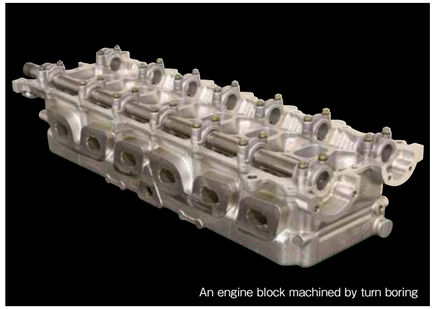
YASDA

YBM 7T & 8T

YASDA PRECISION CENTER

Thermal Distortion Stabilizing System
High-performance Spindle with Preload Self-adjusting System
Twin screw Drive System



An engine block machined by turn boring

The YASDA PRECISION CENTERS are highly acclaimed by the users all over the world for its high precision turn boring performance.

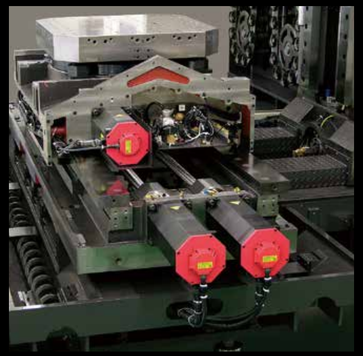
Example: Prototype formula one engine block
Coaxiality: <0.008mm / 600mm

Outstanding main features

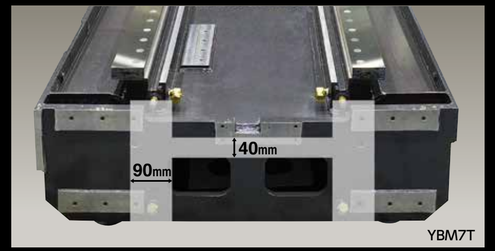
- High speed and high precision positioning with hybrid box guide ways
  Rapid traverse:
  48m/min. on X/Y/Z axis (YBM7T)
  48m/min. on Y/Z axis, 45m/min. on X axis (YBM8T)
- Thermal distortion stabilizing systems:
  YASDA's countermeasures reduce thermal influence and maintain high rigidity and high precision, for continuous high-speed-machining.
- High performance spindle with pre-load self-adjusting system:
  YASDA's unsurpassed spindle technology realizes high precision and high quality machining through the entire speed range.

HIGHLY RIGID CONSTRUCTION

Y-axis twin ball screws



X-axis twin ball screws (YBM8T)



Highly rigid "H configuration"

Column in the double housing structure

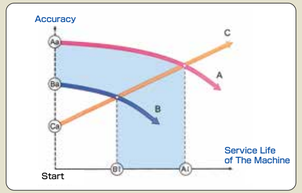
Box guide ways

48m/min high speed and high precision positioning — Rigid construction and unsurpassed accuracy

■Twin ball screws

Rigid construction with YASDA's traditional box-guideways further increases high-speed and high-precision feed, driven by large diameter twin ball screws.
YBM7T: Y axis with twin ball screws
YBM8T: X and Y axis with twin ball screws
Ball screw: dia. : XY: 50mm, Z: 55mm

Information clip



Why?

Built for a long-term profitability

● Graph explanation

1.Line A: Machine of high accuracy and a long life
Line B: Machine of standard accuracy and a short life
2.Line C: Increasing demand for higher precision parts
3.The cross point of Line C and Line A or B:
Life end of machine accuracy

YASDA's long-lasting accuracy meets increasing demands for higher precision machining and brings greater productivity and profit.

Rigid construction for high speed and high precision machining

■Bed

A simple construction of highly rigid solid steel plate forms the H-configuration bed, allowing equal thermal heat capacity at any point, eliminating any thermal distortion due to fluctuating room temperature changes, maintaining a very high level of accuracy and thermal stability.

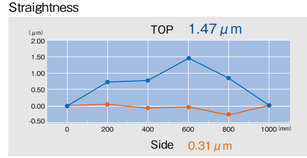
■Column

The double walls reinforced with evenly distributed ribs form the massive cast iron extremely rigid column with superior thermal stability, for constant high-precision machining.

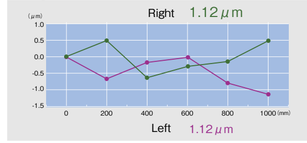
■Hybrid guide ways

YASDA's hybrid guide ways are the combination of box guide ways and linear roller bearing packs. The box guide ways, made of tool steel HRC60 through-hardened and precision ground, and then hand-lapped are precisely bolted onto the hand-scraped mounting surfaces, eliminating micro-vibrations which are typical in roller guide ways, YASDA's hybrid guide ways provide superior damping qualities assuring longer tool life, lower running costs, and higher productivity.

Straightness



Rollingerror



YASDA PRECISION CENTER

YBM 7T

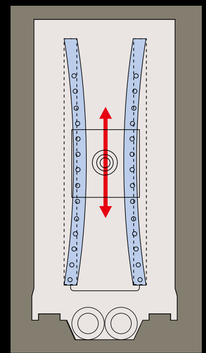
YASDA PRECISION CENTER

YBM 8T

SPINDLE direct drive spindle with preload self-adjusting system

プリロード自己調整型スピンドル

①



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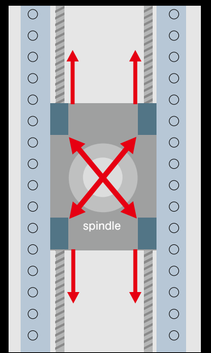
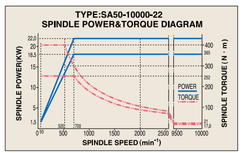


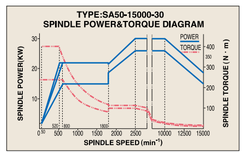
Roller bearing pack

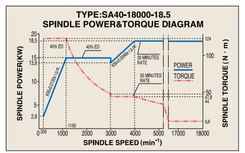
Spindle assembly room (Clean room)

SA type spindle — YASDA's unrivalled spindle technology

YASDA's exclusive preload self-adjusting system technology. The preload of the spindle bearings is automatically adjusted to give more preload at low speeds and less preload at higher speeds. This advanced mechanism gives excellent cutting performance on a wide range of applications and cutting conditions, including heavy-duty cutting, high speed machining, and the milling of hardened steel.







Direct drive system

The spindle motor is connected co-axially with the spindle by means of a diaphragm coupling, absorbing heat and vibration from the spindle motor allowing high precision rotation of the spindle in a full range of speeds to achieve highly accurate machined surface finish. Exchange of the spindle cartridge can be easily done.

BORING TEST

Circularity : 0.0005mm

CIRCULAR CUTTING TEST

Circularity : 0.0020mm

Centrally positioned spindle head — Higher positioning accuracy

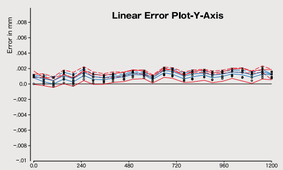
The spindle head is positioned in the center of the Y-axis guide ways and twin ball screws, and the guide ways are mounted in a concave form on the column, this gives the same preload amount to all four roller bearings packs along the full Y-axis stroke.
With this design yawing of the spindle head is eleminated and super accurate positioning is achieved.

Positioning Accuracy

ISO 230/2(1988)	X	Y	Z unit:mm
YBM7T/A(Positioning Uncertain)	0.0029	0.0037	0.0032
YBM8T/A(Positioning Uncertain)	0.0032	0.0033	0.0034

ISO 230/2(2014)	X	Y	Z unit:mm
YBM7T/A(Positioning Uncertain)	0.0023	0.0030	0.0027
YBM8T/A(Positioning Uncertain)	0.0026	0.0026	0.0031

ISO 230/2(2014)	X	Y	Z unit:mm
YBM7T/R(Repeatability)	0.0013	0.0009	0.0011
YBM8T/R(Repeatability)	0.0010	0.0007	0.0008



TABLE／PALLET & PALLET CHUCKING SYSTEM

Large size curvic coupling (AP type)

Large size worm gear (RP type)

Hand scraping on the master jig plate

Pallet with curvic coupling

Pallet chucking system

Table indexing and pallet

120mm thick high quality cast iron pallet is machined and then hand-scraped to achieve micron accuracy clamped always on the master curvic coupling. A spare pallet is produced in the same accuracy as the original pallets.
The flat bottom of the pallet makes it ideal for integration for automatic handling, FMS, or warehouse system.

■Table indexing type

AP type (1° indexing table)

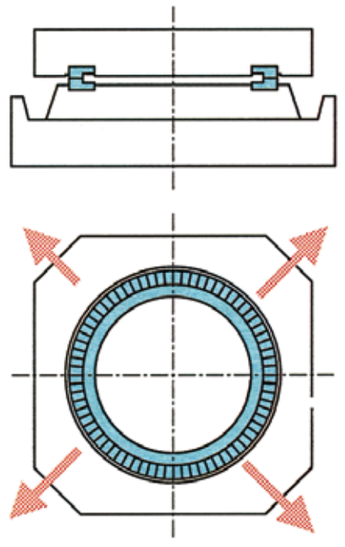
1° indexing with extremely high repeatability is achieved with a large diameter curvic coupling with 360 teeth.

RP type (NC rotary table)

NC rotary table is driven by a large diameter worm gear and positioned by a rotary encoder.
Guaranteed indexing accuracy: ±1.8sec.
Table rotation is guided by high precision roller bearings with a mechanical clamping system. For this, heavy duty milling or boring operation is also performed without problem.

Pallet chucking mechanism — Unsurpassed repeatability and rigidity

A large diameter curvic coupling with 72 teeth with a 30 degree engaging angle ensures the pallet is firmly clamped eliminating back-lash, and ensuring the pallet center and the repeatability of the pallet is accurately maintained with the changes in temperature on the pallet surface.
Unsurpassed pallet changing repeatability and chucking rigidity is assured for a long period.
Curvic coupling diameter : 600mm for YBM8T
350mm/450mm(option) for YBM7T

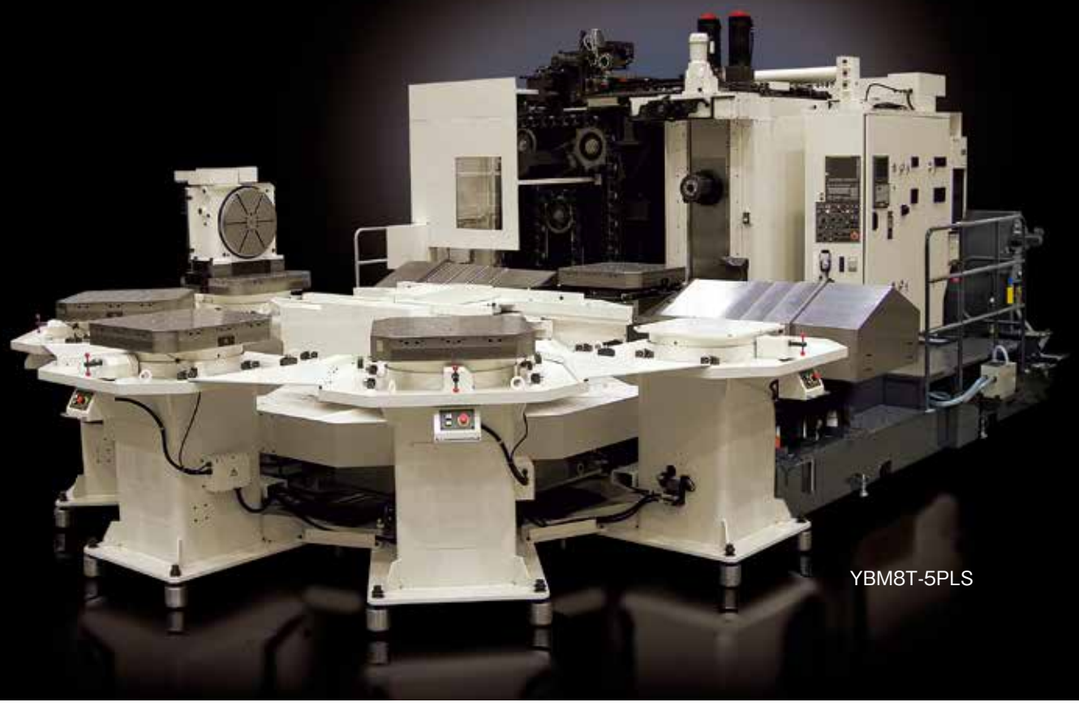


Pallet changing repeatability

Number of repeating	Pallet		
	X Direction	Y Direction	Z Direction
1	0	0	0
2	0.0001	-0.0002	0
3	0.0003	-0.0001	0
4	0.0003	0	0
5	0.0002	0	-0.0001
6	0.0003	0	-0.0002
7	0.0004	0	-0.0002
8	0.0003	0	-0.0002
9	0.0003	0.0001	-0.0003
10	0.0002	0	-0.0002

(mm)

PC & PLS TYPE pallet changer type preload stand type



YBM8T-5PLS

Pallet changing systems: PC type or PLS type

Standard PC type with 2 pallets or PLS (Preload stands) provides flexibility to meet various production needs.

YBM7T : 2 up to 5 PLS + 1 L/U station or 2 up to 6 PLS

YBM8T : 2 up to 6 PLS

YASDA machining centers intergrated into FMS systems have a very high reputation for high production and reliability.

■Automatic tool stocker

YBM7T and YBM8T are equipped with 60-tools single magazine. A single magazine for 90 or 120 tools is also available as an option.
A large capacity tool magazine for fully automated production or permanent tool storage is selectable from multiple combinations of 60 or 90-tools.
Expandable up to a maximum of 450 tools. A foot pedal is available to make manually loading/unloading easy for heavy tools.

ATC automatic tool changer

Automatic tool changer

Tool holder cleaning device

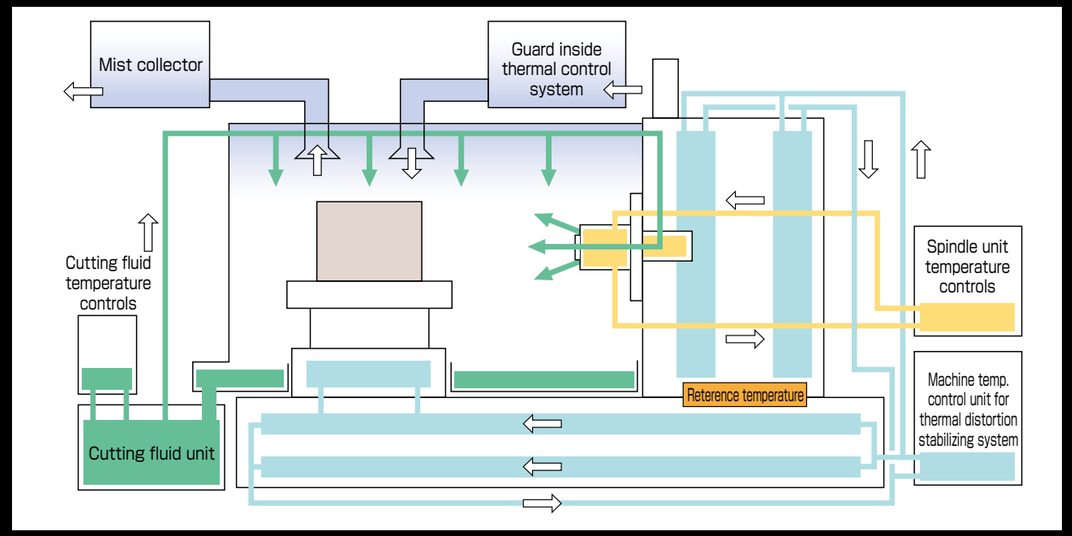
■Automatic tool changer for heavy tools

Standard tool length and weight: 440mm, 20kg
Option : YBM7T : 500mm
YBM8T : 600mm (only in the first magazine of multiple-type tool magazine), 30kg

■Tool holder cleaning device with brush and blower

Tool holder chucking accuracy in the spindle is important for high precision machining and long life of tool holder and the spindle. A tool cleaning station with rotating brush and air blow cleans the tool holder taper before placing into the tool magazine.

ACCURACY RETENTION SYSTEM



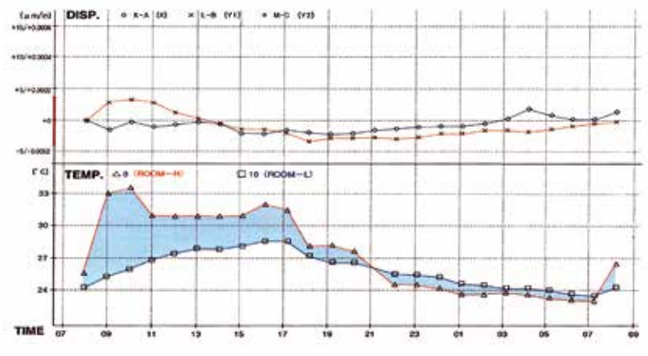
Machine temperature control system

Advanced protection systems against thermal deformation (Option)

Machine geometric accuracy is largely affected by temperature changes in machines and factory environments. Coolant oil, cutting chips and the spindle motor are large heat-generating factors in any machines. Temperature changes from morning to evening, temperature difference between lower and upper level and radiant heat from ceiling or walls are other factors in factories. YASDA provides several protection systems, in order to achieve constant high accurate machining, keeping thermal influence on the machines to a minimum.

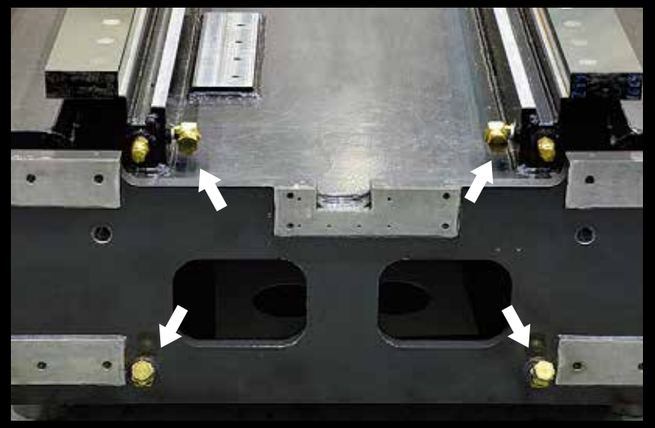
■Thermal distortion stabilizing system (option)

By YASDA's thermal distortion stabilizing system temperature-controlled oil is circulated in the machine bed, column and table bed. Circulating oil is constantly monitored and controlled at ±0.2℃ from reference temperature through a sensor in the machine bed. This unique system minimizes rapid machine distortion through temperature changes in the machine environment, maintaining high constant machining accuracy over long operating hours.



Room temperature and geometrical accuracy under the system in operation

THERMAL DISTORTION STABILIZING SYSTEM



Cooling system of the bed

Cooling system of the ball screw bracket

Type of coolant discharge pressures for YBM7T / 8T

Pumping pressure \ Type	Flat nozzle type	Oil hole through type	Center through type	Flange through type
6.0MPa	—	—	20／24L／min	20／24L／min
3.5MPa	—	—	25／30L／min	25／30L／min
2.0MPa	—	—	25／30L／min	25／30L／min
0.3MPa	40L／min	20L／min	—	—

Controlling thermal sources in machine

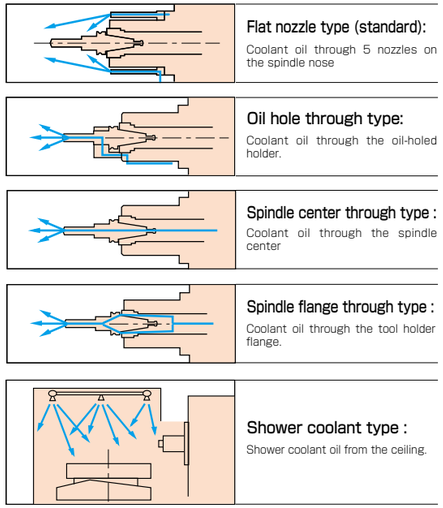
■Cooling system for spindle motor and spindle

The biggest thermal source in the machine body is a spindle motor and a spindle, which deform the spindle iteself and the column. YASDA employs the jacket cooling system by temperature controlled oil (±0.2℃) in the spindle motor and the spindle housing. The system prevents deformation of the spindle and the machine body, and assures constant high precision machining.

■Cooling system for ball screw brackets

Thermal transmission from the ball screws support bearings deforms the machine body and interferes with high positioning accuracy. YASDA employs jacket-oil cooling system in the ball screw brackets by ±0.2℃ temperature-controlled oil maintaining a constant high positioning accuracy.

■Coolant systems



Refer to the above chart for discharge pressures.

OpeNe Version2.0 serves as an intermediary between human and machine

Easier User Interface

Operation and functionality are improved by new FANUC IHMI

Touch-panel type 15-Inch display mounted with FANUC IHMI

A large-sized display with touch panel and the OpeNeVersion 2.0 provides intuitive operation.
The manual viewer makes the FANUC instruction manual and machine user manual appear on the display.

HAS-4 realizes higher speed and higher precision machining

YASDA's high-precision machining function HAS-4, essential for machining molds, has 5 basic modes (M300 to M304) including rough machining and finish machining.
It is possible to reduce machining time and improve machining accuracy by changing parameters such as acceleration/deceleration and tolerance according to machining purpose.
On the machining assist screen, it is possible to select from 5 basic machining modes and to finely adjust machining parameters for each mode according to machining conditions. It is also possible to select smoothing and other functions on the screen, thus allowing optimal conditions to be established according to each type at machining including 3D-shaped mold machining and 5-axis machining.
For HAS-4, machining time is reduced by eliminating the stop time between blocks and surface quality is improved by more finely controlling servo-control feedback signals.

Each function of OpeNe Version 2.0 provides the operator with complete details of the machine.

Tool Information Management

On this screen, not only basic tool information but also associated tool information such as machining load and measurement history are collectively managed.
It is also possible to monitor spindle load in real time in comparison with past record data and check changes in same tool length and diameter.
It is also possible to set a tool selected on the screen into the spindle {tool change} and tool measurement operation in interactive mode from the screen without program instructions.

Production Control

On this screen, not only machine running information but also mechanical information such as load on each axis while running, workpiece coordinates and tool compensation values are displayed. It is possible, in case of machining failure, to carry out a follow-up check because various types of mechanical information are displayed on the same time axis as that of program progress graph. It is also possible to graphically display actual machine running status on a daily, weekly and monthly basis. Machine running status data can be utilized in Excel format.

Maintenance Management

On this screen, various data such as number of operations and running status of peripherals are automatically acquired and saved. Use of acquired data allows for planned and efficient maintenance and predictive maintenance on equipment. A check it current machine status is appropriate or not is carried out automatically by acquiring servo wave data and comparing it with past data.

Work Management

The Work Management Function is an application for scheduling automated machining using AWC and APC. Cutting program can be registered to each workpiece and machining order can be flexibly scheduled on this application.
This application helps increase production efficiency by the judgement function for judging whether each cutting program can be executed or not, machining time simulation function for calculating the total machining time of the whole process, etc.

SPECIFICATIONS

＊Specifications are subject to alteration or change without notice and obligation on the part of the manufacturer.

1. Base machine specifications		YBM7T	YBM8T
1) Travel	X-axis travel	950mm	1,300mm
	Y-axis travel	800mm	1,000mm
	Z-axis travel	800mm	1,100mm
	Table surface to spindle center diatance	70～870mm	0～1,000mm
	Table center to spindle nose distance	150～950mm	200～1,300mm
2) Table(Pallet)	Pallet working size	630×630mm	800×800mm
	Pallet surface configuration	48-M16 tapped holes	77-M16 tapped holes
	Loading capacity	1,200kg	3,000kg
	Min. table indexing angle	1deg.	1deg.
	Max.swing diameter of the workpiece	Φ1,000mm	Φ1,300mm
	Max.workpiece size on the pallet	Φ1,000mm (with limitation)	Φ1,300mm
	Max. height of the workpiece	950mm	1,100mm
3) Spindle	Spindle type	SA50-10000-22 Preload self-adusting spindle	
	Spindle speed range	50～10,000min^{-1}	
	Spindle drive motor	AC18.5kW/22kW (Continuous/30min)	
	Spindle taper hole	MAS BT50	
	Spindle bearing inner diameter	Φ100mm	
	Spindle nose surface	BIG plus spindle	
4) Feed rate	Rapid feed	(X-,Y-,Z-axis) Max.48,000mm/min	(X-axis) Max.45,000mm/min (Y-,Z-axis) Max.48,000mm/min
	Cutting feed	(X-,Y-,Z-axis) Max.15,000mm/min	
	Min.input increment	0.0001mm	
5) ATC	Tool shank type	MAS BT50	
	Pull stud type	MAS403 P50T-1	
	Tool storage capacity	60tools	
	Max. tool dia./length/mass	Φ360mm(with limitation)/440mm/20kg	
	Max.tool diameter in full setting	Φ120mm	
	Tool selection system	Shortcut random selection	
6)Automatic pallet changer(APC)	Method of pallet change	Direct turn	Rotary shuttle
	Number of pallets	2pallets	
	Set-up station	1station	
	Automatic program search		
7) Pallet chucking device		Φ350mm	Φ600mm
8) Mass of machine (without ATC magazine)		Approx.18,000kg	Approx.24,000kg
9) Electric power capacity		Max.76kVA	Max.82kVA
10) NC unit		FANUC 31i-B5	

2. Standard equipments		YBM7T	YBM8T
1) Optical scale feed back		X-,Y-,Z-axis 0.0001mm command available	
2) Hydraulic unit	Pump discharge pressure/Oil reservoir	7MPa/30L	
3) Oil cooling system for spindle head, spindle motor and ball screw brackets			
4) Coolant unit	AA type	5 built-in nozzles	
	Pump discharge	0.3MPa, 40L/min	
	Tank capacity	1,000L	1,400L
5) Splash guard		"Manual slide door with celling cover 1 LED light"	"Manual slide door with celling cover 2 LED lights"
6) Chip conveyor		Screw conveyor (inside the machine) + scraper chip conveyor with separator (outside the machine)	
7) Guide way protector			
8) Automatic power breaker			
9) 3-layer signal light		Red,yellow,green (Flashing)	
10) OpeNe Version2.0			

3. CNC standard options	
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) Memory card/USB memory interface	Data input/output

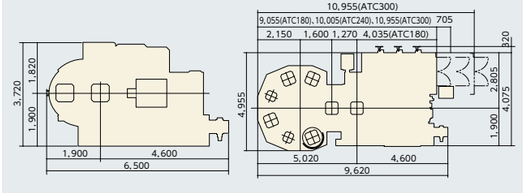
4. Optional equipments			
1) High-torque spindle	Spindle type	SA50-6000-22 Preload self-adusting spindle	
	Spindle speed range	60～6,000min^{-1}	
	Spindle drive motor	AC15kW/22kW (Continuous/30min)	
	Spindle taper hole	MAS BT50	
	Spindle bearing inner diameter	Φ110mm	
2) High-speed spindle	Spindle type	SA50-15000-30 Preload self-adusting spindle	
	Spindle speed range	50～15,000min^{-1}	
	Spindle drive motor	AC26kW/30kW (Continuous/60%ED)	
	Spindle taper hole	MAS BT50	
	Spindle bearing inner diameter	Φ90mm	

4. Optional equipments		YBM7T	YBM8T
3) High-speed spindle	Spindle type		SA40-20000-18.5 Preload self-adusting spindle
	Spindle speed range		200～20,000min^{-1}
	Spindle drive motor		AC15kW/18.5kW (Continuous/30min)
	Spindle taper hole		MAS BT40
	Spindle bearing inner diameter		Φ65mm
4) N/C Rotary table (RP type)			Rotary encoder feedback
	Min. table indexing angle		0.0001deg.
	Table indexing rate		Max.12min^{-1}
5) Pallet chucking device	Diameter of curvic coupling	Φ450mm	–
6) Preload stand (PLS)			6PLS Automatic program search
7) Single magazine (with ATC)	Tool storage capacity		90tools,120tools
	Max. tool dia./length/mass		Φ360mm(with limitation) /440mm/20kg
	Max.tool diameter in full setting		120mm
8) Multiple magazine (with ATC)	Tool storage capacity		120～450tools
	Max. tool dia./length/mass	Φ360mm (with limitation) /440mm500mm (No.1 magazine only) /20kg	Φ360mm (with limitation) /440mm,600mm (No.1 magazine only) /20kg
	Max.tool diameter in full setting		120mm
9) Stroke extension	Y-axis	200mm/total 1,000mm	250mm/total 1,250mm
	Z-axis	300mm/total 1,100mm	–
10) Thermal distortion stabilizing system			With weekly timer
11) Coolant temperature controller			
12) Shower coolant unit			Celling shower
13) Spindle center through flood coolant	Pump discharge pressure		3.5MPa/6MPa
	Pump dischaege amount		20L/min
14) Spindle center through micro fog coolant			
15)External mist coolant			2 nozzles around the spindle
16) Oil skimmer			
17) Mist collector			
18) Tool measurment & Tool breakage detection system			LP2(by Renishaw) NT-H (by BLUM)
19) Automatic workpiece measuring system			Touch prove OMP60(by RENISHAW)
20) High-speed machining function (YASDA HAS-4 system)			With Machining support screen
21) Weekly timer			
22) Compensation for spidle thermal displacement			Individual data
23) Signal tower (Multilayer signal lamp)			Red,yellow,green(Flashing)
24) Washing gun			
25) Chip bucket			
26) Anchor unit			
27) Automatic fire-exthiguishing equipment interface			

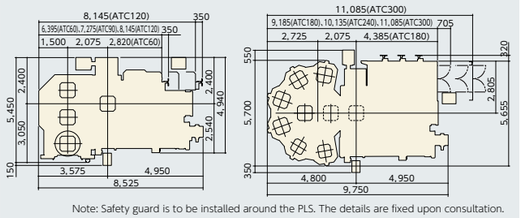
5. CNC options	
1) Part program storage	Total:1MB,2MB,4MB,8MB
2) Number of registerable programs	Total:2,000, 4,000
3) Herical interpolation	G02・G03
4) Inch/metric conversion	G20・G21
5) Scaling	G50・G51
6) Coordinate system rotation	G68・G69
7) Programmable mirror image	G50.1・G51.1
8) Optional block skip	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 countouring 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/Ethenet
18) Data server function	Fast data server,Capacity:1GB,2GB,4GB,16GB,32GB

OUT LINE

YBM7T PC (M/C Height:3,145mm(～F.L.)) **YBM7T PLS** (M/C Height:3,145mm(～F.L.))



YBM8T PC M/C Height(～F.L.):3,495mm(Y=1000) 3,745mm(Y=1250) **YBM8T PLS** M/C Height(～F.L.):3,495mm(Y=1000) 3,745mm(Y=1250)



Note: Safety guard is to be installed around the PLS. The details are fixed upon consultation.

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