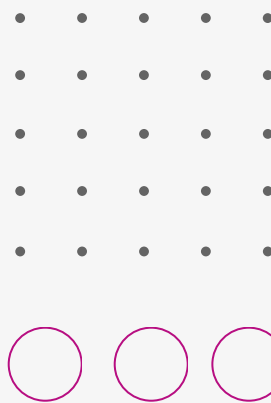
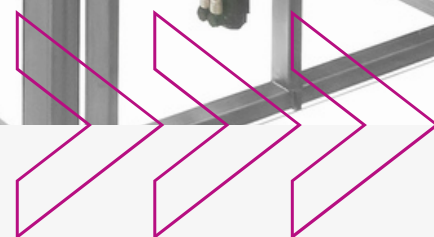
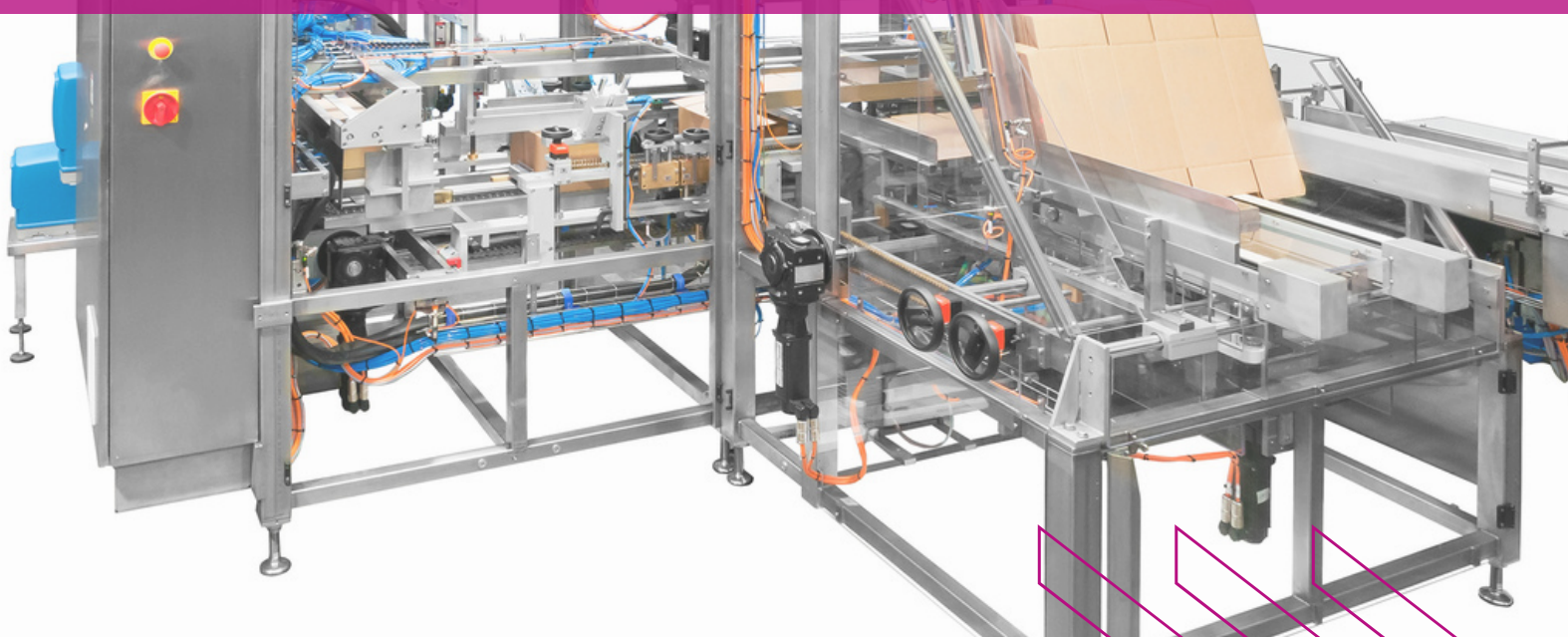


CASE STUDY



Butter and margarine-packing with care.

Captivating solutions: lifgo® - rack and pinion gear facilitates the secure transport packaging of delicate food items.



The wrap-around/tray packer from the mechanical engineering firm Schäfer & Flottmann is a versatile packaging machine. It efficiently packages delicate food items, such as butter and margarine, for subsequent transport while simultaneously offering retailers a robust outer packaging solution.

A corresponding sales display is accessible. A lifgo® 5.1 linear precision gearbox from LEANTECHNIK AG guarantees the precision necessary for packaging at high speeds and rapid cycle times.



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Erecting, grouping, filling, or stacking—packaging activities encompass a wide spectrum. The mechanical engineering firm Schäfer & Flottmann, based in Gevelsberg, specializes in automating packaging and order picking processes. Established 60 years ago, this family-owned business offers a diverse product range, including individual machines and complete packaging lines, such as erectors, packaging systems, closing modules, and palletizing systems. These solutions are primarily utilized in the food industry, as well as in the pharmaceutical, chemical, and hygiene sectors. "Our mission extends beyond merely placing goods into secondary packaging efficiently; we also aim to expedite processes, facilitate format changes, and reduce downtime," states Günter Wibbing, Managing Director of Schäfer & Flottmann.

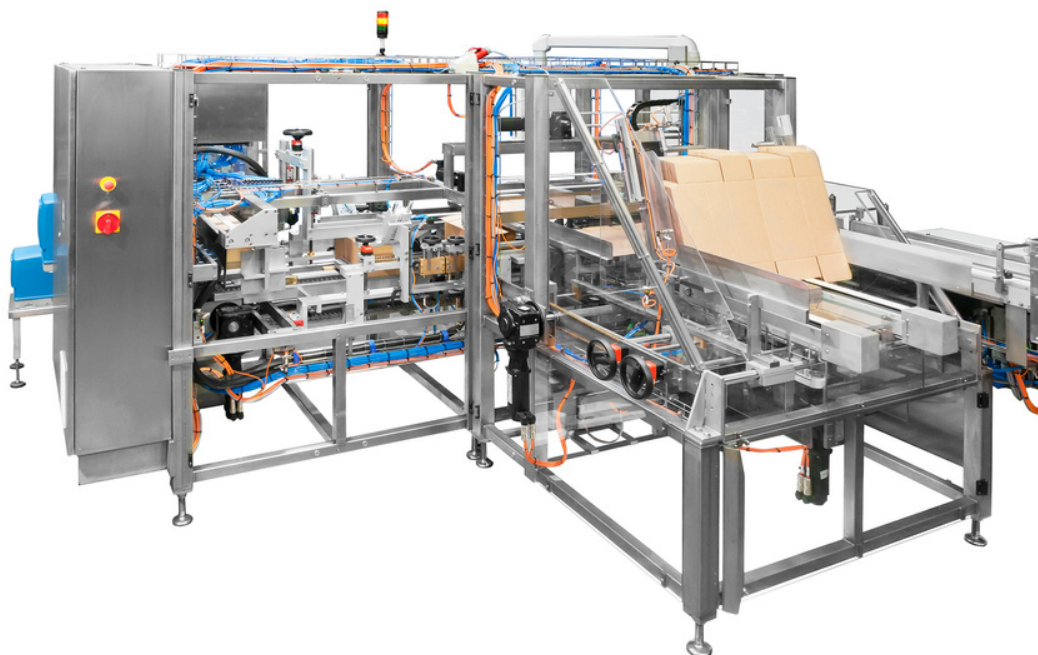
Wrap-around: exact fit and product safeguarding

The goods requiring packaging in the food industry are varied, encompassing frozen products, beverages, bread and baked goods, as well as delicate dairy items. These products are typically liquid or soft in nature and must remain undamaged throughout the packaging process. Secondary packaging serves to protect individual items during transport and, with suitable design features such as tear perforation, can also function as a sales display at the point of sale. For the packaging of soft products like butter or margarine, Schäfer & Flottmann provides wrap-around/tray packers, which are particularly cost-effective as they fold the cardboard blank directly around the product, serving as both transport packaging (wrap-around) and sales display (tray). The absence of folding tools between the product and the carton ensures a particularly tight packaging. Overlapping folds of side, bottom, and lid flaps enhance the carton's stability and offer greater resistance on the pallet compared to a tubular carton. "For packing wrap-arounds or trays, safe product handling and smooth operation are essential," states Günter Wibbing. "A packer is generally not a standalone solution; it must be synchronized with the speed of the preceding filling stations at the end of the packaging process."



Packing solutions at a rate of 30 layers per minute

The SFS 374 packer, made from stainless steel, is perfectly suited for the food industry, boasting a capacity of up to 25 wrap-around cartons or trays per minute and an output exceeding 30 layers per minute. All primary movements are governed by servo drives, while the carton folder functions pneumatically. The gluing mechanism can be selectively activated or deactivated, facilitating rapid and reproducible format changes for carton blanks.

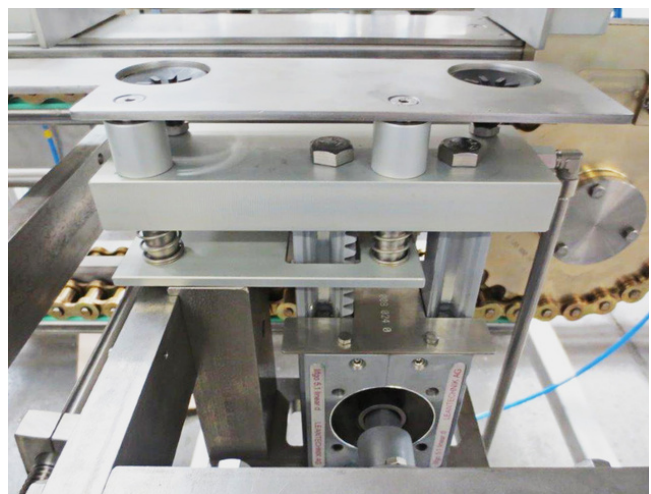


The distinctive characteristic of the SFS 374 lies in its formation of flat blanks around the product groups. The product units designated for packaging are introduced into the wrap-around/tray packer through a stop-and-go conveyor belt followed by a "dead plate." Products accumulate on this conveyor belt, with their status indicated by proximity switches. Once the target quantity is achieved, the belt halts, creating a gap. The product layer is subsequently pushed off and lifted by a tongue plate, which advances the layer onto the awaiting blank.

Developments are occurring in the cutting magazine.

The blanks are supplied from a magazine where the cartons are arranged vertically. A suction plate equipped with two integrated vacuum grippers lifts a blank for separation and directs it horizontally through a rotating motion and a slider located directly beneath the tongue plate. Once the product layer is deposited onto the blank, the blank, along with the product, is drawn vertically between the plates of the conveyor chain.

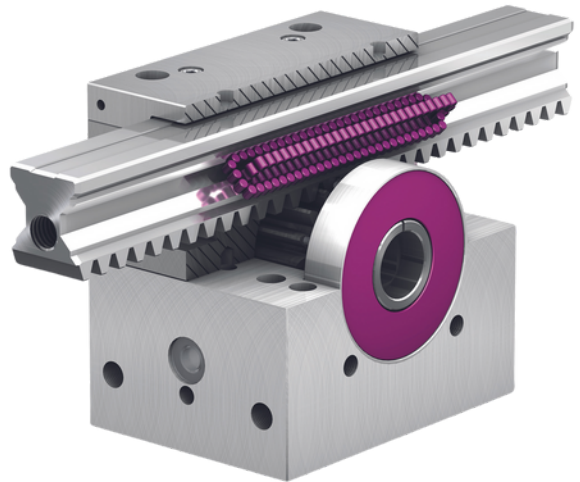
The subsequent steps entail folding and adhering the inner and outer flaps. The lid is subsequently affixed to a side panel. Ultimately, the completed carton is positioned on a conveyor belt.



To achieve the cycle times mandated by the upstream filling station, the feeding of the product layer and the preparation of the carton blanks necessitate corresponding dynamics. The cartons must be cleanly separated and accurately pulled between the sheets of the conveyor chain, which requires a gradual start, subsequent acceleration, and careful threading into the chain guide. Schäfer & Flottmann manages the requisite drive with a servo motor and an appropriate control concept. A lifgo® precision rack and pinion drive from LEANTECHNIK in Oberhausen transforms the motor's rotary motion into a linear lifting motion. "Processing over 30 layers per minute results in a cycle time of less than two seconds. This truly tests the drive's limits," states Klaus Reiner, Head of Design at Schäfer & Flottmann. "Additionally, they are highly compact and operate with exceptional precision. Their unique design eliminates the need for supplementary guidance technology such as toothed belts or similar devices, facilitating straightforward installation."

Drive and leadership within a single unit

lifgo® gear units from LEANTECHNIK are rack and pinion systems featuring a compact housing that encompasses a pinion with a quadruple roller guide. A rack traverses the pinion through this guide. Depending on whether the motor drives the rack or the pinion, the movement of one is translated into the other. The rack and housing can serve as lifters and supports for devices, providing versatility for a broad range of applications.



The lifgo® 5 series rack and pinion gear units facilitate substantial load capacities while maintaining low operational noise. These gear units are distinguished by their exceptional positioning accuracy, rapid lifting speeds, and significant transverse force absorption. In addition to the standard model, the gear units are offered in the lifgo® double, lifgo® linear, and lifgo® eccentric configurations. Each variant is available in sizes 5.0, 5.1, 5.3, and the newly introduced special size 5.4. At a velocity of 3 m/s, the lifgo® 5.3 can generate a lifting force of up to 15,900 N. The lifgo® linear version is particularly well-suited for extended travel or lifting distances and can be effortlessly converted from the standard lifgo® model by detaching the adapter plate and making minor modifications. The lifgo® linear can operate with either a fixed rack or, if necessary, with a fixed jack and a movable rack.



The rotary motion necessary for the preparation of blanks in the Schäfer & Flottmann wrap-around/tray packer is executed through a lever mechanism mounted at the pivot point, to which the servo motor required for driving the linear gears is also affixed. This mechanism is linked to the gear pinion via a profile shaft. Given that the required stroke of the gear is notably extensive at 200 mm, the engineers opted to utilize the lifgo® 5.1 linear double. A lifgo® double features two racks that operate in opposing directions. In their implementation, Schäfer & Flottmann substituted one rack with a lifgo® guide rail to serve as a parallel guide for enhanced stabilization. The rack and guide rod are securely bolted to the vacuum suction plate and move freely within the lifter.

“The lifgo® 5.1 gearbox is perfectly suited for our application as it can endure high torques and accelerations during lever action, despite its compact size,” explains Klaus Reiner.

In the case of the SFS 374, this corresponds to an acceleration of 9 m/s^2 and a velocity of 2.5 m/s . Engineered for a maximum acceleration of 50 m/s^2 and a lifting speed of 3 m/s , the lifgo® gearbox adeptly meets these specifications. The superior quality and durability of the gearboxes are also crucial for Schäfer & Flottmann. After all, the wrap-around/tray packer is intended for prolonged use in a three-shift operation. In the over 150 machines delivered to date, the lifgo® gearboxes operate seamlessly, ensuring that margarine and butter reach retail outlets in pristine condition.

