

Higher accuracy produces greater profitability

**YASDA CNC JIGBORER**

# **V-series**

## **Mold & Die Miller**

New technology · High speed hard milling

**YBM640V** Ver.V

**YBM950V** Ver.V

**YBM9150V** Ver.II



YBM 950V Ver.V

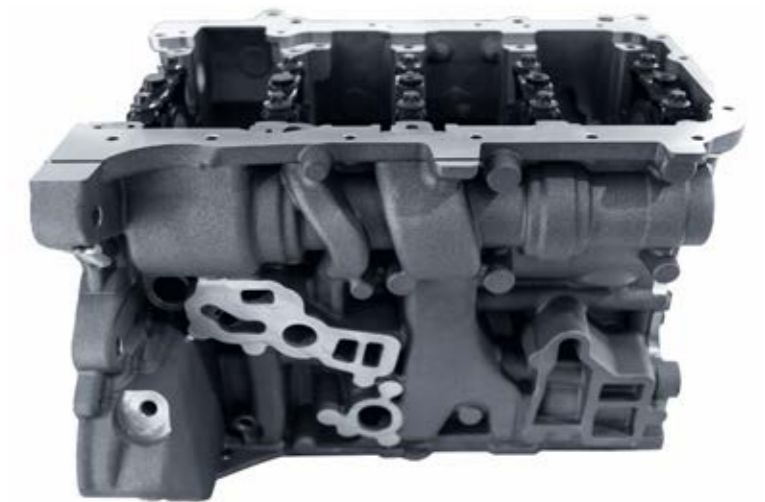
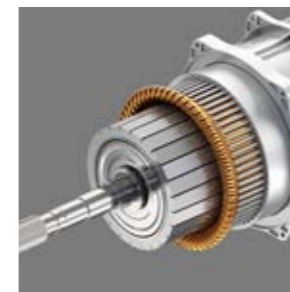
# V-series

Unique machine structure and spindle designed for high accuracy, and thorough countermeasures against thermal distortion.

YASDA's sophisticated technologies gathered and realizes stable high precision machining for long hours.



Outstandingly versatile machining capabilities which cover high speed rough-removal through fine precise finishing in hard milling. Suitable for leading-edge manufacturing fields, e.g. medical, semiconductor, next-generation automobile and so on.



Progressive new outlook of YBM 640V & 950V

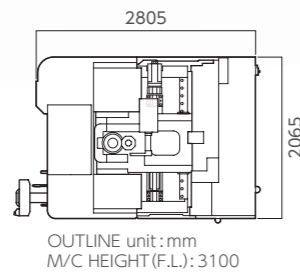


**YBM 640V** Ver.V

Travel(X × Y × Z)	600 × 400 × 350
Table working surface	700 × 450
Loading capacity	300kg

ISO 230-2(1988)	unit (mm)
Accuracy : A	X:0.0018 Y:0.0016 Z:0.0023

ISO 230-2(2014)	
Accuracy : A	X:0.0015 Y:0.0013 Z:0.0019
Repeatability:R	X:0.0005 Y:0.0003 Z:0.0006

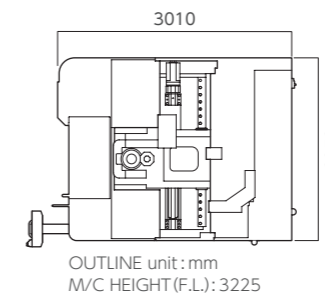


**YBM 950V** Ver.V

Travel(X × Y × Z)	900 × 500 × 350
Table working surface	1000 × 500
Loading capacity	800kg

ISO 230-2(1988)	unit (mm)
Accuracy : A	X:0.0027 Y:0.0014 Z:0.0019

ISO 230-2(2014)	
Accuracy : A	X:0.0022 Y:0.0011 Z:0.0015
Repeatability:R	X:0.0008 Y:0.0004 Z:0.0004

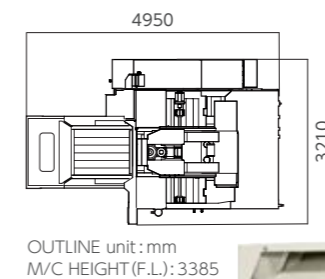


**YBM 9150V** Ver.II

Travel(X × Y × Z)	1500 × 900 × 450
Table working surface	1500 × 900
Loading capacity	3000kg

ISO 230-2(1988)	unit (mm)
Accuracy : A	X:0.0026 Y:0.0016 Z:0.0017

ISO 230-2(2014)	
Accuracy : A	X:0.0020 Y:0.0013 Z:0.0013
Repeatability:R	X:0.0010 Y:0.0006 Z:0.0008



Common specifications

- Spindle speed range / 100~24,000min<sup>-1</sup>
- Spindle taper / MAS BT40
- Spindle nose surface / Big Plus (BBT40)
- Rapid feed / 20,000mm/min (XYZ)

New design of YBM 640V & 950V Ver.V

Swivel and height adjustable CNC display

Operating position and visual access can be adjusted for different operators based on an ergonomic design.



Maintenance area

Accessibility for robot automation is improved by gathering all the accessories for daily maintenance on the back side of the base machine.



Covers in machining area

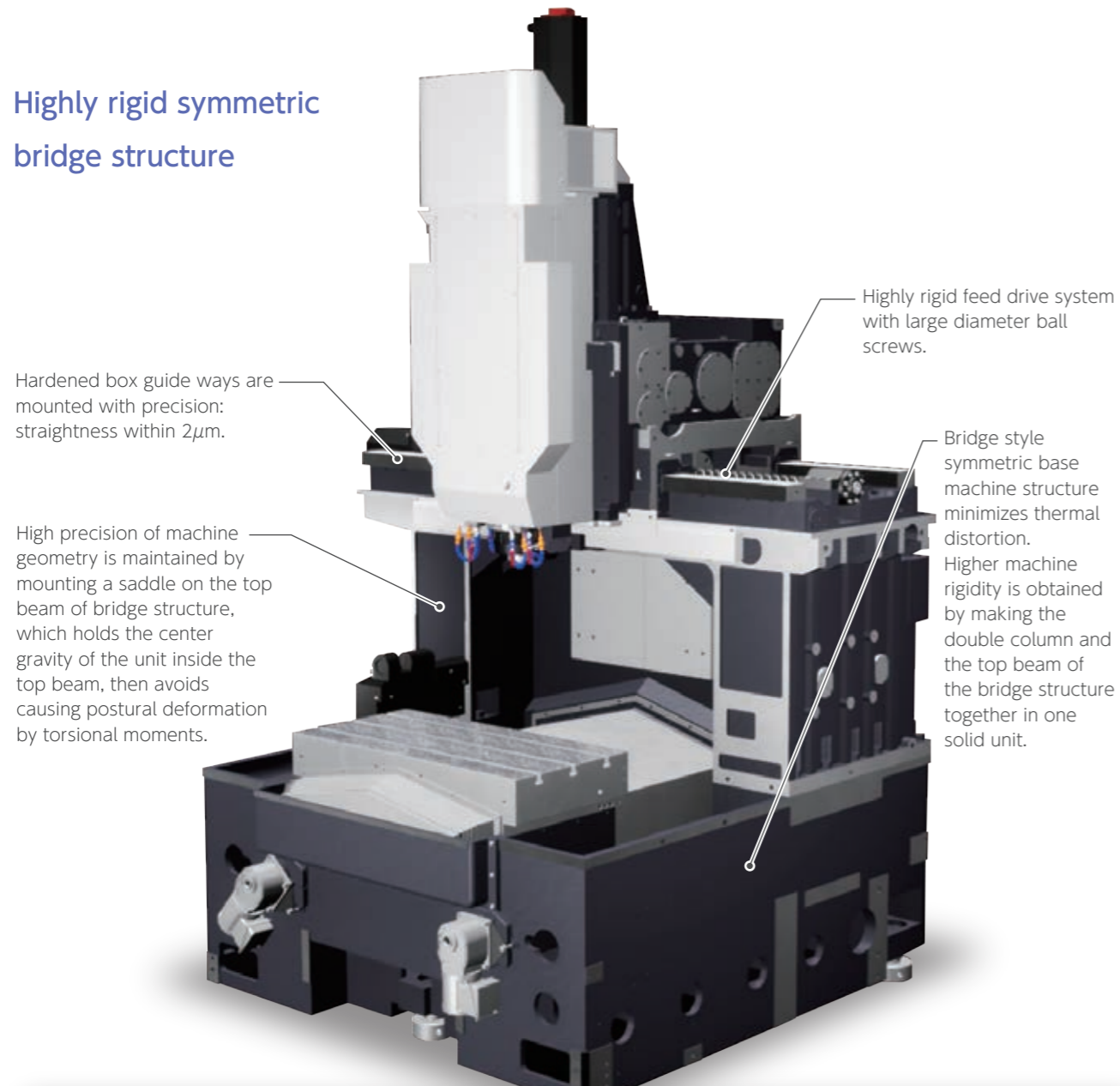
Slanted covers of stainless steel have smooth surfaces, improving cutting chip evacuation and rust prevention.



Eco-friendly: The inverter hydraulic units with energy saving mode.

## So that's YASDA: Reasons to be selected

### Highly rigid symmetric bridge structure



Hardened box guide ways are mounted with precision: straightness within  $2\mu\text{m}$ .

High precision of machine geometry is maintained by mounting a saddle on the top beam of bridge structure, which holds the center gravity of the unit inside the top beam, then avoids causing postural deformation by torsional moments.

Highly rigid feed drive system with large diameter ball screws.

Bridge style symmetric base machine structure minimizes thermal distortion. Higher machine rigidity is obtained by making the double column and the top beam of the bridge structure together in one solid unit.

### Making Guideways

Guideways are mounted on the meticulously hand-scraped surfaces. The highest precision is achieved through repetition of hand-scraping on the mounting surfaces and measuring straightness of each linear axis assembled.

In addition, by assembling base components free from stress, the machine minimizes deterioration of geometric accuracies and supports high precision machining for long years.

Y axis Straightness Within  $0.5\mu\text{m}/1000\text{mm}$  (YBM 640V)

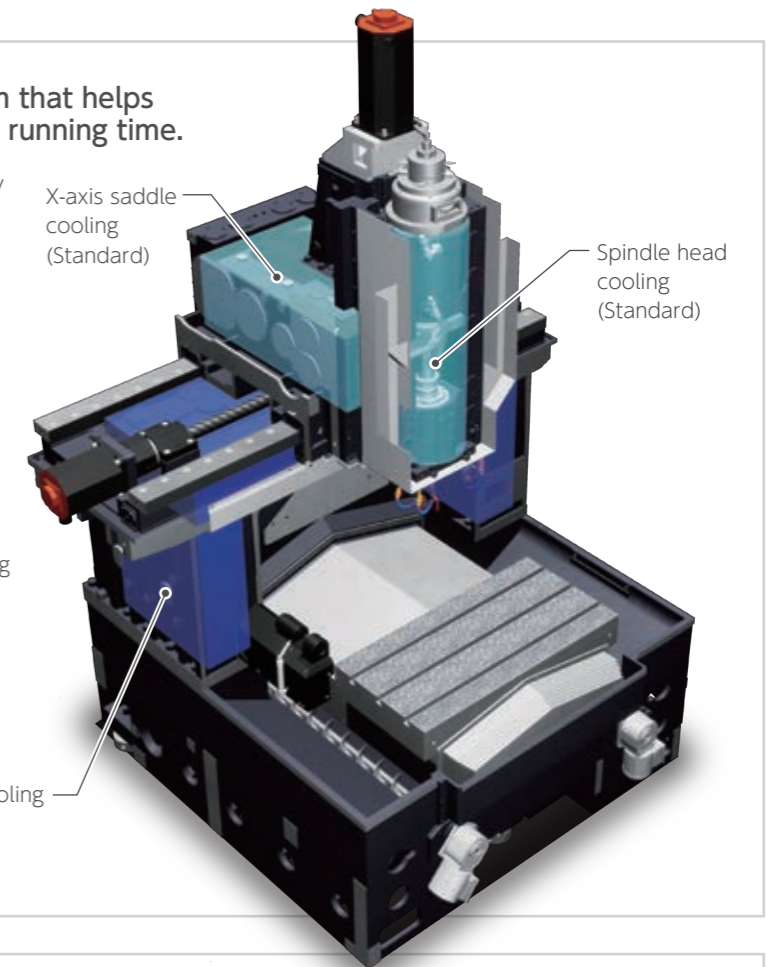


### Thermal distortion stabilizing system that helps assure highest accuracy during long running time.

Thermal displacement of the machine caused by rapid environmental changes around the machine, such as room temperature changes, temperature differences between the top and bottom of the machine, and radiation heat from the ceiling and walls, can greatly affect machining accuracy.

YASDA's thermal distortion stabilizing system prevents sudden geometry change of the machine due to temperature change in the surrounding area by circulating the heat exchange liquid controlled at  $\pm 0.2^\circ\text{C}$  relative to the room temperature throughout the machine. This enables stable, and highly precise machining for a long time.

By synchronizing the temperature of the heat exchange liquid with the room temperature, it avoids excessive cooling and reduces the energy required for cooling.



### Spindle for high quality surface machining

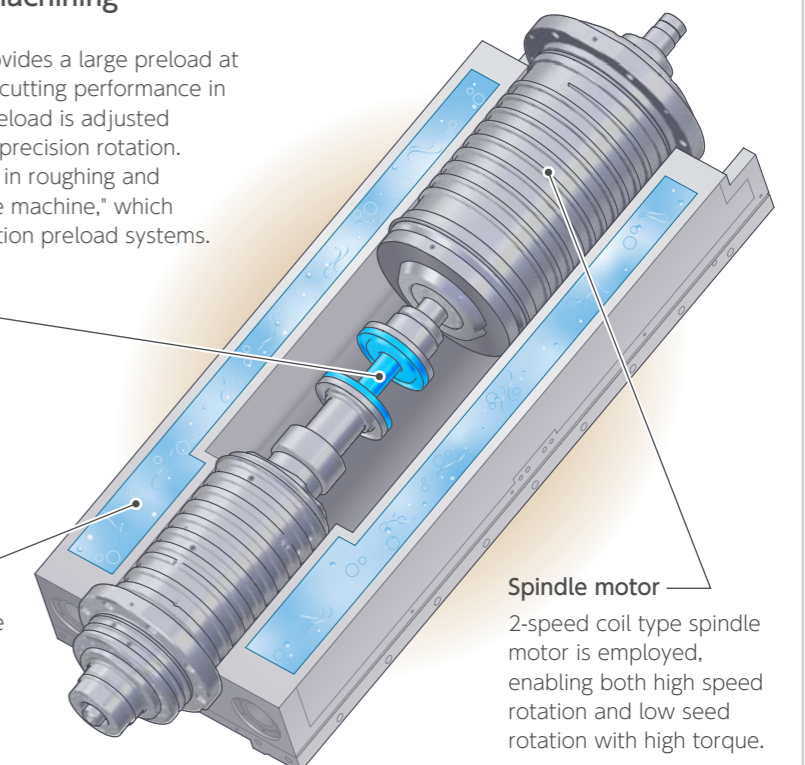
YASDA's "Preload Self-Adjusting Spindle" provides a large preload at low spindle speed rotation to ensure heavy cutting performance in the low speed range. At high speeds, the preload is adjusted reducing heat generation and enabling high-precision rotation. The machine realizes "heavy-duty machining in roughing and finishing with small-diameter tools in a single machine," which cannot be achieved with ordinary fixed-position preload systems.

#### Direct Drive System

The spindle and the spindle motor are connected co-axially by a diaphragm coupling in between, in order to maintain precise rotation of the spindle throughout the full speed range of the spindle.

#### Thermal distortion stabilizing system in the spindle head

The spindle head and saddle of the machine contains the largest heat-generating units. By circulating heat exchange fluid through these components, the system minimizes thermal distortion.



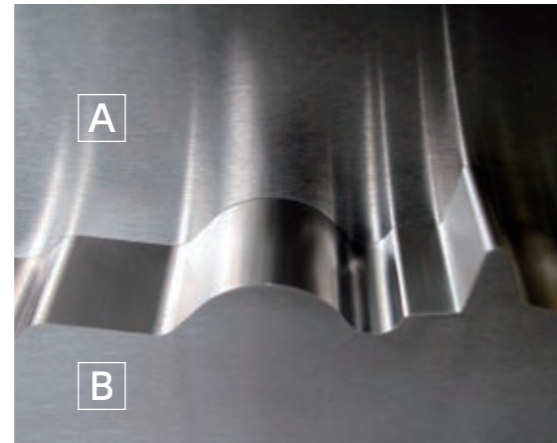
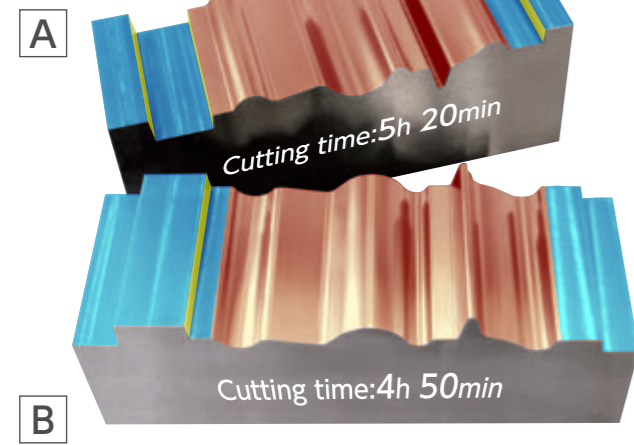
2-speed coil type spindle motor is employed, enabling both high speed rotation and low speed rotation with high torque.

## Application examples for high precision machining

### Fitting test pieces finished by 3 different tools

Realizing highly precise fitting accuracy and quality with 3D shapes taking long machining hours, changing tools, without gap.

Material: NAK80 (40HRC)  
Machine: YBM 640V



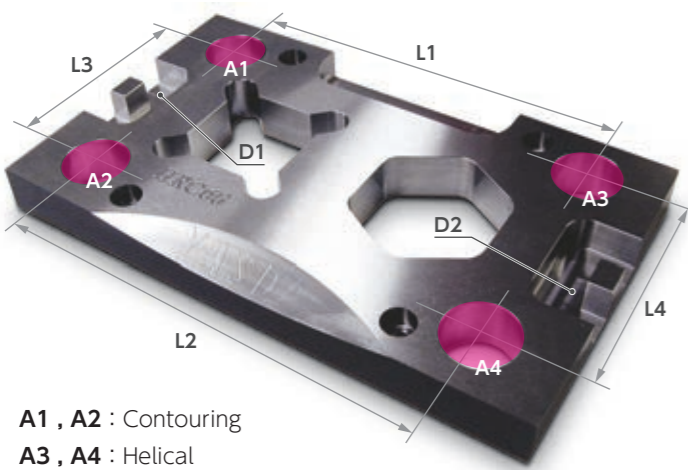
Process

- ① R1×6 Ball end mill S15000
- ② φ10 Flat end mill S2000
- ③ φ5×5° Taper end mill S1300

### Die Plate

Precision hard milling on highly hardened steel.

Material: ARK1 (60HRC)  
Machine: YBM 950V φ10 Flat end mill



A1, A2 : Contouring  
A3, A4 : Helical

unit (mm)

Position	Target	Actual Value	Error
A1	X -92.5	X -92.4998	X +0.0002
	Y 50.0	Y 50.0008	Y +0.0008
A2	X -92.5	X -92.5000	X 0
	Y 50.0	Y -50.0006	Y -0.0006
A3	X -92.5	X 92.4995	X -0.0005
	Y 50.0	Y 49.9996	Y -0.0004
A4	X -92.5	X 92.4994	X -0.0006
	Y 50.0	Y -49.9997	Y +0.0003
Roundness:A1-A4		0.002	
Straightness:A3,A4		0	

Pitch	Target	Actual Value	Error
L1	185	184.9997	-0.0003
L2		184.9994	-0.0006
L3	100	100.0014	+0.0014
L4		99.9993	-0.0007

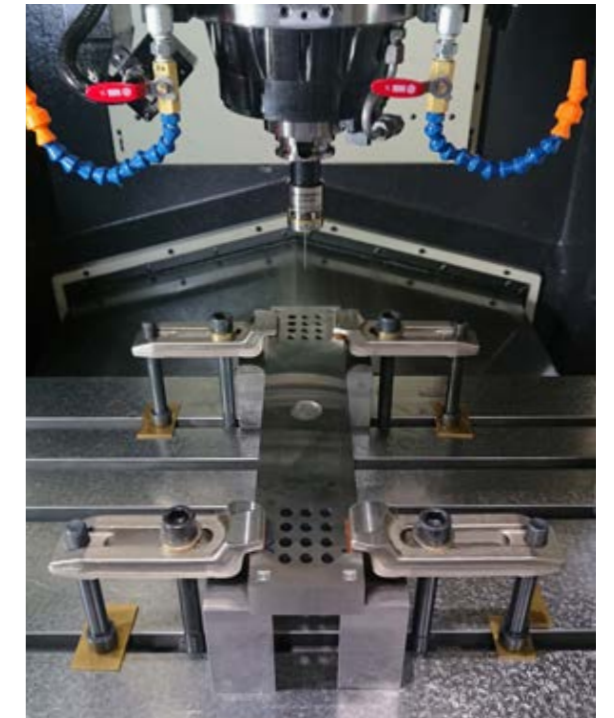
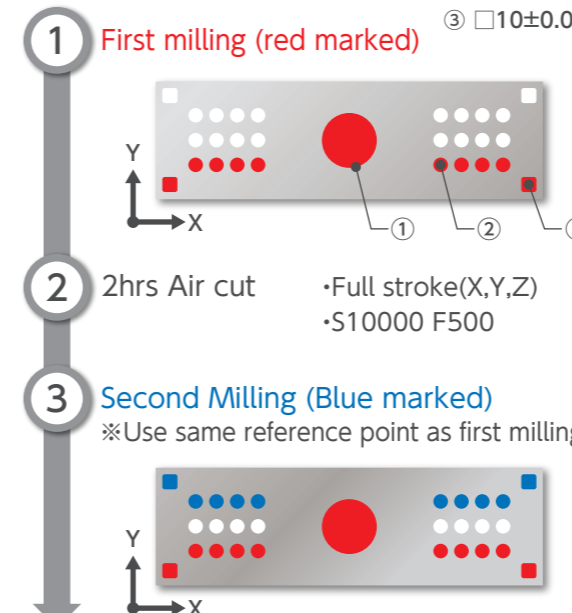
Depth	Target	Actual Value	Error
D1	15	14.9997	-0.0003
D2		15.0000	0

## Thermal Stability test

### Proving out the stability against thermal distortion during long hours

Check the thermal displacement during machining.

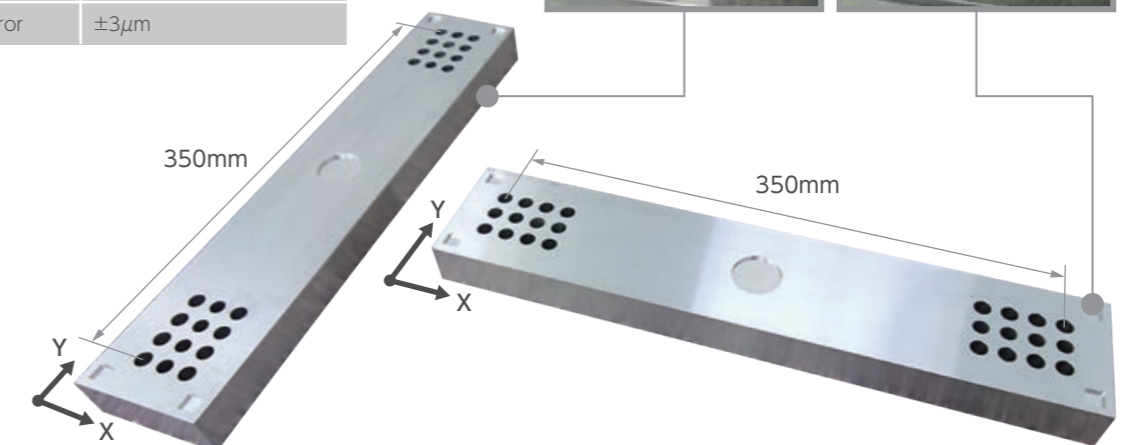
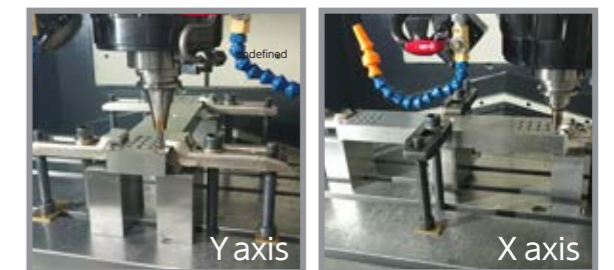
Material: SKD11 (58HRC) Target: ① φ30±0.01  
Machine: YBM 950V ② φ10 <sup>+0.005</sup><sub>0</sub>  
③ □10±0.01



Total Time : 5hrs

Perform this test in different set up (work piece 0 degree and 90 degree) and check the position error (thermal displacement) of the holes before and after air cut.

Measurement Point	Measuring result	
Center error	X axis	X:2μm / Y:3μm
	Y axis	X:2μm / Y:1μm
Pitch error	+3μm	
Depth error	±3μm	



## “HAS-4” realizes higher speed, higher precision machining

HAS-4 (high-speed and high precision machining function) sets the optimal parameters automatically according to every milling purpose.

HAS-4 reduces machining time and improves machining accuracy by changing parameters such as acceleration/deceleration and tolerance according to machining purpose.

YASDA’s high-precision machining function HAS-4, essential for machining molds, has 5 M-codes (M300 to M304) including rough machining and finish machining. On the machining assist screen, it is also possible to adjust machining parameters for each mode according to machining results expected.



## YASDA’s original software "OpeNe"

### Tool Management



- Batch management of tool information, measurement history, etc.
- Real-time monitoring of spindle loads (comparing with actual values).
- Tool measurement without measuring program.

### Production Management



- Automatically obtaining machine information, e.g. load to each axis, work coordinates, tool offsets, etc., then display these with the machine running status and time line.
- The data can be output with CSV data.

### Maintenance Management



- Automatic monitoring system obtaining running status and counting activation of each accessory unit.
- Monitoring servo waveform data then recognize machine conditions compared to the time of machine installation.
- Planned and preventive maintenance.

### Program Management Function



- Search with program number or tool number.
- Machining time simulation.

## Operation support

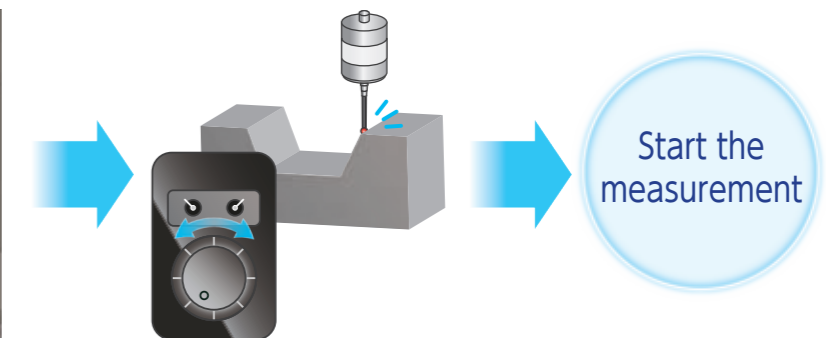
### EZ-Me

“On-machine measurement” and easy work setting for everyone.



Option: EZ-Me PRO

Select the measurement mode



Touching workpiece by MPG

EZ-Me facilitates on-machine measurement of workpiece by touching workpiece from manual (MPG) operation. As the measuring program is not required, everyone can perform centering of work piece easily before and after machining.

### Navi-CAL

Navi-CAL automatically calibrates tools, probes and Z-axis which are necessary for high precision machining.



Calibration for tool length measuring using a master tool.



Calibration for touch probe using a master gauge.



Checking Z-axis using a master tool and gauge.

Regular calibration is essential for high precision machining. However memorizing the procedure and determining the appropriate machine condition for calibration is complicated and time-consuming. Navi-CAL assists everyone to perform these calibrations easily. The correct calibration can be completed by following the navigation, thereby reducing the variation among operators.



## Automatic Tool Changer (ATC)

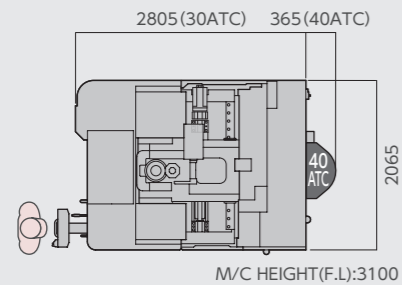
For automation of workpieces with multiple tools.

### OUTLINE

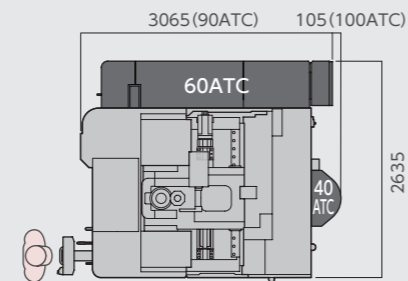
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#### YBM 640V Ver.V

Standard 30 tools  
Option 40 tools

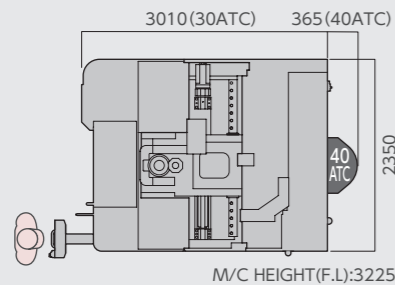


Option  
90 tools (30 tools+60 tools)  
100 tools (40 tools+60 tools)

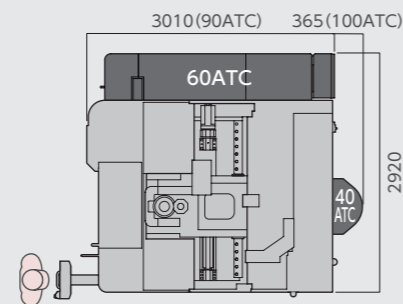


#### YBM 950V Ver.V

Standard 30 tools  
Option 40 tools

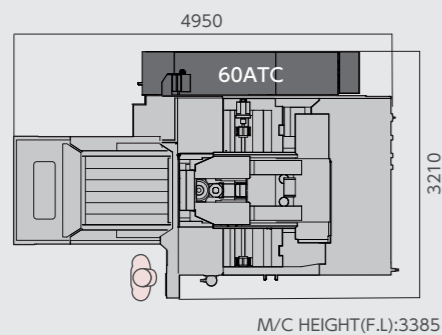


Option  
90 tools (30 tools+60 tools)  
100 tools (40 tools+60 tools)

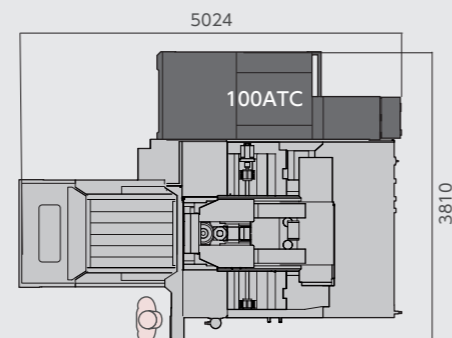


#### YBM 9150V Ver.II

Standard 60 tools



Option 100 tools



## Automatic Pallet Changer (APC)

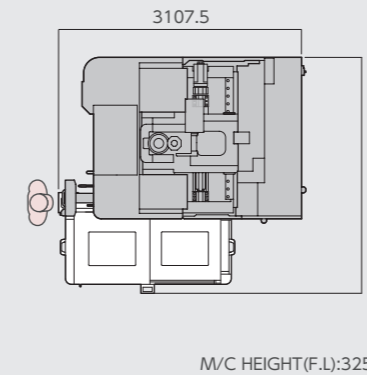
Consistent positioning accuracy by original pallet chucking mechanism.

### OUTLINE

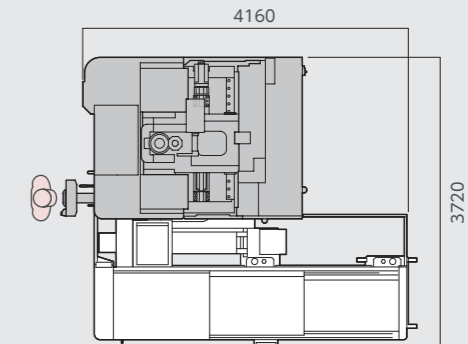
unit:mm

#### YBM 640V Ver.V

APC

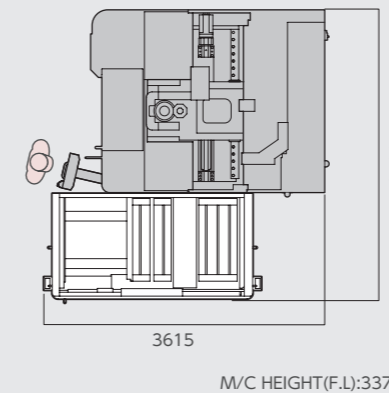


5PLS

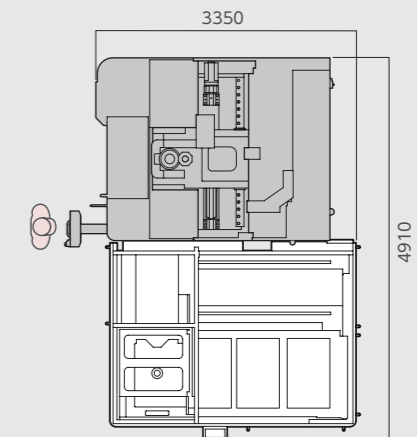


#### YBM 950V Ver.V

APC

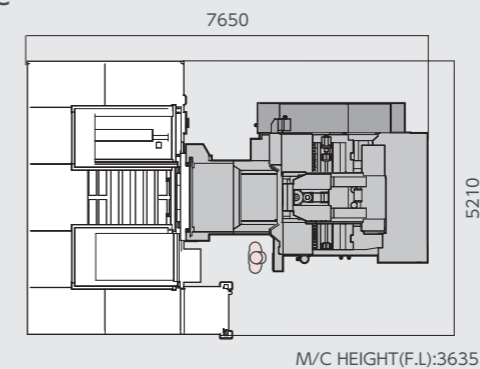


4PLS



#### YBM 9150V Ver.II

APC



## Robot Interface

Realizing “automation of high precision machining” by connecting with a robot for long hours operation.

Machines prepared for flexible and versatile customer expectations in system development. Compact and stable automation system for long hour machine running is realized by connecting with an external robot work transferring system.



### Layout examples

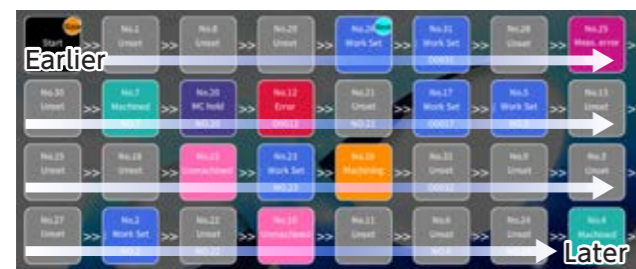
Robot can be connected from both sides and a system design of two machines with one robot can be realized.



## YASDA Work Management

Multiple workpiece machining schedules can be created by YASDA's original scheduler.

### Priority order



When urgent machining is required, Machine always selects prior workpieces.

### Schedule order



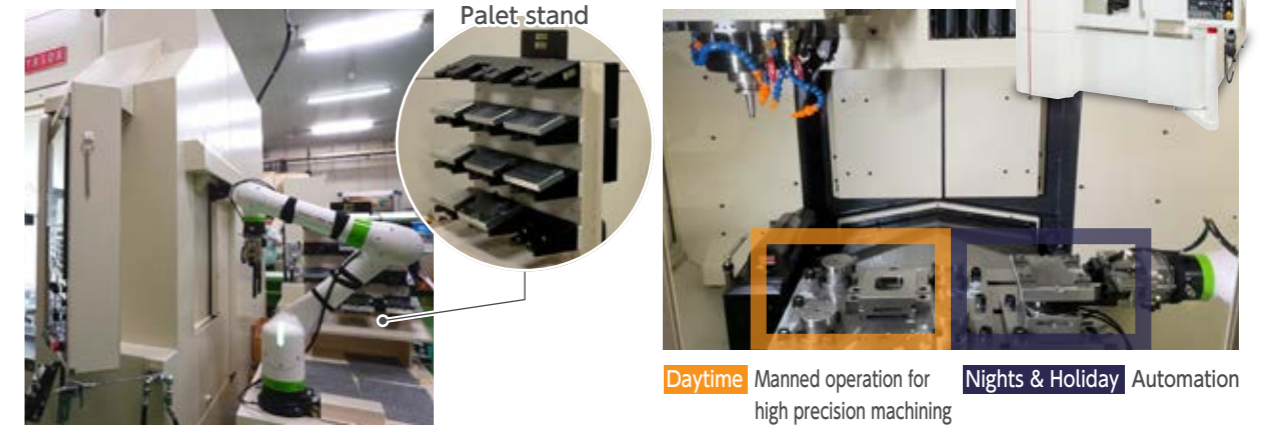
Machining is performed in the order of schedule.

## CASE STUDY-1



Business Design and fabrication of precision jigs and dies & molds.

**YBM640V** +



## CASE STUDY-2



Business Injection Mold manufacture

**YBMvi40** +



## Rotary Table

A DD (Direct Drive) motor provides indexing machining as well as highly accurate simultaneous 4-axis machining.

# RS20

Rotary axis indexing accuracy  
(Measured value)  
ISO 230-2 (1997)

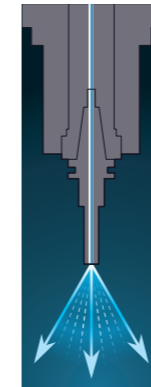
Accuracy : A	0.99sec
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### RS20 specifications

Table diameter	φ200mm
Table surface configuration	4 T-slots x 90 degree pitch Slot width:12mm H8 (standard)
Table center hole diameter	φ30mmH7(Depth:10mm)
Table rotational axis travel	360° (Continuous)
Rotary table Max. rapid feed rate	150min <sup>-1</sup>
Loading capacity	40kg
Min.input	0.0001deg
Height up to table center	200mm

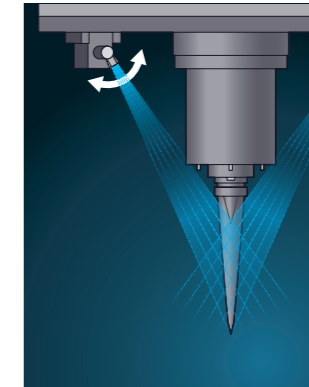


## Coolant system



### Spindle center through flood coolant

Coolant is supplied from the center of the spindle.  
Pump discharge pressure: 3.5 or 6.0 MPa



### Wavy nozzles

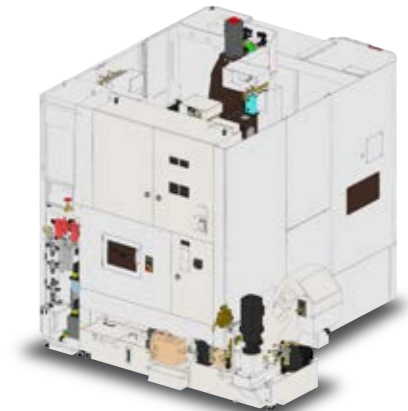
- Coolant is supplied following the tool edge.
- Swinging motion prevents chips from entangling in the tool.
- Suitable for cleaning during automatic operation and helps to avoid chip accumulation on the workpiece and inside the machine.

## Chip conveyor

### Screw conveyor (Standard)



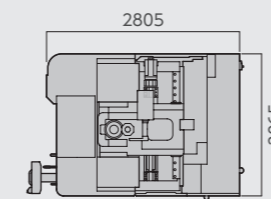
### Scraper type chip conveyor (Option)



### OUTLINE

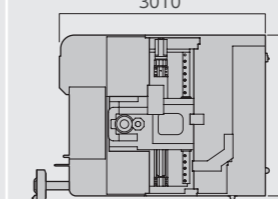
unit:mm

#### YBM 640V Ver.V



M/C HEIGHT (F.L.): 3100

#### YBM 950V Ver.V

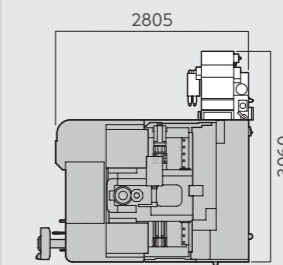


M/C HEIGHT (F.L.): 3225

### OUTLINE

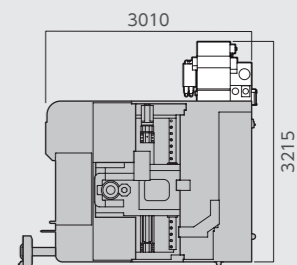
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#### YBM 640V Ver.V



M/C HEIGHT (F.L.): 3100

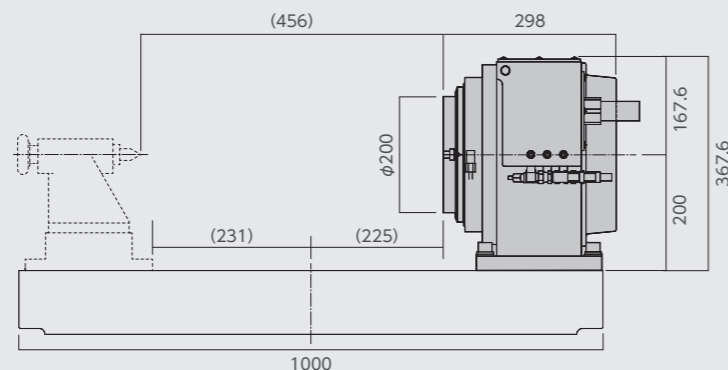
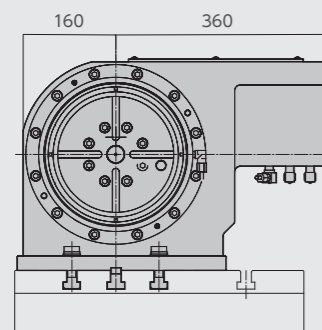
#### YBM 950V Ver.V



M/C HEIGHT (F.L.): 3225

### OUTLINE YBM 950V Ver.V

unit:mm



1. Base machine specifications		640V Ver.V	950V Ver.V	9150V Ver.II
1) Travel	X-axis travel	600mm	900mm	1,500mm
	Y-axis travel	400mm	500mm	900mm
	Z-axis travel	350mm	350mm	450mm
	Table to spindle nose distance	150 ~ 500mm	200 ~ 550mm	150 ~ 600mm
2) Spindle	Spindle speed range	100 ~ 24,000min <sup>-1</sup>		
	Spindle drive motor	AC18.5/22kW (Continuous/15min.)		
	Spindle taper hole	MAS BT40		
	Spindle nose surface	BIG plus spindle		
3) Table	Table working size	700mm×450mm	1,000mm×500mm	1,500mm×900mm
	Loading capacity	300kg	800kg	3,000kg
	Table surface configuration (width/pitch/number of T slots)	18mm/125mm/3	18mm/150mm/3	18mm/150mm/5
4) Feed rate	Rapid feed	20,000mm/min		
	Cutting feed	1 ~ 5,000mm/min		
	Min. input increment	0.0001mm		
5) ATC	Tool shank type	MAS BT40		
	Pull stud type	JIS B6339-40P		
	Tool storage capacity	30 tools	30 tools	60 tools
	Max. tool dia./length/mass	φ70mm(φ100mm)/250mm/7kg	φ70mm(φ100mm)/250mm/7kg	φ70mm(φ100mm)/300mm/7kg
6) Mass of machine	Approx.8,000kg	Approx.11,000kg	Approx.16,000kg	
7) Electric power capacity	Max.39kVA	Max.39kVA	Max.41kVA	
8) NC unit	FANUC 31i-B5 Plus			

2. Standard equipments		640V Ver.V	950V Ver.V	9150V Ver.II
1) Optical scale feed back	X-,Y-,Z-axis 0.0001mm command available			
2) Splash guard	Manual slide door with ceiling cover,1 LED light	Manual slide door with ceiling cover,1 LED light	Manual slide door with ceiling cover,2 LED lights	
3) Screw conveyor	Twin screw			
4) Thermal distortion stabilizing system	Standard type			
5) Compensation for spindle thermal displacement	Standard data			
6) Automatic power braker				
7) Automatic fire-extinguishing equipment interface				

3. Optional equipments		640V Ver.V	950V Ver.V	9150V Ver.II
1) Spindle nose face configuration	HSK-A63			
2) Spindle	Spindle speed range	150 ~ 30,000min <sup>-1</sup>	150 ~ 30,000min <sup>-1</sup>	50 ~ 10,000min <sup>-1</sup>
	Spindle drive motor	AC5.5/11kW (Continuous/5min.)	AC5.5/11kW (Continuous/5min.)	AC18.5/22kW (Continuous/30min.)
	Spindle taper hole	MAS BT30	MAS BT30	MAS BT40
3) Signal tower (Multilayer signal lamp)	Red,yellow,green (Flashing)			
4) Coolant temperature controller				
5) External mist coolant	Manufactured by Bluebe / 2 nozzles			
6) Spindle center through flood coolant	Pump discharge pressure 6Mpa/3.5Mpa			
7) Spindle center through air coolant	Micro fog coolant unit			
8) Oil skimmer	Oil Pure or belt type			
9) Mist collector				
10) Tool measurement & Tool breakage detection system	Dyna Line (by BIG Daishowa)			
	Dyna Vision (by BIG Daishowa)			
	DynaZero Vision (by BIG Daishowa)			
				LC50-DIGILOG (by BLUM)
11) Automatic workpiece measuring system				
12) High-speed machining function (YASDA HAS-4 system)	Max. feed rate 12,000mm/min			
13) Thermal distortion stabilizing system	With weekly timer			
14) Weekly timer				
15) Compensation for spindle thermal displacement	Individual data			
16) Automatic pallet changer(APC)	Unit mass	1,500kg	2,500kg	5,000kg
	Safety guard for pallet changer			
17) Preload stand (PLS)	Number of pallet stands	5 stands	4 stands	—
	Unit mass	2,500kg	3,000kg	—
	Automatic program search	—		
	Safety guard for PLS	—		
18) Pallet	Pallet size	500mm×400mm,600mm×400mm	900mm×500mm	900mm×1,500mm
	Pallet surface configuration type	M16 tap		
	Pallet thickness	110mm	100mm	120mm
	Pallet mass	200kg	300kg	1,400kg
19) Pallet chucking system	Loading capacity	300kg	400kg	2,500kg
20) Automatic tool changer	Tool storage capacity	40,60,90,100	40,60,90,100	100
21) AWC door				
22) Robot interface	Compatible with System 3R, EROWA, etc.			
23) Washing gun				
24) Scraper type chip conveyor				
25) Coolant unit level switch				



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\*Export of the products and associated software, and related services are subject to prior approval of the Japanese government according to "Foreign Exchange and Foreign Trade Law".