

Hartford  
*innovation*

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50  
1965-2015 Anniversary  
Innovation makes  
sustainable development

# 5BC-X300

## 5-axis Machining Center

# 5BC-X300

## 5-axis Machining Center

Website



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#### EU Technical Center

Prague, Czech Republic

#### Distribution Center

Saint - Etienne, France / Istanbul, Turkey / Bangkok, Thailand

Caxias Do Sul, Brazil / Buenos Aires, Argentina

#### Sales & Service Center

Korea - Seoul, Busan, Daegu

China - Dongguan, Xiamen, Wuxi, Chongqing, Xian

Taiwan - Taipei, Hsinshu, Taichung, Kaohsiung

## Enhanced Structural Design

# Done-In-One Machining

- ✿ Heavy Machining with High Removal Rates
- ✿ Fine Finishing with Excellent Surface Finish
- ✿ Single Set Up for Molds & Dies



# The Next Generation



5BC-X300

## 5BC-X300

### Unlimited Machining for **Aerospace**

The 5-axis head on the 5BC-X300 is designed and constructed by Hartford to deliver the widest possible working envelope for our customers.

For high precision large Aerospace components and difficult to machine materials this Hartford 5-axis Double column machining center delivers the power and versatility to deliver complex multi axis components machining whilst maintaining high precision and excellent material removal efficiency.

$\pm 240^\circ$

$\pm 100^\circ$

$\pm 100^\circ$

## Swivel Machining Head



# Join The Aerospace Revolution



5BC-X300



## High Efficiency Solution for Aerospace Components

The Hartford 5BC-X300 5-axis machining center builds on decades of machining excellence from the Hartford brand to deliver a 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 in house 240° 5-axis head delivers the versatility and cutting flexibility you need to handle large complex components machining.

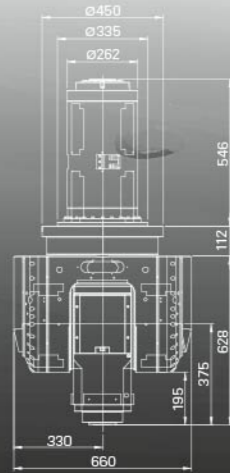
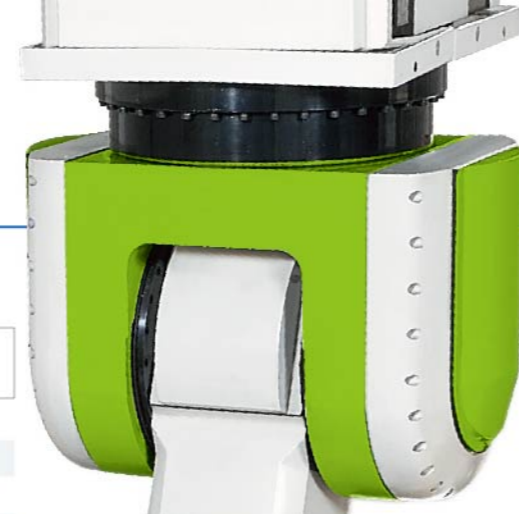


**C17 Cargo Aircraft Wing Components**

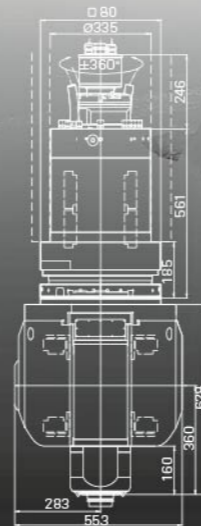
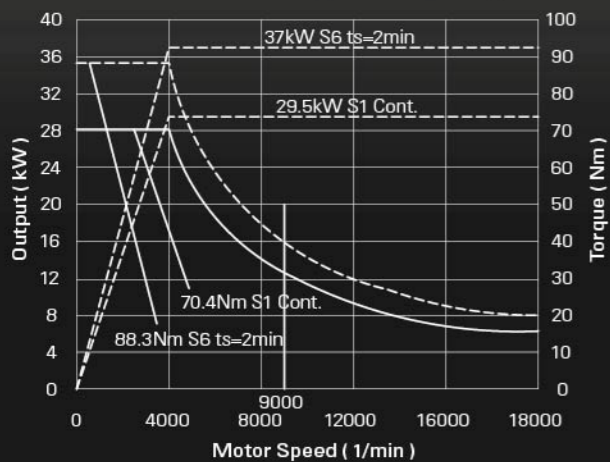


## Powerful & Versatile

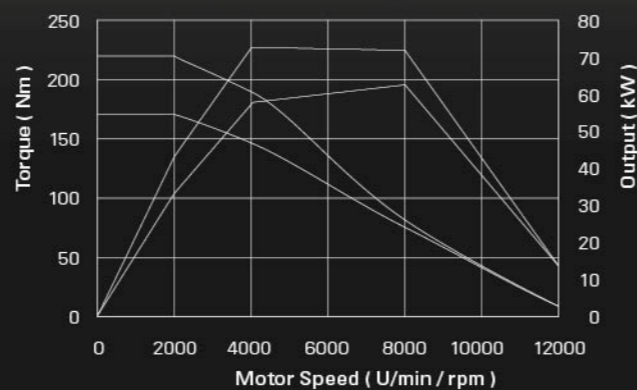
Model	HSK-A63		HSK-A100	
	B Axis	C Axis	B Axis	C Axis
Rotation Range	± 100°	± 240°	± 100°	± 240°
Positioning Accuracy	sec ± 5"	± 3"	± 2.5"	± 2"
Rotation Speed	rpm 60	60	360°/s	360°/s
Rotation Speed (Continuous)	Nm 648	638	—	—
Rotational Torque (Maximum)	Nm 1200	1000	1000	1200
Holding Torque	Nm 4000	4000	4000	4000



**HSK-63A**  
15000 rpm



**HSK-100A**  
12000 rpm



## Advanced Measurement & Control Technology

Hartford understands that with high speed 5-axis machining the need for even greater axis accuracy is essential.

Our State of the Art machining centers come equipped with the latest measurement and control technology delivering the extreme accuracy and high productivity you demand.

### Dynamic Collision Monitoring (DCM)

Heidenhain's new software option automatically monitors the working space of the machine, preventing collisions with machine components and increasing the level of safety for both the operator and the machine.

### Kinematic Opt 48

Complex parts with stringent accuracy requirements require precision and repeat accuracy even over long periods. Kinematics Opt is a 3-D touch probe cycle that automatically measures all rotary axes and makes recalibration a fast and efficient process.

### Kinematic Comp (Opt)

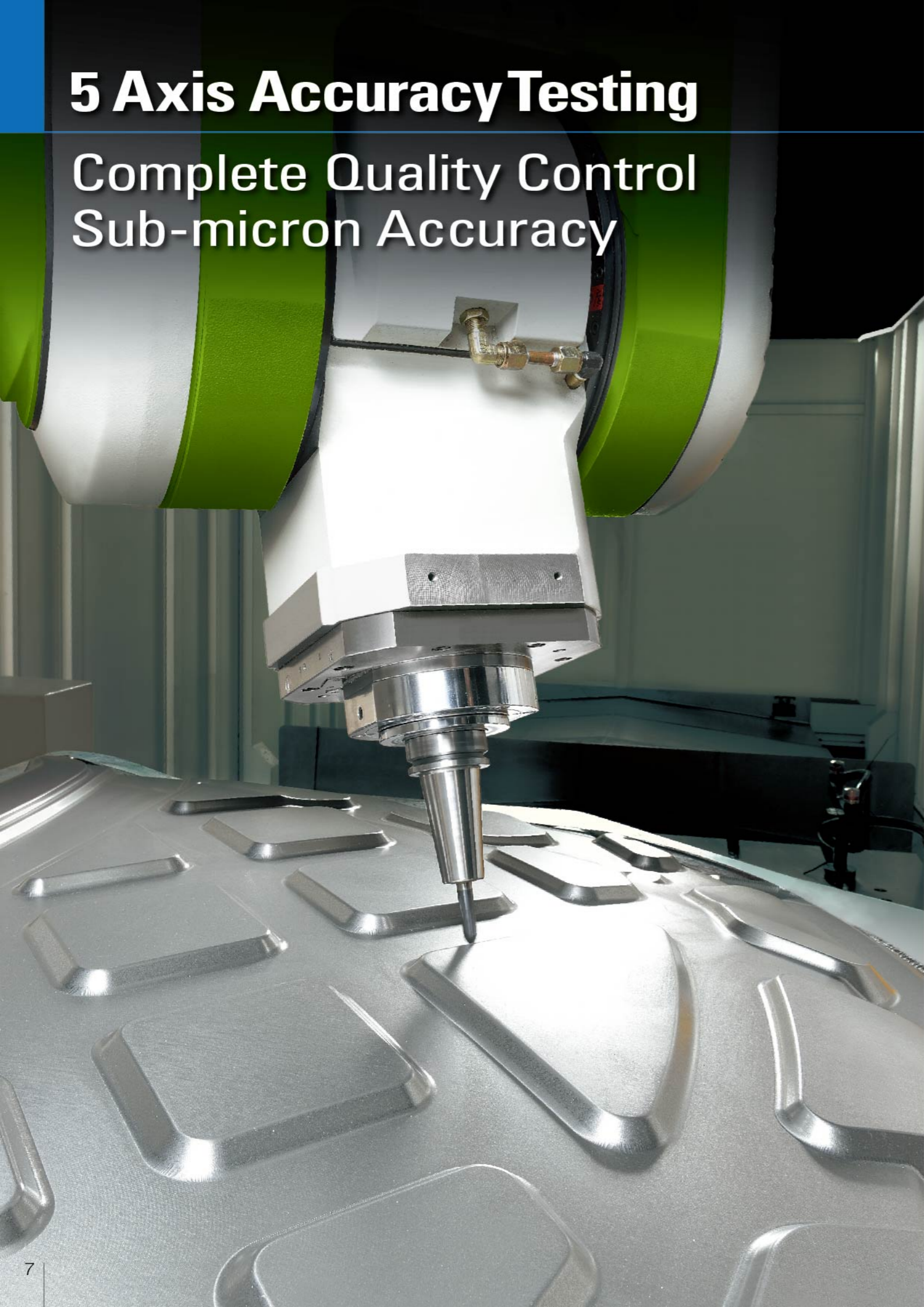
Heidenhain's Kinematic Comp technology takes volumetric compensation to a new level and has been proven to enhance precision machining of large work pieces.

HEIDENHAIN



# 5 Axis Accuracy Testing

## Complete Quality Control Sub-micron Accuracy



**5BC-X300**

Work Pieces Name : **NCG2005**  
 Work Piece Material : Necuron1007  
 Work Piece Size : 75 x 105 x 50mm  
 Work Piece Fixed Angle : 0° & 30°  
 Cycle Time : 15min



### 1 Workpiece Surface Quality Check



Accurate Right Angle  
Between X and Y Plane.



High Perpendicularity Accuracy  
Between Tool and Workpiece.

### 2 Dimensional Accuracy Measurement



Marginal Lines (1mm) in X,  
Y-axis are Consistent.

### 3 Angle Accuracy Deviation of Rotating Axes



High Angle Accuracy of  
B/C Axes is Easily Recognized.



By Surface Finish and  
Spacing Symmetry.

### 4 N/C Thermal Elongation Check



Connection Wall Thickness  
Down to 10µm is Not Broken.

### 5 Axis Accuracy Check



In Hole Cutting,  
Tool Feeds in Right and Left  
Directions are Symmetrical.

### 6 Tool Center Point Check



Tool Center Point in  
5 Axes (X, Y, Z, B, C)  
Positions Accurately.

### 7 Contour Accuracy Check



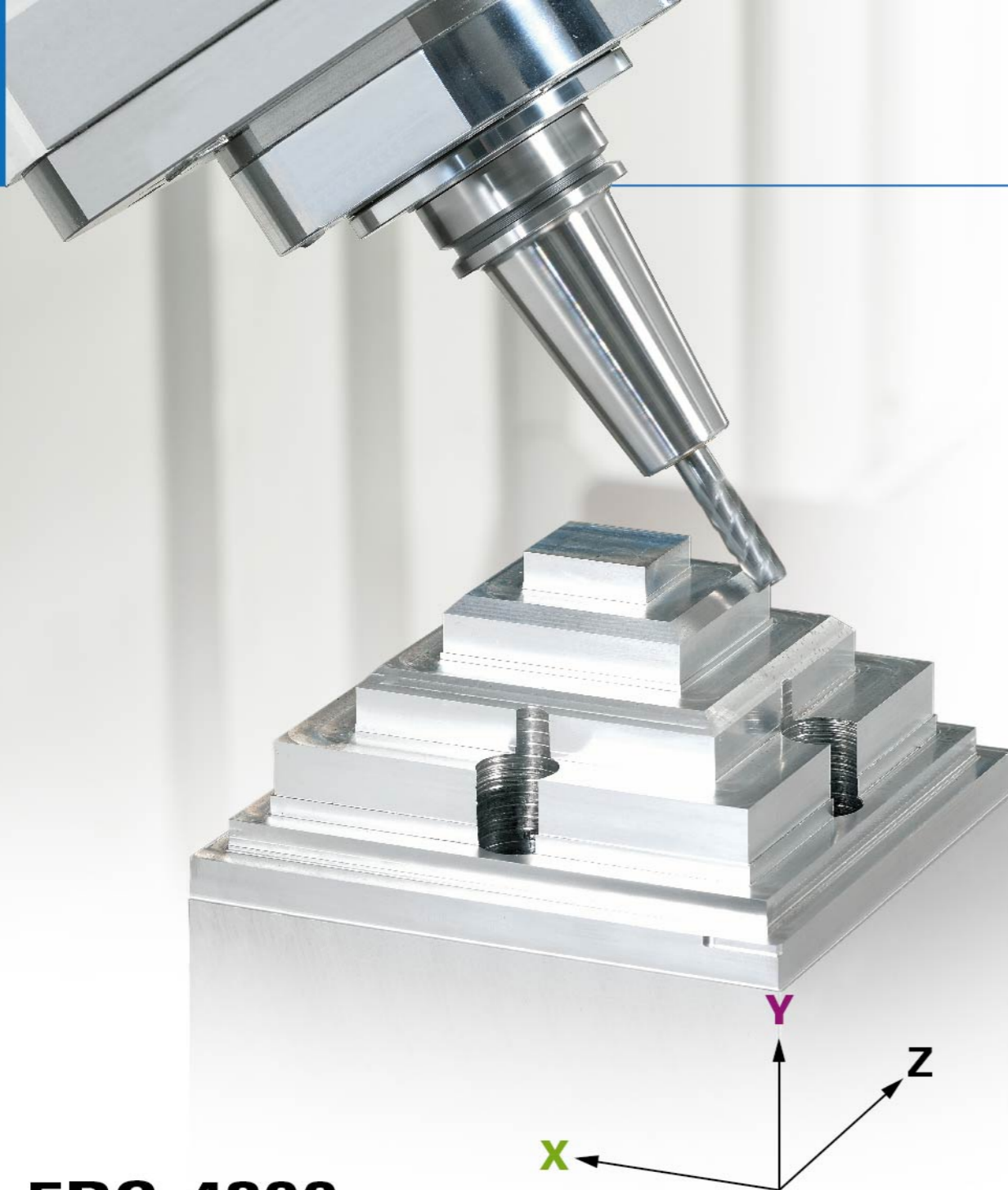
By the High Accuracy of Contour.



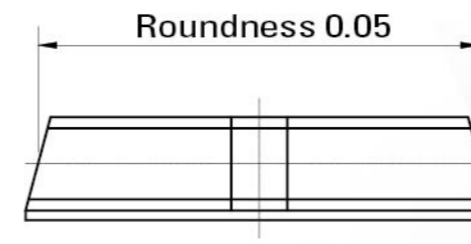


5BC-X300

# 5-axis Machining Center Accuracy Test NAS-979 Standard



## 5BC-4300 Pyramid RMP600 Precision Measuring



### NSA-979 Cutting Report

	Tolerance	Test Results
Inclination Angle	$\angle 15^\circ (\pm 1^\circ / 20'')$	15.0007
Roundness	0.05	0.0148

Unit: mm

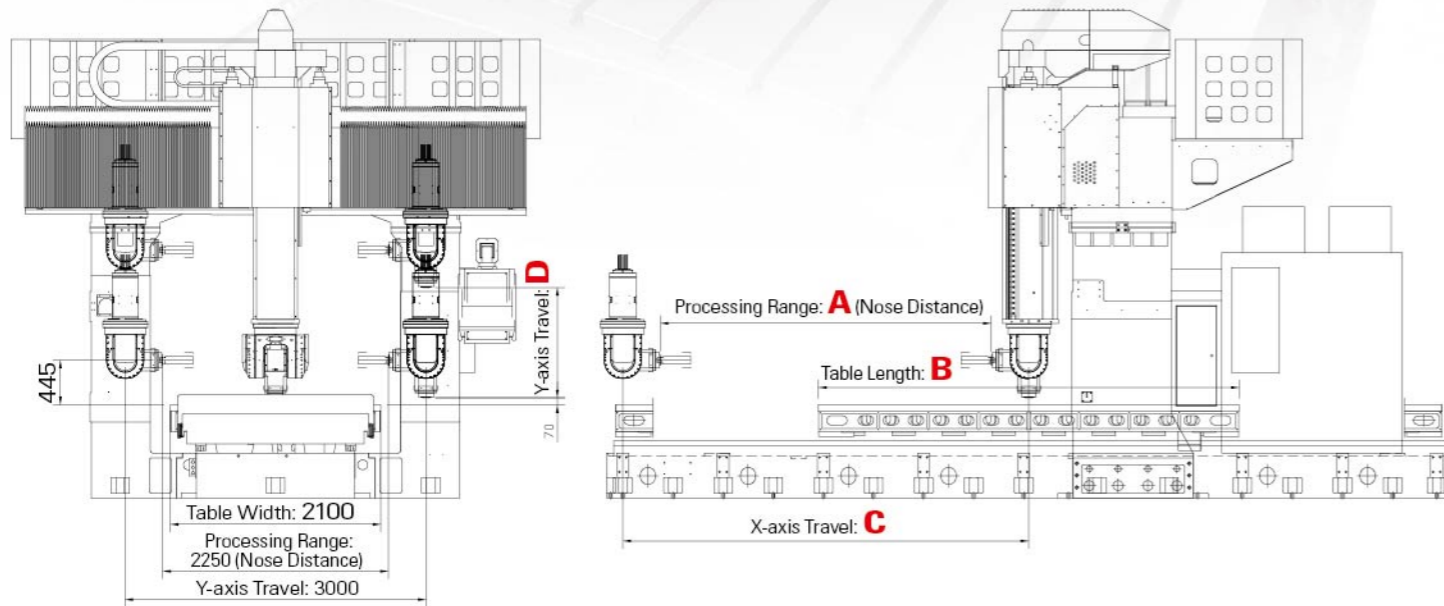
Y+	Y-	X+	X-	Actual Length		Std. Length		Error Margin		BC Rotation
				Y-axis	X-axis	Y-axis	X-axis	Y-axis	X-axis	
20.8045	20.8028	17.3119	17.2942	41.6073	34.6061	41.6	34.6	-0.0073	-0.0061	NO
40.2079	40.2014	35.7281	35.6926	80.4093	71.4207	80.4	71.4	-0.0093	-0.0207	Y+ / X+ / C180
60.7998	60.8027	56.3084	56.2965	121.6025	112.6049	121.6	112.6	-0.0025	-0.0049	NO
80.0998	80.1057	75.6247	75.5915	160.2055	151.2162	160.2	151.2	-0.0055	-0.0162	Y+ / X+ / C90

Unit: mm

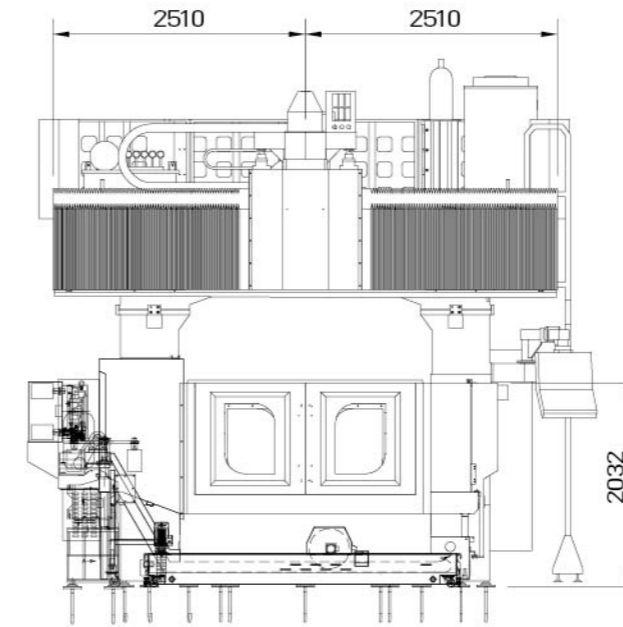




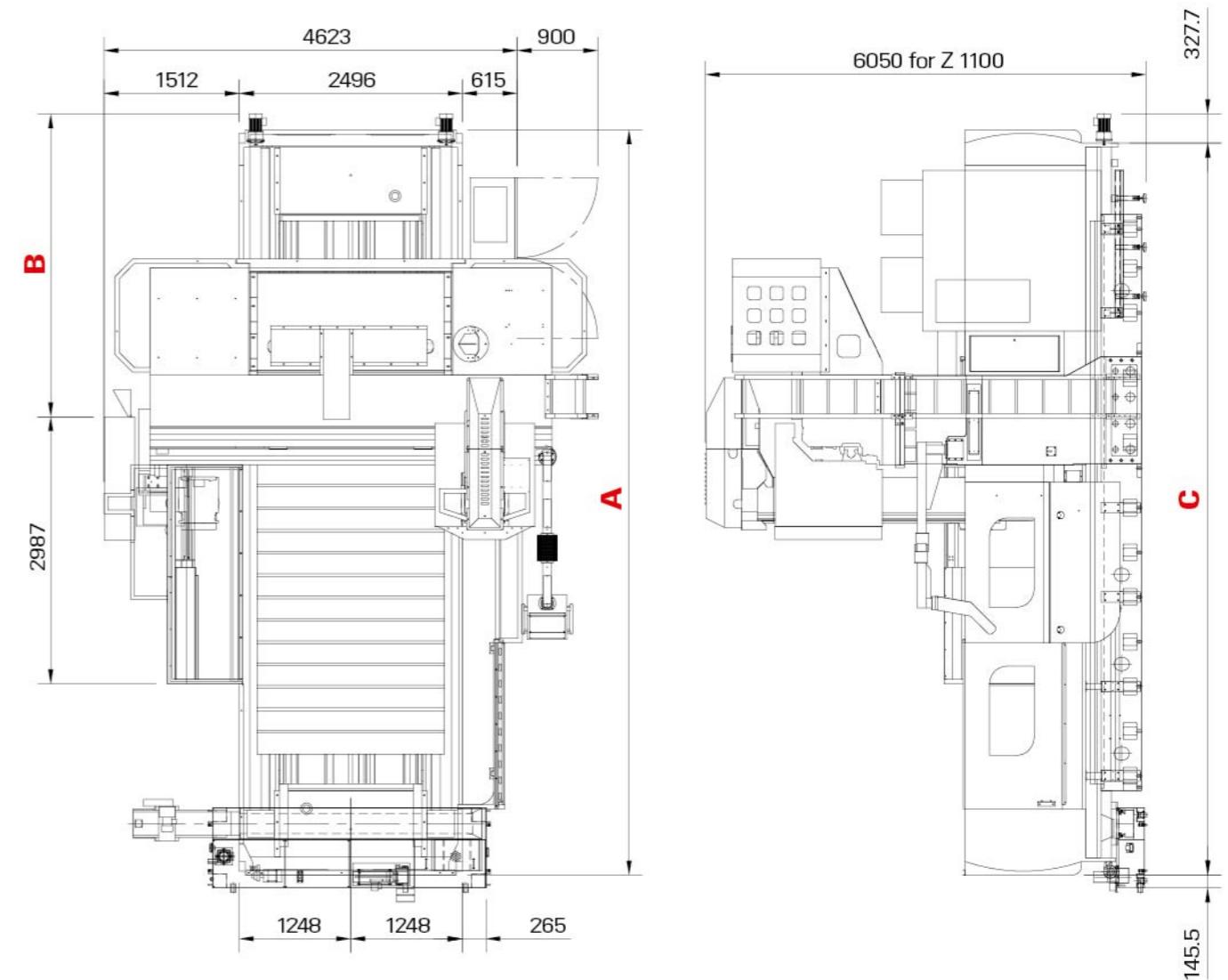
## Enhance Precision Machining of Large Work Pieces



Model	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
5BC-3300	2300	3200	3050	1100/1200
5BC-4300	3300	4200	4050	1100/1200
5BC-5300	4300	5200	5050	1100/1200
5BC-6300	5300	6200	6050	1100/1200



Model	<b>A</b>	<b>B</b>	<b>C</b>
5BC-3300	8340	3391	8190
5BC-4300	10340	4391	10190
5BC-5300	12340	5391	12190
5BC-6300	14340	6391	14190





# Machine Specifications



Model	Unit		5BC-3300		5BC-4300		5BC-5300		5BC-6300	
<b>Table</b>										
Working Surface	mm	inch	3000 x 2100	118.11 x 82.68	4000 x 2100	157.48 x 82.68	5000 x 2100	196.85 x 82.68	6000 x 2100	236.22 x 82.68
T-slot (Size x Number x Pitch)	mm	inch	28 x 9 x 220	1.1 x 9 x 8.66	28 x 9 x 220	1.1 x 9 x 8.66	28 x 9 x 220	1.1 x 9 x 8.66	28 x 9 x 220	1.1 x 9 x 8.66
Max Table Load	kg	lbs.	10000	22046.23	13000	28660.00	15000	33069.34	17000	37478.58
<b>Travel</b>										
Longitudinal Travel (X-axis)	mm	inch	3050	120.08	4050	159.45	5050	198.82	6050	238.19
Gross Travel (Y-axis)	mm	inch	3000	118.11	3000	118.11	3000	118.11	3000	118.11
Vertical Travel (Z-axis)	mm	inch	1100	43.31	1100	43.31	1100	43.31	1100	43.31
Distance From Spindle Center to Column	mm	inch	430	16.93	430	16.93	430	16.93	430	16.93
Distance From Spindle End to Table Center	mm	inch	70~1170	2.76~46.06	70~1170	2.76~46.06	70~1170	2.76~46.06	70~1170	2.76~46.06
Width Between Column	mm	inch	2400	94.49	2400	94.49	2400	94.49	2400	94.49
<b>Spindle</b>										
Spindle Drive Motor	kW(S1 / S6)	HP(S1/S6)	29.5/37(34/43)	39.56/49.62(45.6/57.7)	29.5/37(34/43)	39.56/49.62(45.6/57.7)	29.5/37(34/43)	39.56/49.62(45.6/57.7)	29.5/37(34/43)	39.56/49.62(45.6/57.7)
Spindle Rated Torque	Nm(S1 / S6)	ft-lbs(S1/S6)	70.4/88.3(170/220)	51.92/65.13(125.4/162.3)	70.4/88.3(170/220)	51.92/65.13(125.4/162.3)	70.4/88.3(170/220)	51.92/65.13(125.4/162.3)	70.4/88.3(170/220)	51.92/65.13(125.4/162.3)
Spindle Speed (DDS)	rpm	rpm	15000(12000)	15000.00(12000.00)	15000(12000)	15000.00(12000.00)	15000(12000)	15000.00(12000.00)	15000(12000)	15000.00(12000.00)
Spindle Nose Taper			HSK-63A(HSK-100A)	HSK-63A(HSK-100A)	HSK-63A(HSK-100A)	HSK-63A(HSK-100A)	HSK-63A(HSK-100A)	HSK-63A(HSK-100A)	HSK-63A(HSK-100A)	HSK-63A(HSK-100A)
<b>B-axis</b>										
Swiveling Speed	rpm	rpm	60	60.00	60	60.00	60	60.00	60	60.00
Roted Torque	Nm	ft-lbs	1200	885.07	1200	885.07	1200	885.07	1200	885.07
Braking Torque	Nm	ft-lbs	4000	2950.25	4000	2950.25	4000	2950.25	4000	2950.25
Swiveling Angle	deg	deg	±100°	±100°	±100°	±100°	±100°	±100°	±100°	±100°
Precision of Positioning			±5"	±5"	±5"	±5"	±5"	±5"	±5"	±5"
<b>C-axis</b>										
Swiveling Speed	rpm	rpm	60	60.00	60	60.00	60	60.00	60	60.00
Roted Torque	Nm	ft-lbs	1000	737.56	1000	737.56	1000	737.56	1000	737.56
Braking Torque	Nm	ft-lbs	4000	2950.25	4000	2950.25	4000	2950.25	4000	2950.25
Swiveling Angle	deg	deg	±240°	±240°	±240°	±240°	±240°	±240°	±240°	±240°
Precision of Positioning			±5"	±5"	±5"	±5"	±5"	±5"	±5"	±5"
<b>Feed</b>										
Cutting Feedrate(X/Y/Z)	mm / min	ipm	8/8/8	314.96/314.96/314.96	8/8/8	314.96/314.96/314.96	6/8/8	236.22/314.96/314.96	6/6/6	236.22/236.22/236.22
Rapid Traverse(X/Y/Z)	mm / min	ipm	20/12/12	787.4/472.44/472.44	12/12/12	472.5/472.5/472.5	10/12/12	393.70/472.44/472.44	8/12/12	314.96/472.44/472.44
<b>ATC</b>										
Tool Storage Capacity	pcs		32/40/60(A-Type)	32/40/60(A-Type)	32/40/60(A-Type)	32/40/60(A-Type)	32/40/60(A-Type)	32/40/60(A-Type)	32/40/60(A-Type)	32/40/60(A-Type)
Max. Tool Weight	kg	lbs.	7	15.43	7	15.43	7	15.43	7	15.43
Max. Tool Size (Diameter x Length)	mm	inch	Ø75 x 300	Ø2.95 x 11.81	Ø75 x 300	Ø2.95 x 11.81	Ø75 x 300	Ø2.95 x 11.81	Ø75 x 300	Ø2.95 x 11.81
<b>Other</b>										
Required Air Pressure	Kg / cm <sup>2</sup>	PSI	6.5	92.45	6.5	92.45	6.5	92.45	6.5	92.45
Machine Weight	Kg	lbs.	46000	101412.64	50000	110231.13	54000	119049.62	58000	127868.11
Floor Space (Full Guarding)	mm	inch	10400 x 7000	409.45 x 275.59	12400 x 7000	448.19 x 275.59	14400 x 7000	566.93 x 275.59	16400 x 7000	645.67 x 275.59
For Other Specs Please Ask Sales.										

## Standard & Optional Mechanical Accessories

Standard	Optional
<ul style="list-style-type: none"> <li>■ Coolant System Coolant Pump Motor</li> <li>■ Lubrication System</li> <li>■ Air Blast Through Spindle (M53)</li> <li>■ Spray Around Spindle</li> <li>■ Spindle Water Cooler</li> <li>■ Link Type Chip Conveyor &amp; Portable Chip Bucket (1 EA)</li> <li>■ Fluorescent Lamp x 1</li> <li>■ Full-enclosed Splash Guard (Single Door)</li> <li>■ Foundation Bolt, Concrete</li> <li>■ Tool Package</li> <li>■ Hartford Manual x 1</li> </ul>	<ul style="list-style-type: none"> <li>■ Distance From Spindle Center to Column 430mm</li> <li>■ Built-in Spindle 15000rpm (ATE) DC / 150 / 150 / 6 x 15000 x 37kw (S6-60%)</li> <li>■ Tool ARM Type Tool Magazine 32Pcs, Ø75 x 300l x 7kg</li> <li>■ Hydraulic Hose Coolant Gun</li> <li>■ Operator Panel, Pendent Type</li> <li>■ Spindle Air Curtain</li> <li>■ Coolant Through Spindle, Prepare, Without Water Cart</li> <li>■ Three-steps Treadle (Side-operation), 1500 x 810 x 852mm</li> <li>■ Maintenance Safety Guard (Including Maintenance Ladder)</li> </ul>
	<ul style="list-style-type: none"> <li>■ Oil Skimmer</li> <li>■ Coolant Through Spindle, 20BAR, with Water Cart</li> <li>■ Coolant Through Spindle, 25BAR, with Water Cart</li> <li>■ Full-enclosed Splash Guard 3pcs Door</li> <li>■ CTS Full Splash Guard with Top Cover</li> <li>■ Tool ARM Type Tool Magazine 40pcs, Ø75 x 300l x 7kg</li> <li>■ Tool ARM Type Tool Magazine 60pcs, Ø75 x 300l x 7kg</li> <li>■ X-axis Linear Scale System (Heidenhain)</li> <li>■ Y-axis Linear Scale System (Heidenhain)</li> <li>■ Z-axis Linear Scale System (Heidenhain)</li> </ul>
	<ul style="list-style-type: none"> <li>■ Air Gun</li> <li>■ Hoist Seat</li> </ul>

