Higher accuracy produces greater profitability

YASDA CNC JIGBORER

V-series

Mold & Die Miller
New technology - High speed hard milling

YBM640V Ver. W
YBM950V Ver. W
YBM9150V Ver. W

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Combination of traditional manufacturing and cutting-edge IT technology

The V series leading the market of high precision machines, is further increasing its performance with the newest software.

Equipped with YASDA’s proprietary advanced technology

The CNC JIGBORER “V” series has evolved as requirements have changed over time. Equipped with YASDA’s proprietary technology including high rigidity construction, the preload self-adjusting spindle and the thermal distortion stabilizing system, the V series realized ultimate high precision machining. Newly installed advanced software and a high performance measurement system takes high precision machining to a whole new level.

- Equipped with a highly rigid “preload self-adjusting spindle” realizes both heavy cutting and high surface quality machining.
- The “thermal distortion stabilizing system” minimizes thermal distortion of the machine body and allows for stable high-precision machining over long hours.
- Equipped with the high-precision interpolation function “HAS-4 (High Accurate & Speedy machining system),” this function accurately reflects high quality NC data on machining to realize high precision and high-speed machining.
V-series

Further improve high precision and high speed machining capability of the machines leading the market.

**YBM640V Ver.IV**

The YASDA CNC JIGBORER YBM640V Ver. IV demonstrates superior performance in die and mold machining including high precision contouring machining and adequately meeting advanced requirements.

- **Travel** (X × Y × Z): 600 × 480 × 350
- **Table working surface**: 750 × 450
- **Loading capacity**: 3500 kg
  - Accuracy: ±0.0018  ±0.0016  ±0.0012
  - Accuracy: ±0.0015  ±0.0013  ±0.0011
  - Speed: ±0.0010  ±0.0009  ±0.0008

**YBM950V Ver.IV**

The YASDA CNC JIGBORER YBM950V Ver. IV meets a wide range of user needs offering automatic pallet changer and preload stand as options allowing for unmanned operation for extended periods of time.

- **Travel** (X × Y × Z): 900 × 500 × 350
- **Table working surface**: 1000 × 500
- **Loading capacity**: 8000 kg
  - Accuracy: ±0.0022  ±0.0019  ±0.0015
  - Accuracy: ±0.0018  ±0.0015  ±0.0012

**YBM9150V Ver.II**

The YASDA CNC JIGBORER YBM9150V Ver. II with larger table allows for the wider range of workpieces.

- **Travel** (X × Y × Z): 1500 × 900 × 450
- **Table working surface**: 1500 × 900
- **Loading capacity**: 3000 kg
  - Accuracy: ±0.0020  ±0.0016  ±0.0017
  - Accuracy: ±0.0013  ±0.0012  ±0.0011

**Common specifications**
- Spindle speed range: / 100 ~ 24,000/min
- Spindle taper hole: / 7-24 taper No.40
- Spindle end surface: /BIG plus spindle
- Rapid traverse rate: / 20,000mm/min(XYZ)
Framework structured in highly rigid symmetric bridge type

The highly rigid integrated bridge structure dominates the field of ultrahigh precision and heavy cutting.

YASDA’s traditional manufacturing

Attachment of a highly straight guideway to an extremely flat mounting surface

Precisely ground guideway is fastened to a hand scraped mounting surface after lapping. In order to minimize roll error, pitch error, and yaw error of each guideway, high straightness and geometric accuracy are ensured by repeated straightness measurement, guideway removal and re-scraping of the mounting surface.

Challenges the areas where machining alone is impossible

All of YASDA’s products are manufactured through a highly collaborative effort of design, manufacturing and measurement. Technical symbols of YASDA include, not only using the full range of cutting-edge technology and pursuing product performance enhancement, but also manufacturing by “scraping”. Very fine errors in units of some micrometers on metal are ground by hands of experienced craftsmen while measured by ultrahigh precision measuring equipment. This cannot be realized by machining alone. Machining in ultrahigh precision areas through YASDA’s “uncompromising commitment” to precision and performance.
Spindles that realize stable high quality machining

The preload self-adjusting spindle that machines at high degree of accuracy through whole speed range

(MODEL:SA5type)

With a conventional fixed-position preload type spindle, as preload increases along with heat generation of the bearing by high speed spindle rotation, the initial preload is set very low. This method, however, did not satisfy spindle rigid surface requirements. The "preload self-adjusting spindle" developed by YASDA is equipped with a mechanism that applies a large preload at low speed rotation, and the preload is adjusted in accordance with the amount of heat generation of the spindle bearing at high speed rotation. Accordingly compatibility during heavy-duty cutting within a low-speed range and low heat generation and high-precision rotation within a high-speed range can be achieved. With this function, heavy-duty cutting, high-speed cutting of highly hardened steel and machining by a helical end mill that generates a thrust-reversing force can be performed with high precision.

Direct Drive System
The preload self-adjusting spindle and the spindle drive motor are connected co-axially by a diaphragm coupling, in order to achieve high precision rotation of the spindle throughout the full speed range of the spindle.

Spindle motor
YASDA spindle motor employs a two coil changeover type winding, and helps high torque drive at both high and low spindle speeds.

Spindle head
Thermal distortion stabilizing system
The spindle head and saddle of the machine contain the largest heat generating parts such as spindle, spindle motor and feed motor. This is why machining centers suffer from thermal distortion which can easily result in inconsistent machining accuracy. YASDA’s design prevents such distortion by circulating heat exchange fluid throughout the spindle head, controlling the temperature of spindle head following the sensor for reference room temperature.

Air exhaust system contributes to minimizing thermal distortion.
The spindle and spindle motor serve as major heat sources for the spindle head. These heat sources are also factors that cause adverse effects in geometric accuracy. Equipped with a system to take ambient air into the spindle head cover and efficiently exhaust the heated air retained in the cover outside of the machine, the system allows the spindle head cover to be maintained at a constant temperature inside, and also minimizes thermal distortion.

Mating sample
This sample shows high precision machining even over long hours of machining accompanied by multiple tool changes.

Spindle power and torque diagram

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed (min⁻¹)</th>
<th>Power (W)</th>
<th>Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA40-24,000</td>
<td>10,100</td>
<td>7.0</td>
<td>0.01</td>
</tr>
<tr>
<td>SA30-30,000</td>
<td>10,100</td>
<td>7.0</td>
<td>0.01</td>
</tr>
<tr>
<td>SA40-10,000</td>
<td>10,100</td>
<td>7.0</td>
<td>0.01</td>
</tr>
</tbody>
</table>

YASDA CNC JIGBORER V-series
Measures against thermal displacement developed from experience and technological advancements

Thermal distortion stabilizing system to maintain stable high precision machining

Thermal distortion stabilizing system that blocks rapid thermal distortion

The thermal distortion of a machine and machining errors are caused by changes in a factory’s environment such as rapid changes in room temperature, differences in temperature between the upper portion and lower portion of an indoor space and radiant heat from ceilings and walls. YASDA’s proprietary “thermal distortion stabilizing system” circulates heat exchange oil controlled to ±0.2°C from room temperature through main components to prevent rapid thermal distortion of a machine’s body which occurs due to changes in room temperature in a factory, and always realizes stable high precision machining.

Machining sample
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 Oleaha Version 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 (M330 to M334) 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 of 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.

OpeNe serves as an intermediary between human and machine

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 if 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.

Program Management

On this screen, machining time for any registered program can be easily calculated by simulation even while the machine is operating.
Knowing machining end time with accuracy enables optimal utilization of equipment and smooth production.
Automatic tool changer (ATC)

Allows to change No. 40 tools employing an armless change method

Simple and highly reliable

The ATC adopts a highly reliable armless change method to directly change tools by the stroke of the tool magazine itself. The tool magazine (number of tools: 30 tools) incorporated in the machine body prevents foreign substances such as chips from entering the magazine and adhering to the tool Shank by an automatic opening/closing type sealing door.

Automatic pallet changer (APC)

Realizes highly reliable high precision machining even during unmanned operation for long hours

The APC adopts YASDA’s proprietary pallet chucking mechanism, and offers high repeatability and chucking rigidity which are most important in the performance of high precision machining. The preloading stand (PLS) can be easily set up, and can automatically machine several kinds of different workpieces one after another. Both of YASDA’s APC and PLS allows for unmanned operation with high reliability for long hours.
**Additional 1 axis supports precise 4-axis machining**  
Option

YASDA’s 1 axis rotary table realizes highly accurate 4-axis machining.

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**YASDA automation system with robots**

Responds to diversified user needs  
Responds to flexible system architecture

By connecting an external robot to the V series, an automation can be designed and built as well as saving space which allows for a long and stable operation. The arrangement of the machine and robot allows for free layout (right and left), and a system design of two machines with one robot can be realized.

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**RS 20**

Adoption of a DDI (Direct Drive) motor offers high speed and high-precision positioning. Enables multi-face indexing machining as well as highly accurate simultaneous 4-axis machining.

**Rotary axis indexing accuracy**  
(Measured value)  

| Accuracy | 0.99sec |

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**RS20 specifications**

<table>
<thead>
<tr>
<th>Table diameter</th>
<th>φ200mm</th>
</tr>
</thead>
</table>
| Table surface configuration | 4 T-slots x 90 degree pitch  
1st width:12mm H8 (standard) |
| Table center hole diameter | φ30mmH7/Depth 1.0mm |
| Table rotational axis travel | 360° (Continuous) |
| Max. rotation speed (rapid traverse) | 1500mm/|
| Allowable workspace loading capacity | 400g |
| Smallest input increment | 0.0001 |
| Height up to table center | 200mm |

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**OUTLINE YBM 640V Ver.4**  
unit:mm

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**YASDA robot schedule function allows for highly efficient operation**

The YASDA robot schedule function offers two machining schedule modes “priority” and “machining sequence”. The priority mode sets the priority order group according to a numerical value. The machining sequence mode sets the machining order for each workpiece allowing for random operation. Since the machining schedule can be set flexibly, highly efficient operation can be realized according to production plans. In addition, even when there is an urgent request, it can be quickly set without editing the previously planned machining schedule.
1. Specifications of base machine

<table>
<thead>
<tr>
<th>640V Ver.</th>
<th>950V Ver.</th>
<th>9150V Ver.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Travel</td>
<td>9.000 mm</td>
<td>9.000 mm</td>
</tr>
<tr>
<td>2) Spindle</td>
<td>4.500 mm</td>
<td>4.500 mm</td>
</tr>
<tr>
<td>3) Table</td>
<td>1,000 mm</td>
<td>1,000 mm</td>
</tr>
<tr>
<td>4) Feed rate</td>
<td>20.000 mm/min</td>
<td>20.000 mm/min</td>
</tr>
<tr>
<td>5) Automatic tool change</td>
<td>5.000 mm/min</td>
<td>5.000 mm/min</td>
</tr>
<tr>
<td>6) Mass of machine</td>
<td>Approx.16,000 kg</td>
<td>Approx.16,000 kg</td>
</tr>
<tr>
<td>7) Electric power capacity</td>
<td>41.5kVA</td>
<td>41.5kVA</td>
</tr>
<tr>
<td>8) NC unit</td>
<td>TANAKA, 3115 EV</td>
<td>TANAKA, 3115 EV</td>
</tr>
</tbody>
</table>

2. Standard equipment

<table>
<thead>
<tr>
<th>640V Ver.</th>
<th>950V Ver.</th>
<th>9150V Ver.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Optical scale feed back</td>
<td>X.Y.Z axis 0.001mm command completion</td>
<td>X.Y.Z axis 0.001mm command completion</td>
</tr>
<tr>
<td>2) Cutting on unit</td>
<td>Manual box with top cover</td>
<td>Manual box with top cover</td>
</tr>
<tr>
<td>3) Thermal displacement compensation for spindle</td>
<td>Standard data</td>
<td>Standard data</td>
</tr>
<tr>
<td>4) Screw conveyor</td>
<td>Twin screw</td>
<td>Twin screw</td>
</tr>
<tr>
<td>5) Automatic power-breaker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6) Thermal distortion stabilizing system</td>
<td>Standard type</td>
<td>Standard type</td>
</tr>
<tr>
<td>7) Standard Machine color</td>
<td>RAL 1013 (Glossy white)</td>
<td>RAL 1013 (Glossy white)</td>
</tr>
<tr>
<td>8) Chipper version2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. CNC standard options

<table>
<thead>
<tr>
<th>640V Ver.</th>
<th>950V Ver.</th>
<th>9150V Ver.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Least Input / travel movement</td>
<td>0.001mm</td>
<td>0.001mm</td>
</tr>
<tr>
<td>2) Display</td>
<td>15’’ LCD touch panel with HMI</td>
<td>15’’ LCD touch panel with HMI</td>
</tr>
<tr>
<td>3) Program storage length</td>
<td>8000 lines (32k lines)</td>
<td>8000 lines (32k lines)</td>
</tr>
<tr>
<td>4) Custom macro</td>
<td>Common variable</td>
<td>Common variable</td>
</tr>
<tr>
<td>5) Number of registerable programs</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>6) Automatic corner override</td>
<td>64 parts</td>
<td>64 parts</td>
</tr>
<tr>
<td>7) Tool offset parts</td>
<td>c. memory</td>
<td>c. memory</td>
</tr>
<tr>
<td>8) Extended part program editing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9) Background setting</td>
<td>Data input/output</td>
<td>Data input/output</td>
</tr>
</tbody>
</table>

4. Optional equipment

<table>
<thead>
<tr>
<th>640V Ver.</th>
<th>950V Ver.</th>
<th>9150V Ver.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Spindle nose face configuration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Spindle speed range</td>
<td>150 ~ 30,000 rpm</td>
<td>150 ~ 30,000 rpm</td>
</tr>
<tr>
<td>3) Spindle drive motor</td>
<td>AC15.0kW/11kV (Continuously)</td>
<td>AC15.0kW/11kV (Continuously)</td>
</tr>
<tr>
<td>4) Spindle taper hole</td>
<td>2/4 taper No.30</td>
<td>2/4 taper No.30</td>
</tr>
<tr>
<td>5) Signal tower/Multiaxis signal lamp</td>
<td>Red, yellow, green, red/yellow</td>
<td>Red, yellow, green, red/yellow</td>
</tr>
<tr>
<td>6) Cutting fluid temperature control unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7) External mix coolant</td>
<td>Manufactured by Bluec</td>
<td>Manufactured by Bluec</td>
</tr>
<tr>
<td>8) Spindle center through food coolant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9) Spindle center through air coolant</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>