigidity, load and longer lifetime
- 3.BC axes parallel connection torque motor drive**  
 High dynamic performance  
 No mechanical wear and minimize maintenance  
 Wide torque-speed range and no reverse backlash  
 High accuracy
- 4.Automatic tool clamp / unclamp system**
- 5.Grease lubrication**
- 6.CTS is standard equipment**

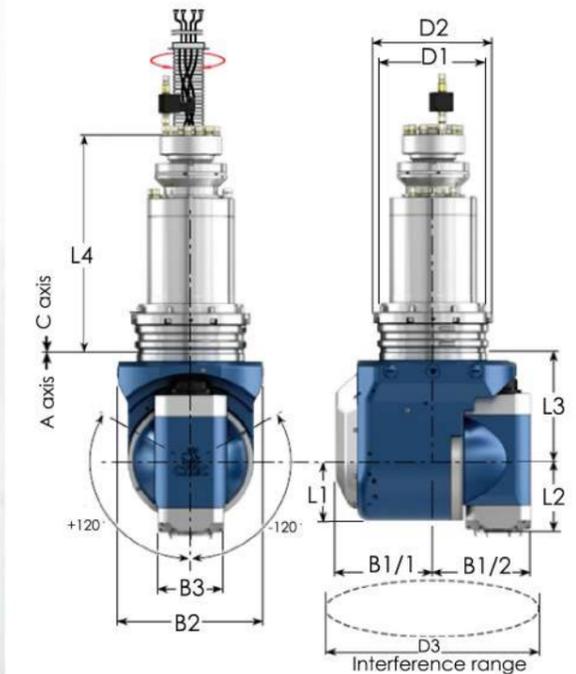
### Powerful & Versatility



item	D1	D2	D3	B1/1	B1/2	B2	B3	L1	L2	L3	L4
HSK-A63 (Standard)	335	□400	588	284	271	400	200	200	310	290	807
HSK-A100 (option)	335	□400	588	284	271	400	200	200	385	290	807

Spindle Spec		unit	CS-34-180-A (Standard)	CS-21-180-A (Option)	CS-60-180-S (Option)	CS-42-180-S (Option)	CS-34-180-S (Option)			
Spindle drive motor		<b>kW(S1/S6)</b>	34/43	21/27	60/80	42/53	34/43			
Spindle Rated Torque		<b>Nm(S1/S6)</b>	72/91	100/130	82/109	201/253	170/220			
Spindle speed		<b>rpm</b>	24000	18000	24000	12000	12000			
<b>Head Spec</b>			M21	M21	M21	M21	M21			
Spindle nose tape			HSK-A63	HSK-A63	HSK-A63	HSK-A100	HSK-A100			
Bearing Lubrication			GREASE	GREASE	Oil-air	GREASE	GREASE			
Metal removal rate	<b>Material</b>		AlMgSil	Steel	AlMgSil	Steel	Steel			
	<b>Milling</b>	<b>cm3/min</b>	2000	400	5500	700	700			
	<b>Drilling</b>		-	∅30	-	∅50	∅50			
	<b>Threading</b>		-	M20	-	M24	M24			
<b>Head Spec</b>			B Axis	C Axis	B Axis	C Axis	B Axis	C Axis	B Axis	C Axis
Swiveling Speed	<b>rpm</b>		60	60	60	60	60	60	60	60
Rotated Torque	<b>Nm</b>		1340	1530	1340	1530	1340	1530	1340	1530
Braking Torque	<b>Nm</b>		4000	4000	4000	4000	4000	4000	4000	4000
Swiveling Angle	<b>deg</b>		±110	±360	±110	±360	±110	±360	±110	±360
Precision of Positioning	<b>sec</b>		±5"	±2"	±5"	±2"	±5"	±2"	±5"	±2"

Description	unit	CS-21-180-A (Option)	CS-40-160-S (Option)		
Spindle drive motor	<b>kW(S1/S6)</b>	21/27	40/48		
Spindle Rated Torque	<b>Nm(S1/S6)</b>	100/130	67/80		
Spindle speed	<b>rpm</b>	18000	24000		
Head Spec		P12	P12		
Spindle nose tape		HSK-A63	HSK-A63		
Bearing Lubrication		GREASE	GREASE		
Metal removal rate	<b>Material</b>	Steel	AlMgSil		
	<b>Milling</b>	<b>cm3/min</b>	400	500	
	<b>Drilling</b>		∅30	-	
	<b>Threading</b>	M20	M20		
<b>Head Spec</b>		B Axis	C Axis	B Axis	C Axis
Swiveling Speed	<b>rpm</b>	60	60	60	60
Rotated Torque	<b>Nm</b>	433	1020	433	1020
Braking Torque	<b>Nm</b>	1400	4000	1400	4000
Swiveling Angle	<b>deg</b>	±120	±360	±120	±360
Precision of Positioning	<b>sec</b>	±2"	±2"	±2"	±2"



item	D1	D2	D3	B1/1	B1/2	B2	B3	L1	L2	L3	L4
HSK-A63 (Standard)	244	322	680	270	271	400	180	175	210	309.5	630

# Precision measuring

## NCG-2005 5-axis accuracy testing

- Workpiece name NCG2005
- Workpiece material Necuron 1007
- Workpiece size 75x105x50 mm
- Workpiece fixed angle 0° & 30°
- Cycle time 12 min
- Tool Ø6 mm end mill



## 5-axis accuracy test : S-CUT



Item	Test Item	Tolerance	Test Results
1	Multi-faces simultaneous (Finish/smooth)	RA3.2 Rmax12.5	<b>RA2.0 Rmax12.5</b>
2	Profile accuracy	±0.1mm	<b>0.085mm</b>
3	Thickness accuracy of 5-axis simultaneous	±0.1mm	<b>0.063mm</b>
4	commutation grain	No cutting stepping grain	<b>No cutting stepping grain</b>

### Dimensional accuracy



Marginal lines(1 mm) in X, Y-axis are consistent.

### N/C Thermal elongation check



Connection wall thickness down to 10 µm is not broken.

### Angle accuracy deviation of rotating axes



High angle accuracy of B/C axes is easily recognized by surface finish and spacing symmetry.

### Tool center point check



Tool center point in 5-axis (X,Y,Z,B,C) positions accurately.

### Workpiece surface check



Accurate right angle between X & Y plane.

### Axis accuracy check



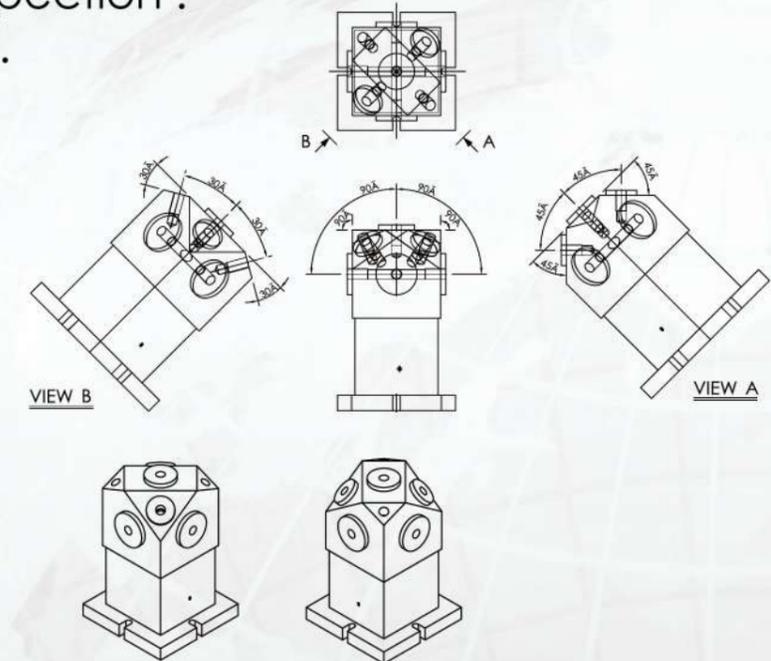
In hole cutting, tool feeds in right and left direction are symmetrical.

### Contour accuracy check



By the high accuracy of contour.

## Five axis accuracy inspection : 9 faces measurement.

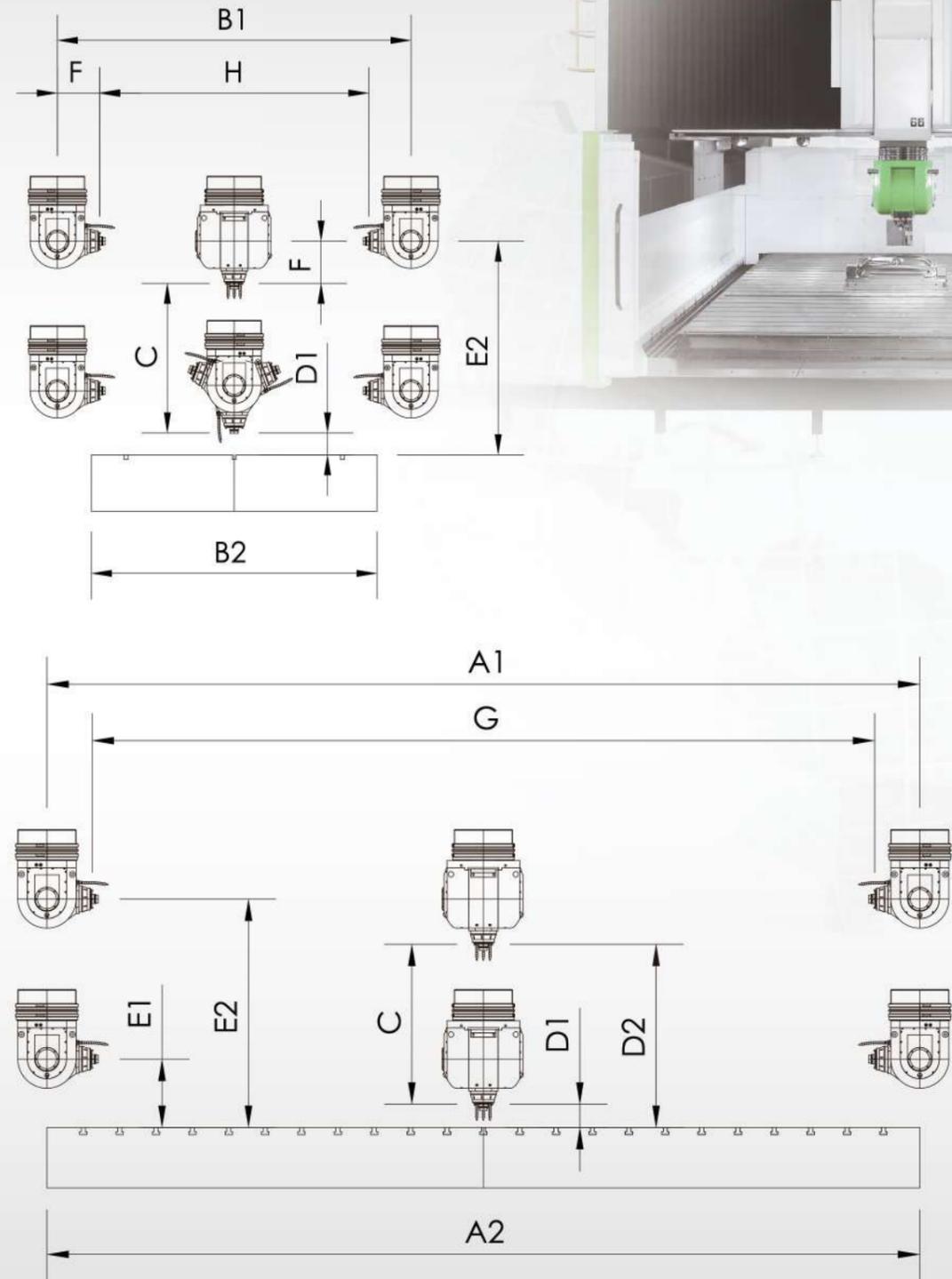


Item	Test Item	Tolerance	Test Results
1	Reference surface P relative face A, B, C, D (90 degree) of angle error.	±0.1mm	<b>0.0036</b>
2	Reference surface P relative face E, F (45 degree) of angle error.		<b>0.0036</b>
3	Reference surface P relative face G, H (30 degree) of angle error.		<b>0.0044</b>
4	Reference hole P relative axial hole A, B, C, D (90 degree) of angle error.		<b>0.007</b>
5	Reference hole P relative E,F axial hole (45 degree) of angle error.		<b>0.0055</b>
6	Reference axial hole P relative G, H axial hole (30 degree) of angle error.		<b>0.001</b>

unit : degree

All the test results featured in this catalogue were produced under strict testing condition in a special testing environment. Under different testing conditions and less than ideal testing environments. That the test results may vary from those shown in this catalogue.

# The Y-axis is designed to bring a broader range of processing



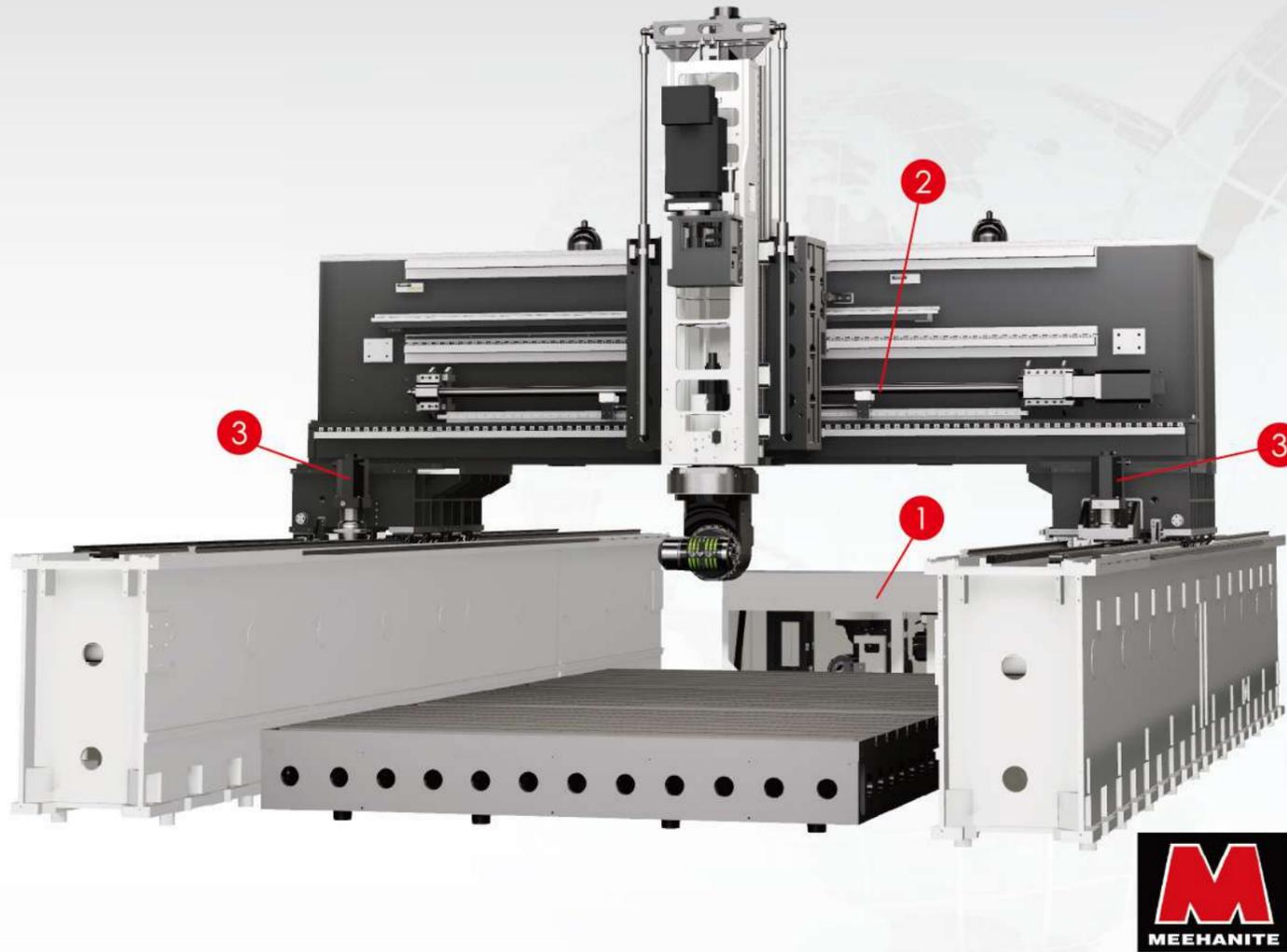
Model / Head Series	AERO-2225L/5X AERO-2225B/5X	AERO-x32L/5X AERO-x32B/5X	AERO-x36L/5X AERO-x36B/5X AERO-x36G/5X	AERO-x41L/5X AERO-x41B/5X AERO-x41G/5X	AERO-x46L/5X AERO-x46B/5X AERO-x46G/5X	
X axis travel : A1	2200	2200/4000/6000	4000/5000/6000/ 8000/10000	5000/6000/8000/10000		
Y axis travel : B1	2500	3200	3600	4100	4600	
Z axis travel : C	1100(1300)					
Table Size L : A2	2000	2200/4000/6000	4000/5000/6000/8000/10000	5000/6000/8000/10000		
Table Size W : B2	2000	2700	3100	3600	4100	
D1	M21 HSK-A63	250	200			
	M21 HSK-A100	175	125			
	P12 HSK-A63	250.5	200.5			
D2	M21 HSK-A63	1350(1550)	1300(1500)			
	M21 HSK-A100	1275(1475)	1225(1425)			
	P12 HSK-A63	1350.5(1550.5)	1300.5(1500.5)			
E1	M21 HSK-A63	560	510			
	M21 HSK-A100	560	510			
	P12 HSK-A63	540.5	490.5			
E2	M21 HSK-A63	1660(1860)	1610(1810)			
	M21 HSK-A100	1660(1860)	1610(1810)			
	P12 HSK-A63	1640.5(1840.5)	1590.5(1790.5)			
F	M21 HSK-A63	310	310			
	M21 HSK-A100	385	385			
	P12 HSK-A63	400	400			
G	M21 HSK-A63	1580	1580/3380/5380	3380/4380/5380/7380/9380	4380/5380/7380/9380	
	M21 HSK-A100	1430	1430/3230/5230	3230/4230/5230/7230/9230	4230/5230/7230/9230	
	P12 HSK-A63	1400	1430/3200/5200	3200/4200/5200/7200/9200	4200/5200/7200/9200	
H	M21 HSK-A63	1880	2580	2980	3480	3980
	M21 HSK-A100	1830	2330	2830	3330	3830
	P12 HSK-A63	1700	2400	2800	3300	3800

L: Linear Motor / B: Ballscrew(X-axis6000 and below) / G: Rack and Pinion Features(X-axis8000 and above)

unit : mm

# Optimal Rigid Design Construction for AERO-X36B/G

The gantry type construction provides a solid support for AERO-X36B/G

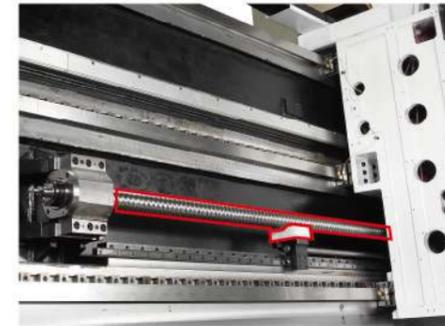


## 1. AERO-X36B/G can operate with the automatic head changer and horizontal or vertical tool changer system to offer efficient and versatile machining.



- Can operate with the auto universal head/auto 90° head/extension head.
- The full automatic head changer is provided with the protective cover and independent head magazine.
- The hydraulic cylinder is used for fast head changeover.
- Each magazine is provided with an independent moving door that is opened only during the head changeover to prevent debris from contaminating heads.
- Additional head magazines are also available. If you need them, contact your sales representative.

## 2.Screw support mechanism maintains excellent positioning accuracy



Y-axis screw support mechanism

- In time of the transmission of the x and Y axis, ensure that power is maintained.
- Improve screw dead weight sagging ; enhance the positioning accuracy and life of screw.
- Increase 1 level of screw specification; lift static rigidity.

## Diversified strong spindle meets your processing needs



Hartford made gear type 8,000rpm Two-stage spindle (optional feature)

- To follow the process attribute, pair up with high or low gear.
- Spindle-mounted structure design
- Thermal separation technology enables thermal extension to control and apply to AERO-X36B/G



Hartford made i-Tech hybrid type 10,000 rpm spindle (optional feature)

- Motor and spindle dual cooling circulation design.
- Cooling cycle design
- Built-in motor-maximum 35kw, 600N-m



## 3.X axis Rack and Pinion Features

1. No backlash by electrical pre-loading
2. High positioning accuracy even by single driver
3. High torque transmission.
4. Low noise, helical angle and pressure angle give system running smoothly.
5. In closed loop control, machine transmission components can reduce damping.

# Complete angular head design package for AERO-X36B/G

Hartford has a full range of angular head specifications, in addition to automatic universal heads, automatic 90 degrees head, automatically extension head, automatic grab head to pair up with a 90-degree head, there are series of manual and semi-automatic universal heads, 90 degrees head and extension head, etc., for you to choose to meet you wide range of processing needs.

## 1. Automatic heads (automatic clamp) suitable



Automatic universal head (2.5°/1°)	Axis	A / C axis division angle configuration table			
A / C axis automatic rotation angle Maximum speed: 4,000 rpm Maximum power: 26 kW The maximum torque to withstand: 930 N-m Optional configuration of maximum pressure 70 BAR CTS	C-axis	1°	2.5°	2.5°	1°
	A-axis	1°	2.5°	1°	2.5°
Remark	ST. standard feature	OPT. customized specifications			



Automatic 90° head (2.5° / 1°)
Maximum speed: 4,000 rpm / 2,500 rpm (opt.) Maximum power: 26 kW The maximum torque to withstand: 930 N-m Optional configuration of maximum pressure 70 BAR CTS Minimum optional configuration C-axis positioning indexing: 1 degree



Automatically extension head (350 / 500 mm)
Maximum speed: 4,000 rpm Maximum power: 25 kW The maximum torque to withstand: 750 N-m Optional configuration of maximum pressure 70 BAR CTS Automatic tool change function



Automatic clamp/unclamp+ the manual 90° head
Maximum speed: 2,000 rpm Maximum power: 18.5 kW The maximum torque to withstand: 650 N-m External guide pins enhance the positioning accuracy of the exchange head, with automatic grab head function and manual rotating angle function.

## 2. Manual position head (manually fixed) applicable to general model AERO-X36B/G



Universal head (manual / semi-automatic)		Manual universal head	Semi-automatic universal head
A axis: ± 110°, C-axis: ± 180° Maximum speed: 2,500 rpm Maximum power: 18.5 kW The maximum torque to withstand: 650 N-m	Binding mechanism	Manual	Manual
	Unclamping mechanism	Manual	Automatic
	C-axis rotation	Manual	Manual



90° side milling head (manual / semi-automatic)		Manual 90° head	Semiautomatic 90° head
Manual tool change (manual / hydraulic lock release tool.) Maximum speed: 2,000rpm Maximum power: 18.5 kW The maximum torque to withstand: 650 N-m	Binding mechanism	Manual	Manual
	Unclamping mechanism	Manual	Automatic
	C-axis rotation	Manual	Manual



Extension head (350 / 500 mm)
Maximum speed: 4,000 rpm Maximum power: 18.5 kW The maximum torque to withstand: 650 N-m

# Angular head exclusive technology for AERO-X36B/G

## Patented technology



Clutch-type vertical skew angular axis head.  
 The clutch lock of the horizontal axis(CHE)  
 During clutch, the electromagnetic brake will activate on both the rotating and linkage shaft.  
 The slanting swing is generated by gravity. Reduce the amount of slanting swing while in clutch to avoid tooth jamming.



Angular head C-axis 1 degree positioning mechanism (TWC)  
 Angular head C-axis 1-degree indexing positioning function. Because the whole transmission system is a fully closed loop, it can still better eliminate the origin of mechanical backlash.



Angular head center coolant mechanism(UAC)  
 All automatic head classes have CTS function, can give customers maximum tool life and processing performance.



• Adjust teeth clearance



• Check gear

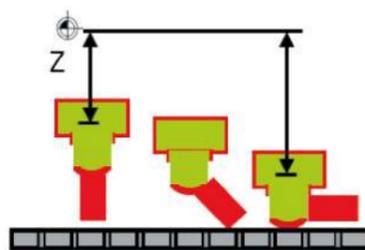


• End surface flatness correction

## Intelligent technology



Minimum optional configuration A/C-axis positioning indexing : 1 degree  
 In AC travel, arbitrary integer angular inclined surface processing needs.(Optional accessory)



Auto angular head travel intelligent switching  
 Solves the problems of switching between travel and protected areas so that the travel limit (Y-axis & Z-axis ) is automatically adjusted according to the universal head angular.(Standard accessory)



AC universal head rotation center + Tool tip automatic error measurement function  
 Raises processing accuracy, reduces manual measurement error, and shortens the measurement time. In time of measured comprising a heat deflection of the angle head, so it is possible to improve accuracy errors. (Optional accessory)

## Adhere to quality and meticulous detail

Hartford adheres to each gradation, grasps every possibility, and is devoted to adhering to quality and meticulous detail.  
 By demanding quality precision within each process, we remain dedicated to producing the best.

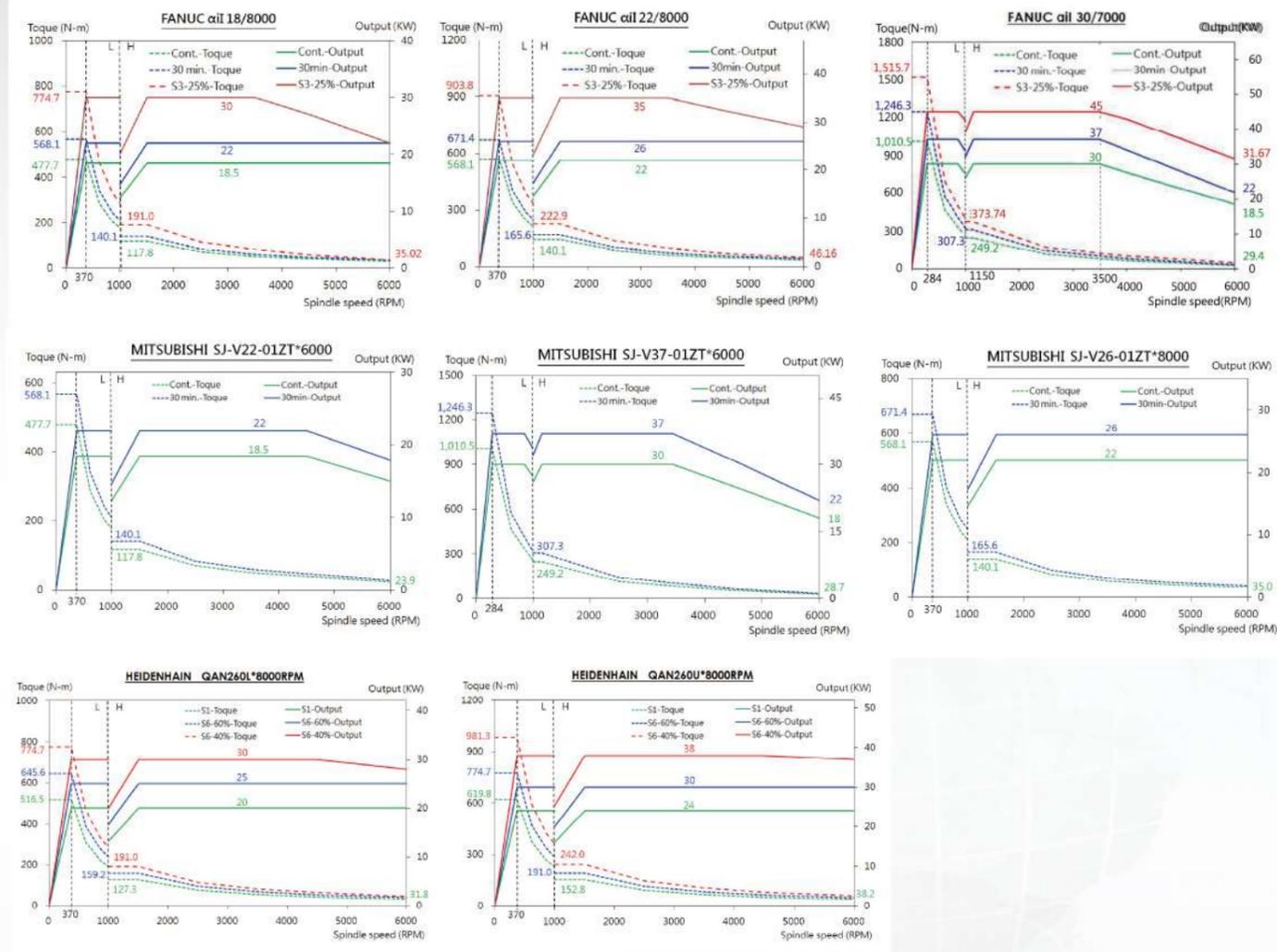


# A variety of Hartford mode spindles have quality assurance for AERO-X36B/G

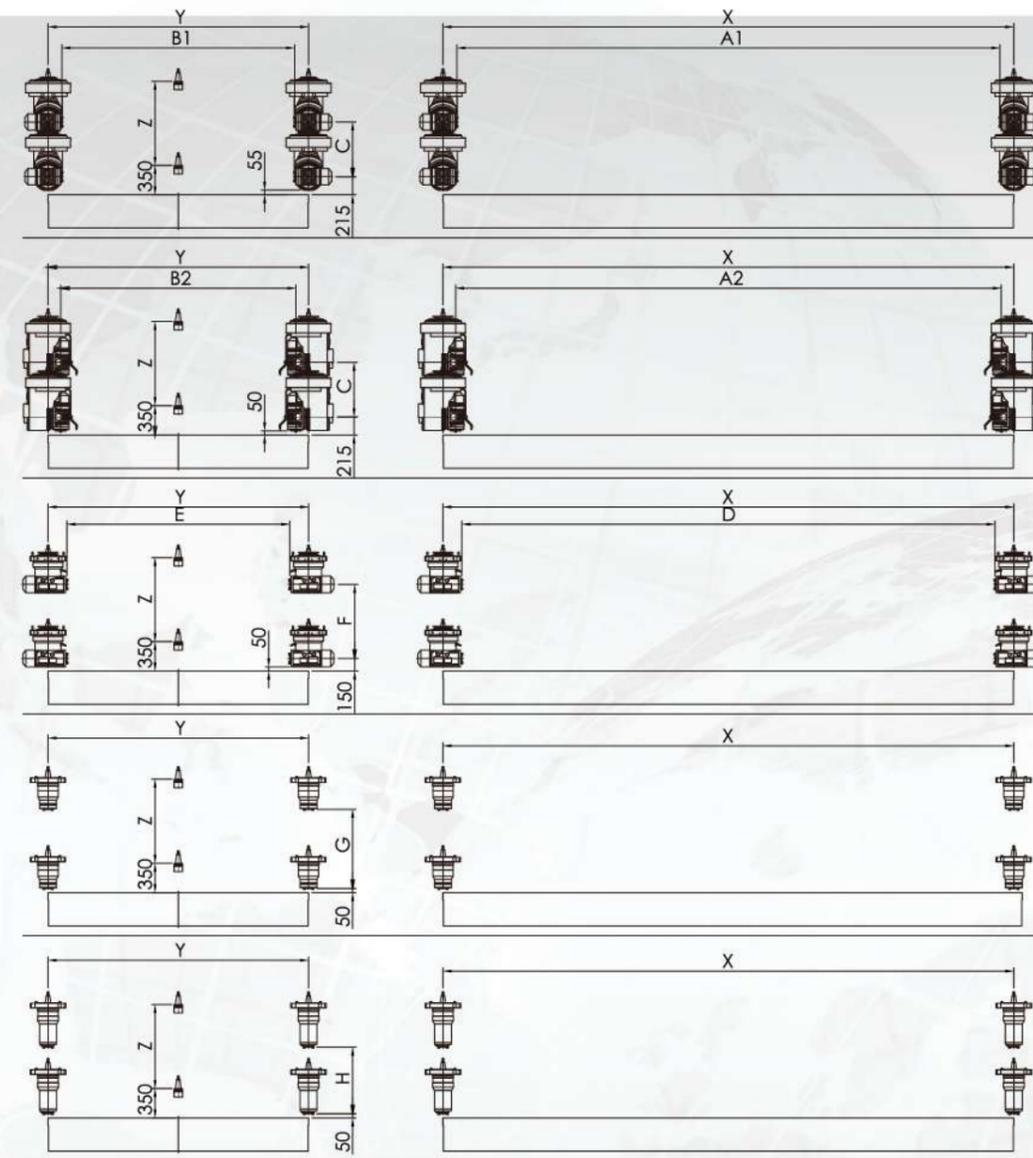
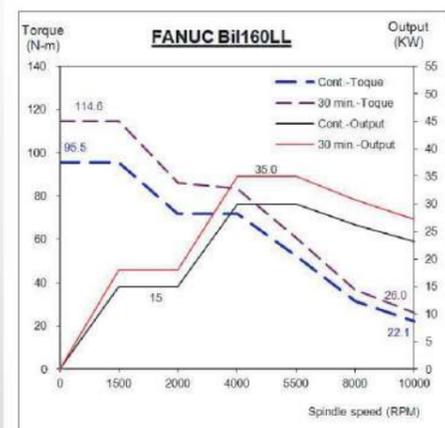
## Cutting Range

### Torque curve diagram

#### Gear type 6,000RPM



#### Hybrid 10,000RPM



Model / Head Series	AERO-2225B	AERO-x32B	AERO-x36B/G	AERO-x41B/G	AERO-x46B/G
X axis travel : X	2200	2200/4000/6000		4000/5000/6000/8000/10000	
Y axis travel : Y	2500	3200	3600	4100	4600
Z axis travel : Z	1100(1200/1400 OPT.)				
A1	1870	1870/3670/5670		3670/4670/5670/7670/9670	
A2	1900	1900/3700/5700		3700/4700/5700/7700/9700	
B1	2170	2870	3270	3770	4270
B2	2200	2900	3300	3800	4300
C	650(850/1050 OPT.)				
D	1752	1752/3552/5552		3552/4552/5552/7552/9552	
E	2052	2752	3152	3652	4152
F	880(1080/1280 OPT.)				
G	942(1142/1352 OPT.)				
H	792(992/1192 OPT.)				

# AERO/5X Specification

Model	Unit	AERO-2225L/5X AERO-2225B/5X	AERO-x32L/5X AERO-x32B/5X	AERO-x36L/5X AERO-x36B/5X AERO-x36G/5X	AERO-x41L/5X AERO-x41B/5X AERO-x41G/5X	AERO-x46L/5X AERO-x46B/5X AERO-x46G/5X
Table	Working surface	M				
	T-slot(Size×Number×Pitch)	mm				
	Max. table load	kg/m <sup>2</sup>				
Travel	Longitudinal travel (X-axis)	2.2	2.2/4/6	4/5/6/8/10	5/6/8/10	5/6/8/10
	Cross travel (Y-axis)	2500	3200	3600	4100	4600
	Vertical travel (Z-axis)	mm				
	Distance from spindle end to table	mm				
	Width between columns	mm				
Feed	Cutting feed rate (X · Y · Z axis)	m/min				
	Rapid traverse (X · Y axis)	m/min				
	Rapid traverse (Z axis)	m/min				
	Tool storage capacity	pcs				
ATC	Max. tool weight	kg				
	Max. tool size (diameter x length)	mm				
	Tool Selection	Random				
Motor	Spindle drive motor (S1/S6)	kW				
	X · Y axis linear motor	kW				
	X · Y axis drive motor (Ball Screw)	kW				
	X axis drive motor (Rack & Pinion)	kW				
	Z axis drive motor	kW				
	B axis drive motor	kW				
	C axis drive motor	kW				
Other	Floor space (Full Guarding)	Please contact staff for assistance				

## Standard & Optional Mechanical Accessories

### Standard

- X,Y,Z -axis Roller Rail Linear Guide
- X,Y -axis Closed Loop Linear Scale Positioning System
- M21 HSK-A63-24000RPM Head(CS-34-180-A)
- Full Splash Guard
- Without Coolant through spindle
- Cooling System\_Coolant Pump Motor, Stand
- Spray around spindle
- Centralized Automatic Lubrication System
- Electric Grease Lubricators
- Air Blast Through Spindle
- Spindle Air Curtain
- Spindle Water Cooler
- B/C Axis Water Cooler
- X/Y Axis Linear Motor Water Cooler
- Screw Type Chip Conveyer
- Link Type Chip Conveyor And Portable Chip Bucket
- Hoist Seat
- Fluorescent(X6M above: 6 / X5M below: 4)
- Automatic Power off
- Wireless hand-wheel for HEIDENHAIN ( HR550 )
- RS-232 Interface
- Leveling Bolts and Blocks
- Adjusting Bolt And Blocks
- Adjusting Tools And Box
- Operation manual & electric drawing equipment
- Heat Exchanger/Air conditioning
- Imitative Mold Cutting System TS460
- Calibration spheres (KKH 250)
- Dynamic Collision Monitoring
- KinematicOpt
- Tri-colors in one Lamp LED type
- Drum Type Tool Magazine\_30 pcs
- Oil Fluid Separator
- Z AXIS Nitrogen Accumulator
- Z-axis Ball Screw Without Coolant System

### Optional

- Z -axis Closed Loop Linear Scale Positioning System
- M21 HSK-A63-18000RPM Head(CS-21-180-A)
- M21 HSK-A63-24000RPM Head(CS-60-180-S)
- M21 HSK-A100-12000RPM Head(CS-42-180-S)
- M21 HSK-A100-12000RPM Head(CS-34-180-S)
- P12 HSK-A63-18000RPM Head(CS-21-180-A)
- P12 HSK-A63-24000RPM Head(CS-40-160-S)
- Full Splash Guard, Including External Fence
- CTS Full Splash Guard With Top Cover
- Air gun
- Auto Tool Length Measurement
- KinematicComp
- DNC Software
- CTS Full Splash Guard With Top Cover, Including External Fence
- Coolant Through Spindle\_ With Secondary Tank
- Machine Inner Sides Chain Chip Conveyor
- Fluorescent(X6M above: 12 / X5M below: 6)
- Drum Type Tool Magazine \_40pcs
- Arm Type Tool Magazine \_40pcs
- Arm Type Tool Magazine \_60pcs
- Cooling Device for Z-Axis Ball Screws
- Anti-collision Design Of Hydraulic Shock Absorbers (For Linear Motor)
- Maintenance Safety Guard( Including Maintenance Ladder)
- Limit switch
- NC Rotary Table
- Hydraulic Hose Coolant gun

## Standard & Optional Electrical Function

### Standard

- Kinematics opt.(Auto length measurement, auto workpiece measurement and KKH-10 are necessary option for this function)
- Software option 1: PLANE function
- Software option 2: TCPM

### Optional

- Kinematics comp
- DXF converter
- AFC: Adaptive feed control
- CTC: Cross talk comp.
- PAC: Pos. adaptive control
- LAC: Load adaptive control
- MAC: Motion adaptive control
- ACC: Active chatter control
- AVD: Active vibration damping

# Specification

Model	Unit	AERO-2225B	AERO-x32B	AERO-x36B AERO-x36G	AERO-x41B AERO-x41G	AERO-x46B AERO-x46G	
Table	Working surface	M	2 x 2.2	2.7 x 2.2/4/6	3.1 x 4/5/6/8/10	3.6 x 5/6/8/10	4.1 x 5/6/8/10
	T-slot(Size×Number×Pitch)	mm	28 x 250				
	Max. table load	kg/m <sup>2</sup>	5000				
Travel	Longitudinal travel (X-axis)	M	2.2	2.2/4/6	4/5/6/8/10	5/6/8/10	5/6/8/10
	Cross travel (Y-axis)	mm	2500	3200	3600	4100	4600
	Vertical travel (Z-axis)	mm	1100(1200/1400 opt.)				
	Distance from spindle end to table	mm	N/A: 350-1350(350-1550 / 350-1750) Universal head, Vertical:50-700(50-900 / 50-1100) Universal head, Horizontal: 215-865(215-1065 / 215-1265)		Automatic 90° Head: 150-1030(150-1230 / 150-1430) Automatically extension head 350L: 50-992(50-1192 / 50-1392) Automatically extension head 500L: 50-842(50-1042 / 50-1242)		
	Width between columns	mm	3140	3840	4240	4740	5240
Feed	Cutting feed rate (X · Y · Z axis)	m/min	Ball Screw: 1-24		Ball Screw: 1-24 (X travel ≤ 6M) Rack & Pinion: 1-20 (X travel ≥ 8M)		
	Rapid traverse (X · Y axis)	m/min	Ball Screw: 24/24/24		X/Y/Z-axis Ball Screw: 24/24/24 X travel ≤ 6M X-axis Rack & Pinion: 24 Y/Z-axis Ball Screw: 24 X travel ≥ 8M		
	Rapid traverse (Z axis)	m/min	Ball Screw: 4				
Spindle	Spindle nose taper		BT50(BBT50/CAT50/DIN)				
	Spindle speed	rpm	Gear Type: 6000(8000 opt.); Hybrid Type (For FANUC): 10000				
	Spindle power(Cont/30min.)	kW	Gear Type: 18.5/22(22/26/30/37); Hybrid Type (For FANUC): 30/35				
	Spindle Torque(Max.)	Nm	Gear Type: 556.8(669.8;1249.4);Hybrid Type (For FANUC): 600				
ATC	Tool storage capacity	Pcs	30(S-TYPE) ; Option: 40(S-TYPE) / 40(A-TYPE) / 60(A-TYPE)				
	Max. tool weight	Kg	20				
	Max.tool size (diameter×length)	mm	Ø125×400				
Motor	Tool Selection		Random				
	X · Y axis drive motor (Ball Screw)	kW	X: 8.9(11 opt.) X travel ≤ 6M Y: 8.6(8.9 opt.)				
	X axis drive motor (Rack & Pinion)	kW	-	X: 8.9(11 opt.) X travel ≥ 8M			
Other	Z axis drive motor	kW	8.9(11 opt.)				
	Floor space (Full Guarding)		Please contact staff for assistance				

B: Ballscrew(X-axis6000 and below) / G: Rack and Pinion Features(X-axis8000 and above)

## Standard & Optional Mechanical Accessories

### Standard

- X,Y,Z -axis Roller Rail Linear Guide
- X-axis Closed Loop Linear Scale Positioning System
- Full Splash Guard
- Without Coolant through spindle
- Cooling System\_Coolant Pump Motor, Stand
- Spray around spindle
- Centralized Automatic Lubrication System
- Electric Grease Lubricators
- Air Blast Through Spindle
- Spindle Air Curtain
- Spindle Oil Cooler
- Screw Type Chip Conveyer
- Link Type Chip Conveyor And Portable Chip Bucket
- Hoist Seat

### Optional

- Y,Z -axis Closed Loop Linear Scale Positioning System
- Full Splash Guard, Including External Fence
- CTS Full Splash Guard With Top Cover
- CTS Full Splash Guard With Top Cover, Including External Fence
- Coolant Through Spindle\_ With Secondary Tank
- Fluorescent(X6M above: 12 / X5M below: 6)
- Drum Type Tool Magazine \_40pcs
- Arm Type Tool Magazine \_40pcs
- Arm Type Tool Magazine \_60pcs
- Maintenance Safety Guard ( Including Maintenance Ladder)
- NC Rotary Table
- Hydraulic Hose Coolant gun
- Air gun
- Auto Tool Length Measurement
- KinematicComp
- DNC Software
- Automatic angular head (HF-A90L) 2.5deg./div., 2500RPM
- Automatic angular head (HF-A90H) 2.5deg./div., 4000RPM

- Fluorescent(X6M above: 6 / X5M below: 4)
- Automatic Power off
- Wireless hand-wheel for HEIDENHAIN ( HR550 )
- RS-232 Interface
- Leveling Bolts and Blocks
- Adjusting Bolt And Blocks
- Adjusting Tools And Box
- Operation manual & electric drawing equipment
- Imitative Mold Cutting System TS460
- Tri-colors in one Lamp LED type
- Drum Type Tool Magazine\_30 pcs
- Oil Fluid Separator
- Z AXIS Nitrogen Accumulator
- Z-axis Ball Screw Without Coolant System

- Automatic angular head (HF-A90L) 2.5deg./div., 2500RPM, CTS
- Automatic angular head (HF-A90H) 2.5deg./div., 4000RPM
- Automatic angular head (HF-A90L) 1deg./div., 2500RPM
- Automatic angular head (HF-A90H) 1deg./div., 4000RPM
- Automatic angular head (HF-A90L) 1deg./div., 2500RPM, CTS
- Automatic angular head (HF-A90H) 1deg./div., 4000RPM, CTS
- Angular head\_HF-M90L\_2000RPM,Auto clamp head
- Automatic Extend Head\_HF-AE35L\*4000RPM, 350mmL [13.78"L]
- Automatic Extend Head\_HF-AE50L\*4000RPM, 500mmL [19.69"L]
- Automatic Mutiangular milling head\_HF-AU360H, 5deg./div., 4000RPM
- Automatic Mutiangular milling head\_HF-AU360H, 2.5deg./div., 4000RPM
- Automatic Mutiangular milling head\_HF-AU360H, 5deg./div., 4000RPM, CTS
- Automatic Mutiangular milling head\_HF-AU360H, 2.5deg./div., 4000RPM, CTS
- Automatic Mutiangular milling head\_HF-AU360H, 1deg./div., 4000RPM
- Automatic Mutiangular milling head\_HF-AU360H, 1deg./div., 4000RPM, CTS

## Standard & Optional Electrical Function

### Standard

- Kinematics opt.(Auto length measurement, auto workpiece measurement and KKH-10 are necessary option for this function)
- Software option 1: PLANE function
- Software option 2: TCPM

### Optional

- Kinematics comp
- DXF converter
- AFC: Adaptive feed control
- CTC: Cross talk comp.
- PAC: Pos. adaptive control
- LAC: Load adaptive control
- MAC: Motion adaptive control
- ACC: Active chatter control
- AVD: Active vibration damping