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## SIMOTION

SDF Spezialmaschinen GmbH integrates an inkjet printer into a napkin printing machine for the first time

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### **Leading supplier of variable format napkin printing and folding machines chooses automation and drive technology from Siemens**

Some moments are forgotten all too quickly, such as the view of the sea during last summer's vacation, or encountering a herd of cows in an Alpine pasture. But instead of sticking snapshots into an album or hanging the pictures on the wall, such images can now be printed on napkins. Quality digital printing at a good price-performance ratio has long been a reality, even for small runs, such as invitation cards or photo books. But until now this had not been possible for napkins. The absorbent paper did not seem suitable for printing with an inkjet printer.

### **Highest print quality**

The world's first digital napkin printing machine for advertising prints will soon make small runs of high-quality, personalized napkins a reality. At the customer's request, the machine prints the full surface of napkins in photo quality and, of course, this is also food-safe. Developed by SDF in Monheim, Germany, the DigiPlus 430S rolls up, prints and cuts napkins in a single operation. It has an integrated Canon Océ inkjet printer. The machine feeds in the paper over large rollers, where a liquid coating is sprayed on, and then dried before printing. The coating compacts and smooths the surface. This prevents the ink from running, without impairing the absorbency of the napkin. After printing, the napkins are given their characteristic shaped edges, cut, folded, and passed to the packaging machine in stacks of between 10 and 150.

## Complex leading axis configuration

Günther Kluge, Head of Electrical Design at SDF, has much to say about the system: "In contrast to flexographic printing presses, in this case a third-party printer is integrated into the machine. The printer acts as the leading axis, which all the other axes have to follow with highly precise angular synchronism. This inevitably introduces disturbance variables into the system, which have to be filtered out to retain the exact pattern." The SIMOTION D445-2 Motion Control System is the heart of the drive technology. The SIMOTION functionality is integrated directly into the control unit of the SINAMICS S120 drive system. This makes the complete system, consisting of a controller and drive, significantly more compact and exceptionally quick to respond. The high speed of the printer places extremely high demands on the synchronization of the speed and angular accuracy of the axis group. Minimal deviations would move the photo from the middle of the napkin, or shift the shaped edges, which would be immediately noticeable. "In this application, we got to know new qualities of SIMOTION, and substantially broadened our experience of using the system," adds Kluge.

## End-to-end automation

The use of the SIMATIC S7-1500 and the configuration in the TIA Portal were also new to SDF. "The TIA Portal and the SIMATIC S7-1500 were attractive for us because the engineering system for SIMOTION was integrated into Scout version 4.4," Kluge continues.

A higher-level, fail-safe SIMATIC S7-1500F controller handles the safety functions and processes distributed signals. "The integration of the safety functions into the controller saves both wiring and configuration effort, because the same programming language is used for both standard and safety functions," he adds. The display on the CPU is very useful during commissioning, because the states of all the connected PROFINET bus nodes can be read off it. In this specific case, these are the inputs and outputs of the ET 200SP distributed I/O. A few, small control cabinets in the system are all that is needed for these compact I/O devices. According to Kluge, the SIMATIC KP8F Key Panels with fail-safe inputs, through which all the emergency stop switches are wired, are especially useful in practice.

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The compact installation with an Active Line Module and Double Motor Modules saves space in the control cabinet

The freely programmable buttons clearly show the system states with five, freely selectable colors. The machine is operated and monitored via a high-resolution SIMATIC TP1500 Comfort Panel. "As far as possible, the user interfaces have to be self-explanatory," says Kluge, "as this saves our customers labor costs and increases their competitiveness." The memory capacity and the reader integrated into the SIMATIC Comfort Panel meet these customer requirements optimally.

## Integration increases efficiency

Configuration in the TIA Portal impressed Kluge particularly because of the symbolic programming: "If a motor or load changes, limiting values can be changed without us having to rewrite blocks. The long-term usefulness of established standards that makes us independent from unavoidable changes in the mechanical system protects our investments and consequently also those of our customers." In his opinion, the integration of automation and drive technology in a single project increases both the clarity and efficiency of the engineering.

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