Robert Bürkle GmbH, based in Freudenstadt, Germany, has developed the world’s first multi-opening laminating line for the photovoltaic industry. In addition to analyzing the mechanical setup of the multi-opening laminating line, the machine building company also subjected the proven individual drive system of the Ypsator series to scrutiny and replaced it with a technically and economically superior solution.

Modularity reduces components

Bürkle opted for the modular Sinamics S120 multi-axis drive system in combination with Simotics S-1FK7 servodrive motors. This system now drives all the conveyor belts and lift drives of the Ypsator lines. Up to 60 drives are used for 4 to 10 openings. Previously, the laminating line featured a separate converter for each motor – each with a power feed, mains filter, and brake resistor, which involved increased hardware, assembly, and wiring effort.

The modular multiaxis drive system makes things much easier. The drive system of a laminating line is reduced to a single power feed, a few control groups, and the necessary number of power units, preferably the double-axis motor module version in a compact booksize format. All the drive components are linked to each other via the digital Drive-Cliq system bus and with the higher-level process control system via Profinet, reducing the wiring for drives to only a few connectors.

Up to six servo-controlled motors can be operated on each control unit. The motor modules on one CU320-2PN control unit are connected to a common intermediate circuit, which considerably reduces the number of mains filters and brake resistors. The extensive use of compact double-axis modules also saves space – equivalent to up to two control cabinets for medium-sized systems. Last but not least, the integrated communication via Profinet selected by the German machine builder eliminates limitations on the number of axes and the size of the sys-
And thanks to the considerably higher transmission rates, the ever-increasing amounts of data can be handled reliably as well.

**Intensive support during system change**

The new drive system also integrates a number of safety functions such as Safe Torque Off, making external safety components and the corresponding wiring unnecessary. A further reduction of components, engineering effort, and therefore cost can be achieved by integrating the sequence and safety control into a fail-safe Simatic S7-300F unit. The sequence control system of an Ypsator driven in this way is a Profinet-capable Simatic S7-317-2 PN/DP PLC. Siemens developed coupling components to integrate its converters so that the proven PLC program could for the most part simply be carried over. "Siemens provided intensive support during the entire system change," reports Michael Pojtinger, head of construction in electrical engineering at Bürkle. "With the Sinamics demo case we were able to test the desired drive functions in advance."

An industrial PC with a Simatic WinCC user interface serves as the central visualization system, and a Simatic Mobile Panel 177 PN is used for fault elimination during operation. An additional Simatic IPC427C Microbox PC is used as a link between the automation level and the MES (manufacturing execution system) level.

**Integrated diagnostic options**

The integration of control and drive systems offers a wide range of benefits throughout the entire lifecycle of the plant. "We were able to commission all the drive functions very easily with the Starter software tool," says Harald Finkbeiner, Bürkle team leader for hardware construction. Procuring everything from a single source also enables integrated diagnostics, right down to the drive level. "All drive problems can be solved with the Sinamics S120 drive system, which features a modular design and finely scalable performance," says Finkbeiner. There is also a first end user for the new multi-opening laminating lines: a well-known company in the United States has already implemented two lines with this innovative system.

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The Ypsator multi-opening laminating line quickly established itself on the world market, thanks to its modular design.