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M&R Printing Equipment Beats Its Own World Record with MR-J4 Servo and Q170 Stand-Alone Motion Controller

Case Study



Solution

- MR-J4 Servo
- Q170MCPU Stand-Alone Motion Controller

Advantages

- Motion control with built-in logic control
- Industry-leading speed frequency response
- Patented model adaptive control
- High resolution feedback
- Fully closed loop with external encoder

Mitsubishi Electric Value-added Advantages

- Short settling time
- Robust disturbance compensation
- Fast response
- High positioning accuracy
- Highest level of speed and precision

BACKGROUND

M&R is the world's largest manufacturer of screen printing equipment, with production facilities in Glen Ellyn & Niles, IL, and Wojnicz, Poland. A 20-year history of working with Mitsubishi Electric Automation and the success of the MR-J3 B Safety Servo Drive and HF-SP Motor used in its production Challenger III press convinced M&R not to evaluate servo systems from other manufacturers for the Challenger III D J4 press. The company was confident that Mitsubishi Electric's successor to the MR-J3 would meet its needs.

CHALLENGE

M&R Printing Equipment challenged itself with a lofty goal. Beat the world record for the most T-shirts printed by a single operator in one hour. The benchmark was M&R's own record of 1909 shirts per hour set in 2010 with its Challenger III press. M&R also set the previous record in 2005 with 1805 shirts per hour on its Formula press. This time, M&R chose FESPA, the largest global event for the wide format print industry, as the venue to determine



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– Bo Biel, M&R Print

if its new concept Challenger III D J4 automatic textile press could accurately index faster than its previous presses. The servo systems incorporated within the press would also have to deliver improved performance with short settling time, and be highly accurate despite the system's inertia.

SOLUTION

Mitsubishi Electric recommended the MR-J4 Servo System for M&R's high-speed concept press because it provides fast index time, quick settling time, rapid closed loop control and extremely accurate positioning control – all features that M&R required in its new press in order to beat the T-shirt printing speed record.

M&R's complex application also required reliable motion control. M&R used Mitsubishi Electric's Q170MCPU stand-alone motion controller in its Challenger III production press and was impressed with its superior performance. But, in order to meet the sophisticated demands of M&R's concept press, Mitsubishi Electric recommended the Q170MCPU motion controller with built-in motion

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and logic control, as well as a built-in Ethernet network. With the Q170MPCU motion controller and PLC, motion control data is shared via the built-in Ethernet/IP port. Designed to handle the most complicated high-speed applications, the Q170MPCU also includes built-in power supply, an external encoder interface and high-speed registration inputs.

It is more than just the company's products that continues the tight cooperation between Mitsubishi Electric and M&R Printing Equipment. "Mitsubishi Electric maintains the legacy of its products, which is important to our future development needs," says M&R's chief electrical engineer, Bo Biel. "M&R and Mitsubishi Electric share the same vision for the development of our products."

RESULTS

At FESPA 2013, M&R set a new world record of 2139 T-shirts screen printed in one hour by a single operator, and did so in front of a crowd of printing industry professionals. The operator used M&R's high-performance Challenger III D J4 automatic screen printing press, M&R's Passport automatic T-shirt unloader and M&R's Fusion electric conveyor dryer to achieve the feat. When asked about the significance of beating its own world record, Biel explains that it's about testing new technologies for future product development in order to improve performance and increase production output. "And, we know that Mitsubishi Electric will be there to support our development needs five, ten or thirty years from now," Biel concludes.



Left photo; the world record team in action. Rich Hoffman and the machine operator show off the record breaking T-shirt.

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