



ACCELERATION IN 5-AXIS TECHNOLOGY

Innovative technology of **H40i**

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

DD (Direct Drive) motor for C/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 C 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**



H40i



H40i-24PLS

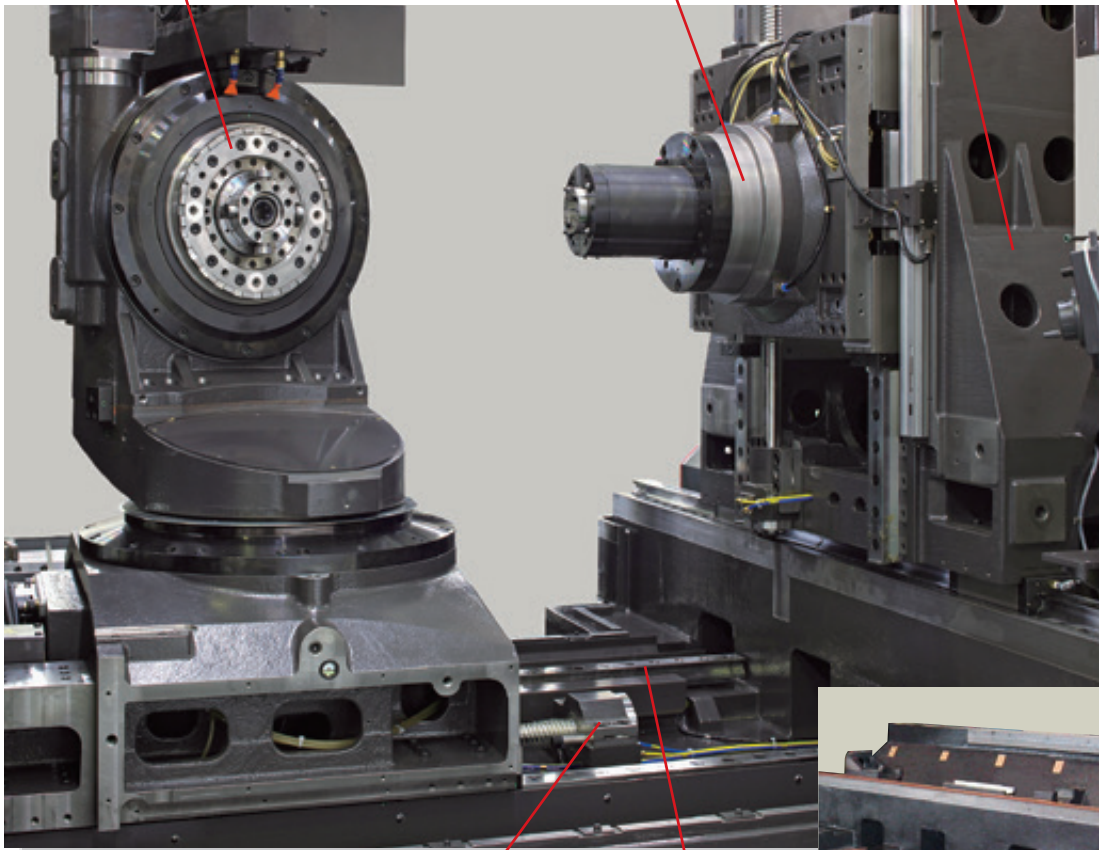
H40i Here is the point !

Large diameter 320mm curvic coupling for pallet chucking

Lightened weight of spindle for high response

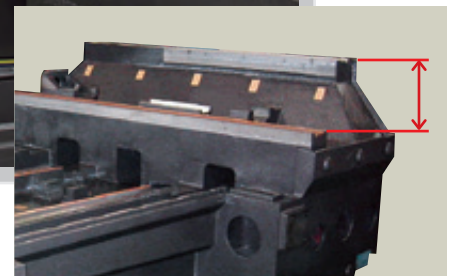
Lightened column unit:

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



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

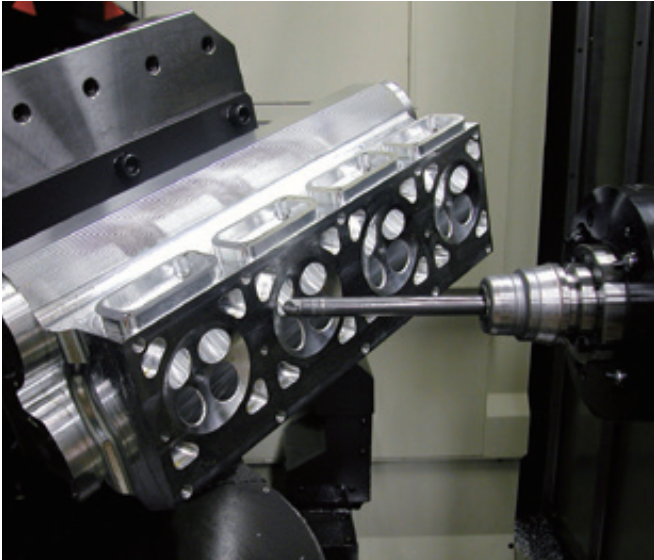


X- guide ways in different height:

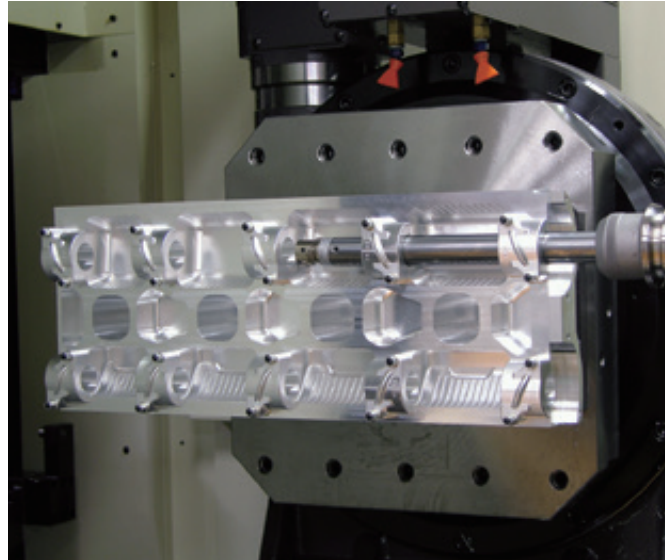
- High response of column unit and increase its rigidity

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

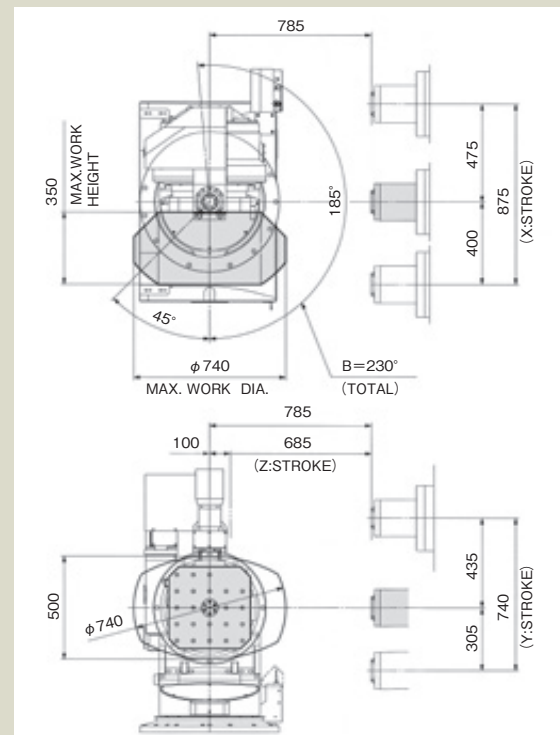
H40i is improving versatile performances in its 5-faces indexing application and complex simultaneous 5-axis applications, due to its high rigidity and high accuracy.

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

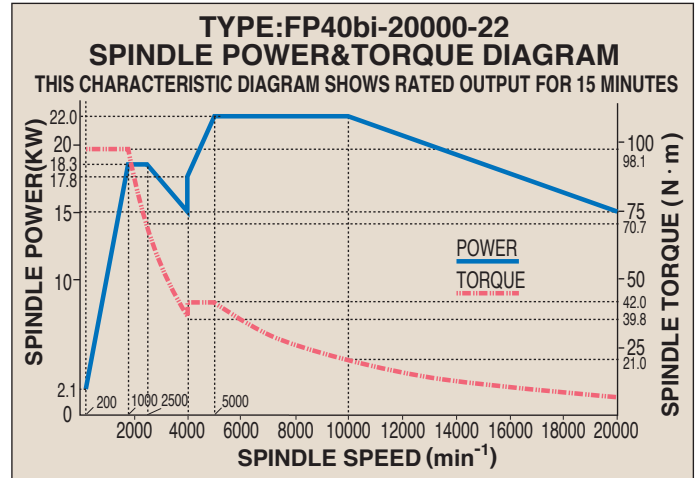
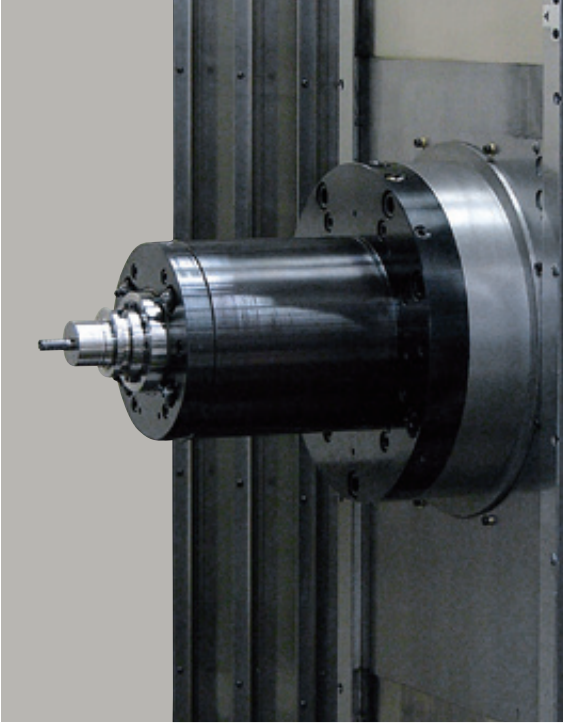
		Worm gear	DD motor
Max. spindle speed (min ⁻¹)	C axis	30	100
	B axis	20	75
Machining time in engine cylinder block in/out holes		3 min 48 sec	2 min 50 sec
% in machining time		100	74.6

WORK DIMENSIONS

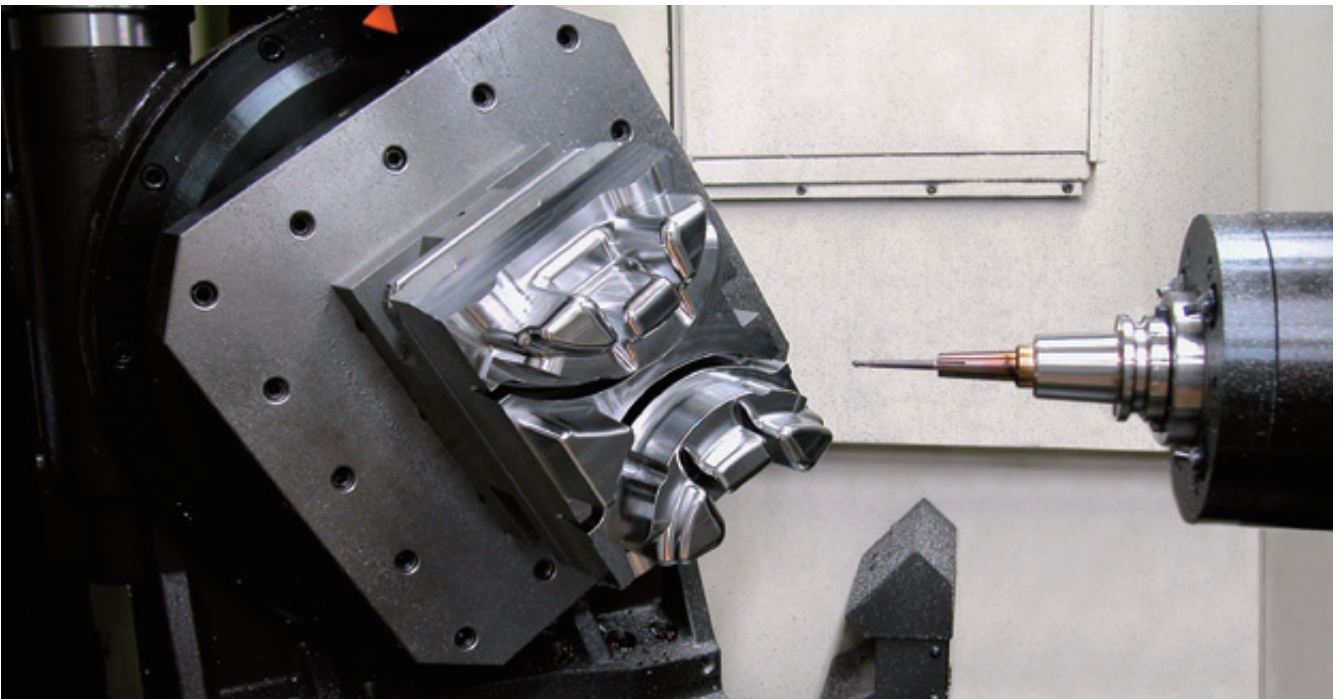


Highly accurate spindle minimizing thermal distortion helps draw the best performance of tools, achieve dimension and surface accuracies

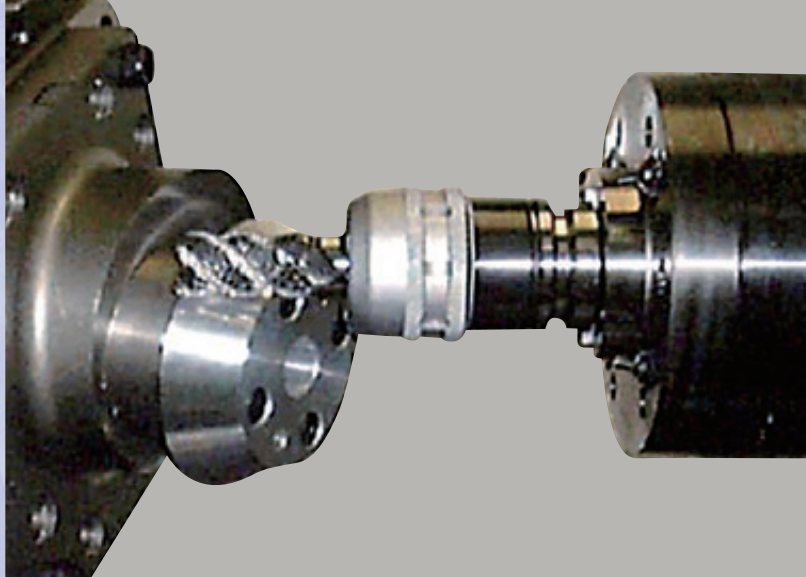
Spindle



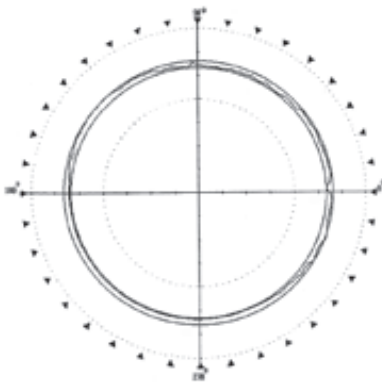
Highly efficient oil and air lubrication is employed for spindle. Large capacity inverter cooler, plus cooling system for spindle jacket minimize power loss of spindle in its high speed rotation. Double face contact type spindle is equipped as standard.



Simultaneous 5-axis cone cutting

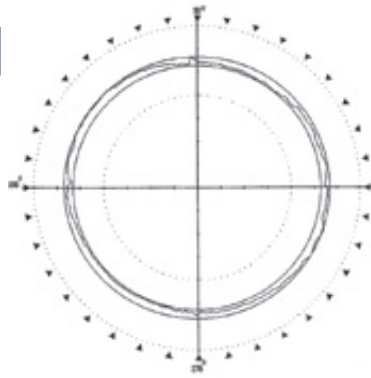


Circular cutting accuracies



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

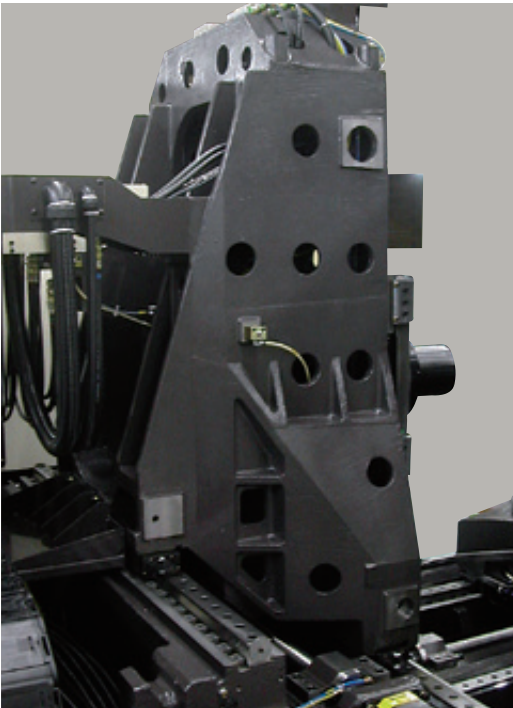
Material : AL (A2017)
Tool diameter : 15mm
Work diameter : 150mm
Cutter speed : 376m/min
with YASDA HAS-0 system
Spindle speed : 8000min⁻¹
Feed rate : 2000mm/min
0.06mm/tooth



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

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

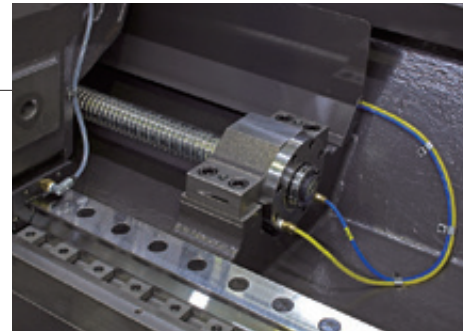
High quality solid cast iron is employed for bed, realizing high rigidity. 3 points support of the bed minimizes deterioration of accuracy in floor level.

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	unit:mm
ISO 230/2(1988)	A (Positioning Uncertain)	0.0023	0.0023	0.0026	
ISO 230/2(2014)	A (Positioning Uncertain)	0.0020	0.0020	0.0023	unit:mm
ISO 230/2(2014)	R (Repeatability)	0.0010	0.0004	0.0004	unit:mm

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)

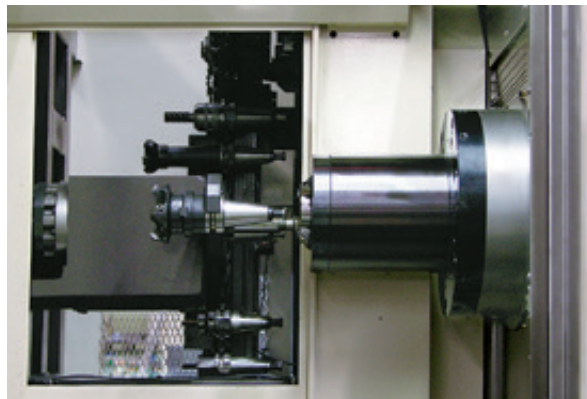
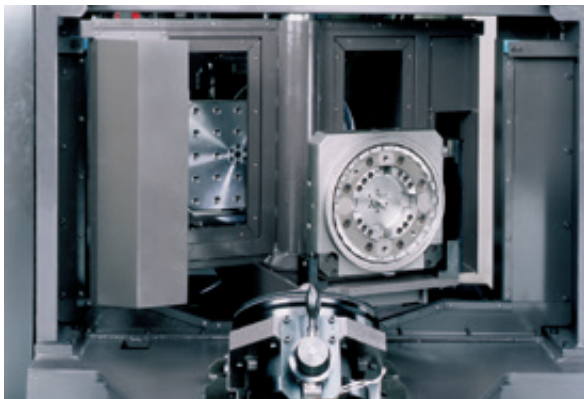
Depending on purpose of machining plan, ATC is selectable from 60 tools up to maximum 240 tools.

■ Number of tools
60, 120, 180, 240 tools



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

- Highly accurate $\pm 0.002\text{mm}$ 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 specifications

1) Travel	X-axis travel	875mm
	Y-axis travel	740mm
	Z-axis travel	685mm
	C-axis center to spindle center distance	-305~435mm
	B-axis center to spindle nose distance	100~785mm
2) Table(Pallet)	Pallet working size	400×400mm
	Pallet surface configuration	25-M16 tapped holes
	Loading capacity	200kg
	Table rotating axis travel (C-axis)	360deg.
	Table tilting axis travel (B-axis)	-95~+135deg.
3) Spindle	Spindle speed range	200~20,000min ⁻¹
	Spindle drive motor	AC18.5/22kW(Continuous/15min)
	Spindle taper hole	MAS BT40
	Spindle nose surface	BIG plus spindle
4) Feed rate	Rapid feed	(X-, Y-, Z-axis)Max.50,000mm/min (C-axis)Max.30min ⁻¹ (B-axis)Max.20min ⁻¹
	Cutting feed	(X-, Y-, Z-axis)Max.20,000mm/min (C-axis)Max.15min ⁻¹ (B-axis)Max.7min ⁻¹
	Min. input increment	0.0001mm (deg.)
5) ATC	Tool shank type	MAS BT40
	Pull stud type	JIS B6339-40P
	Tool storage capacity	60 tools
	Max. tool diameter/length/mass	Φ100mm/300mm/7kg
6) Automatic pallet changer(APC)	Method of pallet change	Direct turn
	Number of pallets	2 pallets
	Set-up station	1 station
	Automatic program search	
7) Pallet chucking device	Curvic coupling	
8) Mass of machine	Approx.16,000kg	
9) Electric power capacity	Max.67kVA	
10) NC unit	FANUC 31i-B5	

2. Standard equipments

1) Optical scale feed back	X-, Y-, Z-, B-, C-axis 0.0001mm(deg.) command available
2) Hydraulic unit	
3) Cutting oil unit	4 nozzles
4) Splash guard	Manual slide door, 1 LED light
5) Chip conveyor	Screw conveyor in the machine
6) Lift-up chip conveyor	Scraper chip conveyor with separator
7) Shower coolant system	
8) Automatic power breaker	
9) OpeNe Version2.0	

3. CNC standards

1) Display	15"LCD touch panel with iHMI
2) Program memory capacity	512KB (1,280m)
3) Custom macro common variable	600
4) Number of registerable programs	1,000
5) Automatic corner override	

6) Tool offset pairs	64 pairs
7) Tool offset memory	Memory C
8) Extended part program editing	
9) Background editing	
10) Rigid tap	
11) Built-in 3D interference check	
12) Tool geometry size data	
13) Memory card/USB memory interface	Data input/output

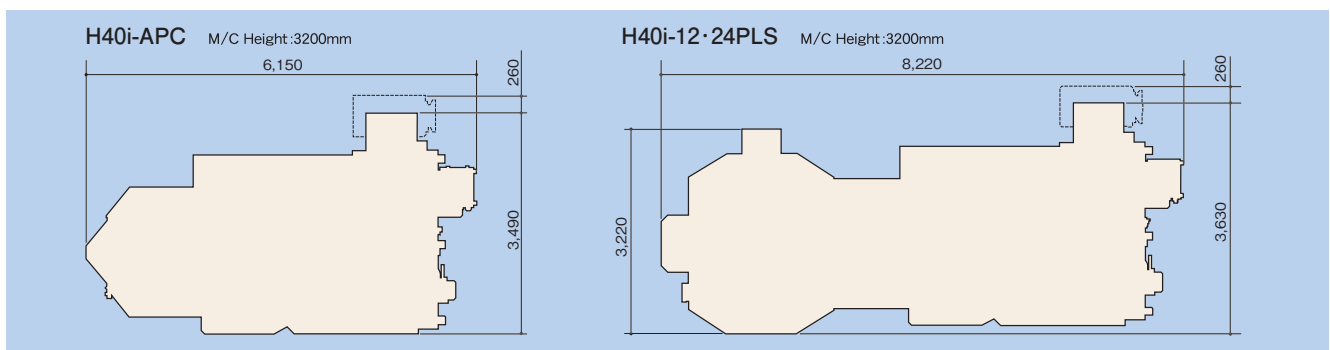
4. Optional equipments

1) Preload stand (PLS)	Number of pallets	12 pallets, 24 pallets
	Automatic program search	
2) ATC	Tool storage capacity	120, 180, 240 tools
	Max. tool diameter/length/mass	Φ100mm/300mm/7kg
3) C/B-axis direct drive motor	(C-axis)100min ⁻¹ (B-axis)75min ⁻¹	
4) Coolant temperature controller		
5) Spindle center through flood coolant	Pump discharge pressure	2MPa/3.5MPa
6) Spindle center through micro fog coolant		
7) Oil skimmer		
8) Mist collector		
9) Tool measurement & Tool breakage detection system		
10) Automatic workpiece measuring system		
11) High-speed machining function (YASDA HAS-4 system)	With Machining support screen	
12) Weekly timer		
13) Compensation for spindle thermal displacement	Individual data	
14) Signal tower (Multilayer signal lamp)	Red, yellow, green (Flashing)	
15) Washing gun		
16) Chip bucket		
17) Anchor unit		
18) Automatic fire-extinguishing equipment interface		

5. CNC Options

1) Part program storage	Total: 1MB, 2MB, 4MB, 8MB
2) Number of registerable programs	Total: 2,000, 4,000
3) Herical interpolation	G02-G03
4) Inch/metric conversion	G20-G21
5) Scaling	G50-G51
6) Coordinate system rotation	G68-G69
7) Programmable mirror image	G50.1-G51.1
8) Optional block skip	Total: 9
9) Tool offset pairs	Total: 99, 200, 400, 499, 999pairs
10) Addition of workpiece coordinate pair	48pairs, 300pairs
11) Tool management function	
12) Normal direction control	G40.1-G41.1-G42.1
13) Cs contouring control	
14) High-speed smooth TCP	G43.4-G43.5
15) Tilted working plane command with guidance	G68.2-G69-G53.1
16) Workpiece setting error compensation	G54.4Pn
17) Ethernet function	FOCAS2/Ethernet
18) Data server function	Fast data server, Capacity: 1GB, 2GB, 4GB, 16GB, 32GB

OUT LINE unit: mm





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