

Application Handbook

Industrial Robots

Harmonic Drive LLC SCARA Robot Primary Axes

- Low Inertia Wave Generator
- Integrated Output Bearing

The use of SCARA robots for fast assembly tasks is an ideal application area for Harmonic Drive® strain wave gears. High dynamic performance dictates the use of compact, lightweight gears. The high accuracy required for correct assembly tasks necessitates gears with excellent repeatability. These selection criteria lead almost all of the world's leading SCARA robot manufacturers to use Harmonic Drive® strain wave gears in their designs.

This design example shows a very compact and elegant design incorporating SHF Simplicity Units. In the shoulder joint, the outer ring of the cross-roller bearing is connected directly to the upper robot arm segment, while the Circular Spline is connected to the base. In the elbow joint, the Circular Spline is connected to the lower arm segment. The elbow-axis gear features a special low inertia wave generator design. This solid Wave Generator design does not possess the Oldham coupling of the standard Wave Generator and therefore requires very precise motor shaft tolerances.

However, the moment of inertia is up to 40% lower than that of the standard design. This can help to improve the dynamic performance of the robot. This design example shows that both Flexspline and Circular Spline can be used as output elements.

