The new 4+1 axis vertical machining centers are high quality machine tools designed to achieve maximum capacity and performance ideal for medical, aerospace, power-generation, automotive and allied industries including mold making and complex 4-axis components.

The Bridgeport V320 SF is manufactured to the highest industry standards to exceed the requirements of the demanding metal-cutting market. 4+1 machining allows the part to be machined on 5 faces in a single set up drastically reducing setup time, reducing part handling, while improving overall part accuracy.

Bridgeport’s innovative technology provides superior accuracy, repeatability, a large load rating, stable accuracy, high rigidity and low friction optimum for small to medium parts. All of the robust features are designed into a small cost-effective footprint machine. The machines come packed with standard features including a BIG-PLUS® spindle, oil chiller, chip conveyor, coolant flush system, preparation for through spindle coolant (with rotary union), coolant wash down gun, tri-color stack light and many standard control features.

FEATURES & BENEFITS

12.60" (320mm) diameter trunnion table with 4+1 – 4 axis simultaneous operation.

Stable & rigid structure - FEA techniques were used to analyze the structure for static and dynamic rigidity to ensure stiffness, minimal vibration, excellent geometrical accuracy and cutting performance.

Standard 10,000 rpm DDS with hollow shaft provides excellent performance low noise, low vibration, and high accuracy for a wide range of materials from heavy cutting of steel to high speed cutting of nonferrous materials.

Mitsubishi M80 Control features a 10.4” touchscreen display with functions that are commonly used in smart-phones and tablets, allowing for intuitive and easy operation.
FORGING DIE

SIZE  300MM X 145MM
HARDNESS  51 HRC
FEED RATE  5000MM/MIN
The Bridgeport V320 5F vertical machining centers are designed for accuracy, speed and productivity. They are built to provide years of dependable machining on parts requiring consistent tolerances, tough to machine materials and fine surface finishes.

### MACHINE OPTIONS

- 12,000 RPM - air/oil lube, direct coupled, BIG PLUS® spindle, hollow shaft motor, spindle chiller *
- 15,000 RPM - air/oil lube, direct coupled, BIG PLUS® spindle, hollow shaft motor, spindle chiller *
- Spindle chiller (optional for 10,000 RPM spindle, standard for 12,000 and 15,000)
- 280 PSI coolant through spindle
- Chip conveyor hinge type (interface included as standard equipment) *
- Chip conveyor scraper type (interface included as standard equipment) *
- Additional spare M codes (8 set)
- External high voltage transformer, 25KVA, 380-440V, 50/60HZ *
- X/Y/Z axis auto greased lubrication in lieu of manual greased lubrication *
- Air thru spindle 87 P.S.I (6 bar) *
- Heidenhain optical linear scales X/Y/Z *
- Sliding door for 30-tool ATC (magazine, auto door) *
- A/C axis rotary encoder *
- Probing package – Renishaw wireless probe combo
- Servo driven auto door with light curtain *

* Factory order only

### FEATURES

- 4+1 machining center with simultaneous 4-axis operation
- Stable & rigid structure
- Mitsubishi M80 control
- 10K, 12K, 15K RPM direct drive spindle
- BIG-PLUS® spindle
- 30 tool servo driven ATC
- 2 axis trunnion table diameter: 12.60” (320 mm)
- Axis (Tilt) +30° ~ -120°; C-axis (Rotary) 360°
- Table max. swing diameter: 16.02” (407mm)
- Auto power off
- 1000 PSI TSC prep
- Manual chip wash gun
- Circular flushing
- Coolant chip flush system
- Air blast
- Central grease lube (manual)
- Probe prewiring
- LED status lamp
MACHINE STRUCTURE

- Strategically ribbed base, column, and spindle carrier for increased rigidity and stiffness during demanding machining applications.

- Double-nut ball-screws are featured in the X, Y and Z-axis. The fixed, pre-tensioned ball-screw design minimizes thermal growth, enhances rigidity, stability, and precision of the machine.
  
  X & Y: 45 x 16mm pitch  
  Z: 45 x 12mm pitch  

- Machine structure features 19 precision hand scraped joints for maximum stiffness

MACHINE BASE

- Designed using FEA (Finite Element Analysis) techniques to provide superior machining performance

- Highly-rigid base with optimum dynamic stability

- The iron structure weighs 10,498lbs (4,762kg)
One key feature is the integrated 2-axis trunnion rotary table with 4-axis simultaneous motion and one positioning axis giving you the ability to machine a part on five different faces. This configuration greatly reduces cycle time and eliminates multiple set-ups when compared to a 3-axis machine. The machining methods are similar to 3-axis machining but with the addition of a 2-axis trunnion rotary table you can simply machine up to five different sides (or faces) in one set-up making this machine's efficiency much higher than a 3-axis machine.

TILT ROTARY TABLE

- 4-axis simultaneous motion, one positioning
- Table diameter size: 12.60” (320mm)
- Max. work piece diameter 15.75” x 12.60” (400mm x 320mm)
- Tilting degree (A degree): +30°~ -120°
- C-axis rotation: 360°
- Load capacity:
  Vertical – 220.46lbs (100kg)
  Horizontal – 441lbs (200kg)
- Clamping torque:
  A-axis: 153 kg-m (1106 lbs ft.)
  C-axis: 76 kg-m (550 lbs ft.)
- T slots-0.47” (12mm) x 4

TOOL CENTER POINT CONTROL

A key control function that continuously keeps track of the tool center point during all axis interpolation.
V320 5F  KEY FEATURES

LARGE CAPACITY, FAST PERFORMANCE AUTOMATIC TOOL CHANGERS (AIS)

The 30 tool servo driven ATC provides 2.0 seconds (tool to tool) change time. The servo driven ATC also allows fast recovery after an interrupted tool change cycle.

- Max. tool diameter
  Full drum: 2.95” (75mm)
  (Adj. pockets empty)
  5.91” (150mm)
- Max. tool length
  11.81” (300mm)
- Max. tool weight
  15.43lbs. (7kg)
- Standard ATC is 30 tool (max.)
- Tool change time:
  Tool to tool – 2.0 sec.
  Chip to chip – 4.0 sec.*

* factory test result for reference

DIRECT DRIVE SPINDLE

The standard 40 taper, 10,000-rpm grease lubricated spindle is a performance enhancement over belted spindles.

- Direct drive spindles provide faster Acc/Dec over belted spindles.
  - 0 to 12,000 rpm is 2.6 sec*
  - 12,000 to 0 rpm is 3.1 sec*

- The standard hollow shaft spindle motor allows easy installation of the CTS
- Continuous torque rating at 1400-rpm: 55 ft-lb (75.2Nm); 75 ft-lb (102Nm)
- Optional spindle chiller on 10,000 rpm
- Optional 12,000 rpm air/oil spindle
- Optional 15,000 rpm air/oil spindle

* factory test result for reference

STANDARD ISO-40 DUAL CONTACT TAPER SPINDLE

BIG-PLUS® Dual Contact Spindle
Provides a stiffer interface between the spindle and the tool holder providing higher rigidity, stiffness, and accuracy when performing high-speed and difficult to machine applications. Tool retention force is 1,984-lbf/8,820N/900kgf for aggressive cutting applications.
MITSUBISHI M80 TYPE A

- 10.4” Color LCD Display with Full Keyboard
- Inch/Metric Data Selection by G-Code
- 1280 Meters Part Program Storage
- (2) SD card (32G part storage)
- Data Input/output - USB or SD card
- MDI (Manual Data Input) Operation
- Reader/Punch Interface RS232
- Ethernet interface (Data Transfer Capability)

BRIDGEPORT V320 5F
Mitsubishi Spindle Motor~10,000 RPM
Power & Torque Characteristic Curve
GRAPHIC ELECTRODE

Size: 80mm x 55mm x 40mm
Diameter Ratio: 18:1
Feed Rate: 2000mm/min
## SPECIFICATIONS V320 5F

### AXIS TRAVEL

<table>
<thead>
<tr>
<th>Axis</th>
<th>Travel</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table (X-axis)</td>
<td>20.08” (510mm)</td>
<td></td>
</tr>
<tr>
<td>Saddle (Y-axis)</td>
<td>24.01” (610mm) +/- 305mm</td>
<td></td>
</tr>
<tr>
<td>Head (Z-axis)</td>
<td>20.08” (510mm)</td>
<td>+/- 305mm</td>
</tr>
<tr>
<td>A-Axis (Tilt)</td>
<td>+30°~120°</td>
<td></td>
</tr>
<tr>
<td>C-Axis (Rotary)</td>
<td>360° (continuous)</td>
<td></td>
</tr>
<tr>
<td>Max Swing Diameter</td>
<td>16.02” (407mm)</td>
<td></td>
</tr>
</tbody>
</table>

### POSITIONING

<table>
<thead>
<tr>
<th>Axis</th>
<th>X, Y, Z-Axis Positioning Full Travel (ISO 230-2) (with scale)</th>
<th>X, Y, Z-Axis Repeatability (ISO 230-2) (with scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.00019 in (0.005mm)</td>
<td>.00012 in (0.003mm)</td>
</tr>
<tr>
<td></td>
<td>X, Y, Z-Axis Positioning Full Travel (ISO 230-2) (w/o scale)</td>
<td>X, Y, Z-Axis Repeatability (ISO 230-2) (w/o scale)</td>
</tr>
<tr>
<td></td>
<td>.00015 in (0.004mm)</td>
<td>.00031 in (0.008mm)</td>
</tr>
<tr>
<td></td>
<td>A-Axis Positioning (Arc sec) with scale</td>
<td>A-Axis Positioning (Arc sec) w/o scale</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>C-Axis Positioning (Arc sec) with scale</td>
<td>C-Axis Positioning (Arc sec) w/o scale</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>A-Axis Repeatability (Arc sec) with scale</td>
<td>A-Axis Repeatability (Arc sec) w/o scale</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>C-Axis Repeatability (Arc sec) with scale</td>
<td>C-Axis Repeatability (Arc sec) w/o scale</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

### SPINDLE

- Spindle Speed Range Direct Coupled: 10,000 RPM standard
  12,000 RPM optional
  15,000 RPM optional
- Spindle Motor HP Rating (S1-30 mins.)
  High speed winding: 14/20, 20/24
  (11/15 kW, 15/18.5 kW)
- Max Torque at Motor Base Speed (S1-30 min.): 55/75/110 ft. lb
  75/102/148 Nm
- Spindle Taper: BIG-PLUS® No. 40
- Tool Holder: ISO 40

### WORKTABLE

- Rotary Table Diameter: 12.6” (320mm)
- Table load:
  - Vertical: 220.46lbs (100kg)
  - Horizontal: 441lbs. (200kg)
- Number of T-Slots: 4
- T-Slot Size: 0.47” (12mm)

### AUTOMATIC TOOL CHANGER

- Taper: NO.40
- Type: Swing Arm
- Tool Type: CAT 40
- Tool Selection: Bi-directional
- Tool Capacity: 30 Tools
- Max Tool Diameter (Full Drum): 2.95” (75mm)
- Max Tool Diameter (Adj. Pockets Empty): 5.91” (150mm)
- Max Tool Length: 11.8” (300mm)
- Max Tool Weight: 15.43 lbs (7kg)
- Tool Change Time (T-T/C-C): 2/4 sec

### COOLANT

- Coolant tank capacity: 99 US gallons (375L)
- Wash down: Standard
- Wash gun: Standard
- Stainless chip pan: Standard

### MACHINE SIZE

- Length: 144” (3663mm)
- Height: 125.8” (3195mm)
- Depth: 108.7” (2760mm)
- Machine weight: 16,324 lbs (7405kg)

### SERVICE REQUIREMENTS

- Power Requirements*: (FLA/Volts/Phase) 86/220/3
- Air Requirements (L/min): 6 kg/cm²

* Other voltages require an external transformer
Hardinge is a leading international provider of advanced metal-cutting solutions. We provide a full spectrum of highly reliable CNC turning, milling, and grinding machines as well as technologically advanced workholding accessories.

The diverse products we offer enable us to support a variety of market applications in industries including aerospace, agricultural, automotive, construction, consumer products, defense, energy, medical, technology, transportation and more.

We've developed a strong global presence with manufacturing operations in North America, Europe, and Asia. Hardinge applies its engineering and applications expertise to provide your company with the right machine tool solution and support every time.