

HB-500II

Horizontal Machining Center



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HB-500II



Main Specifications

Spindle	10,000 rpm Build-in spindle
	Rapid traverse 60 m/min, acceleration/deceleration 0.7 G
Three axes	X/Y/Z axis travel 800/710/710 mm
	X/Y/Z axis □45 mm High rigidity roller guide way
	X/Y/Z axis Ø40 mm High precision ballscrew
	Three axes linear scale(Optional)
B axis rotary table	Hirth coupling 1° rotary table
	NC 0.001° rotary index table (Optional)
ATC	Separable type tool pots
	High speed cam type tool changing device

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High efficiency machining

HB-500II has excellent appearance and friendly human-machine interface. It improves machining efficiency by decreasing non-cutting time and becomes a high cost-performance rate machine.

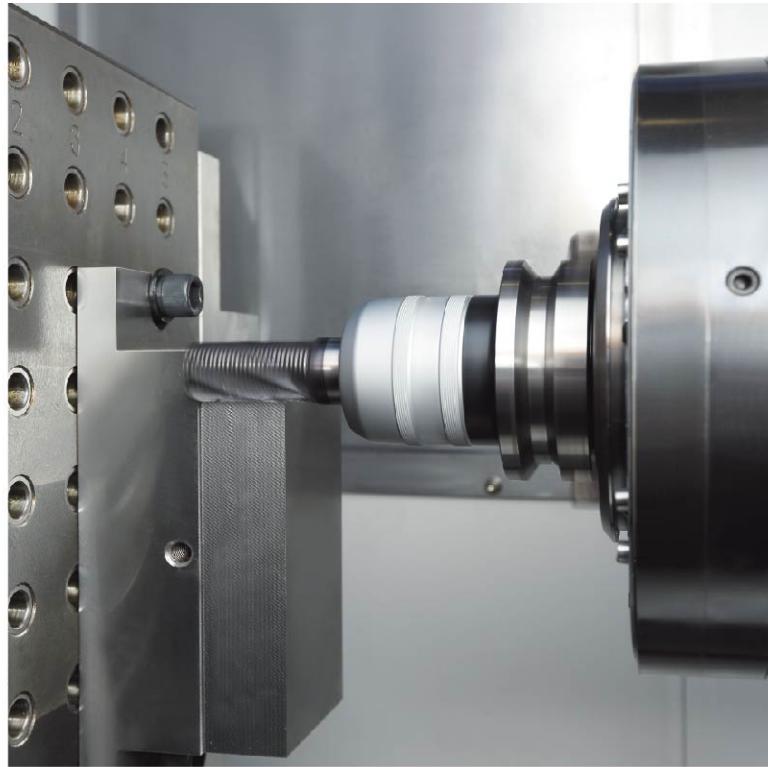
High torque & power spindle

10,000 rpm build-in spindle is equipped with high power 25/30 kW and high torque 420 Nm as standard. This spindle is suitable for machining materials of aluminum alloy, cast iron and steel. HB-500II is applied mainly in the industries of automobile, construction machinery, agriculture machinery and general parts.

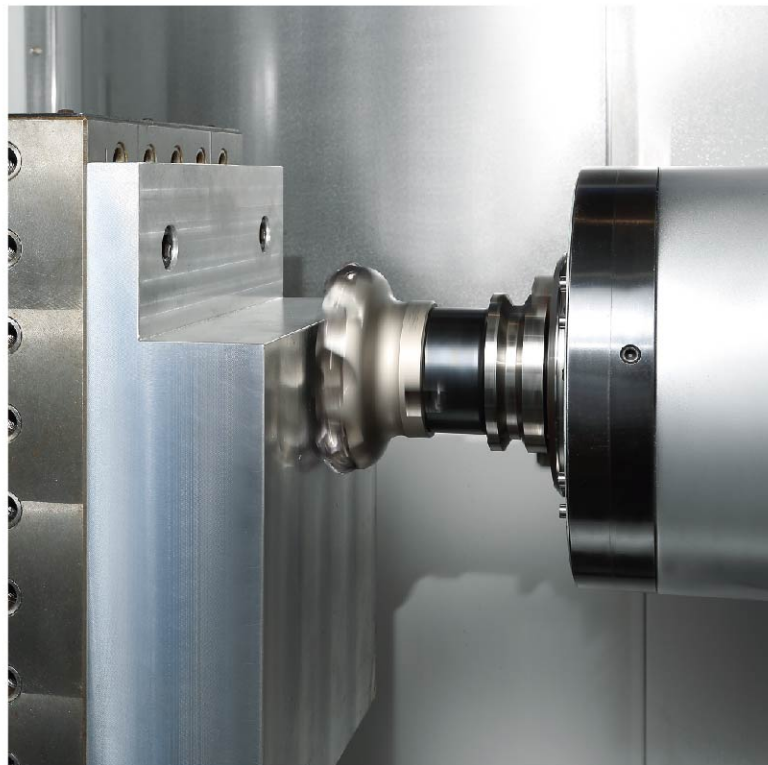


Machining ability

Testing data with 10,000 rpm build-in spindle



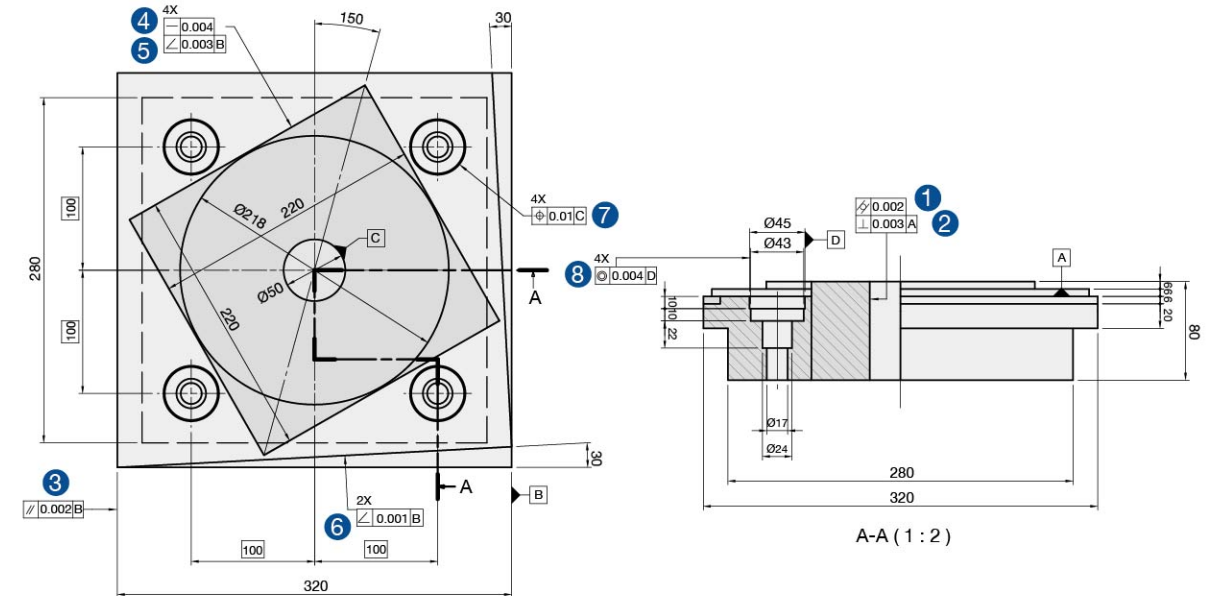
End mill Ø30mm		
Material	S45C	FCD25
Depth/Width	30/15 mm	30/15 mm
Spindle speed	424 rpm	480 rpm
Feed rate	255 mm/min	360 mm/min
Chip removal rate	114 cm ³ /min	143 cm ³ /min



Face mill Ø125mm		
Material	S45C	FCD25
Depth/Width	4/100 mm	7/100 mm
Spindle speed	586 rpm	586 rpm
Feed rate	880 mm/min	880 mm/min
Chip removal rate	351 cm ³ /min	615 cm ³ /min

Machining accuracy

Testing accuracy



Test standard : ISO10791-7
Material : A6061

Unit : mm

Test items	Test accuracy
1 Cylindricity	0.002
2 Perpendicularity	0.003
3 Parallelism	0.002
4 Straightness	0.004
5 Angular accuracy	0.003
6 Angular accuracy	0.001
7 Position accuracy	0.01
8 Concentricity	0.004

Three axes accuracy

Test standard : VDI3441

Unit : μm

	Positioning accuracy	Repeatability accuracy
X axis	3.32	2.71
Y axis	3.43	2.35
Z axis	3.1	2.46
	Positioning accuracy with linear scale	Repeatability accuracy with linear scale
X axis	2.46	0.97
Y axis	1.93	0.91
Z axis	2.11	1.37

*The above data is measured in-house. The test result may not be obtained due to differences cutting conditions and environment conditions.

Linear scale (Optional)

Linear scale is able to compensate the positioning error, repetition error, and pitch error of the ballscrew, which are caused by the temperature changing. The positioning accuracy achieves ±3μm with compensation of linear scales.



Main structure

High rigidity structure

Travel

X/Y/Z axis 800/710/710 mm

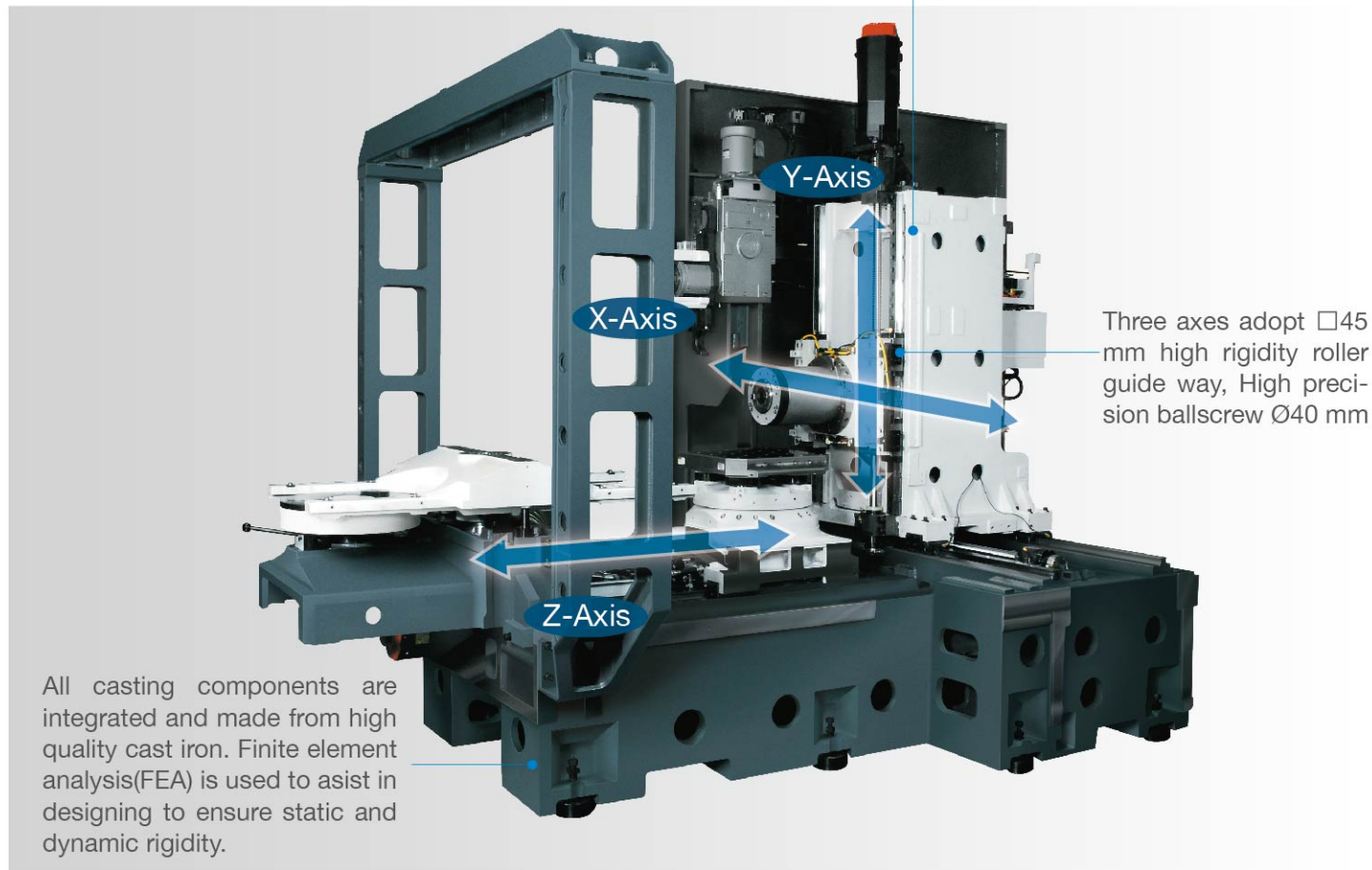
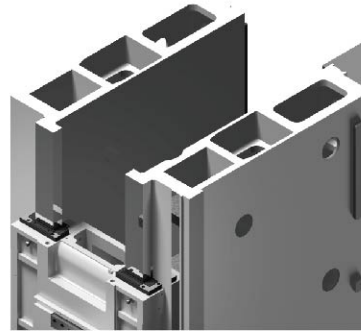
Rapid traverse

X/Y/Z axis 60 m/min

Acceleration/deceleration

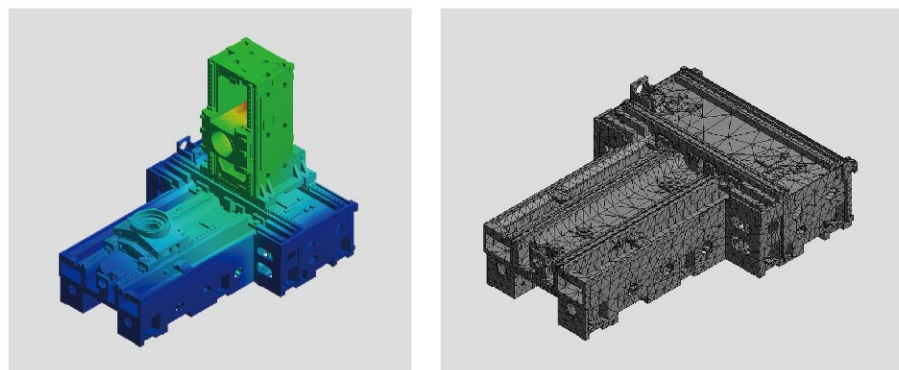
X/Y/Z axis 0.7 G

Double-wall and symmetrical structure are used to improve structure rigidity and reduce accuracy error caused by thermal deformation.



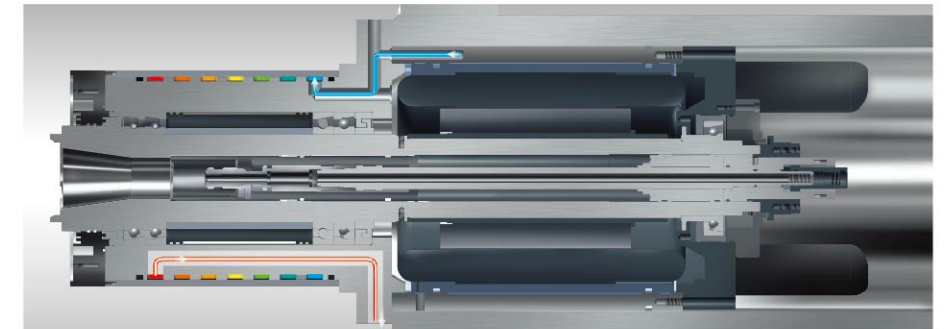
All casting components are integrated and made from high quality cast iron. Finite element analysis (FEA) is used to assist in designing to ensure static and dynamic rigidity.

Through the finite element analysis (FEA), structure has high rigidity and stability in high speed motion. The optimized rib distribution of robust T-shape bed and column transfer and absorb vibrations during machining to get an excellent machining surface.



Spindle

Ø100 mm ceramic bearings are aligned in 10,000 rpm high torque built-in spindle. Chilled cooling fluid is recirculated through the spindle cartridge for cooling. Furthermore, compressed air is led into the motor chamber to cool the motor. It generates 420 Nm torque at 500 rpm, especially suitable for the heavy duty cutting in cast iron or steel materials.



Min. distance from spindle nose to table center 150 mm
 Min. distance from spindle center to table surface 50 mm

Max. speed 10,000 rpm

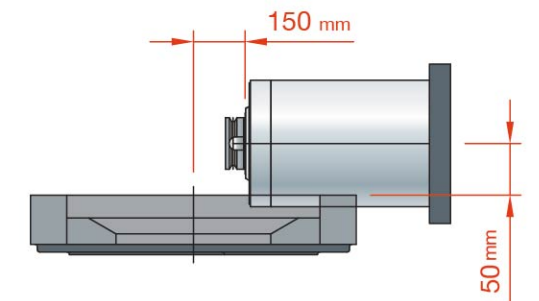
Spindle motor 30/25 kW

Output torque 420/350/238 Nm

(25%ED/10 min./Cont.)

Acceleration time 2.5 sec (0→10,000 rpm)

1.1 sec (0→4,000 rpm)



B axis rotary table

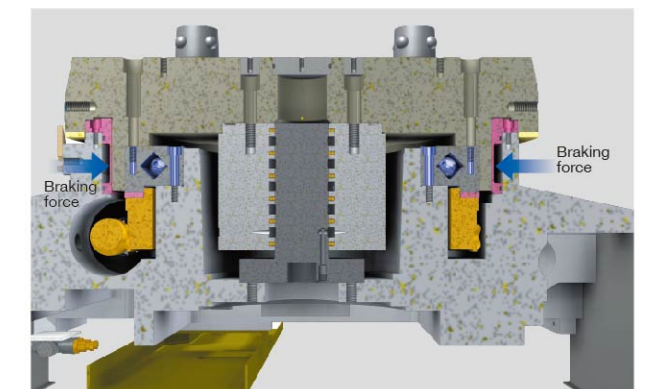
High precision positioning cones with hydraulic locking device, generating 18 tons of clamping force to ensure the table stability during machining.

Max. table load	600 kg×2
90° indexing time of 1° rotary table (Standard)	1.7 sec
90° indexing time of 0.001° rotary table (Optional)	1.5 sec
Pallet clamping force	18,000 kgf
Braking torque	250 kg-m



Full-circle hydraulic braking system (NC 0.001° index table)

HB series adopts a full-circle hydraulic braking system. The full-circle surface is locked synchronously by a metallic ring which is expanded by hydraulic oil. Because of the large clamping area, it can produce high rigidity and durability during heavy duty cutting.



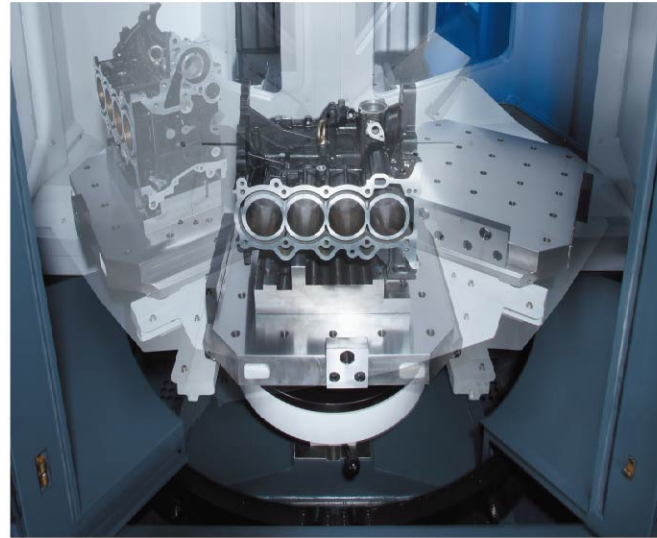
Main structure

APC

To increase dynamic rigidity, the hydraulic driving mechanism of APC is improved. Additionally, timers of PLC are optimized. Pallet changing time is saved dramatically.

Pallet changing time

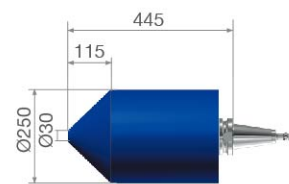
11 sec	16 sec (Previous model)
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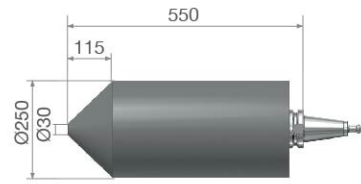
ATC

Automatic tool changer : Equipped with Japanese made cam type ATC.

T to T	2.4 sec
C to C	4.2 sec
Tool capacity	60 pc 90/120 pc optional

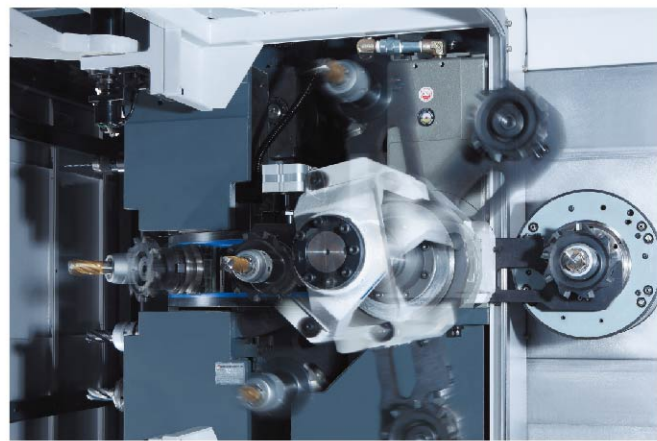


Maximum tool size for automatic tool changing
(Max. Workpiece diameter : Ø900)

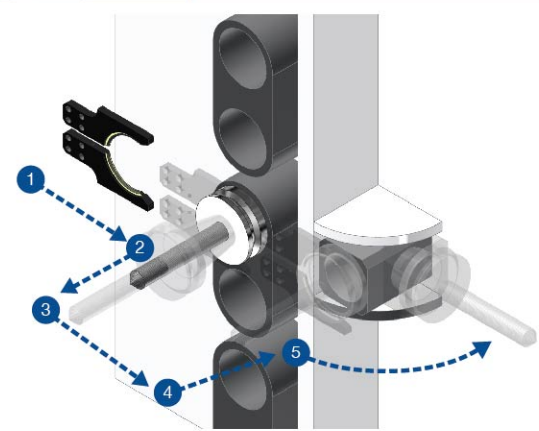


Maximum tool size for automatic tool changing
(Max. Workpiece diameter ≤ Ø620)

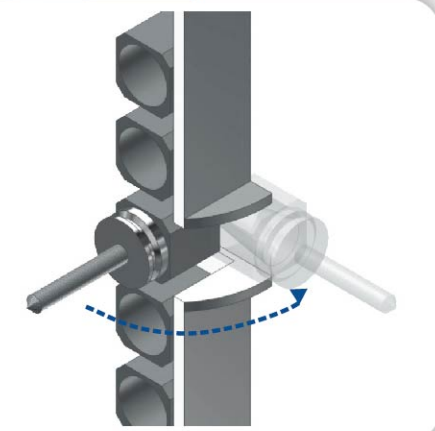
Unit : mm



HB-500



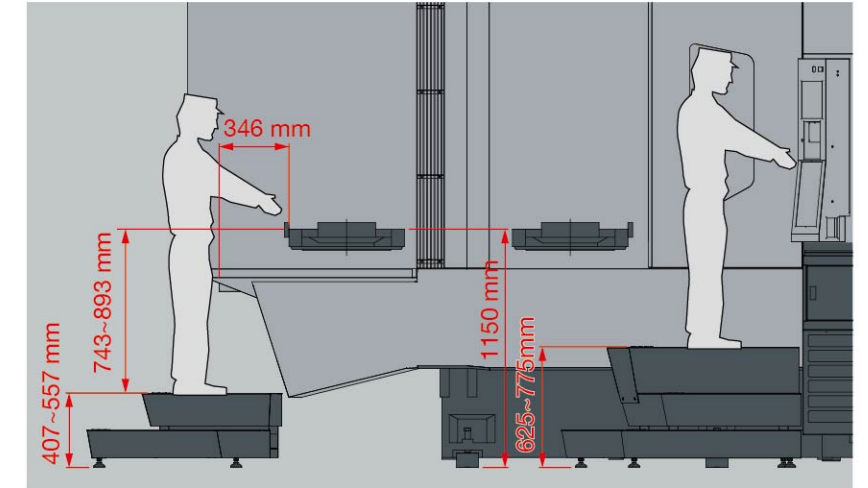
HB-500II



※Separable type tool pots are used in HB-500II, that are able to turn 90° directly to save moving time.

Operation

The assisted platforms are placed on the loading/unloading and operator area so that operators can use the machine comfortably.



Spacious area facilitates loading, unloading and jig & fixture operations.



The tool magazine door design facilitates tool changing and checking. The operating distance and height is comfortable to operators.



Through centralized management of air FRL unit and lubricant pump, daily maintenance is made easily.

Peripheral accessories

Rearward type chip conveyor(Standard)

According to different materials and chip size, Tongtai provides various chip conveyors for the best chip disposal.

○ : Suitable X : Non-suitable

Specification	Steel		Cast iron		Aluminum/Non-ferrous metal		
	Long/ Curl chips	Short chips	Powder chips	Short chips	Long/ Curl chips	Short chips	Powder chips
Hinge type	○	×	×	×	○	×	×
Scraper type	×	○	○	○	×	○	○
Magnetic scraper type	×	○	○	○	×	×	×
Drum type	×	○	○	○	×	○	○
Integrated type	○	○	○	○	○	○	○

Short chips : Chips shorter than 60 mm or ball type chips smaller than Ø40 mm.
Curl long chips : Chips' length is longer than short ones.



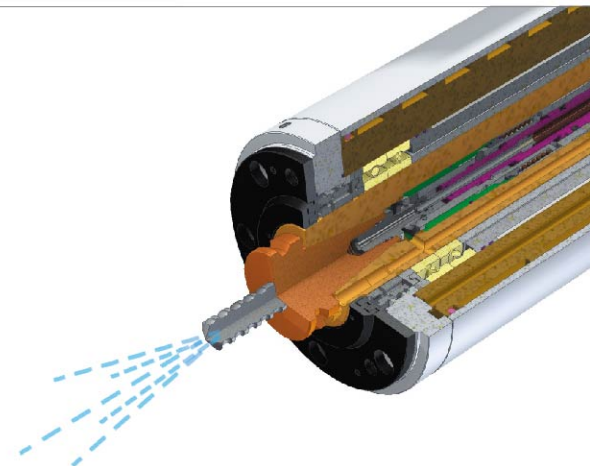
Coolant tank capacity
510 L(80% full)

Coolant Through Spindle(Standard)

C.T.S. increases the efficiency of chip disposal and extends the tool life by cooling the cutting position.

Discharge pressure : 20/40/70 bar
(2.0/4.0/7.0 MPa)

Filtering accuracy : 40 µm

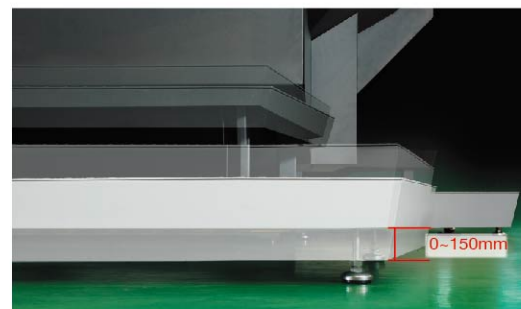


Roof type flushing system (Standard)



Roof type flushing system helps metal chips to be flushed into chip auger and saves time to clean up.

Assisted stair (Standard)



The assisted stairs on loading / unloading side and machining side with platforms are adjustable according to operator's stature. This friendly design makes operators more comfortable.

Tool cart (Optional)



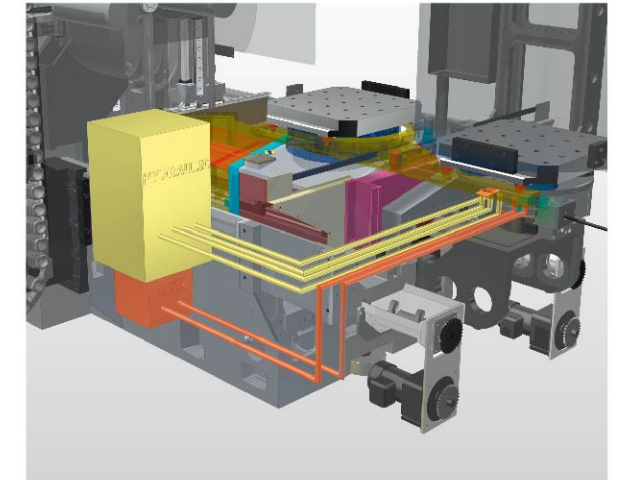
The tool cart is available.

Hydraulic and pneumatic supply for jig & fixture (Optional)



1. Suspended arm type supply

Totally 6 ports are provided on each side and the maximum hydraulic pressure allowed is 250 bar.



2. Hydraulic supply under pallet

Quick couplers are used for hydraulic supply under pallet. There is no limitation for B axis rotating.

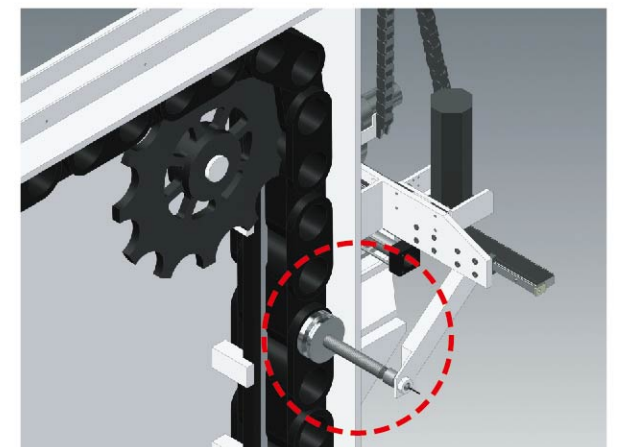
Interior tool measuring device (Optional)

It can measure tool length and tool diameter. In storage, it can be drawn back on the lateral side of pallet to prevent interference from tool or workpiece.



Tool magazine side tool breakage detector (Optional)

Tool breakage can be detected on the standby position of tool magazine side for saving cycle time.



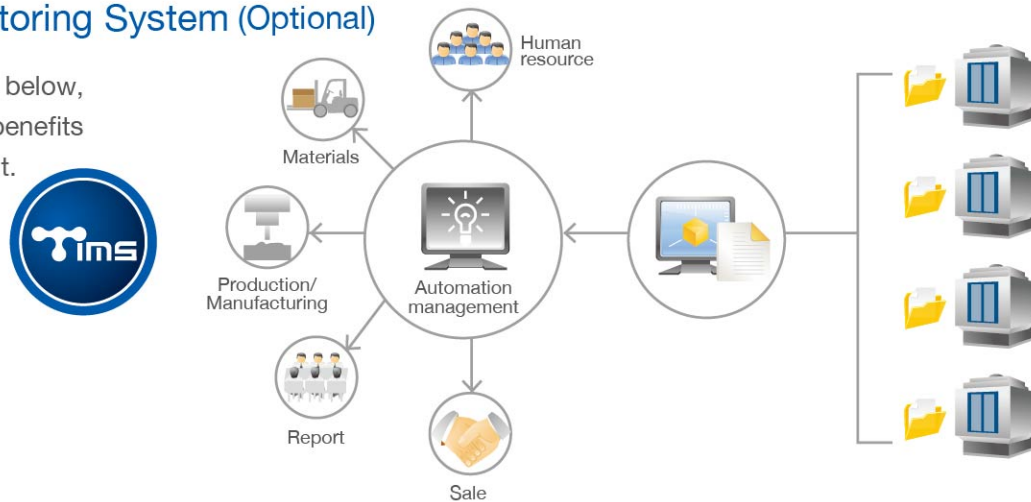
Intelligent system and friendly human-machine interface

Customized friendly human-machine interface for increasing the operation efficiency

Tongtai Integrated Monitoring System (Optional)

TIMS has four main functions as below, and provides full data base and benefits managers for factory management.

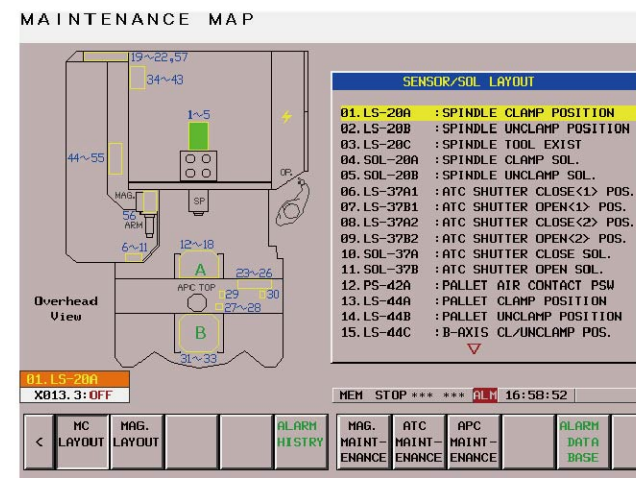
- A. Machine status
- B. Production management
- C. Operation history
- D. Alarm history



Maintenance Map (Standard)

Machine shows the malfunction unit and inspection information, which can reduce maintenance time.

- A. Sensors positions list
- B. Malfunction codes list
- C. Machine in-time malfunction list
- D. Malfunction details description and trouble shooting
- E. Malfunction history record
- F. M code list
- G. Tool number display



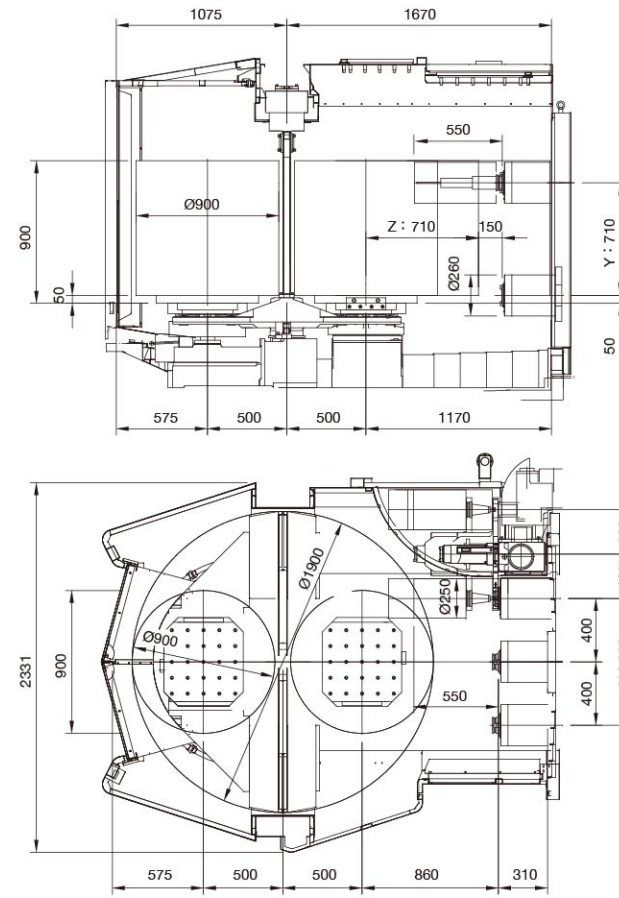
Tool Management (Standard)

Integrated with tool life monitor, tool management and adaptive cutting. Offer customers intelligent management interface.

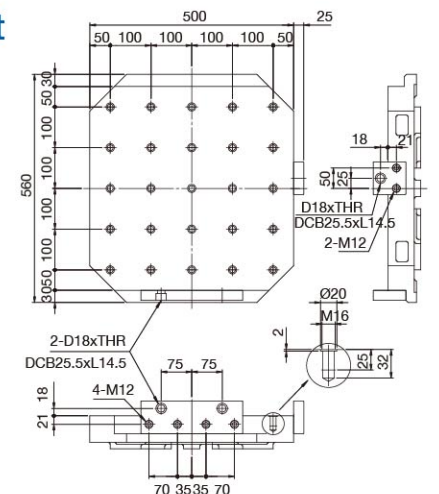
- A. Tool life monitor
- B. Tool management
- C. Adaptive cutting

NO.	TOOL	T	TOOL-ID	C	No.	GEOMCH	WEARCH	GEOMCD	WEARCD
1	1		7801	1	1	11.000	1.000	101.000	0.000
2	2		7802	3	2	22.000	3.000	33.300	0.000
					102	44.400	3.000	55.000	0.000
					152	55.000	2.000	33.000	0.000
					3	77.000	23.000	9.000	0.000
3	3		7803	1					
4	4		7804	1	4	88.000	3.000	6.000	0.000
5	5		7805	1	5	99.000	3.000	3.000	0.000

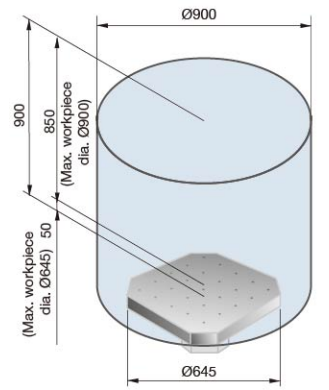
Interference diagram



Pallet

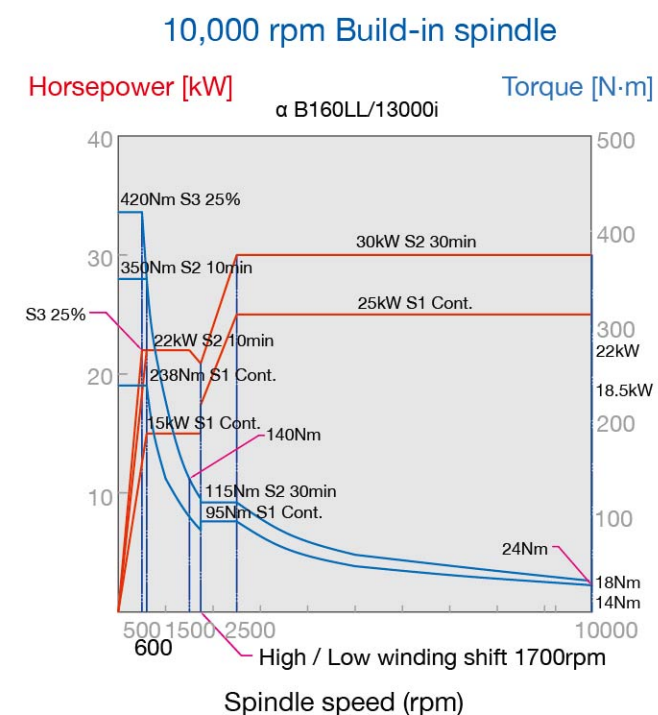


Max. Workpiece size

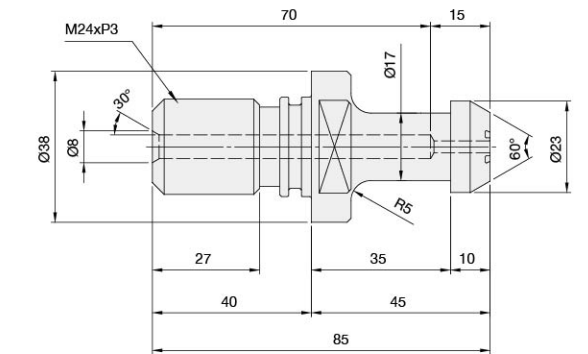


Unit : mm

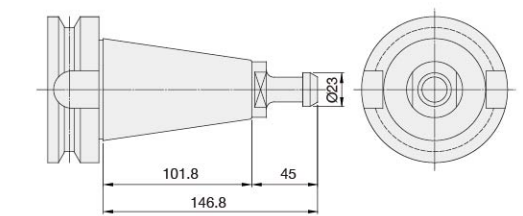
Spindle output and torque chart



Pull stud (coolant through spindle A type)



Tool shank MAS BT50



Unit : mm

Standard/optional accessories

		Standard	Optional
Spindle	10,000 rpm Build-in spindle	●	
B axis	Hirth coupling 1° rotary table	●	
	NC 0.001° index table (Rotary encoder in B axis is available)		○
Tool shank	BT50	●	
	HSK-A100		○
	DIN50		○
	CAT50		○
Angle of BT50 pull stud	MAS407 BTIII(90°)	●	
	MAS407 BTII(60°)		○
	MAS407 BTI(45°)		○
Coolant through spindle pump	20 bar	●	
	40 bar		○
	70 bar		○
Tool capacity	60 pc	●	
	90 pc		○
	120 pc		○
Cooling system	Spindle cooling system	●	
	Hydraulic temperature control system		○
	Coolant temperature control system		○
	Air conditioner for electrical cabinet		○
Automatic pallet changer	Two pallets	●	
	8PPL system		○
	FMS (flexible manufacture system)		○
Interior chip disposal	Two chip augers	●	
Chip conveyer	Scraper type conveyer	●	
	Magnetic scraper type conveyer		○
	Hinge type conveyer		○
	Drum type conveyer		○
	Integrated type conveyer		○
Lubrication system	General lubricant system	●	
	LHL integrated lubrication system		○
Three axes linear scale	5 μm resolution		○
	3 μm resolution		○
Jig & fixture hydraulic/pneumatic supply	Suspended arm type supply, 6 holes on each side (Maximum hydraulic pressure 250 bar)		○
	Table type, 6 holes on APC side (Maximum hydraulic pressure 250 bar)		○
Tool measuring system	Tool breakage detector (Installed on tool magazine side to detect tool breakage)		○
	Renishaw TS-27R touch sensor (Installed in the interior of the machine for measuring tool length, tool breakage and tool diameter)		○
Controller	FANUC 0i-M	●	
	FANUC 31i-M		○
Other accessories	Renishaw OMP60 workpiece measuring system		○
	Machining air blow		○
	Air gun		○
	Coolant gun		○
	Oil skimmer		○
	Oil mist collector		○

Specifications

Item	Specification	Unit	HB-500II
Travel	X axis	mm	800
	Y axis	mm	710
	Z axis	mm	710
	Spindle nose to table center	mm	150-860
	Spindle center to table surface	mm	50-760
	Table height from floor	mm	1,150
Pallet	Pallet size	mm	500×500
	Max. load	kg	600×2
	Pallet face		M16×25 holes
	Min. Indexing increment	degree	1 (0.001° optional)
Spindle	Spindle speed	rpm	60-10,000
	Spindle shift	step	Two steps by electric
	Spindle taper		7/24 Taper No.50
	Bearing diameter	mm	Ø100
Feed	Rapid traverse	m/min.	60
	Cutting feedrate	mm/min.	1-20,000
ATC	Tool shank		BT50
	Pull stud	degree	90(MAS-P50T)
	Tool capacity	pc	60(90/120 optional)
	Max. tool diameter	mm	Ø125
	Max. tool diameter (w/o adjacent tool)	mm	Ø250
	Max. tool length	mm	550
	Max. tool weight	kg	25
	Tool selection system		Fixed type
APC	Number of pallets		2
	Pallet changing system		Rotary type
Required electricity	Required electricity	kva	45
	Required voltage	v	200-220 ±10%
	Current frequency	hz	50 or 60 ±1%
	Pneumatic source	mpa	0.5
Capacity	Air supply	liter/min	400
	Hydraulic tank	liter	30
	Lubricant tank	liter	2
	Coolant tank	liter	510
Weight		kg	14,000
Controller	FANUC		0i-M

Machine dimensions

