



# YBM 15 T

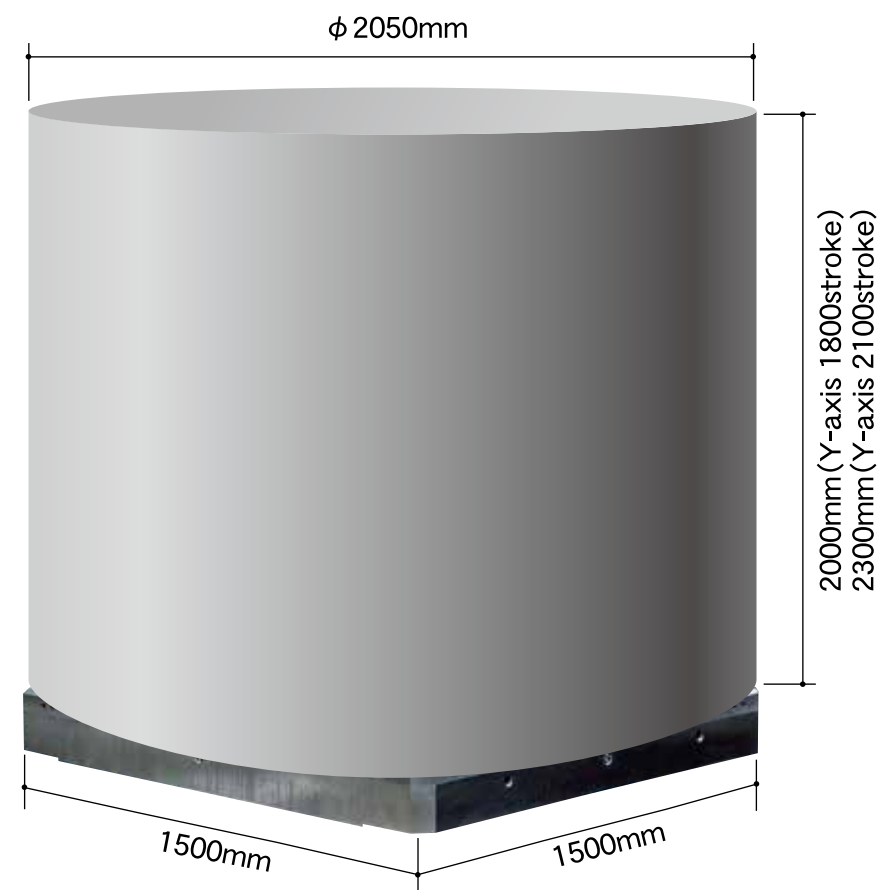
## YASDA PRECISION CENTER

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



**12ton** /  $\phi$ 2050mm swing diameter



**24m/min**

**BIG PERFORMANCE**

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

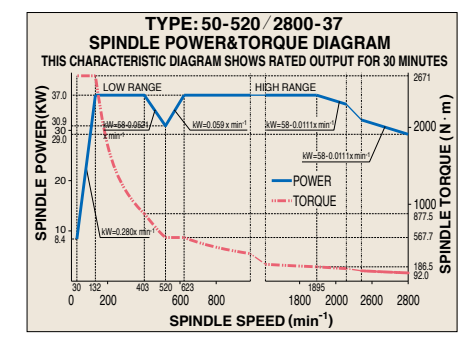
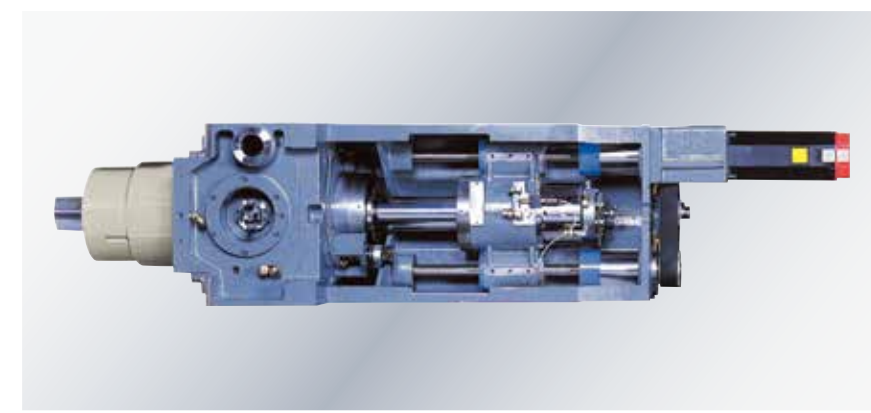
**D Double feed system with quill spindle and column feed**

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



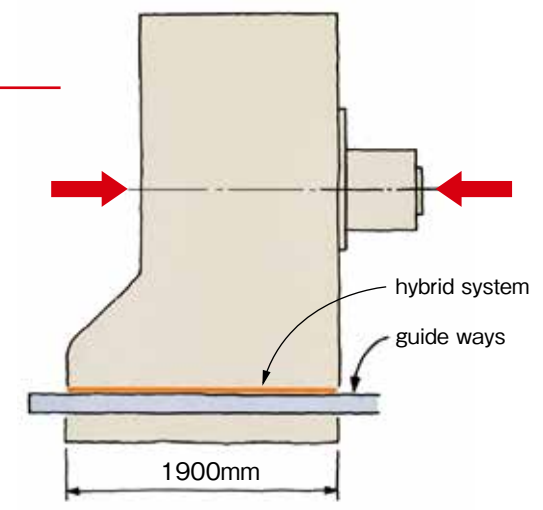
Spindle quill type with 300mm (option 400mm) W-axis travel of dia. 120mm spindle helps shorten cutter length and improves machining performance, especially in heavy-duty machining. Wide range of spindle power and torque covers from low speed heavy-duty machining to high speed high precision machining.



**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 Selectable spindle** ———  
Type It is possible to select spindle fixed type according to purpose of usage.

YBM15T has quill 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

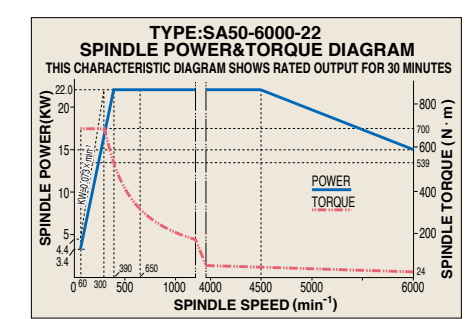
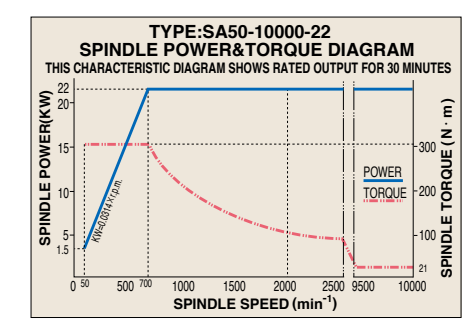


Preload self-adjusting system

Spindle assembly room in YASDA

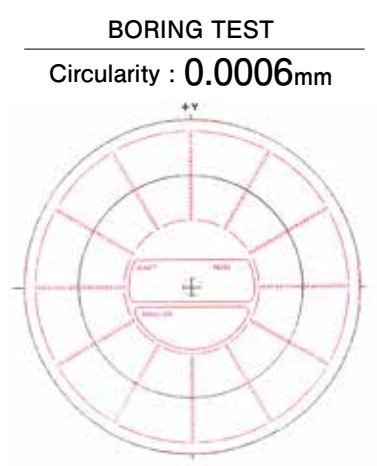
**Reliable performance, enabling highly stable and accurate machining in its all rotation range**

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**

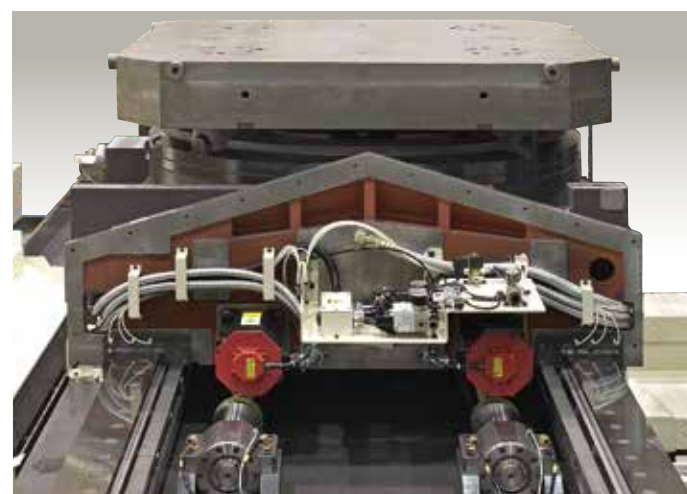
Spindle cartridge and spindle motor are connected co-axially by a diaphragm coupling to achieve highly accurate rotation of the spindle at full range of its rotation speed, which helps achieve highly accurate machining surface



# YASDA PRECISION CENTER YBM 15T



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



X-axis twin ball screws

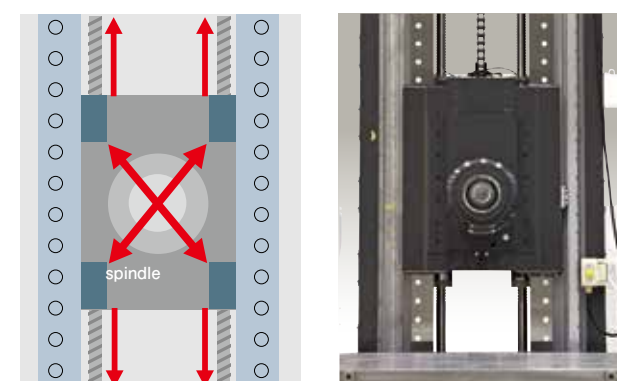
By employing twin ball screws for all linear axes (X/Y/Z), 24m/min fast rapid feed has achieved without losing outstanding machine accuracy and high rigidity. At the same time, Twin ball screws on Y-axis help support highly accurate spindle travel stable all the time.



Y-axis twin ball screws

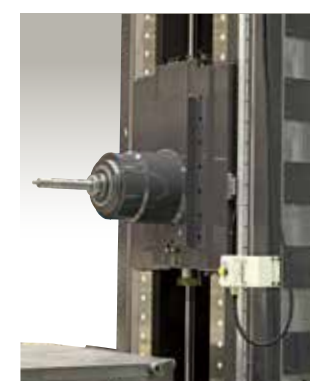
### ■Twin ball screws on Y-axis

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.



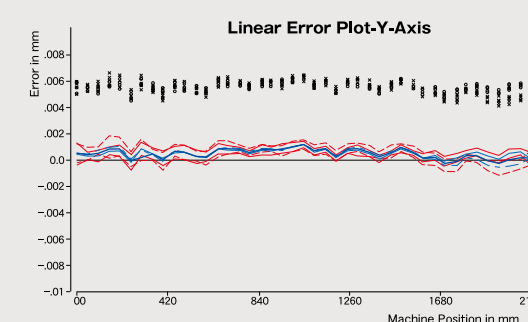
### Optical scale feedback

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.



### Positioning Accuracy

ISO 230/2 (1988)	X	Y	Z
正確さ:A	0.0049	0.0043	0.0046
ISO 230/2 (2014)	X	Y	Z
正確さ:A	0.0043	0.0037	0.0040
ISO 230/2 (2014)	X	Y	Z
繰返し性:R	0.0014	0.0010	0.0009



## **Component** Highly rigid main components supporting high speed highly accurate machining of large work pieces.

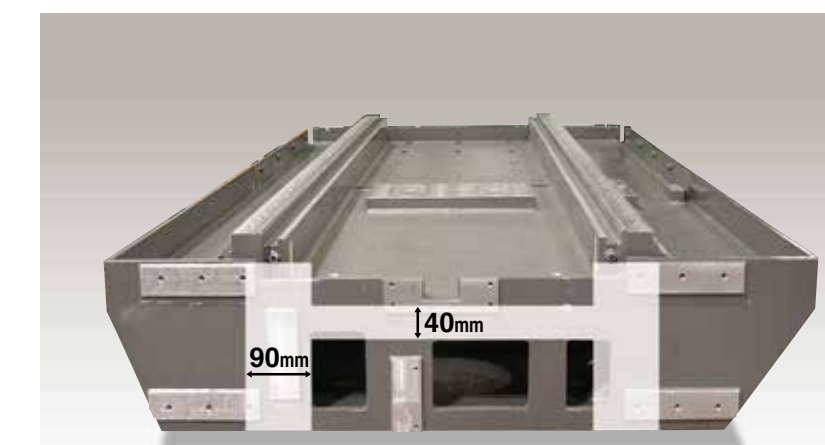
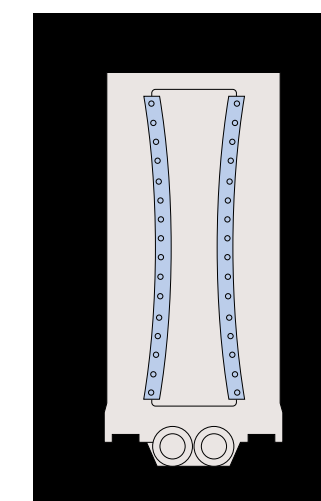
High accuracy and durability of YBM 15T is realized by outstandingly rigid mechanical components, for example, bed and column designed symmetric to control thermal deformation, hardened die steel guide ways assuring durability of long strokes, highly rigid feed drive system with big diameter twin ball 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.



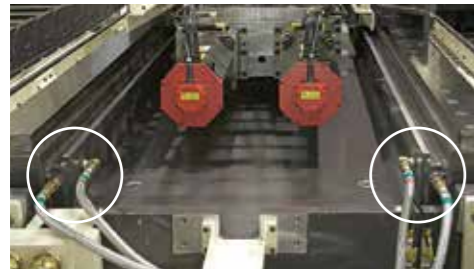
## BED

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.

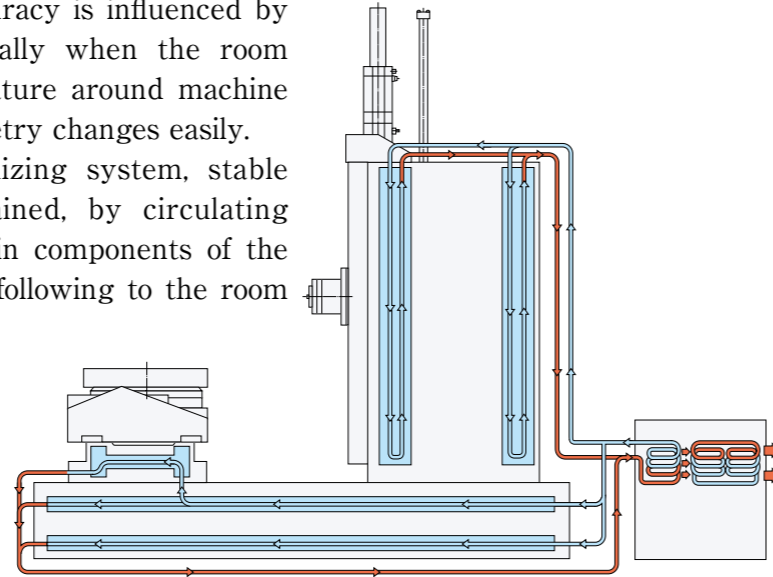
# Thermal control Reliable mechanism controlling thermal distortions

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

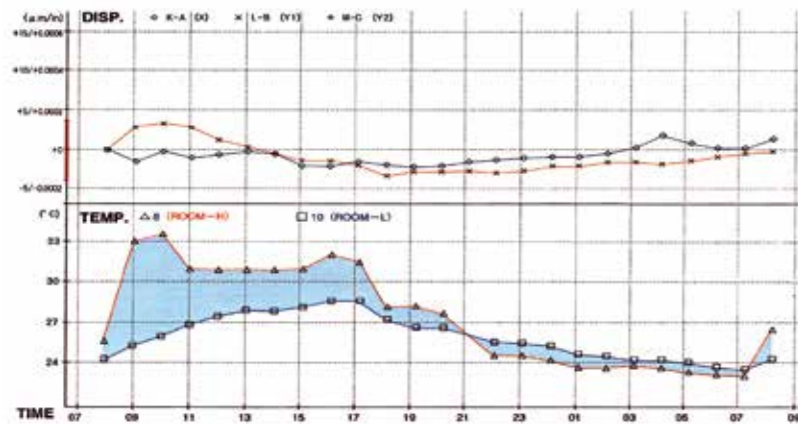
Even the most accurate machining center, accuracy is influenced by the environment of work shop a lot. Especially when the room temperature changes quickly or when temperature around machine top and bottom are different, the machine geometry changes easily. By YASDA option Thermal distortion stabilizing 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  $\pm 0.2^{\circ}\text{C}$ .



Thermal distortion stabilizing oil to the bed

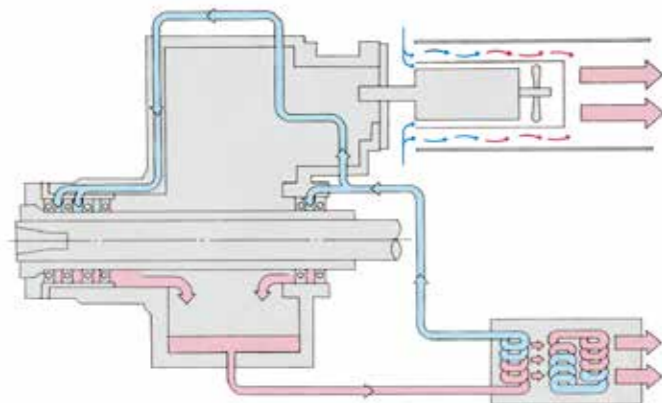


## Machine geometric stability test with Thermal distortion stabilizing system



## 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.



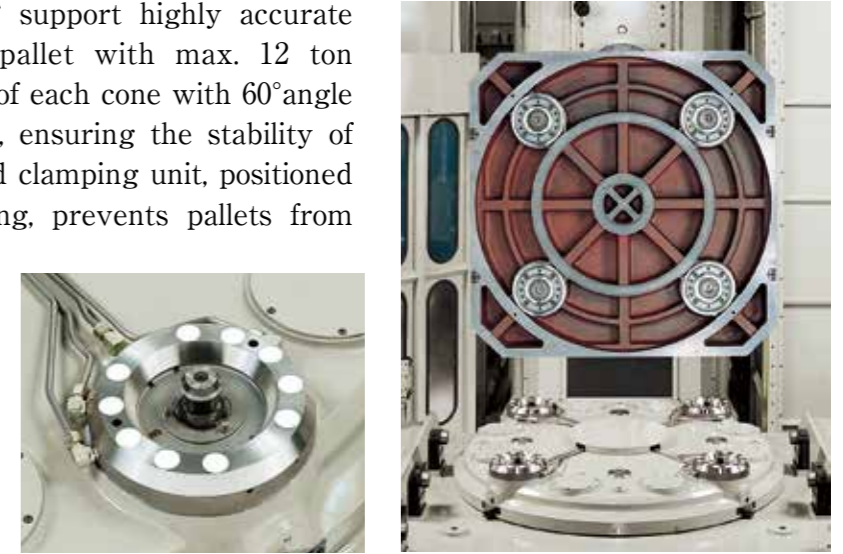
## Spindle jacket cooling system

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

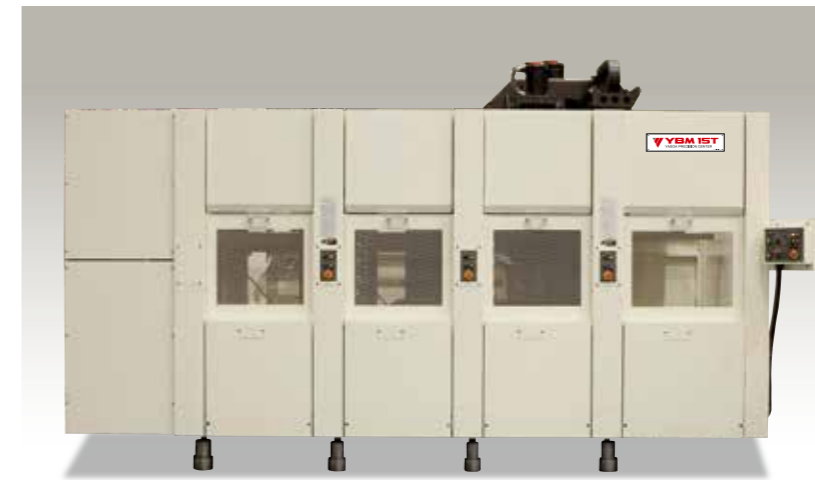
# Changer units Conic couplings for pallet chucking

## 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° angle 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 removes 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

# OpeNe Version 2.0 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.

## 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.

## 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.

## 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		
1) Travel	X-axis travel	2,100mm
	Y-axis travel	1,800mm
	Z-axis travel	1,500mm
	W-axis travel	300mm
	Table surface to spindle center distance	0~1,500mm
	Table center to spindle nose distance	4400~1,900mm (When W-axis quill is 0)
2) Table (Pallet)	Pallet working size	1,500×1,500mm
	Pallet surface configuration	77-M16 tapped holes
	Loading capacity	12,000kg
	Min. table indexing angle	0.0001deg.
	Max.swing diameter of the workpiece	Φ2,050mm
	Max.workpiece size on the pallet	Φ2,050mm
	Max. height of the workpiece	2,000mm
3) Spindle	Spindle type	50-520/2800-37
	Spindle speed range	30~2,800min <sup>-1</sup>
	Spindle drive motor	AC30kW/37kW (Continuous/30min)
	Spindle taper hole	MAS BT50
	Spindle bearing inner diameter	Φ120mm
	Spindle nose surface	BIG plus spindle
4) Feed rate	Rapid feed	(X-axis) Max.20,000mm/min (Y-,Z-axis) Max.24,000mm/min (W-axis) Max.8,000mm/min (B-axis) Max.3min <sup>-1</sup>
	Cutting feed	(X-,Y-,Z-,W-axis) Max.7,000mm/min (B-axis) Max.2min <sup>-1</sup>
	Min.input increment	0.0001mm (deg.)
5) ATC	Tool shank type	MAS BT50
	Pull stud type	MAS403 P50T-1
	Tool storage capacity	60 tools/120 tools stand
	Max. tool dia./length/mass	Φ400mm(with limitation) /550mm/25kg
	Max.tool diameter in full setting	Φ100mm
	Tool selection system	Shortcut random selection
6) Automatic pallet changer(APC)	Method of pallet change	Rotary shuttle
	Number of pallets	2 pallets
	Set-up station	2 station
	Automatic program search	
7) Pallet chucking device		Conic couplings system
8) Mass of machine (without ATC magazine)		Approx.42,000kg
9) Electric power capacity		Max.116kVA
10) NC unit		FANUC 31i-B5

2. Standard equipments		
1) Optical scale feed back		X-,Y-,Z-axis 0.0001mm command available
2) Rotary encoder feedback		B-axis 0.0001deg. command compliant
3) Hydraulic unit	Pump discharge pressure/Oil reservoir	9MPa/100L
4) Oil cooling system for spindle head, spindle motor and ball screw brackets		
5) Coolant unit	AA type	8 nozzles around spindle nose
	Pump discharge	0.3MPa, 30L/min
	Tank capacity	1,600L
6) Splash guard		Manual slide door with ceiling cover ,4 LED lights
7) Chip conveyor	Screw conveyor (inside the machine) + scraper chip conveyor with separator (outside the machine)	
8) Guide way protector		
9) Automatic power breaker		
10) 3-layer signal light		Red,yellow,green (Flashing)
11) OpeNe Version2.0		

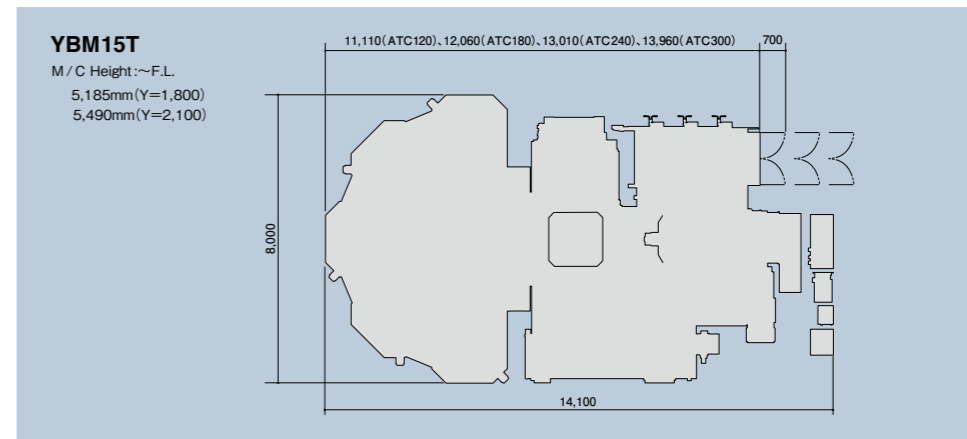
3. CNC standards		
1) Display		15"LCD touch panel with iHMI
2) Program memory capacity		512KB (1,280)
3) Custom macro common variable		600
4) Number of registerable programs		1,000
5) Automatic corner override		
6) Tool offset pairs		64pairs
7) Tool offset memory		Memory C
8) Extended part program editing		
9) Background editing		
10) Memory card/USB memory interface		Data input/output

4. Optional equipments		
1) High-speed spindle (Spindle fixed type without W-axis)	Spindle type	SA50-10000-22 Preload self-adusting spindle
	Spindle speed range	50~10,000min <sup>-1</sup>
	Spindle drive motor	AC18.5kW/22kW (Continuous/30min)
	Spindle taper hole	MAS BT50
	Spindle bearing inner diameter	Φ100mm

4. Optional equipments		
2) High-speed spindle (Spindle fixed type without W-axis)	Spindle type	SA50-6000-37 Preload self-adusting spindle
	Spindle speed range	60~6,000min <sup>-1</sup>
	Spindle drive motor	AC30kW/37kW (Continuous/30min)
	Spindle taper hole	MAS BT50
	Spindle bearing inner diameter	Φ110mm
3) Preload stand (PLS)	Number of stands	5PLS
4) Multiple magazine (with ATC)	Automatic program search	
	Tool storage capacity	90~450 tools
	Max. tool dia./length/mass	Φ400mm(with limitation) /440mm · 550mm(No.1 magazine only)/25kg Φ100mm
5) Stroke extension	Max.tool diameter in full setting	Φ100mm
	X-axis	900mm/ Total 3,000mm
	Y-axis	300mm/ Total 2,100mm
	Z-axis	300mm/ Total 1,800mm
6) Thermal distortion stabilizing system		100mm/ Total 400mm
7) Coolant temperature controller		With weekly timer
8) Shower coolant unit		Celling shower
9) Spindle center through flood coolant	Pump discharge pressure	3.5MPa/6MPa
	Pump discharge amount	20L/min
10) Spindle center through micro fog coolant		
11) External mist coolant		2 nozzles around the spindle
12) Oil skimmer		
13) Mist collector		
14) Tool measurement & Tool breakage detection system		LP2(by Renishaw) NT-H (by BLUM)
15) Automatic workpiece measuring system		Touch prove OMP60(by RENISHAW)
16) High-speed machining function (YASDA HAS-4 system)		With Machining support screen
17) Weekly timer		
18) Compensation for spindle thermal displacement		Individual data
19) Signal tower (Multilayer signal lamp)		Red,yellow,green(Flashing)
20) Washing gun		
21) Chip bucket		
22) Anchor unit		
23) Automatic fire-extinguishing 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/Ethernet
18) Data server function		Fast data server,Capacity:1GB,2GB,4GB,16GB,32GB

## OUT LINE





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