

The Clean Cut

JBT Corporation Benefits from Kollmorgen Hygienic Motor Design in Food & Beverage Application

Matthew Jaster, Senior Editor

JBT Corporation has been producing food industry machinery since the 1880s. The current JBT portfolio includes slicing, waterjet cutting, and sorting systems to meet portioning and trimming needs. The company's DSI Portioning Systems generate portions, nuggets, chunks, strips, fat-trimmed, and fat-free products efficiently and accurately.

The product is loaded on a conveyor and scanned with an automated vision system that determines key attributes for each piece. *DSI* software selects a cut strategy that maximizes yield for each piece, and cutting takes place via a horizontal slicer blade or a vertical ultra-thin stream of high-pressure water. If you compare this to manual portioning in the food and beverage industry, a small staff can replace dozens of laborers with knives and scissors.

Expanding upon the success of their DSI Portioning Systems, JBT Corporation sought to develop a new blade portioner that would be easy-to-maintain, easy-to-clean and use less floor space while continuing to utilize both *DSI Q-LINK* software and *BladeSense* software technologies for yield optimization and blade condition monitoring.

The challenge was designing a compact, easy-to-clean portioning system, according to Jon Hocker, JBT Director of DSI and Global Product R&D.

"Most systems on the market had covers around the servomotors to protect from water spray during cleaning. These covers made sanitization a challenge. Eliminating these covers was essential to our JBT design intent and marketing message. For JBT it is imperative to improve the hygienic design in our new equipment to help customers maximize uptime and minimize food safety risk," Hocker said.

The result was the DSI DB20, an accurate, hygienic, easy-to-operate portioning system suitable for a wide range of linear portioning applications. Machine maintenance requirements are reduced significantly using self-aligning belts and software that suggests replacement blades at the optimal time.

In addition to reducing maintenance frequency, the system is designed for routine maintenance to occur quickly with conveyor belts or belt sections and blades designed to be safely replaced in a matter of minutes increasing machine uptime.

DSI DB20 Dual Blade Portioning System: a hygienic, high-yield, low-maintenance blade portioning system powered by proven DSI Q-LINK Portioning Software from JBT.

Collaboration Yields to Design Modifications

Along with the motor sizing and "co-engineering" (CoE) at the beginning of JBT's DSI DB20 Portioning System project, Kollmorgen and JBT worked closely throughout the evolution of the machine, according to Kevin Garrison, senior mechanical engineer and lead engineer for AKMH at Kollmorgen.

"This collaboration enabled several design modifications to be proposed on-site. Thereafter, the new design was implemented quickly and exceeded the performance of the original, further thanks to the great teamwork," Garrison said.

A key focus of the design was to prevent water ingress into the motors in extremely harsh washdown environments. Kollmorgen's knowledge in sealing, and shaft design was critical to ensure the durability of the motors.

Servo Performance Upgrades

One of the highlights of the design was the application of the Kollmorgen AKMH IP69K servomotors directly coupled to the blades. This allowed for a compact yet open design of the cutting compartment.

The AKMH servomotors deliver the necessary servo performance and are durable enough to be applied without the bulky motor covers that complicate cleaning and maintenance procedures and add to machine size.

AKMH stainless steel servomotors can be cleaned with solutions ranging from 2 to 12 pH and high pressure spray up to 1,450 psi, allowing them to be cleaned just like the rest of the machine and hence save valuable time.

Kollmorgen's AKMH motors are designed with a smooth surface finish, laser annealed nameplate, no external fasteners, no metal to metal seams, no flat surfaces and no nooks and crannies leaving no place for pathogens or food to hide.

"These motors reliably survive direct spray from sanitation personnel, eliminating the troublesome housing and





Close-up of the Dual Blade Portioning System from JBT.

ventilation systems present on other blade portioners,” Hocker said.

He was also surprised by some of the additional AKMH servomotor capabilities:

“Some very specific applications generate significant heat in any servo solution. We realized we could liquid cool these motors with mist nozzles for the rare occasion when needed. What surprised us was how effective the liquid cooling was. We can significantly outperform competitors on specific applications because when other systems overheat or have to be slowed to manage heat, our solution can run continuously at higher capacity,” Hocker said.

In addition to the motors, the machine is designed with ample lighting and open surfaces for inspection and cleaning and low profile removable trays for easy collection and clean-up of any minor cutting debris. The DB20 portioner can operate at belt speeds up to 100 feet per minute and perform up to 2,200 cuts per minute, increasing production rates.

Digital Manufacturing Advantages

Hocker said that washdown robots have been making progress in the food & beverage industry. Components such as gaskets, shaft seals and cord grips must meet hygienic and durability standards. Kollmorgen’s AKMH motors have good solutions in these areas.

“Value-creating secure connectivity is a vital capability as we look forward,” Hocker said. “The JBT iOPS System securely connects to and stores our customer’s product, process and equipment data. We are now providing predictive maintenance and process optimization with the JBT iOPS system. We also gather useful information from the Kollmorgen servo system.”

Garrison agrees that maintenance through IoT and Industry 4.0 is within reach.

“Active output monitoring of the AKMH motor can be an indicator of the health and condition of the motor and provide triggers for when service needs to intervene in advance of a line shutdown. Our modular based product design means that the AKMH servomotor, combined with the Kollmorgen AKD drive, is ready to move with the market as IoT advances,” he said.

Preventative maintenance for AKMH servos is done using the servo drive which monitors parameters such as current.

“As IoT continues to gain traction, we expect to see even more tools for preventative maintenance to appear in all Kollmorgen products,” Garrison added.

An Evolving Partnership

Kollmorgen looks at two important criteria when dealing with a food and beverage production facilities:

Limit machine downtime to expected, preventative maintenance (PM) cycles.

Reduce downtime required for cleaning cycles.

Garrison believes the AKMH is purposely-engineered for durability and performance in the most challenging conditions. It is designed to reduce the amount of downtime required for cleaning cycles by making it easier to clean a system and eliminating additional steps in the cleaning process.

Hocker plans to take advantage of these servomotors moving forward.

“We plan to use this product in different sizes and applications and look forward to future products as well,” Hocker said. **PTE**

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