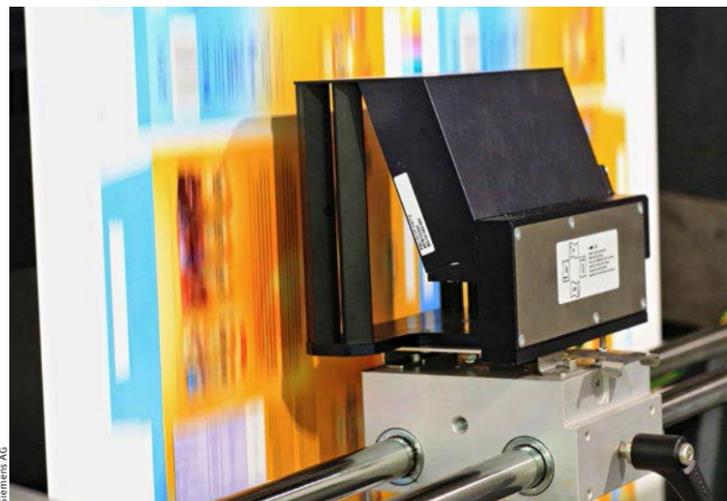


# Perfecting the art of inline converting

**Packaging:** Heidelberg Web Carton Converting GmbH achieves optimum quality and profitability in the printing and inline finishing of high-quality folded boxes from the reel with an integrated Simotion register control.

**HEIDELBERG**



The TRC7000 register camera is directly linked to the integrated Simotion register control via Profinet IRT

verting systems from Heidelberg Web Carton Converting GmbH in Weiden, Germany. As a development partner, the machine manufacturer has contributed considerably to the functionality of the Simotion register control. The register control, based on the Print Standard software package, is embedded in Simotion. The Simotion TRC7000 register control uses an intelligent camera that captures all the dot marks on a printed page at the same specific point in time. Real-time communication means optimum control dynamics, delivering a measurement resolution of under 5 µm and outstanding repeat accuracy, which results in consistently high process and print quality at speeds of up to 1,000 m/min (up to 350 m/min for this particular system). The camera detects dot marks anywhere on the printed image, even on low-contrast backgrounds. So in most cases, there is no need for a separate edge strip for this task – a bonus that significantly reduces the material costs of the system. An optional varnish strobe optimizes recognition on varnishes. Live images on each printing unit facilitate the positioning of the camera and monitoring of register accuracy.

In the world of printing, it is the functionality of the register control that determines how quickly the desired quality can be achieved and maintained. But other factors that contribute to system performance are the communication and connection of the control system, sensor technology, and drive system. The fewer the interfaces, the simpler and more efficient the processes – from engineering to service. This is what motivated

Siemens to develop an integrated register control in the Simotion D motion control system, as well as evaluation units and register cameras designed specifically for this purpose.

#### Dot detection in the interpolation cycle

Among the most demanding applications of this solution are the modular and thus extremely flexible ICS 670/850 printing and inline con-

#### Completely modular machines and motion control

The fully modular design makes the 670- or 850-mm-wide machines stand out. Different process modules on standardized Easy Value Add (EVA) platforms on the main body of the machine can be combined in any sequence based on the particular job. These include HiDef flexographic, coating, and screen-printing modules, as well as laminating and cold foil units. Then there are gravure printing units, various stamping units, dryers, punches, and other additional units. The new design supports reverse-side printing and holographic foil inseting, plus it is able to adapt to the procedures of the future. The system is thus ideal for use in highly flexible continuous production of high-quality packaging products – from the reel to the finished blank. With change-over times of just five minutes from a flexographic printing unit to a screen-printing unit, production of even small to medium batch sizes with frequent changes in precisely the required quantities is extremely cost-effective. "The motion control system from Siemens was the only solution that met our requirement of being able to change, for example, from flexographic to screen printing or to switch functions from synchronous axes to winding axes and vice versa on the fly – capabilities that are essential for quick product and module change-over," says product manager Werner Schwab.

The modular design of the systems is based on an automation solution with a centralized failsafe Simatic S7-400F system control unit and subordinate Simotion D435-2 motion controllers on every printing unit. The latter use modular Sinamics S120 drives to coordinate the printing cylinders and adjustments for the Simotics servomotors pertaining to each respective module. The distributed D435-2 motion controllers can easily be integrated into the Profinet architecture at various points on the EVA platform, and the drives can be connected on the fly. This also makes the automation cost-effectively scalable for a specific range of applications. All the machine and

register control functions can be accessed both on the central control panel and on every printing unit. Set-up and changeover are thus extremely easy, and there is no longer a need for a second person at the central control panel.

#### Everything for efficient register control

The register control function library extends the functionality of Simotion Print Standard with the addition of modules for process-specific tasks. The centerpiece is the actual register control module, which evaluates the instantaneous values delivered by the measurement system (sensor or camera) and calculates the register correction speeds based on the

parameterized printing technology and the geometric machine data. If register movements influence the material – as the clamping fixture does in rotogravure printing, for example – the underlying controller model takes additional downtime into account in the control loop. The module covers the web-web and web-cylinder control modes. There are additional function blocks designed to ensure efficient processes, such as register decoupling and inseting. This means that optimum adjustment of the control system is always possible for the given type of machine. ■

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The completely modular ICS 670 inline converting system is designed to enable highly flexible production of extremely refined packaging products