



LIFE SCIENCES



IMPROVING SERVO CONTROL

High Speed Servo Control and Recipe Management in the CPG Industry

Background

Avid Solutions upgraded the control systems on a pair of crimping machines for a cosmetics manufacturer. The customer was having reliability issues with the existing servo control system causing excessive line down time and erratic behavior. Furthermore, the existing machine had communication issues due to passing Ethernet through a slip ring. The application included a number of tricky issues including a requirement to keep to an existing footprint within a small, round enclosure on top of the rotating turret. Avid was able to replace all electrical components including a fixed panel subplate, turret PLC, 12 servo drives and motors, and HMI PC onsite and bring two lines up with minimum downtime. The original time line was met with the first line back in production after only two weeks and the second line was back in production a single week later. The customer was ecstatic to have both lines back running “green” with no extra downtime or work stoppage starting the day that the line came back up.

Approach

The application included replacement of a proprietary Galil motion system with 12 servo drives and motors with an Ethernet/IP based Allen Bradley Kinetix Servo system using Integrated CIP Motion. Kinetix 5500 servo drives were used in conjunction with Kinetix VP Low-Inertia Servo Motors, a CompactLogix L36ERM PLC, and an AB 842E Ethernet/IP Absolute Encoder. In this

fashion, all 12 motion axis were able to be coordinated over Ethernet without the need for the complication and hassle of encoder signal splitting or SERCOS fiber networking. Wireless Ethernet via Hirschmann BAT products were used to send status and HMI communication down from the rotating turret of the crimping machine to a fixed PLC and HMI panel.

Avid made use of the Electronic Cam instructions available in the Integrated Motion suite to produce a master Cam Profile that detailed the motion of a single axis throughout the rotation of the crimping machine turret. Each individual axis was calculated based on a degree offset from the Machine Cam Profile to develop individual Servo Cam Profiles. In this way, only a single Machine Cam Profile was required to run all 12 synchronized axis. The Machine Cam Profile was calculated based on measurements of key bottle and pump parameters entered and stored into a recipe management system.

Results

FactoryTalk View SE Local was used to create an HMI application that was straightforward for the operators to use and provided a recipe system for storing individual bottle type recipes. Avid incorporated customer feedback to create a simple recipe manager that alleviated previous issues by sorting recipes alphabetically and creating a straightforward way to save, copy, and verify loaded recipes.

Applications

Automated Bottle Filling

Automated Bottle Capping

Conveying

Technologies

Allen-Bradley
Rockwell