5-Axis Vertical Machining Center

QV5 3000

QUANTUM
The QV5-3000 is a high accuracy 5 Axis vertical machining center with an A/B Rotary System. The perfect solution for simultaneous 5 axis machining of components with a range of 118.1” x 39.4”.

Quantum QV5-3000
The QV5-3000 iA/B Rotary System was designed and built in Japan for Quantum, by Tsudakoma. For over 20 years the A/B rotary unit has been proven, tested, and improved providing the QV5-3000 a design that is compact, lightweight, with a simple construction. Using the latest engineering technology the Quantum Rotary System delivers outstanding performance, with high rigidity, repeatable accuracy, quality finish, and low maintenance.
DESIGNED FOR HIGH RIGIDITY AND SPEED

- Superior Meehanite Cast Iron main body components provide a solid structure ensuring long-term stability.
- Inverted “T” structure base design with 3-point support endows the machine with a firm foundation.
- X /Y Axes are designed with heavy-duty roller guide ways for supreme stability and precision.
- Heidenhain Scale Feedback System delivers the highest accuracy on X,Y,Z axes.
- Z Axis box way design supplies the A/B axes with unsurpassed machining rigidity.
- 60 Tool Magazine is directly fixed to the floor, isolating the tool magazine movement, so that each moving axis can maintain maximum accuracy and finish.

Built-In Motor Spindle

60 Tool Magazine

Z Axis

Moving Column in Y Axis

Work Table - 128” x 31.5”

X, Y Axis: Roller Guide Way

Worktable is fully supported by the base ensuring rigidity and accuracy of X axis
Nitrogen Balancing Cylinders

- Z-axis is equipped with two nitrogen balancing cylinders.
- Balancing cylinders are used to stabilize the momentum variation in vertical direction.
- The high performance nitrogen balancing cylinders are easily accessible for maintenance. Eliminating the need of sophisticated hydraulic piping or mechanical components.

Nitrogen Balancing Cylinder provides a Counter-Weight for Spindle Head

- Alleviate Loads to Servo Motor
- Reduce Power Consumption
- Minimize Thermal Displacement
- Reduce Loads to Ballscrew
- Minimize Heat Generated

Ensure Precision of Machining

Maintain Machining Flatness

Weight of Spindle Head

Balancing Force (N2 Nitrogen Balancing Cylinder)
The QV5-3000's CAT 50 Spindle Taper and high power / high torque electrical driving mechanism ensure maximum dynamic performance and position accuracy. With a compact structural design, it enlarges the machining range without interfering issues.

### Spindle Specifications

<table>
<thead>
<tr>
<th>Tool</th>
<th>Spindle Taper</th>
<th>Spindle Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAT 50</td>
<td>12,000 RPM</td>
</tr>
</tbody>
</table>

| Output Torque         | S1 cont.      | 304Nm         |
|                       | S2 60min.     | 353Nm         |
|                       | S2 30min.     | 375Nm         |
|                       | S2 15min.     | 420Nm         |

| Weight                | Stator        | 143 lbs       |
|                       | Rotor         | 62 lbs        |

| Rotor Inertia         | 0.121 kgm²    |
| Insulation Class      | H             |
| Main Motor Servo      | ai SP30       |

| Cooling Condition     | Capacity requirement of oil cooler: 4900W or more |

### Cutting Test Results

<table>
<thead>
<tr>
<th>Tool</th>
<th>Ø4.92&quot; Face Cutter</th>
<th>Ø0.98&quot; End-Mill</th>
<th>Ø1.77&quot; Drill</th>
<th>M36xP4.0 Tap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Piece Material</td>
<td>Steel</td>
<td>S50C</td>
<td>1018</td>
<td>S50C</td>
</tr>
<tr>
<td>Spindle Speed RPM</td>
<td>764</td>
<td>2292</td>
<td>450</td>
<td>88</td>
</tr>
<tr>
<td>Feedrate (in/min)</td>
<td>47</td>
<td>48</td>
<td>0.003</td>
<td>13.8583</td>
</tr>
<tr>
<td>Cutting Depth (in)</td>
<td>0.196</td>
<td>1” x 0.1</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Chips Removal (cu/in)</td>
<td>34in³</td>
<td>33.7in³</td>
<td>10in³</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Unique cam-driven tool exchange with random axis magazine.
Proven & reliable the QV5-3000 ATC enhances production efficiency providing fast, repeatable performance over many years of operation.
The **FANUC 31i MODEL B-5** CNC comes standard on all **QV5-3000** machining centers. With 5-axis simultaneous machining functions it can machine complex shapes at high speed with accuracy and high quality.

**CONTROL YOUR**

**Tilted Working Plane Command**

Tilted Work Plane is a function that allows the user to define a new Work Plane by specifying an X,Y,Z Coordinate Origin and the angular rotation about X,Y,Z axis centerlines. The benefit of this function is that you can use all the canned cycles while the head is tilted. You can also generate 2-1/2D tool-paths with arcs without having them linearized because of the plane orientation.

**Manual Feed for 5-Axis Machining**

Manual 5-Axis feed is a powerful function that aids in retracting the cutting tool along its current vector instead of just a strict single axis linear retract.

**Tool Center Point Control**

Tool center point control (TCPC) adds true 5-Axis functionality to the machine tool by allowing the control to handle the kinematic transformations and pivot distances. The intended feedrates are maintained relative to the tool’s posture.
Tool Radius Compensation

Tool Radius Compensation value on the plane perpendicular to tool axis may follow command direction and set left/right hand side of the path. When tool radius is changed due to wear, there is no need to modify the machining program.

Tool Tip Compensation Function

When the tool length compensation is made on a plane, the system will calculate the tool contact point on a machined side depending on different inclining angles so that the accurate outline can be maintained. When the cutter length is changed there is no need to modify the machining program.
**MACHINE SPECIFICATIONS**

### Machine Size
- **Machine Height**: 3778 (149) mm (in.)
- **Floor Space**: 7410x5360 (290x210) mm (in.)
- **Machine Weight**: 28000 (61700) kg (lb)

### Travel
- **X-Axis Travel**: 3000 (118.1) mm (in.)
- **Y-Axis Travel**: 1000 (39.4) mm (in.)
- **Z-Axis Travel**: 750 (29.5) mm (in.)
- **A-Axis Travel**: -40 ~ +40 degree
- **B-Axis Travel**: -40 ~ +40 degree
- **Spindle Nose to Table**: 100-850 (3.9-33.5) mm (in.)

### Table
- **Table Size**: 3250x800 (128x31.5) mm (in.)
- **T-Slot (No. X Width x Distance)**: 5x16x150 (0.7x6.3x5.9) mm (in.)
- **Table Height**: 1075 (42.3) mm (in.)
- **Maximum Load Capacity**: 3000 (6600) kg (lb)

### Spindle
- **Max Spindle Speed**: 12000 RPM
- **Spindle Taper**: 7/24 Taper, No.50
- **Tool Clamping Force**: 18 KN
- **Power Requirement**: AC 200V

### Feed Rate
- **X/Y/Z Axis Rapid Speed**: X&Y 20 (787), Z 10 (394) M/min (ipm)
- **Cutting Feed**: X&Y 20 (787), Z 10 (394) M/min (ipm)
- **Jog Feed Rate**: 1260 (49.6) mm/min (ipm)

### Automatic Tool Change (ATC)
- **Tool Shank**: CT-50
- **Chain Magazine Station**: tool 60
- **Maximum Tool Diameter (Without Adjustment Tool)**: 250 (9.8) mm (in.)
- **Maximum Tool Length**: 350 (13.8) mm (in.)
- **Maximum Tool Weight**: 20 (44) kg (lb)
- **ATC Type**: Double ARM

### Motor
- **Spindle Motor (cont./30 min)**: KW (HP) 25/30 (33.3/40)
- **Axes motor X/Y/Z**: KW (HP) 4/4/9 (5.3/5.3/12)

### Power
- **Power Equipment**: KVA 45
- **Air Source**: kg/cm² (PSI) 6 (85)

### Oil/Coolant Tank Capacity
- **Coolant Tank Capacity**: gal 200
- **Hydraulic System Capacity**: gal 15.9
- **Lubricating System Capacity**: gal 1.1

### Top View
- **Unit**: mm (in.)

### A View (21 Places)
- **Unit**: mm (in.)

### Front View
- **Unit**: mm (in.)

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**Quantum QV5-3000**
**MACHINE SPECIFICATIONS**

- **NC System**
  - FANUC 31i MODEL B-5
  - 48 Additional Work Offsets
  - 8mb Memory
  - Data Server, Ethernet and IC Card
  - Al Nano HPCC (1,000 Block Look Ahead)
  - Expanded Macro Variable (C#149-#199 and #549-999)
  - Smooth TPC (G43.4)
  - Nano Smoothing
  - 3D Cutter Compensation for 5-axis
  - Tool Radius Comp
  - Tilted Work Plane Command (G68.2/G53.1/G69)
  - Manual Feed for 5-axis
  - 3-D Interference Compensation

- **Scale Feedback System**
  - X/Y/Z (HEIDENHAIN)

- **Standard Accessories**
  - Total Enclosure with Top Cover
  - Z-Axis Motor Brake
  - Dual Nitrogen Balancing Cylinders
  - Interior Work Lamps
  - 3-Color Patrol Light
  - Chip Wash Down System
  - Lift-up Chip Conveyor with Drum Filter
  - Disc Oil/Coolant Separator
  - Hydraulic Unit and Spindle Oil Cooling System
  - Spindle Oil Air Lubricator
  - Spindle Air Dryer
  - Movable Manuel Pulse Generator

**T-Slot Dimension**

Unit: mm(in)

- 12 (.47)
- 18 (.71)
- 30 (1.18)
- 34 (1.33)
- 40 (1.57)
- 45 (1.77)
- 50 (1.97)
- 55 (2.17)
- 60 (2.36)
- 65 (2.56)
- 70 (2.76)
- 75 (2.96)
- 80 (3.15)
- 85 (3.35)
- 90 (3.54)
- 95 (3.74)
- 100 (3.94)
- 105 (4.14)

**Table Top View**

Unit: mm(in)

- 7410 (291.7)
- 3386 (133.1)
- 3790 (149.6)
- 4900 (193.7)
- 5914 (232.3)
- 3250 (128)
- 21-A
- 1318 (51.9)