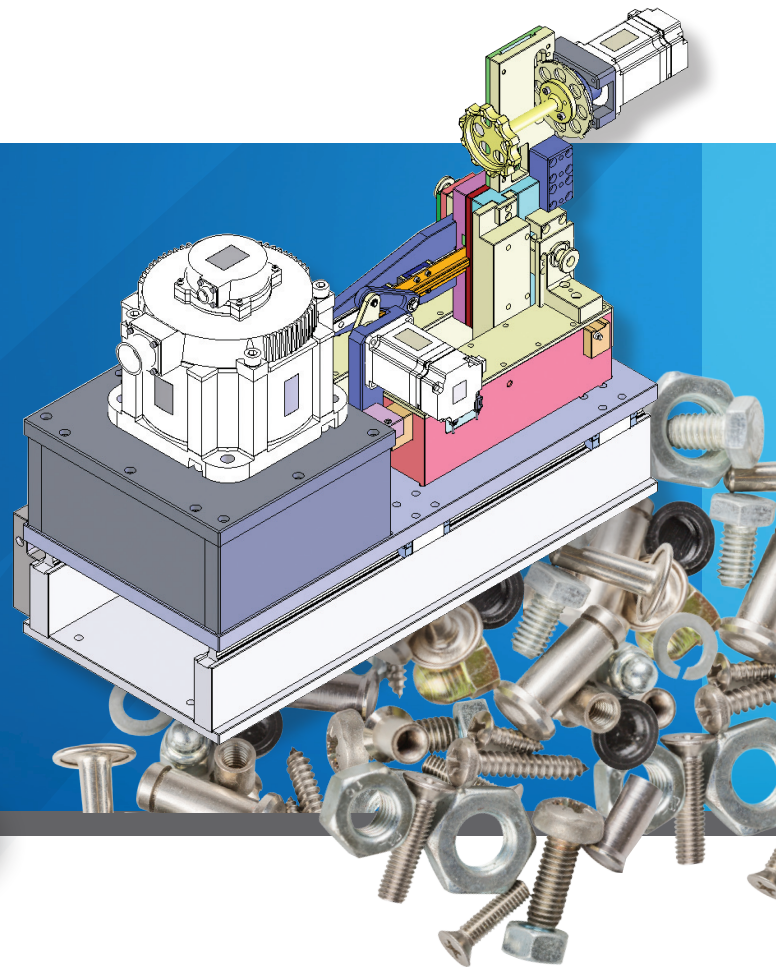


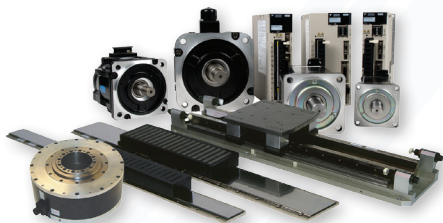
Optimizing parts insertion rate using camming

Automated Applications, Moorpark, California, designed a machine to separate metal parts coming from an unwind reel in strip form, move the parts into position, and insert them into a housing. The desired rate was 700 parts/minute.



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Challenge

Three servo axes were involved: Strip Feed Axis (200 watt-shown with strip feed wheel in the illustration), Cut/Position Axis (4.4 kwatt) and Insertion Axis (200 watt).

The maximum velocity required to feed the metal strip in a start-stop fashion required too violent of a motion profile, causing the strip feed axis servo to overload and causing instability in the tension control of the unwind reel. Automated Applications was looking to increase speed while maintaining stability.

Solution

Using a multi-axis Yaskawa MP2300 Motion Controller with camming capability, and Yaskawa Sigma-5 servos, the Cut / Position axis and the Insertion axis could be run faster, allowing the Strip Feed axis to slow down and still maintain desired rate. A Virtual Master in the Yaskawa MP2300 controller was used to allow each axis to have a separate non-linear relationship to the virtual master. All axes were networked to the controller using MECHATROLINK-II protocol on an RS485 network.

Results

Use of the Virtual Master with the high resolution feedback of the Sigma-5 servo (20 bit) and low inertia relative to peak torque of the Sigma-5 servo motor allowed Automated Applications to adjust the relationship of each axis to the Virtual Master to attain maximum possible rate while maintaining stability in the Strip Feed axis.

