

# HA-400II/500II

## Horizontal Machining Center



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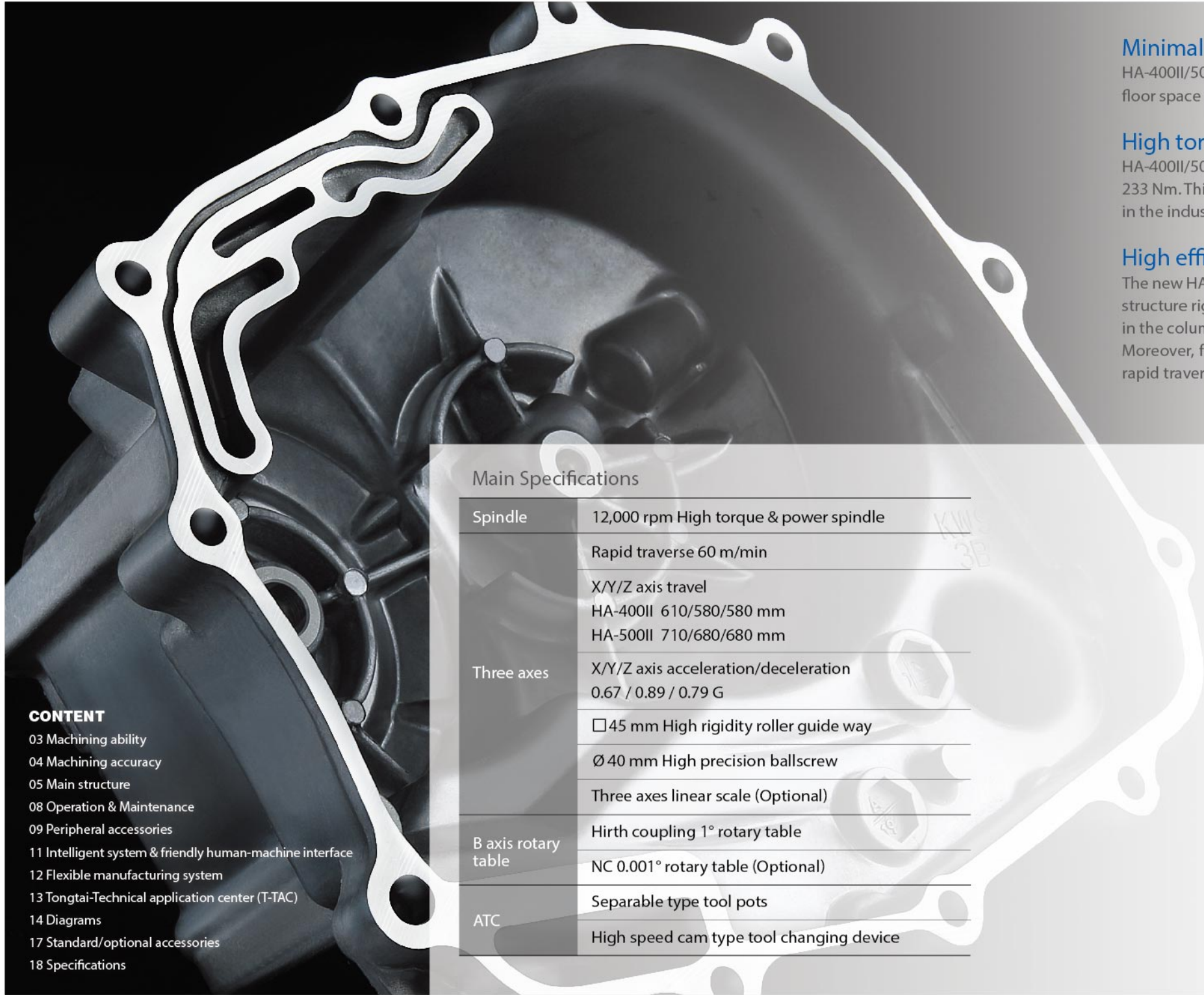
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# HA-400II/500II



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**Main Specifications**

Spindle	12,000 rpm High torque & power spindle
	Rapid traverse 60 m/min
	X/Y/Z axis travel HA-400II 610/580/580 mm HA-500II 710/680/680 mm
Three axes	X/Y/Z axis acceleration/deceleration 0.67 / 0.89 / 0.79 G
	□45 mm High rigidity roller guide way
	Ø40 mm High precision ballscrew
	Three axes linear scale (Optional)
B axis rotary table	Hirth coupling 1° rotary table NC 0.001° rotary table (Optional)
ATC	Separable type tool pots High speed cam type tool changing device

**Minimal floor space requirement**

HA-400II/500II adopts new splash guard design. Compared with the last generation, it saves 15% of floor space and allows the clients to have more space available.

**High torque & power spindle**

HA-400II/500II adopts 12,000 rpm spindle, with a motor output of 25/22 kW and maximum torque 233 Nm. This spindle is suitable for machining materials of aluminum alloy and steel, widely applied in the industries of automobile, hydraulic/pneumatic parts and general parts.

**High efficiency machining**

The new HA series has a redesigned casting structure. Furthermore, it adopts improvements on the structure rigidity, including triple-point support in the machine bed, double-wall structure design in the column and high rigidity linear guide ways in three axes. Moreover, for machining efficiency, new HA series saves 10%-30% non-cutting time in three-axis rapid traverse, pallet/tool changing and B-axis positioning.







# Main structure

## High rigidity structure

### Travel

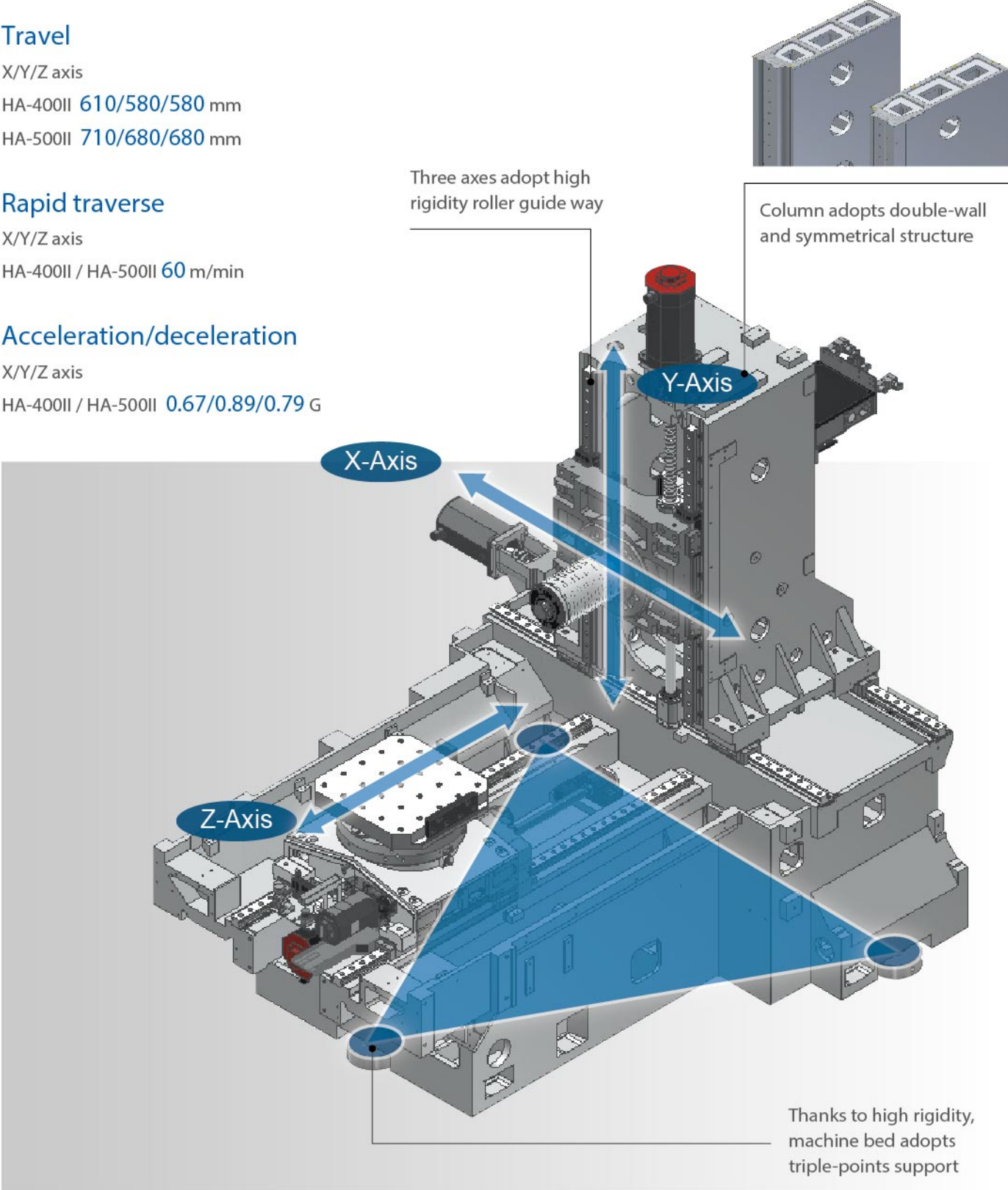
X/Y/Z axis  
HA-400II 610/580/580 mm  
HA-500II 710/680/680 mm

### Rapid traverse

X/Y/Z axis  
HA-400II / HA-500II 60 m/min

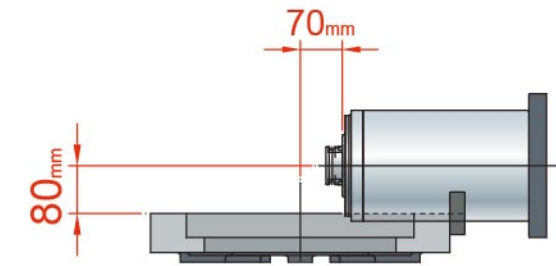
### Acceleration/deceleration

X/Y/Z axis  
HA-400II / HA-500II 0.67/0.89/0.79 G

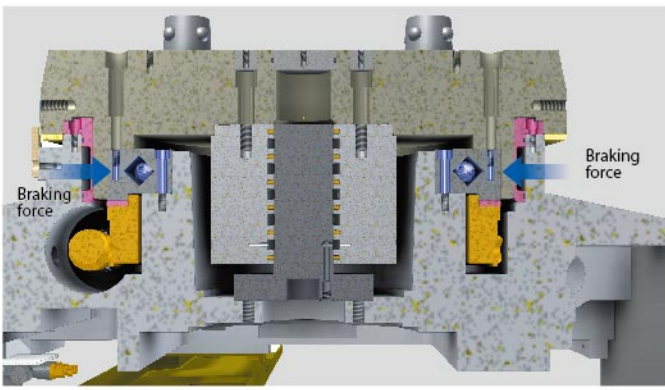
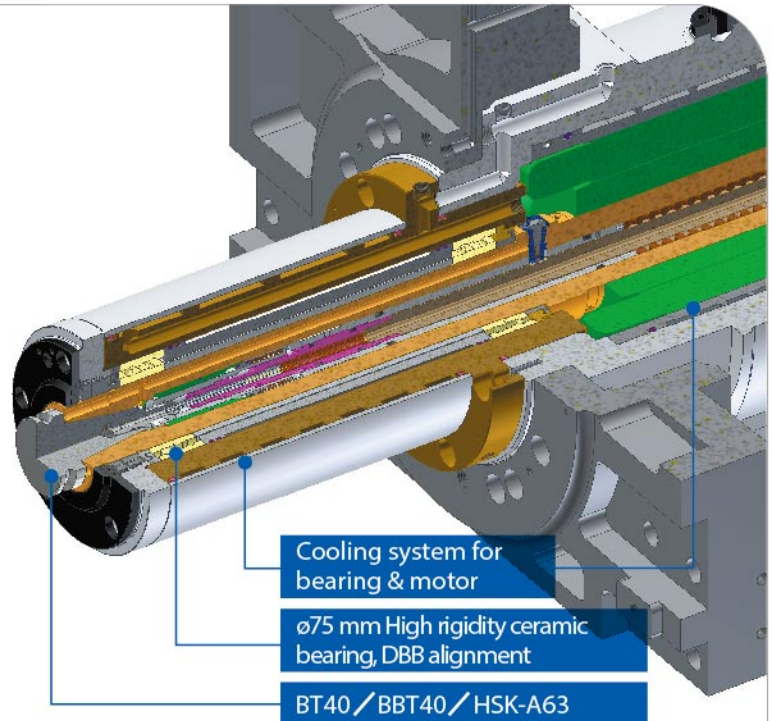


## Spindle

Max. speed 12,000 rpm  
Spindle motor 25/22 kW  
Output torque 233/143 Nm (S2/con.)  
Acceleration time 2.6 sec (0→12,000 rpm)  
0.9 sec (0→5,000 rpm)



Min. distance from spindle nose to table center 70 mm  
Min. distance from spindle center to table surface 80 mm

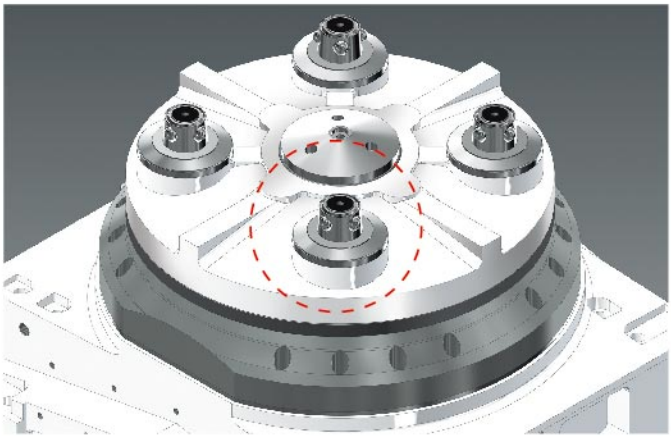


## Full-circle hydraulic braking system

HA 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.

## B axis rotary table

High precision positioning cones with hydraulic locking device, generating 17 tons of clamping force to ensure the table stability during machining.



	HA-400II	HA-500II
Max. table load	400 kg×2	500 kg×2
90° indexing time of 1° rotary table (Standard)	2 sec	2 sec
90° indexing time of 0.001° rotary table (Optional)	1.1 sec	1.1 sec
Pallet clamping force	17,000 kgf	17,000 kgf
Braking torque	500 kg-m	500 kg-m

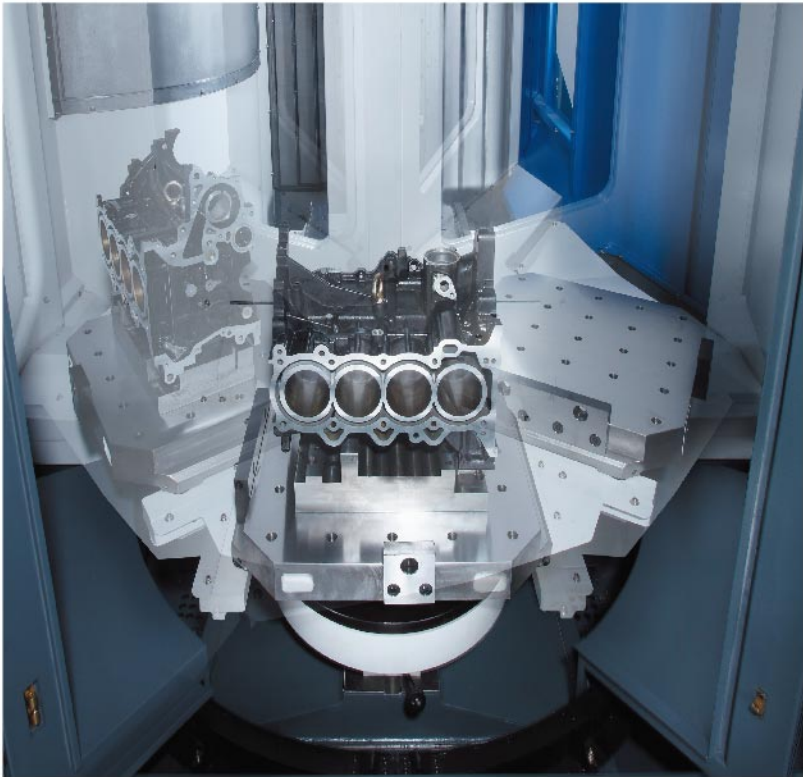


# Main structure

## APC

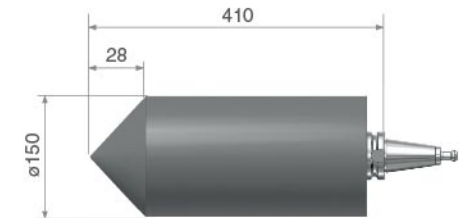
To increase dynamic rigidity, the hydraulic driving mechanism of APC is improved. Additionally, timers of PLC are optimized. Pallet changing time is saved dramatically.

HA-400II	HA-500II
10 sec	10 sec
16 sec (Previous model)	15 sec (Previous model)

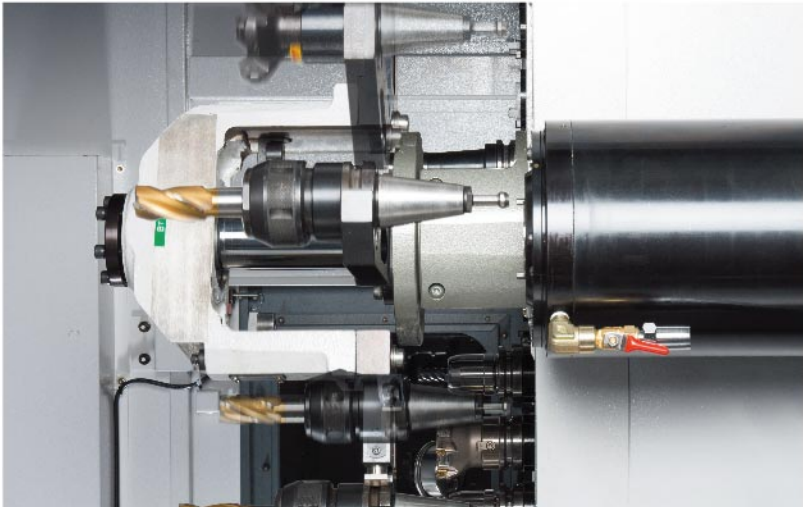


## ATC

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



Maximum tool size for automatic tool changing



	HA-400II	HA-500II
T to T	1.5 sec	1.5 sec
C to C	2.8 sec	3 sec
Tool capacity	60 pc 90/120 pc optional	60 pc 90/120 pc optional

# Operation



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



Access to spindle facilitates rapid tool changing.



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

	HA-400II	HA-500II
A	620	820
B	270	270
C	300	320

Unit : mm



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



# Peripheral accessories

## Rearward type chip conveyor

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

○ : Suitable    × : 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.



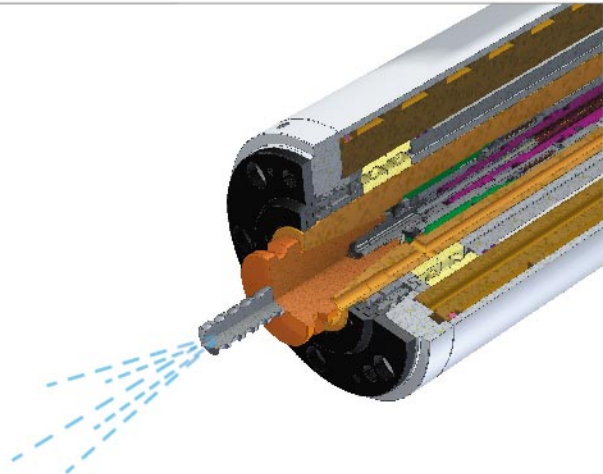
Coolant tank capacity  
HA-400II / HA-500II 550 L(80% full)

## Coolant Through Spindle (Optional)

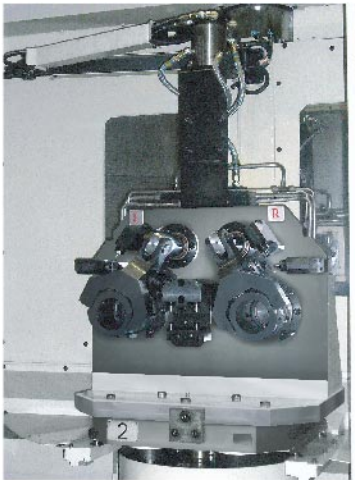
C.T.S. increases the efficiency of chip disposal and extends the tool life by cooling the cutting position.

Discharge pressure : 20/35/70 bar  
(2.0/3.5/7.0 MPa)

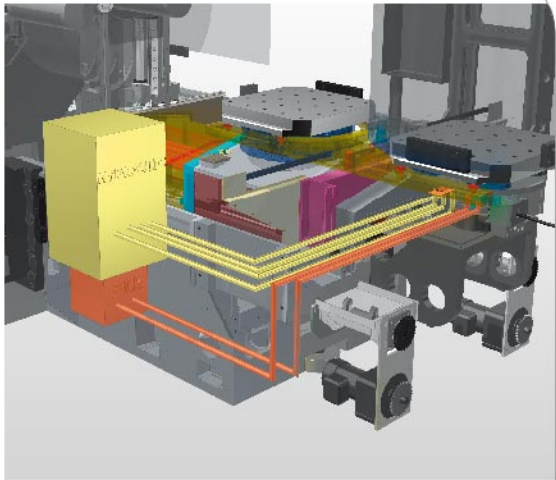
Filtering accuracy : 40 μm



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



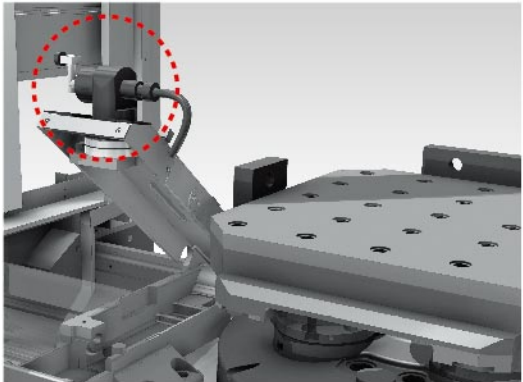
1. Suspended arm type supply  
Totally 6 holes are provided on each side and the maximum hydraulic pressure allowed is 250 bar.



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.

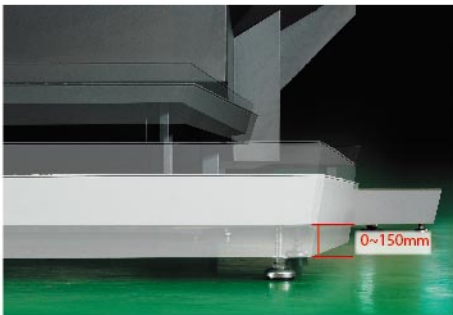


## Roof type flushing system



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

## Assisted stair



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.

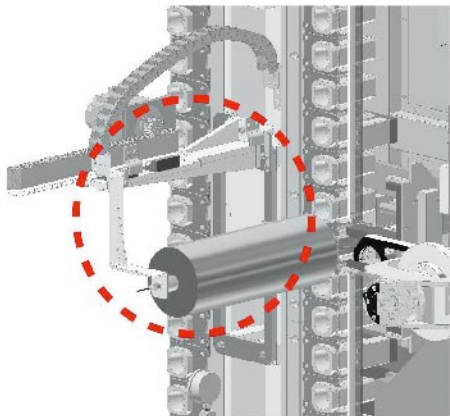
## Tool cart



The tool cart is available.

## 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

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

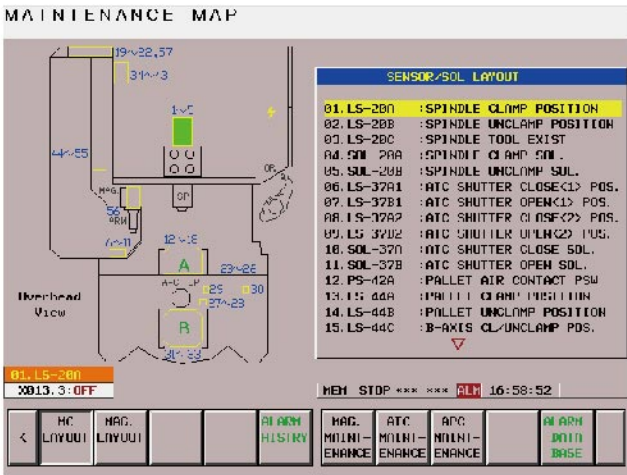
- A. Machine status
- B. Production management
- C. Operation history
- D. Alarm history



## Maintenance Map

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

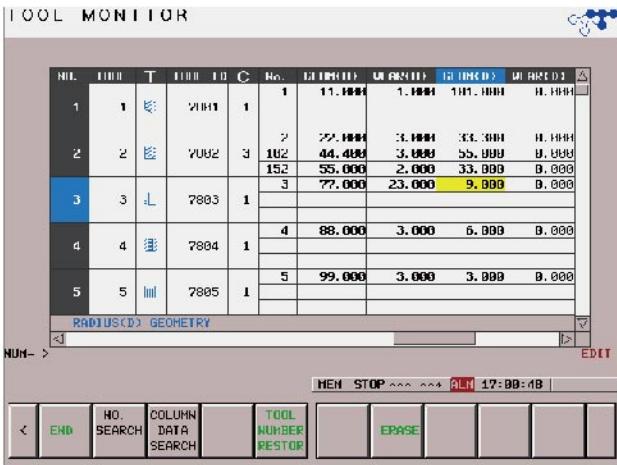
- A. Sensors positions list
- B. Malfunction codes list
- C. Machine in-time malfunction list
- D. Malfunction details description and trouble shooting
- E. Malfunction history record
- F. M code list
- G. Tool number display



## Tool Management

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



# Flexible Manufacturing System, FMS

**1 Container**

It allows temporary storage of machined parts and finished goods. The basic storage capacity is 10 sets and possible to expand to 20 sets maximum.

**2 Stacker Crane**

It assists workpiece movement from storage area to loading area, loading area 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 combine with a monitoring module for collecting the production information and feedback.

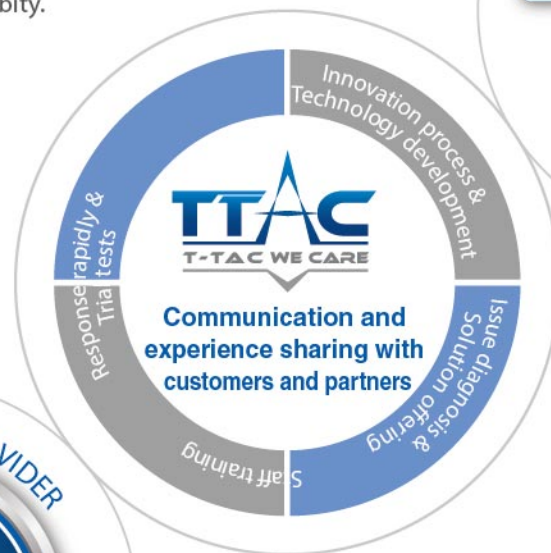
**4 Loading/unloading station**

Raw material and finished workpiece can be loaded and unloaded at this station. One loading/unloading station is standard and the second one is available.

Item	Specification	
Workpiece storage system	Number of stacker cranes	1
	Max. loading capacity of stacker crane(kg)	1000
	Number of containers	1(2)
	Storage number of pallet	10 (20)
	Number of loading/unloading station	1 (2)
	Minimum limited machining time	4.5(10)
MMS	CC1 control system	1
	MMS-5000(Machine status monitoring)	option
	MMS-5100(Remote monitoring service)	option
Number of machine	1 (2)	

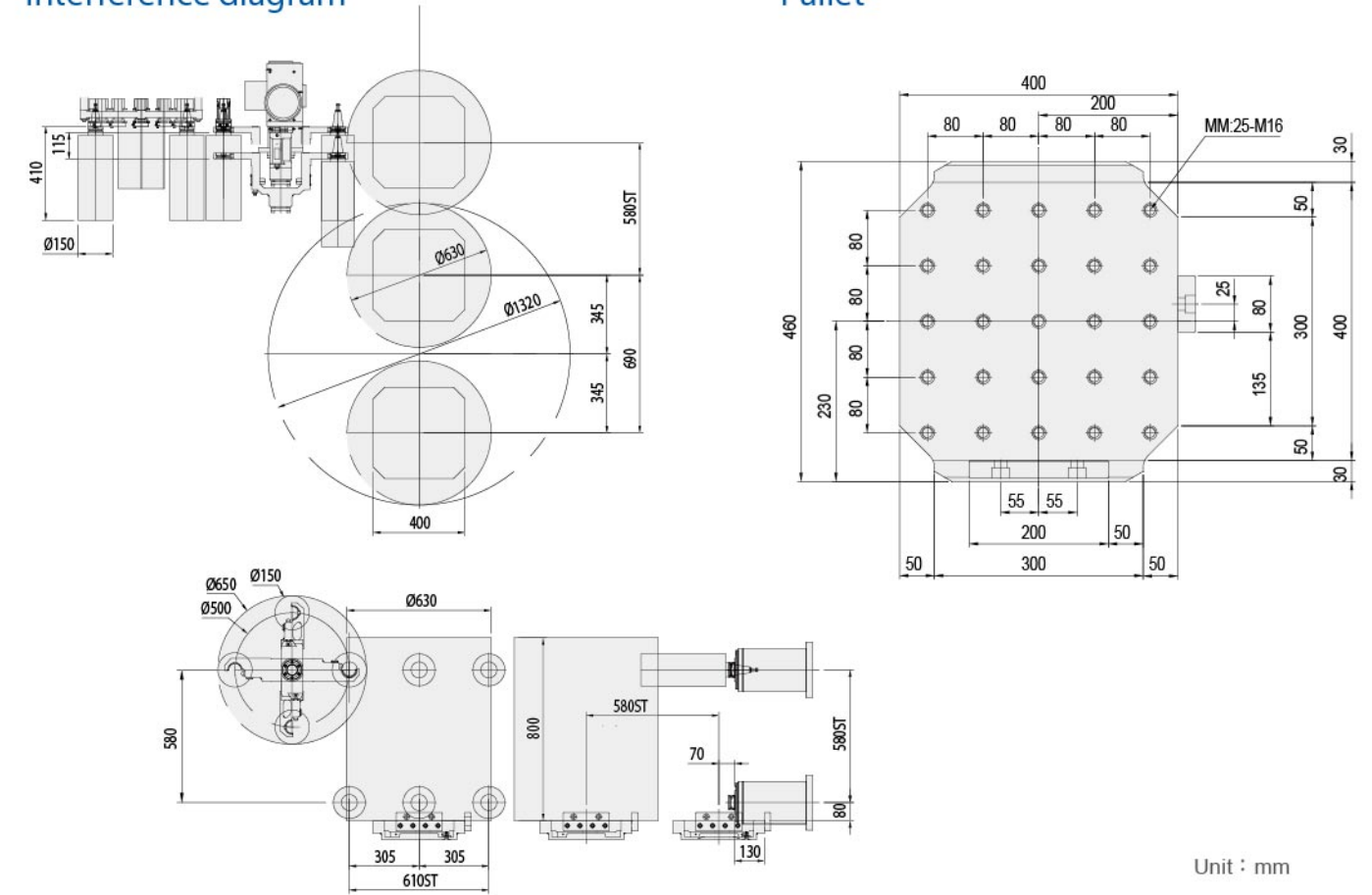


## HA-400II



Solutions	Contents
Product manufacture test	Through the manufacturing progress and fix & fixture plans, Tongtai's skilled staff will manufacture the first piece for understanding the client's corresponding demands.
Machining technologies	By introducing innovative technologies and adding the extra functions, T-TAC is available to provide the brand-new solutions.
Machine technology	Our technical staff will test current problems, which clients have, in the same machine model for processing problem diagnosis and providing possible solutions. Furthermore, our skilled staff is able to provide the services at the client's factory.
Training	T-TAC is open to train current clients, potential customers, agents, teachers/students, and employees and to strengthen their abilities.
Technology exhibits	T-TAC is also an excellent platform to launch new products/technologies by cooperation with software/hardware suppliers. With presentation of highly reliable products/technologies, it's possible to provide higher efficiency and availability solutions than existing ones.

## Pallet



Technical drawings of the machine showing front and side views with dimensions.

**Front View Dimensions:**

- Overall width: 2550
- Internal width (between doors): 2100

**Side View Dimensions:**

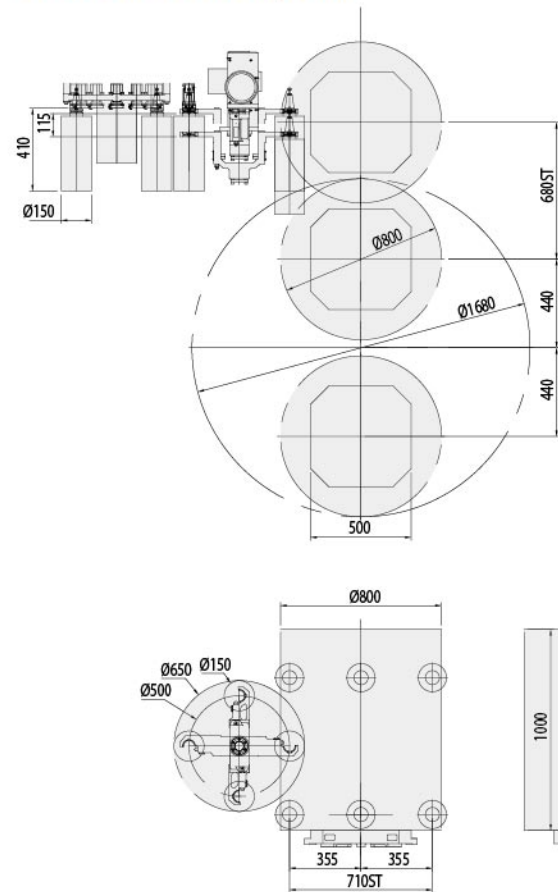
- Overall height: 2878
- Overall depth: 4894
- Depth to main body: 4458

Unit : mm

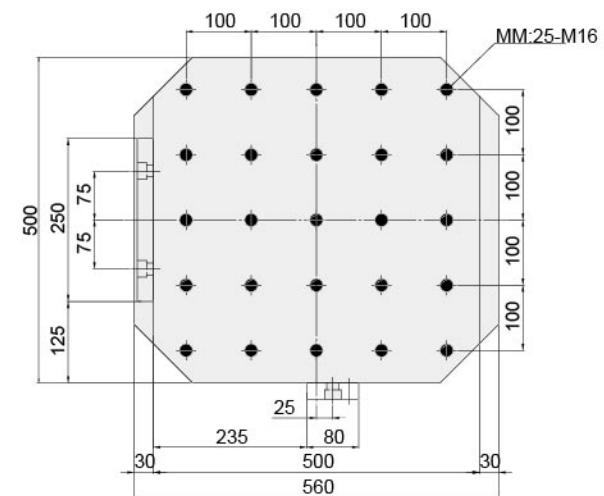


## HA-500II

## Interference diagram

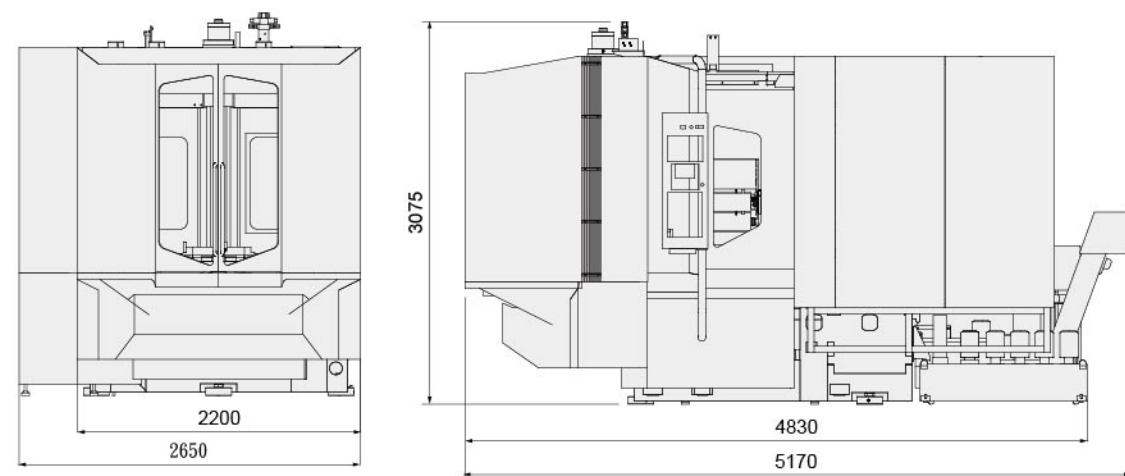


## Pallet



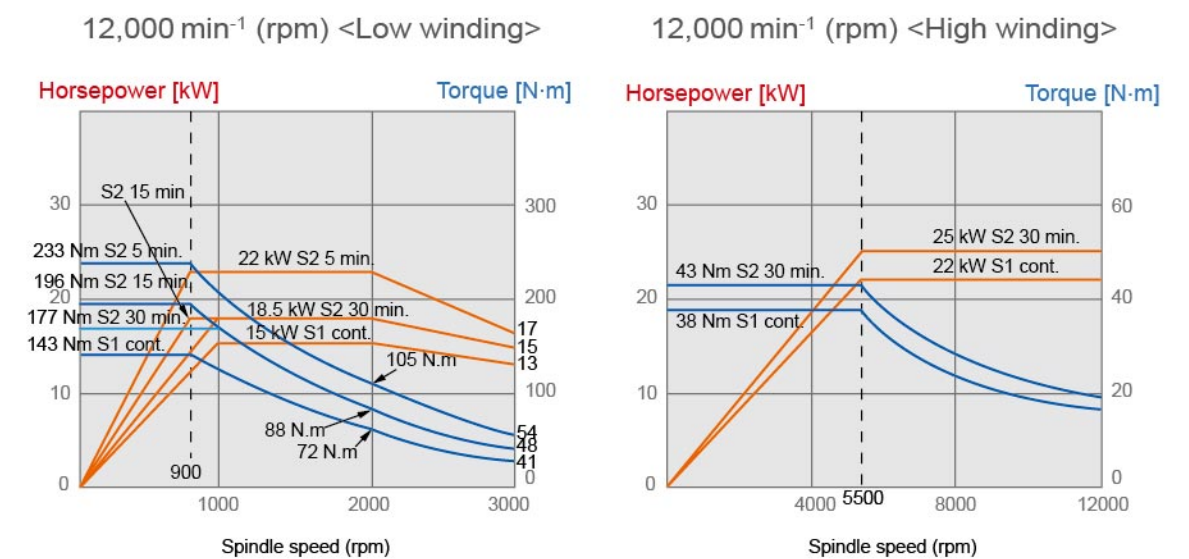
Unit : mm

## Machine dimensions

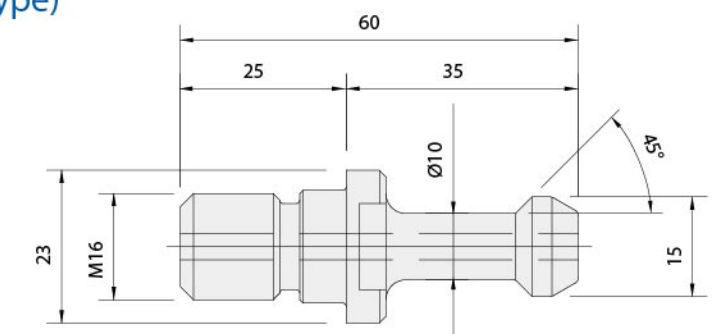


Unit : mm

## Spindle output and torque chart

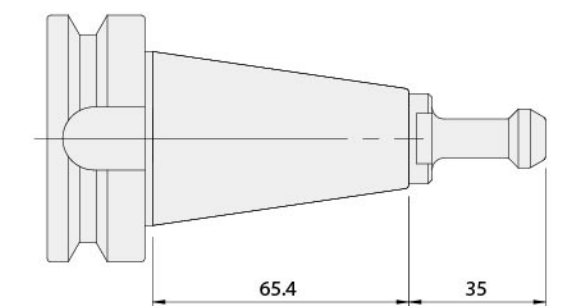


### Pull stud (Coolant through spindle A type)



Unit : mm

Tool shank MAS BT40



Unit : mm



Standard/optional accessories

		Standard	Optional
B axis	Hirth coupling 1° rotary table	●	
	NC 0.001° index table (Rotary encoder in B axis is available)		○
Tool shank	BT40	●	
	HSK-A63		○
	DIN40		○
	CAT40		○
			○
Angle of BT40	MAS407 BTIII(90°)		○
pull stud	MAS407 BTII(60°)		○
	MAS407 BTI(45°)	●	
Coolant through spindle pump	20 bar	●	
	35 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 is 250 bar)		○
	Table type, 6 holes on APC side (Maximum hydraulic pressure is 250 bar)		○
Tool measuring system	Tool breakage detector (Installed on tool magazine side to detect tool breakage)		○
	Retreat Renishaw TS-27R touch sensor (Installed in the interior of the machine for measuring tool length, tool breakage and tool diameter)		○
Other accessories	Renishaw OMP60 workpiece measuring system		○
	Machining air blow		○
	Air gun		○
	Coolant gun		○
	Oil skimmer		○
	Oil mist collector		○

Specifications

Item	Specification	Unit	HA-400II	HA-500II
Travel	X axis	mm	610	710
	Y axis	mm	580	680
	Z axis	mm	580	680
	Spindle nose to table center	mm	70-650	70-750
	Spindle center to table surface	mm	80-660	80-760
	Table height from floor	mm	1,150	1,150
Pallet	Pallet size	mm	400×400	500 x 500
	Max. load	kg	400×2	500 x 2
	Pallet face		M16×25 holes	M16×25 holes
	Min. Indexing increment	degree	1 (0.001° optional)	1 (0.001° optional)
Spindle	Spindle speed	rpm	12,000	12,000
	Spindle shift	step	Two steps by electric	Two steps by electric
	Spindle taper		7/24 Taper No.40	7/24 Taper No.40
	Bearing diameter	mm	75	75
Feed	Rapid traverse	m/min.	60	60
	Cutting feedrate	mm/min.	1-20,000	1-20,000
ATC	Tool shank		BT40	BT40
	Pull stud	degree	90(MAS-P40T)	90(MAS-P40T)
	Tool capacity	pc	60	60
	Max. tool diameter	mm	Ø75	Ø75
	Max. tool diameter (w/o adjacent tool)	mm	Ø150	Ø150
	Max. tool length	mm	410	410
	Max. tool weight	kg	12	12
	Tool selection system		Fixed type	Fixed type
APC	Number of pallets		2	2
	Pallet changing system		Rotary type	Rotary type
Required electricity	Required electricity	kva	45	45
	Required voltage	v	200-220 ±10%	200-220 ±10%
	Current frequency	hz	50 or 60 ±1%	50 or 60 ±1%
	Pneumatic source	mpa	0.5	0.5
	Air supply	liter/min	400	400
Capacity	Hydraulic tank	liter	30	30
	Lubricant tank	liter	2	2
	Coolant tank	liter	550	550
Weight		kg	9,500	12,200