

...Application SOLUTIONS

Industry:
Packaging

Application:
Electronic Line Shaft

From Cleveland Motion Controls, Inc.

Background Description:

A well-known candy manufacturer was encountering packaging line problems with respect to registration errors and offset, as well as reliability problems that emanated from the packaging line's existing mechanical system.

Key Reasons For CMC Product Selection:

The CMC Aximaster® Motion Controller was selected because of its ability to provide a cost-effective, maintenance-free reliable solution that would easily adapt to the existing system. The Aximaster 9000D with its self-contained 'state-space' servo controller, digital amplifier and power supply was the perfect solution for both size and performance.

Problem:

The existing packaging line system was slow, inaccurate and a maintenance problem. A decision was made to retrofit the line with a new servo system. The system had to include complete programming and startup assistance, and interface with an existing PLC that controlled the overall process. An easy to-use operator terminal in a moveable pendant was also required for operator adjustment and display of the label length, offset and system error conditions. All system start-up and program testing had to be completed by the vendor in five business days.

Objective:

The manufacture wanted to increase the accuracy and correction ability of a candy bar flow-wrapper system.

The system had to be a slave to an existing knife drive and index the wrapper with existing fin seal wheels while keeping the film in registration with the cutter / end sealer, despite frequent in-feed starts and stops. The controller also had to monitor registration errors (due to splices in wrapper spools), missing candy bars and "blow off" "bad bars" from the line into a reject bin. It all had to be accomplished with a continuous flow of film-making corrections for each bar .

CMC® Product Solutions:

- Aximaster 9000D Single-Axis Motion Controller
- ACM 4431 Series AC Brushless Servo Motor
- View Pad Operator Terminal for Aximaster 9000D

Key Features & Benefits:

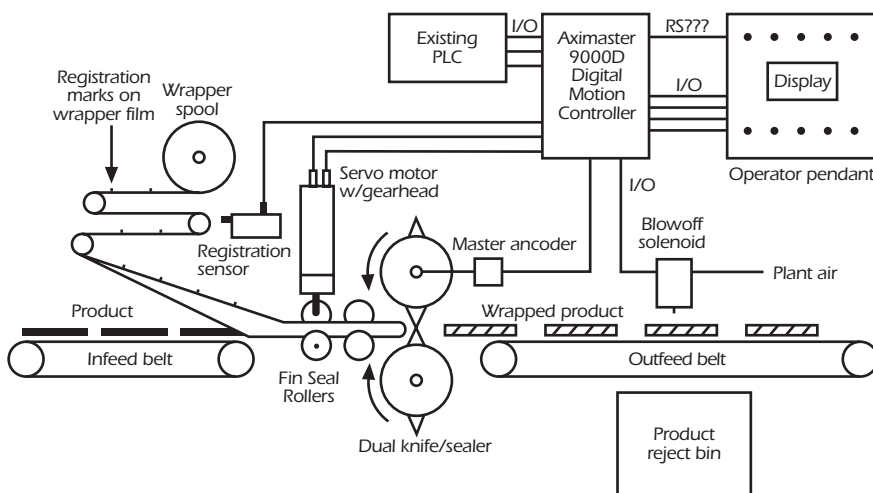
The Aximaster 9000D Motion Controller provided a total integrated system solution:

- Improving process repeatability with continuous synchronization and the Aximaster Controllers' 'moving frame of reference' command set.
- Also improved process control and simultaneous rejection of a product that was 'out-of-spec.'
- Reduced installation time with the compact-sized Aximaster enclosure that easily fits into existing control cabinets.

Why CMC?

- Customer support before during and after the sale
- Single source for all your motion control requirements.
- Our ability to respond to your performance and delivery requirements

CMC® Product Solutions PACKAGING SYSTEM USING REGISTRATION



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Aximaster 9000D Product Solution:

The Aximaster 9000D is used in its "moving frame of reference" mode to synchronize the film feed rolls with an existing cutting knife. The system employs a master encoder on the rotary cutting knife to track its position. The knife is driven by a system motor connected to a drive shaft. Its drive signal is a function to incoming product feed. The system also requires a photo eye to pickup a registration mark on the film for each candy bar. This photo eye is connected to the Aximaster's hardware registration input. On the occurrence of a registration mark, the Aximaster instantaneously captures the master encoder position. This position is used to calculate a distance error between the cutting blade and the registration mark itself. The film feed rolls are electronically synchronized to the cutting blade; in order for an error correction to be made, the Aximaster will "add or subtract" a distance move on top of this synchronization. This move must be smooth and not jerky. To achieve this, the program used the distance error and the master velocity to calculate an appropriate jerk, acceleration and deceleration limit. The use of this limit calculation caused the correction move to be spread out over the entire time allotted for each candy bar, making the correction unnoticeable to the entire system.

Multi-Tasking:

The Aximaster is capable of eight simultaneous user-defined program tasks. While this program is doing its motion synchronization, it is also handling an operator station with several I/O's and an RS232 display terminal. The I/O consists of operator switches such as jog,

start, stop, auto, manual and others. While in auto (run) mode, the display terminal is used to show the cut length and the offset. The offset is used to electronically adjust the registration mark to an exact cut position. The offset could be changed by 0.10" increments (on-the-fly) to zero in on the exact required cut position. In manual mode, the display and its numeric

keypad are used to enter cut length and offset and to zero the master encoder connected to the cutting blade. The automatic mode supports an enhanced diagnostic feature to display several system variables. It also positions for trouble-shooting. The variables are displayed on-the-fly for each candy bar cut.

Other CMC® Integrated Solution Capabilities:

Aximaster 9000D Motion Controllers

- Easy-to-use digital motion controllers are versatile and can be quickly configured in a variety of single and multiple-axis control solutions
- Future configuration changes accommodated with flexible open architecture design
- Fast, convenient setup through controller's RS-232 port connected to any IBM PC compatible computer
- Precise control repeatability with digital circuitry—eliminates potentiometer and uses auto-drift compensation and auto tuning capability open architecture design
- Random in-feed sequencing

Operator Interfaces for Aximaster 9000D

- Choose from a variety of operator interface solutions

CMP2000 32 Bit Controller

- High performance 'State-Space' control algorithms provide on-the-fly corrections.
- Programmable-jerk limiting, electronic CAM profiling, moving frame of reference, master / slave synchronization and registration.

- Up to 230 axes + of motion control.
- High level multi-tasking programming language with embedded editor and compiler.

AC or DC Brushless Servo Drives & Motors

- Meeting the needs of applications that demand fast response, accurate control and maintenance-free applications
- Highly responsive, providing smooth operation throughout the speed range

Aximate

- Cost-effective, multi-axis, motion controller.
- High level programmability and communication capability.

DC Drives

- HP to 1000 HP
- Digital and analog versions



Aximaster 9000D

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