

## 5A Series Smartcenter

**Intelligent** 5-axis high accuracy  
machining center

- 5-year warranty on guideways
- Thermal insulation solutions
- Built-in spindle shaft with cooling system
- 5-axis total error within 0.04mm



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

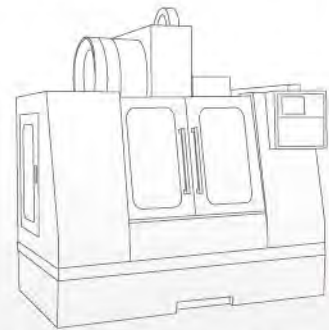
Hartrol · Smartcenter · Robocell

We manufacture intelligent machines only

# What is Smartcenter?

Smartcenter is Smart machining center. To put it simply, an intelligent machining center. HartfordSmartcenter has three major advantages:

- Intelligent :
  1. Intelligent operating interface / 2. Intelligent machining / 3. Intelligent quality control /
  4. Intelligent maintenance system, to help our customer reach the ultimate goal: Zero Down Time.
- Networking :  
To manage your multiple facilities in a smart and simple way by using Hartford Superbox linking all the machining centers of your production line.
- Automation :  
Hartford Robocell is the best answer for improving your productivity, the solution for you to join the new generation: Automation.



The regular standard machining center

VS.



## Hartford Smartcenter will help you become an intelligent manager

The main technologies of Hartford smartcenter include intelligent managing system, status monitoring, alarm predicting, machine status diagnosis, crash preventing, 3D program simulation, machining efficiency improving...etc. All the intelligent functions help you control the machine status and assure the job quality.

### Hartford smartcenter APP



The functions mentioned above will need to option the Hartrol plus controller or Dual screen with Fanuc controller.



# The Ultimate In Speed, Productivity And Versatility

Hartford 5A series is specially designed for simple and complex parts in small lot production, which require high precision 5-axis machining.



1. Tire (for 5-axis controller)



2. Bullet blade(for 5-axis controller)



3. Hollow fan(for 5-axis controller)



Generator Blades



Turbine Blade

- Work piece Size:ø160 cylinder
- Special features : Flake machining B,C axes machining.

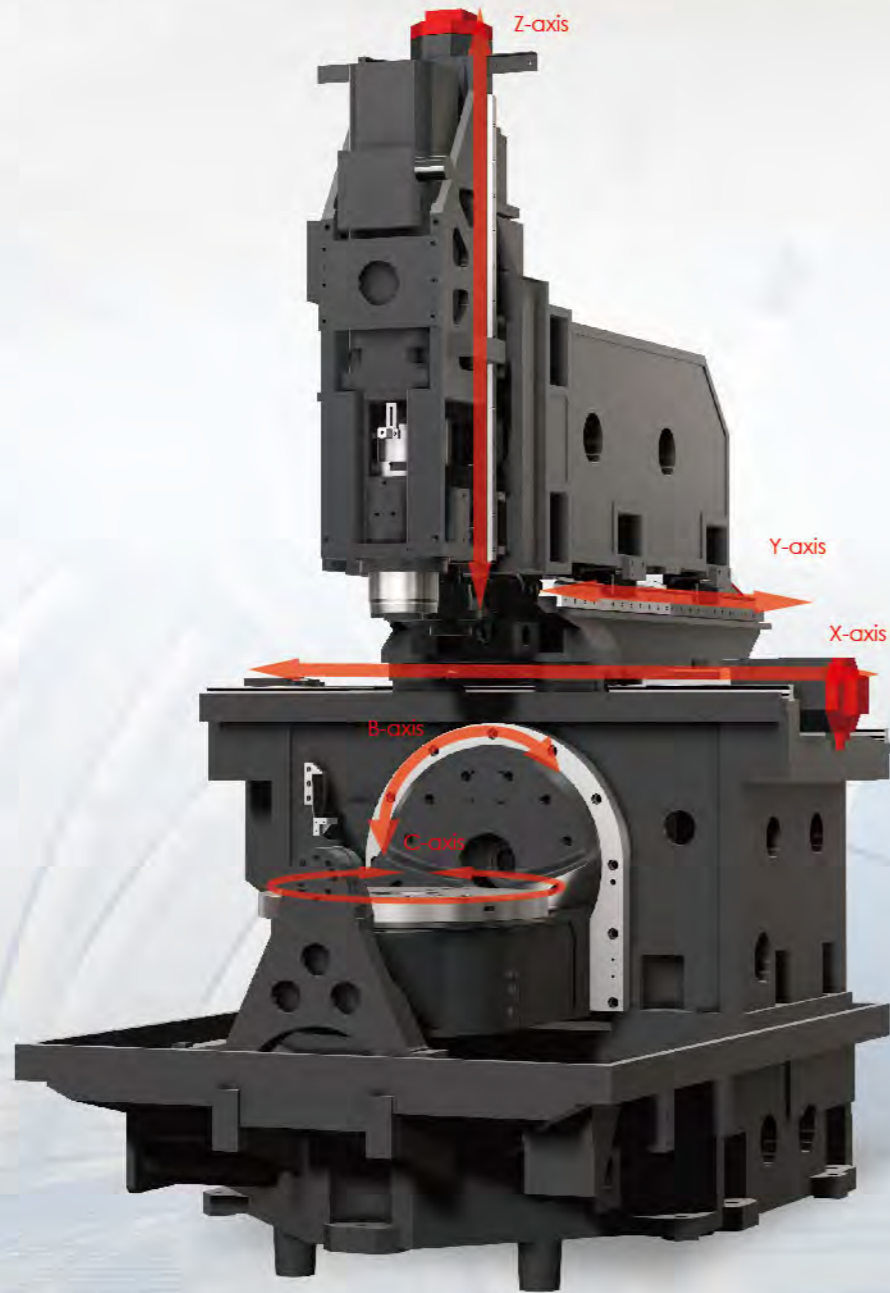
Tool	Rpm	Feed rate	Machining Time
D8R4mm Aluminum Ball End Mill	10000	3000	02:58:56
D4R2mm Aluminum Ball End Mill	12000	2000	25:26:15
D4R1mm Aluminum Ball End Mill	12000	1000	02:08:38
Total time			<b>36:33:49</b>

- Work piece Size:ø450 cylinder
- Special features : 5 axes blade module application,5 axes machining with Table-Table type.

Tool	Rpm	Feed rate	Machining Time
D80 Rough Mill	2200	6000	03:28:35
D10R5mm Aluminum Ball End Mill	8000	3000	101:45:58
D10R5mm Aluminum Ball End Mill	10000	3000	01:55:32
D10R5mm Aluminum Ball End Mill	10000	3000	01:22:54
Total time			<b>108:32:59</b>

# High rigidity structure design on 5A-65E

The single arm structure design of 5A-65E delivers higher rigidity, support and better machining capability.



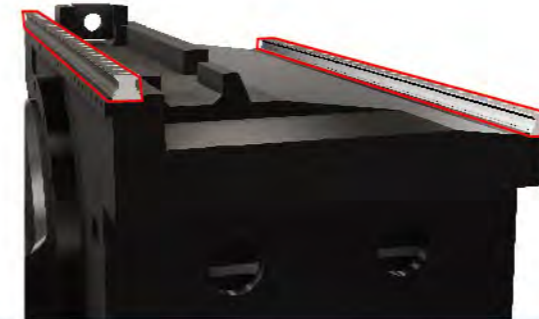
### Full range of linear guideway five-year warranty:

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.

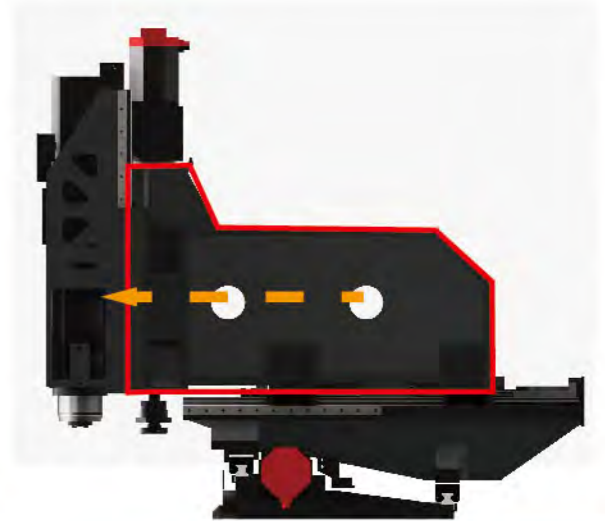
### X-axis guide ways are set on stepped bed

- This makes better support for machine.
- Machine rigidity is much better.
- Deformation is not an issue for machine



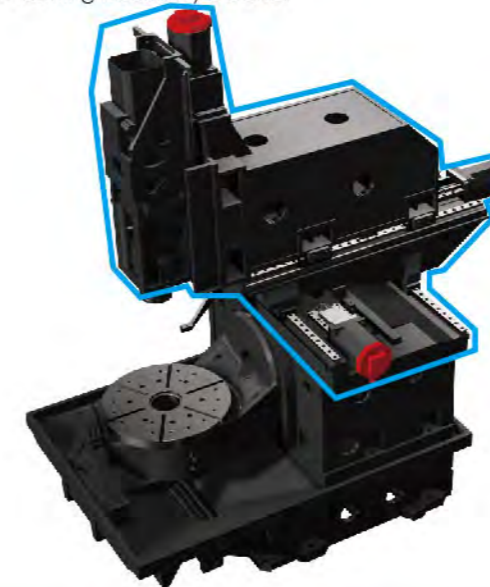
### Full-support design on Y-axis

- Weight sagging problem is improved.
- Machining accuracy is enhanced.



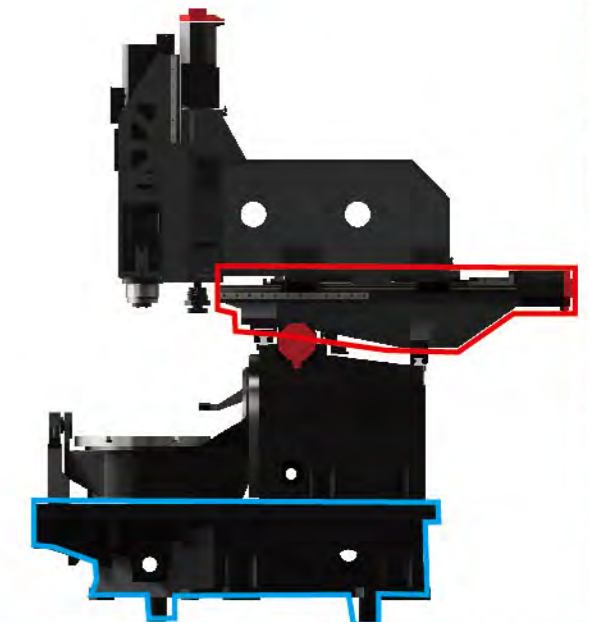
### Overlap design on 3-axis

- Workpiece does not move with 3-axis.
- The impact on 3-axis positioning accuracy is minimized.
- Cutting accuracy is better



### Oversized design on base

- Movement cutting accuracy is improved.
- Delivers higher support for machine



# 5A-600T(F)/5A-800T(F) , Latest Advances In Structure Design

Gantry type construction delivers higher stability for 5A-600T(F) and 5A-800T(F).

### Great span on Y-axis linear guideway

- Machine structural rigidity is increased.
- Average rigidity increased by **64%** on the three axes.

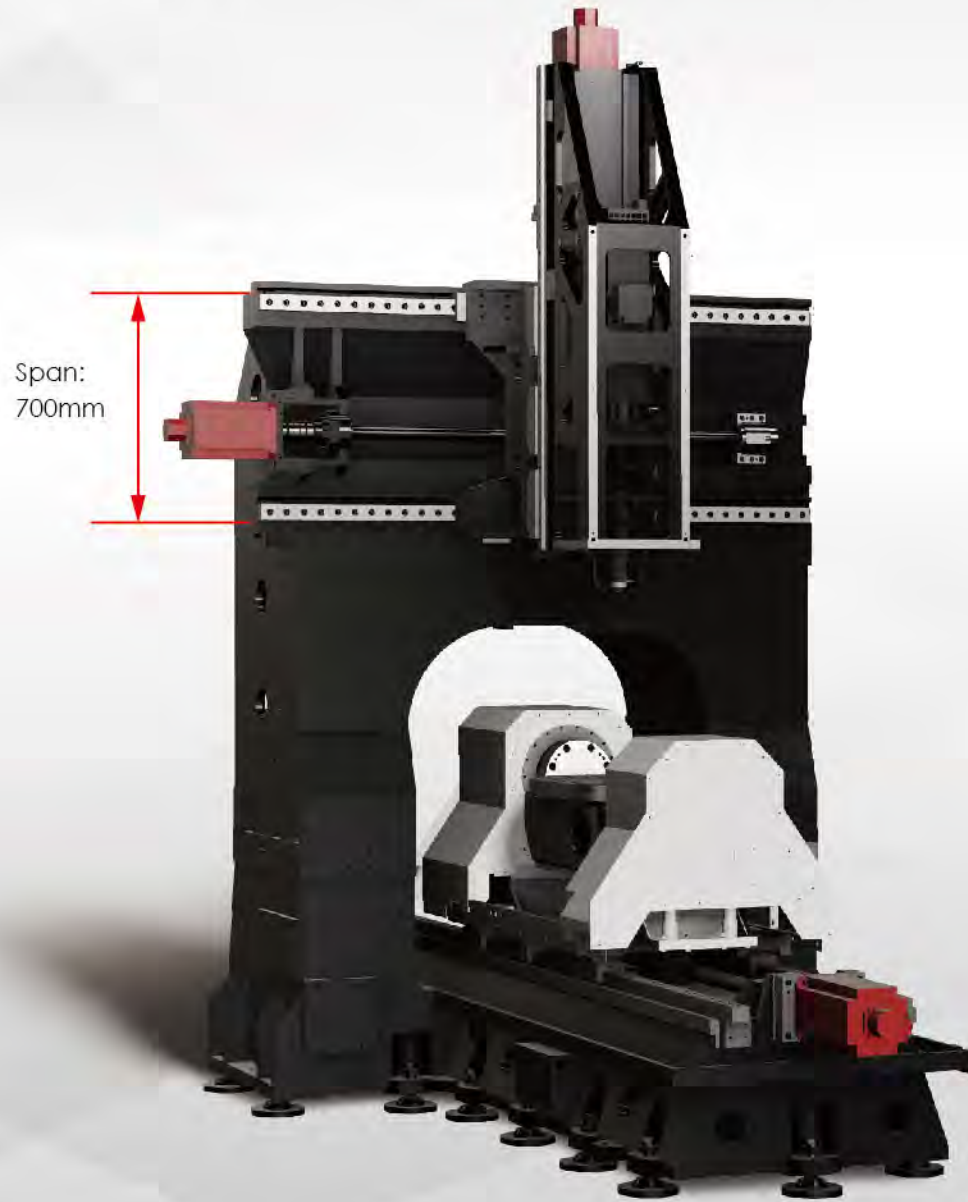
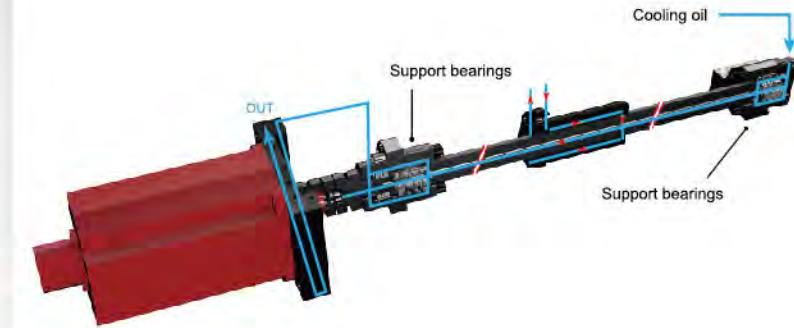


Photo shows 5A-600T



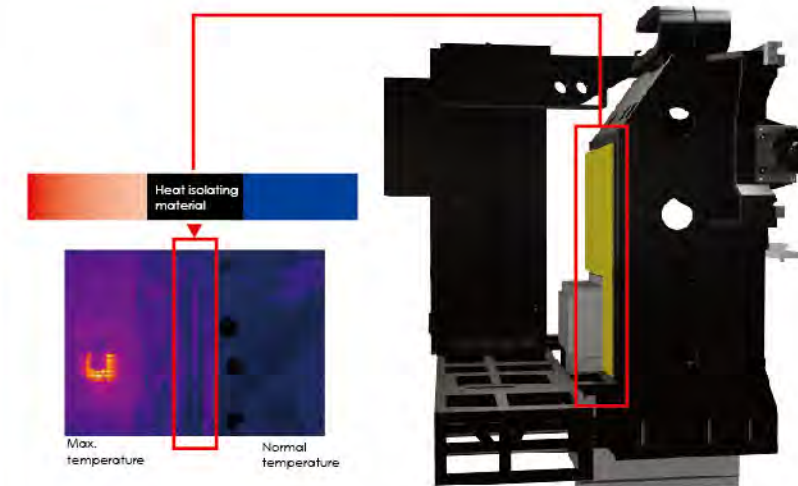
### Bearing housing stop pin

- Baring housing with stop pin design.
- Increases machine transmission rigidity.
- Axis rigidity is increased by **14%**



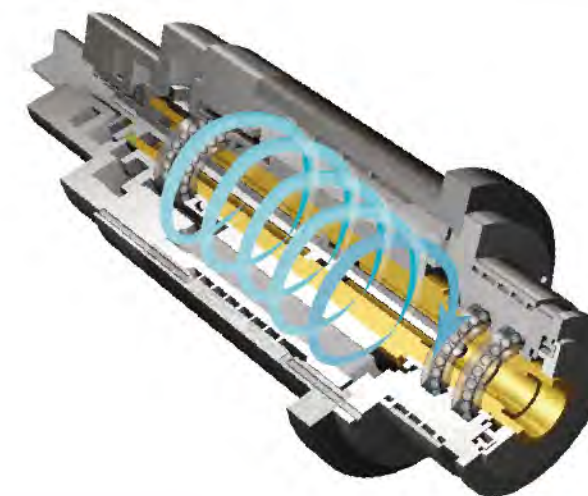
### Thermal growth control on 3-axis (opt.)

- The parts in 3-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.



### Thermal symmetry and heat isolation

- Heat isolating material is added between machine crossbeam and cabinet.
- Ensures machine accuracy.
- Thermal deformation problem can be prevented.
- Crossbeam thermal growth is reduced by **13%**



### Built-in 24,000 spindle shaft with cooling system

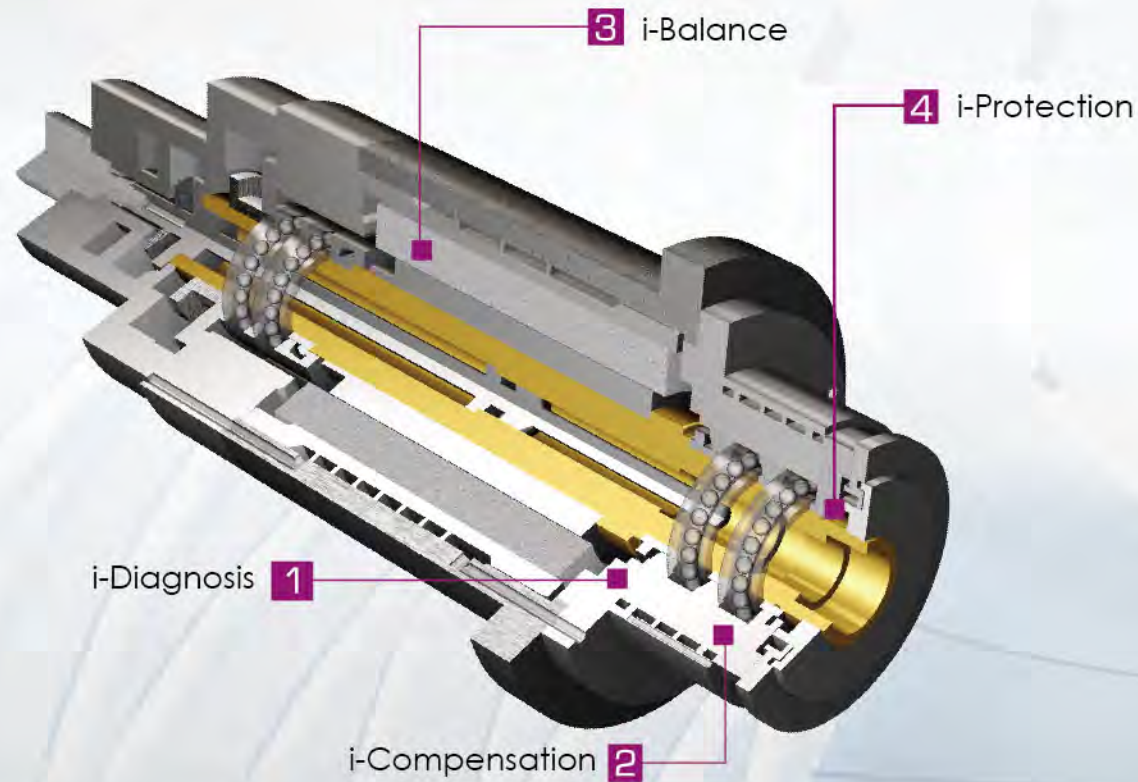
- It's small size, light, low noise and low vibration, available for all controllers.
- Intelligent spindle is optional.
- Spindle thermal deformation is decreased by **50%**

# Spindles Manufactured by Hartford Offer Quality Assurance

The self-designed and made built-in type 24,000rpm spindle guarantee the best quality for you and provide you instant solutions when you need.

Smart functions for high speed 24,000rpm spindle(opt.)

The spindle is available to integrate various smart functions such as i-Diagnosis, i-Compensation, i-Balance and i-Protection which provide safety protection of the spindle, increase the spindle accuracy and reduce down time.



## NCG-2005 5-axis Accuracy Testing

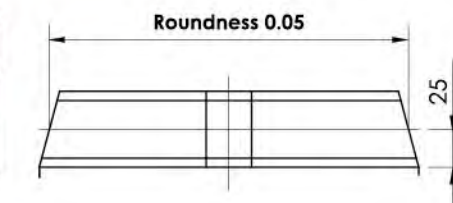
- Workpiece name NCG2005    ■ Workpiece material Necuron 1007    ■ Workpiece size Ø75x105x50 mm
- Workpiece fixed angle 0° & 30°    ■ Cycle time 12 min    ■ Tool 6 mm end mill

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

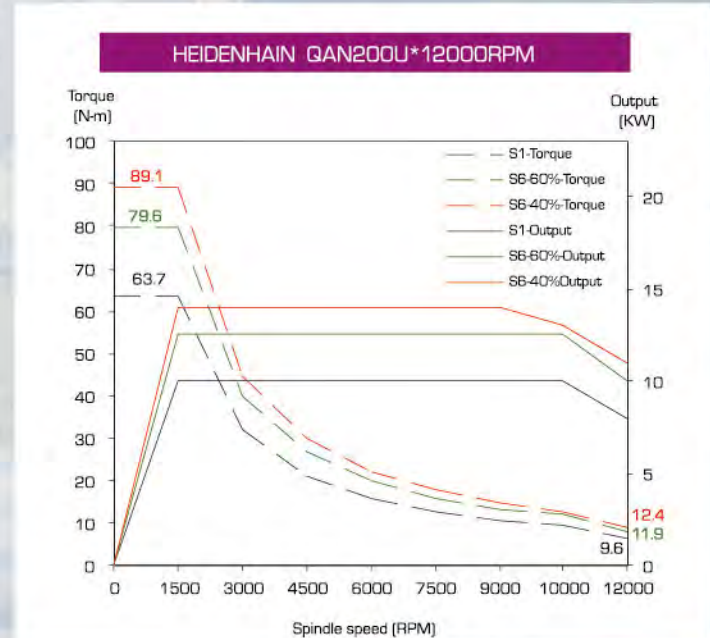
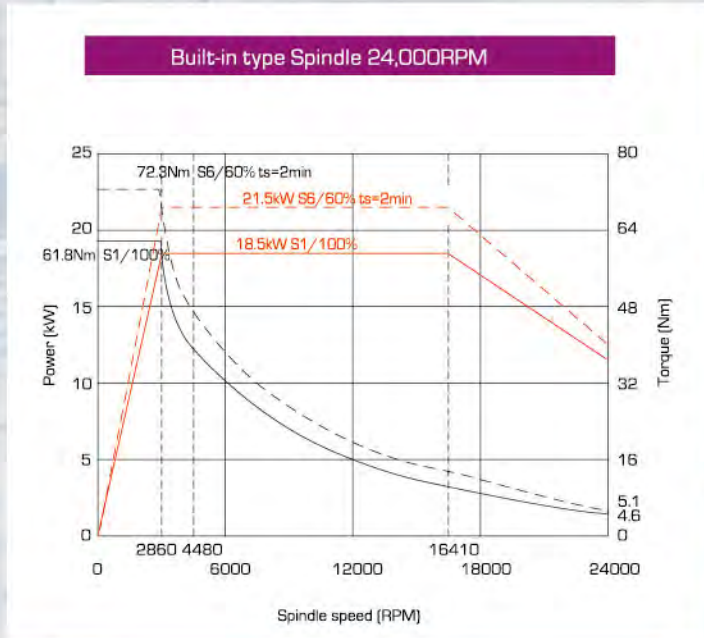
## NAS-979 Inspection Cutting report

	Tolerance	Test results
Inclination angle	$\angle 15^\circ (\pm 1^\circ/20'')$	15.0007°
Roundness	0.05	0.008

Unit: mm

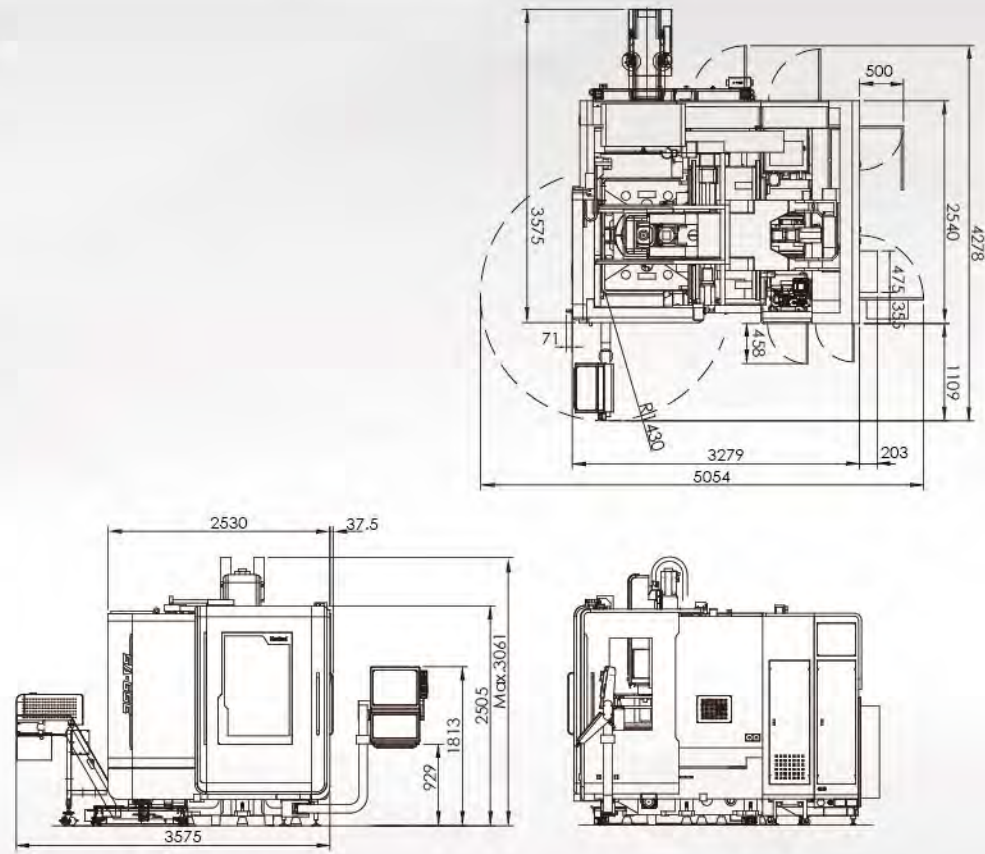


All the test results featured in this catalogue were produced under strict testing condition in a special zed testing environment. Under different testing conditions and less than ideal testing environments. That the test results may vary from those shown in this catalogue.

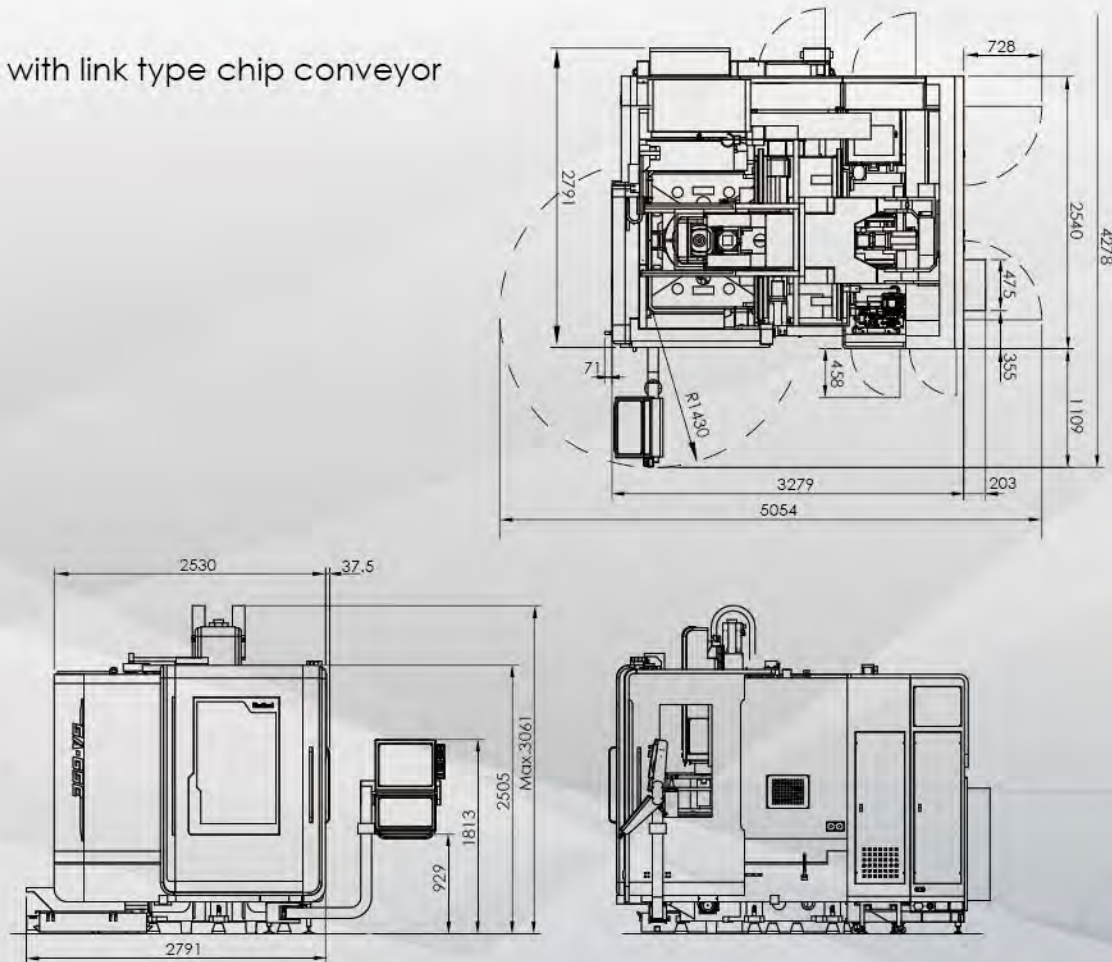


# Machine Dimension

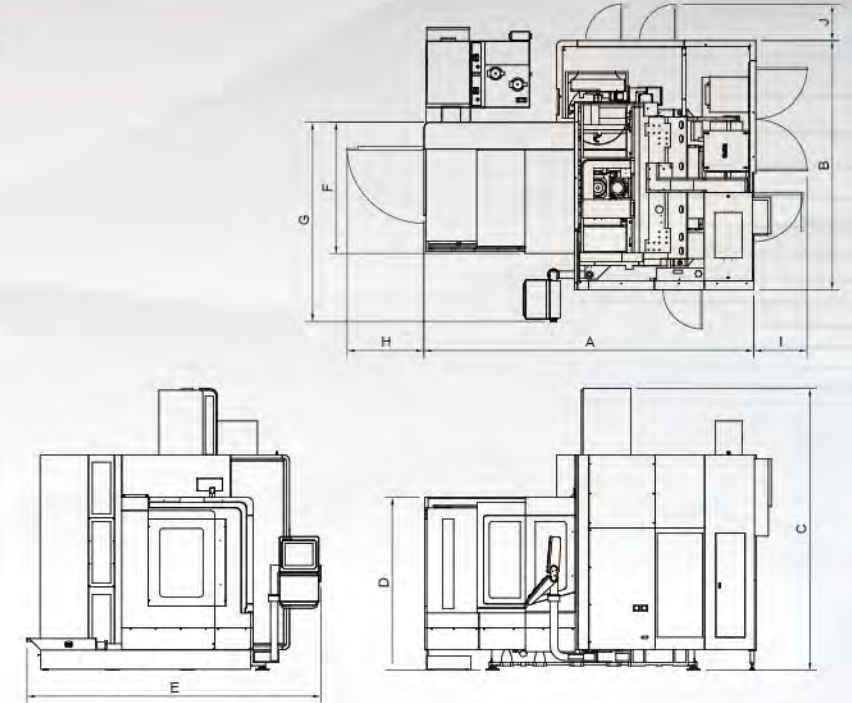
5A-65E



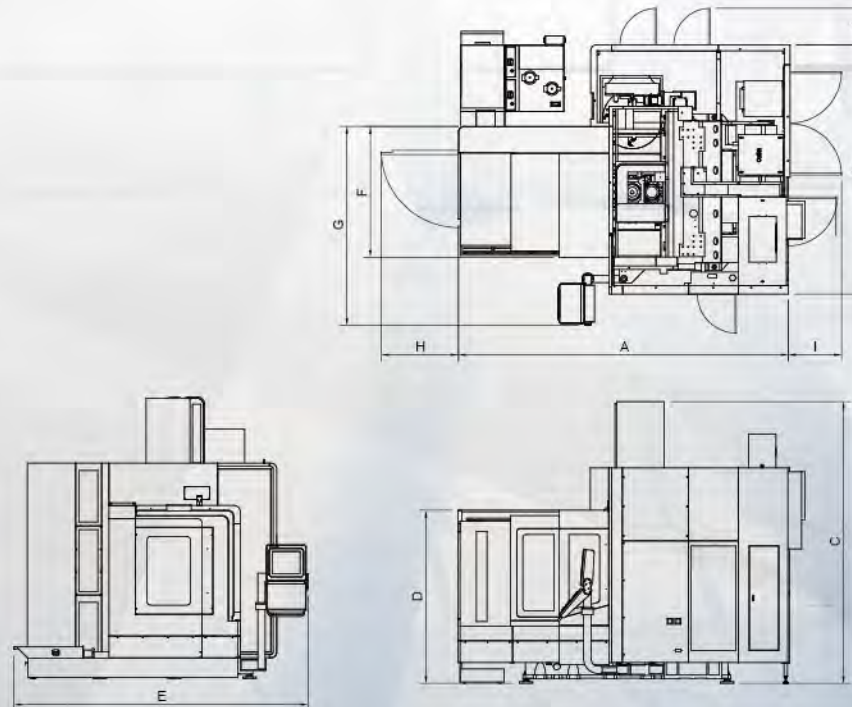
\* Machine with link type chip conveyor



5A-600T(F)/800T(F)



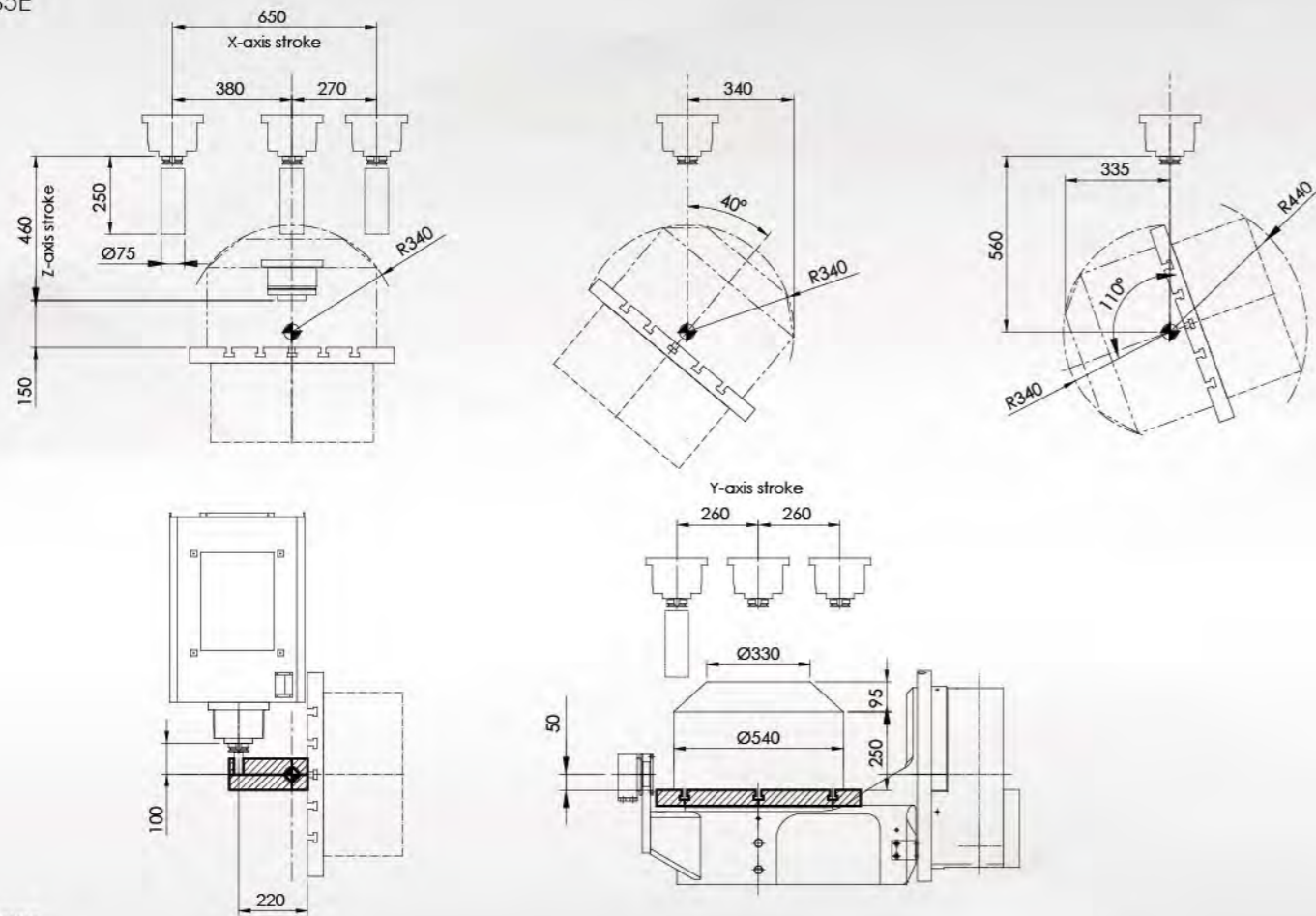
機型	A	B	C	D	E	F	G	H	I	J
5A-600T	4475	3380	3820	2345	3990	1680	2705	1045	720	495
5A-600TF										



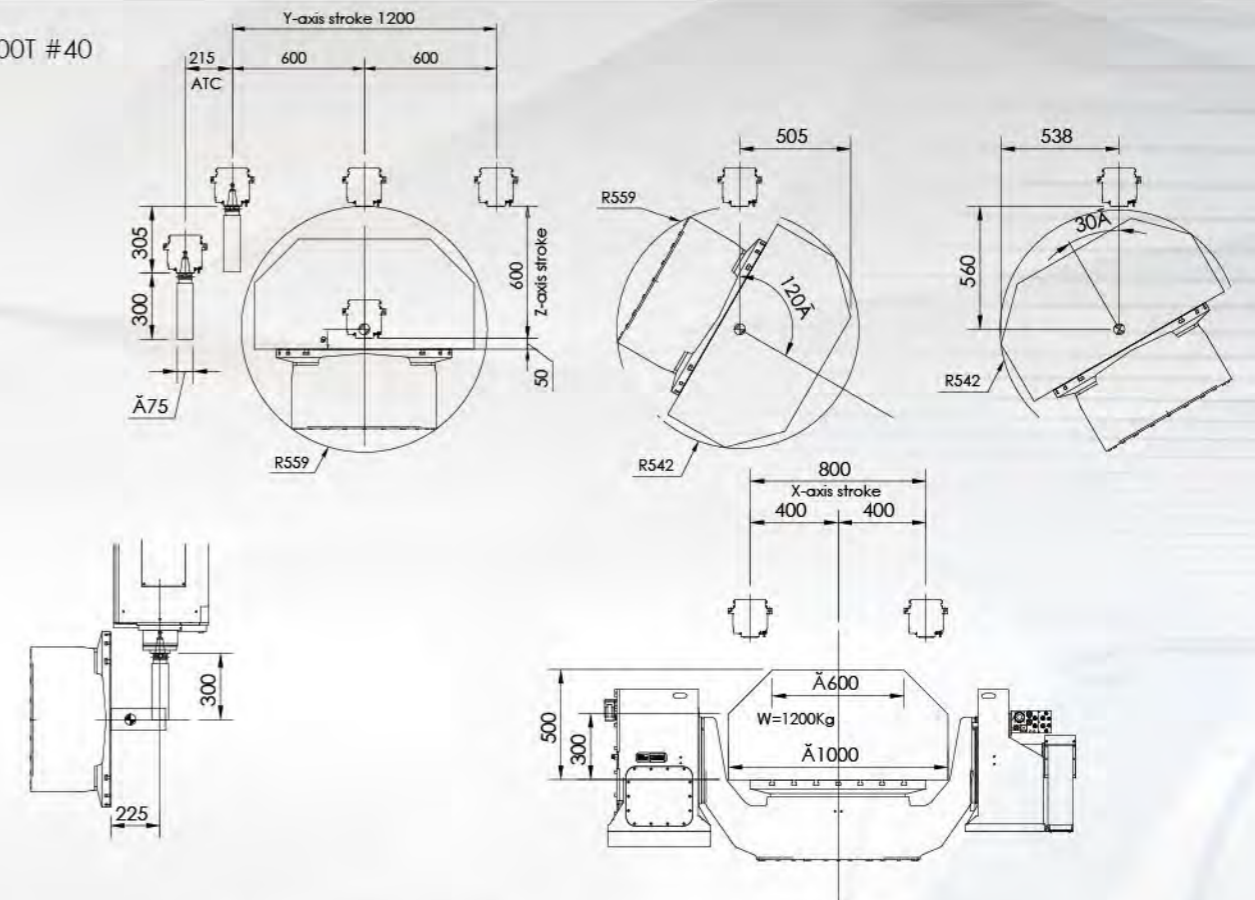
機型	A	B	C	D	E	F	G	H	I	J
5A-800T	5340	3710	4060	2575	4320	2000	3035	1120	975	940
5A-800TF										

# Cutting Range and Interference

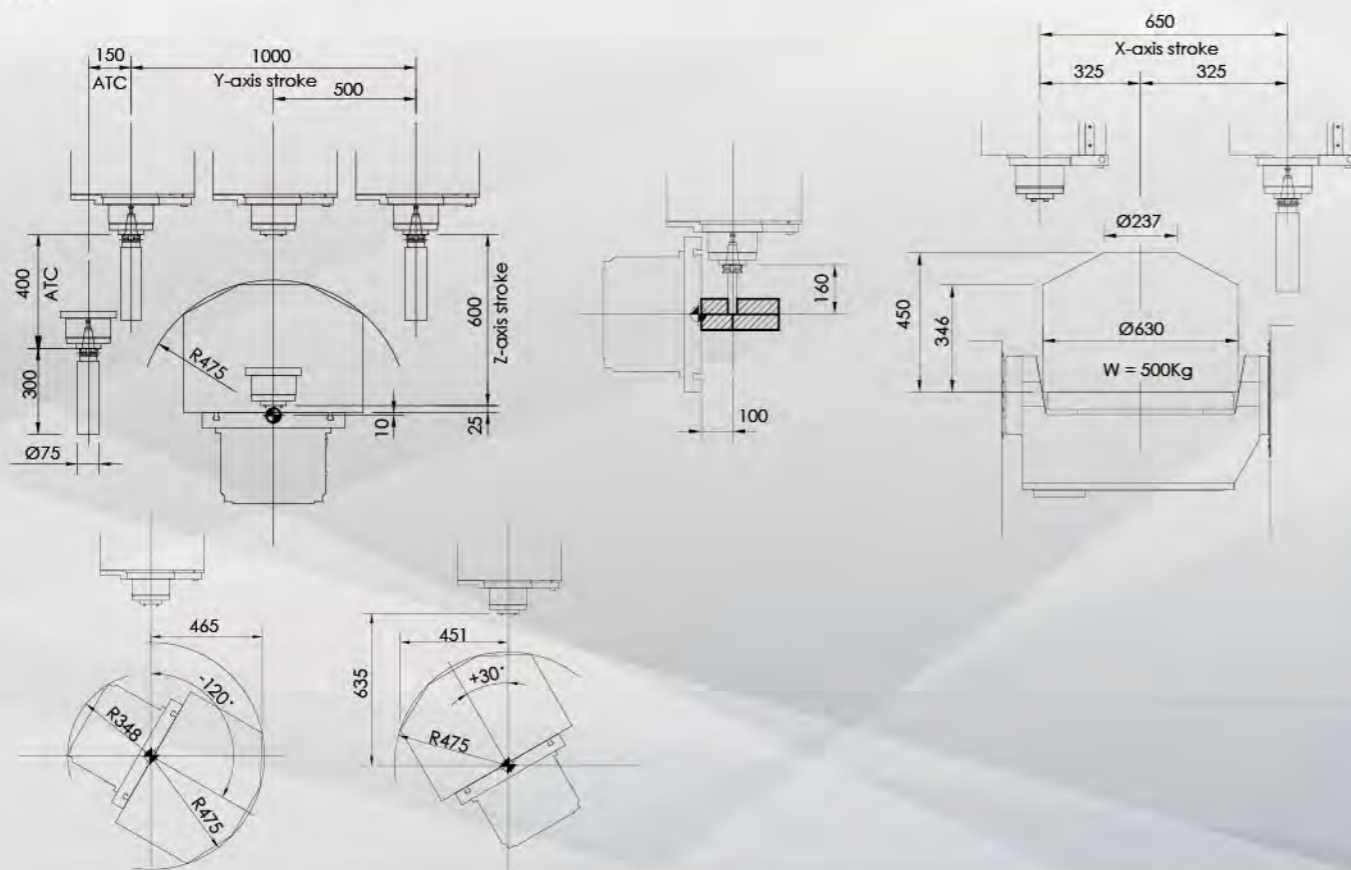
5A-65E



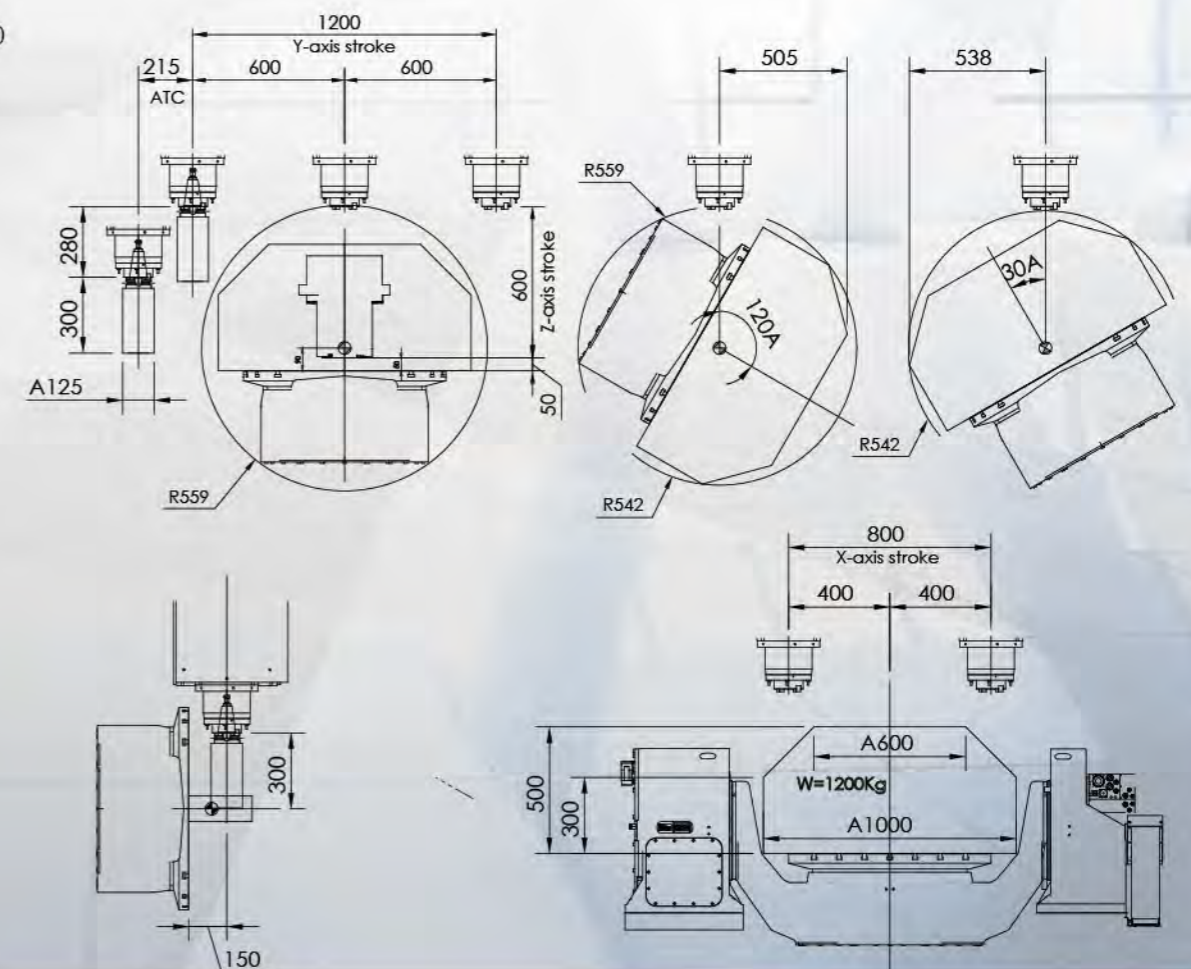
5A-800T #40



5A-600T



5A-800T #50



# Specification

Model	5A-65E/F	5A-600T	5A-600TF (Hartrol Plus 1/Fanuc:4+1(31IMB))	5A-800T	5A-800TF (Hartrol Plus 1/Fanuc:4+1(31IMB))
Working Surface	mm	mm	mm	mm	mm
T-slot (Size x Number x Pitch)	mm	mm	mm	mm	mm
Max Table Load	kg	kg	kg	kg	kg
<b>Travel</b>					
Longitudinal Travel (X-axis)	mm	mm	mm	mm	mm
Gross Travel (Y-axis)	mm	mm	mm	mm	mm
Vertical Travel (Z-axis)	mm	mm	mm	mm	mm
Tilting travel (A-axis)	mm	mm	mm	mm	mm
Cross travel (B-axis)	mm	mm	mm	mm	mm
Vertical travel (C-axis)	mm	mm	mm	mm	mm
Distance From Spindle End to Table Center	mm	mm	mm	mm	mm
<b>Spindle</b>					
Spindle Nose Tape	ISO40, HSK-A63(24K only)	ISO40/HSK-A63	ISO40/HSK-A63	ISO40/HSK-A63 ISO50/HSK-A100	ISO40/HSK-A63 ISO50/HSK-A100
Spindle Speed (DDS)	rpm	rpm	rpm	rpm	rpm
Spindle Speed (Built-in)	rpm	rpm	rpm	rpm	rpm
<b>Feed</b>					
Cutting Feedrate (X/Y/Z Axes)	m/min	m/min	m/min	m/min	m/min
Cutting Feedrate (A/B/C Axes)	rpm	rpm	rpm	rpm	rpm
Rapid Traverse (X/Y/Z Axes)	m/min	m/min	m/min	m/min	m/min
Rapid Traverse (A/B/C Axes)	m/min	m/min	m/min	m/min	m/min
<b>ATC</b>					
Tool Storage Capacity	pcs	pcs	pcs	pcs	pcs
Max. Tool Weight	kg	kg	kg	kg	kg
Max. Tool Size (Diameter x Length)	mm	mm	mm	mm	mm
Tool Shank	ISO40/HSK-A63	ISO40/HSK-A63	ISO40/HSK-A63	ISO40/HSK-A63 ISO50	ISO40/HSK-A63 ISO50
Pull Stud Bolt	#40 MAS-P40-1/ CAT-40/DIN69872	#40 MAS-P40T-1/ CAT-40/DIN69872	#40 MAS-P40T-1/CAT-40/DIN69872	#40 MAS-P40T-1/CAT-40/DIN69872 #50 MAS-P50T-1/CAT-50/DIN69872	#40 MAS-P40T-1/CAT-40/DIN69872 #50 MAS-P50T-1/CAT-50/DIN69872
<b>Motor</b>					
Spindle Drive Motor(30min)	Mitsubishi kW	-	11	-	11
	Fanuc kW	-	11	-	11
	Heidenhain TNC 640 kW	12.5	12.5	12.5	12.5
X/Y/Z axis drive motor	Mitsubishi kW	-	3.5 / 3.5 / 7	-	7 / 3.5 / 7
	Fanuc kW	-	4 / 4 / 9	-	7 / 4 / 9
	Heidenhain TNC 640 kW	5.1 / 4.5 / 5.4	8.6 / 8.6 / 8.9	8.6 / 8.6 / 8.9	8.6 / 8.6 / 8.9
A/C axis drive motor	Mitsubishi kW	-	3.5/2	-	15 / 12.9
	Fanuc kW	-	4/2.7	-	15 / 12.9
	Heidenhain TNC 640 kW	-	3.5 / 2.1	15 / 12.9	15 / 12.9
B/C axis drive motor	Mitsubishi kW	-	-	-	-
	Fanuc kW	-	-	-	-
	Heidenhain TNC 640 kW	8.6 / 4.5	-	-	-
<b>Positioning Accuracy</b>					
3 axes laser positioning accuracy (JIS B6338)	mm	mm	mm	mm	mm
Positioning accuracy/Full travel	mm	mm	mm	mm	mm
Repetitive positioning accuracy	mm	mm	mm	mm	mm
3 axes laser positioning accuracy (VDI 3441)/Repeated 5 times	mm	mm	mm	mm	mm
Positioning accuracy	mm	mm	mm	mm	mm
Repetitive positioning accuracy	mm	mm	mm	mm	mm
<b>Accuracy</b>					
Positioning (with angle encoder)	A axis sec	10	10	15	15
	B axis sec	10	-	-	-
	C axis sec	7	10	10	10
Repeatability (with angle encoder)	A axis sec	4	4	6	6
	B axis sec	5	-	-	-
	C axis sec	5	4	4	4
<b>Other</b>					
Required Air Pressure	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>
Electric Power Consumption	kVA	40(65 opt.)	40(65 opt.)	40(65 opt.)	40(65 opt.)
Floor Space(Full Guarding)	mm	3990x4705	3990 x 4705	4320 x 5570	4320 x 5570
Net Weight	kg	9000	14000	20000	20000
Coolant capacity(Standard)	L	210	300	300	300

## Standard & Optional Mechanical Accessories

### Standard

- Full-enclosed splash guard
- Spray around spindle
- Lubrication system
- Tool package
- Foundation bolt. Concrete
- Encoders for 4/5 axis
- Spindle air curtain
- B,C-axis linear scale system\_Heidenhain (5A-650)
- Fluorescent lamp X1
- Hartford manual X 1
- X,Y,Z-axis linear scale system\_HEIDENHAIN
- Air blast through spindle\_M53
- Auto power off
- Spindle oil cooler
- Operator Panel, Stand type
- Table side air blast M50 control

### Optional

- Link type chip conveyor & portable chip bucket(1 EA)
- Spindle shaft with coolant system(Built-in 24,000rpm spindle)
- Fluorescent lamp X 2
- Coolant through spindle(20/25/40/70BAR)
- 3-axis ballscrew coolant system (Vary by model)
- Oil skimmer
- Auto tool length measurement
- Wash down hose
- Auto workpiece measurement
- Air gun
- Oil mist coolant system

## Standard & Optional Electrical Function

### Standard

- Kinematics opt.(Auto length measurement, auto workpiece measurement and KKH-10 are necessary option for this function)
- DCM collision
- 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

## Model Identification

- T Twin arm(Twin arm supported rotary table)
- F Four (4+1-axis control function)
- TF Twin arm+four