



## Application Solutions Case study: Print Inspection

Product names - Harmonica

**Elmo Motion Control** has integrated its compact Harmonica digital servo drive into an automated print inspection machine. Mounted in the optical head of the system, the Harmonica controls the position of the camera as it scans each millimeter of the newly printed area.

## The Challenge

The printing industry has developed highly sophisticated mechanisms to automate the various print processes. A main challenge has been to introduce automatic process and quality controls in order to significantly reduce waste of time and materials when defects are found usually by the customer, after the printed material has already been delivered.

Advanced Vision Technology (AVT) Ltd. is a leader in developing sophisticated machine-vision technologies for inspecting printed substrates for both random and process flaws. The company's line of PrintVision machines enables printing personnel to automatically detect and analyze defects as part of the printing process, alerting the print operator on-the-spot in order to save valuable time and wasted material. The AVT systems can be used with all types of continuous web printing (including labels), and detect certain defects that are not always visible to the human eye, including color variation, misregistration, streaks and smears.

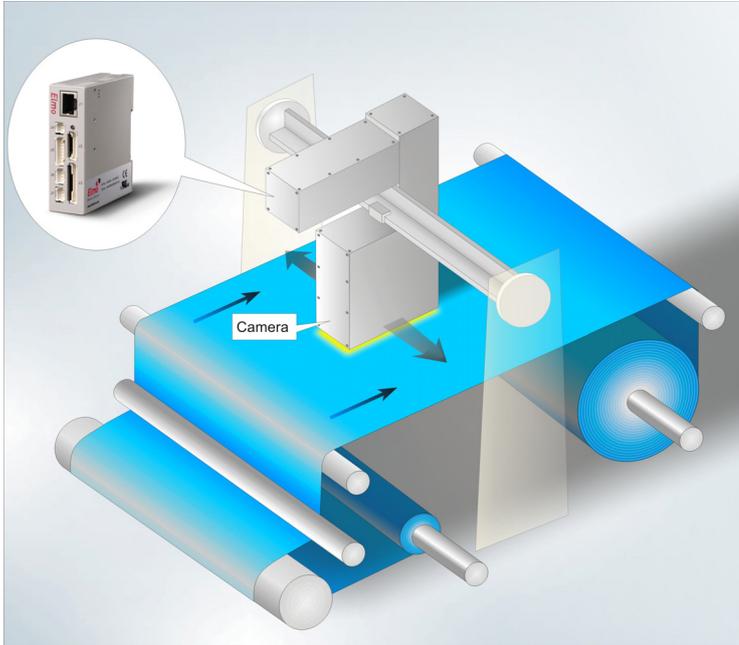
The actual vision mechanism is a high-resolution process control camera mounted in the printing press apparatus. The optical head in the inspection unit scans each millimeter of the printed material, back and forth. When a defect is detected, the image of the printed area is frozen on one of the two monitors of the control workstation and an alarm is activated. The defect is marked and classified immediately. At the same time, the inspection operator is alerted by a special beeper so that the problem can be analyzed and fixed before a large amount of additional material is printed.



The high-resolution optical head operating in the inspection unit must be flexible enough to operate with top accuracy, while the printing press is operating at fast speeds. What is required is a highly responsive drive that controls the position of the head, and yet is small enough in both weight and size to be mounted within the head without hindering the actual head motion.

## The Elmo Solution

To meet the demanding requirements of the AVT PrintVision systems, Elmo Motion Control installed its compact Harmonica digital servo drive in the optical inspection head in order to control the position of the camera. The drive's small size and weight were the critical reason for making this the optimal solution.



*The Elmo Harmonica servo drive is compact and flexible enough to be mounted in the moving optical head of the PrintVision inspection unit.*

Once the Harmonica was installed and operating in the AVT machine, Elmo personnel suggested implementing a CANopen network environment to further enhance the flexibility of the application and extend the drive's programming capabilities, while at the same time reducing the complexity of the entire machine.



*The AVT print inspection unit.*

## Compact Drive for Top Accuracy and Flexibility

The Elmo Harmonica digital drive has provided the ideal solution that AVT required for its high-resolution, moving optical head. Easily mounted and powerful in terms of its programming capabilities, the Harmonica is managing all required position control of the inspection camera.

### Elmo's Harmonica Digital Servo Drive

The Harmonica is a fully digital powerhouse that delivers up to 750 watts of continuous power (and 1500 watts peak power) for DC brush and brushless motors.

This tiny drive packs high intelligence and one horsepower into a 150-gram (5.3-ounce) package. It features sinusoidal vector control, trapezoidal vector control, trapezoidal six-step and DC commutation methods. Integrated in the drive is high-efficiency power switching technology aligned with Elmo's specially fast implementation of the CANopen DS-301 protocol. The Harmonica is fully programmable with Elmo Motion Control's programming language. Using Elmo's Composer setup tool, Harmonica users can perform drive setup, configuration, tuning, analysis and drive programming quickly and easily.



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