

HB-630

Horizontal Machining Center



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HB-630



High efficiency machining

HB-630 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. The 1,050 Nm high torque gear type spindle is also available on HB-630 for machining cast iron, steel and tough materials. HB-630 is applied mainly in the industries of automobile, construction machinery, agriculture machinery and general parts.

Main Specifications

Spindle	10,000 rpm Build-in spindle
	6,000 rpm High torque spindle with gearbox
Rapid traverse 50 m/min	
X/Y/Z axis travel 1,050/850/970 mm	
X/Y/Z axis acceleration/deceleration 0.36/0.7/0.7 G	
Three axes	X/Y/Z axis LM □65/□55/□55 mm
	High rigidity roller guide way
	X/Y/Z High precision ballscrew Ø50/Ø40/Ø50 mm
	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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Machining ability

Testing data with 10,000 rpm build-in spindle

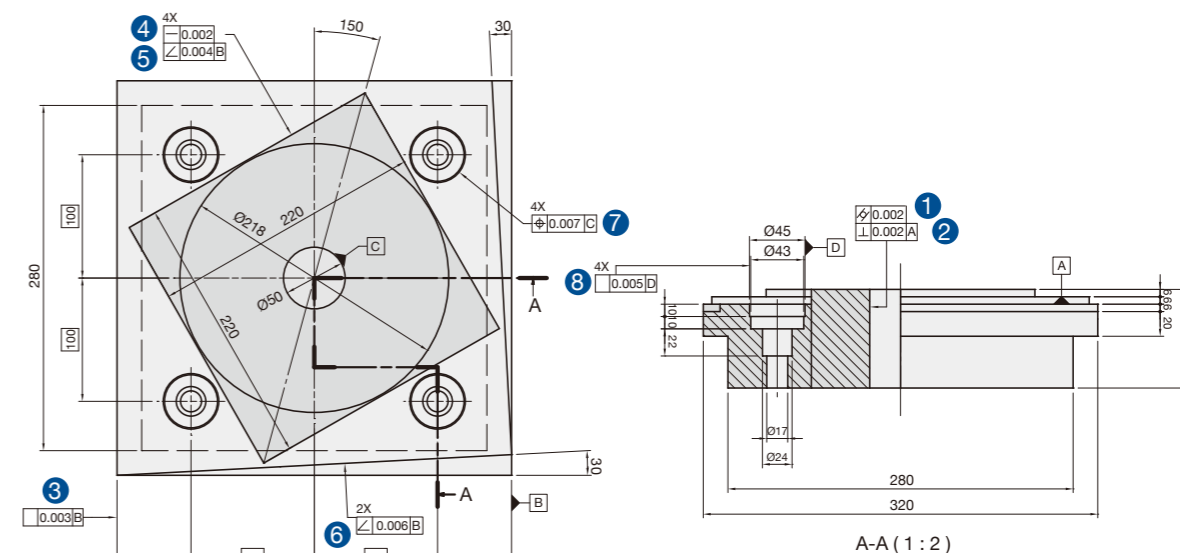


End mill Ø30mm		
Material	S45C	FCD25
Depth/Width	30/15 mm	30/15 mm
Spindle speed	424 rpm	480 rpm
Feed rate	255 mm/min	360 mm/min
Chip removal rate	114 cm ³ /min	143 cm ³ /min



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

Testing accuracy



Test standard : ISO10791-7
Material : A6061

Test items	Test accuracy
① Cylindricity	0.002
② Perpendicularity	0.002
③ Parallelism	0.003
④ Straightness	0.002
⑤ Angular accuracy	0.004
⑥ Angular accuracy	0.006
⑦ Position accuracy	0.007
⑧ Concentricity	0.005

Three axes accuracy

	Test standard : VDI3441	
	Unit : μm	
	Positioning accuracy	Repeatability accuracy
X axis	7.61	1.68
Y axis	7.43	2.38
Z axis	7.53	1.49
	Positioning accuracy with linear scale	Repeatability accuracy with linear scale
X axis	3.79	1.12
Y axis	3.34	1.53
Z axis	3.25	1.05

*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 1,050/850/970 mm

Rapid traverse

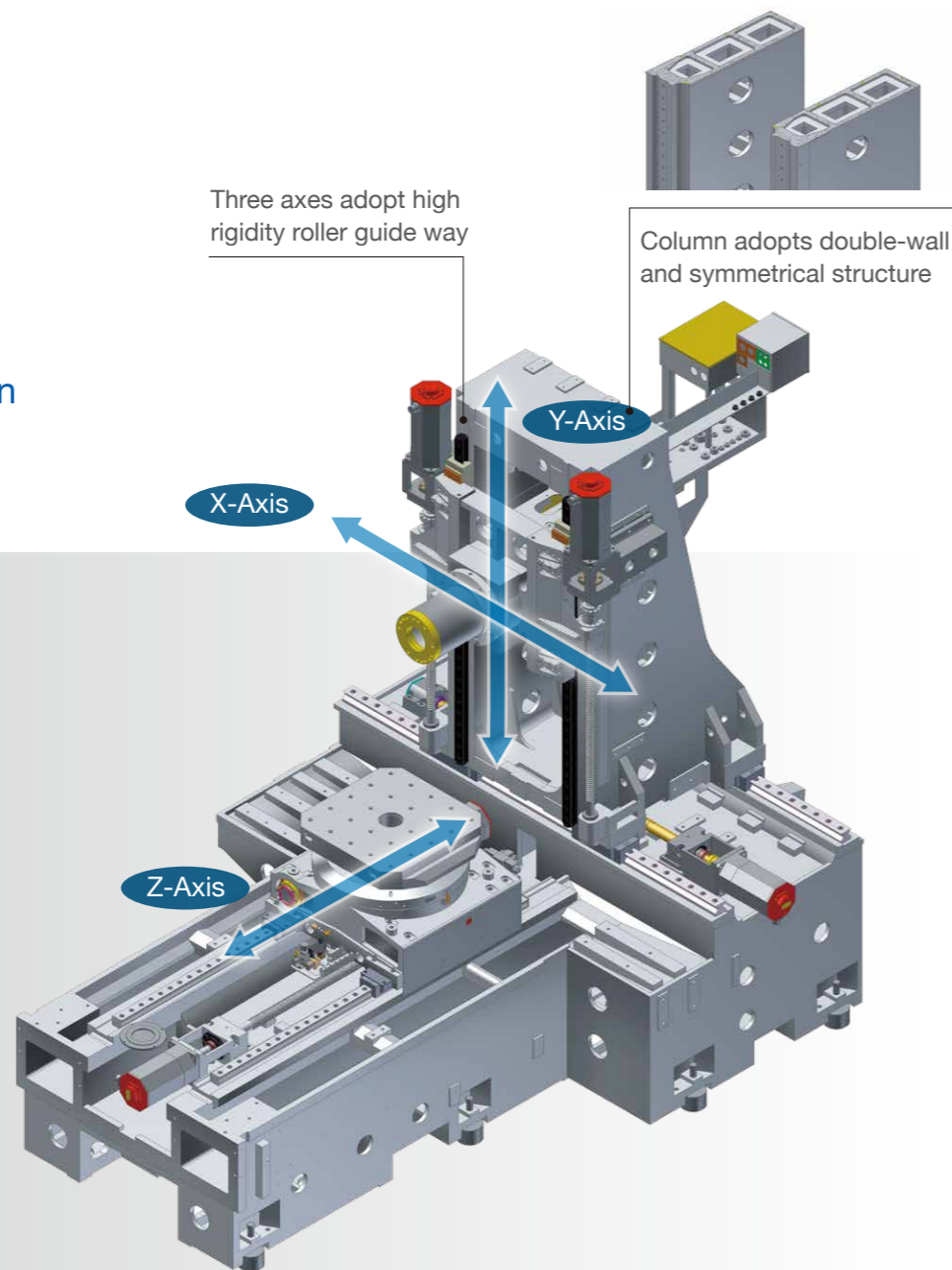
X/Y/Z axis 50 m/min

Acceleration/deceleration

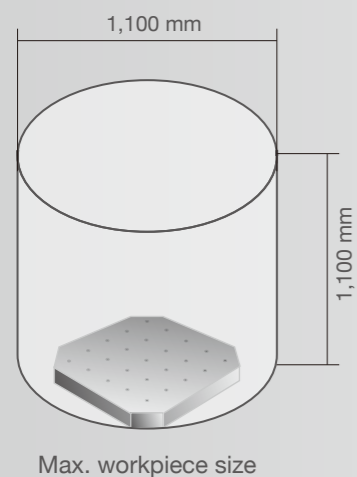
X/Y/Z axis 0.36/0.7/0.7 G

Three axes adopt high rigidity roller guide way

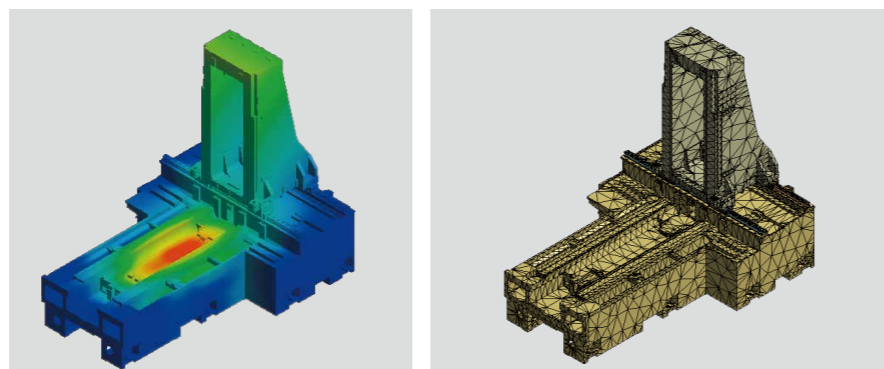
Column adopts double-wall and symmetrical structure



Working area



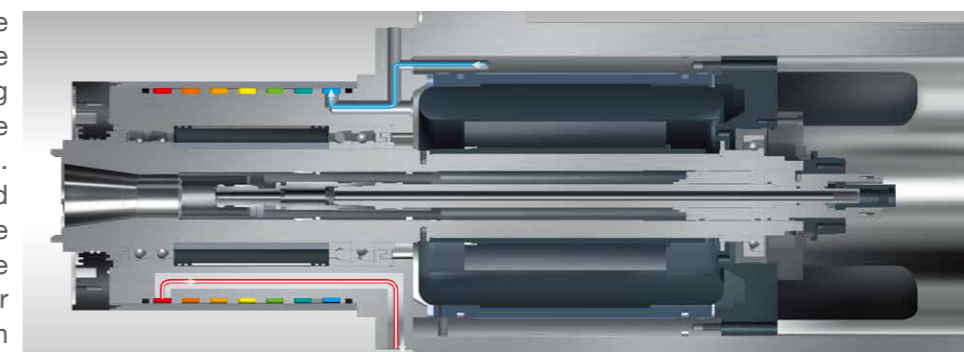
Through the finite element analysis (FEA), structure has high rigidity and stability in high speed motion. The optimized rib distribution of robust T-shape bed and column transfer and absorb vibrations during machining to get an excellent machining surface.



Spindle

Standard 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.



Max. speed 10,000 rpm

Spindle motor 30/25 kW

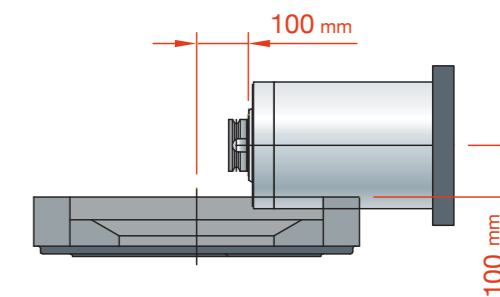
Output torque 420/350/238 Nm

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

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

1.1 sec (0→4,000 rpm)

Min. distance from spindle nose to table center 100 mm
Min. distance from spindle center to table surface 100 mm



High torque spindle with gear box

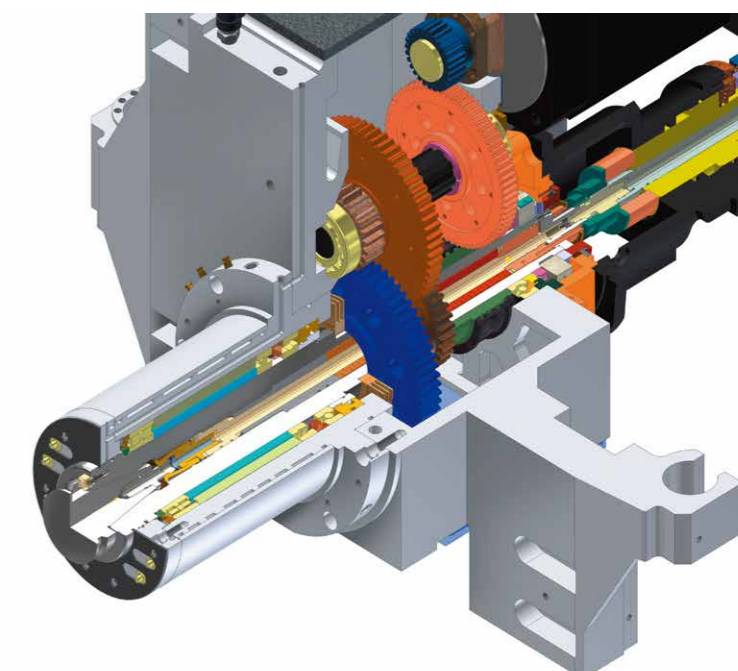
High precision gears are used in spindle to supply high transmission efficiency. The two step gear box can generate more than 1,000 Nm torque at 200 rpm, especially suitable for toughness materials and large tools.

Max. speed 6,000 rpm

Spindle motor 22/18.5 kW

Output torque 1,050/883 Nm

(30 min. S3, 60%/Cont.)



Main structure

B axis rotary table

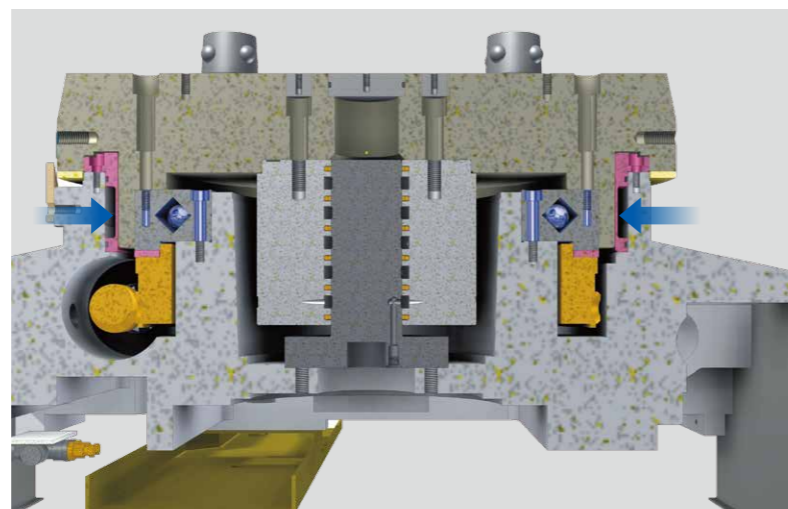
High precision positioning cones with hydraulic locking device, generating 18 tons of clamping force to ensure the table stability during machining.



Max. table load	1,200 kg×2
90° indexing time of 1° rotary table (Standard)	2.4 sec
90° indexing time of 0.001° rotary table (Optional)	1.6 sec
Pallet clamping force	18,000 kgf
Braking torque	528 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.



APC

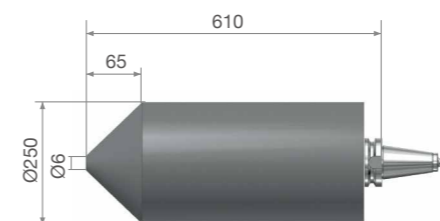
To increase dynamic rigidity, the hydraulic driving mechanism of APC is improved. Additionally, timers of PLC are optimized. Pallet changing time is saved dramatically.

Pallet changing time	
15.5 sec	20 sec (Previous model)



ATC

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



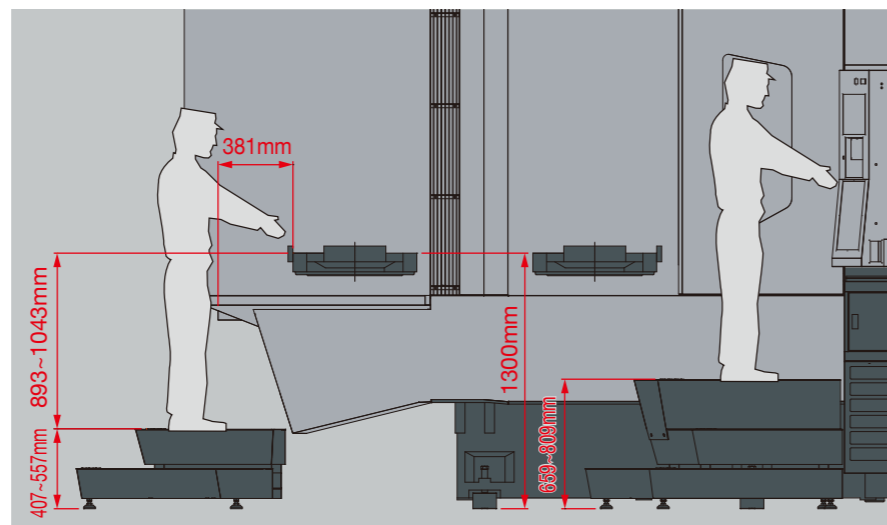
Maximum tool size for automatic tool changing



T to T	2.4 sec
C to C	4.5 sec
Tool capacity	60 pc 90/120 pc optional

Operation

The assisted platform 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.



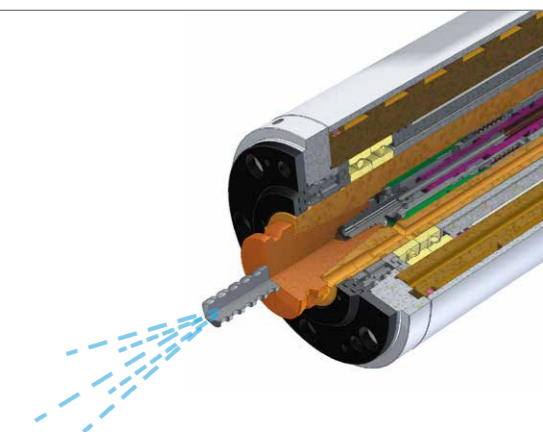
Coolant tank capacity 800 L(80% full)

Coolant Through Spindle

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
(2.0/4.05/7.0 MPa)

Filtering accuracy : 40 μm

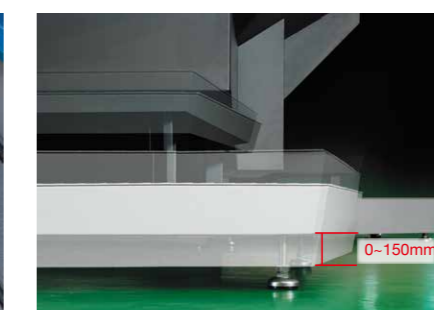


Roof type flushing system (Standard)



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)



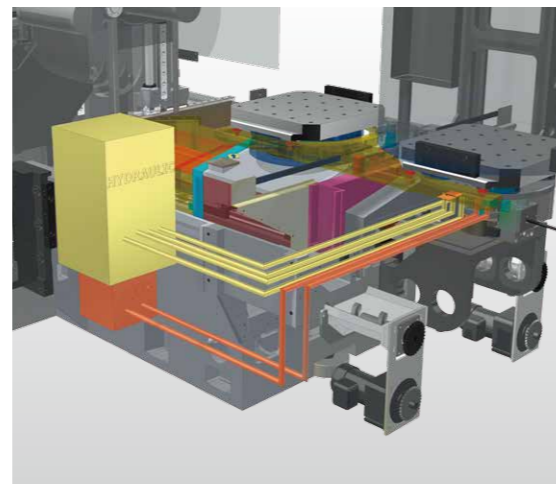
The tool cart is available.

Peripheral accessories

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.

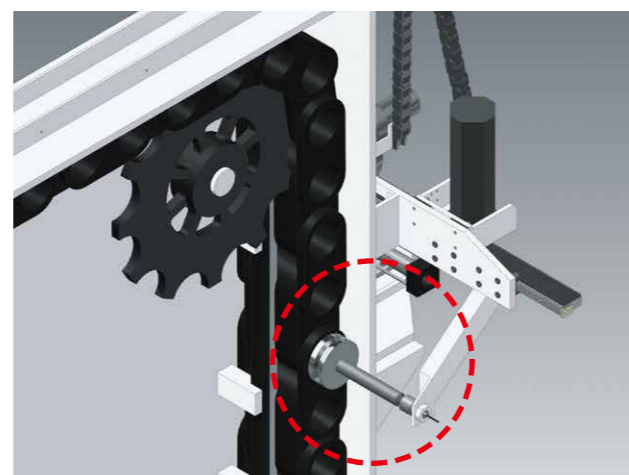
Interior tool measuring device (Optional)

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.



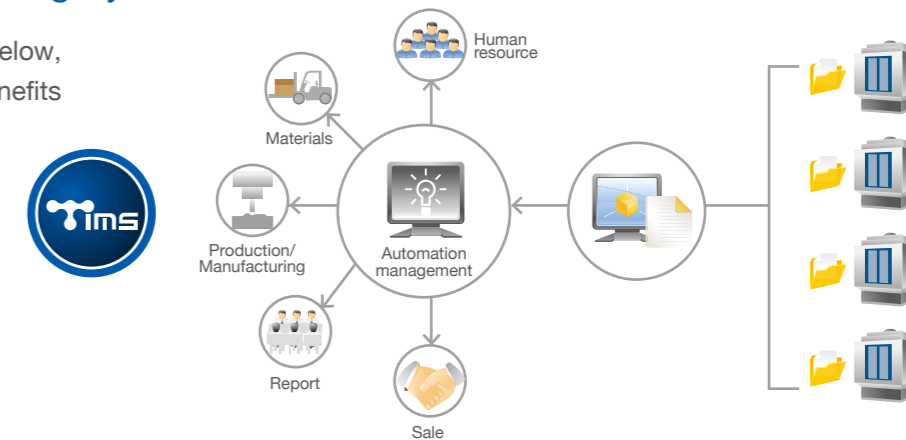
Intelligent system and friendly human-machine interface

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.

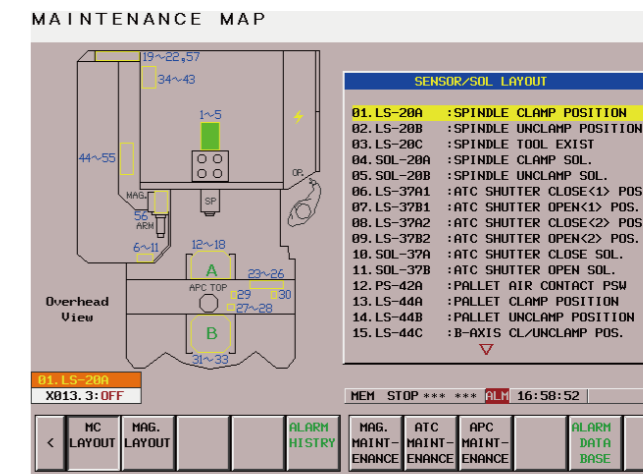
- A. Machine status
- B. Production management
- C. Operation history
- D. Alarm history



Maintenance Map (Standard)

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

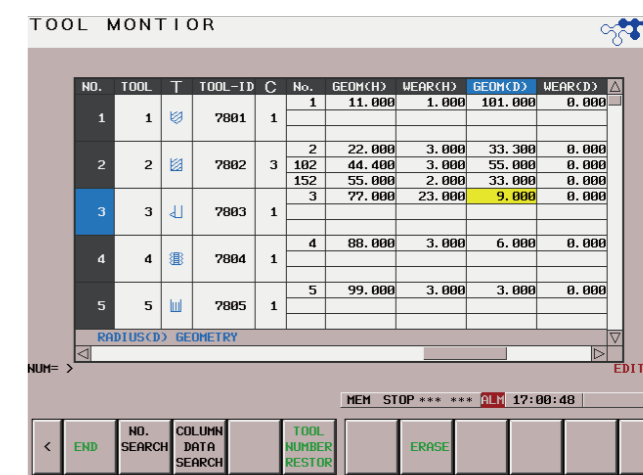
- A. Sensors positions list
- B. Malfunction codes list
- C. Machine in-time malfunction list
- D. Malfunction details description and trouble shooting
- E. Malfunction history record
- F. M code list
- G. Tool number display



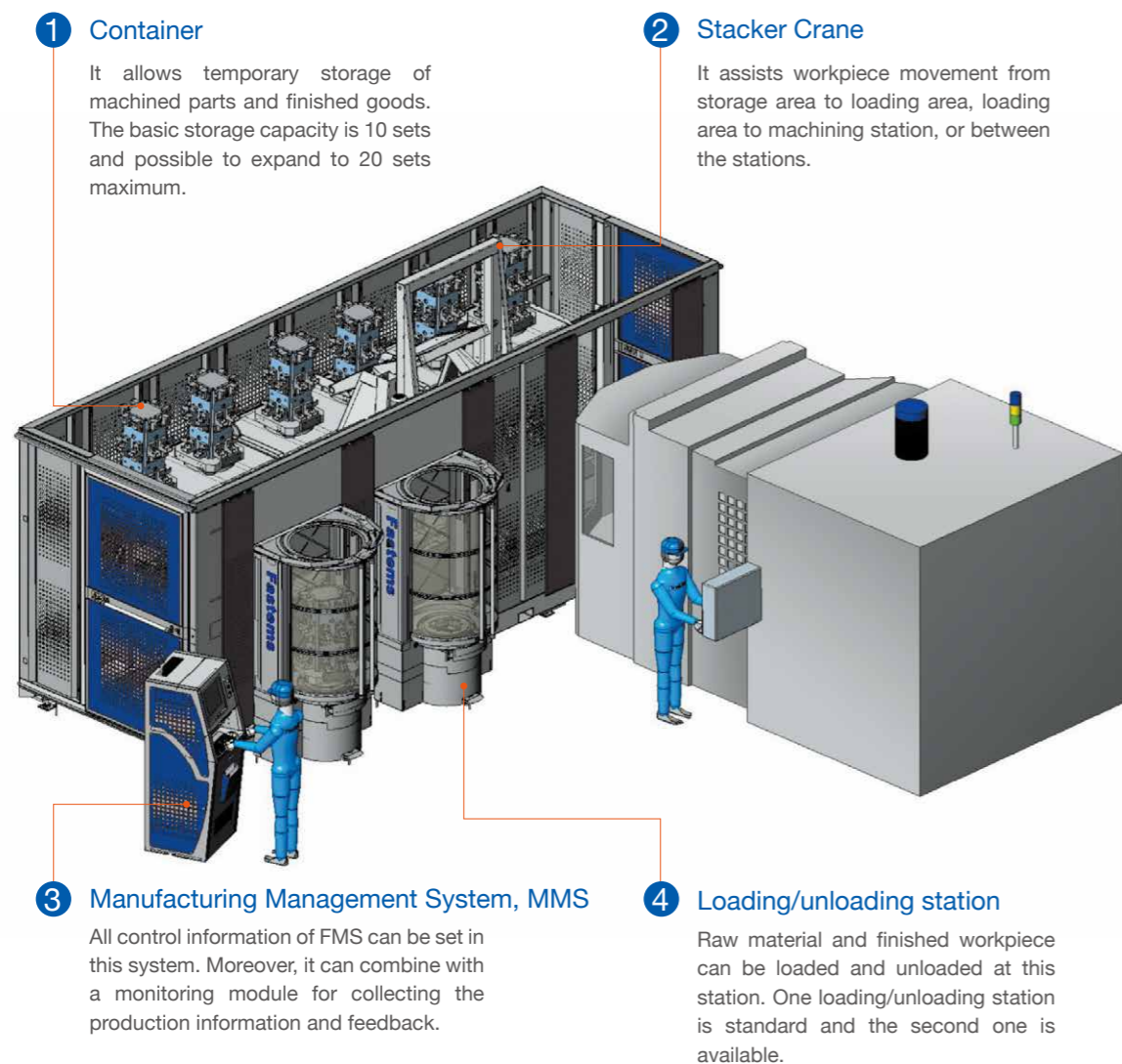
Tool Management (Standard)

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



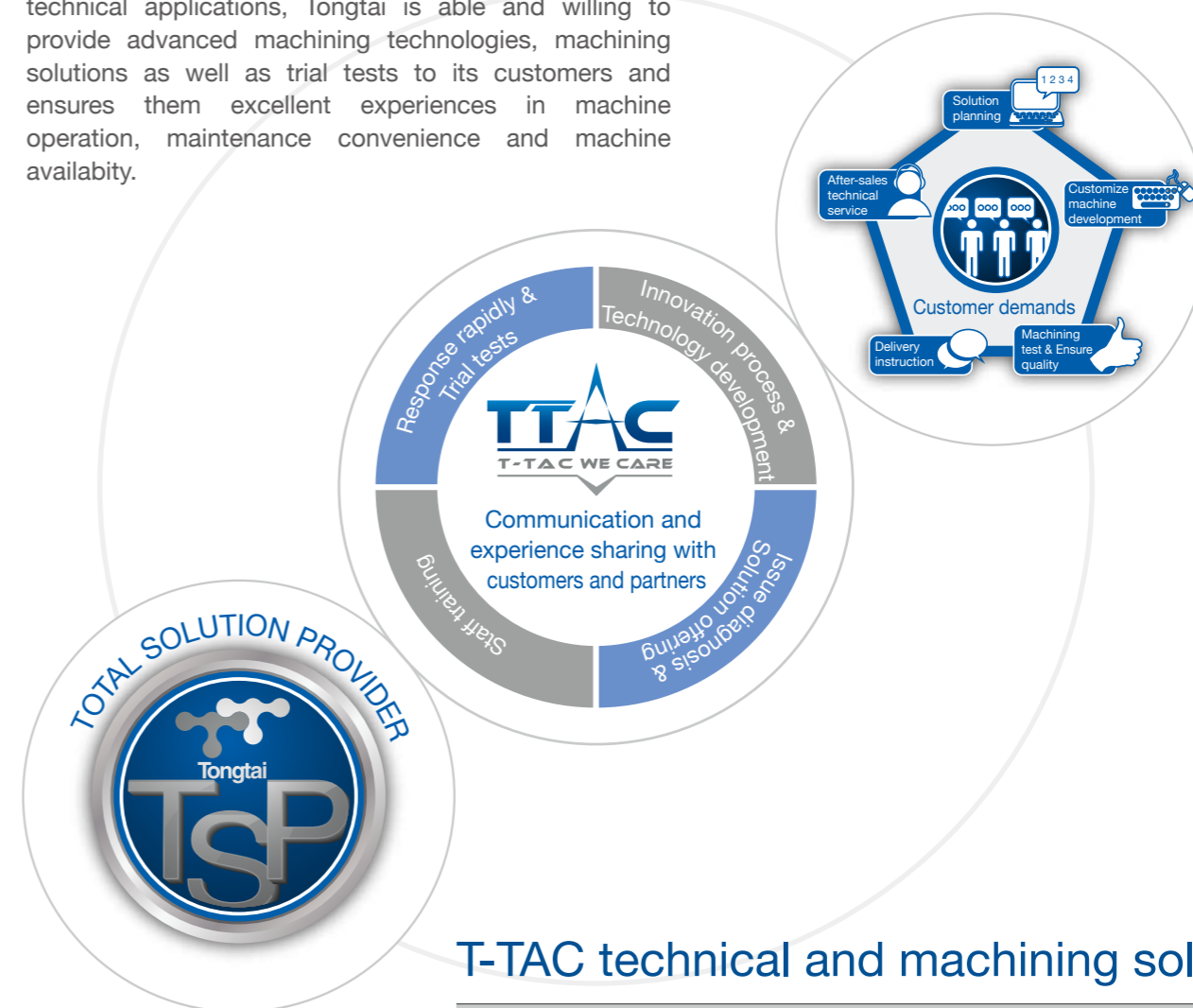
Flexible Manufacturing System, FMS



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)	

Tongtai- Technical Application Center

The purpose of T-TAC is to take care of customer's machining solution actively. Based on the outstanding technical applications, Tongtai is able and willing to provide advanced machining technologies, machining solutions as well as trial tests to its customers and ensures them excellent experiences in machine operation, maintenance convenience and machine availability.

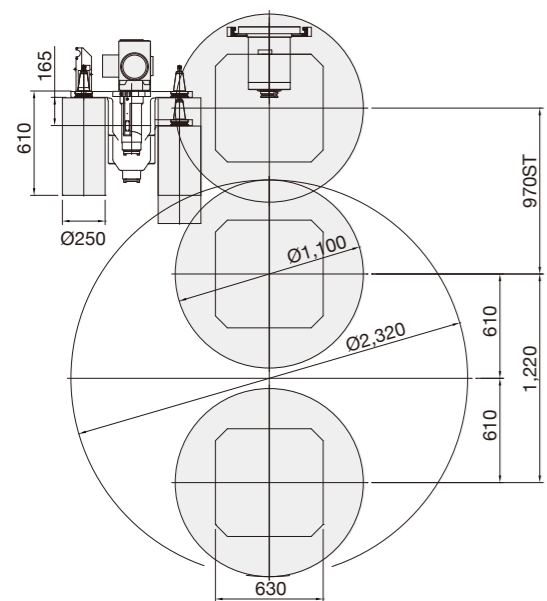


T-TAC technical and machining solutions

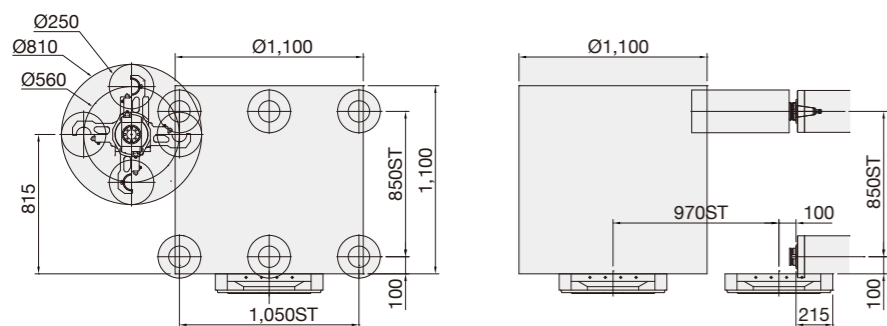
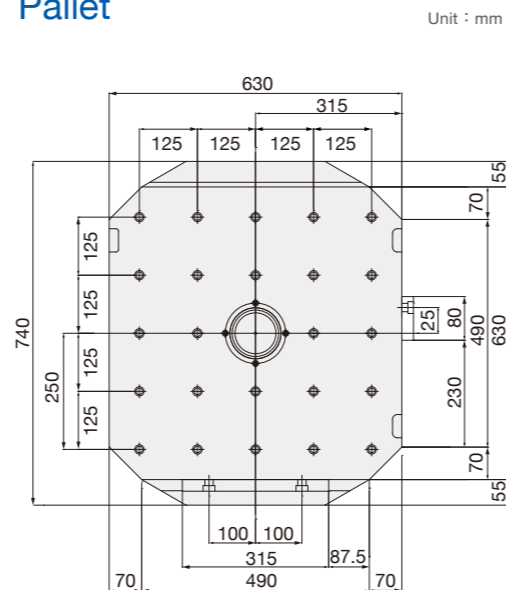
Solutions	Contents
Product manufacture test	Through the manufacturing progress and jig & fixture plans, Tongtai's skilledstaff will manufacture the first piece for understanding the client's corresponding demands.
Machining technologies	By introducing innovative technologies and adding the extra functions, 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.

Interference diagram/Pallet · Machine dimensions

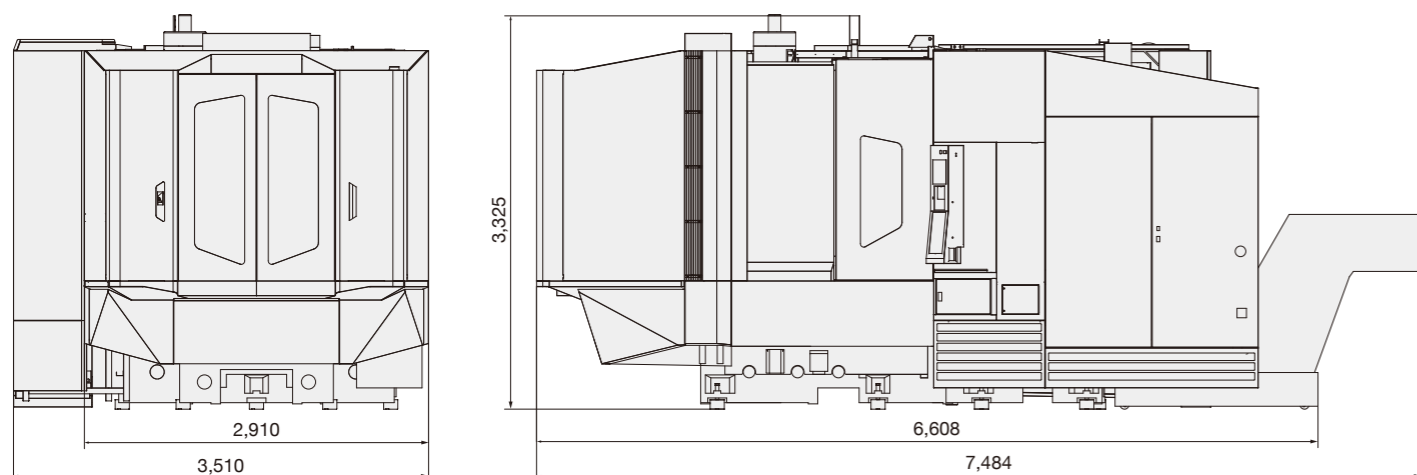
Interference diagram



Pallet

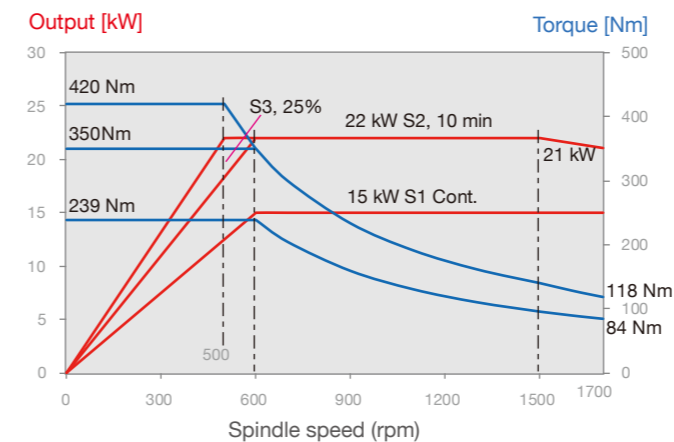


Machine dimensions

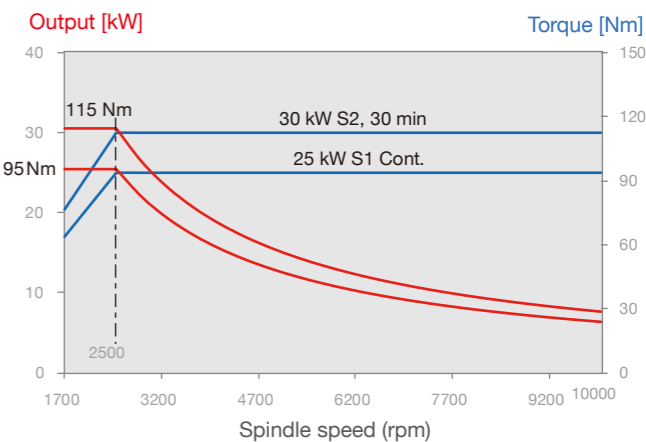


Spindle output and torque chart

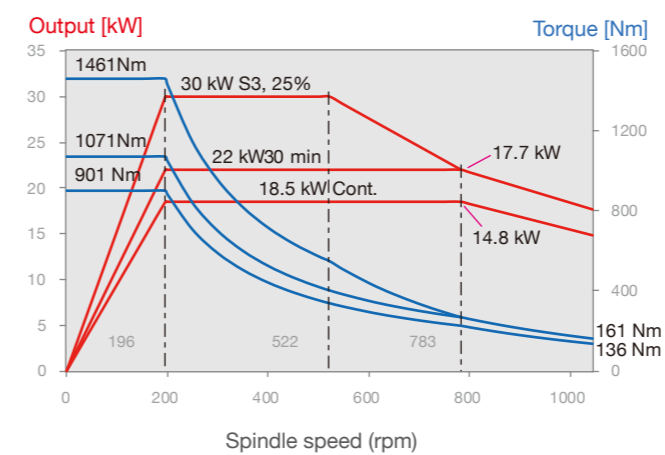
10,000 rpm Build-in spindle (Low-winding)



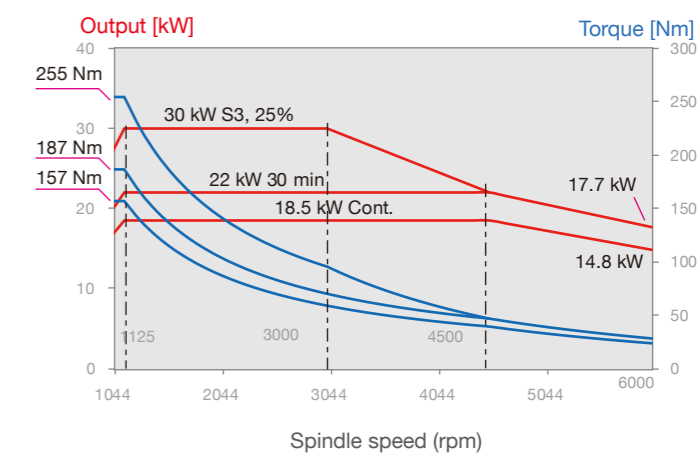
(High-winding)



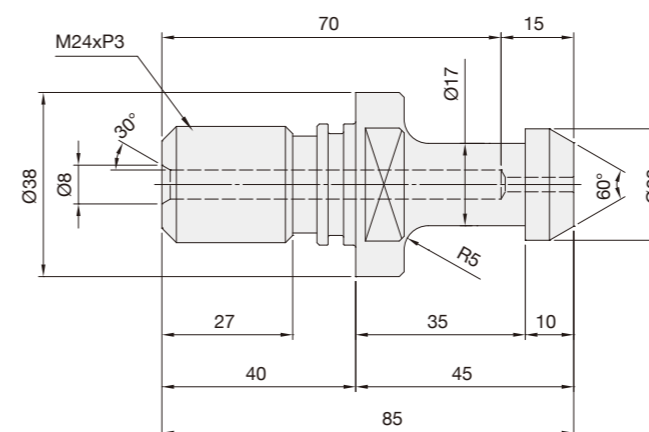
6,000 rpm High torque spindle with gearbox (Low-winding)



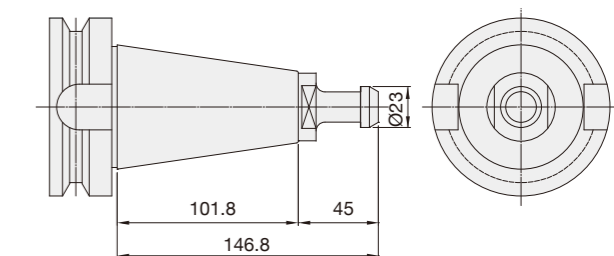
(High-winding)



Pull stud (coolant through spindle A type)



Tool shank MAS BT50



Standard/optional accessories

		Standard	Optional
Spindle	10,000 rpm Build-in spindle	●	
	6,000 rpm High torque spindle with gearbox		○
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	●	
	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 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 31i-M	●	
	FANUC 0i-M		○
Other accessories	Workpiece measuring system		○
	Machining air blow		○
	Air gun		○
	Coolant gun		○
	Oil skimmer		○
	Oil mist collector		○

Specifications

Item	Specification	Unit	HB-630
Travel	X axis	mm	1,050
	Y axis	mm	850
	Z axis	mm	970
	Spindle nose to table center	mm	100-1,070
	Spindle center to table surface	mm	100-950
	Table height from floor	mm	1,300
Pallet	Pallet size	mm	630×630
	Max. load	kg	1,200×2
	Pallet face		M16×25 holes
	Min. Indexing increment	degree	1 (0.001° optional)
Spindle	Spindle speed	rpm	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.	50
	Cutting feedrate	mm/min.	1-20,000
ATC	Tool shank		BT50
	Pull stud	degree	90(MAS-P50T)
	Tool capacity	pc	60
	Max. tool diameter	mm	Ø125
	Max. tool diameter (w/o adjacent tool)	mm	Ø250
	Max. tool length	mm	610
	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	50
	Required voltage	v	200-220 ±10%
	Current frequency	hz	50 or 60 ±1%
	Pneumatic source	mpa	0.5
	Air supply	liter/min	400
Capacity	Hydraulic tank	liter	30
	Lubricant tank	liter	2
	Coolant tank	liter	800
Weight		kg	21,600
Controller	FANUC		31i-M