



## **INMOCO'S E-CAM LABELLING/CAPPING SOLUTION CAN DOUBLE THROUGHPUT, REDUCE COMPLEXITY & DELIVER HIGH RELIABILITY**

Inmoco's Elmo E-cam (electronic cam) solution for labelling and capping machines can double throughput, reduce complexity, and provide top level performance, with high levels of reliability in demanding environments.

The solution, based upon Elmo Harmonica servo drives and servomotors, is designed for use with rotary carousels. These are traditionally mechanical cam systems employing magnetic clutches to regulate tightening torque. However, mechanical cam systems have a number of shortcomings. First, they have reduced efficiency, due to the mechanical couplings that require complex and costly installation procedures and constant maintenance. Second, they are noisy. Third, they offer inadequate or no format flexibility. Fourth, there is limited scalability of the machine, both during the design stage of the installation and for machines already in service.

Recent technological advances have led to the replacement of the mechanical cam with an electronic cam. As a result, each platter or chuck is driven by an onboard electric motor. The use of an electronic cam offers advantages in terms of format flexibility, as the format is managed electronically, and allows modifications to the machine operating cycle, both during the design stage and for machines already in service.

Inmoco's Elmo E-cam solution has an ECAM operating table in each drive. This provides implementation flexibility on existing mechanics. It allows the bottle movement profiles to be changed by altering parameters without making a mechanical change. For example, changing the bottle turning speed based on the bottle's radius. In addition, the distribution of processing power using ECAM enables the network update rate to be increased from 4 ms/point to 2 ms/point, while reducing the network baud-rate from 15 MHz to 500 KHz. This enables the machine speed to be increased, without affecting network robustness, which is assured by the ability of the small Elmo drives to absorb shocks.

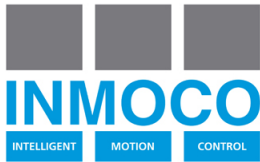
With the ECAM solution, all of the axes are slaves of the main axis in the carousel, with slave point 0 received by a camera through the central controller. Also included in the system is an HMI, which is linked to the central controller, and a master encoder that sits in the static part of the machine and provides the location information of the carousel's central axis - without additional general wiring - using CANopen communication.

In order to increase process reliability, the machine is assembled with two labelling systems; one after the other. Both systems are designed to attach the same label. If bottle inspection after the first system senses that there is no label on the bottle, the second labelling system is activated, and the bottle runs a second ECAM motion. The bottle is also inspected before the first labelling system, to determine its angle on the axis. The angle is measured by a vision system; it is then sent to the drive, which corrects its ECAM motion to align it according to the bottle itself.

The management of the ECAM motion, across the first and second labelling systems, is performed in every drive that is commanded by the central controller. In this system flexibility of feedback is provided by the ability to operate with resolvers in compact drives. Moreover, the ruggedness and compact nature of the system enables motors to be placed in the bottle axes without timing belts. Although the motors get shocked when a bottle is pressed, their rugged construction enables them to withstand these conditions and provide high levels of reliability in operation.

The Harmonica range of servo drives that control the capping/labelling motors are miniature units that offer OEM machine builders all the performance and features of much larger digital servo drives in a smaller and more cost effective package, which measures just 82mm x 25.4mm x 75mm. Providing unmatched levels of flexibility, the Harmonica is available as a fully digital velocity or current mode amplifier, as a network drive in distributed motion systems using the CANOpen interface, or as a standalone motion controller for single axis servo control.

The combination of small size, ease of set-up and commissioning, simplicity in mounting (panel or DIN rail), and communication facilities offered by the Harmonica and Harmonica "Plus" models mean that they are the ideal product for OEM machine builders. Although extremely compact, the drives sacrifice nothing in functionality, offering all the



dynamics, precision and functionality of much larger servo drives with a specification that integrates position loop, and both digital current and digital velocity loops, all with auto tuning adjustment. Conveniently for the user, adjustments to these loops can also be undertaken using Windows based Composer software, which is part of the automated set-up, start-up & tuning package that supports the amplifier.

The many onboard facilities of the Harmonica Series provide OEMs with the widest range of operating possibilities, including Point-to-Point positioning, Dual Loop operation- which compensates for mechanical backlash, PT1, PVT2, Follower and Pulse & Direction modes and ECAM, or Electronic CAM. ECAM is the ideal operating mode for periodic operation, especially in applications such as flying shears, rotating knives and packaging systems, where varying gear ratios are required along the motion cycle.

## About INMOCO

Established in 1987, INMOCO now offers an extensive range of motion control equipment including: compact servo amplifiers, position controllers, stepper motors, PLC controllers, linear motors, sensors, electric actuators and gearheads. INMOCO's product portfolio is supported by extensive applications and technical expertise, in addition to customer-specified electro-mechanical development and sub-assembly services; including calibrating and testing in a class 10,000 clean room facility.

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