

STÄUBLI FLASH

Food 2015



Maximum performance across all processes

Meat – Ice cream – Fish

Automation of highly complex applications involving unwrapped food in compliance with ultra-stringent hygiene criteria.

4 – 7

Cheese

Extensive range of robots for the cheese industry.

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Bread

A solution for the bakery industry. Fully automated slicing of dough.

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Stäubli Robotics – Partners of the food industry

For many years, Stäubli robots have served as the reference point for food applications. The extensive range of robots including the TP80 Fast Picker, the various Scaras and six-axis robots together with Stäubli's outstanding kinematics means that the optimum machine is available for almost any application in the food industry. At a time when automation in food production was still considered a niche market, Stäubli was already focusing on this sensitive sector in which robots are expected to do far more than work quickly and reliably. In this highly competitive industry, technical factors such as particle emissions and hygiene standards as well as commercial considerations play a decisive role.

Stäubli is familiar with all the typical characteristics of the sector and is able to provide economical solutions for even the most demanding applications. A prime example of the high level of expertise in the food sector is the development of HE robots for use in damp conditions and in circumstances where they are exposed to water spray.

"Without our HE robots, it would be impossible to automate certain applications involving unprotected food whilst complying with the strictest hygiene specifications," says Bernard Carera, General Division Manager Stäubli Robotics. "They have to undergo intensive cleaning and sterilization processes which no other robot would be able to withstand over a lengthy period. With the HE machines, we were able to open up completely new territory in the food sector and make processes significantly more productive."

This newsletter is intended to demonstrate the sort of work that Stäubli robots perform every day in the food industry, using selected examples from Germany, Europe and around the world. We hope you will be favorably impressed by this small sample and rest assured in the knowledge that you can rely on the long-standing expertise of a robot manufacturer with probably the most extensive experience of any in the food sector. Stäubli branch offices and subsidiary companies are to be found all around the world, and there will certainly be one in your area.

Complete solutions for the food industry

The superior performance, dynamics and durability of Stäubli robots has made them a benchmark in the food industry. Pioneering improvements and innovative developments meet the current industry-specific requirements of all conceivable food applications.

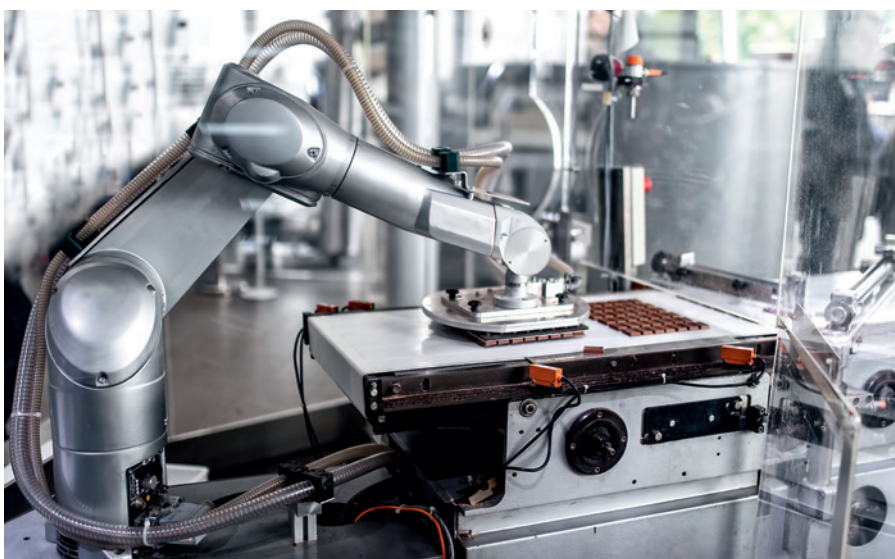
Today Stäubli has the broadest and most powerful range of robots for the food industry. From simple primary or secondary packaging tasks to ultra-fast handling processes and tasks involving unprotected food under the strictest hygienic requirements, Stäubli can offer the perfect solution.

Stäubli robots can be adapted for the most diverse of foodstuffs – bread, pasta or cakes, meat and fish or dairy products, frozen foods or fruits and vegetables – and for a variety of processes – filling, dispensing, cutting, handling, labeling, sorting, packing and palletizing. The optimum design for any special application can be configured from the wide range of pickers, Scaras and six-axis kinematics. One key benefit is that the complete Stäubli robot spectrum is available in versions that operate with Class NSF H1 food grade oil without any loss in efficiency.

Cleanroom and HE robot versions for germ-free production

The production and processing of foods is increasingly taking place in cleanroom environments conforming to ISO Classes 5 to 8. Under these conditions, the formation of bacteria and molds can be safely ruled out. It is therefore a major plus that even the standard versions of Stäubli robots are cleanroom compliant. If the standard models are still not within spec, optional cleanroom versions can be supplied up to ISO 2.

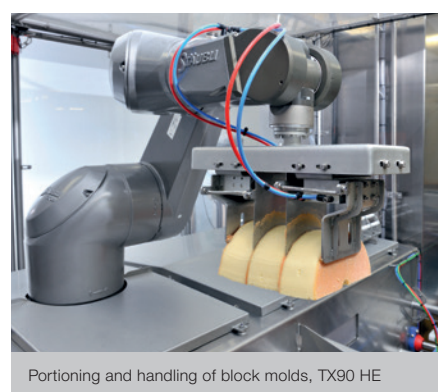
Proving especially popular in the food industry are the HE versions of the Stäubli robots which are able to handle loads of up to 150 kilos. The additional HE designation stands for “Humid Environment” and signifies Stäubli models which



Handling chocolate: TX90



Robot mixed pack unit: SCARA TS80



Portioning and handling of block molds, TX90 HE

have been specifically modified for use in damp areas or are exposed to spray. They are also in great demand for applications that call for the most stringent hygiene conditions. HE robots successfully cope with the daily round of cleaning processes. Whereas the aggressive treatment would soon finish off a conventional robot, the HE versions carry on operating with their customary reliability.

High-speed picker for sorting and packaging tasks

Another superlative has been claimed by a new high-speed robot developed principally for sorting and packing applications in the food industry. The TP80 Fast Picker achieves a pick rate of more than 200 per minute, thus paving the way for new concepts and strategies in the handling, sorting and packaging of foodstuffs.

The Fast Picker robot has been fine-tuned for uncompromising reliability and precision. The four-axis version can operate across large work spaces with a diameter of 1.6 meters and achieves an impressive repeatability rate of ± 0.05 millimeters. High precision is maintained even after many thousands of operating hours.

Mayekawa, Japan

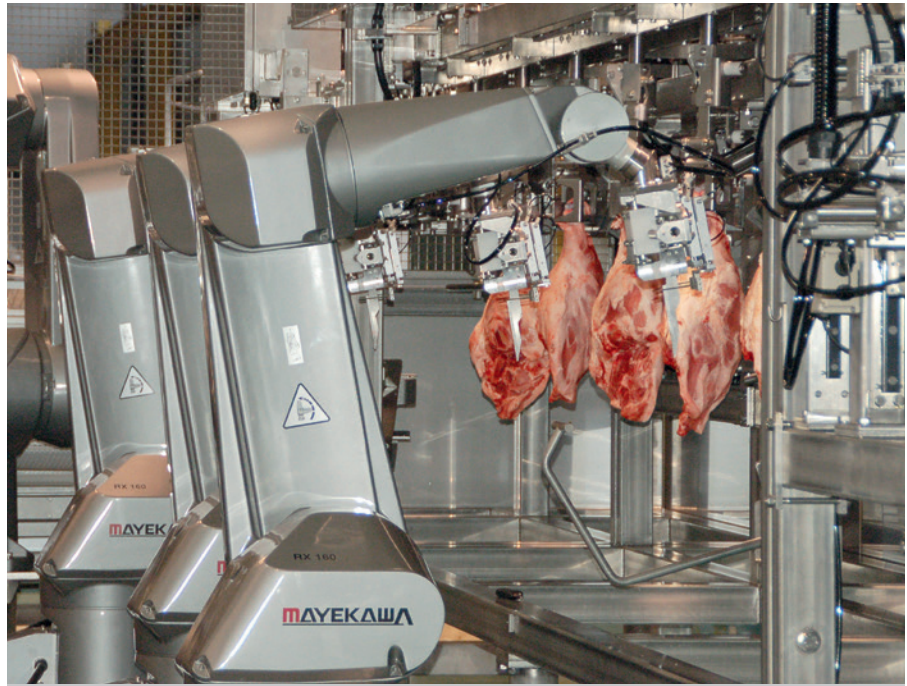
New options in meat processing

A particularly innovative solution for the preparation of pork comes from Japan. The pioneering HAMDAS-R robotic system manages the deboning process. Taking on the role of master butcher is a six-axis type RX160 HE Stäubli robot.

The specification for robotics to be used in a meat factory could not be set higher. Naturally, the priority here is to satisfy the stringent hygiene requirements that apply to the processing of fresh meat. The plant is disinfected daily with water and appropriate cleaning agent. The Stäubli RX160 (HE version) has been specifically designed to withstand the harsh cleaning processes in the food industry and also to work with the expected level of reliability under conditions that would soon finish off a conventional robot.

Furthermore, the pork processing plant imposes rigorous demands on the robot in terms of speed, precision and flexibility. No fewer than 500 portions of pork leave the plant each hour. The two Stäubli RX160 HEs are pushed to the limit by the conditions that prevail in the meat processing industry. This is because no two joints of meat are the same. Flexibility is therefore required to stay up to speed.

To ensure this, the Japanese owners opted for hi-tech. An X-ray system de-



Deboning pork joints: RX160 HE.

fects the position of the bones in the joint of meat and calculates the precise cutting line for the robots. A perfect solution, but one that is also subject to the vagaries of meat processing. The joints of pork are liable to sway about on the overhead conveyors. In order to counteract this element of uncertainty, the robot must wield the knife attached to its wrist with precision so as to avoid collisions with the bone. The RX160 passes this test with flying colors, opening up new

horizons in meat processing in terms of productivity and efficiency.



Robot system HAMDAS-R with multiple Stäubli six-axis robots.

Big Drum Engineering GmbH, Germany

Ice cream filling by robot

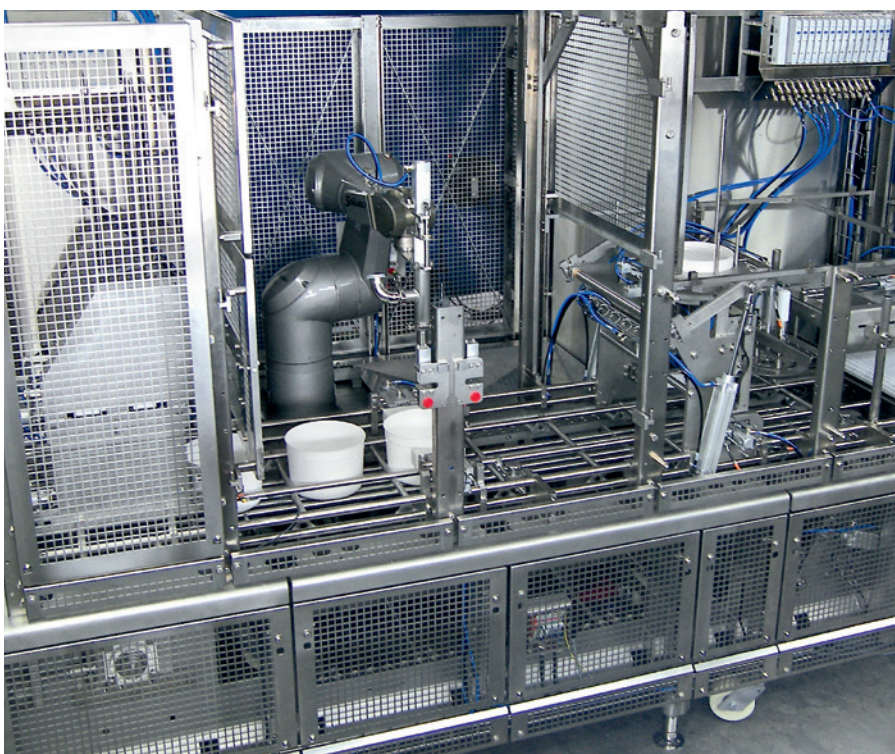
In the industrial manufacture of ice cream, presentation plays a decisive role. Even in large tubs, the product should ideally look like a handmade delicacy. Robot Filler performs this job to perfection, as the pilot use of the system in Bangkok demonstrates.

Big Drum Engineering GmbH based in the Eder valley near Kassel specializes in the manufacture of equipment for the filling and packaging of ice cream. Its innovative machines are able to produce a vast range of ice cream variants quickly and cost-effectively. The production capacity of the plant it supplies goes as high as 50,000 portions per hour.

But nowadays, output is not the only factor of importance; the presentation of the product must also be persuasive. A production technique was called for that allows ice cream to be sold in large tubs made of cardboard or plastic which nonetheless have an appealing, appetizing and individual appearance. The solution to this conundrum was discovered by Marco Gottschalk, Head of Purchasing and Product Preparation at Big Drum Engineering, on a visit to the Automatica trade fair in Munich. Here he observed a demonstration of the TX90 HE robot operating under permanent exposure to spray, thus underscoring its suitability for use in extreme conditions.



The Stäubli TX90 HE is at the heart of the filling line. These special robots can even withstand aggressive cleaning procedures.



The system complies with the highest standards of hygiene. Its open design makes for easy cleaning.

Today, Big Drum Engineering uses the Stäubli TX90 HE in the new generation of plant that goes by the name of Robot Filler. These systems are designed for filling and packaging ice cream in large tubs ranging from 3.5 to 6.0 liters in volume. Marco Gottschalk highlights a decisive advantage of Robot Filler: "The job of filling is taken on by the special robots. We can program the Stäubli TX90 HE to perform this task with the same finesse as if it were done by hand. We can even set up different filling programs, so that the contents vary slightly from tub to tub, thereby enhancing the hand-made characteristics." The first two Robot Fillers were recently installed at a factory in Bangkok. The customers there are enthusiastic about the quality of product presentation and the flexibility of the system.

While the actual filling of the ice cream tubs is a routine job for the robots, the regular and frequent cleaning intervals pose a severe test. In Thailand just as much as over here in Germany, production facilities have to abide by the strictest criteria which involve the use of aggressive cleaning agents and powerful jets of water. Whereas this intense level of cleaning would soon finish off a

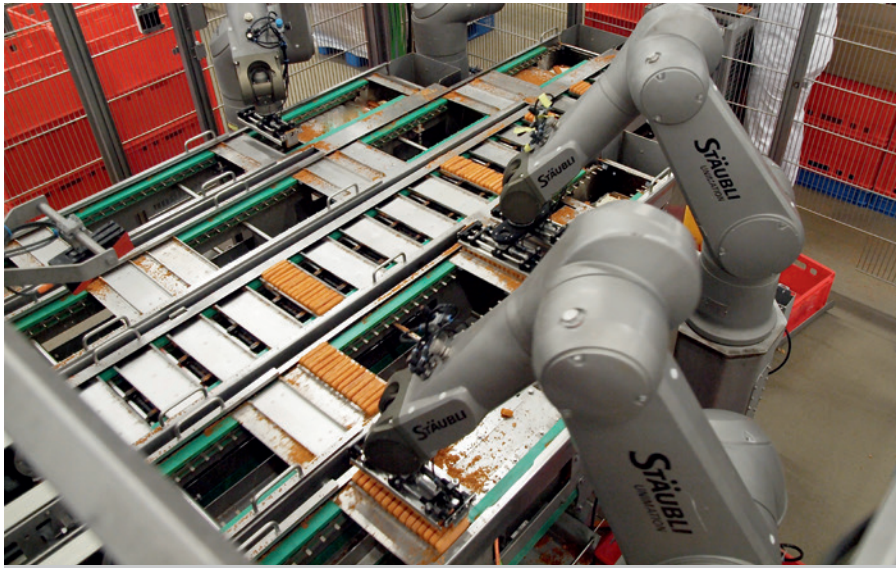


The robot is seen here filling ice cream at the factory in Bangkok. The system was installed by Big Drum Engineering and is operating to the complete satisfaction of the user.

conventional robot, the superior Stäubli TX90 HE has no problem in coping with the procedure.

The Seafood Traders, Germany

Making short work of crumbly foods



Decisive factor: The Stäubli robots are able to keep up with a belt speed of 30 meters per minute, pushing the fish sticks onto moving conveyors.

The standard pack of 15 breadcrumb-coated fish sticks is a classic in the range of frozen products. In order to stay competitive within tight margins, seafood specialist TST relies heavily on automation. The result is that Stäubli robots are now boxing almost half of the fish sticks sold in Germany, and at unrivaled speed.

The processing companies responsible for ensuring that supermarket freezers in this country are constantly restocked with a variety of convenience fish products face tough competition. It is therefore all the more surprising that a newcomer has managed to establish itself in this market over the past five years. TST (The Seafood Traders) set out to become the fastest provider in the volume segment for retailers. In 2011, they opened an ultra-modern production facility on a greenfield site at Ihlow near Emden on the North Sea coast and instantly created 160 new jobs in the area.

TST senior management consists of experienced industry insiders who aim to produce fish products in high volume at the best possible price. Fast and efficient processing is no longer conceivable in the food sector without advanced automation.

The value chain of the seafood specialist starts with sawing frozen blocks of raw fish and then continues through bak-

ing, in some cases filling, coating with breadcrumbs and freezing, culminating in the packaging of the finished products in packs and boxes bearing a variety of brand names.

One particular challenge is the packaging of fish sticks. Even in a frozen state, these natural products with their bread coating are crumbly to the touch and push any automated system to its limits. For the packaging of fish sticks with a planned output of 200 units per minute, TST called on the services of Econo-Pak in Flonheim, an equipment manufacturer specializing in the primary packaging of foodstuffs.

Criteria only attainable with Stäubli robots

“At the planning stage, it soon became apparent that a linear system with a side-load cartoning machine would be the right way to optimize the cycle times for getting the finished products packed in boxes,” says Ulrich Oppermann, Head of Technology at TST. “The sorting and grouping of fish sticks beforehand was to be handled by six-axis robots. But it subsequently turned out that the specified capacity of five tons of fish per hour and per packaging line under the given conditions was an impossible challenge for almost all of the robot manufacturers we consulted. Only Stäubli Robotics

were able to guarantee that their high-speed six-axis robots (TX90L models) working in shifts around the clock would be up to the task.”

“The Stäubli robots did indeed prove to be faster than any other model of the required size and load class on the market,” explains Markus Zerbe, National Sales Manager at Econo-Pak and responsible for supplying packaging equipment to TST. “Consequently, there really was no alternative for deployment on the TST packaging lines.”

“The Stäubli TX90L HE also scores top marks for its enclosed construction with internal cabling and the fact that it has been specifically designed for humid environments (hence the “HE” suffix). It therefore does not require any additional protective cover to comply with the strict hygiene regulations in the food industry and with all the other requirements for use in direct contact with frozen products. Even the prescribed cleaning processes cause it no damage or wear.”



Fjölfnir Finnbogason (left) and Ulrich Oppermann (right): “Without this level of automation, it would not have been economically feasible to expand our production.”

Four robots per line

Since late 2011, four Stäubli TX90L HE robots have been working in concert on each of the two packaging lines for high-grade fillets and fish sticks. They form the core of the automated systems, assuming responsibility for grouping prior to packaging – five gourmet fish fillets or 15 fish sticks depending on the line. Each robot handles the contents of one package, and does so 50 times per minute.

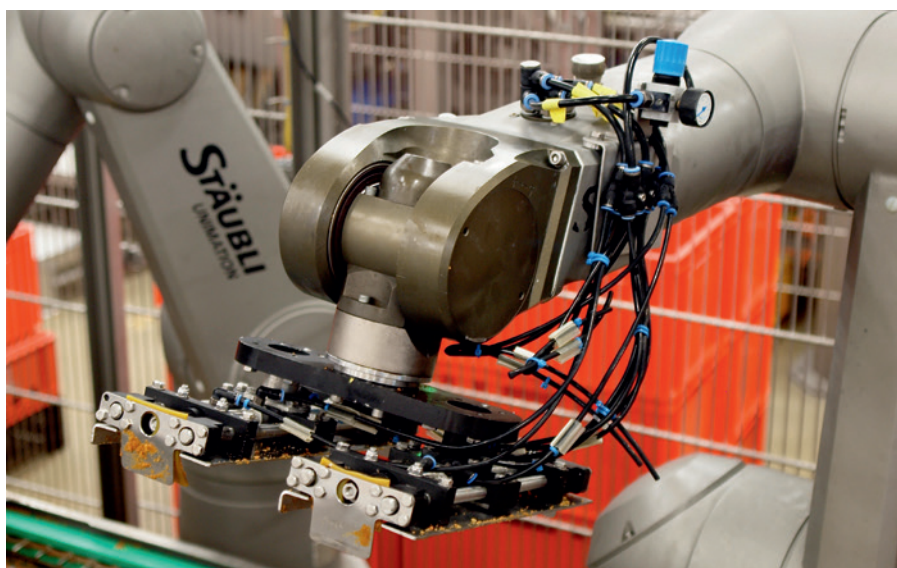
As the fish sticks are automatically conveyed to the packaging line, they undergo an initial rough alignment on a vibrating table. An automatic lift-out station then groups and correctly aligns them on four parallel conveyor belts ready for the robot cell. Each of these conveyors is served by its own Stäubli TX90L.

The robots are tasked with moving the fish sticks in batches of 15 off the four belts onto a centrally located product cassette belt which leads to the single packaging station. The four robots are capable of shifting 3,000 fish sticks per minute, enough for packing into 200 cardboard boxes. The synchronization of the robots with the fast-moving product cassette belt is effected by means of rotary encoder signals in the conveyor tracking process and works well even at the relatively high belt speed of 30 meters per minute.

High availability despite difficult conditions

“This is the first time we have integrated Stäubli robots into TST systems,” says Markus Zerbe. “Our experience has been so good that we will certainly use them again for similar applications. Setting up the robots was a smooth process. It is easy to teach them the points to which they have to travel. Full communication between the robots and synchronization with the belt speed via conveyor tracking is managed by Stäubli’s own controls. Because they work autonomously, this considerably simplifies the integration of the robotic cell into the overall system which is controlled by Siemens SIMOTION.”

The operators especially appreciate the user-friendly features such as the simple repositioning of the robots after any temporary stoppage which happens from time to time due to product collisions. Even though such cases require an employee to manually remove a “distressed” fish sticks, the robot cell maintains an annual average of 95 percent availability. Ulrich Oppermann: “Compared to our competitors, we are achieving excellent productivity with these systems, and that’s despite handling dif-



Due to the crumbly nature of the fish sticks, TST opted for a mechanical gripper designed and manufactured by Econo-Pak.

ficult products at high speed. Our target was set at five tons of fish per hour and per line. Thanks to an average 85 percent availability for all four lines – which is very high for this type of product – we continue to meet our ambitious target as a matter of routine.”

Stringent hygiene specifications

Strict mandatory hygiene standards and unannounced audits by clients demand effective measures to prevent the ingress of contaminants to the sensitive areas given over to seafood processing. This includes an approximately two-hour-long cleaning cycle of the packaging line performed once per day, which involves the use of cleaning substances with pH values ranging from 2 to 10.

In the four years of continuous operation since they were installed, the HE-spec Stäubli robots have suffered no ill effects from the aggressive chemical compounds or the high-pressure jet washing. With their smooth surfaces, stainless steel components and special seals, the six-axis HE versions are designed to withstand such harsh cleaning methods.

“We are highly satisfied with the quality of robots as well as with the fast response times of Stäubli Robotics in Bayreuth,” adds Oppermann. “The service is really

top notch, and the same goes for Econo-Pak.” Equally complimentary is plant manager Fjölurinn Finnogason as he contemplates the day’s output of up to 300 of fish achieved over three shifts. Virtually all major supermarket chains and discounters offer TST products either in bags or in packets bearing their individual brand name.

Photos: Uschi Winkler

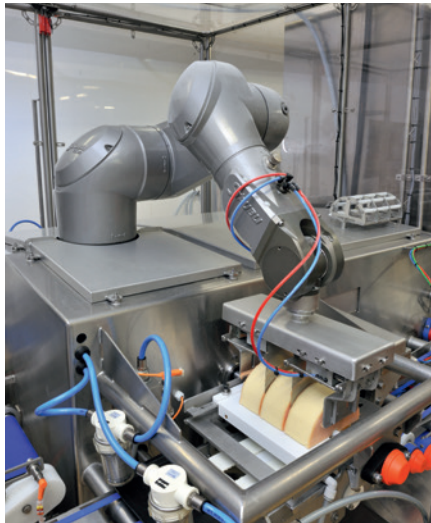


The enclosed Stäubli TX90L HE robot copes well with this crumbly product and the subsequent cleaning cycles.

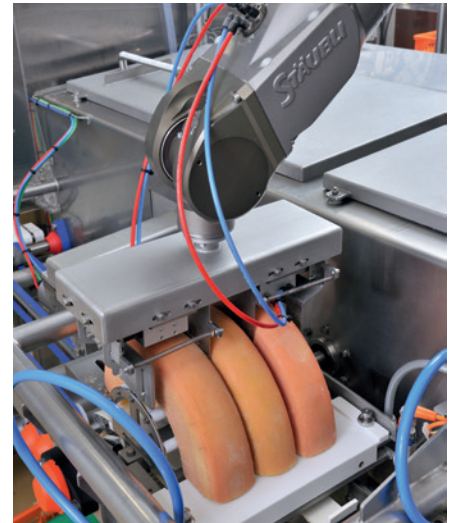
Extensive range of robots for the cheese industry

Automation projects in the industrial production of cheese make high demands on robotics: direct contact with unwrapped food, the strictest hygiene criteria, harsh cleaning procedures – all factors that have to be managed by Stäubli robots whilst making no compromise on efficiency.

Stäubli took an early interest in applications for the cheese industry and is fully conversant with the prevailing requirements. This experience going back several decades has now culminated in a range of robots which has been specially tailored to the needs of the industry and serves as the benchmark for all stages of the production line.



Handling cheese molds.



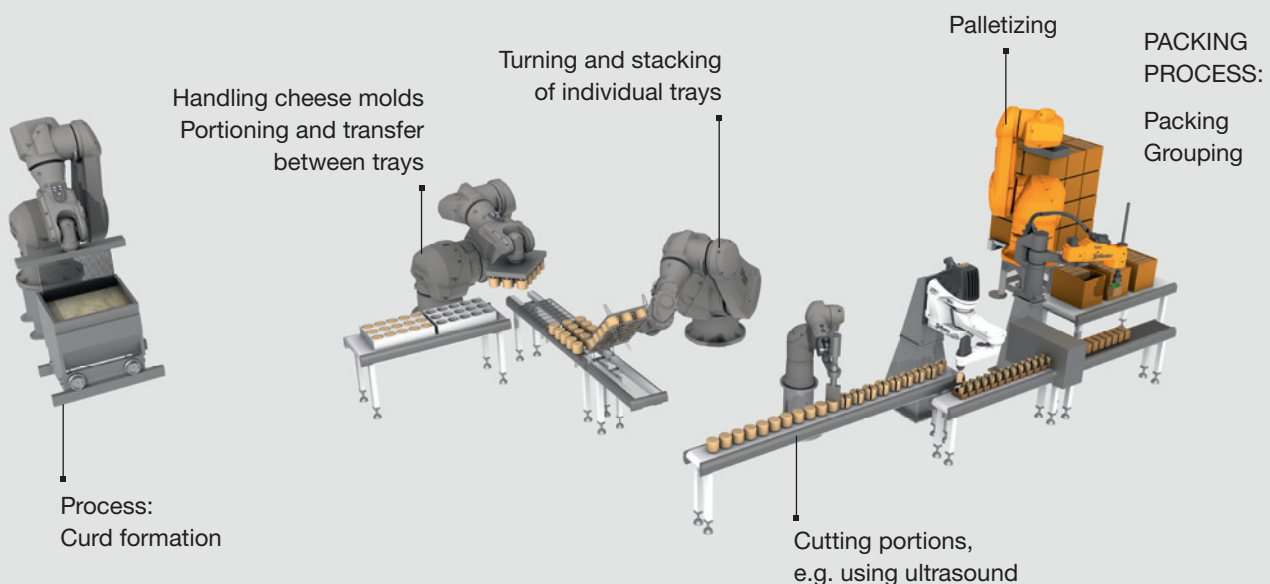
The current Fast Pickers, Scaras and articulated kinematics are best suited to conventional applications by virtue of their cleanroom compatibility which comes as standard. For the most exacting hygiene requirements, there are special cleanroom variants distinguished by the HE suffix (HE standing for “Humid

Environment”). HE robots are splash proof and withstand the harshest cleaning routines without adverse effect. In addition, all Stäubli robots can be operated with food grade oil (Class NSF H1) without any loss of performance.

“I cannot conceive of any application in the cheese industry for which we do not have the appropriate robot in our program,” says Gerald Vogt, Managing Director of Stäubli Robotics Germany. “Our machines score top marks not only for their superior technical performance but also for their outstanding efficiency.”

Robots in the production of soft cheese

Are you looking for a reliable and economical solution which is compliant with the strictest hygiene standards? Whether in curd formation, in portioning or in the packaging process, Stäubli robots are equipped for all tasks.



ALPMA Alpenland Maschinenbau GmbH, Germany

Optimum curd preparation for all capacities

Bassine systems for the production of soft cheeses have been part of the ALPMA product range for several years now, as an alternative to the coagulator. ALPMA supplies this 'bassine technology' primarily to customers with low to medium output.

The special form of the plastic vats, combined with the patented cutting process by means of robot, enables curd cutting with a very small amount of waste. The insulating plastic ensures low temperature gradients of the milk, thus permitting regular souring and clotting.

Due to the fact that individual rows of vats can be shut down and the processing stations can be moved, there is a high degree of flexibility with regard to pre-ripening, coagulating, syneresis and agitation times.

While the Coagulator can achieve high yields and capacities of up to 50,000 l/h, the Bassine-System's strengths lie in the preparation of small batches and use in dairies with limited space.

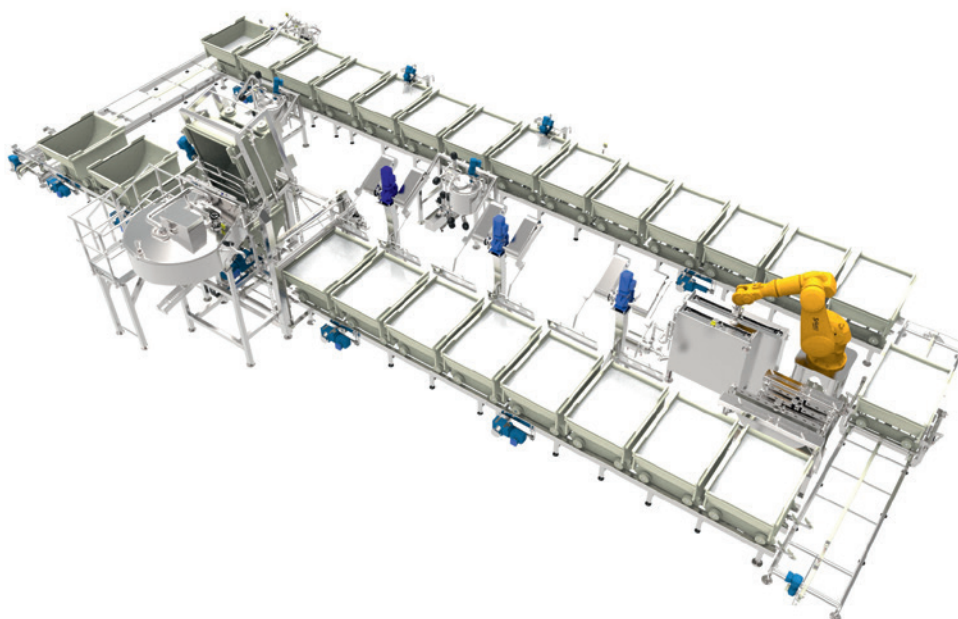
Its flexible and parallel strands mean that wide rooms can be optimally used.



TX200 HE without the need of special protective covering, is used where handling tasks must be achieved flexibly and in tight spaces

By combining the Bassine-System with the proven ALPMA filling technologies, ranging from the AFE to the high-capacity filler MR, you guarantee your product an exact dosage and clean portioning.

The Bassine-System from ALPMA serves: automated polyethylene vats with a capacity of 150 l to 670 l will round off ALPMA's range of curd preparation equipment with a capacity of 2,000 to 30,000 l/h.



The Bassine System from ALPMA is particularly suitable where space is limited.

Elten, Netherlands

Cheese processing at its most flexible

An innovative system for processing cheese comes (not surprisingly) from Holland. The Elten SLF*160S is characterized by maximum flexibility and is capable of cutting large blocks of cheese into two, three, four or even five smaller ones, the handling of which is managed by a special Stäubli robot.

The system basically consists of a cutting and a distribution station. The cheese blocks reach the cutting station via a conveyor belt. They are then centered, guided and by the motor driven pusher, pushed through the fixed cutting blades. The powerful and smooth motion of the pusher ensures optimum and precise division of the cheese.

The handling of the cheese blocks and their precise positioning for the rest of the process is now the task of the Stäubli robot. As this stage involves working on unwrapped food, Dutch manufacturer Elten has opted for the HE version of the pioneering Stäubli RX160. The abbreviation HE stands for "Humid Environment" and identifies the robot models that have been specially modified for use in damp conditions while conforming to the most stringent standards of hygiene.

HE robots: Benchmark for processing unwrapped foods

Stäubli HE versions consistently prove to be the perfect solution in the food industry where stringent hygiene standards must be met. These robots easily cope with being hosed down during the daily round of cleaning. To withstand being sprayed by high-powered water jets, they are fully enclosed and comply with IP65 protection standard. The wrist of the machine actually satisfies IP67, resisting liquid detergents with a pH value of between 4.5 and 8.5.

Even before the final coat of paint is applied, all surfaces undergo a special treatment designed to increase resistance to corrosion and make the entire casing less susceptible to mechanical



Slicer feed for various types of cheeses, a revolutionary new concept for feeding cheese into the slicer.

damage. Highly stressed parts are made of stainless steel. The internal vertical cabling makes this model especially suited to areas where there is a lot of moisture. All connectors are located under the base where they are safe from water ingress. Even so, Elten has taken the further precaution of mounting the RX160 HE on top of the cell to provide added protection during cleaning as well as optimum access.

The manufacturer's long experience of the food industry is also apparent in the choice and arrangement of all other system components. For example, the conveyors are installed on one side only and are equipped with a quick-release system, while the Teflon conveyor rollers can be replaced without the use of tools. Such attention to detail and various oth-

er useful features significantly facilitate the cleaning of the system and contribute to the maintenance of the most stringent hygiene standards.

The SLF*160S impresses not only with its technical performance but also by virtue of its exceptionally user-friendly operation. Although the complete system has been designed for different block sizes, slicing programs and types of cheese, the operator has only to select the desired program and type of cheese, and away we go. There is no faster, easier or more economical way of processing cheese currently on the market.



Since a robotic system is applied for the handling of the bars, a very flexible system is created that is suitable for various splits and output patterns.

Picking like no other

Stäubli has gone its own way with the TP80 Fast Picker robot. The highly original four-axis kinematics are set to revolutionize food applications, avoiding the inherent drawbacks of conventional high-speed kinematics. Stäubli has now announced the arrival in 2015 of an ultra-robust model for sensitive applications involving unprotected food.

In fact, Stäubli is redefining the whole concept of the high-speed robot with its Fast Picker. This is a machine that can cope well with over 200 picks per minute, handling weights of up to 0.1 kilos. Even higher loads up to a maximum of 1.0 kilos hardly impair its performance. Under these conditions and in continuous use, the TP80 still approaches the 200 picks mark. This makes the four-axis model ideal for use in the food industry where there is a demand for turnover, sorting and packaging in the shortest possible cycle times.

At the same time, the Fast Picker has been designed for consistent reliability and precision. The four-axis robot can operate in large work spaces with a diameter of 1.6 meters and achieves an impressive repeatability rate of ± 0.05 mm. High precision is guaranteed, even after many thousands of operating hours.

The rigid design of the kinematics reduces wear in continuous operation virtually to zero. In addition, all tubes and cables are encased within the arm, thus obviating the need for failure-prone external leads. The standard TP80 model already complies with IP54 protection class and can optionally be upgraded with jacket and bellows to IP65.

Perfect for food applications

General Manager Stäubli Robotics Germany Gerald Vogt, who was responsible for the TP80 project in his previous role as Head of Robot Development at the main Stäubli factory in Faverges, highlights other key advantages of the machine in addition to its superior overall technical performance: "The Fast Picker is perfect for the food industry in every



High-speed kinematics for applications in the food industry.

respect. This four-axis robot can be operated with Class NSF H1 food grade oil without suffering any loss of performance; it is easy to integrate and does not have to be ceiling-mounted directly above the sensitive foodstuffs passing underneath. The further good news is that the Fast Picker will soon be available in an optional HE version. This ultra-robust version is specially designed to withstand the intensive cleaning processes which robots are subjected to in the food industry."

Working in close cooperation with a partner company, Stäubli has invested a lot of time and effort in the development of a food-grade oil and has come up with a lubricant that combines two key advantages. Firstly, the newly developed H1 oil perfectly matches up to the special requirements of Stäubli robot drives, thus ensuring maximum service life. Secondly, the dynamics of the robot are not restricted in any way by the properties of H1 oil. This means that the TP80 can achieve maximum performance, even when lubricated with food grade oil, and is not subject to the sort of restrictions that apply to machines supplied by other manufacturers in the market.

Risk of contamination excluded

Thanks to its superior construction, the Fast Picker facilitates the implementation of new automation concepts in the

food industry. The modern tendency towards space-saving cells, with multiple robots working alongside each other, together with the ease of integration of the TP80 enables operators to attain the levels of productivity and sustainability to which they aspire. With these kinematics, advanced food handling facilities can at last be implemented without practical constraints.

The ease with which the TP80 can be integrated into systems is ultimately a key factor differentiating it from conventional delta kinematics. Gerald Vogt: "The positioning of the robot is particularly relevant in the food sector. Whereas delta kinematics must by their very nature be ceiling-mounted directly above the product, the TP80 can be floor- or wall-mounted to the side of the conveyor belt. In the event of a leak in a ceiling-mounted robot, the food products below inevitably become contaminated. There is no danger of that with the side-on positioning of the TP80."

Quick and easy cleaning

There are also other advantages. For example, the TP80 can easily be swiveled to the side away from the production line for the routine and intensive cleaning processes with liquid media that are mandatory in the food sector. With ceiling-mounted delta kinematics, cleaning is more awkward and becomes a lot more expensive. That's because the cleaning



Packaging of bakery products.



LINEmanager software tool, a reliable solution for picking, sorting and packing on lines with several robots.

fluids spread out over the entire ceiling in the cell and inevitably trickle down to the conveyor belts below, as well as affecting sensitive system components such as sensors, image processing systems and the like. By contrast, the cleaning of TP80 cells can be performed in a far more suitable fashion. The procedure is much faster, thus reducing costly downtime and contributing to significantly higher plant availability.

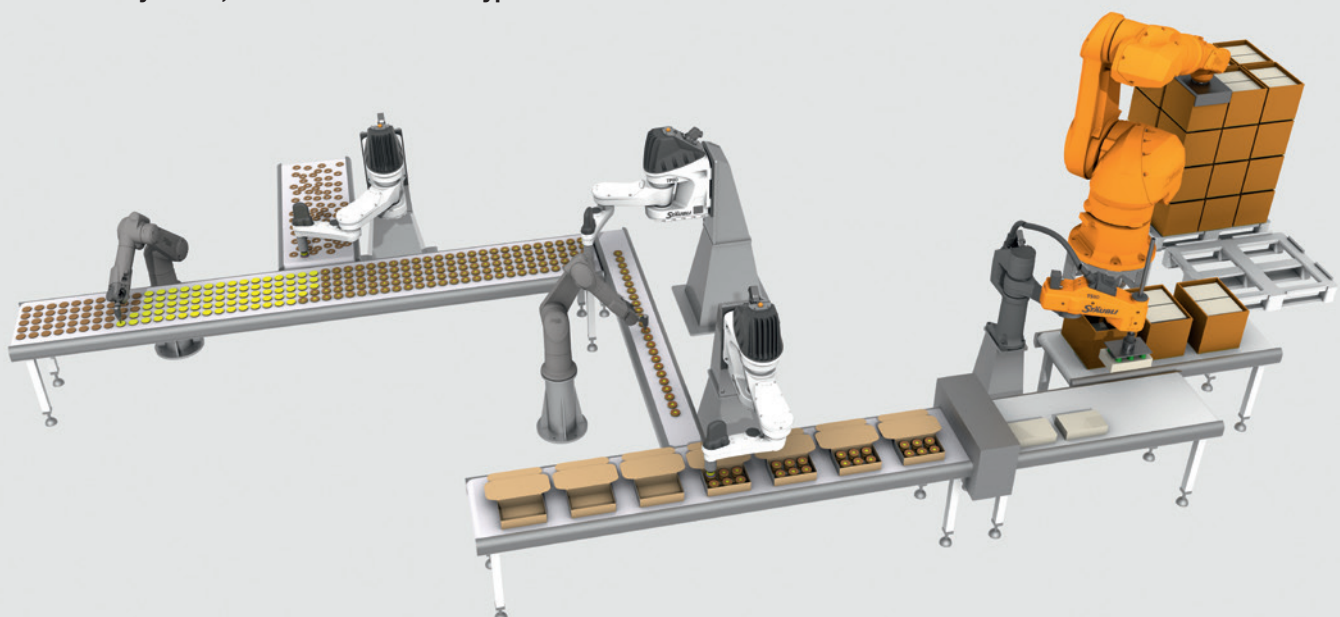
From the third quarter of 2015 onwards, Stäubli will be offering an optional HE version of the TP80 for applications requiring the most stringent hygiene standards in the food sector, e.g. primary packaging. The HE suffix stands for "Humid Environment" and identifies Stäubli models which are specifically modified for use in damp areas or are exposed to spray. The HE versions withstand cleaning processes which often have to be carried out several times

daily and which would soon put paid to a conventional robot.

Stäubli has also considered the needs of users who are looking for more than "just" a high-performance picker. In conjunction with the new load-sharing LINEmanager software, the TP80 provides the optimum all-round solution. The tool has been designed for highly complex picking, sorting and packaging tasks where a 100 % reliable solution is required for multiple robots working on a single conveyor belt. The software package manages the complete synchronization of the production line by coordinating the speeds of all the robots and of the feed and discharge belts.

Potential uses for robots in industrial bakeries

Automation solutions for the baking industry in the production of cookies and confectionery items, snacks and different types of bread.



Dewilde Engineering, Belgium

Economical solution for bakery production



Flexible robotic cell for the scoring of dough.



Precise cutting of the incoming bakery products according to predefined cutting parameters.

Whereas the manual scoring of dough is still economically viable in small bakeries, such a procedure in the industrial production of baked items would soon prove to be prohibitive in terms of cost. A flexible robot cell from Dewilde Engineering in Belgium provides the perfect solution.

German rye bread, French baguettes, individual breakfast rolls – before they find their way into the oven, the dough has to be trimmed to size to prevent it deforming during baking. In the mass production of baked goods, such work cannot be done by hand. For employees working on the production line, constantly cutting into moist dough would demand an inordinate amount of physical stamina and would involve associated health risks. For the company owner, manual labor of this kind is simply too time-consuming and therefore uneconomical.

Belgian plant manufacturer Dewilde has developed a compact robot cell for this work with an ultra-responsive TP80 Fast Picker at its heart. The four-axis high-performance machine from Stäubli manages up to 220 cuts per minute. Occupying only a three-meter stretch of the production line are the 3D position detector for the dough, an automatic

changing station for the knives, a cleaning station and of course the robot itself.

The TP80 accurately slices the incoming items for baking according to predefined parameters. Data on the exact position of the dough is fed to the robot by an upstream laser scanner. The Fast Picker selects the right knife for each batch from the changing magazine. For applications where even 220 cuts per minute

are not enough, Dewilde offers a cell with two TP80 Fast Picker robots which are then able to perform up to 440 cuts per minute.



Automated cleaning and moistening of the knife.

Fu Ling Zha Cai, China

Sorting and packaging of mustard pickles

An innovative sorting and packaging plant in China is demonstrating that robot automation makes good economic sense, even in countries with relatively low wage levels. The Fu Ling Zha Cai company has set up a pioneering production line with multiple TP80 Fast Picker robots for the handling of mustard pickles, a popular Chinese vegetable called “Fulin Zha-cai” and is scoring top marks in terms of quality and productivity.

Here’s something you might not expect to find in the Chinese food industry, namely a highly complex, fully automated sorting and packaging line for pickles. On closer inspection, it turns out to be a superior overall solution with impressive output.

Chinese systems integrator Tuanyou Mechanical has devised a customized production line concept that perfectly meets the customer’s needs. For Fu Ling Zha Cai, the priority was to achieve various improvements in comparison with manual labor – a significant increase in output, measurable reduction in costs, higher quality and maximum plant availability.

The system in detail

The sorting and packing of pickles is performed on a central conveyor belt with multiple Stäubli TP80 robots operating in series. The previously packed pickles portions arrive at the robot stations via the high-speed belt in chaotic order. An image processing system determines the respective location and position of the sealed pots of pickles on the belt and reports their coordinates to the Stäubli robot control system. The TP80s then pick up the individual pots and put



An image processing system determines the respective location and position of the sealed pots of pickles and relays the coordinates to the Stäubli robot controller.

them in cardboard boxes which arrive on roller conveyors alongside the packing system. The process is repeated until the delivery cartons are full and then starts all over again.

Stäubli TP80, the ideal team player

The use of agile Fast Picker robots on the packing line has proved to be a big hit. The four-axis machine fulfills the target cycle times of 120 units per minute, even under the challenge of having to track items that are arriving in chaotic order. The robot also scores high marks on this application for its considerable reach, coping with work areas of up to 1.6 meters in diameter. Another plus was the easy integration of the compact Fast Picker, which made no special demands on the steel frame of the conveyor system.

Overall, the sorting and packing plant has satisfied the high expectations of the user in every detail. Even in China with its low-wage economy, this hi-tech solution



High-performance, fully automated sorting and final packaging of pickles in cartons.

makes a major contribution to cost-effectiveness and to making the workplace a more employee-friendly environment by relieving the workforce of monotonous tasks and allowing them to graduate to higher-skilled roles.



For the packaging of pickled vegetables, the Fu Ling Zha Cai company has opted for a pioneering line with multiple TP80 Fast Picker robots.

SVZ Maschinenbau GmbH, Germany

Turning solo products into all-sorts

The best display areas in supermarkets are at a premium, so it makes sense to place as many varied products as possible in the customer's field of view. The repackaging of segregated foodstuffs into mixed trays is therefore an important part of modern retail – and it is the perfect sort of job to entrust to a fast robot.

SVZ Maschinenbau GmbH was founded in 1999 by its current managing directors Sieghard Schwarz, Walter Volz and Matthias Zaiss. The company specializes in the automation of tasks related to end-of-line packaging.

One recent example of a packaging solution from SVZ is a picking system with a total of six ultra-fast Stäubli Scaras that was delivered to a well-known food manufacturer.

The specification was by no means new: segregated sales packs that need to be unpacked and remixed as assortments. SVZ Sales Manager Bernd Bleher: "With increased demands being made on production and packaging resources, time-consuming and labor-intensive methods are inevitably being replaced by automated solutions. Whether picking dairy products, sliced meat and salami, salads for the deli counter, breakfast cereals or confectionery, robot-based automation is the way ahead."



The vacuum grippers have been developed in-house by SVZ.



High output and maximum flexibility and availability characterize the SVZ packing plant.

Hybrid system for maximum flexibility

SVZ makes a calculated decision on the level of automation that is optimum for the individual application. In the case of the new foodstuffs line, they opted for a hybrid solution in which the robot performs the main task, namely the actual repacking of the trays, with the conveyor or loading being done manually. "With this semi-automated system, we have succeeded in reconciling the criteria of high throughput and maximum flexibility," adds packaging strategist Bleher. "The pick-and-place tasks which are so critical to cycle times are performed by the ultra-fast TS80 Scara robots supplied by Stäubli. Meanwhile the loading of the conveyors plus the removal of the finished mixed packs is done by hand, on the basis that speed is less important than flexibility."

Inspection of the plant layout shows what Bernd Bleher means. The food products in plastic trays with lid and sleeve – segregated by type – are placed in separate cardboard stacking trays. The packaging plant consists of a central carton conveyor system, twelve powered roller conveyors which handle the uniformly sized cartons and six high-performance robots.

According to Bleher, it is no coincidence that Stäubli TS80 Scaras were chosen



The Stäubli TS80 Scaras meet the complex requirements set by the equipment manufacturer in an optimal way.

for this job: "The Stäubli machines have always scored high marks for their outstanding precision. For our purposes, however, we were looking at features such as maximum dynamics, length of reach and optimum integration. But on these points too, the TS80 set the benchmark. In addition, our clients expect the highest level of system availability, which was also an argument in favor of the Stäubli robot."

Dynamic robots ensure shortest cycle times

The operators load the correct cartons onto the roller conveyors to achieve the desired assortment. Each of these cartons holds 24 trays containing an identical product. The robot then takes on responsibility for resorting the contents. The Stäubli TS80 Scaras put in an impressive performance during the working day. Equipped with vacuum grippers specially developed by SVZ, they pick individual trays out of the cartons and position them in the mixed product boxes as directed by the master program. It is thanks to the dynamics of the robot that the strict cycle times specified by the user were attainable.

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