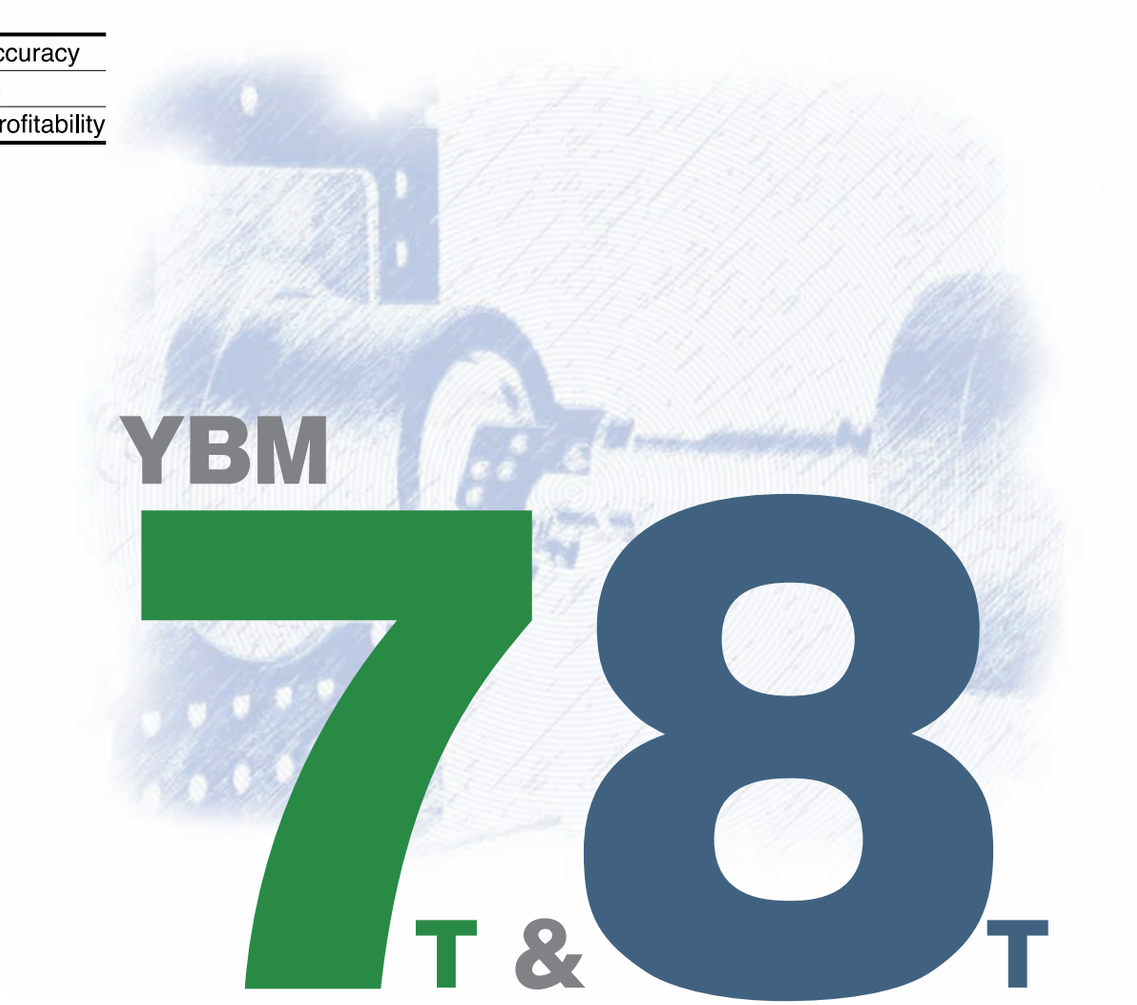
Higher accuracy
produces
greater profitability

E



YBM 7T & 8T

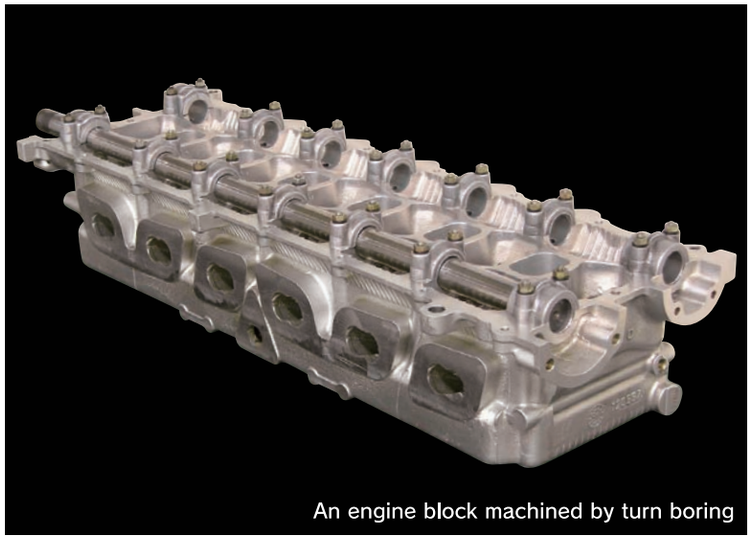
YASDA PRECISION CENTER

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

YASDA

Bulletin No.7T·8T0003-E

YBM 7T·8T



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.

YASDA PRECISION CENTER

YBM 7T

YASDA PRECISION CENTER

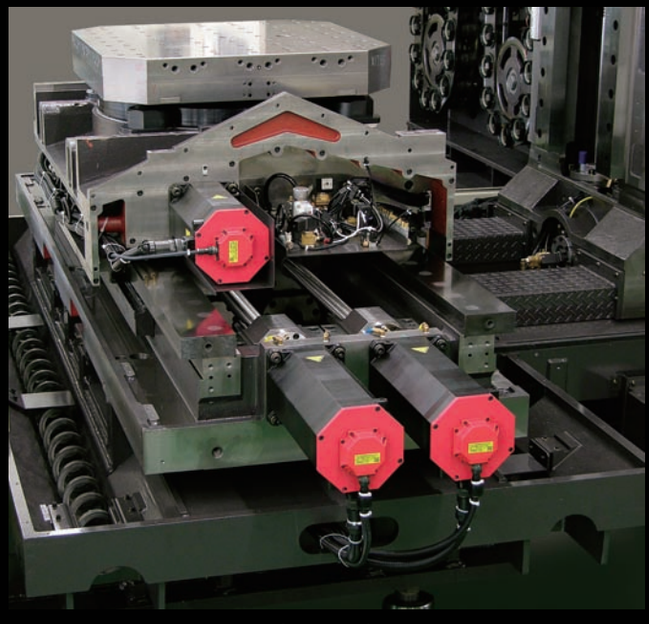
YBM 8T

SPECIFICATIONS

Standard specifications		YBM7T	YBM8T
Travel	X axis (mm)	950	1300
	Y axis (mm)	800	1000
	Z axis (mm)	800	1100
Table working surface (mm)		630×630	800×800
Table loading capacity (kg)		1200	3000
Max. workpiece height (mm)		950	1100
Max. workpiece diameter (mm)		ϕ1000	ϕ1300
Spindle speed range (min^{-1})		10000	10000
Spindle nose taper		No.50	No.50
Spindle drive motor (kW)		AC22/18.5	AC22/18.5
Rapid traverse rate X/Y/Z (mm/min.)		48000	48000(X:45000)
Automatic tool changer		60 tools	60 tools
Type of automatic pallet changer		Direct turn	Rotary shuttle

HIGHLY RIGID CONSTRUCTION

Y-axis twin ball screws



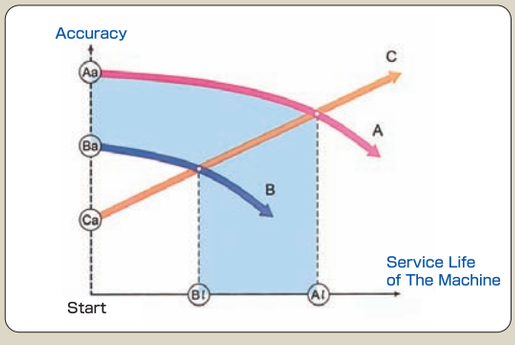
X-axis twin ball screws (YBM8T)

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



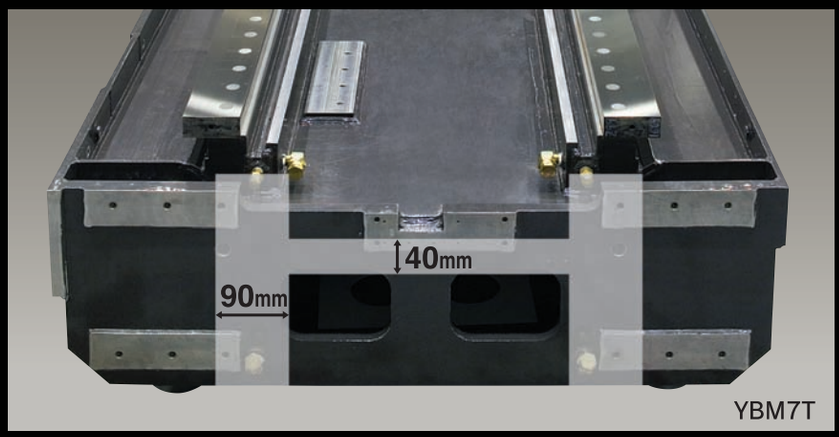
Why ?

Built for a long-term profitability

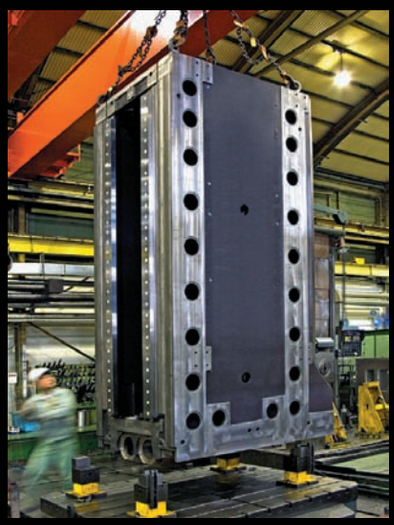
● Graph explanation

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.



Highly rigid “H configuration”



Column in the double housing structure

Box guide ways

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.

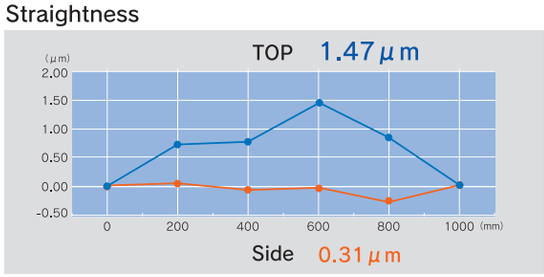
Column

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.

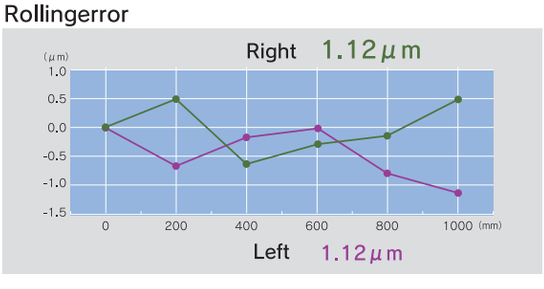
Hybrid guide ways

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.

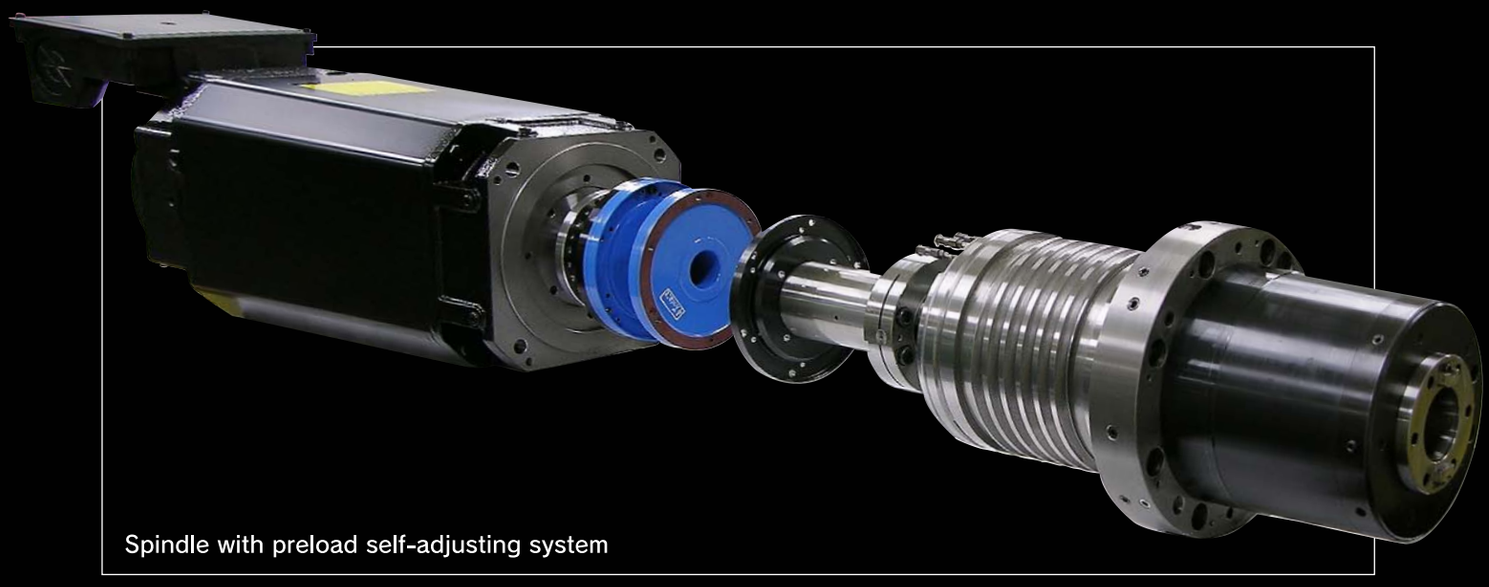
Straightness



Rollingerror



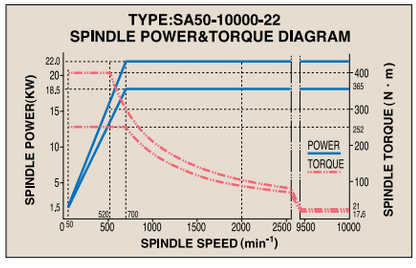
SPINDLE direct drive spindle with preload self-adjusting system

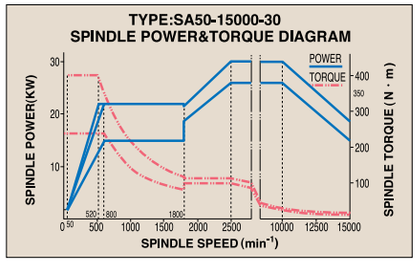


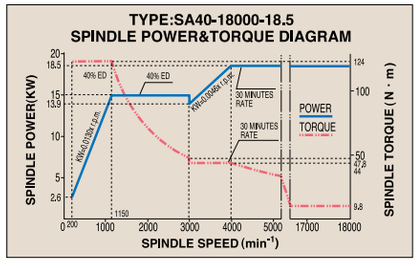
Spindle with preload self-adjusting system

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.



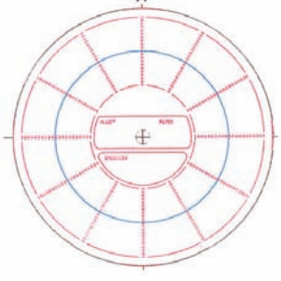




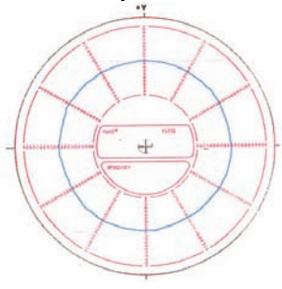
Direct drive system

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



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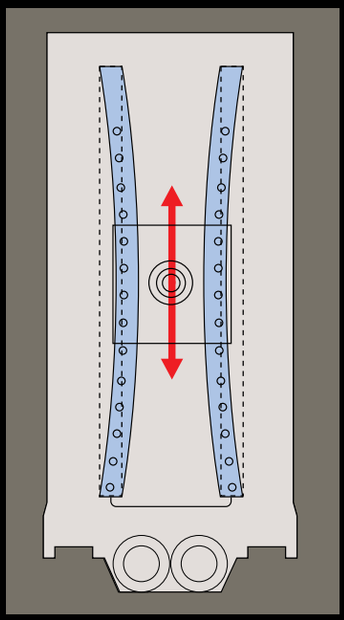

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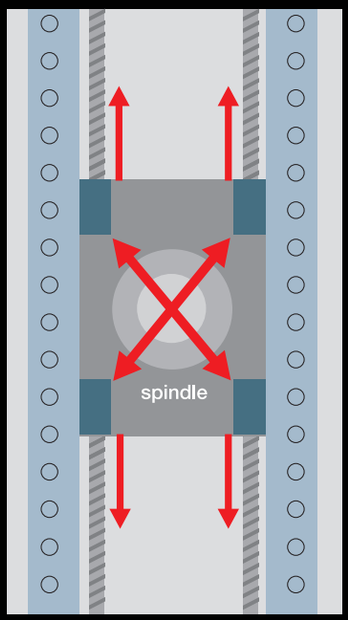


Roller bearing pack

Spindle assembly room (Clean room)

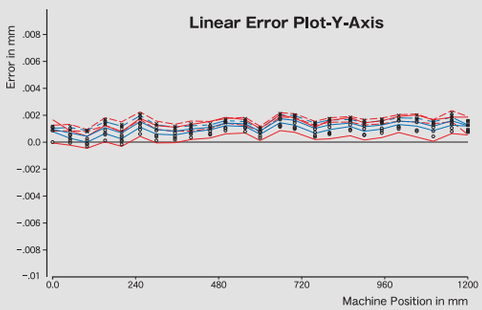
Centrally positioned spindle head — Higher positioning accuracy

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.

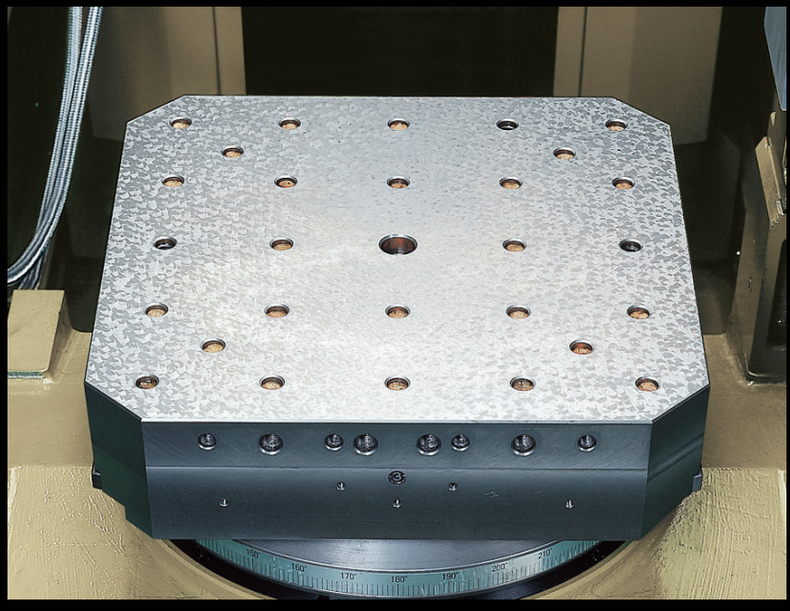
Positioning accuracy on the Y-axis

ISO 230/2

A (Accuracy)	0.002702
R (Repeatability)	0.001816
B (Reversal Value)	0.000203



TABLE／PALLET & PALLET CHUCKING



Large size curvic coupling (AP type)

Large size worm gear (RP type)

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.

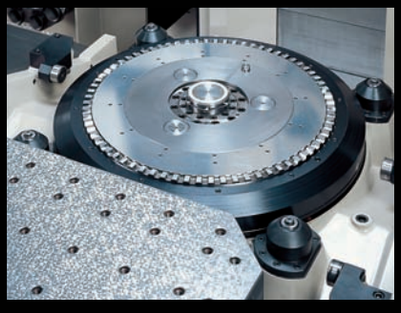
RP type (NC rotary table)

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.

SYSTEM

Hand scraping on the master jig plate

Pallet with curvic coupling



Pallet chucking system

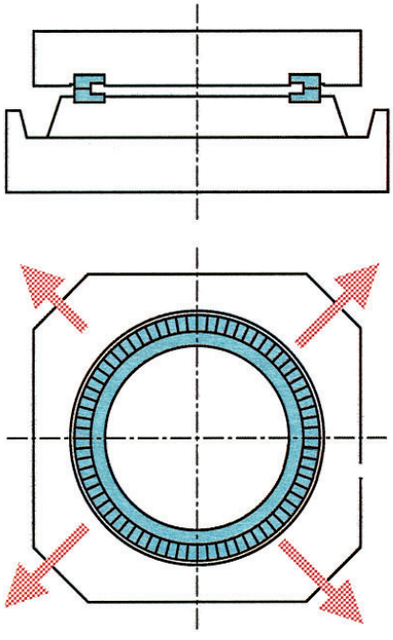
Pallet chucking mechanism — Unsurpassed repeatability and rigidity

A large diameter curvic coupling with 72 teeth with a 30 degree engaging angle ensures the pallet is firmly clamped eliminating backlash, 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

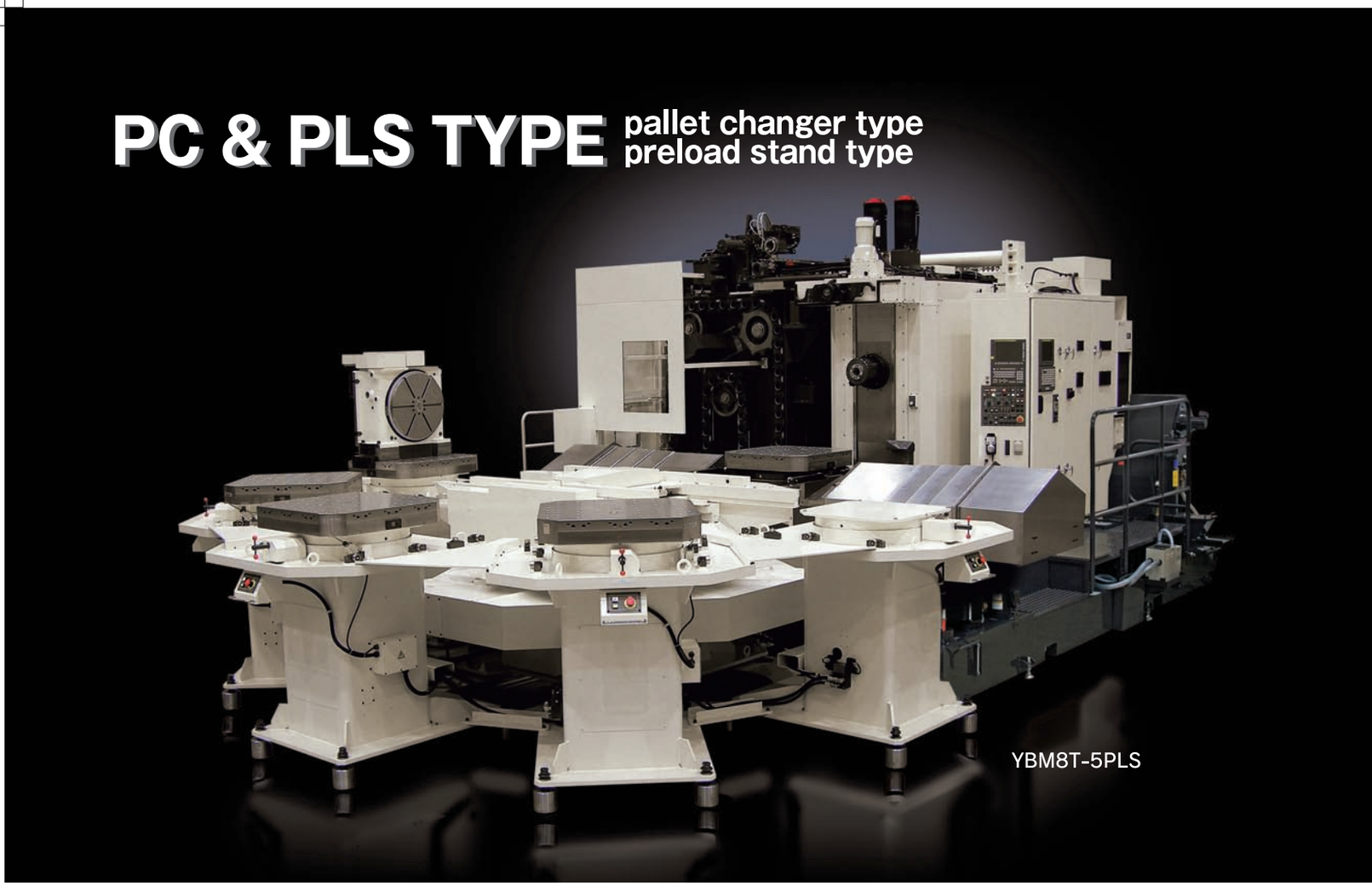


Pallet changing repeatability

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



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

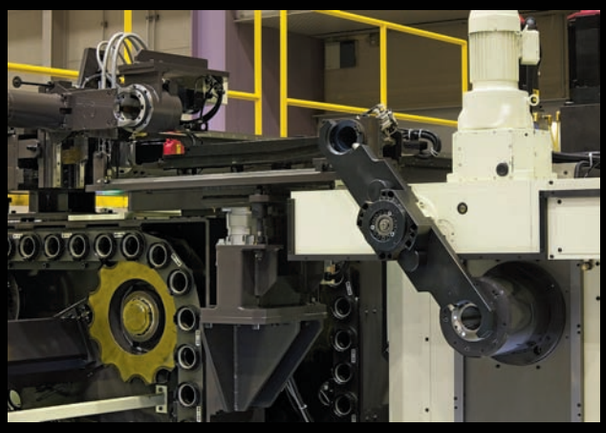
YBM8T : 2 up to 6 PLS

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

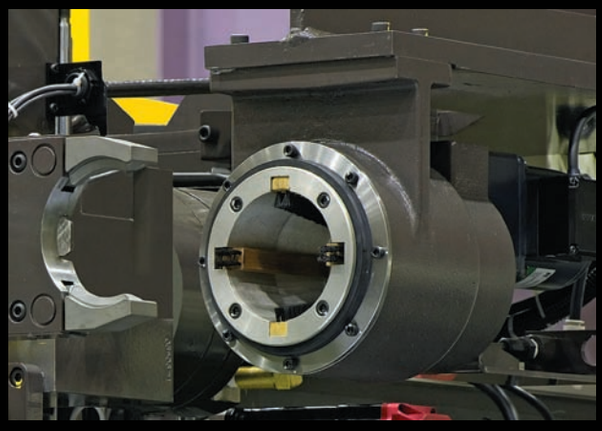
Automatic tool stocker

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

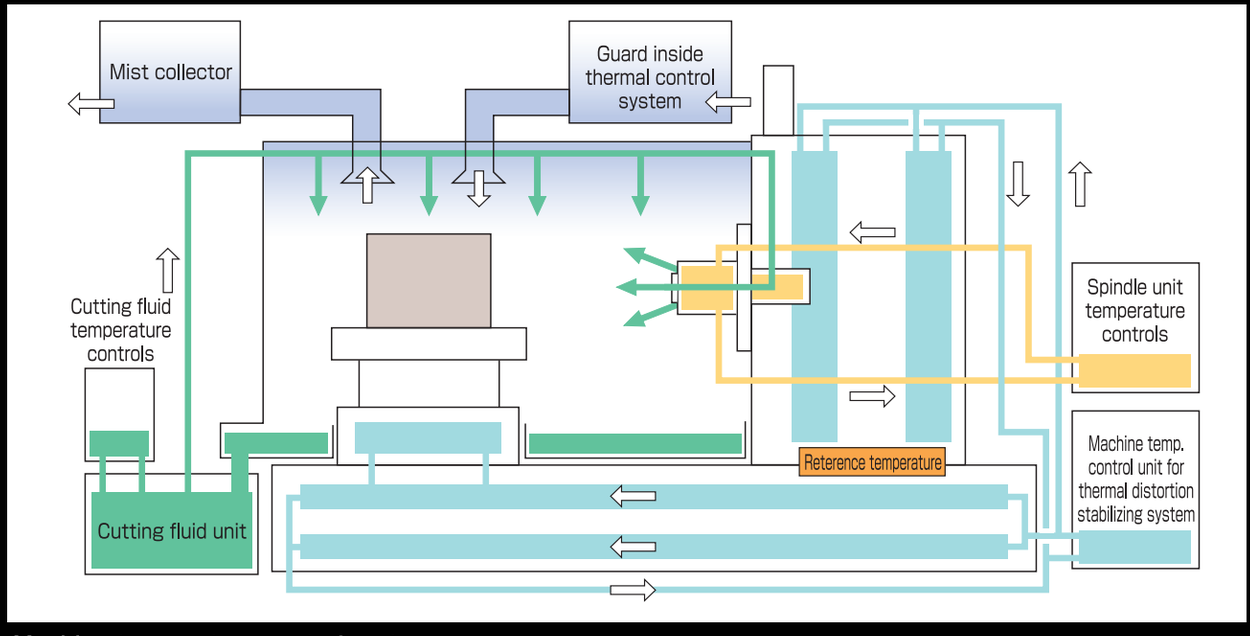
■Automatic tool changer for heavy tools

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



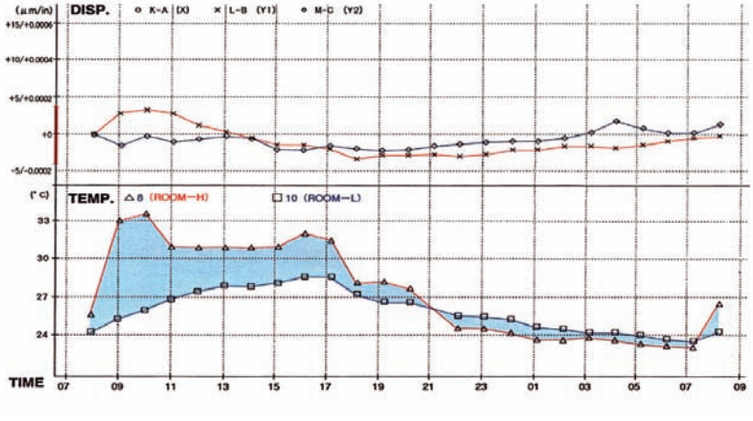
Machine temperature control system

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.

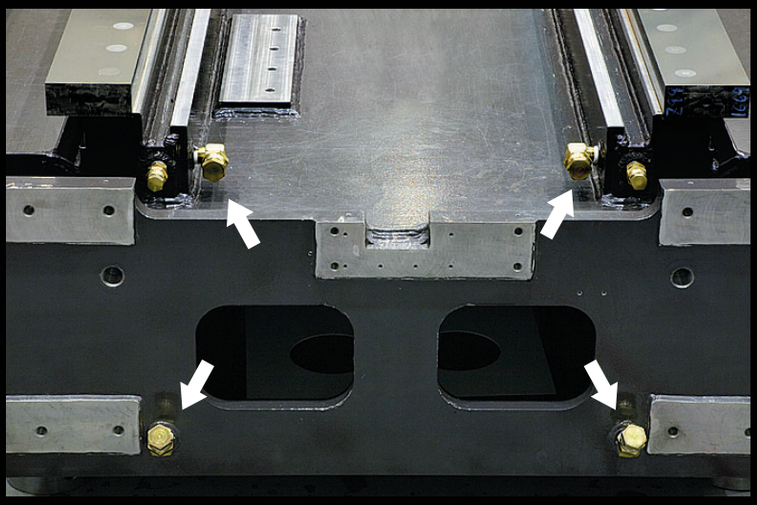
Thermal distortion stabilizing system (option)

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.

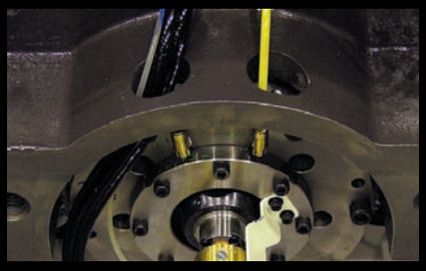


Room temperature and geometrical accuracy under the system in operation

THERMAL DISTORTION STABILIZING SYSTEM



Cooling system of the bed



Cooling system of the ball screw bracket

Type of coolant discharge pressures for YBM7T / 8T

Type / Pumping pressure	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

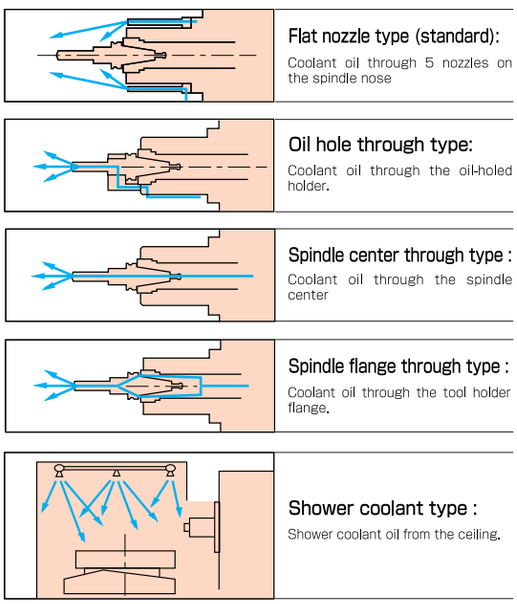
■Cooling system for spindle motor and spindle

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.

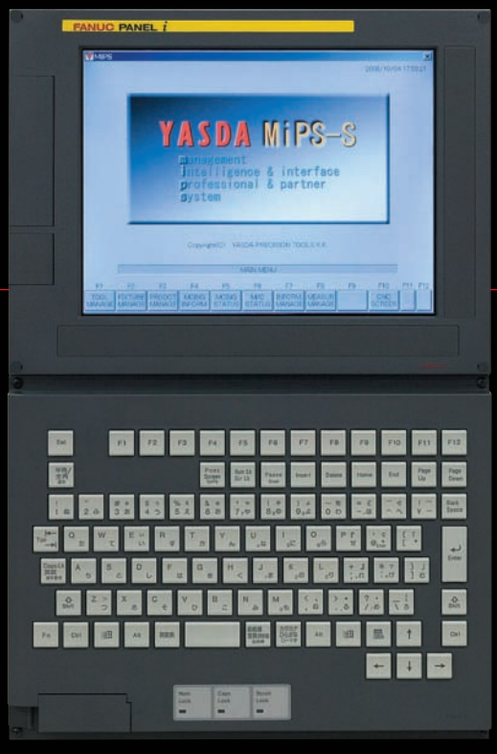
YASDA MiPS

YASDA MiPS:

Production and maintenance support system (Option)

YASDA MiPS control with a separate color display assists production control and ease of maintenance.
MiPS can be operated in a network.

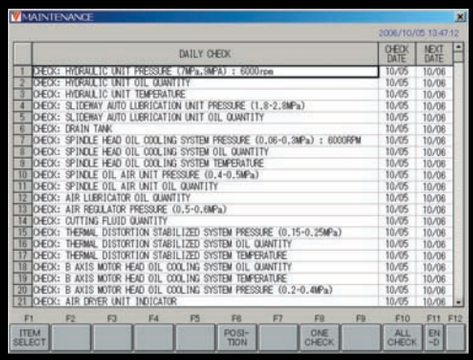
- "Maintenance Function": Display all periodical maintenance programs
- "Self-Diagnosis Function": Display the location of malfunction for easy troubleshooting
- "Management Function": Tool management, spindle load monitoring and production management
- And "Machining Support Function": YASDA's recommendation of cutting conditions and data transfer to NC memory



SPECIFICATIONS

1. Standard specifications	YBM7T	YBM8T
1-1 Travel		
X-axis travel (Longitudinal movement of table)	950mm (450+500)	1300mm (600+700)
Y-axis travel (Vertical movement of spindle head)	800mm	1000mm
Z-axis travel (Cross movement of column)	800mm	1100mm
Distance from table surface to spindle center	70~870mm	0~1000mm
Distance from table center to spindle nose face	150~950mm	200~1300mm
1-2 Table		
Table working surface	630×630mm	800×800mm
Table loading capacity	1200kg	3000kg
Minimum table indexing angle	1°	
Max. swing diameter of workpiece	φ1000mm(with limitation)	φ1300mm
1-3 Spindle		
Model	SA50-10000-22 (Preload self-adjusting spindle)	
Spindle speed range	50~10000min^{-1}	
Spindle drive motor (30 min. rating)	AC18.5kW/22kW	
Spindle nose taper	7/24 taper NO. 50 (BT50)	
Spindle bearing inner diameter	φ100mm	
1-4 Feed rate		
Rapid traverse rate (X, Y, Z-axis)	48000mm/min	48000mm/min (X-axis:45000mm/min)
Feed rate (X, Y, Z-axis)	1~5000mm/min	
1-5 Single magazine (with ATC)		
Type of tool shank	MAS-403 BT50	
Type of pull stud	MAS-403 P50T-1 (45°)	
Tool storage capacity	60 tools	
Max. diameter of tool	φ360mm(with limitation)	
Max. length of tool	440mm	
Max. mass of tool	20kg	
Max. tool diameter in full setting	φ120mm	
Tool selection system	Shortcut random selection	
1-6 Automatic pallet changer (APC)		
1-7 Pallet chucking device	Direct turn	Rotary shuttle
Curvic coupling size	φ350mm	φ600mm
1-8 Mass of machine	ca. 18000 kg	ca. 24000 kg
1-9 Electric power supply	Max.68kVA	Max.80kVA
2. Standard equipments	**YBM7T**	**YBM8T**
2-1 Numerical control unit		
2-2 Hydraulic unit		
Pump discharge pressure	7MPa	
Oil reservoir	30L	
2-3 Oil cooling system for spindle head, spindle motor and ball screw brackets		
Cooling capacity	100~6000W Reference temperature tracking system	
2-4 Cutting oil unit (Wet type)		
AA type: flat nozzles	5 nozzles around the spindle nose	
Pump discharge	0.4MPa, 40L/min	
Tank capacity	1000L	1350L
2-5 Splash guard	with 1 fluorescent lamp	with 2 fluorescent lamps
2-6 Chip conveyor: Screw conveyor in the machine + scraper chip conveyor with separator outside the machine		
2-7 Way protector		
2-8 Optical scale feedback	X, Y, Z-axis	
2-9 High speed machining function (YASDA HAS-0 system)		
Feed rate	Max.15000mm/min	
2-10 Power saving function		

1



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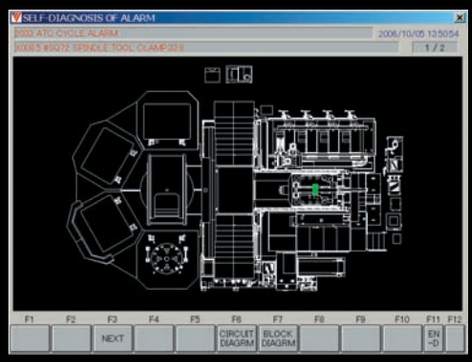


3

1 Maintenance function

Display of maintenance programs

2 Self-diagnosis function

Display of self-diagnostic of alarm messages

3 Production management function

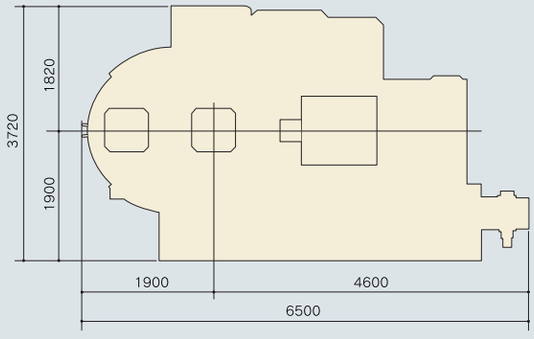
Display of pallet stand status

3. Optional equipments	YBM7T	YBM8T
3-1 YASDA MiPS		
Tool Management function		
YASDA self-diagnosis function, maintenance function		
3-2 High-speed spindle		
Model	SA50-15000-30 Preload self-adjusting spindle	
Spindle speed range	50～15000min^{-1}	
Spindle drive motor (30 min. rating)	AC26kW／30kW	
Spindle nose taper	7/24 taper No.50 BT50	
Spindle bearing inner diameter	ϕ90mm	
3-3 High speed spindle		
Model	SA40-18000-18.5 Preload self-adjusting spindle	
Spindle speed range	200～18000min^{-1}	
Spindle drive motor (30 min. rating)	AC15kW／18.5kW	
Spindle nose taper	7/24 taper No.40 (BT40)	
Spindle bearing inner diameter	ϕ65mm	
3-4 NC Rotary table (RP type)		
Rotary encoder feedback		
Minimum table indexing angle	0.0001°	
Table indexing rate	12min^{-1}	
3-5 Pallet chucking device		—
Curvic coupling size	ϕ450mm	—
3-6 Single magazine (with ATC)		
Tool storage capacity	90, 120 tools	
3-7 Multiple magazine (with ATC)		
Tool storage capacity	120～450 tools	
Max. length of tool	440mm,500mm (No.1 magazine only)	440mm,600mm (No.1 magazine only)
3-8 Thermal distortion stabilizing system		
Temperature controlling unit: Reference temperature (Machine temperature) tracking system		
Temperature control range	±0.2℃ of reference temperature	
Cooling capacity	0～4000W	
Heating capacity	1000W	
Tank capacity	140L (Total 390 L)	140L (Total 415 L)
Weekly timer	Equipped (Setting power activation times within one week is possible)	
3-9 Shower coolant unit	Shower from the ceiling	
3-10 High pressure cutting oil unit (Spindle center through type)		
Pump discharging pressure	3.5MPa／6MPa	
Pump discharging amount	20L/min	
3-11 Cutting oil temperature control unit		
3-12 Spindle center through micro-fog coolant unit		
3-13 External mist coolant unit	2 nozzles around the spindle	
3-14 Stored tooling content confirmation system (MiPS)		
3-15 Automatic tool length / radius compensation system & tool breakage sensing system		
3-16 Auto-measuring system		
3-17 Anchor unit		
3-18 High speed machining system (YASDA HAS-3 system)		
Feed rate	Max.15000mm/min	
3-19 Y-axis stroke extension	200 mm / Total 1000 mm	250 mm / Total 1250 mm
3-20 Z-axis stroke extension	300 mm / Total 1100 mm	300 mm / Total 1400 mm
3-21 Preload stands (PLS)	5PLS+1 L/U station or 6 PLS	6PLS

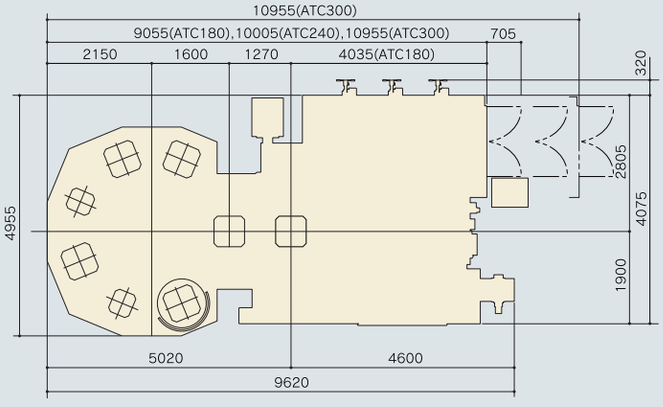
Remarks : Specifications are subject to changes without notice. Some photographs in this catalog are not corresponding with the standard specifications and standard colors.

OUT LINE

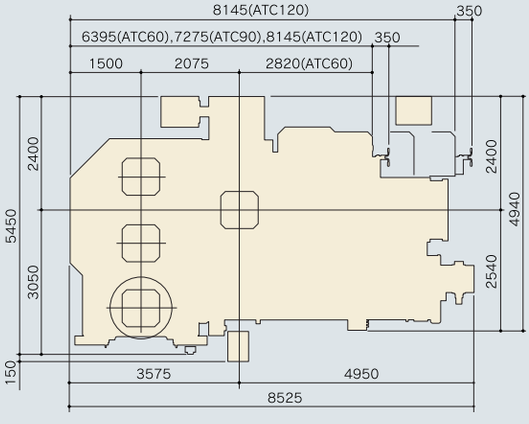
YBM7T PC 〔M/C Height : 3145mm (~F.L.)〕



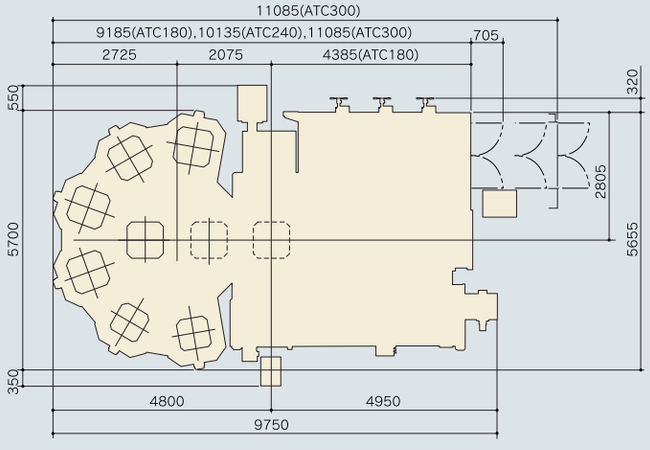
YBM7T PLS 〔M/C Height : 3145mm (~F.L.)〕



YBM8T PC M/C Height (~F.L.) : 3495mm (Y=1000) 3745mm (Y=1250)



YBM8T PLS M/C Height (~F.L.) : 3495mm (Y=1000) 3745mm (Y=1250)



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

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