

Horizontal Machining Center

# HB Series



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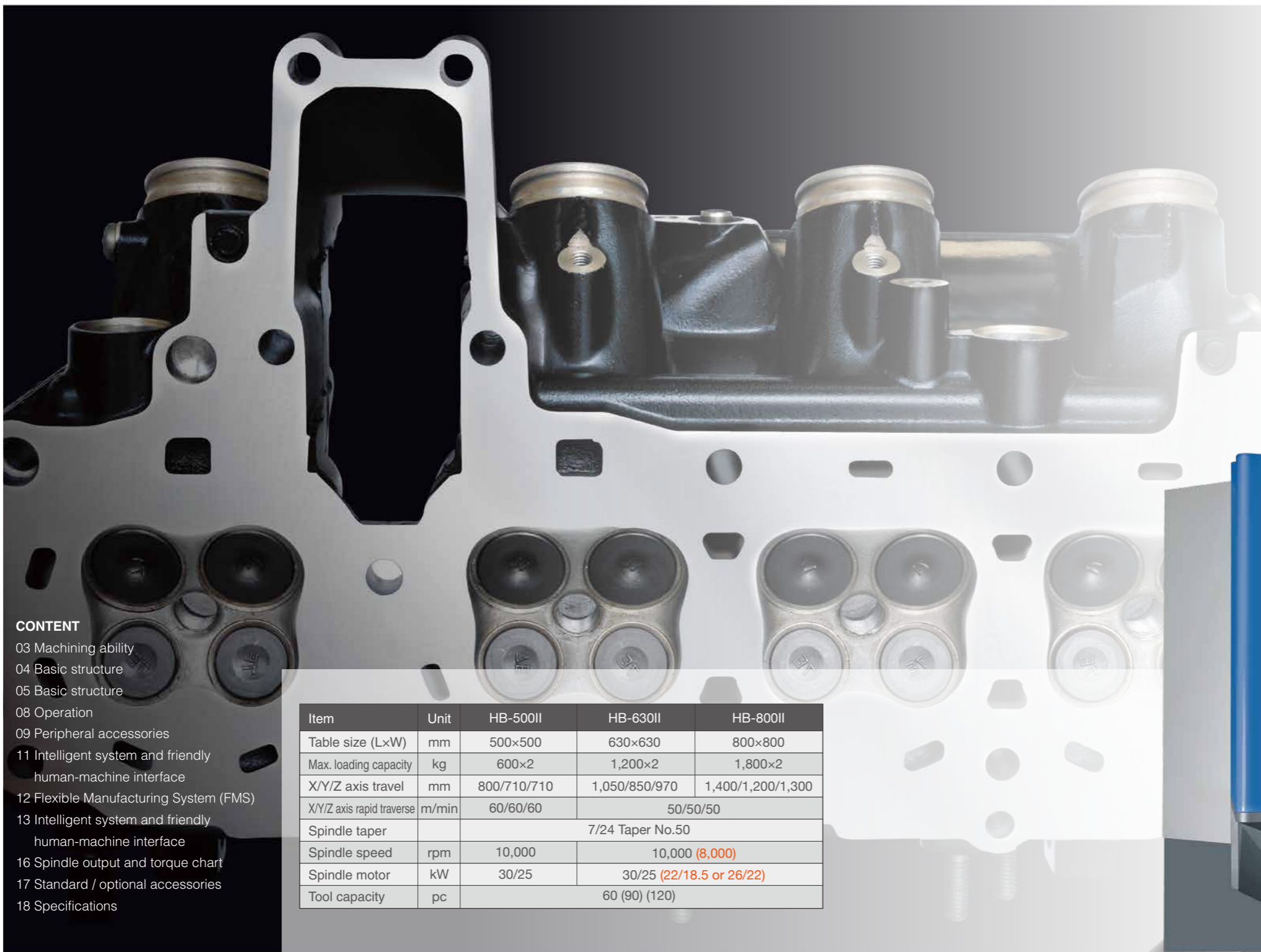
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# HB Series



- Standard equipped with 10,000 rpm built-in spindle for 420 N m of torque at 500 rpm.
- B axis rotary pallet adopts hydraulic locking unit to provide huge tightening force for machining stability.
- Index table adopts full-circumference hydraulic braking system with large contact area and can withstand heavy cutting.
- High efficiency automatic pallet changer (APC).
- Available for Flexible Manufacturing System (FMS).
- Suitable for heavy duty machining for ferrous materials.

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Item	Unit	HB-500II	HB-630II	HB-800II
Table size (LxW)	mm	500x500	630x630	800x800
Max. loading capacity	kg	600x2	1,200x2	1,800x2
X/Y/Z axis travel	mm	800/710/710	1,050/850/970	1,400/1,200/1,300
X/Y/Z axis rapid traverse	m/min	60/60/60	50/50/50	
Spindle taper		7/24 Taper No.50		
Spindle speed	rpm	10,000	10,000 (8,000)	
Spindle motor	kW	30/25	30/25 (22/18.5 or 26/22)	
Tool capacity	pc	60 (90) (120)		



## Machining ability

### Test data with 10,000 rpm built-in spindle

Ø30 mm End mill		
Material	S45C	FCD25
Cutting depth/width	30/15 mm	30/15 mm
Spindle speed	424 rpm	480 rpm
Feedrate	255 mm/min	360 mm/min
Chip removal rate	114 cm <sup>3</sup> /min	143 cm <sup>3</sup> /min

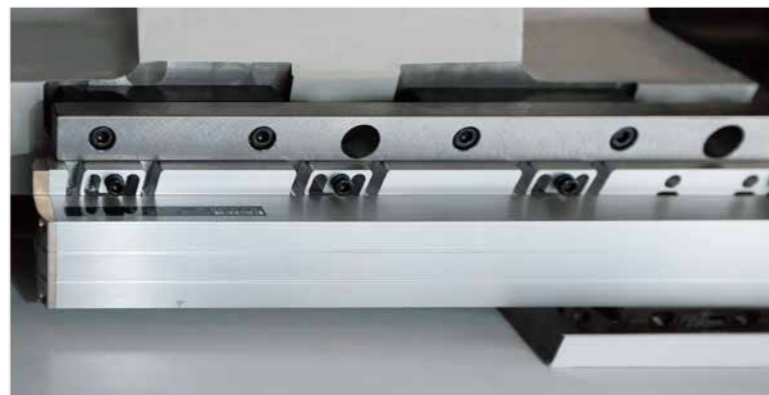
Ø125 mm Face mill		
Material	S45C	FCD25
Cutting depth/ width	4/100 mm	7/100 mm
Spindle speed	586 rpm	586 rpm
Feedrate	880 mm/min	880 mm/min
Chip removal rate	351 cm <sup>3</sup> /min	615 cm <sup>3</sup> /min



## Machining accuracy

### Linear scale (optional)

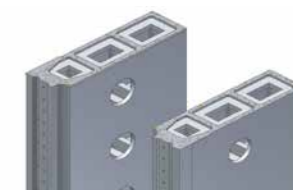
Linear scale is optional for error compensation (positioning error/repetition error/pitch error) of ballscrew, possibly caused by temperature changing. The best positioning accuracy achieves ±3 μm.



## Basic structure

### High rigidity structure

Specification	Unit	HB-500II	HB-630II	HB-800II
X/Y/Z axis travel	mm	800/710/710	1,050/850/970	1,400/1,200/1,300
X/Y/Z axis rapid traverse	m/min	60/60/60	50/50/50	
X/Y/Z axis acceleration/deceleration	G	0.7/0.7/0.7	0.36/0.7/0.7	0.4/0.6/0.4



Column with dual-layer wall structure design

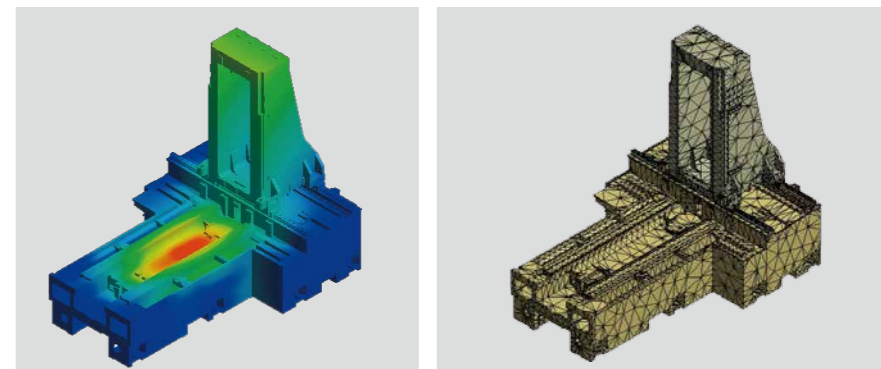
Three axes adopt high rigidity roller guideway

Unit: mm

Maximum parts size		
	A	B
HB-500II	900	900
HB-630II	1,100	1,100
HB-800II	1,300	1,250

Maximum parts size

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

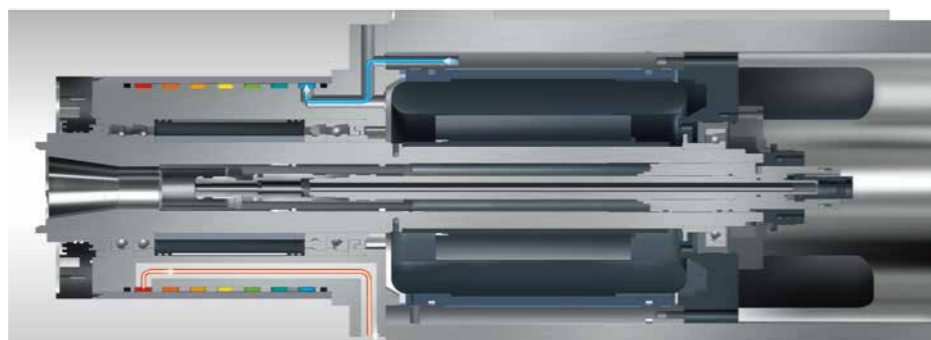


# Basic structure

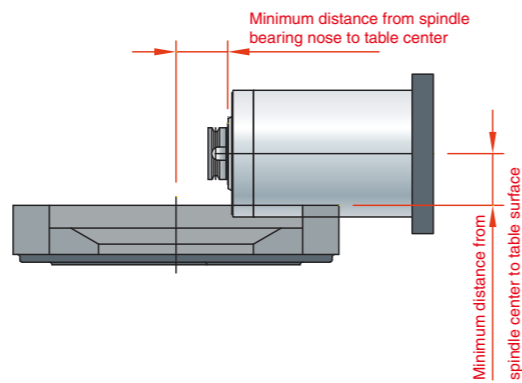
## Spindle

Ø100 mm ceramic bearing are aligned in 10,000 rpm standard built-in spindle in HB series. Chilled cooling fluid is recirculated through the spindle cartridge and compressed air is led into the motor for cooling. It generates 420 N m torque at 500 rpm, especially suitable for the heavy duty cutting in cast iron or steel materials.

- Max. spindle speed **10,000 rpm**
- Spindle motor **30/25 kW**
- Output torque **420/350/238 N m (25% ED/10 min./Cont.)**
- Acceleration time **2.5 sec (0→10,000 rpm)**
- 1.1 sec (0→4,000 rpm)**



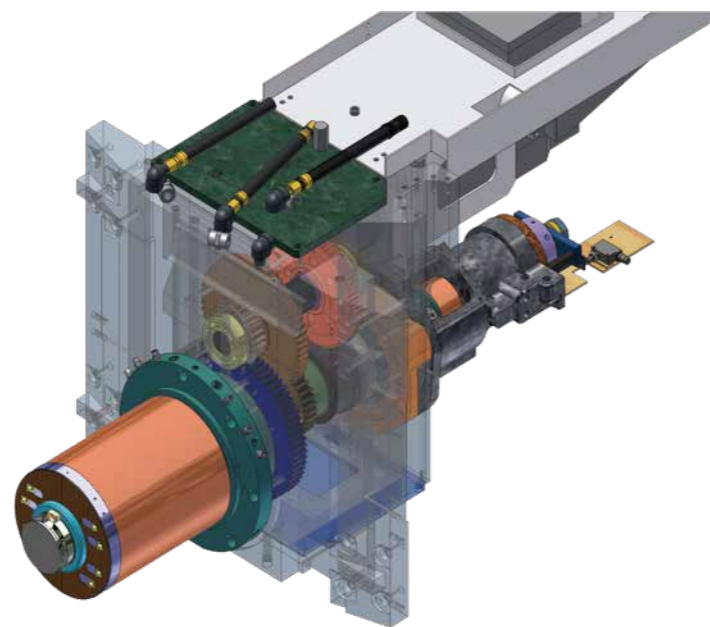
	Unit	HB-500II	HB-630II	HB-800II
Minimum distance from spindle bearing nose to table center	mm	150	100	150
Minimum distance from spindle center to table surface	mm	50	100	100



## High torque spindle with gear box (HB-630II/HB-800II)

Adopts high quality gears for high transmission efficiency. The two-step gear box can generate more than 1,000 N m torque at 200 rpm, especially suitable for tough materials and large parts.

- Max. spindle speed **6,000 rpm**
- Spindle motor **22/18.5 kW**
- Output torque **1,050/883 N m**  
(30 min. S3, 60%/Cont.)



## B-axis rotary pallet

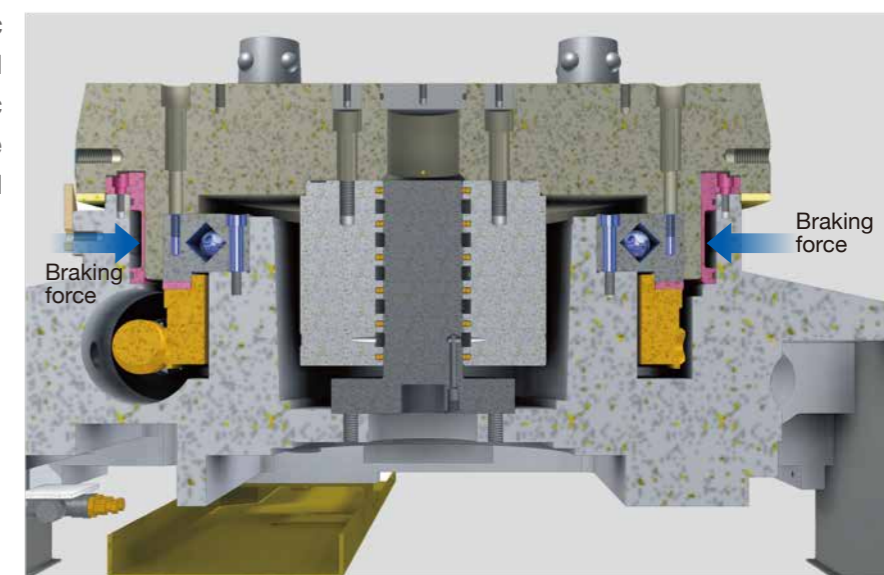
High precision positioning cones with hydraulic locking unit, generates 18 tons of clamping force to ensure the table stability during machining.



	Unit	HB-500II	HB-630II	HB-800II
Maximum table load	kg	600×2	1,200×2	1,800×2
90° indexing time of 1° rotary pallet (std.)	sec	1.7	2.4	3.5
90° indexing time of 0.001° rotary pallet (opt.)	sec	1.5	1.6	1.5
Clamping force of pallet	kgf	18,000	18,000	18,000
Braking force of pallet	kg-m	250	528	528

## Full-circumference hydraulic braking system (for NC 0.001° indexing)

The full-circumference hydraulic braking system uses the oil pressure to lock the entire disc synchronously. Because of its large locking area, it has high rigidity and can withstand heavy cutting.



## Basic structure

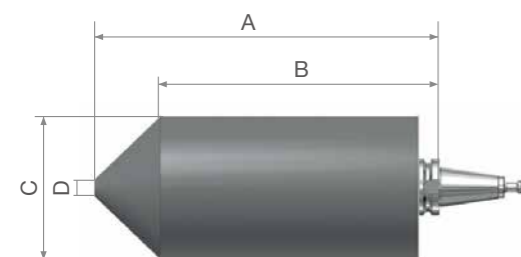
### Automatic pallet changer (APC)

The latest APC hydraulic driving unit improves dynamic rigidity and optimizes the PLC settings. Under the situation of maximum loading in both sides, the exchanging time is decreased dramatically.



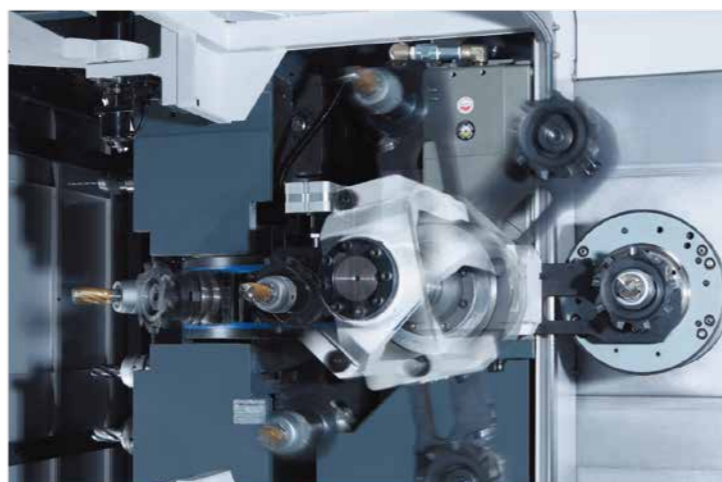
### Automatic tool changer (ATC)

Equipped with Japanese made cam type ATC.



Maximum tool size for ATC				
	A	B	C	D
HB-500II	550	436	Ø250	Ø30
HB-630II	610	545	Ø250	Ø6
HB-800II	610	545	Ø250	Ø6

Unit: mm



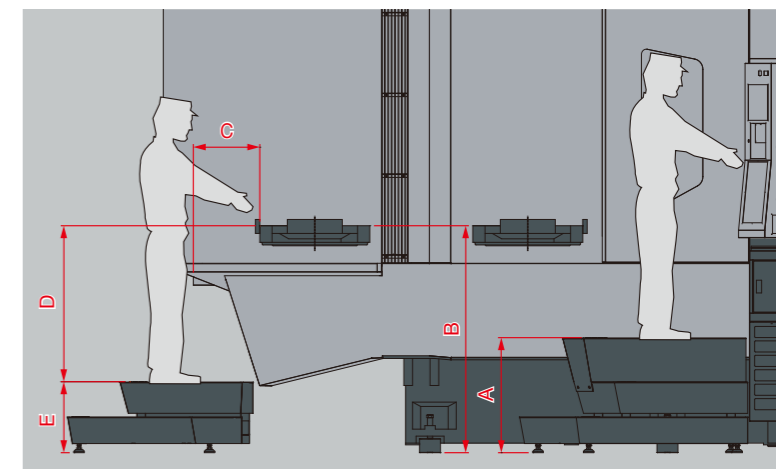
	Unit	HB-500II	HB-630II	HB-800II
T to T	sec	2.4	2.4	2.4
C to C	sec	4.2	4.5	6
Tool capacity	pc	60 (90) (120)		

## Operation

The assisted platform is placed on the loading/unloading and operator area for convenience during machine operations.

	HB-500II	HB-630II	HB-800II
A	625~775	659~809	
B	1,150	1,340	1,440
C	346	381	400
D	743~893	893~1,043	985~1,135
E	407~557		

Unit: mm



Spacious working area facilities loading/unloading and jig & fixture operation.

	Operation area (A)
HB-500II	900 mm
HB-630II	1,120 mm
HB-800II	1,320 mm



Large window and tool magazine design facilitates tool inspection and changing. The operating distance and height is comfortable to operators.



Through centralized management of air FRL unit and hydraulic pump, daily maintenance is easily done.

# Peripheral accessories

## Rearward type chip conveyor (standard)

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

○ : Recommend × : Non-recommend

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

Short chips: The length of chip is under 60mm or the diameter of ball type chip is under Ø40 mm.  
 Long chips: The length or the diameter is longer than short ones.

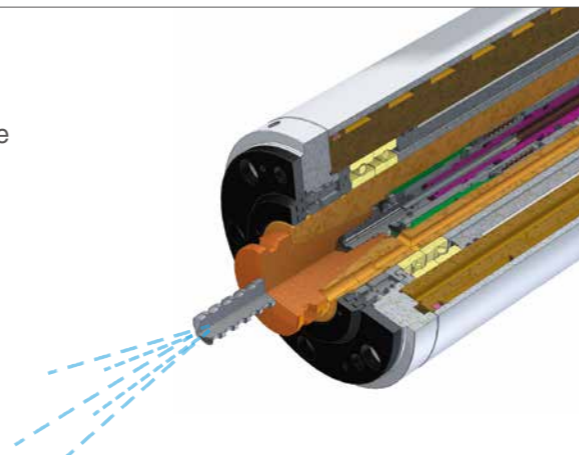


Volume of hydraulic tank:  
800L (80% full)

## Coolant through spindle (C.T.S.)

C.T.S. system increases the efficiency of chip removal and extends the tool life by cooling its cutting point.

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

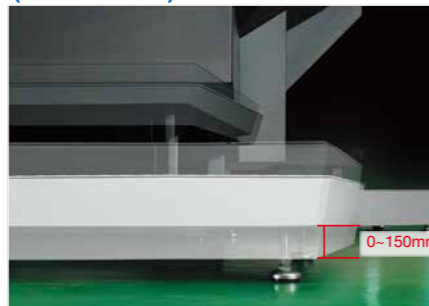


## Roof-type flushing system (standard)



Flush metal chips into chip auger for avoiding the chip accumulation on the plate.

## Assisted platform (standard)



The assisted platform is placed on the loading/unloading and operator area. The height of platform is adjustable for convenience during machine operations.

## Tool cart (optional)

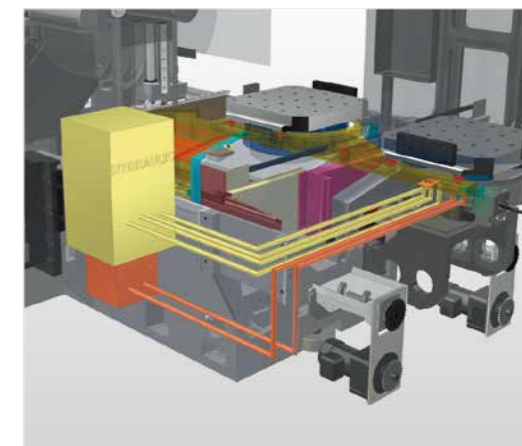


The tool cart is available for customers.

## Hydraulic and pneumatic supply for jig & fixture (optional)



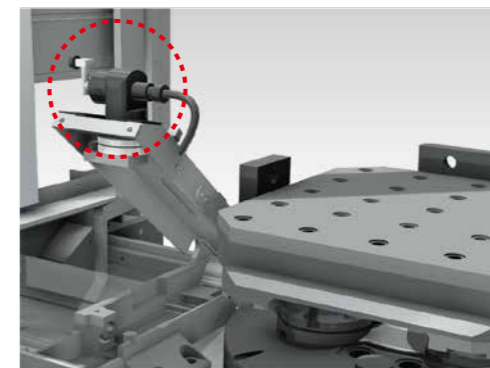
1. Suspended arm type supply  
6 ports are provided in each side (loading/unloading/machining) and the maximum allowable hydraulic pressure is 250 bar.



2. Hydraulic supply for pallet  
Use quick coupler to connect with the pallet and the hydraulic oil is supplied under the pallet. Once pallet changes, the quick coupler will separate. It solves the problem of twisted pipes and benefits B axis rotation.

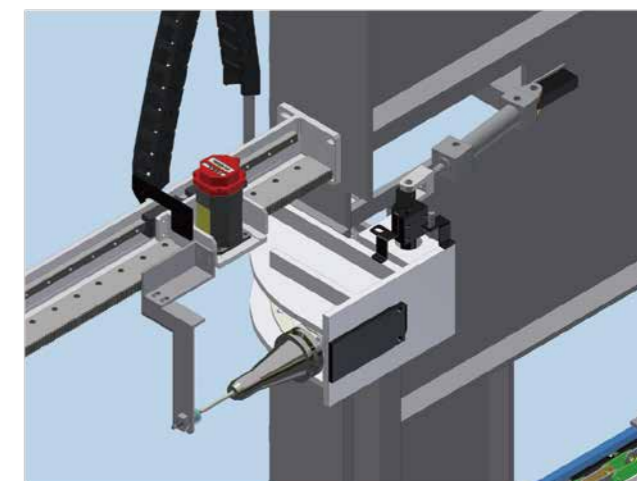
## Interior tool measuring device (optional)

This device measures tool length and tool diameter. It is hidden on the side of the pallet during storage, and does not interfere with the workpiece and the tool during machining.



## ATC side tool breakage detector (optional)

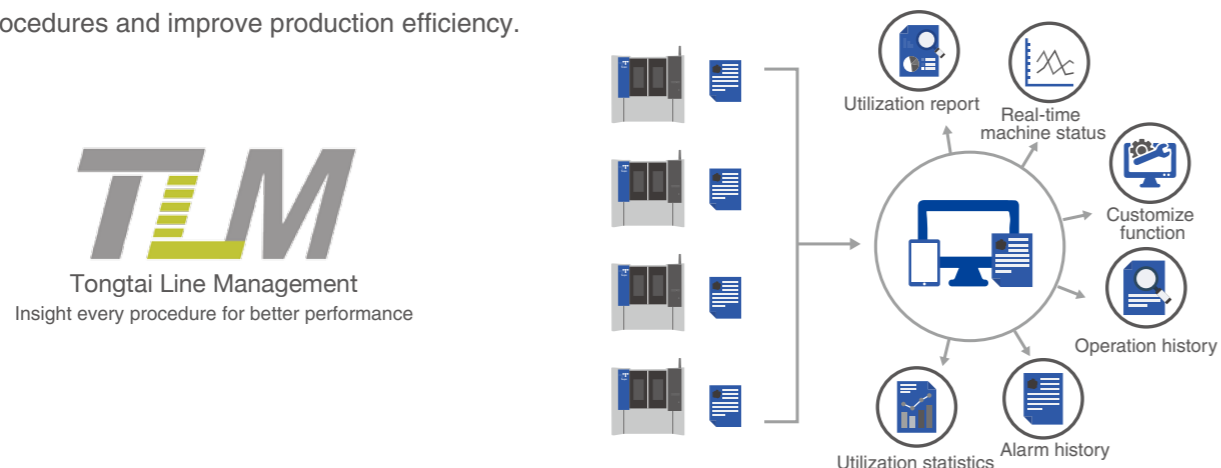
Tool breakage can be detected on the standby position of TAC side, it ensures the machining quality and also benefits cycle time.



## Intelligent system and friendly human-machine interface

### Tongtai Line Management, TLM (optional)

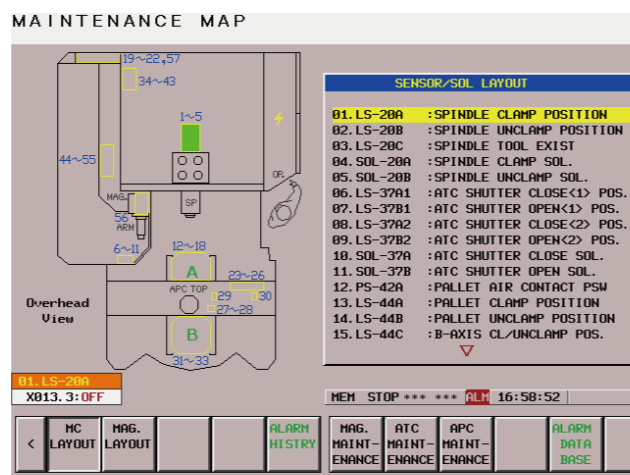
TLM adopts network structure to realize IoT. It collects and calculates machine data and summaries that for an easy-to-read report. Through the analysis of producing data, it assists every operator to optimize processing procedures and improve production efficiency.



### Maintenance Map (standard)

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

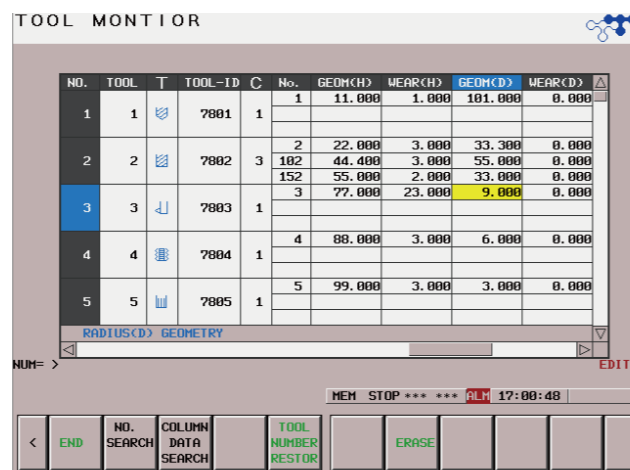
- A. Sensor positions list
- B. Malfunction codes list
- C. Machine in-time malfunction list
- D. Malfunction details description and troubleshooting
- E. Malfunction history record
- F. M code list
- G. Tool number displayer



### Tool management (standard)

Integrate with tool life monitoring, tool management, and adaptive cutting functions and offer an intelligent tool management interface.

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



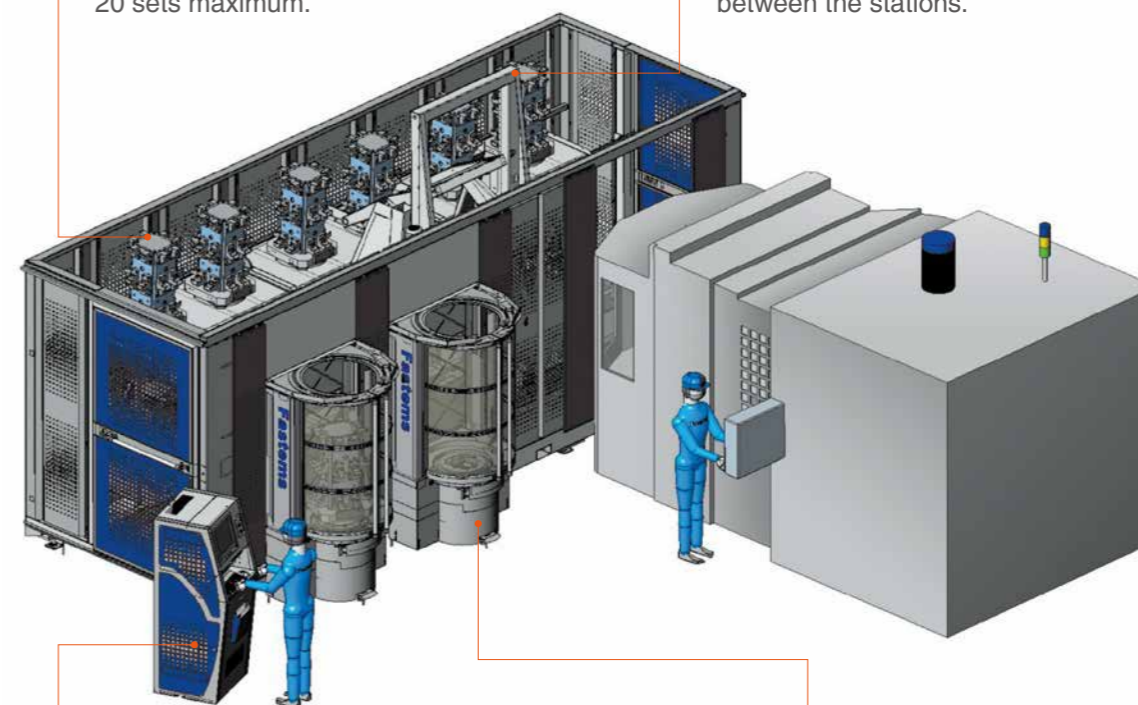
## Flexible Manufacturing System

### 1 Container

It allows temporary storage of workpiece and finished parts. The basic storage capacity is 10 sets that can be expanded to 20 sets maximum.

### 2 Stacker crane

It assists workpiece movement from temporary storage area to loading/unloading station, loading/unloading station to machining station, or between the stations.



### 3 Manufacturing Management System, MMS

All control information of FMS can be set in this system. Moreover, it can equip with monitoring module for collecting production information and feedback.

### 4 Loading/unloading station

Raw and finished workpiece can be loaded and unloaded at this station. The basic amount of loading/unloading station is 1 set and allows to expand to 2 sets totally in maximum.

Item	Specification	
Workpiece storage system	Number of stacker cranes	1
	Max. loading capacity of stacker crane (kg)	1500
	Number of containers	1 (2)
	Storage number of pallet	10 (30)
	Number of loading/unloading station	1 (2)
MMS	Minimum limited machining time	4.5 (10)
	CC1 control system	1
	MMS-5000 (machine status monitoring)	Opt.
Number of machine	MMS-5100 (remote monitoring service)	Opt.
		1 (2)



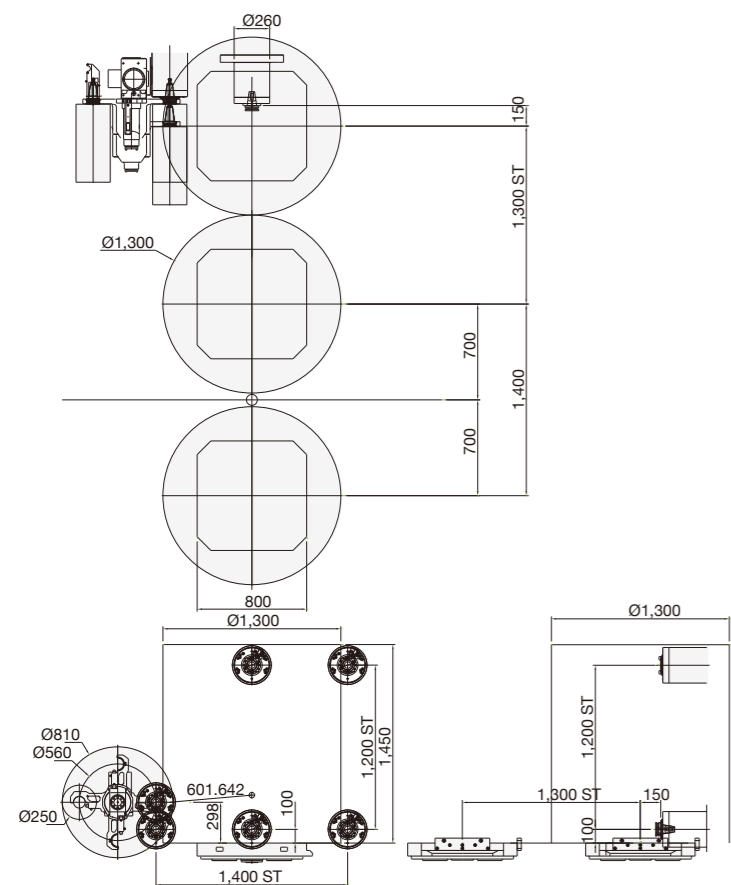


# Interference diagram/Pallet & Machine dimensions

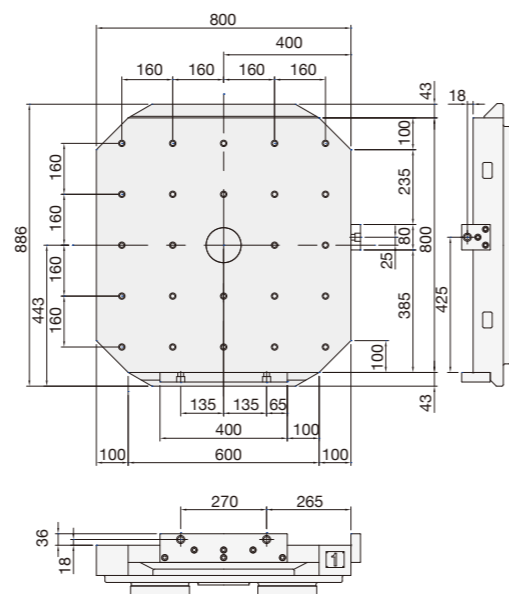
HB-800II

Unit : mm

## Interference diagram

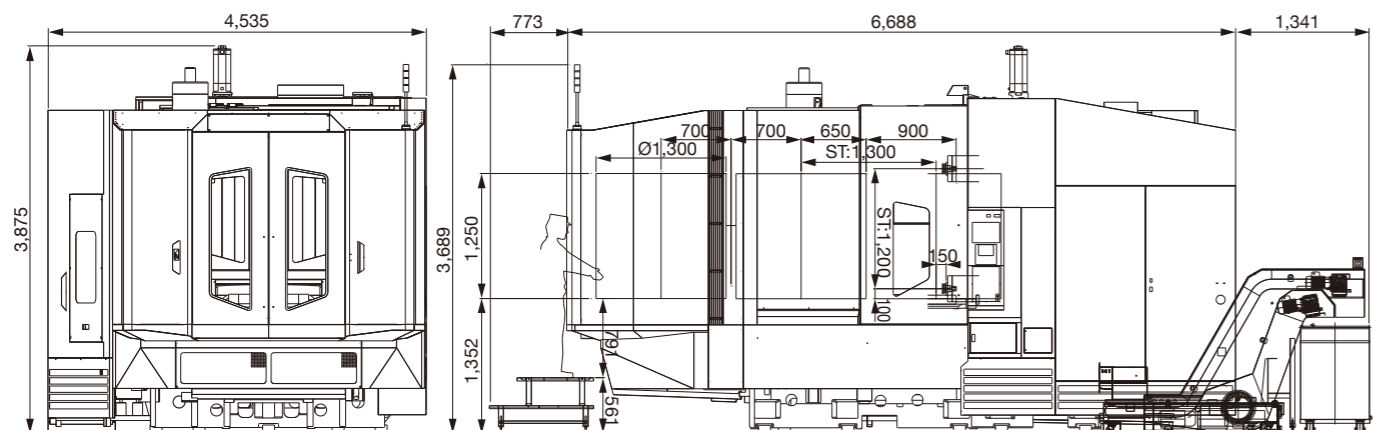


## Pallet



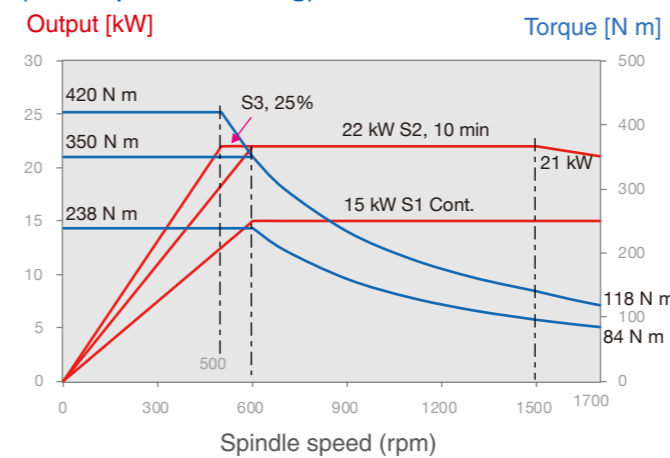
## HB-800II Machine dimensions

Unit : mm

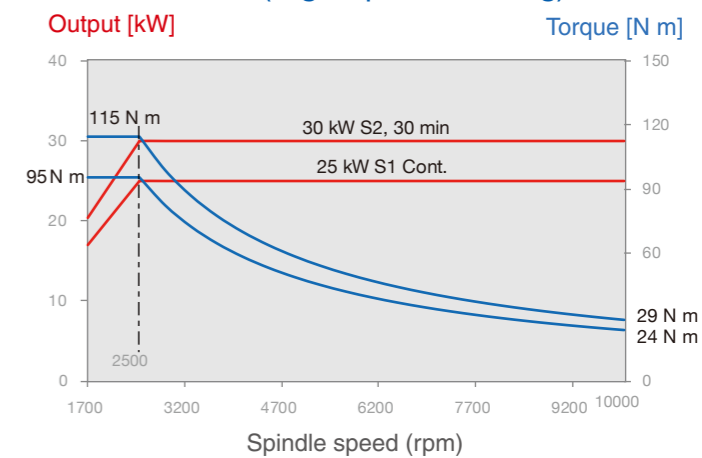


# Spindle output and torque chart

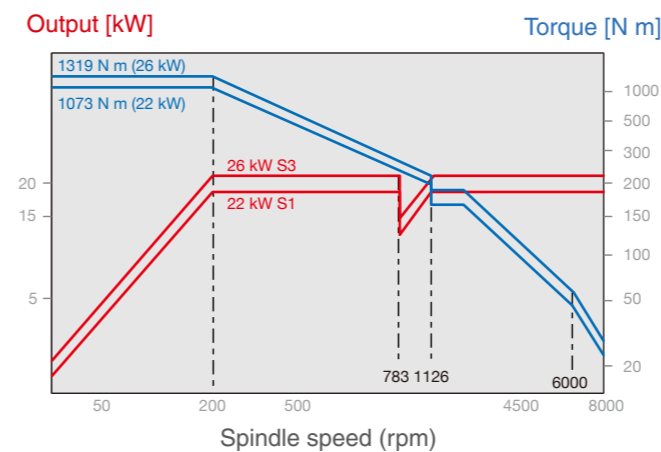
## 10,000 rpm Built-in spindle (Low-speed winding)



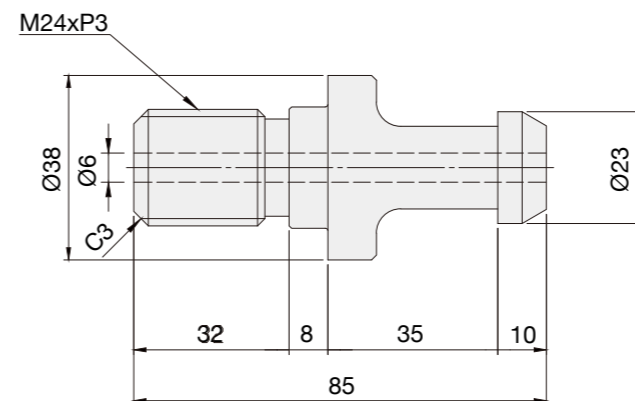
## (High-speed winding)



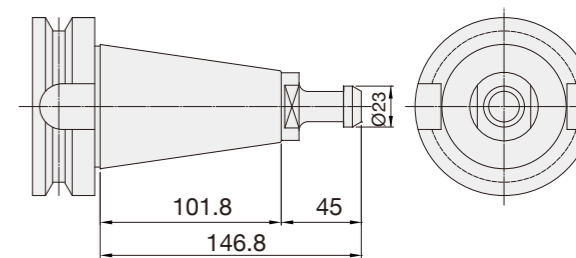
## 8,000 rpm Gearbox type spindle



## Pull stud (C.T.S. A-type)



## Tool shank MAS BT50



Unit : mm

## Standard/optional accessories

		Standard	Optional
Spindle	10,000 rpm built-in spindle	●	
	8,000 rpm gearbox spindle with high torque		○
B axis	Index table for 1°	●	
	Index table for 0.001° (rotary encoder in B axis is optional)		○
Tool shank	BT50	●	
	HSK-A100		○
	DIN50		○
	CAT50		○
Angle of BT50 pull stud	MAS407 BTIII (90°)	●	
	MAS407 BTII (60°)		○
	MAS407 BTI (45°)		○
C.T.S. pump	20 bar	●	
	40 bar		○
	70 bar		○
Tool capacity	60 pcs	●	
	90 pcs		○
	120 pcs		○
Cooling system	Spindle cooling system	●	
	Hydraulic temperature control system		○
	Coolant temperature control system		○
	Air conditioner for electrical cabinet		○
Automatic pallet changer	Two pallets	●	
	PPL system		○
	Flexible manufacturing system (FMS)		○
Interior chip disposal	Two chip augers	●	
Chip conveyor	Scraper type conveyor	●	
	Magnetic scraper type scraper		○
	Hinge type conveyor		○
	Drum type conveyor		○
	Integrated type conveyor		○
Lubrication system	General lubrication system	●	
	LHL integrated lubrication system		○
Three axes linear scale	5 μm resolution		○
	3 μm resolution		○
Hydraulic/ pneumatic supply for jig & fixture	Suspended arm type supply. 6 ports on each side (Max. hydraulic pressure 250bar). Oil from top		○
	Pallet type, 6 ports on APC side (Max. hydraulic pressure 250bar). Oil from bottom		○
Tool measuring system	Tool breakage detector (installed on tool magazine side)		○
	Renishaw TS27R contact tool setting probe (installed in the interior of the machine for measuring tool length, tool breakage, and tool diameter)		○
Controller	FANUC 31i-M		○
	FANUC 0i-MF	●	
Other accessories	Renishaw OMP60 touch probe		○
	Air blow		○
	Air gun	●	
	Coolant gun	●	
	Oil skimmer		○
	Oil-mist collector		○

## Specifications

Item	Specification	Unit	HB-500II	HB-630II	HB-800II
Table	Table size	mm	500×500	630×630	800×800
	Max. loading capacity	kg	600×2	1,200×2	1,800×2
	Table height from floor	mm	1,150	1,300	1,392
	Max. workpiece dimension	mm	Ø900×H1,000	Ø1,100×H1,100	Ø1300×H1,250
	B axis min. indexing increment	deg	0.001°		
	Spindle	Spindle taper		7/24 Taper No. 50	
Spindle speed		rpm	10,000	10,000 (8,000)	
Travel	X/Y/Z axis travel	mm	800/710/710	1,050/850/970	1,400/1,200/1,300
	Distance from spindle center to table surface	mm	50-760	100-950	100-1,300
	Distance from spindle bearing nose to table center	mm	150-860	100-1,070	150-1,450
Feed	X/Y/Z axis rapid traverse	m/min	60/60/60	50/50/50	
	Cutting feedrate	mm/min	1-20,000		
ATC	Tool shank		BT-50 (BBT-50)	BBT-50	BT-50 (BBT-50)
	Tool capacity	pc	60 (90) (120)		
	Max. tool diameter	mm	Ø125		
	Max. tool diameter (w/o adjacent tool)	mm	Ø250		
	Max. tool length	mm	550	610	
	Max. tool weight	kg	25		
Motor	Spindle motor	kW	30/25	30/25 (22/18.5 or 26/22)	
	X/Y/Z axis servo motor	kW	5.5/9/4.5	7/9/7	
Machine Size	Width×depth×height	mm	3,125×6,700×3,124	4,315×7,906×3,536	4,535×8,803×3,875
	Weight	kg	14,500	21,600	22,000
Controller			Fanuc 0i-MF		

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