

Harmonic Drive LLC

Machining Center Chain-Type Tool Magazine

- Hollow-shaft actuator

The peripheral axes of machining centers are an important application area for Harmonic Drive® strain wave gearing products. The increasing automation of handling tasks, both of workpieces and tools, means that modern machine tools feature an increasing number of positioning axes. The simultaneous requirement to reduce the size of new machines means that the designer must implement particularly compact gears and actuators. Both machining centers (prismatic workpieces) and turning centers (rotational-symmetrical workpieces) are increasingly provided with tool magazines. There are many different designs, though chain-type and disc-type magazines are the most popular.

These magazines can carry more than 100 tools and must rapidly move the required tool to the tool changer in time for the next machining operation. When the magazine is fully loaded the moment of inertia of the tools is substantial. The required tool must be accurately as well as dynamically positioned before being removed from the magazine by the tool changer. The gear or actuator used to drive the magazine must therefore have a high torque capacity, high torsional stiffness and excellent repeatability.

This design example shows a chain-type tool magazine driven by an FHA hollow-shaft actuator. This is the basis for a very simple design, with the chain pulley attached directly to the output flange of the actuator.

