



Reducing time-to-market:

Customized motion
control solutions
For food and
beverage applications

Food and beverage white paper



The power of innovation in the food and beverage industry

How modular off-the-shelf and custom food-grade motion control solutions address time-to-market challenges for OEMs in the industry

The food and beverage industry is evolving at an unprecedented pace. Increasing SKU proliferation, tightening regulatory requirements and the push for sustainable practices are creating intense pressure on manufacturers to reduce time-to-market. Design and automation engineers face the dual challenge of meeting these demands while delivering reliable, compliant and high-performing systems.

This white paper explores how a customized approach to motion control solutions can help Original Equipment Manufacturers (OEMs) in the food and beverage sector navigate these challenges. By combining modular off-the-shelf components with custom food-grade solutions, engineers can accelerate development cycles, enhance system reliability and achieve strict compliance with industry standards.

Discover how flexible and compliant motion control solutions empower engineers to meet shorter project timelines without compromising on performance or quality. If you're looking for strategies to keep pace with the rapid demands of the food and beverage market, this document provides actionable insights and proven solutions.

The future of the food and beverage industry

Lies in the delicate balance between innovation and tradition, efficiency and sustainability, ultimately paving the way for a thriving, trustworthy industry that meets the needs and values of modern consumers. For manufacturers, staying ahead means adopting a holistic approach that incorporates modern technologies, ethical sourcing and agile adaptation to market trends.¹

Source:

1. [Agency Forward: 2024 Consumer Trends in the Food and Beverage Industry](#)



How time-to-market pressures are shaping the industry

The food and beverage industry is under constant pressure to bring products to market faster than ever before. For OEMs, meeting these demands requires innovative strategies to prioritize speed without compromising on quality, reliability or compliance. Addressing these challenges is essential to staying competitive in this dynamic and fast-paced sector.

Frequent changeovers

Rising demand for multi-SKU production lines has become a significant driver of complexity in the food and beverage manufacturing process. According to McKinsey, the number of SKUs in the U.S. manufacturing industry increased 66% in the past three years.²

The challenge	The solution
Multi-SKU production lines demand frequent equipment adjustments to switch between different product sizes and packaging formats.	Advanced motion control solutions, including pneumatic actuators, servo-driven components and programmable logic controllers (PLCs) enable faster, more precise changeovers.

Packaging diversity

Diverse, customizable and eco-friendly packaging in the food and beverage industry presents unique challenges for production lines.

The challenge	The solution
Accommodate varying shapes, weights and materials and enable precise handling for personalized or small batch runs without compromising speed or efficiency.	Motion control solutions, including adaptive grip technology, tracking capabilities and modular designs, provide the flexibility and precision needed to handle a wide range of packaging requirements.

Regulatory updates

Frequent updates to strict regulatory requirements for the food and beverage industry add complexity, requiring validation and compliance at every stage of production.³

The challenge	The solution
Ensure equipment meets the food safety and sanitation standards expected while maintaining productivity, without sacrificing efficiency, reliability or quality.	Motion control solutions designed with IP69K-rated components made from hygienic, food-grade materials simplify compliance. Sealed designs and smooth surfaces simplify cleaning and reduce contamination risks, and built-in traceability features help manufacturers stay compliant and adapt to changing regulations.

Delayed product launches can have significant consequences for OEMs, impacting both their operational efficiency, revenue and market position:

Escalating development costs due to prolonged prototyping, validation and redesigned cycles.

Inability to capture early market demand translates directly into lost revenue opportunities.

Erosion of competitive edge as it gives competitors a chance to enter the market first, making it harder to regain traction when their solutions finally launch.

The food & beverage industry is witnessing a rapid increase in automation adoption, with a CAGR of **8.5% expected by 2028.**⁴

The global food robotics market is anticipated to reach a value of **\$4 billion by 2028.**⁵

86% of manufacturers believe smart factories will be the main competition driver of 2025 and **83%** believe smart factories will transform the way products are made.⁶

Sources:

- 2. McKinsey & Company: [Managing Complexity in Consumer Goods](#)
- 3. Hogan Lovells: [FDA Issues Fiscal Year 2025 Priority Deliverables for the HFP](#)
- 4. MARKETSANDMARKETS: [Exploring the Future of Industrial Automation in 2025](#)
- 5. ESV: [Transforming the Food Processing Industry with Advanced Automation Technology](#)
- 6. Deloitte: [Implementing the smart factory. New perspectives for driving value](#)

Motion control solutions for food and beverage applications

Key considerations for optimizing performance

Keeping these **5 factors** in mind is critical for achieving efficiency, compliance and reliability:

01

Designing for hygiene:
Meeting food safety and washdown demands

The solution must withstand aggressive cleaning protocols, including CIP and SIP processes.

Components like IP69K-rated motors and stainless-steel housings prevent contamination and corrosion.

Compliance with FDA and 3-A standards ensures safety and facilitates audits and regulatory approvals.

Smooth surfaces and sealed designs reduce bacterial harborage points and enables effective sanitation.

02

Precision in motion:
High-speed solutions for critical processes

High-speed operations demand precision to reduce waste and ensure consistent product quality.

Synchronized servo systems, multi-axis drives and high resolution feedback devices enable precise control.

Real-time monitoring and diagnostics minimize error and downtime.

Reliability at high speeds ensures meeting tight time-to-market deadlines without sacrificing quality.

03

Flexibility in action:
Streamlining changeovers for Multi-SKU lines

Frequent changeovers require flexible systems with modular components and programmable controllers.

Automated setups reduce downtime and manual intervention.

Adaptive grip technology and automated tool changers allow seamless transitions between packaging sizes and materials.

04

Future-ready systems:
Integrating motion control with legacy equipment

Scalable and interoperable systems enable incremental upgrades without replacing existing machinery.

Ethernet-based communication protocols and modular designs support smooth integration.

Custom interface solutions extend the life of legacy systems while introducing modern capabilities.

Features like predictive maintenance and data analytics bridge the gap between traditional and advanced technologies.

05

Powering efficiency:
Cutting energy costs without compromising performance

Energy-efficient actuators and variable-speed drives optimize compressed air usage.

Intelligent systems recover and reuse energy during braking cycles to lower power consumption.

Real-time energy monitoring identifies inefficiencies and enables targeted improvements.

Prioritizing energy-efficient components reduces costs, supports sustainability and maintains high-speed performance.

Trends

31% of food industry companies are planning to invest in robotics and automation in 2025

Challenges

70% consider cost the main barrier to digital transformation

53% cite legacy system integration as their main challenge to adopt new technologies

Sustainability tech adoption motivators

Meet consumer demand for sustainable products: **52%**

Achieve cost efficiencies: **43%**

New technology adoption main advantages

Improving production efficiency: **51%**

Cost savings: **45%**

Food safety: **28%**

Supply chain control: **26%⁷**

Sources:
7. Food Industry Executive: 2025 Food Industry Tech Trends

Transforming food and beverage production

How technology leaders tackle motion control challenges

Here we explore how advanced technology companies are stepping up to the plate, offering cutting-edge motion control solutions tailored to the unique challenges of food and beverage production.

By leveraging modular designs, intelligent automation, and innovative materials, these companies empower OEMs to optimize performance, reduce time-to-market and stay ahead in an ever-evolving market.

This is how they do it.

Providing the building blocks of efficiency

Modular off-the-shelf components are pre-engineered for compatibility, making them easy to integrate into existing systems with minimal customization.

- **Cost efficiency:** Using standardized components reduces development costs and lead times compared to fully custom designs.
- **Scalability:** Modular solutions allow OEMs and manufacturers to expand or reconfigure their systems as production needs evolve, without requiring a full redesign.
- **Reliability:** Proven off-the-shelf components undergo rigorous testing, ensuring consistent performance and durability in demanding food and beverage environments.

Meeting specific demands

Custom motion solutions are developed to address specific challenges, such as handling irregular packaging, delicate materials or unique processing needs.

- **Performance optimization:** Engineers fine-tune custom solutions to maximize efficiency, precision and throughput for specialized applications.
- **Compliance assurance:** Custom designs incorporate industry-specific standards, ensuring safety, sanitation and regulatory compliance.
- **Competitive edge:** Unique, application-specific solutions differentiate OEMs and manufacturers, by enabling innovative production methods and superior product quality.

Enabling a hybrid approach to motion control

Combining modular off-the-shelf components for core functionalities with custom elements for critical areas, speeds up implementation and helps mitigate risks while addressing specific operational needs.

- **Cost-effective customization:** This approach minimizes the expense of full custom development while maintaining flexibility for unique applications.
- **Enhanced versatility:** Solutions can be adapted to handle diverse product lines and operational changes, offering a balance between standardization and innovation.
- **Future proofing:** Hybrid systems provide a pathway for gradual upgrades, ensuring compatibility with emerging technologies and evolving market needs.

Setting the standard

IMI legacy of innovation and precision

A global leader in motion and fluid control technologies, IMI delivers innovative solutions that drive efficiency, reliability and sustainability across a wide range of industries. With a rich legacy of 100+ years of engineering expertise, IMI specializes in precision-engineered products that meet the highest standards of performance and compliance.

IMI offers a robust suite of motion control components customized for the food and beverage industry.

Hygienic and durable components

Designed for contamination-free operation using food-grade materials compliant with FDA, EHEDG and 3-A standards. Built to withstand high-pressure washdowns and harsh environments.

High-speed and customizable systems

Motion solutions such as linear and rotary actuators support high-speed packaging and clean-in-place (CIP) systems. Scalable designs meet evolving production needs while maintaining performance.

Engineering expertise and compliance

Collaborative engineering services help optimize system design for food and beverage applications, ensuring compliance with safety and regulatory standards while maximizing operational efficiency.



Breakthrough engineering for a better world

Innovating today to build a sustainable tomorrow

By driving innovation, IMI has the power to build solutions that not only meet today’s challenges but also pave the way for a more sustainable and resilient tomorrow.

Hygienic motion solutions for high-speed, high-compliance environments

IMI offers a broad portfolio of motion control and automation solutions engineered for performance in the most demanding washdown environments. Our portfolio includes advanced actuators, air cylinders, grippers, valves and air preparation systems. We offer modular, energy-efficient solutions crafted from corrosion-resistant materials and sealed for efficiency and sanitation. Ideal for high-speed bottling, packaging, and processing lines, they deliver precise, reliable performance in multi-SKU and material handling applications, helping OEMs and manufacturers meet stringent regulatory standards while maximizing uptime and efficiency.

Use Case:

Snack packaging precision

Need: A snack company needed precise motion control for packaging chips into individual bags, with the flexibility to handle different bag sizes.

Product Used: IMI Bimba Original Line®

Benefit:

The Original Line® cylinders provided smooth and precise movement to ensure bags were accurately filled and sealed without product loss.

These positioners continuously monitor actuator position and adjust control signals to align packaging, dispense exact amounts and seal bags accurately.

Production efficiency improved by 20%, and the flexible system reduced changeover time between product sizes by 50%.

Reduced compliance risks.

Use Case:

Chocolate sorting and packaging

Need: A premium chocolate manufacturer required a high-precision solution to handle delicate products without damage during sorting and packaging.

Product Used: IMI Bahr Precision Linear Modules

Benefit:

The precision linear modules provided smooth, accurate motion for robotic arms to pick and place chocolates into boxes without smudging or misalignment.

Customization allowed the system to handle varying chocolate shapes and sizes, offering flexibility for seasonal products.

Product waste decreased by 12%, and the system ensured consistent presentation, enhancing the brand’s premium image.





Building the future of the food and beverage industry

Partnering with industry experts in motion control systems is key to overcoming the unique challenges of the food and beverage sector. By leveraging customized solutions that combine speed, reliability, compliance and flexibility, OEMs and manufacturers can stay ahead of market demands while ensuring efficiency and sustainability.

Whether optimizing multi-SKU production lines, integrating advanced technologies or meeting regulatory standards, the right partner makes all the difference in achieving operational excellence and long-term success.

Ready to break through your food and beverage challenges and accelerate time-to-market?

→ Talk to Us



About IMI engineered solutions for the food and beverage industry

IMI is a unified company comprised of three well-known and well-trusted names in the manufacturing industry: Norgren, Bimba and Bahr Modultechnik. Under this combined umbrella, manufacturers can gain the components they need, backed by more than 150 years of collective experience.