BNJ-34S3/42S3/34SY3/42SY3/51SY3
CNC Turning Center with 2 Spindles, 2 Turrets and 1 Y-axis Slide

Miyano Evolution Line
What could not be done can be done

X-axis movement is added to the traditional self loading mechanism which the main spindle is fixed and the opposed sub spindle can move to the Z-axis direction to receive the workpiece. Wide space appears immediately after the back working turret is indexed at the concave position, then sub spindle passes.

The state-of-art technology of starting full capacity machining immediately after turret index completion reduces idle time and make it possible to do complete machining including eccentric machining and multiple machining, which other machines cannot do.
Simultaneous machining of work pieces on the L-spindle with the main turret and work on the R-spindle with the back working turret is the key to high efficiency.

Simultaneous machining by main and back working turrets

Overlapping control, which enables the R-spindle to precisely follow the movement of the main turret, reduces machining time for operations such as turning operation and combined machining with the Double sided revolving tool.

Off-center machining on the R-spindle

The off-center collet on the R-spindle enables off-center machining, including combined machining such as crank machining, which other machines are not capable of.

Combined machining on the Y-axis

The Y-axis function of the main turret enables side milling which previously required both C-axis and end milling. This also enables large diameter threading and machining of work pieces with large pockets and bosses which were previously difficult to machine.

Simultaneous, overlapping machining for the front and back operations

Simultaneous machining of work pieces on the R-spindle with the back working turret is the key to high efficiency.
Machining at full capacity starts immediately after indexing the back working turret and the entire operation is completed in a single process as a result of combined machining. Cranks and off-center bushes can also be machined.

The backworking turret has two concave sections. Immediately after this turret is indexed to a concave section, clearance is created to allow the R spindle to gain access to rearward facing tools mounted on the main turret and/or to collect the workpiece from the L spindle. This new innovation results in reduced idle times.

Off-center machining by X-axis shift

The off-center collet is installed in the R spindle and the R spindle is shifted horizontally in the X-axis direction by the off-center dimension. Then the chuck centers of the L and R spindle are aligned. The R spindle traverses to the left and chucks the workpiece that has been partially parted off. The workpiece is fully parted off by using an end mill to allow the operation to begin. Off-center machining on parts such as cranks, bushes can begin on the R spindle. Double off-center machining can also be carried out manually.

Examples of Machining

- Cut-off with endmill

Reference of off-center amount

\[
\text{Off-center work amount} = \frac{D-d}{2} - \frac{41}{2} \cdot \frac{d}{2}
\]
A wide variety of combined machining with revolving tools

- **Basic combined machining**
  In addition to conventional cross drilling, tapping and face tapping on the main spindle's center axis, a Y-axis allows for off-center drilling, tapping, and milling.

- **Contour Milling**
  Combining the C-, X-, and Z-axes makes it possible to do contour milling with simultaneous 3-axis control.

- **Contouring milling + Off-center machining**
  One side is machined off-center by contour milling and the other side is machined off-center on the off-center chuck. Double off-center machining can be performed on the machine.

- **High precision milling**
  Accurate positioning by the C-axis and high precision combined machining by the Y-axis allow for a wider range of machining.

The L/R-spindles and tool spindles enable stable machining

Double row roller bearing and angular contact ball bearing used for the front bearing and double row roller bearing used for the back bearing are mounted in the quill housing for both L and R axes. This makes it possible to achieve sufficient rigidity, heat control, and flexible thermal distortion qualities to facilitate the production of high precision parts. Tool spindles are driven by a tough AC servo motor to achieve stable machining and overload protection.
A tooling system that is ideal for bar work machining and abundant options for a wide tooling zone.

Tooling system

Since this model employs the same tooling system as the ABX series, the tool holders are completely compatible. Ideal tooling is achieved by selecting the most appropriate tool holders. When the bar feeder is not attached to the machine, a pull out finger chuck is available, which is commonly used for round bar, hexagonal bar and square bar. The back working turret is a turret for back side machining. The OD cutting tool is directly mounted on the turret as a wedge and the ID cutting tool is mounted on the holder.

Tooling area
### Various options

- **Parts catchers and parts conveyors**
  Parts catcher & Parts conveyor is the requirement for bar work machining.

- **Chip conveyor**
  This chip conveyor is a universal hinge type. It enables high precision machining by smoothly carrying out large volumes of chips and eliminating chip heat generated during prolonged machining. A chip conveyor is the indispensable for prolonged operation. Please consult with us when using special work piece materials for machining.

- **Revolving tools**
  The standard tooling is a simple setup consisting of an X-spindle unit and a Z-spindle unit. The rigid tapping function (optional) is used for tapping. The tapping collet is mounted only in special situations.

- **Tool-break detection for drill**
  Drill breakage is detected by the swing cylinder. The machine stops when breakage is detected, second accident can be protected.

### Cut-off confirmation
This is a function to confirm that cut-off of the work piece is completed and the R-spindle can traverse with low thrust to the retract position for cut-off confirmation and program skip. The safety and reliability of this function makes it easier to avoid mechanical troubles.

### NC SPECIFICATIONS MIYANO-FANUC

- **Simultaneously controlled axes**
  4axes / 2 paths, X1,Z1,Y1,A1(Rev. tools) / X2, Z2, C1, C2

- **Min. input increment**
  0.001mm, 0.0001 inch, 0.001 deg.

- **Min. output increment**
  X-axis:0.0005mm, Z-axis: 0.001mm

- **Parts program storage capacity**
  512 kb, 1,280m (4,200 feet) Tape length

- **Spindle function**
  Spindle speed 54 digits direct specify, Constant cutting speed control(G96)

- **Rapid traverse rate**
  X1,X2, axis:18m/min, (708ipm), Z1,2, axis:20m/min (787ipm), Y-axis 12m/min (472ipm)

- **Cutting feed rate**
  F3.4 digit direct specify

- **Cutting feed rate override**
  0 ~ 180% (10% steps)

- **Interpolation**
  G01, G02, G03

- **Threaded**
  032, 092, 093

- **Canned Cycle**
  090, 092, 094

- **Work coordinate setting**
  Automatic setting, E4 sets by the geometry offset function

- **Tool selection and work coordinate system selection**
  Tool selection 1 ~ 64 can be done by the first two digit of the T-4 digit code.

- **Tool wear offset**
  Tool wear selection 1 ~ 64 sets can be done by the last two digit of the T-4 digit code.

- **Direct input of tool positions**
  Measured value can be directly key in

- **Input/Output interface**
  RS-232C, PC Card slot.

- **Automatic operation**
  Single/Continuous cycle operation, Single block operation, Block delete, Machine tool, Dry run, Optional block skip.

### Others
- 10.4" Color LCD, 800 storage parts programs, Decimal point input
- Manual pulse generator, Memory protect, AC digital servo
- Polar coordinate interpolation, Programmable data inputs(510)
- Cs-axis control(R Spindle)
- Basic Options
  Chamfering/Corner R control, Tool nose R compensation, Background editing
- Run hour/Parts count display, Synchronous mixing feed function
- Multiple repetitive canned cycle(070 ~ 079), Drilling canned cycle
- Continuous threading, Tool life management system
- Continuous multi-lead thread cutting, Rigid tapping function(Spindle / Revolving Tools)
- Cylindrical interpolation, Custom macro B
- NC Additional Function
  Manual release function, Macro executer, Additional parts program storage (1MBbyte)
- NC Options
  Helical Interpolation
MACHINE SPECIFICATIONS

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URL: http://cmj.citizen.co.jp/

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MACHINING CAPACITY & CHUCKING SYSTEM

<table>
<thead>
<tr>
<th>Model Name</th>
<th>BNJ-34S3</th>
<th>BNJ-42S3</th>
<th>BNJ-34SY3</th>
<th>BNJ-42SY3</th>
<th>BNJ-51SY3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Bar Capacity (L-spindle)</td>
<td>Φ34mm (1.34&quot; Dia.)</td>
<td>Φ34mm (1.34&quot; Dia.)</td>
<td>Φ34mm (1.34&quot; Dia.)</td>
<td>Φ34mm (1.34&quot; Dia.)</td>
<td>Φ51mm (2&quot; Dia.)</td>
</tr>
<tr>
<td>Max. Bar Capacity (R-spindle)</td>
<td>Φ42mm (1.65&quot; Dia.)</td>
<td>Φ42mm (1.65&quot; Dia.)</td>
<td>Φ42mm (1.65&quot; Dia.)</td>
<td>Φ42mm (1.65&quot; Dia.)</td>
<td>Φ42mm (1.65&quot; Dia.)</td>
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<tr>
<td>Type of Collet Chuck</td>
<td>L&amp;R-spindle Stationary</td>
<td>L&amp;R-spindle Stationary</td>
<td>L&amp;R-spindle Stationary</td>
<td>L&amp;R-spindle Stationary</td>
<td></td>
</tr>
<tr>
<td>Standard Turning Length</td>
<td>100mm</td>
<td>100mm</td>
<td>100mm</td>
<td>100mm</td>
<td></td>
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<tr>
<td>Size of Power Chuck</td>
<td>L/R-spindle 5&quot; / 4&quot; / 4&quot;</td>
<td>L/R-spindle 5&quot; / 4&quot; / 4&quot;</td>
<td>L/R-spindle 5&quot; / 4&quot; / 4&quot;</td>
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SPINDLE

<table>
<thead>
<tr>
<th>Model Name</th>
<th>BNJ-34S3</th>
<th>BNJ-42S3</th>
<th>BNJ-34SY3</th>
<th>BNJ-42SY3</th>
<th>BNJ-51SY3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spindle Speed Range (L-spindle)</td>
<td>60 ~ 7,000min⁻¹</td>
<td>60 ~ 7,000min⁻¹</td>
<td>60 ~ 7,000min⁻¹</td>
<td>60 ~ 7,000min⁻¹</td>
<td>50 ~ 5,000min⁻¹</td>
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<tr>
<td>Spindle Speed Range (R-spindle)</td>
<td>67 ~ 5,000min⁻¹</td>
<td>67 ~ 5,000min⁻¹</td>
<td>67 ~ 5,000min⁻¹</td>
<td>67 ~ 5,000min⁻¹</td>
<td>67 ~ 5,000min⁻¹</td>
</tr>
<tr>
<td>Spindle Motor (30min./Cont.)</td>
<td>7.5/5.5 kW</td>
<td>11/7.5 kW</td>
<td>11/7.5 kW</td>
<td>11/7.5 kW</td>
<td>11/7.5 kW</td>
</tr>
<tr>
<td>R-SP Slide Stroke</td>
<td>X2 70mm</td>
<td>Z2 70mm</td>
<td>70mm</td>
<td>70mm</td>
<td>70mm</td>
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MAIN TURRET

<table>
<thead>
<tr>
<th>Model Name</th>
<th>BNJ-34S3</th>
<th>BNJ-42S3</th>
<th>BNJ-34SY3</th>
<th>BNJ-42SY3</th>
<th>BNJ-51SY3</th>
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</thead>
<tbody>
<tr>
<td>Type of Turret Station</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
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<tr>
<td>Turret Indexing Time</td>
<td>0.25sec./1st.</td>
<td>0.25sec./1st.</td>
<td>0.25sec./1st.</td>
<td>0.25sec./1st.</td>
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<tr>
<td>Slide Stroke</td>
<td>X1 165mm</td>
<td>Z1 246mm</td>
<td>Y1 ---</td>
<td>246mm</td>
<td>246mm</td>
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<tr>
<td>Back-working Turret</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
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<tr>
<td>Turret Indexing Time</td>
<td>0.2sec./1st.</td>
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<td>0.2sec./1st.</td>
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REVERSING TOOLS (MAIN TURRET / OPTION)

<table>
<thead>
<tr>
<th>Model Name</th>
<th>BNJ-34S3</th>
<th>BNJ-42S3</th>
<th>BNJ-34SY3</th>
<th>BNJ-42SY3</th>
<th>BNJ-51SY3</th>
</tr>
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<tbody>
<tr>
<td>No. of Reversing Tools</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
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<tr>
<td>Tool Speed Range</td>
<td>60 ~ 6,000min⁻¹</td>
<td>60 ~ 6,000min⁻¹</td>
<td>60 ~ 6,000min⁻¹</td>
<td>60 ~ 6,000min⁻¹</td>
<td>60 ~ 6,000min⁻¹</td>
</tr>
<tr>
<td>Tool Motor</td>
<td>2.5 kW</td>
<td>2.5 kW</td>
<td>2.5 kW</td>
<td>2.5 kW</td>
<td></td>
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<tr>
<td>Machining Capacity</td>
<td>Drill/Tap 13mm/MBp1.25</td>
<td>13mm/MBp1.25</td>
<td>13mm/MBp1.25</td>
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<tr>
<td>Machining Capacity</td>
<td>60 ~ 6,000min⁻¹</td>
<td>60 ~ 6,000min⁻¹</td>
<td></td>
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</tr>
<tr>
<td>Floor Space</td>
<td>2,780mm x 1,536mm</td>
<td>2,780mm x 1,536mm</td>
<td>2,780mm x 1,536mm</td>
<td>2,780mm x 1,536mm</td>
<td>2,780mm x 1,536mm</td>
</tr>
<tr>
<td>Machine Height</td>
<td>1,720mm (67.7&quot;)</td>
<td>1,720mm (67.7&quot;)</td>
<td>1,720mm (67.7&quot;)</td>
<td>1,720mm (67.7&quot;)</td>
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<tr>
<td>Machine Weight</td>
<td>5,500kg (12,125lbs.)</td>
<td>5,500kg (12,125lbs.)</td>
<td>5,500kg (12,125lbs.)</td>
<td>5,500kg (12,125lbs.)</td>
<td></td>
</tr>
</tbody>
</table>

Others

- Splash Guard Interlock, Coolant, Pneumatic Unit, Machine Light, Regular Hand Tools Kits & Box
- Options: Collet Chuck System, Power Chuck System, Cutoff Confirmation, High Pressure Coolant, Revolving Tools and Drive Unit, Work Ejector, R-spindle Inner Coolant and air blow
- Spindle Brake System (L&R-spindle), Air Box, Parts Catcher and Parts Conveyor, Coolant Level Switch, Drill Breakage Detector, Chip Conveyor, Chip Box, R-spindle Through Parts Carrier
- Magazine Bar Feeder, Signal Tower (3 steps)

The specifications are subject to change without notice, Standard equipment package may vary by region.

MACHINES IN PHOTOS MAY NOT LOOK EXACTLY THE SAME AS THE ACTUAL PRODUCTS.

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