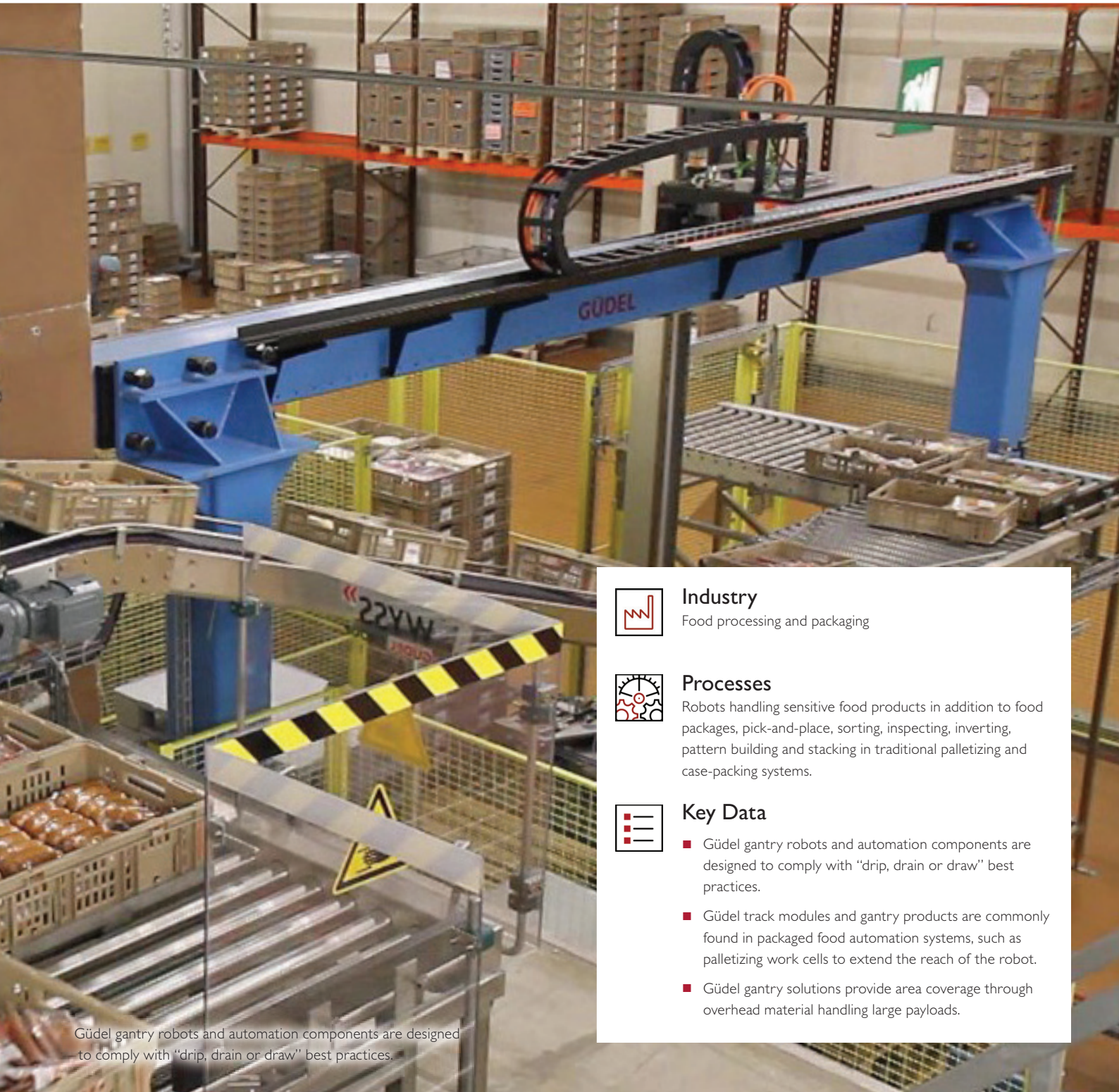
GÜDEL

Food Industry Applications for Industrial Robots

This paper explores two major application areas where industrial robots are used in the food-processing industry, illustrates critical system requirements for each and describes how Güdel products are positioned for successful use in these systems.



Güdel gantry robots and automation components are designed to comply with "drip, drain or draw" best practices.

Industry

Food processing and packaging

Processes

Robots handling sensitive food products in addition to food packages, pick-and-place, sorting, inspecting, inverting, pattern building and stacking in traditional palletizing and case-packing systems.

Key Data

- Güdel gantry robots and automation components are designed to comply with "drip, drain or draw" best practices.
- Güdel track modules and gantry products are commonly found in packaged food automation systems, such as palletizing work cells to extend the reach of the robot.
- Güdel gantry solutions provide area coverage through overhead material handling large payloads.

Güdel regularly partners with companies such as Fanuc to extend the reach of robotics in food packaging and processing applications.

The food-manufacturing industry — composed primarily of facilities for food handling and packaging — has seen demand grow along with the global population.

As demand has increased, larger companies have seen the benefits of automation. This is particularly true for end-of-line packaging and palletizing. Most recently, the availability of highly effective pick-and-place robots has allowed automation to move upstream and undertake food-handling operations on production lines.

During the past decade, a number of market and other trends have emerged that seriously challenge traditional manual-labor-intensive manufacturing. These trends include a decline in the availability of suitable low-cost labor; employment laws and health and safety directives that put pressure on labor costs; a demand for assured hygienic products, which can mean removing human operators from production processes; and higher commodity prices. The good news for industry and consumers alike is that robotics technology has been steadily advancing to meet these and other challenges. Modern automation is more versatile than ever, which makes it worth a look for food manufacturers of almost all sizes.

This white paper explains the two major application areas where industrial robots are used in the food-processing industry, illustrates critical system requirements for each and describes how Güdel products are positioned for successful use in these systems.

From Packaging to Handling to Profits

Robots handling packaged food products perform basic tasks such

Güdel Technology

- TrackMotion Overhead TMO.

- Using the TrackMotion Overhead, the optimum configuration can be attained for any production process.
- No other linear axis provides a comparable range of possible solutions.
- Max payloads up to 50,000 N.
- Designed to stand up to dynamic loads.

Güdel track modules and gantry products are commonly found in packaged food automation systems, such as palletizing work cells to extend the reach of the robot.

as pick-and-place, sorting, inspecting, inverting, pattern building and stacking in traditional palletizing and case-packing systems. This work is commonly known as secondary packaging, and it is a mature market for industrial robotics. Among the expected benefits of automation systems are process flexibility, labor reduction, production cost decreases and worker safety improvement.

In food-handling systems, robots handle highly sensitive food products. These applications involve an additional incentive to automate: the elimination of a major contamination source — namely, human operators. In these applications, the automation system must be designed to prevent contamination of both the product and the equipment.

Clean Design Principles

Standards and design guides include the Robot-Based Automation Systems standard, developed by 3-A Sanitary Standards Inc. (3-A.org). The standard defines sanitation requirements in dairy and other food applications and stipulates that a third party, such as the FDA, USDA or an independent consultant, be employed to verify compliance. To successfully comply, designers must employ clean design principles intended to prevent the growth and multiplication of harmful microbes.

To multiply, common microbes require oxygen, an energy or food source, an environment with a comfortable ambient temperature and a neutral pH level. These conditions exist in food-manufacturing environments, so equipment builders use clean design to create sanitation and cleaning processes that eliminate microbial energy and food sources.

Equipment Design Guidelines

- Equipment must be cleanable to a microbiological level.

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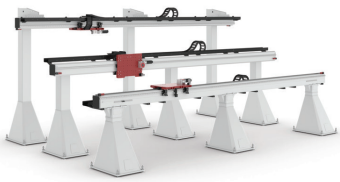
- Linear Axis Tracks.



- Multi-axis configurations available.
- Payloads from a few kilos to several tons.
- Designed to stand up to dynamic loads.

Gudel gantry solutions provide area coverage through overhead material handling large payloads.

• No product or liquid collection areas may exist.

• Equipment must be accessible for cleaning, sanitation, inspection and maintenance.

• Equipment must be hygienically compatible with other plant systems.

• Equipment must be able to operate in a sanitary condition without contaminating the environment.

• All cleaning and sanitation procedures must be validated.

In addition, the equipment itself cannot be a source of contamination. The "drip, drain or draw" rule for clean design stipulates that liquids from equipment may neither drip nor drain onto the product; nor can equipment allow liquids to be drawn into the product. In other words, equipment cannot introduce any foreign material into the food product. This is why bakery pans and other food containers are inverted prior to filling and must remain covered until the food product is in the container. This is also why many pieces of equipment require drip shields.

Food-handling equipment must also be protected from the moisture, sanitation processes and caustic chemicals used in cleaning. So to be compatible with clean design requirements, equipment should have smooth surfaces to promote draining and prevent puddles, sealed enclosures that prevent fluid entry and surface materials that can withstand harsh environments and cleaning products.

Food-Handling Considerations

In food-handling systems, we protect the food product with sanitation standards just as we protect workers with safety standards. Because of strict environmental requirements, food handling is a novel — and fast-growing — application area for robotics.

Güdel Technology

- 3-Axis FP.

- New Gantry System enables the flexible positioning of the legs of the gantry beam.
- The beams are equipped on both sides with exact joining elements, making almost any desired total length possible.
- Tapped holes at a pitch of 100 mm for universal fixing of parts.

Güdel track modules and gantry products are commonly found in packaged food automation systems, such as palletizing work cells. Track modules are regularly used to extend the reach of a robot, while gantry solutions provide complete area coverage through overhead material handling.

Güdel products used in packaged food applications do work that includes picking from multiple products in feed lines and placing products at various locations to create rainbow packs or mixed loads. In addition, Güdel gantries are capable of handling large payloads, such as picking up entire layers of product for stacking mixed loads and even picking up complete pallets of product for staging in warehouse locations.

Güdel Food Handling Guidance

Güdel's gantries, tracks and components can also be found in food-handling applications. Environmental protection is available in the form of guideway rack and pinion coatings. Steel and aluminum can be coated with acceptable food-grade coatings. The standard lubrication is NSF H1 food grade, which is accepted in all food applications. Güdel offers system builders the following guidance on implementing solutions to automate a food-handling procedure:

• The "drip, drain or draw" rule requires that overhead tracks, such as the TrackMotion Overhead (TMO), not be located directly over food products. Consider a wall-mounted track with drip trays to keep the robot away from food products except during actuation and to protect the food from fluids during handling.

• To extend the reach of robots, consider the TrackMotion Floor (TMF), which is mounted below the product contact area and is free of any drip, drain or draw issues.

• Install Güdel floor tracks with a slight tilt to encourage liquids to drain away from the food product.

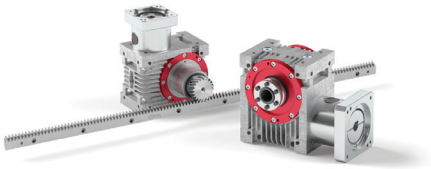
• Use sealed enclosures over the track drive motor and cable entry at the base of the robot to eliminate fluid penetration.

• Consider applying a food-grade sealant on the interfaces between robot and carriage, floor and track, and legs and floor to prevent water from wicking and accumulating under surfaces.

As proven by the success of Güdel solutions for packaged food applications such as palletizing and packaging, Güdel's products are well positioned to help our system integrator partners develop solutions for challenging applications in the food-processing industry. For more information on Güdel solutions for the food industry, contact Bob Rochelle at 734-214-0000 ext. 9048 or Bob.Rochelle@us.gudel.com.

Güdel Technology

- High-Performance Angle Gearboxes.



- An extremely broad choice of gear ratios — thirteen in total, ranging from 2 to 60.
- Ideally suited for harsh working environments.
- Cooling fins guarantee optimal heat dissipation.

About Güdel Inc.

Güdel Inc. is the US subsidiary of Güdel Group, a global manufacturer of robotic automation products, systems and services. Güdel supplies linear-motion modules, robot track motion units, gantry robots and components to OEMs, systems integrators and machine builders serving the automotive, aerospace, logistics, heavy industrial and power generation industries. Güdel Inc. is located in Ann Arbor, Michigan, in a dedicated 45,000-square-foot facility, providing North American customers with engineering, design, production and customer service support.

Güdel Group was founded in 1954. Headquartered in Langenthal, Switzerland, today Güdel operates in more than 30 locations worldwide.

Contact

Güdel Inc.
4881 Runway Blvd.
Ann Arbor, Michigan
48108 USA
Phone: +1-734-214-0000
Fax: +1-734-214-9000
info@us.gudel.com | gudel.com/us