Improves Geometry and Offers Flexibility when Finishing Large, Multiple Bore Hydraulic Valve Bodies

Manufacturers of large hydraulic valve bodies face a challenge aligning and finishing the bores once the bodies have been stacked. Engis has designed a three axis single-pass bore finishing system to address this challenge.

The FPM-3X enables bore finishing after stacking of the valves, which improves overall cylindricity and roundness. Improving the quality of the valve body results in better performance and less downtime in the field.

FPM SERIES

Machines Features:

- Linear bearing vertical slide with ball screw feed and 750mm stroke
- BT-40 style spindle with hydraulic drawbar arrangement
- X-Y Axis linear bearing horizontal slide base
- 8 – 13 pocket automatic tool changer
- Wireless probe system for precise bore location
Typical Hydraulic Stack Valve Application

<table>
<thead>
<tr>
<th>Bore Diameter:</th>
<th>25mm</th>
<th>Bore Length:</th>
<th>245mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material:</td>
<td>Cast Iron</td>
<td>Number of Bores:</td>
<td>4</td>
</tr>
<tr>
<td>Bore Type:</td>
<td>Thru</td>
<td>Stock Removal:</td>
<td>0.070mm</td>
</tr>
<tr>
<td>Tool #1:</td>
<td>25.020mm</td>
<td>Diamond Size:</td>
<td>60/80</td>
</tr>
<tr>
<td>Tool #2:</td>
<td>25.034mm</td>
<td>Diamond Size:</td>
<td>100/120</td>
</tr>
<tr>
<td>Tool #3:</td>
<td>25.039mm</td>
<td>Diamond Size:</td>
<td>200/230</td>
</tr>
<tr>
<td>Tool #4:</td>
<td>25.041mm</td>
<td>Diamond Size:</td>
<td>325/400</td>
</tr>
</tbody>
</table>

Most stack valves are between 100mm and 300mm. To straighten a bore that has a banana shape, diamond tools are needed that are longer than the entire bore to span. Most machine centers do not have capacity for that stroke length or sufficient depth between part and spindle, but the FPM-3X does!

The FPM-3X can finish stacked valve body bores to a cylindricity of 2 microns and a diameter of +/- 1 micron, especially those with multiple bores of different diameters. To precisely locate the bore under the BT-40 spindle, the FPM-3X uses a wireless Renishaw CNC probe to establish bore location; position information is automatically translated into G-Code Coordinates.

This system also features full CNC controls with a Z-stroke of 750mm, an X-stroke of 1066mm and a Y-stroke of 100mm. The slide base can accommodate parts up to 3000 lbs.

SPECIFICATIONS:

- **Required Air Pressure:** 90 PSI 5 CFM
- **Operating Voltage:** 230V 60Hz 3Pz
- **Horizontal Slide Base — X Axis Linear Bearing Slide:** Up to 1066mm of stroke
  - **Y Axis:** Up to 100mm of stroke
- **Slide Base Load Capacity:** Over 1,000 lbs
- **Spindle Motor:** 5 HP Standard
- **Spindle Speed:** 100-1200 RPM
- **Spindle:** BT-40 with hydraulic drawbar arrangement
- **Available # of Tools:** 8 - 13
- **Controller:** Mitsubishi (standard)
  - **Other types available**
- **Programming:** G-Code

OPTIONS:

- 208 liter (55 gal) coolant system with double cartridge filtration
- Magnetic separator addition for filtration
- Full perimeter guarding
- Automation and gauging packages available
- Standard and custom fixturing packages available