

**Category:** Mechanical Components & Systems

**Reference:** TD-DE-1060

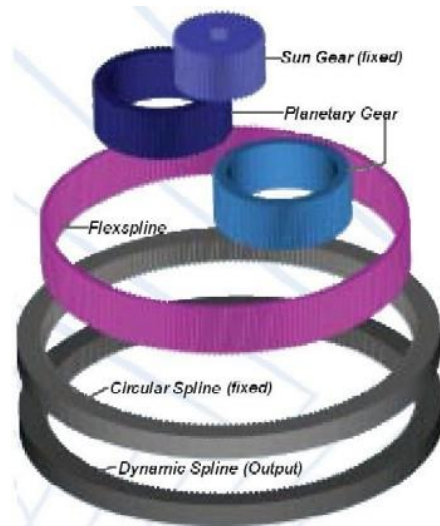
### Precision Microactuators

The backlash-free gear, the heart of a large number of our products, works according to the worldwide unique principle of our parent company Harmonic Drive® AG and is based on the elasticity of metallic components. It consists of four basic elements, the Wave Generator, the Flexspline, Circular Spline and Dynamic Spline. The Wave Generator consists of a sun gear - usually attached to the motor shaft - and two or more elastically deformable planet gears.

The sun gear of the Wave Generator serves as the drive element. Via the planet wheels, the Wave Generator deforms the Flexspline, which is in mesh with the Circular Spline and the Dynamic Spline. As the sun gear turns, the Wave Generator's planet gears move - the major ellipse axis shifts and so does the tooth meshing area.

The Flexspline has two teeth less than the Circular Spline and thus after one rotation of the Wave Generator a relative movement between Flexspline and Circular Spline takes place by the pitch of two teeth. When the Circular Spline is fixed, the Flexspline moves in the opposite direction to the sun gear. The Dynamic Spline rotates in the same direction and at the same speed as the Flexspline and is used as the output element.

This design allows a wide range of variations in the overall reduction ratio of the gear unit without having to accept changes in terms of installation space. Flexible adaptation of the very high speeds to different requirements is also possible without difficulty. An extremely low mass moment of inertia for highly dynamic accelerations and positioning movements successfully rounds off the package.



### Innovative Aspects:

The Micro Harmonic Drive® gear as the world's smallest backlash-free precision gear meets the new market requirements: miniature dimensions and low weight, but above all precise and backlash-free positioning capability. By combining new micro-technological manufacturing techniques with the unique Harmonic Drive operating principle, a new standard has been set with respect to positioning accuracy, high torque capacity, high reduction ratios, compact dimensions and low weight for applications in a wide range of compact machines and portable devices.

**Application Areas:**

The precision micro-gears and micro-actuators are a key enabling technology for a new generation of miniaturised products in a wide range of application areas. The Micro Harmonic Drive® is ideally suited to precise positioning applications in optics, medical equipment, optical communications, semicon, robotics, laser technology, biotechnology, measuring machines, aircraft and spacecraft.

**Cooperation:**

The donor is interested in selling micro-gears and micro-actuators designed for individual and specific demands.