

Books and newspapers on demand

Finishing: manroland web systems develops innovative finishing solutions for the digital printing age based on tried-and-tested motion control solutions and drive technology from Siemens.

Shorter and shorter print runs, tighter delivery schedules, and a greater variety of formats and versions are the driving force behind the trend of digital printing on demand in the book and newspaper market. Augsburg-based manroland web systems GmbH has developed the FormerLine (for books) and FoldLine (for newspapers) modular folding systems in order to meet these same requirements in finishing. The Simotion D motion control system, the Sinamics S120 modular drive family, and Simotics servomotors are at the heart of the automation of both solutions.

Highly flexible, from reel to book block

The FormerLine folding system – which can be used both offline and inline – is designed for use in digital book production for even the smallest of print runs in industry sizes. In both cases, the printed web is guided synchronously over two or three longitudinal folds and into the variable cutting unit for the crosscut before continuing for further processing. Cut lengths from 145 to 420 mm are infinitely variable, and the flexible former positioning provides the option of variable page numbers for book signatures. With accessories, the system can deliver stacked signatures or an output of up to 6,000 preglued book blocks per hour.



»Simotion facilitates complex drive tasks and allows the extremely high demands placed on our finishing systems to be met in a highly flexible and dynamic way.«

Ralf Losert, Automation Systems Developer, Web Press Division, manroland web systems

Multivariable solution for newspapers and more

The FoldLine multivariable pin-type folder is specially designed for finishing digital newspaper printing. It allows individual broadsheet and tabloid newspapers with up to 12 variable sections or up to 96 pages to be produced cost-effectively. It also provides a flexible option for finishing advertisements, direct mail, cylinder-stapled booklets, and book signatures.

When format changes are frequent, short set-up times are crucial for ensuring profitability. With this in mind, the two folders facilitate a dynamic change of pagination and book structure on the fly as well as dynamic adaptation of cut lengths for all folding options while keeping synchronization times to a minimum. Adjusting the former takes three minutes at the most, and set-up for a different paper type with a web width of up to 1,067 mm takes five minutes.

High-performance motion control...

The clock generator used by the two folding systems is a Simotion D455-2. As with the folding units, the motion controller is also designed for modular extension – preferably via CX32-2 controller extension modules, which contribute the intelligence for the six axes controlled in each case. Addi-



Christian Pfammatter

manroland web systems' FoldLine finishing system for digital newspaper printing meets the increasing flexibility, quality, productivity, and profitability requirements

tional single-axis modules make this possible in fine-grain format on the drive side. The main task of the motion controller is to synchronize all the main and auxiliary axes of the folding systems at throughput speeds of up to 300 m/min. This equates to more than 20 real axes on a typical FoldLine. There are also several virtual cascaded master axes arranged in constellations that can be modified on the fly, for example, in cam disk or gear synchronization. This group of axes interacts via technology objects (TOs) with external components such as quick measuring probes and sensors for detecting print marks for cutting control or for tracking via code readers. Up to 60 TOs of this kind must interact in a highly dynamic and precise way to ensure that each individual page and each signature goes where it should to produce the highest-quality results.

...and high precision

The two real axes of each pair of cutting rollers are operated synchronously in order to achieve a clean cross section in two stages with a precision of 0.2 mm through the conveyor belts. Both pairs in turn follow a virtual master axis that specifies the throughput speed. Cam disk synchronization with the option for modification during ongoing operation can also be selected for each pair of cutting rollers in order to enable variable cut lengths and the formation of spaces between pages. Deviations from the set-point dimensions are also detected and corrected via print marks in the process. The Simotion Dynamic Servo Control spline uses polynomial functions to create interim reference values (bases) for position, speed, and torque in the rotation speed regulator. manroland uses this solution for the purpose of dynamic torque feedforward control, allowing for the highest possible posi-

tioning accuracy of the electronic cam disks. Code readers are used to track each individual page during throughput, divert it via the waste gate if necessary, and guide it to the appropriate destination.

"Simotion facilitates complex drive tasks and allows the extremely high demands placed on our finishing systems to be met in a highly flexible and dynamic way," says Ralf Losert, who develops software for drives and other technology at manroland web systems. These extremely flexible and high-performance folding systems are now being used by well-known companies worldwide, producing various high-quality products in the smallest of batch sizes despite frequent changes. ■

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