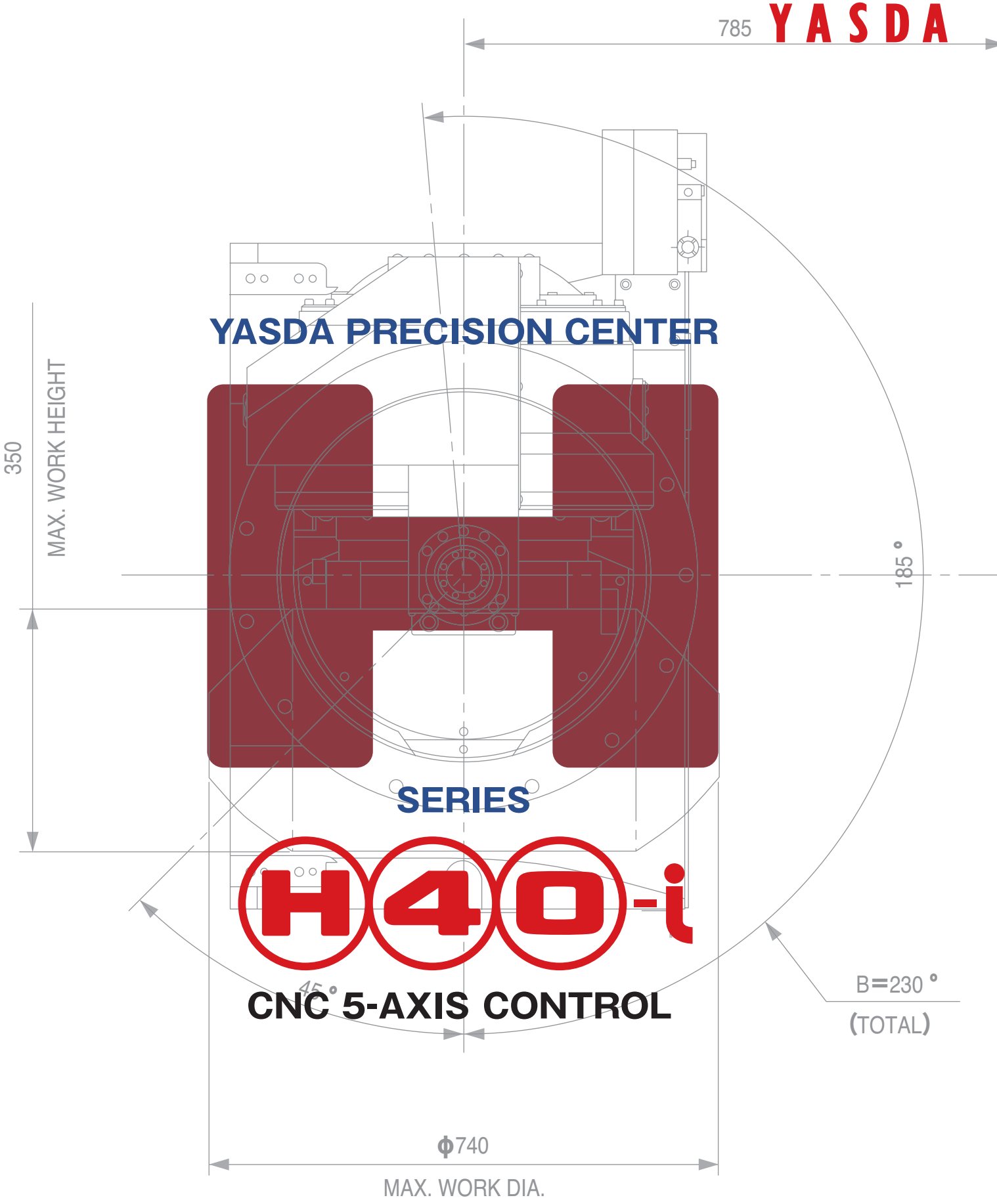
YASDA

YASDA PRECISION CENTER



SERIES

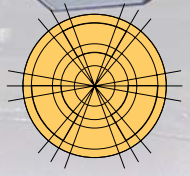
H40-i

CNC 5-AXIS CONTROL

E

ACCELERATION IN 5-AXIS TECHNOLOGY

(option)



Innovative technology of H40-i

- **High speed technology helps shorten machining time**

  DD (Direct Drive) motor for A/B axes 100/75rpm is selectable as an option
  Highly rigid linear guide ways support high feed with outstanding accuracy

- **Improved balance between linear axes and rotary axes**

  Synchronized positioning of A axis 90 degree rotation and linear axes 500mm feed

- **Experience in highly accurate high efficient applications in Aerospace components, die and mold, and other complicated work pieces**

H40-i

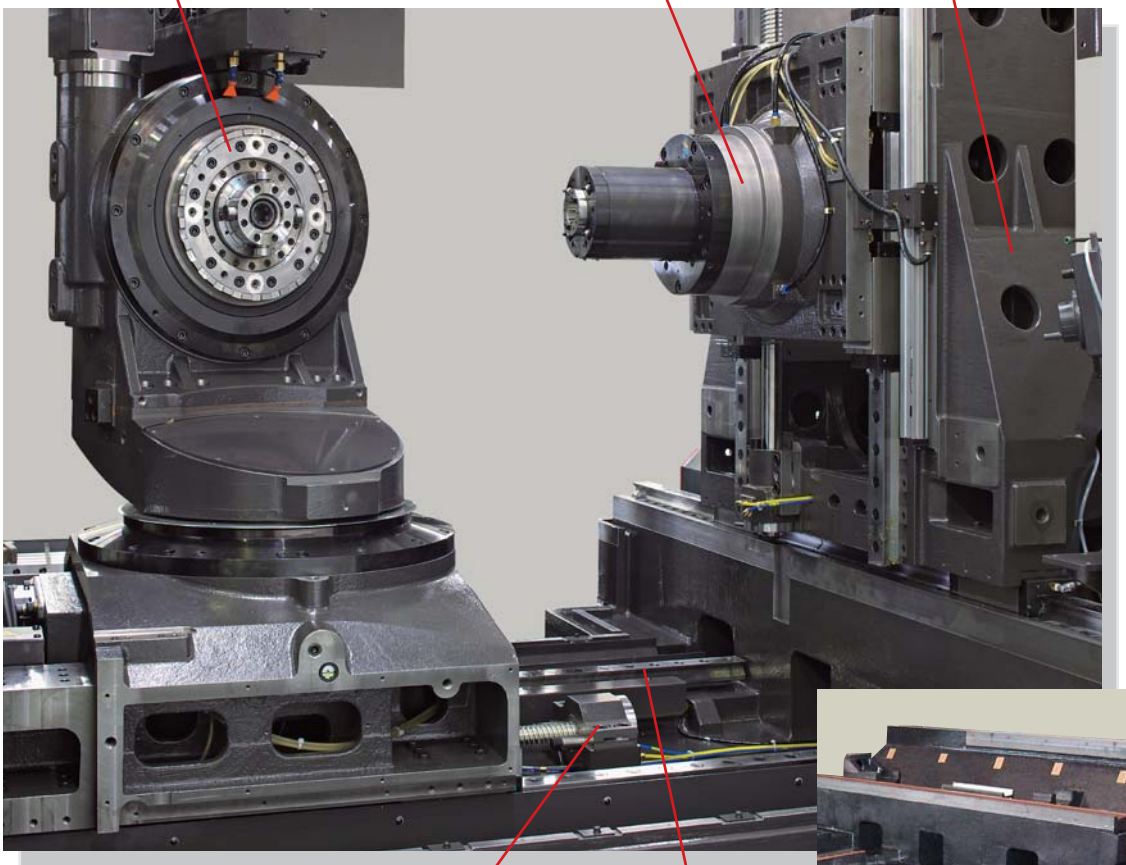
H40-i·24PLS

H40-i Reliable mechanism promising high accuracies all the time

Large diameter 320mm curvic coupling for pallet chucking

Lightened weight of spindle for high response

Lightened column unit:
- improved rigidity in Z-axis
- improved rigidity of machine bed
- realized movement close to the gravity center



X- guide ways in different height:
- High response of column unit and increase its rigidity

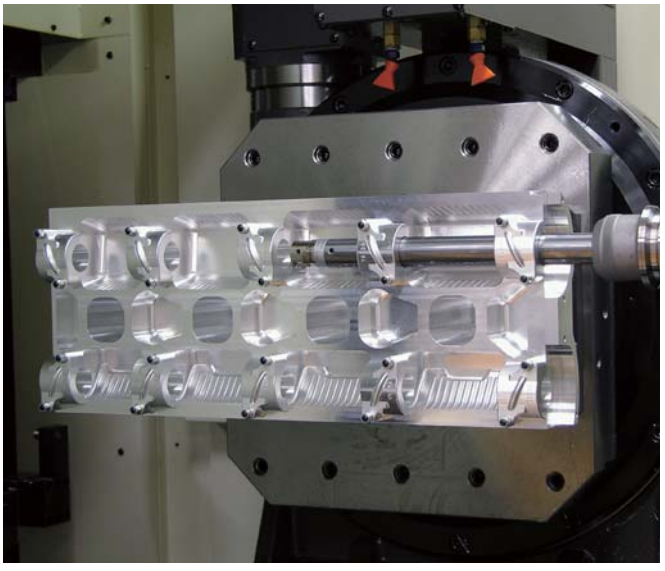
Positioned Z-axis ball screw at the center between guide ways, which supports fast feed without geometrical error

Highly rigid linear guide ways, roller type with retainer are employed for X/Y/Z linear axes

YASDA 5-axis Performance: for higher accuracy, in shorter time, for profitable result in total cost

Example: Engine cylinder head 30% improvement in machining time

5-axis simultaneous machining for inlet/outlet holes



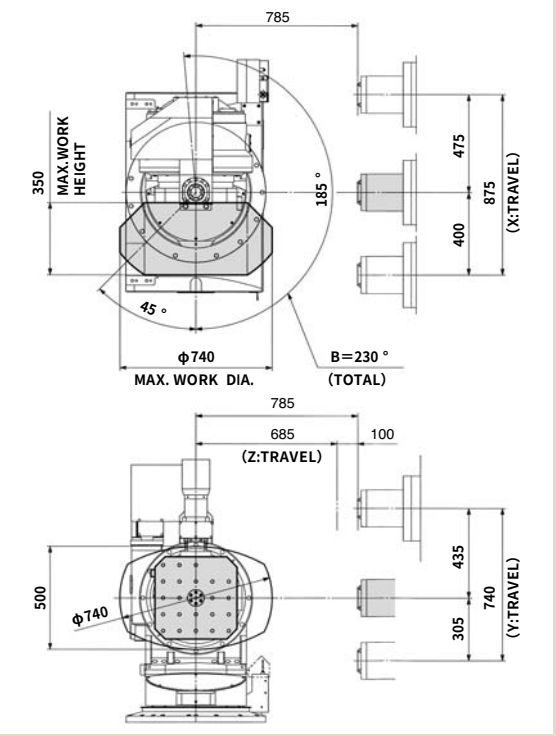
Turn boring of cam shaft holes

H40i is improving versatile performances in its 5-faces indexing application and complex simultaneous 5-axis applications, due to its high rigidity and high accuracy.
This outstanding performance results not only in less setting up, but also in total profitability due to many factors saving machining cost.

Comparison between standard worm gear drive and DD (Direct Drive) motor drive in rotary axis

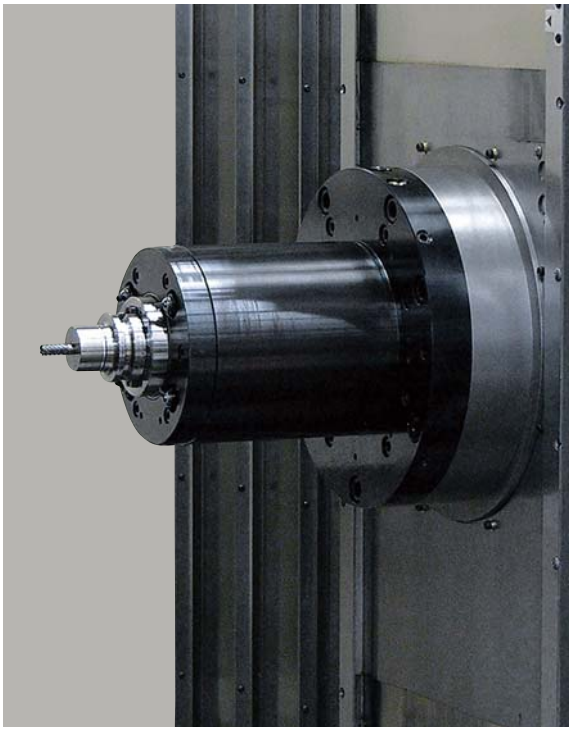
		Worm gear	DD motor
Max. spindle speed (min^{-1})	A axis	30	100
	B axis	20	75
Machining time in engine cylinder block in/out holes		3 min 48 sec	2 min 50 sec
% in machining time		100	74.6

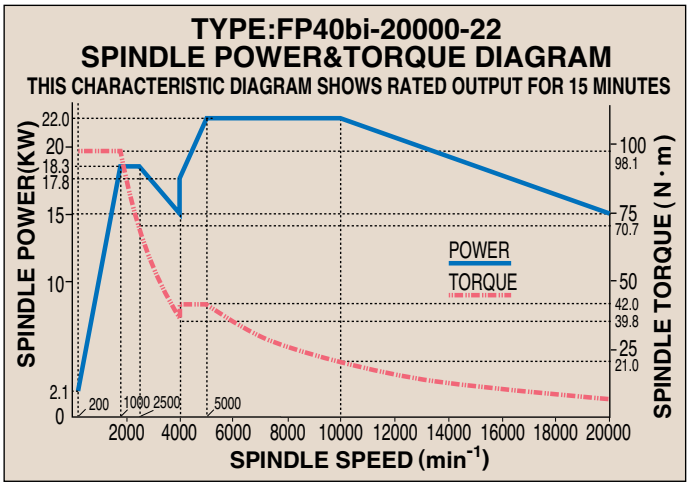
WORK DIMENSIONS



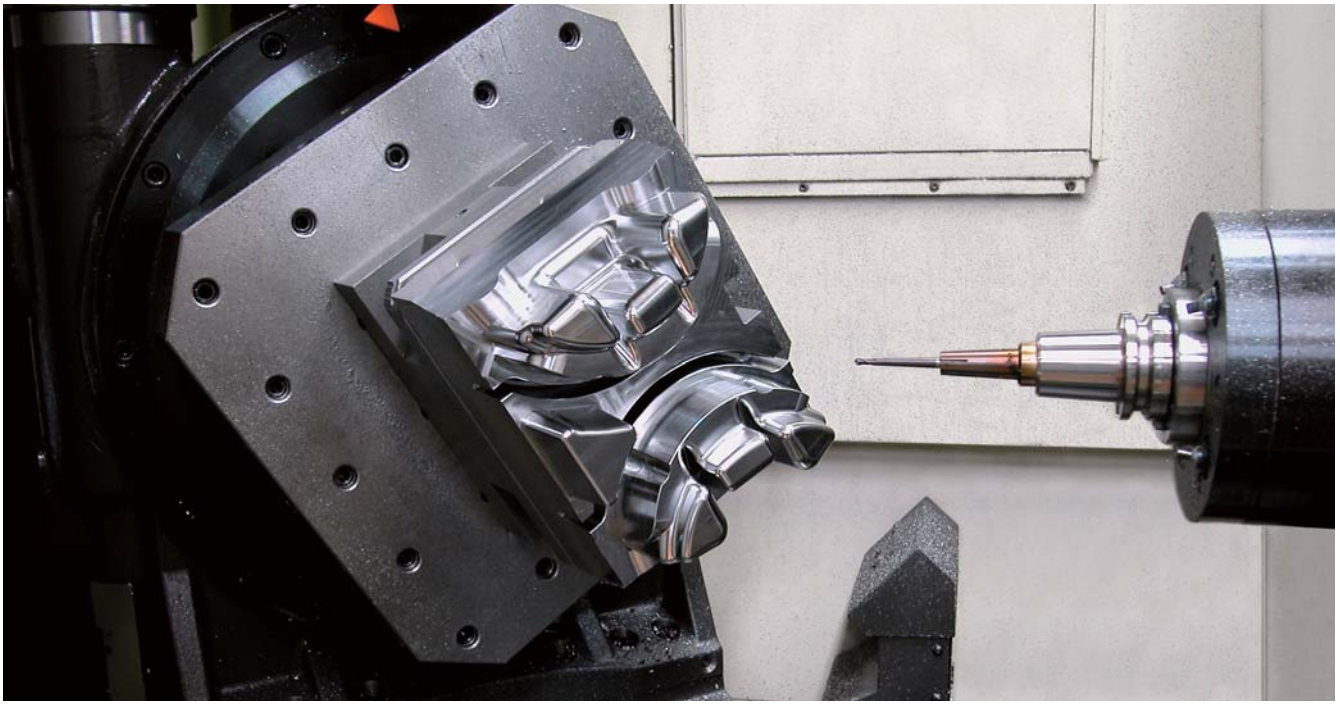
Highly accurate spindle minimizing thermal distortion helps draw the best performance of tools, achieve dimension and surface accuracies

Spindle

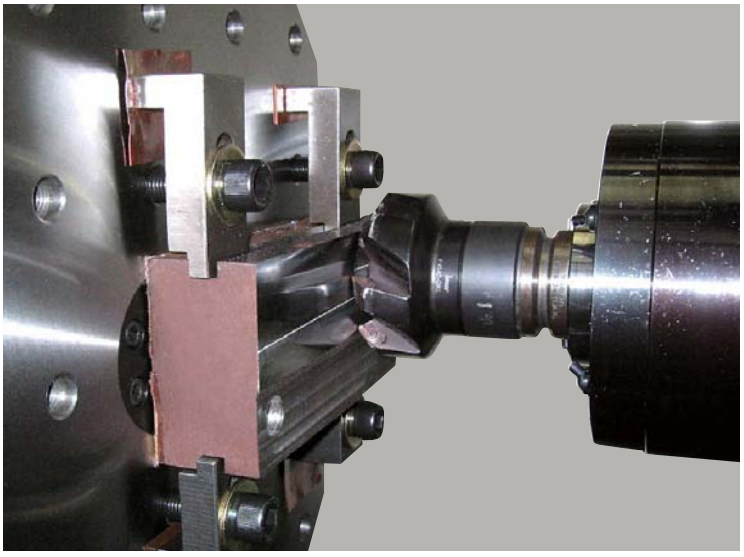




Highly efficient oil and air lubrication is employed for spindle. Large capacity inverter cooler, plus cooling system for spindle jacket minimize power loss of spindle in its high speed rotation. Double face contact type spindle is equipped as standard.



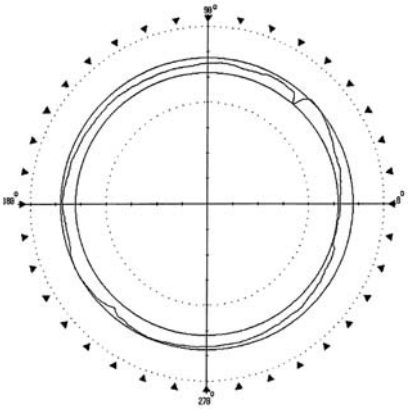
Heavy duty cutting by face mill



Cutting removal : 551cc/min

Material	: S55C
Cutter diameter	: 80mm
Cutting speed	: 376m/min
Spindle speed	: 1500min^{-1}
Feed rate	: 2100mm/min 0.2mm/tooth
Cutting width	: 75mm
Cutting depth	: 3.5mm
Spindle load	: 120%

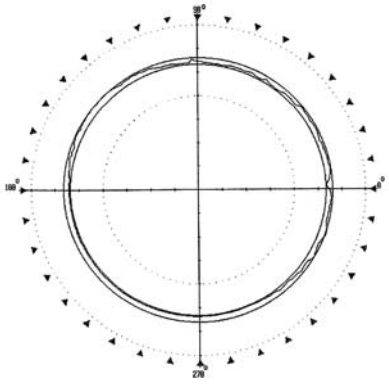
Simultaneous 5-axis cone cutting



Circularity: 0.0058mm

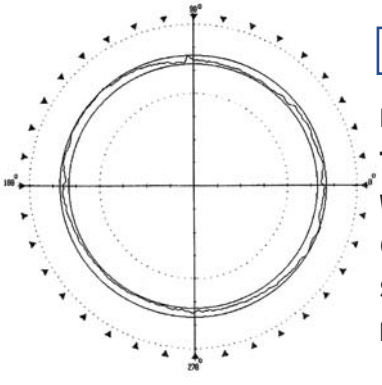
Material	: AL (A2017)
Tool diameter	: 30mm
Work diameter	: 148mm
Cutter speed	: 100m/min
Spindle speed	: 1060min^{-1}
Feed rate	: 130mm/min 0.03mm/tooth

Circular cutting accuracies



Circularity: 0.0014mm

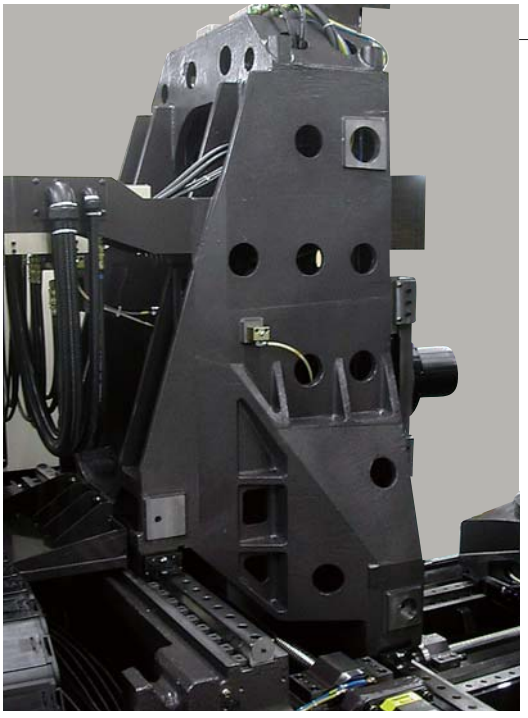
Material	: AL (A2017)
Tool diameter	: 15mm
Work diameter	: 150mm
Cutter speed	: 94m/min
Spindle speed	: 2000min^{-1}
Feed rate	: 500mm/min 0.06mm/tooth



Circularity: 0.0019mm

Material	: AL (A2017)
Tool diameter	: 15mm
Work diameter	: 150mm
Cutter speed	: 376m/min with YASDA HAS-0 system
Spindle speed	: 8000min^{-1}
Feed rate	: 2000mm/min 0.06mm/tooth

Base constructions realizing the both of high rigidity and high performance



Column

Column is assembled on the X-axis guide ways, and the front side of the column is wider than its rear side in order to improve rigidity against cutting force.

Bed

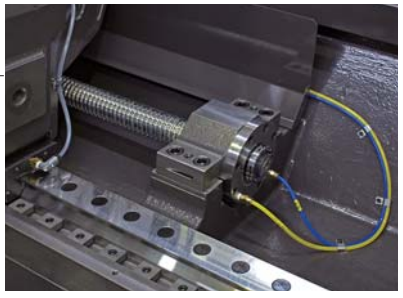
High quality solid cast iron is employed for bed, realizing high rigidity. 3 points support of the bed minimizes deterioration of accuracy in floor level.

Guide ways

Outstanding straightness is requested in guide ways in order to promise high accuracy with high speed feed. In order to achieve these high performances, roller type LM guide ways are employed.

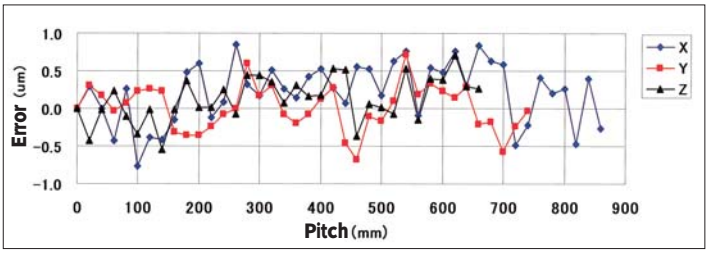
Ball screws

Grease lubricating is employed for ball screws and its support bearings, plus coolant oil is circulated in order to minimize temperature increase.



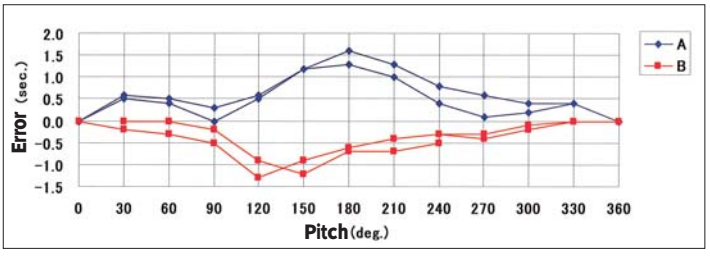
■Positioning accuracy (X/Y/Z)

ISO 230-2 2σ	X(mm)	Y(mm)	Z(mm)
A(Accuracy)	0.0034	0.0026	0.0046
R(Repeated accuracy)	0.0027	0.0019	0.0033
Bave. (backlash)	0.0004	0.0001	0.0001



■Positioning accuracy (A/B)

ISO 230-2 2σ	A(sec.)	B(sec.)
A(Accuracy)	5.32	5.49
R(Repeated accuracy)	4.10	5.04
Bave. (backlash)	-1.31	-1.54



Best solution for Automation: 12 up to 24 PLS (Preload stand) (option) For high productivity

PLS (Preload Stand)

H40i has option of 12PLS up to maximum 24PLS. Reliable multiple pallets management option satisfy versatile purposes of usage, long hours automation, small numbers but different kinds production, and so on.

ATC (Automatic Tool Changer)

Depending on purpose of machining plan, ATC is selectable from 60 tools up to maximum 240 tools.

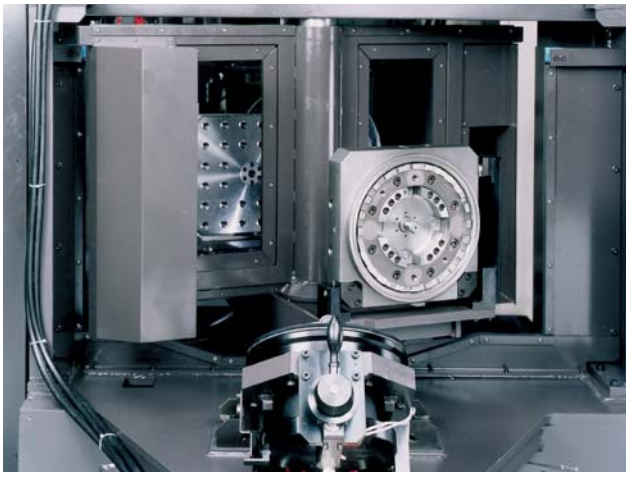
Number of tools
60, 120, 180, 240 tools

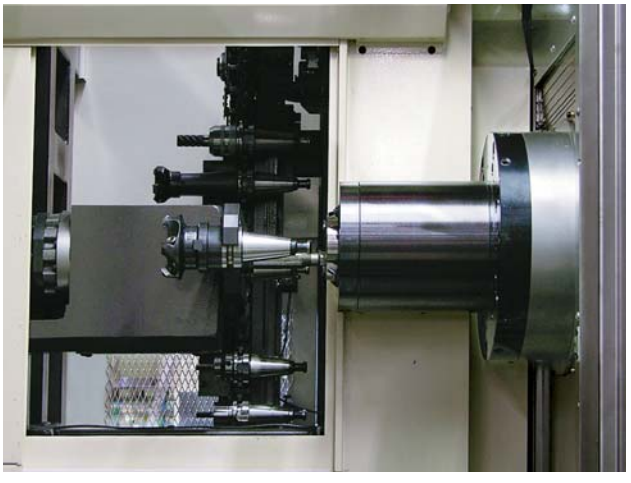
Useful design at operating position

Operator can see the work piece and control panel at sight, and can check cutting process easily.

APC (Automatic Pallet Changer) / ATC (Automatic Tool Changer)

- Highly accurate ±0.002mm positioning accuracy and high chucking rigidity is achieved by large diameter 320mm curvic coupling system for pallet chucking.
- Absolute servo motor is employed for ATC, realized quick stable performance of tool change.





SPECIFICATIONS

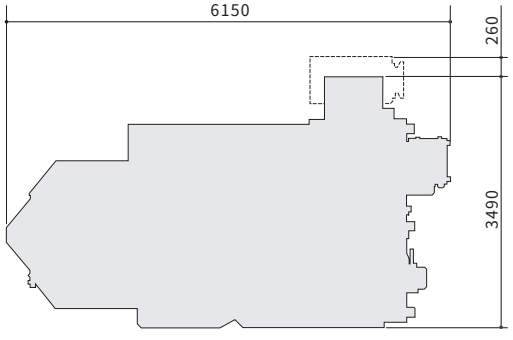
＊Specifications are subject to alteration or change without notice and obligation on the part of the manufacturer.

1. Base Machine Standard		
1-1	**Travel**	
	X-axis travel	875mm
	Y-axis travel	740mm
	Z-axis travel	685mm
	Distance from A-axis center to spindle center	−305～435mm
	Distance from B-axis center to spindle nose	100～785mm
	Distance from B-axis center to spindle center	−400～475mm
	X, Y, Z minimum increment	0.0001mm
1-2	**Table (A-axis)**	
	Pallet working surface	400×400mm
	Pallet surface configuration	25-M16tap
	Pallet loading capacity	200kg, Max. loading moment 200Nm (20kg.m)
	Max. swing diameter	ϕ500mm/ϕ740mm with limitation
	Max. loading height	350mm
	Table min. index	0.0001 °
1-3	**Table (B-axis)**	
	Swivel range	−185 ∾ +45 °
	Pallet min. index	0.0001 °
1-4	**Spindle**	
	Spindle speed	200～20000min^{-1}
	Spindle taper	7/24 taper No.40with BIG Plus two face contact
	Spindle bearing inner diameter	ϕ65mm
	Spindle motor	AC22kW/18.5kW (15min rating)
1-5	**Feed rate**	
	Rapid feed X/Y/Z	50000mm/min
	Feed rate max.	1～20000mm/min
	Jog fed rate max.	0～5000mm/min (12 steps)
	Table indexing	A-axis: max. 30min^{-1} B-axis: max. 20min^{-1}
2. Machine Standard Equipment		
2-1	**Numerical control**	**FANUC 31i-A5**
2-2	**ATC Automatic Tool Changer**	
	Number of tools	60 tools / 120 tools stand
	Tool shank type	MAS403 BT40
	Pull stud type	MAS403 P40T-1
	Max. tool diameter	ϕ100mm
	Max. tool length	300mm
	Max. tool weight	7kg

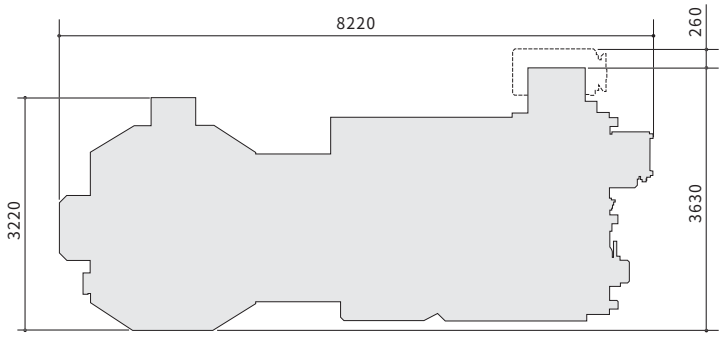
2-3	**APC Automatic Pallet Changer**	
	Numbers of pallet 2 pallets	Direct turn type
	Pallet chucking system	Curvic coupling system
2-4	**Spindle head cooling system**	Inverter type
2-5	**Coolant system Tank capacity**	Tank capacity 900L (outlet 30L/min) 4 flood nozzles
2-6	**Shower coolant system**	
	Pump discharge	80L / min
2-7	**Splash guard with roof**	
2-8	**Optical scale feed back system in X/Y/Z/B/A axis**	
2-9	**YASDA High speed function HAS-0 system**	
2-10	**Chip conveyor**	
	Twin screw type conveyor inside base machine	
	Coolant system with lift-up chip conveyor with 30μm drum filter	
2-11	**Manual pulse Generator**	
2-12	**Work light**	Fluorescent lamp
2-13	**Automatic power off function**	
2-14	**Ground detecting breaker**	
2-15	**Leveling screws**	
2-16	**Mass of machine (including ATC & APC)**	16000kg
3. Optional Equipment		
3-1	**DD (Direct Drive) motor**	A-axis 100min^{-1} B-axis 75min^{-1}
3-2	**ATC Automatic Tool Changer**	120 / 180 / 240 tools
3-3	**PLS (Preload Stand)**	12 / 24 PLS
3-4	**Spindle center through coolant system 2.0Mpa with cutting oil temperature control unit**	
3-5	**Cutting oil temperature control unit**	
3-6	**Automatic tool length compensation and tool breakage sensor**	
3-7	**Automatic measuring and centering system**	
3-8	**External mist coolant**	
3-9	**YASDA high speed function HAS-3**	
3-10	**Signal tower**	

OUT LINE unit: mm

H40i-APC M/C Height:3200mm



H40i-12･24PLS M/C Height:3200mm



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