

# Application Handbook

## Printing Machines

### Harmonic Drive LLC

#### Flexo-Printing Machines Registration Drive

- Differential Gear
- Integrated Output Bearing

A differential drive, in its most common form, consists of a constant speed power input, a secondary control or trim input, and output. The output can then be varied precisely in velocity or phase as a function of trim input speed or position.

The basic three element configurations make the Harmonic Drive® gear ideal as a differential. The following arrangements are possible:

1. Main Power input through the Circular Spline and output through the Flexspline (or Dynamic Spline in the case of pancake-type gears).
2. Main power input through the Flexspline (or Dynamic Spline) and output through the Circular Spline.

Secondary or trim input is always through the Wave Generator. The difference between these two basic arrangements lies in the speed relationship between input and output. A Flexspline output normally runs at a higher speed than the Circular Spline input. Conversely, a Circular Spline output normally runs slower than the Flexspline input.

This design example shows how a CSF-2UH unit can be used in the registration drive of a flexo-printing machine. The housing of the unit, which incorporates the Circular Spline, is driven via a toothed belt and the unit is mounted inside the pulley. The trim input is provided by a hand-wheel, which is connected to the Wave Generator via an input shaft. During normal operation of the machine the hand-wheel is locked in place. The number of teeth on the pulley is carefully selected to cancel the internal ratio of the gear.

