

# Application Handbook

## Semi-Conductor

### Harmonic Drive LLC Wafer-Loading Device Primary Axes

- Hollow-shaft
- Clean-room specification

This design example shows another method of integrating the motors for the primary axes of a wafer-loading device within the base of a robot. The shoulder joint features a SHF-2UH unit with a hollow input shaft. This unit has a special design, with involute gear teeth machined directly into the shaft. This enables the gear to be driven via a spur gear stage.

The elbow joint features a SHF-2UJ unit with a solid input shaft. This gear is driven via a toothed belt. The motor for this joint is also mounted in the base of the robot. The drive is transmitted through the shoulder axis gear by means of a shaft, which passes through the hollow-shaft of the SHF-2UJ unit. The weight of the robot arm is supported by the stiff cross roller bearings of both units. By bringing the motor for the elbow joint within the base of the robot, the mass of the arm has been reduced.

