

# Application Handbook

# Industrial Robots

## Harmonic Drive LLC 6-Axis Robot Hand Axes

- Hollow-shaft
- Integrated output bearing
- Special output bearing

6-Axis robots are typically used for tasks, such as: arc welding, laser cutting, or machine loading. Robots with this configuration feature 2- or 3-axis hand assemblies that manipulate the gripper or tool.

This design example shows the 5th and 6th axes of a 6-Axis robot, where Harmonic Drive® gears are used to drive both axes. The 5th pitch axis incorporates a CSF-2UH unit with a special hollow-shaft design while the 6th roll axis features a CSF-2UH unit with an input shaft. Both gears are driven via toothed belts from motors located within the preceding arm segment of the robot. The drive shaft to the 6th axis gear passes through the hollow shaft of the axis 5 gears. The Wave Generator is supported by one bearing located in a specially modified clamping ring and another located in an input-side flange. The shaft passing through the unit is supported by bearings located in the input-side pulley and output-side flange respectively. Both units have specially designed output bearings to support high tilting moments.

