Higher accuracy
produces
greater profitability

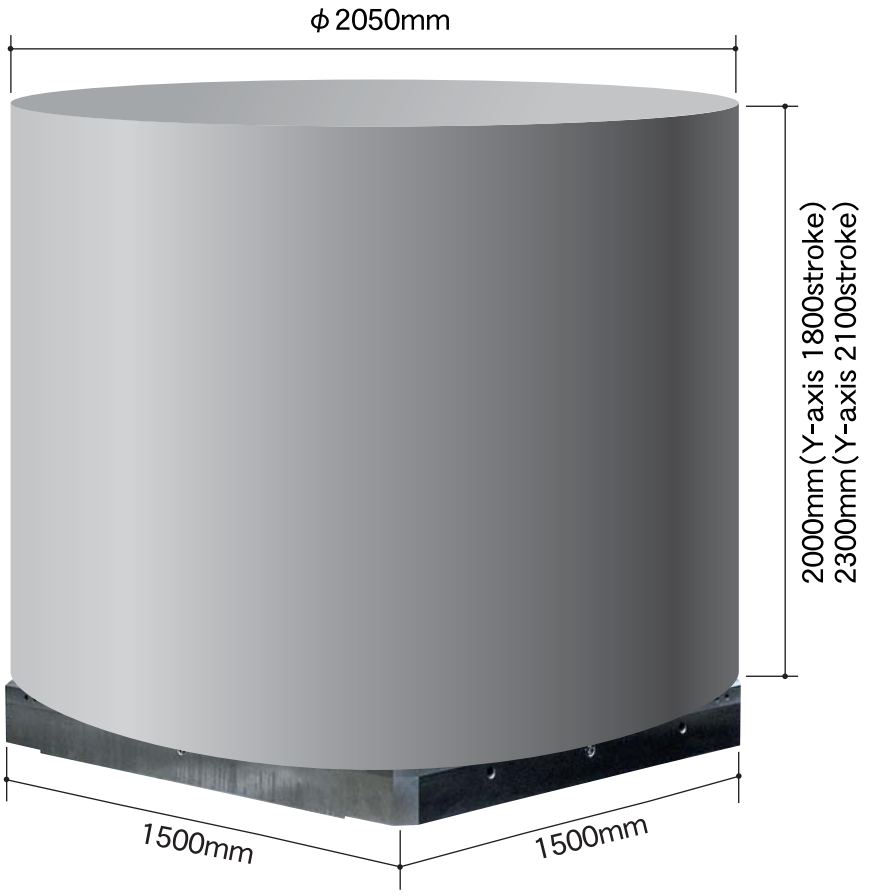
YBM 15T

YASDA PRECISION CENTER

Double feed system with quill spindle and column feed
Thermal distortion stabilizing system
High performance spindle with Preload self-adjusting system
Twin ball screws drive system

YASDA

Bulletin No.15T0001-E



12ton / ϕ2050mm swing diameter

24m/min

BIG PERFORMANCE

High speed and highly accurate positioning of heavy components
Outstanding turn boring capability equivalent to Jig borer machine

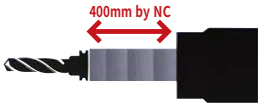
YASDA PRECISION CENTER

YBM 15T

Double feed system with quill spindle and column feed

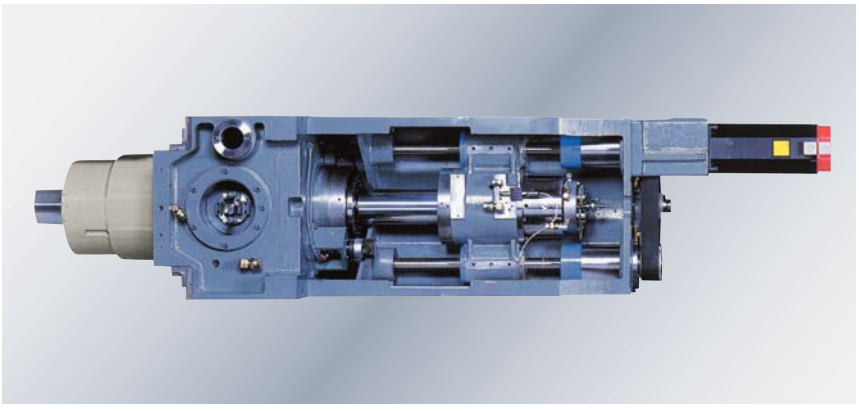
YBM15T has double feed system with spindle feed (quill) system and column feed system. Spindle quill has 300mm (option 400mm) W-axis travel, and help achieve high accuracy on large components.

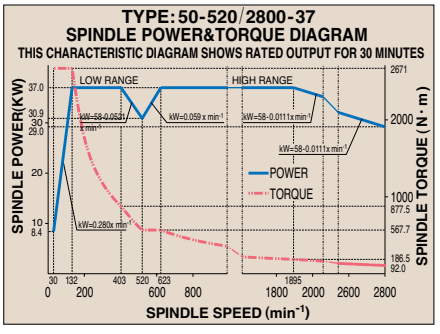
YASDA Quill type spindle model: 50-520/2800-37



Enables highly accurate rough machining and supports longer cutter life for total efficiency

Spindle quill type with 300mm (option 400mm) W-axis travel of dia. 120mm spindle helps shorten cutter length and improves machining performance, especially in heavy-duty machining. Wide range of spindle power and torque covers from low speed heavy-duty machining to high speed high precision machining.

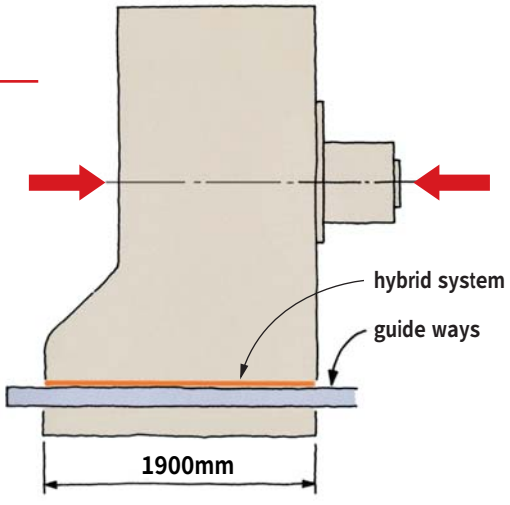




Column feed

New hybrid guiding system

Large column with long slide ways helps minimize geometrical error and straightness against big machining force. Hybrid guiding system (friction and roller) with load sensing system and surface pressure compensation system is employed on the slide ways, in order to position heavy components at high speeds.
※Load sensing system and surface pressure compensation system are employed on Y and Z axes.

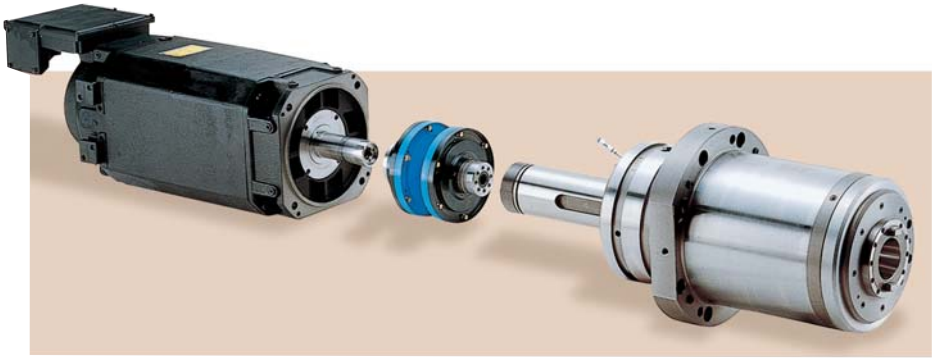


2 Type Selectable spindle

It is possible to select spindle fixed type according to purpose of usage.

YBM15T has qill type spindle as standard, and spindle fixed type as option, in order to meet the customers' application.

Spindle fixed type YASDA Preload self-adjusting system model: SA type

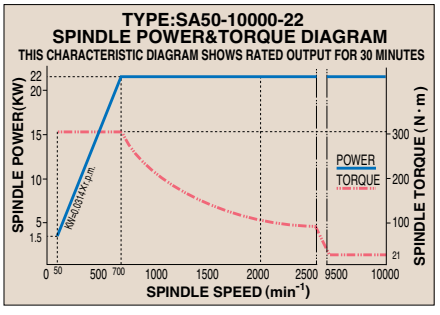


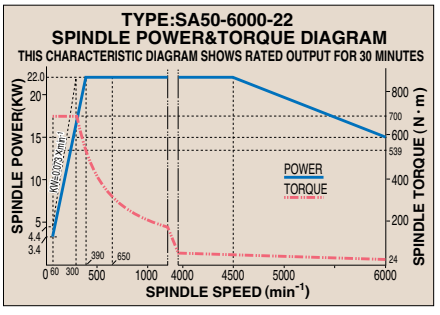
Preload self-adjusting system

Spindle assembly room in YASDA

Reliable performance, enabling highly stable and accurate machining in its all rotation range

YASDA 's exclusive mechanical preload self-adjusting system technology provides a large preload at low spindle speeds and reduces the preload at higher spindle speeds. This mechanism creates a clear advantage over the conventional preload fixed spindles. Excellent performance on various machining, including: heavy-duty machining, high speed machining on hardened materials, high helix angle end mill machining, back face milling, etc.



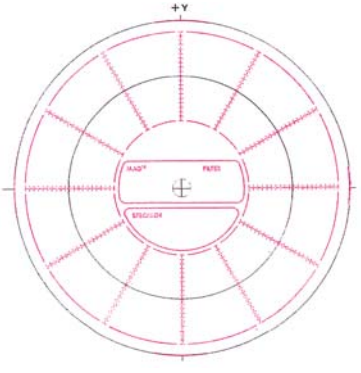


■Direct drive system

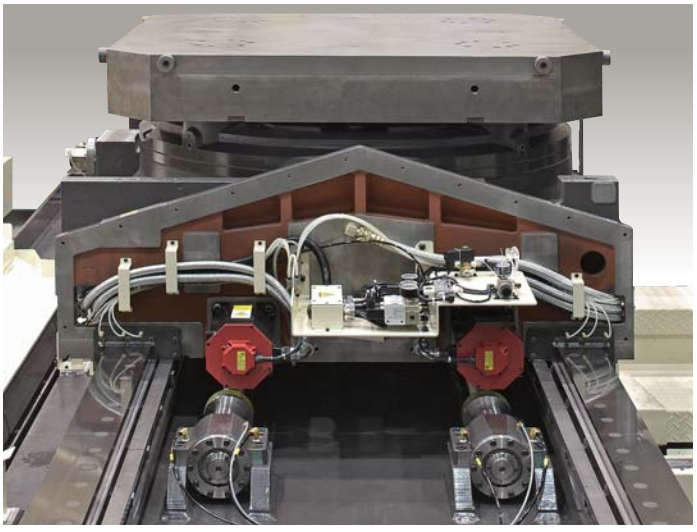
Spindle cartridge and spindle motor are connected coaxially by a diaphragm coupling to achieve highly accurate rotation of the spindle at full range of its rotation speed, which helps achieve highly accurate machining surface.

BORING TEST

Circularity:0.0006mm



Twin ball screws for all axes (X/Y/Z axes)



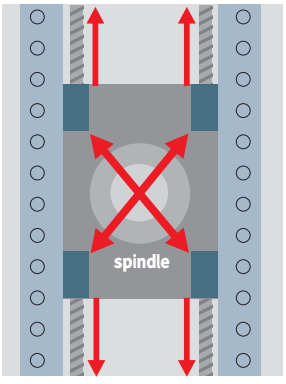
X-axis twin ball screws

Y-axis twin ball screws

By employing twin ball screws for all linear axes (X/Y/Z), 24m/min fast rapid feed has achieved without loosing outstanding machine accuracy and high rigidity. At the same time, Twin ball screws on Y-axis help support highly accurate spindle travel stable all the time.

■Twin ball screws on Y-axis

Spindle center is positioned at the center in the geometry of Y-axis twin ball screws and guide ways, which helps improve stability of geometric accuracy.

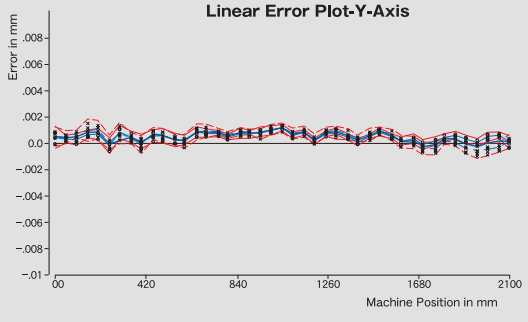


Positioning Accuracy of Y-axis

ISO 230/2 (1997)

unit:mm

A (Positioning Uncertainty)	0.00300097
R (Positional Scatter)	0.00183493
B (Reversal Error)	0.00004119

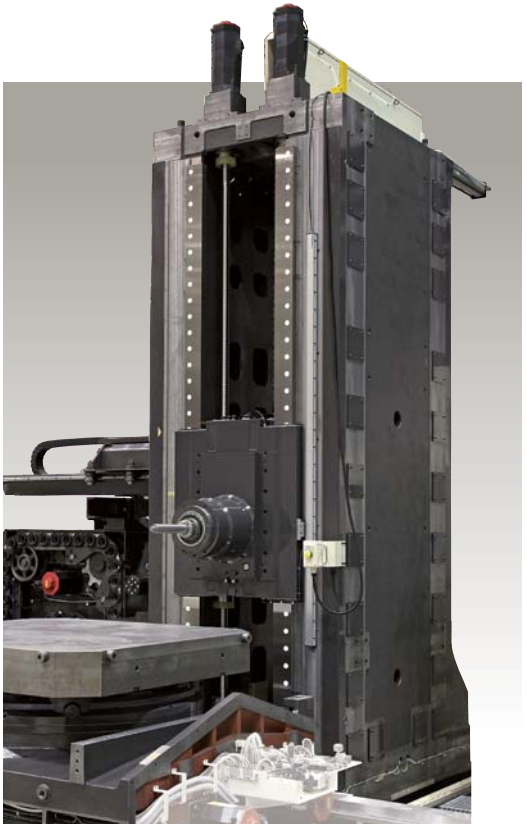


Com-ponent Highly rigid main components supporting high speed highly accurate machining of large work pieces.

High accuracy and durability of YBM 15T is realized by outstandingly rigid mechanical components, for example, bed and column designed symmetric to control thermal deformation, hardened die steel guide ways assuring durability of long strokes, highly rigid feed drive system with big diameter twin ball screws. These are improving positioning accuracy and machine durability, and realizing excellent response in one pulse step feed. Reliable machine rigidity supports machining cutters a lot and helps minimizing process running cost.

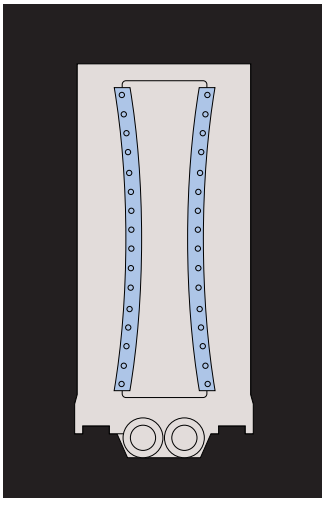
COLUMN

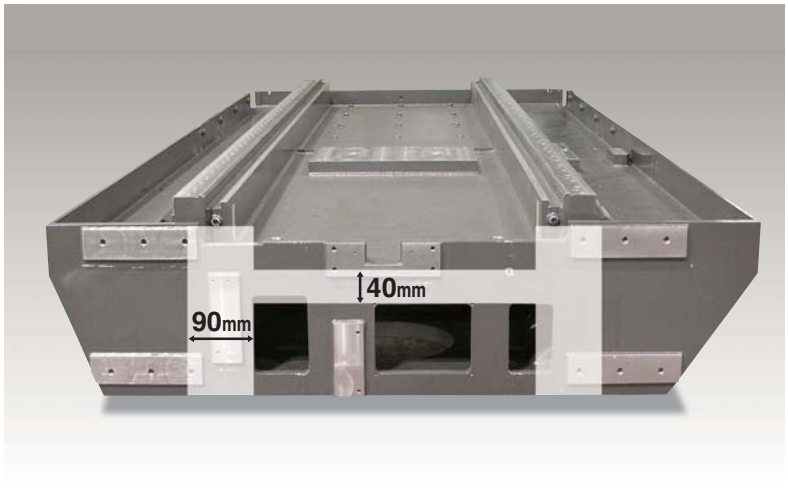
Large column with double housing structure ensures outstanding thermal control and machine rigidity. Each housing is designed in the shape of box formed by double walls and ribs are arranged in the housing.



Column (Y-axis) guide ways

Guide ways on the column (Y-axis) are mounted not completely parallel to each other but intentionally in a slight concave configuration. This design gives a stable preload to roller bearings of the spindle head unit at any positions of its vertical stroke. By this excellent design, yawing error of the spindle head is minimized, and highly accurate positioning is promised.





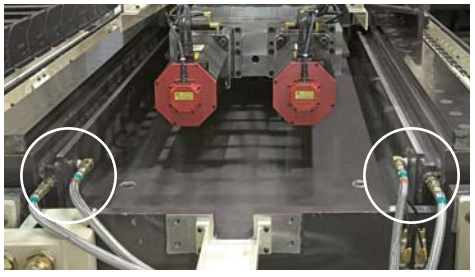
BED

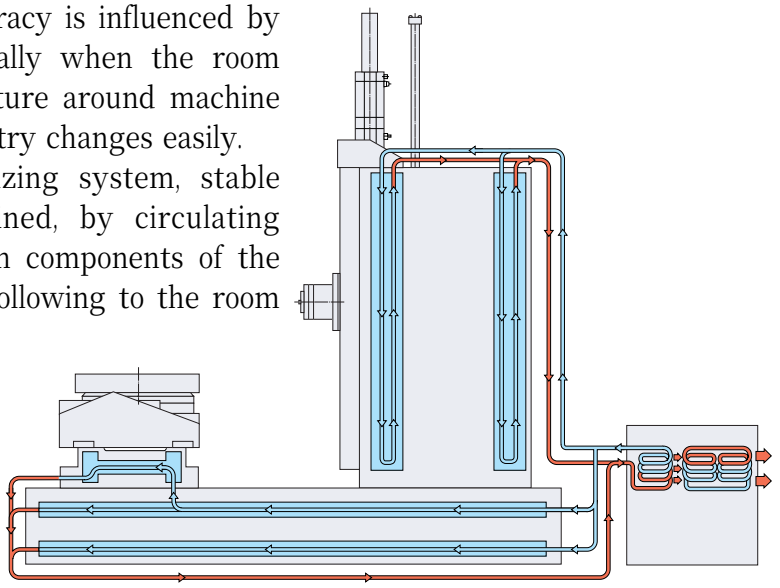
Steel bed of simple " H " configuration of two 90mm thick vertical frames and 40mm thick horizontal frame promise outstandingly high rigidity. Each solid steel frames has an equal heat capacity at any point, therefore the bed is free from any strain caused by room temperature changes, and assuring stable machine geometry all the time.

Thermal control Reliable mechanism controling thermal distortions

Thermal distortion stabilizing system (option) to stabilize high machine geometry

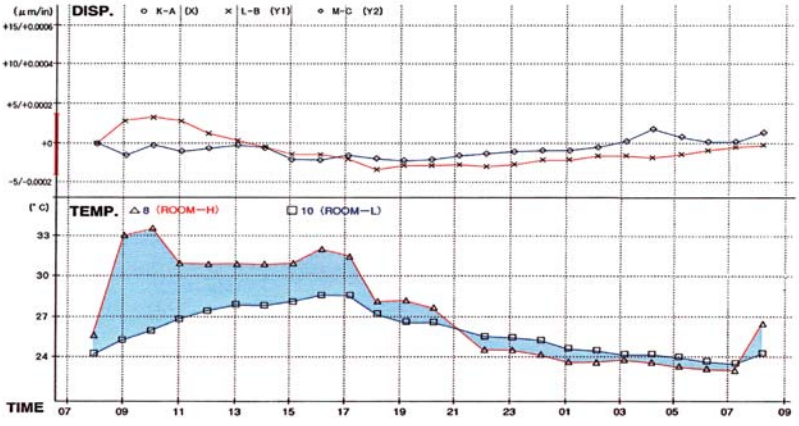
Even the most accurate machining center, accuracy is influenced by the environment of work shop a lot. Especially when the room temperature changes quickly or when temperature around machine top and bottom are different, the machine geometry changes easily.
By YASDA option Thermal distortion stabilizing system, stable geometry and machining accuracy are obtained, by circulating temperature controlled lubrication through main components of the machine, and makes the machine temperature following to the room temperature within range of +/—0.2℃.

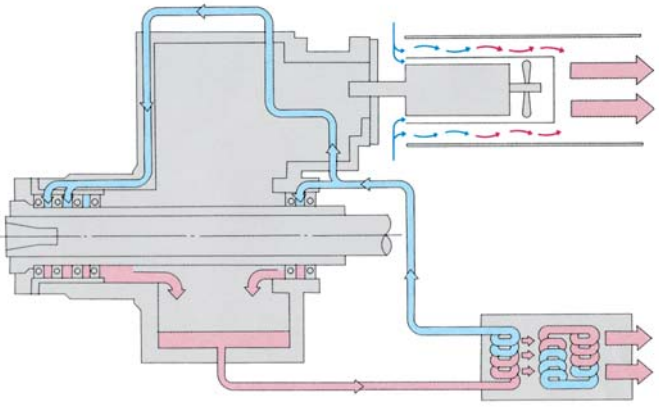




Thermal distortion stabilizing oil to the bed

Machine geometric stability test with Thermal distortion stabilizing system





Cooling system of ball screws bracket

Cooling oil through the oil jacket in the ball screws ' bracket, that prevents heat generation of the thrust bearing and helps minimize machine geometry error during machining.

Spindle jacket cooling system

YASDA jacket cooling system remove heat created from spindle bearings by circulating coolant oil, and help maintain machine accuracy.

Conic couplings for pallet chucking

Pallet chucking mechanism with high accuracy and rigidity

Four conic couplings on YBM 15T support highly accurate pallet chucking of 1500×1500mm pallet with max. 12 ton loading. Both inner and outer faces of each cone with 60 ångle contact with each pallet chuck unit, ensuring the stability of accuracy and rigidity. Well designed clamping unit, positioned at the center of each conic coupling, prevents pallets from deformation. Combination of four conic couplings and clamping units increase the reliability, repeatability of accuracy and rigidity in clamping. Also supports high accuracy of the components in automation with multi-pallet systems, FMS and other automatic systems.

ATC (Automatic Tool Changer)

Options from 120 tools to max. 450 tools capacity, in order to keep suitable tools for variety of customers.

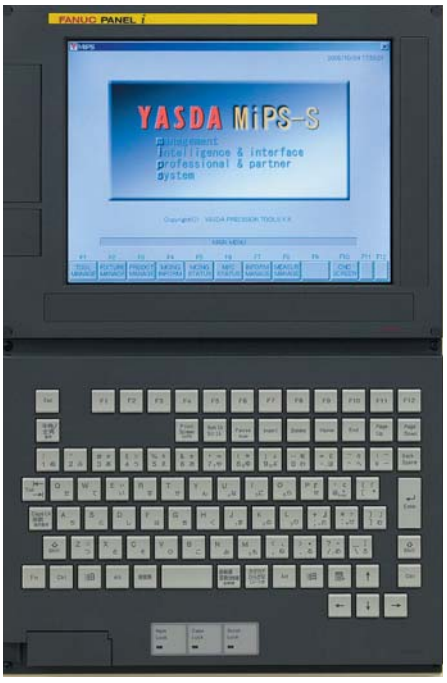
Loading / unloading device of tools
(manual type: option)

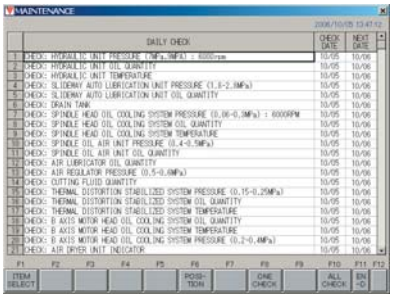
Tool holder cleaning device

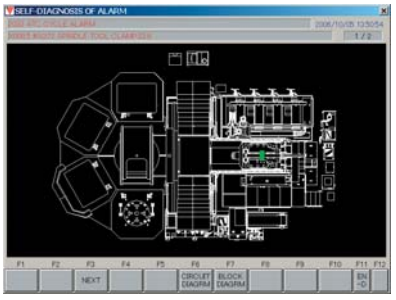
Tool holder cleaning system with brush and air blow remove delicate cutting chips and other objects on tool holders, and maintain spindle taper and tool holder for highly accurate job. In addition, large tool capacity of max. tool weight 25kg and max. tool dia. 300 mm helps support variety of machining.

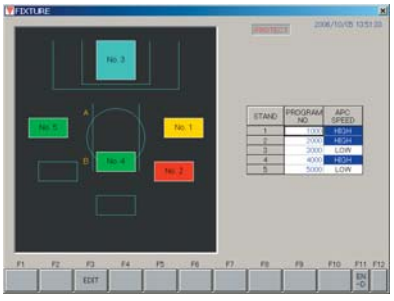
Tool holder cleaning device

YASDA MiPS-S (option)
(YASDA Management intelligence & interface Professional & partner System)









Maintenance function

Self-diagnostic function
Result of self diagnostics on alarm message

Management function
Indication of pallet stand status

High grade management system with color LCD display, which can be connected to network systems:
① Maintenance function: easy check of daily maintenance
② Self-diagnostics function assist trouble shooting, display malfunction and its location.
③ Management function: provide tool management, load monitoring and production control.
④ Newly developed machining support function.

Optical scale feedback

Full closed loop type optical scale is employed for highly accurate positioning of linear axes. The scales are attached to the machine components directly in order not to create difference in temperature between the scales and machine components.

SPECIFICATIONS

1.	Standard specifications of base	
1-1	**Travel**	
	X-axis travel (Longitudinal movement of table)	2100mm
	Y-axis travel (Vertical movement of spindle head)	1500mm
	Z-axis travel (Cross movement of column)	1500mm
	Distance from table surface to spindle center	0～1500mm
	Distance from table center to spindle nose face	400～1900mm (when W-axis quill is 0)
1-2	**Table**	
	Table working surface	1500×1500mm
	Table loading capacity	12000kg
	Minimum table indexing angle	0.0001 °
	Max.swing diameter of work piece	ϕ2050mm
1-3	**Spindle**	
	Model	50-520／2900-37
	Spindle speed range	30～2800min^{-1}
	Spindle drive motor	AC37kW (30min. rating)
	Spindle nose taper	7/24 taper No50 (BT50)
	Spindle bearing inner diameter	ϕ120mm
1-4	**Feedrate**	
	Rapid traverse rate (X-axis)	20000mm/min
	Rapid traverse rate (Y,Z-axis)	24000mm/min
	Rapid traverse rate (W-axis)	8000mm/min
	Rapid traverse rate (B-axis)	360deg/min
	Feedrate (X,Y,Z,W-axis)	1～5000mm/min
	Feedrate (B-axis)	360deg/min
1-5	**Automatic tool changer**	
	Type of tool shank	MAS-403 BT50
	Type of pull stud	MAS-403 P50T-1 (45 °)
	Tool number	60 tools／120 tools stand
	Max. dia. of tool	ϕ300mm
	Max. length of tool	440mm、550mm (No.1 magazine)
	Max. mass of tool	25kg
	Max. tool dia. of full setting	ϕ100mm
	Tool selection system	Random selection by address
1-6	**Automatic pallet changer (PLS)**	Rotary shuttle system
1-7	**Hydraulic unit**	
	Conic couplings system	
1-8	**Mass of machine**	Approx.42000kg (except ATC magazine)
1-9	**Electric power supply**	Max.85kVA

2.	Standard equipments	
2-1	**Numerical Control unit**	FANUC 31i-A5
2-2	**Numerical Control unit**	
	Pump discharge	9MPa
	Oil reservoir	100L
2-3	**Spindle head & X, Y, Z-axis ball screw bracket oil cooling system**	
	Cooling capacity	4460kcal/h／Following reference
2-4	**Cutting oil unit (Wet type)**	
	AA type : flat nozzles	8 nozzles around spindle nose
	Pump discharge／Pump output	0.3MPa、30L/min
	Tank capacity	1250L
2-5	**Splash guard (Automatic door & roof)**	
2-6	**Chip conveyor Twin-screw & scraper chip conveyor**	
2-7	**Way protector**	
2-8	**Optical scale feedback**	X,Y,Z-axis
2-9	**YASDA HAS-0 System**	
	Feedrate	Max.7000mm/min

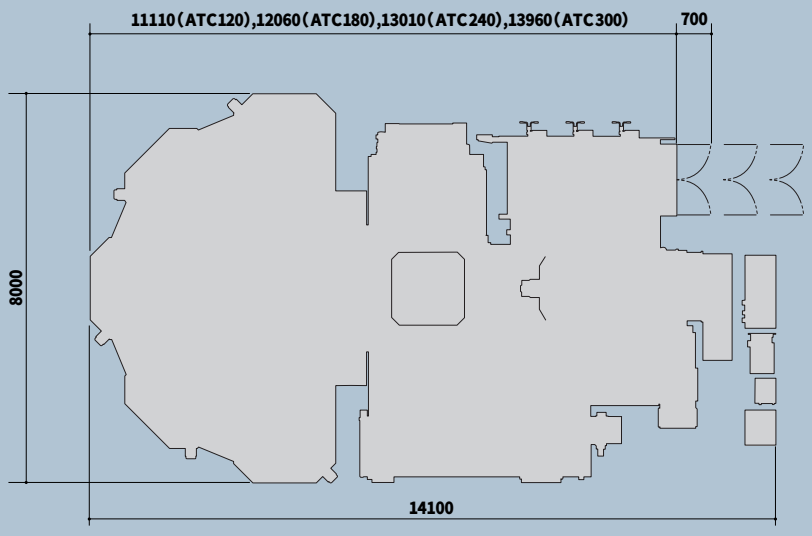
3.	Optional equipments	
3-1	**YASDA MiPS**	
	YASDA self-diagnosis function	
	Maintenance support function	
3-2	**High-speed spindle** (Spindle fixed type without)	
	Model	SA50-10000-22 (Preload self-adjusting spindle)
	Spindle speed ranges	50～10000min^{-1}
	Spindle drive motor	AC22kW (30min. rating)
	Spindle nose taper	7/24 taper No.50 (BT50)
	Spindle bearing inner diameter	ϕ100mm
3-3	**Automatic tool stocker (with ATC)**	
	Tool number	120～450 tools
	Max. length of tool	440mm,550mm (No.1 magazine)
3-4	**Thermal distortion stabilizing system (Column,Columnbed,Tablebed)**	
	Range of temperature control	Ref. temperature ±0.2 ℃
	Cooling capacity	3800kcal/h
	Heating capacity	2000W
	Tank capacity	150L
	Weekly timer	Equipped
3-5	**Coolant shower unit**	from the ceiling
3-6	**High pressure cutting oil unit (Spindle center through type)**	
	Pump output	3.5MPa／6MPa
	Pump discharge	20L/min
3-7	**Cutting oil temperature control unit**	
3-8	**Spindle center through micro-fog coolant unit**	
3-9	**External mist coolant unit**	2 nozzles around spindle nose
3-10	**Tool management function**	
3-11	**Stored tooling content confirmation system (MiPS)**	
3-12	**Automatic tool length/radius compensation system &tool breakage sensing system**	
3-13	**Auto-measuring system**	
3-14	**Anchor unit**	
3-15	**YASDA HAS-3 System**	
	Feedrate	Max.7000mm/min
3-16	**X-axis stroke extension**	900mm／Total 3000mm
3-17	**Y-axis stroke extension**	300mm、600mm／Total 1800mm、2100mm
3-18	**Z-axis stroke extension**	300mm／Total 1800mm
3-19	**Preload stand (PLS)**	4PLS+L/U station

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

OUT LINE

YBM15T

M/C Height:～F.L.
Y＝1500ストローク：4880mm
Y＝1800ストローク：5185mm
Y＝2100ストローク：5490mm



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