



Safely Packed

When it comes to installing and retooling a machine, comfort, productivity, and safety go hand in hand. That is why the machine-building industry increasingly requires safety functions that are as flexible as modular machines. The solution: drive-based functions coordinated by small, cost-efficient F-CPUs.

Hugo Beck Maschinenbau GmbH in Dettingen/Erms, Germany, is a leading manufacturer of horizontal form/fill/seal machines for demanding packing operations in sectors such as the postpress-processing industry. Due to increasingly short amortization cycles, more frequent product changes, and smaller lot sizes, packing machines need to be adapted to the job or lot at hand more quickly. Flexibility up to the shortest possible delivery time for a machine is the key to success.

Up to 18,000 products per hour

Hugo Beck consistently incorporates these requirements in two new series of horizontal form/fill/seal machines: servo X and neo X. The servo X series, a further development of the Flexo machine series, now operates nonstop thanks to move-

ment-controlled servo drives and revised mechanisms, packing up to 8,000 products an hour.

The newly developed neo X can even pack as many as 18,000 products an hour. At this high operating speed, a combination of upstream barrage and finger chain

guarantees a controlled and constant distance between products when inserted in the film bubble.

From the film unwinder to the infeed cycle and lateral and longitudinal sealers to the take-up stand for the rewinding of the remaining film, the servomotor-driven

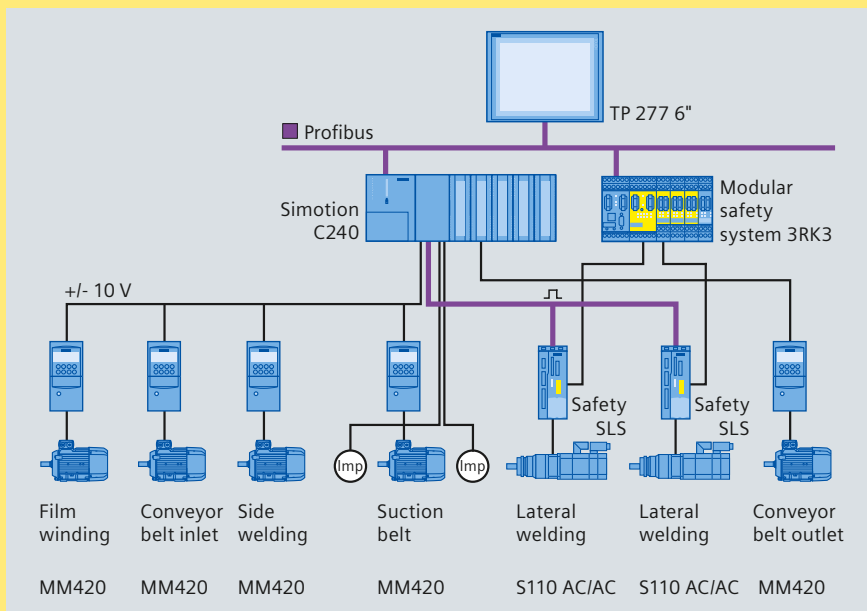
“The drive-based safety solution facilitates the development of versatile, user-friendly machines and makes it easy to adapt them to the operator’s situation.”

Ulrich Dilger, Chief Designer and Product Development Manager,
Hugo Beck Maschinenbau GmbH



all pictures: Siemens AG

The series neo X is designed for up to 18,000 cycles and commands servo motors for recipe-controlled changeovers



System-integrated safety functions guarantee a clear and easy-to-maintain system architecture

shafts of all the machine modules are synchronized by means of the Simotion D motion control system. The Sinamics S120 frequency converters with independently operating drive-based safety functions serve as drives.

In the simplest case, the safety functions can be activated directly via a door sensor or an emergency switch, which is made possible by means of wired signals and by the Profisafe protocol via Profibus or Profinet. The main advantage of this approach is that with sophisticated safety functions such as safely limited speed or safe operating stop, the drive position control remains fully operational. Thus the higher-level Simotion D motion control system can maintain the synchronized relations in the shaft assemblies between the machine modules. This is the most important prerequisite for resuming operations quickly after a safety action and the foundation for a user-friendly and safe drive-supported set-up.

Compact F-CPU creates a new degree of freedom

At Hugo Beck, the safety function to be carried out by every drive in a particular situation has been programmed in a small safety-oriented control. It is therefore easy to intelligently link the safety contact status, the current operating mode, and the user actions. Subsequently, differenti-

ated safety responses (adapted to the situation) are triggered, which in turn are implemented by the drives autonomously. Ulrich Dilger, chief designer and product development manager at Hugo Beck, offers an example: "The film box for carrying the packaging film is fully functional and synchronized during manual work at the sealing station. However, as soon as the film box is opened, the sealing station and infeed cycle are stopped or set to slow." A dangerous action is avoided by means of the safety technology of the drives. Because these can be left active, drive-based set-up functions are possible even if the protective housing is open. And because many manual tasks that were previously required after production interruptions are no longer applicable, such as removing the remainder of the film, productivity is increased.

For the servo X, the MSS 3RK3 modular safety control from the Sirius program is used, while for the neo X, the high-performance F-CPU from the ET 200S I/O system is implemented. Both fail-safe CPUs are programmed using Siemens' standard engineering systems. Because the basic safety functions are already certified, all that remains to be done is program the safety response logic.

Thanks to the system change from safety relay to safety control, the machine manufacturer saves both time and wiring expenditure when installing the machine

and putting it into service. The safety function is deployed on every similar new machine by means of a simple software upload. This makes it easier to comply with even very ambitious delivery deadlines.

Simple engineering – huge benefits

Intelligent drives, a powerful motion control, and compact safety controls create a highly flexible platform. Even with system-integrated safety functions, user programming remains convenient and flexible, as the motion control program itself does not require a security-related approval. The machine's range of functions easily can be adapted to customer requirements, and different expansion stages of the user program can be operated with the same safety functions approved by the trade association. +

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