

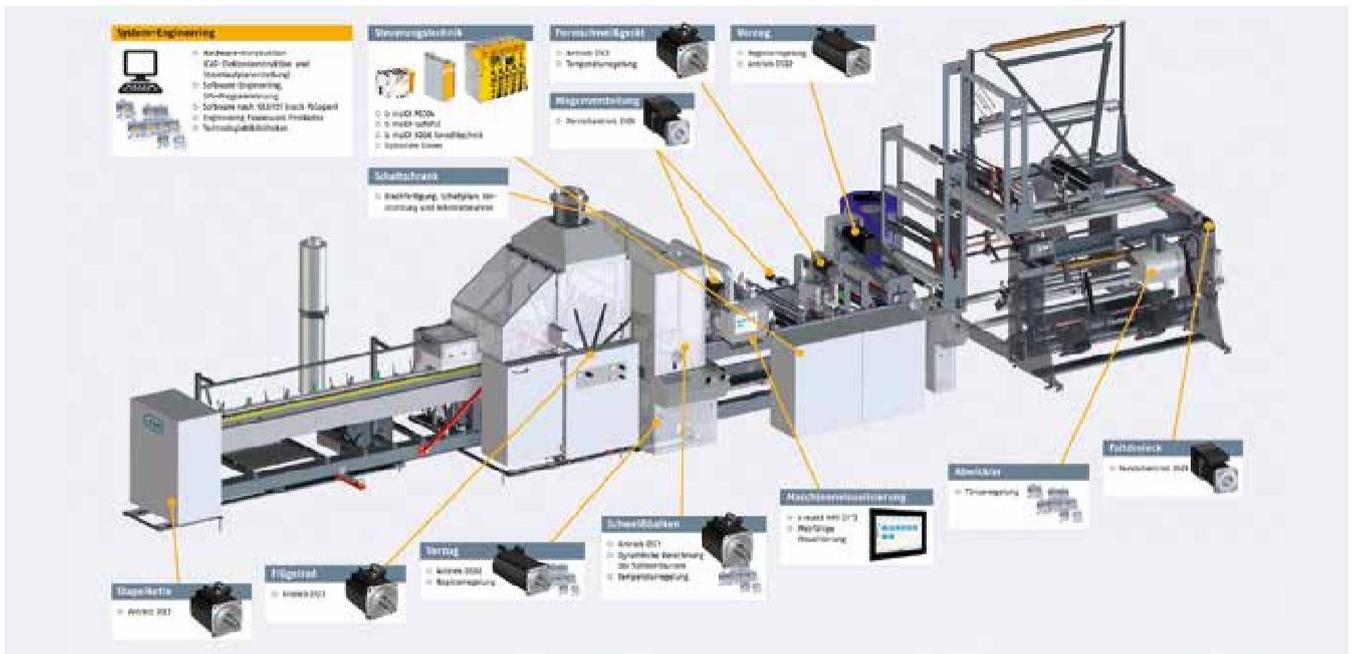
SYSTEM EXPERTISE BAGGED

Loop handle bags, carrying bags with punched handles, plastic grocery bags, bread bags or trash bags. These are just a couple of the examples that can be produced with a film bag machine. The Baumüller engineering specialists received the order from the mechanical engineering company Lemo from Niederkassel to design a new, cost-optimized, efficient and sustainable film bag machine that also affords the manufacturer maximum flexibility and quick commissioning in the production process due to its modular structure. Depending on the end product, the machine operator should then no longer have to purchase more than the necessary machine modules. At the same time, the machine should also achieve optimal version handling for future orders and achieve a higher throughput.

▲ Plastic grocery bags can also be produced on the new film bag machine from LEMO Maschinenbau GmbH. With the system engineering and the entire automation departments, Baumüller has efficiently implemented the requirements of the mechanical engineering company for modularity and work cycle increase | Image: Stepan Popov/fotolia

The use of plastic bags is now indispensable in any sector. There's no way past the bulk goods when it comes to transport or re-packaging, no matter whether for food or shipping, hygiene items or disposal. With its economical and innovative systems for producing flexible film packaging, LEMO Maschinenbau GmbH from Niederkassel is one of the world market leaders in this sector.

Baumüller, the specialist for drive and automation systems from Nuremberg, has already been supplying LEMO with components and assemblies for years. There were several reasons for the decision to have the new film bag machine designed by Baumüller engineering specialists and also have them completely automated with Baumüller systems. Baumüller has been a reliable business partner of LEMO for years and also does well with its many years of interdisciplinary engineering expertise and a multitude of realized tailor-made complete solutions.



▲ The film bag machine is automated by Baumüller engineering specialists and is equipped with a Baumüller complete system, from the control unit to the drive

INCREASED EFFICIENCY DUE TO AN INTELLIGENT OVERALL SOLUTION

The Baumüller specialists were able to meet LEMO's desire for modularity and a work cycle increase with the help of a new automatization concept. Among other things, a modern and streamlined drive and control architecture was used for this purpose. This means an integrated fieldbus system, minimum number of devices and a reduced control structure. The control cabinets were optimized and a future-proof communication structure was selected for the software.

The new film bag machine is based on a complete drive and automatization package from Baumüller with control technology, machine visualization, control cabinet, b maXX converters and various motors. It was possible to increase the work cycle thanks to the coordinated machine concept and the use of EtherCAT as a universal fieldbus system. All of this was also done while maintaining optimal production quality.

This led to a high cost efficiency. In addition, more than 10% higher productivity was achieved compared to comparable machines due to this conceptual design as well as the standardization of versions through intelligent modularization.

"Thanks to the comprehensive system expertise of the Baumüller specialists, the new film bag machine offers the machine builders and machine operators absolute flexibility and has an optimal price-performance ratio."

Willi Fenninger, LEMO managing director and owner

LEMO co-owner and managing director Bernd Schlarp adds, "this gives our customers a future-proof and cost-effective production system that is characterized by the highest quality, the latest technology, energy efficiency and the fastest production speed."

INDUSTRY 4.0: STANDARDIZED MODULARITY AND WEB-ENABLED MACHINE VISUALIZATION

It is self-evident that the new film bag machine is "Industry 4.0-ready."

Thanks to the modular structure of the new machine, it's no problem to switch between different formats, such as loop handle bags, plastic grocery bags, bread bags or trash bags. The base machine has six drives in the minimal design and becomes an individualized customer machine through expansions, depending on whether the machine modules for shape welding and stacking chain are required by the machine operator. If more modules are installed than are required for a current production process, optional slaves in the control help to temporarily disable the modules. The film bag machine can thus be ordered in various versions for the machine operator, despite the standardization.

The operation and monitoring of the new machine is also future-proof and equipped for Industry 4.0. Access via mobile end devices is therefore possible with the web-enabled machine visualization.

Baumüller relies on an automated software parameterization so that the machine builders can quickly go into series production without error and also no time is lost in the event of service. The production and service concept is therefore another component in the efficiency increase with respect to Industry 4.0.



▲ Among other things, the control cabinet planned and produced by Baumüller has the control technology with the stackable servo inverter series b maXX 5000

COMPLETE AUTOMATION: HARDWARE AND SOFTWARE MADE BY BAUMÜLLER

The film bag machine consists of several stations.

These stations begin with the unwinding and folding of the film, whereby the original single-layer web of the film roll is stretched as a double layer. The process continues to the shape welding where, for example, carrying handles are welded out. In the case of a welding bar, the double layer film gets its actual bag shape through separating welding. The separated bags are then transported on via the impeller and deposited in packets on the stacking chain.

The control cabinet planned and produced by Baumüller has the control technology with the stackable servo inverter series b maXX 5000, a b maXX PCC-04 industrial PC and a b maXX-safePLC. The b maXX-safePLC is a combination of safety control and standard control functionalities in one device.



▲ The print mark detection is one of the default features that are already stored in the machine control system that reduces the machine operator's programming effort

The machine is operated via a 17" touchscreen monitor, which is located on a movable support arm. A standard browser is sufficient for the web-enabled machine visualization so that additional license costs are saved. The Baumüller app can also be used for remote access through web-enabled end devices, such as tablets or smartphones.

Another machine feature is the different operation modes that can also be chosen in the visualization. In order to enable service activities, for example, transponders can be used to switch to up to four different operation modes, each with different user permissions, via the machine visualization.



▲ The compact and high-torque DSC servomotors impress with a higher torque density while simultaneously drastically reducing the tree volume

The entire film bag machine is equipped with Baumüller motors. DSC1 motors are used with both welding stations, the stacking chain and the impeller. The compact and high-torque DSC servomotors impress with a higher torque density while simultaneously drastically reducing the tree volume. Both preferred stations with register controls are driven with DSD servomotors, since an extremely dynamic braking and acceleration of the respective motor is required here. The motors of the DSD2 series impress with their high dynamics and the best start-stop qualities. A three-phase current synchronous motor with integrated electronics was installed as the third type of motor. The intelligent DSDI drive has a very short type of construction and supports the modular machine design, since it does not have to be connected to a separate converter.

With its application-specific technology modules, among other things for register and dancer control, Baumüller provides complete basic functions for the film bag machine that reduce the programming effort to a minimum for the mechanical engineer. The technology modules for the control units are acquired with the appropriate runtime license. They can map both simple movements as well as complex processes.

PRODUCTION AND SERVICE CONCEPT AUTOMATES SOFTWARE PARAMETERIZATION

Baumüller allows for the automatic parameterization of devices, modules and entire machines quickly and without programming effort with its production and service concept.

If a machine goes into series production, the machine builder thus has the ability to automate the entire software parameterization. It is just like in the event of service when a device must be replaced, automated and parameterized according to the machine requirements. This concept also makes it possible to quickly and flawlessly update the software of all machines of a model that, for example, are in use worldwide on five continents.

The superordinate control unit uses the fieldbus communication to detect all participants of the system and automatically includes them in the control project configuration. The drive and control system is ready-to-operate after the system initialization, which is also determined via the machine modules that can be selected or deselected in the visualization.

One big advantage of the Baumüller concept is the ability to rely on automatic programming, even when it comes to machine versions. The maximum configuration of the machine series is stored in the system for this purpose. Machine builders and machine operators benefit from this solution both in the event of service for ongoing systems as well as when commissioning new machines.

CONCLUSION

The many years of expertise of the engineering specialists paired with a complete automation consisting of hardware and software, and all of this from Baumüller from a single source, helped the machine builder LEMO to achieve a consistent machine concept with lean drive and control architecture for its new film bag machine. The standardization of the versions through intelligent modularization also led to a short time-to-market.

The machine builder LEMO's requirement was to design an economically efficient film bag machine where the entire servo drive technology with motors and electronics comes from one manufacturer.

"This has advantages during commissioning and in the event of service," explains Mr. Fenninger. And so Baumüller provides automation expertise, software and hardware as well as a production and service concept for the new film bag machine. With just one contact partner and good project management for the machine concept and the construction of the prototype, it was possible to already present the machine to the customer after a short development time that was future-proof and optimized for Industry 4.0. ■