

MOTION CONTROL

BASICS OF DESIGN ENGINEERING

Servomotors increase output in web presses

Replacing lineshafted web press sheeters with servocontrollers increases throughput, reducing both setup time and the number of on-line sheeters needed.

Today's high-speed paper-web presses churn out catalogs, brochures, newspaper supplements, and other printed pieces at rates exceeding a thousand copies per minute. After the paper is printed, a sheeter cuts it into manageable sizes.

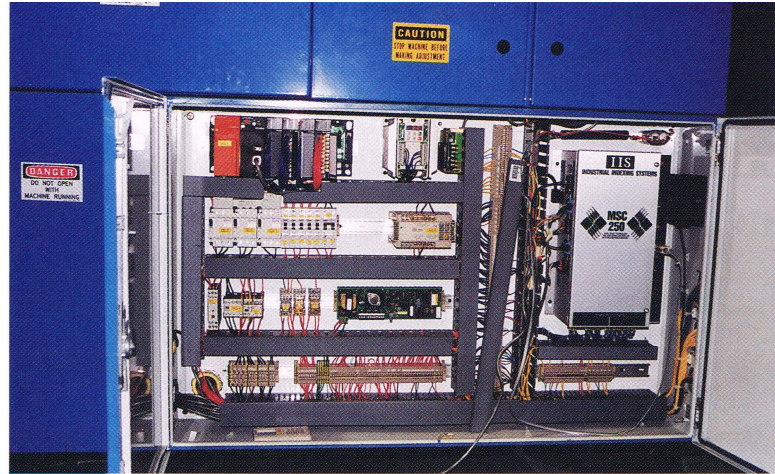
Traditionally, the sheeter was permanently mounted in place, mechanically tied to the web press through a lineshaft. The sheeter ran at a speed synchronized to the press speed, and the cut length could not be changed easily. Making the cut sheet longer or shorter required changing out pulleys, wheels, gears, and belts, often taking about half a day. And what's worse, the web press sat idle while the sheeter was being modified to cut a different length. Moreover, unusual cut lengths — those that were not some standard fraction of the diameter of the cylinder-knife combination — required custom parts costing thousands of dollars and weeks of delay. After the modifications were made, the press was adjusted to reduce backlash and other positioning errors.

To work around these shortcomings, one company updated its sheeter with **Industrial Indexing Systems** digital servosystem. The shaftless, servocontrolled sheeter can be moved from one press to another, something that was impossible with a lineshaft-connected machine. Now workers can remove a roll from the press and cut it off-line with the mobile sheeter, rather than using individual sheeters at each press. And with servomotor control, make-ready time is cut from hours to just minutes.

Another benefit is improved cutting accuracy. A ± 0.010 -in. tolerance cut at speeds of 1,200 ft/min is now possible. And at lower feed rates, the tolerance can be dropped to ± 0.005 in.

Moreover, registered cutoff control on the new sheeter is automatic, a built-in benefit of having servocontrol. Adding a high-speed scanner to the sheeter lets it read preprinted

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*A new servocontrolled sheeter built by VITS America, Blauvelt, N.Y., operates under an **Industrial Indexing Systems** MSC-250, 2½ axis servocontroller. Two Delta Drivers deliver the motion commands to two 5.6-kW precision servomotors that power the infeed rollers and cutting cylinder. Setup of the VITS sheeter is fast and simple, thanks to menu-driven operation and easy-to-use controls.*

registration marks on the web. The scanner data helps the controller make small changes in cut length on the fly to maintain print-to-cut edge alignment. The controller adjusts the phase relationship of the servomotor powered feed roll and cutting cylinder. In contrast, older mechanical systems depended on the sharp eye of an experienced pressman to make this adjustment. With the high speeds involved, thousands of sheets could be wasted before the adjustment was correct.

The sheeter runs in two basic modes of operation, in-line or off-line. When running in the in-line mode the sheeter pulls the printed paper out of the press at line speed and cuts it to length. The servosystem must then provide precise phase synchronism between the press and the sheeter. To accomplish this, an optical encoder mechanically couples to the press and feeds the servocontrols speed and position reference signals. The servocontroller drives the feed roll and cutting-cylinder motors. Operators input data for cut length and press pitch and the controller calculates precise electronic ratios between the press and the two motors to cut correct lengths. Operators can also trim the feed speed to provide optimum tension between the press and sheeter without disturbing the cutting cylinder. The most demanding part of the application is keeping the cutting cylinder phase locked to the press cylinder so it cuts precisely at the proper edge of the printed sheet.

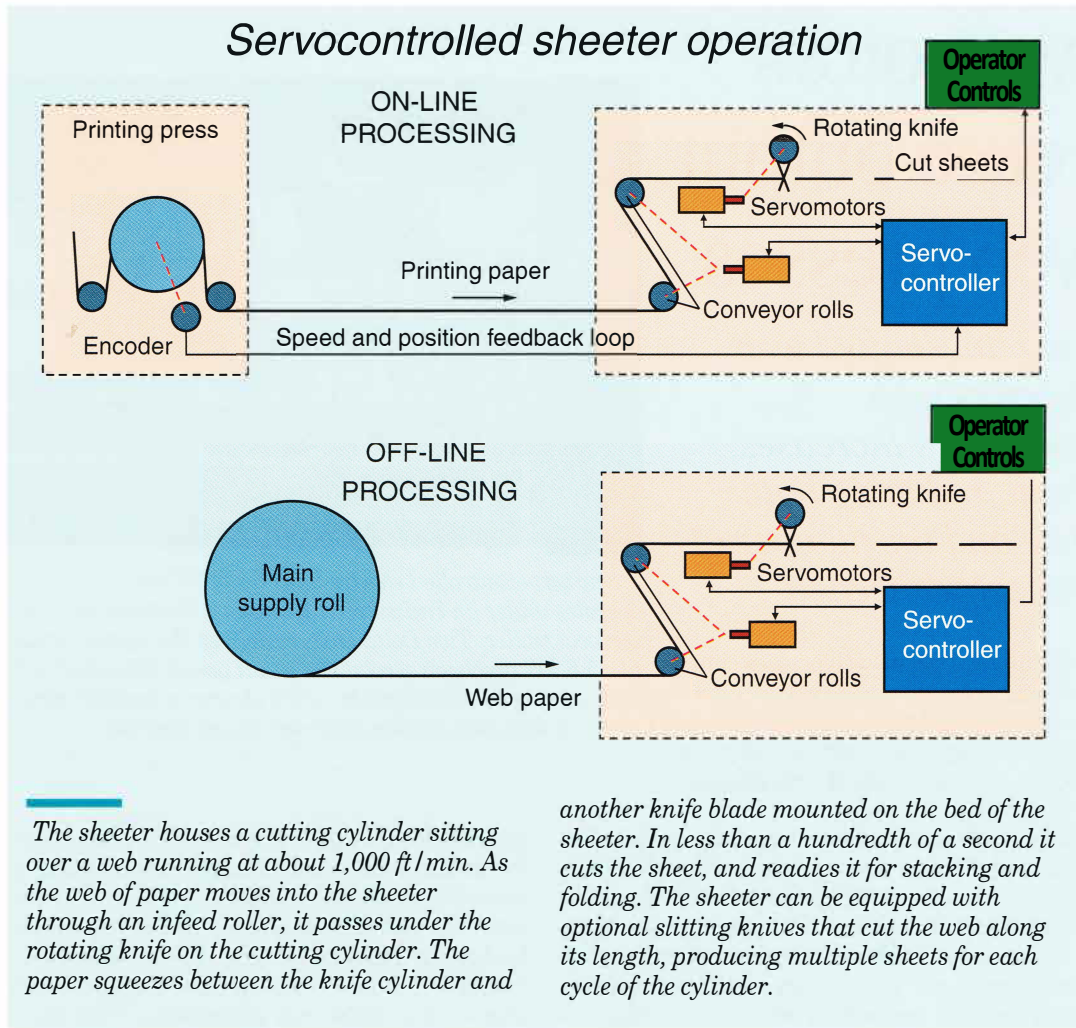
In the off-line mode, the feed roller in the sheeter pulls the paper directly off the roll and provides master position information for the cutting cylinder servo. The electronic synchronization between the feeder and the cutter servomo-

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tors controls the cut length.

The scanner can be used in either mode to keep the cut precisely aligned with the printing on the paper. Alternatively, the servosystem can be programmed to cut at a multiple of the press pitch, maintaining the proper cut location without the scanner. In either case the operator can make simple phase advance or retard adjustments on the fly. ■

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626 Fishers Run, Victor, NY. 14564 ~ (585) 924-9181

info@iis-servo.com ~ www.iis-servo.com



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Sales Representatives

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Area: CT, ME, MA, NH, VT, RI
George Fede (860)930-8066
Email: georgefed@amsmotion.com

Dawn MacKerron (617)489-4709
Email: dawnmackerron@amsmotion.com

■ Brundage Associates, Inc

Area: NJ, Downstate NY, Eastern PA, DE, MD
Bruce Kramer (610)393-9497
Email: BruceKramer@Brundage-Inc.com

Thomas Miceli (973)521-0552
Email: TomMiceli@Brundage-Inc.com

■ New Age Industrial Sales

Area: CO, UT, WY
Edward Rhoden (970)573-6398
Email: e.rhoden@newageindustrialsales.com

■ Jake Rudisill Associates

Area: NC, SC, TN, GA, FL, VA, AL, MS
Lantz Critel (704)910-9227
Email: Lantz.critel@JakeRudisill.com

Sam Thomas (704)907-2179
Email: sam.thomas@jakerudisill.com

Douglas Thackery (770)794-8111
Email: doug.thackery@JakeRudisill.com

■ Satek Engineered Components, Inc

Area: WI, IL, IN
Michael Gabel (312)813-0104
Email: mike@satek.com

■ Motors, Drives & Gears + Controls

Area: TX, OK, AR, LA, NM
Ray W. Zimbal Jr (817)307-1274 / (713)835-9753
Email: Sales@MDGControls.com

■ Culpepper Solutions Group

Area: Western PA, OH, WV, KY
Larry Culpepper (804)312-5985
Email: larry@culpeppersolutions.com

Ryne Culpepper (804)312-5985
Email: ryne@culpeppersolutions.com

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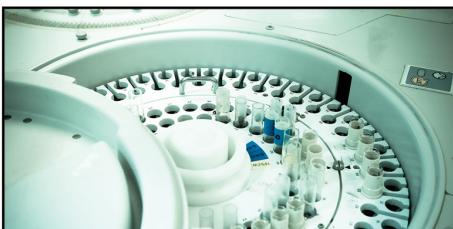
Area: United Kingdom, Europe
Matthew Nickson 011 44 1827 61212
Email: Matthew.Nickson@AxiomGB.com

■ IIS Headquarters, Victor, NY

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