

# PACKAGING

ROBOTICS

A MAGAZINE FROM **ABB**

FEBRUARY

2006

*FlexPicker™*



**ABB** Robots bridge logistical gap at Mukki in Italy.

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**Fish palletized** with help from robots at Saeby Fiskeindustri in Denmark

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## FAST HANDLING MEANS GREATER FLEXIBILITY

says COOP's Dominik Leder Pages 4-6 >

**ABB**

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## Editorial

### Healthy future

➤ The market for robotics in consumer packaged products continues to grow, as all of us within the industry know from firsthand experience. Using robots for a wide range of applications within consumer goods is well-established and no longer a novelty. And these robots are increasingly used with integrated vision systems that give the added advantage of greater flexibility and efficiency.

However, being well-established doesn't mean that there isn't room for development. Packaging machine builders who have started to adopt robotics at a faster pace are driving the development of a range of new applications within food, pharmaceuticals and personal care. It is just these kinds of innovations that help spur further use of robots. At the same time, the cost of robotics systems is also going down as solutions become standardized. All of this contributes to what I expect to be a healthy future for robotics use within consumer packaged products.

We at ABB are doing our part to push the industry forward. Not only are our robots cutting edge, but so is our software. Our goal is to simplify systems engineering, with the end result being the ultimate in user-friendly and time-saving software. For example, our new conveyer tracking provides extremely high accuracy, and the new PickMaster 5.0 supports fast and easy programming of both high speed picking and palletizing applications (see pages 18-19).

Of course, we're not alone. We not only work with a wide range of partners – system integrators, machine builders and consultants – who are part of the ABB Partner Network (see pages 14-15), but we work alongside our partners at companies such as Swiss food retailer COOP (see page 4), Italian dairy Mukki (see page 7) and Finnish pharmaceutical manufacturer Orion (see page 20).

#### Henrik Andersson

Segment Manager Consumer Industries  
ABB Robotics

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## PACKAGING ROBOTICS

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## Calendar

### **Ipak-Ima**

14-18 February 2006  
Milan, Italy

### **Packtech**

8-9 March 2006  
Birmingham, U.K.

### **Hispack**

27-30 March 2006  
Barcelona, Spain

### **Industrie 2006**

27-31 March 2006  
Paris, France

### **Packaging China**

18-20 April 2006  
Beijing, China

### **Empack**

19-20 April 2006  
Hertogenbosch,  
Netherlands

### **Food Process/Food Pack Öresund**

10-11 May  
Malmö, Sweden

### **Taropack**

18-20 September  
Poznan, Poland

### **PPMA**

26-28 September  
Birmingham, U.K.

### **Fachpack 2006**

26-28 September  
Nuremberg, Germany

### **Macropak**

3-6 October  
Utrecht, Netherlands

### **Scanpack**

24-27 October  
Stockholm, Sweden

### **Emballage**

20-24 November  
Paris, France



ABB's booth was a hot spot at PackExpo 2005 held in Las Vegas.

## Packing them in at PackExpo

> It may seem far away, but PackExpo 2006 is already on the horizon for all those who work within packaging. The industry's big trade show is set for October 29-November 2 in Chicago in the U.S. With 50,000 attendees expected, the show will be bigger even than last year's 30,000 visitors. As usual, ABB expects to participate with a booth.

The most prominent companies in the industry will be exhibiting and making product introductions at the show. Pack Expo features important industry updates and the latest in new product technology.

For example, ABB unveiled two new robots – the IRB 660 and the IRB 260 which are designed specifically for the packaging and food industry.

In addition to having a demo cell in the booth,

eight of ABB's partners from the U.S., Canada and Australia also displayed robots in their booths. Customers were not only fascinated by robotic applications but actually brought components to discuss specific applications in more detail with ABB's engineers.

During the conference, ABB experts presented a talk about evolving robotic trends. Business development manager Frank-Peter Kirgis and segment manager Henrik Andersson provided an in-depth look at evolving trends in the global packaging and food industry.

"Compared to the rising cost of labor over the past 10-15 years, the real cost of robots has steadily dropped to a fifth of what it used to cost in the 1990s," said Stefan Nilsson, vice president, robotics division, for North American Channel Partners.

## Robots a first for U.K. Bakery

> The U.K. bakery firm Frank Roberts and Sons are investing over GBP 800,000 as part of their ongoing development project in an automated bread tin store from RTS Flexible Systems using a pioneering new solution. The RTS system will deploy 6-axis robots – four ABB IRB 6600 robots – for the first time ever in a U.K. bread tin store.

Each of the two systems integrates two ABB IRB 6600 6-axis robots with a conventional floor conveyor, and incorporates RTS software. The first robot unloads 4-tin bread straps from the continuous production line. The second reloads the required tin types back onto the line.

Roberts Chief Engineer Chris Daniels said: "We can dispense with a heavy, hot and noisy manual lifting job, bringing health and safety benefits and enabling us to redeploy staff more effectively elsewhere in the bakery. The consistently gentle action of the robots' magnetic grippers also means we can achieve dramatic savings by reducing damage to the bread tins. With automation we expect to extend the life of a set of bread tins to 5 years - double what is possible when the tins are loaded and unloaded manually."

## Up with pharmaceuticals

> A November 2005 study by independent research firm Freedonia says that demand for pharmaceutical packaging will continue to increase worldwide by 5.3 percent per year to USD 24.3 billion through 2009. According to the study, more than 80 percent of the revenues will be absorbed by the ten largest drug-producing countries: the U.S., Japan, France, the U.K., China, Germany, Italy, India, Switzerland and Brazil. Growth will come in the form of packaging with specialized storage requirements in the U.S., and demand in Europe for blister packaging due to EU regulations.



The RobTeq Speed-Picker packages bags weighing up to 1,000 grams. The suction technology of the ABB Flex-Picker was optimized in order to achieve this.



The Skinetta end-of-line packaging machine packages up to 88 bags per minute.

By Skinetta  
Photos Skinetta

# Power of packing powder products

**Sugar, coffee and baking mixes get the delicate treatment from robots at Swiss retailer COOP.**

➤ “Products in granulate and powder form behave as fluids in bags.” This is how Dominik Leder of the Swiss food retailer COOP explains the core problem when it comes to optimizing the end-of-line packaging for loose packaged goods such as sugar, coffee or baking mixes.

“We were aiming for a flexible system that can package our products quickly and reliably,” says Leder, who as the project coordinator at the COOP production and packaging center is responsible for the planning and implementation of technical projects. The system must also



Carton sizes which exactly fill a shelf section are ideal. Product ranges of baking powder and chocolate powder are quite varied. (Prices on the COOP shelf are in Swiss francs).

be able to cope with Duopacks weighing up to 1,000 grams.

The solution to the problem was quite different to what Leder and his team had originally expected. “We were very skeptical about whether there was a robot system which would even be able to hold our products due to the centrifugal forces,” says Leder.

The COOP team was therefore anticipating a more traditional solution. But then a newly developed robot-based system was considered: the RobTeq Speed-Picker by Skinetta Pac-Systeme. “This solved a whole range of problems for us,” says Leder. “Above all, the changeover times and maintenance expenses could be drastically reduced.” This is because the abrasive, sticky contents of damaged bags cause a high level of wear in conventional case packagers, whereas there are considerably fewer mechanical parts in the RobTeq Speed-Picker.

**To start with**, the way to achieve this was anything but clear. Norbert Wörz, head of production development at Skinetta, says: “We were aware that we would have to break away from the norm if we wanted to design a low-

maintenance, fast and extremely flexible end-of-line packaging machine. The ABB FlexPicker seemed to be the new way forward.”

The ABB team involved did not wish to rule out the possibility that the design of such a machine could succeed with the FlexPicker. However, this was not a certainty. Nevertheless, this spurred on the engineers of end-of-line packaging manufacturer Skinetta, which has become a specialist in innovative solutions since the change of management about a year ago. The Skinetta team had a number of problems to solve, the main one being the inertia of the packaging bags.

“It is as if you were to attach a heavy stone to a long rope and then pull quickly on the rope. Your arm accelerates very quickly and without much effort – until the rope is taut. When you then encounter the gravitational pull of the stone, it initially feels as if the stone is hitting your arm,” says Wörz, describing the phenomenon.

To eliminate this problem, Skinetta first had to optimize the suction system. The suction performance of conventional systems was by no means sufficient to transport 1,000 gram bags



“...the changeover times and maintenance expenses could be drastically reduced.”

Dominik Leder, project coordinator

reliably and at the necessary speed. To absorb the sudden weight resistance of the content, a special movement curve was also calculated for the gripper. Says Wörz: “Only with this combination did we find it possible to place the bags in the cartons at high speed.”

**The Swiss company** liked this concept. “Nowadays, we need to be much more flexible than a few years ago,” says Leder, describing the different situation in the packaging center. The logistics engineers stock five distribution centers which each supply around 1,000 local businesses and shops. Packaging is carried out as required. Sales are reported to the distribution centers and simultaneously to the packaging center via an ERP system. In addition, the number of packaged units varies increasingly. “The trend is for packaging sizes which are exactly sufficient to fill the shelf,” explains Leder.

Above all, products which have a low demand should be delivered at a precise time and in small quantities. In the meantime, the packaging center delivers directly to the shops, bypassing the central distribution warehouses. This allows COOP to react quickly to unexpected purchasing trends. The construction of the RobTeq Speed-Picker is designed for quick and flexible packaging. Only the suction cup has to be replaced to switch packaging format. A new locking mechanism makes the changeover even easier. Even the mechanical pre-grouping of the bags is a thing of the past. The Skinetta RobTeq Speed-Picker packages up to 88 bags per minute. The ABB FlexPicker is used and is synchronized with the conveyor belt.

The robot takes the bag with its vacuum gripper and places it in the waiting carton, as specified in the packaging plan. The cartons are changed quickly so that the machine can carry on packaging without having to pause. The packaging plans are programmed off-line using MS Excel. The data is then imported into csv format. This means that the Swiss packaging company has a high degree of independence.

According to Leder, “once Norbert Wörz from Skinetta reprogrammed the machine as part of the acceptance procedure, all our doubts were finally dispelled.”

The number of packaged layers and the speed of the packaging unit can also be directly set on the machine itself. The RobTeq Speed-Picker allows COOP to react to increasing economic demands. Says Leder, “We have the increasing pressure of cost on the one hand and growing customer demands for more flexibility, speed and quality on the other hand.” The “categories” – the buyers responsible for product lines at COOP – can choose to use other manufacturers for production or packaging. For example, the center in Pratteln had lost the task of roasting and packaging peanuts to an independent competitor. “After a year however, the categories have come back simply because our product quality is right,” says Leder.

Conversely, COOP also packages for other manufacturers. “This is something we would like to expand,” says Leder. ☉

*(this story originally appeared in the October 2005 issue of PackReport.)*

## >FACTS

### Choosing robots

The benefits of using robots to pack powdered products for COOP include:

- Significantly shorter changing times
- Drastically reduced maintenance expenses
- Greater flexibility
- Easy to provide packaging on demand



Suitable suction heads have been developed for the different bags which can be changed in seconds using a new type of clip fastening.



By Claudia Magli  
Photos Magliani

At Mukki's plant in Florence, IRB 640 robots carry out the palletizing of a plastic cartons. The robots are digitally connected directly to the plant's supply chain system.

# Log(ist)ical quality

**Robots are becoming the linchpin of a logistical organization that combines production and sales, managing palletization operations on the basis of orders received.**

➤ In May 2005, the Italian dairy company Mukki opened a new plant, designed to meet rigorous environmental and safety requirements. The plant, called Centrale del Latte di Firenze, Pistoia e Livorno, not only meets the high standards but it also boasts a state-of-the-art, extended-shelf-life packaging system. An integral part of the system is the "intelligent" logistics system – a system that digitalizes elements of the supply chain and allows for ever-increasing automation. At Mukki's new plant, the system provides automated handling of the complex operations involved in making up pal-

lets that will be dispatched for general distribution, among other things.

Mukki manufactures a variety of dairy products, including fresh, ultra-high-temperature processed (UHT) and highly pasteurized milk, fresh and UHT cream and mascarpone. The complete cycle of production is painstakingly monitored, from the removal of the milk from the tanks through to packaging, recording processing times, treatment parameters and quantity ratings.

The main production stages include processing the milk and packaging dairy products,





Four IRB 640 robots handle the palletizing of crates of dairy products received from the four packaging lines.

> batching cartons in multiple transit units (for the most part made up of returnable plastic crates) and, finally, palletizing and shipping products to customers.

**Logic plays a vital role** in optimizing times and runs, completing orders quickly and without mistakes, maintaining the cold chain and transferring data to the control system.

To help with this, Mukki turned to Vicenza-based system integrator Mariani. Mariani set up an independent data collection network that connected to all the machines, and it devised a special monitoring and management software that “dialogs” with both the host and the programmable logic controllers on each machine via a dedicated PC.

Above all, the robot management program links sales, warehousing and production, so that palletization works directly according to order specifications.

Even the labeling phase of the packaged product is computerized, with the system gleaning information from each individual pallet via an identification label. The label bears the barcode and data relating to the product’s sell-by date, as well as all the information needed for correctly carrying out picking operations.

**In this kind of organization**, robots are assigned an important part to play, marrying the performance of ABB hardware and Mariani “intelligence.” Their job is to translate the end-of-line work instructions into actions.

In Florence, IRB 640 robots have been used for both pallet formation and depalletization.

With depalletization, the robots release the empty crates from the pallets that originate from the points of sale. The robots have a gripper designed to pick up a layer of eight crates, which they can partially unload onto two different conveyor belts. There are six layers per pallet. The robots are capable of working at an hourly rate of up to 63 pallets, with maximum load heights of 1.950 mm.

With pallet formation, the robots are equipped with a gripper capable of picking up and depositing crates without making contact with the product. They handle 600 containers per hour, picking up two crates per cycle and making up a maximum of seven layers per pallet, each with eight crates. The maximum palletized height is 1.650 mm.

**Plastic crates** are not the only multiple product units at Mukki. There are also bundles and cardboard boxes, which are handled by suitably



equipped robots. What changes is the gripper, which is fitted for either the boxes or the dividers. These machines are able to palletize 1,500 items per hour over five layers, with the number of multipacks varying from 15 to 40 per layer, depending on format. They can make up a load with a maximum height of 1.265 mm.

Finally, brief mention should be made of the returnable crates, designed and patented by Mariani for the dairy and cheese sector. These are stackable, palletizable boxes made of high-density polyethylene, capable of holding different types and formats of primary container. Sturdy and tough, the crates have been designed to withstand the sudden temperature changes that occur en route from the warehouse to the cold-storage rooms as well as transport by forklifts and platform trucks, and automatic handling by depalletizers, stackers, palletizers and high-pressure washing units.

**The software and machinery** launched by Mariani handle a complex flow of operations.

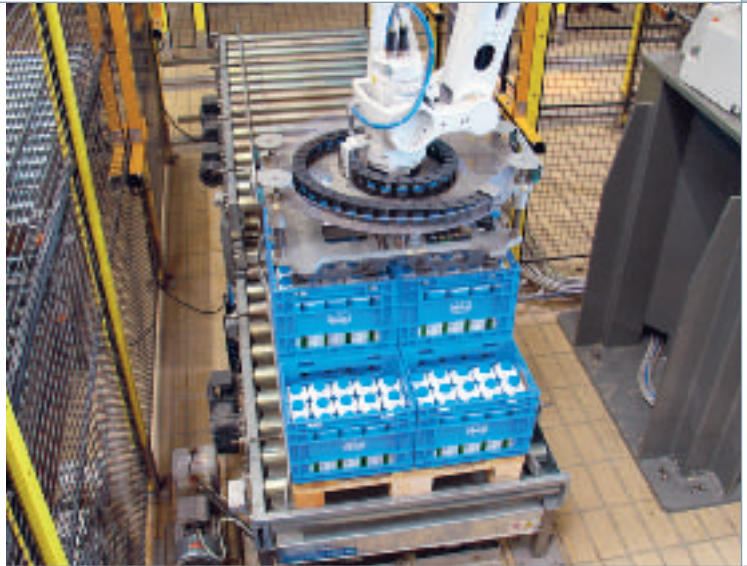
The milk is packed into laminated cardboard containers with resealable tops. After filling, four robots working at 40,000 items per hour insert the individual packs into suitable crates, using a special device that controls the smoothness of the operation. A total of three formats (1,000, 500 and 250 ml) are handled to accommodate 10 types of product.

For complete packaging operations, Mukki has approved four wraparound cartoners working at 7,000 items per hour, a continuous shrink-wrapper with a lid applicator that handles dual-format bundles with a handle and two robots for conveying secondary packaging to palletization.

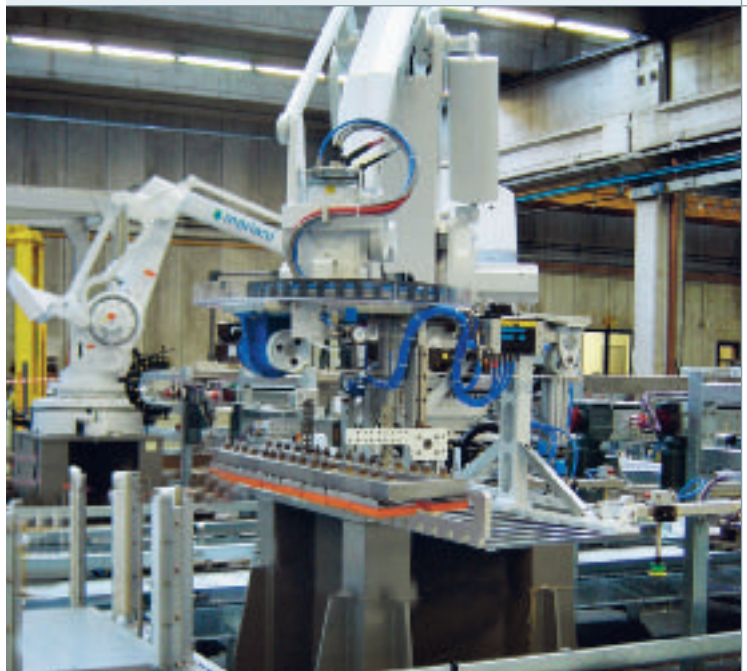
A battery of four robots carries out palletization of the crates arriving from the four packaging lines. An automatic shuttle system feeds the empty pallets and conveys the full ones to the cold-storage rooms. All the pallets of finished product are marked by means of labels bearing the logistical information needed to guarantee efficient and prompt distribution.

The packaged fresh milk has a brief stay in a cold-storage room at 4°C, where preliminary operations are carried out prior to loading onto the motor vehicles that will transport it to points of sale. By way of special loading chutes, the product is conveyed straight to the inside of the refrigerated trucks in such a way as to guarantee the continuity of the cold chain.

The UHT milk is placed in an automated warehouse with space for 2,500 pallets, allowing for optimal handling of batches while at the same time minimizing lead times and maximizing the efficiency and safety of operations. ☉



## Robots translate the end-of-line work instructions into actions...



### >FACTS

#### Better with robots

Mukki has reaped a number of benefits by using robots to palletize and depalletize its dairy products, including:

- Robots are digitally connected to the supply so loading can be done precisely according to need
- Direct connection to the supply means lead times are held to a minimum, saving money and time
- Employees avoid having to work in a cold environment with robots doing the work instead

By John Steffan Olsen  
Photo Svend Christensen

# A big fish story

**When robots take over fish packing, employees win with a better working environment, free from heavy and lifting that could cause injury.**



Production lines at Sæby Fiskeindustri

> If you think that a visit to a fish packing plant means dealing with a lot of slippery rubbish and an unpleasant and overpowering smell, you'd be wrong. At least if you were visiting the fish packing plant at Sæby on the northern tip of Jutland in Denmark. Instead of garbage and stink, there is a large, attractive modern factory, with no special fishy smell.

Already in the reception lobby, it's easy to see that the company is run on modern lines, with a good mixture of the friendliness and business sense that people in the Vendsyssel area of Denmark are known for. The company has spent money on art, and the buildings are beautiful and pleasant to walk around. Any preconceived notions are quickly dispelled.

**Inside the plant,** some 11 ABB robots - three cells of one IRB 4400 and two IRB 140 robots, plus one IRB 6650 and one IRB 640 robot - supplied by SCA Pakkesystemer in collaboration with ABB, pack, stack and handle the many hundreds of thousands of boxes of mackerel, which is what Sæby Fiskeindustri specializes in. Those who like packaged mackerel might be envious to see all the different varieties that are produced

and sent off to customers with different requirements in different countries. The packaging is brightly colored, the products range from the "three for ten crowns" cheap cans to very tasty and more luxurious delicacies.

Henrik Sørensen is the sales manager and Ulrik Bendtsen is the technical manager at SCA Pakkesystemer, which develops and sells modern automation equipment and packing systems. At first glance, it would be hard to determine that the two men are not Sæby Fiskeindustri employees, since they are on a first-name basis with many and are free to come and go in the buildings. But it was Sørensen and Bendtsen who installed a hyper-modern, new packing unit at the factory. SCA has supplied automatic packing systems for over twenty years to Sæby Fiskeindustri, and the trusting collaboration is obvious.

**SCA supplies everything** from manual packing machinery to complete, fully-automated packing system installations, and has handled everything from brake discs to packets of cheese spread. SCA has had a presence at Sæby Fiskeindustri for many years.

"The purchase of the new robots was brought



Ulrik Bendtsen and Henrik Sørensen of SCA Pakkesystemer worked as a team to install the new packing system.

about, first and foremost, by wanting to get rid of heavy, monotonous, repetitious work,” says Bendtsen, who along with Sørensen has gained exceptional expertise in developing packing systems that can manage particularly complicated tasks. The goal here was to get the mackerel sorted from the autoclave trolley, shrink wrapped, packed in paper bags or on several different types of pallet, palletized and then foil wrapped, to suit customer requirements. But several different packing patterns are used. And there are ¼, ½ and 1/1 pallets, several different types of paper bags, and several different requirements for foil wrapping, among other needs.

“This requires a very flexible installation, and SCA succeeded in developing it, even if there were a number of difficult situations from time to time,” says Bendtsen.

“Development used to mean that we had to spend many hours in analysing the movements to be copied, and what the robots really would have to be re-programmed to do,” says Bendtsen. “The requirement was that it should be a flexible system, and that it should be easy to serve. After this, we prepared the layout and came up with a design proposal. After many small adjustments, we were able to create the final design and design specifications. One of the most difficult things was to find space and include the new requirements that natu-



Tanja Pedersen appreciates the ease of changing to new packing patterns.

rally occur during the development phase. But we succeeded and we have now succeeded in achieving a capacity boost of 60-70 percent for the same production time.”

**SCA Pakkesystemer** acquired two of its former collaboration partners during 2005, so it is a new experience for Bendtsen to work in such a large company as SCA. SCA wanted to concentrate competence and know-how so they could offer to take on larger jobs, and it appears that they will succeed with the new company, SCA Pakkesystemer.

“All in all, we have 50-60 robots out there working, and we have 25 currently on order at SCA. So we will soon pass 100 robots. And we always have to be able to offer flexible, turn-key solutions. Progress is rapid. Five years ago, an installation like this would have looked very different, with a lot more traditional mechanical components,” says Bendtsen.

“We have our own service department and have signed a partnership contract with ABB for personnel training, so that we can offer the necessary maintenance and service. This is because these high technology installations have to run at high efficiency levels and capacity all year round. For this reason, we have to be prepared to provide round the clock service for the installations,” Sørensen concludes. ☉



#### >FACTS

##### Better packing, better fish

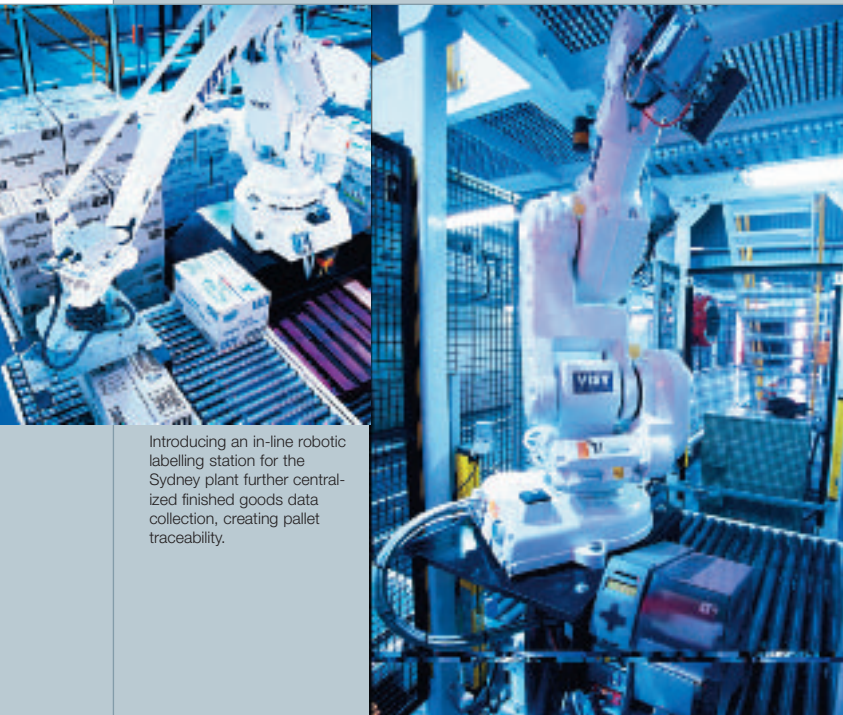
Sæby Fiskeindustri use three cells of one IRB 4400 and two IRB 140 robots, plus one IRB 6650 and one IRB 640, which provide:

- Flexibility to handle a wide range of packages means less downtime
- A capacity boost of 60-70 percent
- Employees avoid monotonous and heavy work

By Barton Jory  
Photos Visy

# Smartly packed snacks

**Arnott Snackfoods in Australia relies on robots for handling of all of their finished goods.**



Introducing an in-line robotic labelling station for the Sydney plant further centralized finished goods data collection, creating pallet traceability.

> Completing a major robotics project for food manufacturer Arnott's Snackfoods has cemented Visy Automation's reputation as a world-leading packaging systems service provider.

Visy Industries' packaging automation business, Visy Automation (VA), recently completed a major robot-based palletizing solution for Arnott's Snackfoods in Sydney, following on from the successful installation of a similar system at the Arnott's Snackfoods' Melbourne plant three years ago.

Valued at a combined total of approximately 5.5 million Australian dollars, the solutions developed for Arnott's Snackfoods incorporate complex product and pallet distribution systems, automated palletizing of a product range comprised of over 400 product varieties, and the integration of complex date coding, labelling, and reporting systems. In fact, Arnott's Snackfoods now entrust their entire finished goods handling at Melbourne and Sydney to solutions provided by Visy Automation.

Both plants run three shifts per day, six to seven days per week, and produce a highly

varied product mix that demands sophisticated automation strategies to achieve the required through-put rates of up to 70+ cases per minute in Sydney, and 45+ cases per minute in Melbourne. Additional complexities include the requirements for handling cases associated with both finished goods and work in progress, easily damaged product and multiple outer case packaging formats.

**Key to the appointment** of Visy Automation by Arnott's Snackfoods was its ability to customize the system and not simply provide an 'out-of-the-box' solution. Michael Woodlock, national engineering manager for Arnott's Snackfoods, stresses the system is far more than just conveyers, robots and grippers.

"We were conscious of working with one supplier that would provide a fully integrated turnkey system throughout every stage – design, construction, installation and testing," says Woodlock. Additionally, Arnott's Snackfoods did not want to host an operating system that relied on the knowledge of a handful of experts every time a new product line was introduced.

Visy Automation's customized control software for Arnott's Snackfoods comprises a database structure capable of managing hundreds of product variants that can be easily extended. New products and their specifications (carton size and weight, pallet configuration) can be added in a matter of keystrokes.

Arnott's Snack foods and Visy Automation have forged a strong partnership that relies on two-way knowledge transfer. Through the Melbourne inception, Arnott's Snackfoods gained a better understanding of how to communicate its requirements for the Sydney plant in terms of handling codes, volume of products, number of lines and other specifications.

**Given the success** of the Melbourne installation and the ongoing dialogue, there was very little fine-tuning required before introducing Visy Automation and robotics to the Sydney plant.

## &gt;FACTS

**The nitty gritty**

The VAPs system developed for Arnott's Sydney facility is a state-of-the-art, purpose-built system that integrates production, palletizing and business reporting systems.

Sophisticated data handling, labelling and tracking means the palletizing system is the hub for finished goods and data collection, such as production summaries and productivity logs. The system has a speed design rate of 70-80 cases per minute.

Both Sydney and Melbourne systems automatically track and distribute product from a common in-feed line and use recirculation conveyors to handle product surges and cell interruptions. Both systems are fully integrated with empty and full pallet distribution, and the Sydney system also interfaces to an automated truck roll-on/roll-off dock.

The systems use custom-designed SCADA operating interfaces designed specifically for the client's production requirements. They are interfaced with the client's ERP system, and are currently in the process of being interfaced to their warehouse management systems to provide additional shift data and real time production reporting.

Both systems provide the platform for electronic time/date stamping of all production and SSCC identification, case date coding, and in Sydney, robotically automated labelling.

The systems are capable of handling hundreds of different SKU's, which are picked up by servocontrolled grippers rather than simple pneumatic systems, due to the requirement to handle a large variety of shippers with light grade board, and numerous palletising patterns.

Developments included refining the carton conveying system to further reduce noise, an upgraded control system platform featuring multiple AB Control Logix processors, and an enhanced WonderWare InTouch operator interface. The investment in software has proven instrumental to the system's error recovery and the ease to which operators can address problems on the line.

"Visy recognised that the technology is only as good as the people behind it, and they tackled it head-on when they developed an operator interface that was easy-to-use with mouse-driven commands," says Woodlock.

"Our system alleviates operator stress levels by giving them the confidence to quickly and efficiently address issues, thereby minimizing stoppages and knock-on effects down the line," he says.

The solutions developed for Melbourne and Sydney have delivered economic, occupational health and safety (OH&S) and strategic benefits. The adoption of a robot-based palletizing system has produced some extra upstream and downstream benefits, such as improvements to carton and sealant integrity. Unlike a manual system, the systems have provided a hub to enable comprehensive visibility and robust reporting of all finished goods, and integration with



The robot-based palletizing solution at Arnott's Snackfoods' Sydney plant comprises four robots handling 12 product lines simultaneously.

the business's Enterprise Resource Planning and warehouse management software solutions. The role the solution plays in getting product out the door cannot be overstated.

**With Visy Board** a major supplier to Arnott's Snackfoods, Visy Automation is able to bring a thorough understanding of all factors to be considered in the packaging supply chain and an understanding of the specific production issues and business requirements associated with palletizing and moving lightweight foodstuffs. The result is an integrated and efficient packaging system, which combines seamlessly with the packaging materials designed and supplied by Visy.

Importantly, Arnott's Snackfoods has regular access to a team of experts at Visy Automation, and personnel regularly communicate to discuss plant operations and system performance. ☉

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## &gt;FACTS

**Visy Automation at a glance**

Visy Automation is a leading provider of total packaging automation solutions in the Australasian region, the leading integrator of ABB Robots in Australia and, more recently, winning over a growing customer base in North America. Formed in 1978, Visy Automation is part of Visy Industries group, which was established in Melbourne, Australia in 1948 and has grown to become the world's leading privately owned packaging and recycling company. Visy employs more than 8,000 people in Australia, New Zealand, and the U.S.

Visy Automation's product offering includes purpose-built machines, case and tray erectors and ladders, robotic packing and palletizing systems, and specialized robotic solutions.



By Graeme Forster  
Illustration Chad Baker, Getty Images

# It's all about teamwork

**Putting together a specialist robotics team can solve all sorts of manufacturing challenges – even the threat of having to relocate your business.**

> It is an old saying, but still true today: A team can achieve what the individual cannot. As an engineering company, ABB already achieves more than most. But when it comes to robotics (in which ABB is a world leader) in consumer industries, the value in a partnership system should not be underestimated. Partnership

operations bring together some of the best talents and specialist competencies in the business, often from different companies. The result is the best possible solution in systems for the client.

The consumer industry, reckons Frank-Peter Kirgis – business developer at ABB Robotics for consumer industries and specialized

“The Partnership concept and the increasing ease-of-use of the products [the robots] is producing a growing trend in automation in the consumer industry.”

Frank-Peter Kirgis, ABB

in coordinating partnership operations – is more demanding than most industrial robotics applications, because it combines so many different and specialized elements. There are product handling and packaging technologies to consider, he says, which also have to take into account hygiene. Vision technology also plays a key role in many applications. And it's the same for healthcare, pharmaceutical and medical care applications. No single company can be an expert in all the specialist disciplines required, so ABB's Partner Network makes good sense.

Partners can be system integrators, machine builders and consultant companies. Each partner has specialist knowledge of certain areas, and the greater the number of partners, the wider the coverage of the market. Partners also have the advantage of being part of the Partner network through ABB, which not only means access to project opportunities, but also ensures the frequent exchange of information and knowledge.

**Robomotion is a typical** Partner Network company, and one with whom Kirgis works closely. Founded by two graduates from the Fraunhofer Institute, a German research center specializing in production and automation technologies, the Stuttgart-based company acts as an application consultancy. It helps other companies within the Partner Network with software development, material flow analysis and simulation, as well as developing grippers for use in robotic applications. The company concentrates on new solutions for robot-based automation, and has growing ambitions that membership of the Partnership will help them achieve. Though mainly operating in Germany at the moment, they are starting to grow their business through working with some of ABB's partners in the United States.

Examples of how the Partnership Network functions can be read elsewhere in this publication, and the solution for the coop project in Switzerland is a good illustration. The challenge was to find a more efficient way of handling powdered goods in bags destined for the shelves, such as coffee, sugar and baking powder. The

solution brought together the robot manufacturer abb and Skinetta (another partner in the Network, and the system integrator for this project) with Robomotion acting as the consulting partner.

“Robomotion is an exception within our Partner Network,” says Kirgis, “They focus on consultancy work. They provide help to our partners, bringing them up to speed – especially machine builders who do not have the experience of integrating robots.

“The Partnership concept and the increasing ease-of-use of the products [the robots] is producing a growing trend in automation in the consumer industry,” he says. “Robotic technology is becoming easier to apply, and the network is helping to create a broader knowledge base in the marketplace. Partners can help to grow the robotics business through that.”

**Kirgis also notes** that the main developers and adopters of automated technology in the consumer fields are Western European countries and the United States. “No surprise there,” he says, because this is where most of the packaging machine technology is already being developed. But the other reason he notes for the emergence of automated technologies in these regions is more political. “Robotization is enabling companies to keep manufacturing in certain countries where you have high labor costs and inflexible employment laws. Through the broad network of partners, we are able to support the industry very efficiently with solutions that help them in growing their business, increase their quality, and keep their manufacturing base intact.” ☉

#### >FACTS

##### **ABB Partner Network**

To find out more about ABB's Partner Network, check out the new website at [www.abb.com/robotics](http://www.abb.com/robotics). There you will find information about a range of products, solutions and service, as well as how to become a partner with ABB.

By Barb Cooper  
Photos Northeast Foods, McDonald's

# Best of the buns



## Robots at Northeast Foods take on the task of inspecting buns bound for McDonald's fast-food restaurants.

► It has taken John Paterakis only 40 years to take a family bakery business and turn it into a company selling hundreds of millions of dollars of buns a year. It helps that Northeast Foods, now run by Paterakis' son Bill, is a major supplier to fast-food chain McDonald's.

But while most of the operations in the plant, which supplies buns to 500 local McDonald's restaurants, are almost fully automated, until recently the final inspection and lane balancing relied on a conveyor and two employees.

While the method provided accuracy and consistency, the company recognized that with the repetitiveness of the job and the challenges of inspecting and balancing 5,000 dozen buns an hour, it would be difficult to find and retain qualified employees in the future.

Northeast's corporate engineer Jim Clouth-

ier explains: "As I investigated automation options, I saw a trade show demonstration of an ABB FlexPicker and discussed the feasibility of its implementation at our plant with PaR Systems' manager for material handling systems, Steve Stegora and several other integrators. PaR Systems was the only integrator with the baking industry experience necessary to understand what we needed and the enthusiasm to help us develop a solution."

**To create and validate** its proposed solution, PaR Systems developed a disciplined engineering approach, which would mitigate project risk.

PaR began with an engineering evaluation of the line that included determining the exact imbalance that could occur over extended periods. Based on the data, a model was built to





Hamburger buns bound for McDonald's get inspected by an IRB 340 robot at Northeast Foods.

identify equipment requirements. The information also showed how minor conveyor modifications could dramatically reduce the actual imbalance, thus reducing the implementation costs.

“With the FlexPicker’s high acceleration, high speed and work envelope, it was ideally suited to this application,” says Stegora. “Its speed for manipulating product on a conveyor moving 120-feet-per-minute enabled us to develop a solution that could mechanically achieve Northeast Foods’ 80 parts per minute handling requirement.”

In the next phase of the project, a prototype system was developed and tested in a laboratory environment. This included a FlexPicker mounted over a circular test conveyor, which was assembled to simulate the actual production situation and the production rate. After several software enhancements, the prototype system met performance requirements and the detailed design, fabrication, assembly and installation of a production grade system followed.

The system’s initial design included a Flex-Picker with an Adept controller and two Adept vision cameras. Due to the configuration of the conveyor, the vision system did not perform final inspections as anticipated. As a result, a Dipix CS24 vision system, specially designed for baking industry applications, was chosen to do a full inspection of the buns including height, color, blotching, seeds and diameter, rejecting all products that do not meet specifications.

The amount of data processed by the vision system to identify products and “holes” at an

extremely high throughput rate presented a challenge. PaR Systems made several software enhancements to optimize the data handling and data structures to achieve the throughput rates.

A downstream Adept vision camera, which views an area 30 inches by 30 inches in which all six lanes can be seen, communicates lane fullness to the robot controller. The robot is then given instructions to move buns from full lanes to empty lanes to achieve a balanced flow of product.

“Since we began running the line in July 2004, equipment downtime has been minimal,” says Clouthier. “The robot requires very little maintenance aside from replacing the rubber suction cups that pick up the buns. They need to be replaced every three to four days because of the production rate. I’m impressed with the way the robot is built and wish that all of our equipment had the same kind of maintenance and uptime record.”

**Northeast Foods’ successful implementation** of the automation system and its plans to add a second robotic/vision system at the end of April, have generated great interest within the baking industry.

Clouthier says: “By automating these two plant operations, Northeast Foods continues its leadership role as an innovative supplier to McDonald’s as well as a baking industry pace-setter.

“In making the investment in automation, we have taken a proactive step to ensure that we can continue to meet our customer’s needs and remain competitive.” ☉

#### >FACTS

##### Value added

Benefits of the new inspection system include:

- Less downtime
- Little maintenance required
- Reduced worry over finding and retaining qualified employees

#### >FACTS

With the installation of a high-speed robot and vision systems, Northeast Foods’ Baltimore, Maryland in the U.S., plant automated the final inspection and lane balancing operations of its six lane, 4,500-dozen-per-hour hamburger bun production line.

Northeast Foods’ automation solution, designed and built by PaR Systems, Inc., St. Paul, Minnesota, uses an ABB IRB 340 FlexPicker and two vision systems. With the new system, final inspection and lane balancing are done with 100 percent accuracy on a conveyor moving 120 feet-per-minute.

By Anne Hammarsjöld  
Illustration ABB

# Three “Ps” on same proven platform

**ABB’s robot family is now to be complemented with software that integrates picking, packing and palletizing. The new PickMaster 5 represents a natural development of a tried and tested platform.**

> During 2005, ABB launched a new palletizing robot: the IRB 660. Faster, stronger and with a greater reach than its predecessors, it set a new standard in the market. Now, there is yet another welcome innovation. The PickMaster 3 for picking and packing is now being extended with the PickMaster 5 for palletizing. This means that PickMaster, together with the world’s broadest robot range for picking, now offers new opportunities for smart, user-friendly solutions for the

entire value chain of the packaging process in the expanding consumer sector.

“From a tried and tested software platform, we have now developed a product for very flexible and scalable palletizing work,” says product manager Henrik Knobel. “Many of the advantages offered by previous versions remain familiar. For example, the application is configured by means of a graphic user interface on a standard PC in a highly familiar open Windows environment, which also allows users to inspect their results in rotatable three-dimensional views of the complete matrixes. With the PickMaster 5 series, we can now offer a global application solution for the entire product chain ranging from primary packing of individual products to the packing of cartons in boxes and the palletizing of the boxes ready for shipping by truck to customers.”

**The PickMaster 5** offers several advantages in common with previous versions. These include the possibility of configuring a new and fully operational line off-line on any PC. The proven method of operating the application from a production PC controlling one or several robots dynamically from a central point in a network and coordinating camera information is now being extended to allow operation fully independent of the PC during production. In these single cells, the application utilizes ABB’s graphic FlexPendant as an optimally adapted operator panel from which the products to be packed can easily be selected. The FlexPendant provides the operator with a powerful tool to adjust the dimensions of the products in accordance with actual imperfections and to detect faults and restart production without risking losing what has already been produced.

The FlexPendant also gives the operator a

## >FACTS

### Integrating the three “Ps” of the production chain

The PickMaster 5 for palletizing is the natural development of a tried and tested concept. The solution offers:

- configuration of entire palletizing processes off-line in a modern Windows environment
- common concept throughout the production chain
- separation of static line information and dynamic project information
- centralized control of up to 16 robots
- automatic calculation of palletizing patterns and robot movements
- process control of complex tool configurations
- graphic operator panel with intuitive menus for easy selection of product runs
- remote control via configurable signal pattern
- fine-tuning of process variables during operation
- testing of critical patterns or positions
- possibility of running several products simultaneously on several lines in and out
- network control from PC or operation as an autonomous robot cell via FlexPendant
- several flexible adaptation opportunities for advanced applications through global partners

## &gt;FACTS

**Faster, longer, stronger**

The IRB 660 palletizing robot is considerably faster than its predecessors. With its exceptional reach of up to 3.15 meters, the IRB 660 is able to handle four lines in, two pallet stacks, one pallet with intermediate layers and four lines out with pallets. The IRB 660 is available in a high-speed version able to handle 180 kilograms and a version able to handle 250 kilograms at limited speed.



good insight into current production information, helping him or her make the right decisions. Significant for PickMaster is its ability to separate configurations for fixed data about the characteristics of the installation from dynamic and changeable process data. Based on the fixed data, various process applications can easily be built in an intuitive Windows environment. In this way, lines in and out can easily be moved and calibrated in the shortest possible time, subsequently allowing the user to resume production without further adjustments. The division of static and dynamic data in line and project files contributes to the PickMaster concept, offering very rapid resetting and resumption of production. This solution is specific to ABB.

“The intuitive and application-focused user interface also allows the end customer, without extensive training, to make changes off-line by adding and removing products while production is in progress – and to then implement these changes in production at a suitable juncture,” says Knobel. “Changes may concern new or altered products and palletizing patterns or new visual identifiers, for which it is sufficient to place the product concerned in front of the camera to begin. By ‘no robot specialist needed,’ we mean that our customers are relieved from the necessity of creating long robot programs that are difficult to maintain by instead being offered an intuitively generated, reusable concept for straightforward configuration. At the same time, we do not close the door on more advanced modifications through several flexible user interfaces and the completely open RAPID code.”

**PickMaster 5 for palletizing** supports installations with one or several robots working in relation to combinations of multiple stations with lines in and out delivering and feeding diverse box dimensions in a large number of different packing formats. The software serves the entire chain from object definition to the optimal selection of palletizing patterns, building up entire stacks of pallets and intermediate layers, and calculating the best and most efficient robot movements.

“PickMaster shortens installation times considerably and provides secure production and reliable results with the highest level of equipment utilization.”

Henrik Knobel, ABB

With the optimal use of advanced robot grippers for picking groups of products and setting them down in one or more stages, right up to optimized sequence control, PickMaster is able to cope with several different products in various product zones. Compared with the previous eight, the program now supports 16 robots. The program's built-in flexibility, scalability and user-friendly interface facilitate uninterrupted operations that take only seconds to change.

“All production changes with time. This may involve new products, additional shifts or more robots. PickMaster provides margins for change and means that changes take almost no time to implement. PickMaster shortens installation times considerably and provides secure production and reliable results with the highest level of equipment utilization,” says Knobel.

The PickMaster 5 series is to be further strengthened in the autumn with a version that completely integrates picking, packing and palletizing in a single program. Together with the market's broadest range of ppp robots, PickMaster pieces together the vision of a global application solution for the entire packing process. ☉



By Benno Bork  
Photo trio group

Finnish company Orion chose an up-to-date robot solution, RobTeqCell, for its pharma packaging.

# Packing more with less

**Less packaging material and more efficient packaging have become a reality at Finnish pharmaceutical company Orion.**



Reinhard Bekel, area sales manager for Skinetta, says strength, flexibility and precision are what he looks for in a robot.

> Orion Corporation, the biggest pharmaceutical company in Finland, needed a new end-of-line packaging that would not only use less packaging material but also be extremely flexible in dealing with packaging in different formats. Naturally, it turned to its long-time supplier Skinetta Pack-Systeme, the end-of-line packaging specialists based in Ottobeuren in Germany.

“Working with Orion we were able to contribute our many years of expertise in conjunction with the most up-to-date robot technology from ABB,” says Skinetta’s area sales manager, Reinhard Bekel, who also shares responsibility for the development of new machines.

The system, which began operation in May 2005, is based on the new end-of-line packaging system RobTeqCell, which Skinetta unveiled in April at Interpack 2005. This flexible packaging

system can be individually tailored to accommodate restricted spaces and can be adapted to suit different factory layouts. Two ABB robots form the heart of the system and allow it to operate, without human intervention, in the smallest of spaces. Components to conduct additional operations such as weighing, labeling and scanning can be added to complement the standard functions of tray, wraparound and American case handling, product placing and inline palletizing.

Hansjoerg Niemann, CEO of Skinetta, explains what the company aims to achieve. “The more individual the product required by the customer, the more specific the demands made on the final packaging,” he says. “That’s why we concentrate on the development of modern packaging lines and machines that will

perform at the highest level.” In this spirit, he says, RobTeqCell was designed specifically for operations that would change frequently.

**The Orion system** is equipped just with an IRB 140, as the trays are still palletized manually. But it has been laid out in such a way as to allow an IRB 6600 to be easily integrated, should the need arise. The 6-axis IRB 140 was chosen for its flexibility, high acceleration, large working area and high load capacity. The robot is open-structured, which was specially designed for flexible use. In addition, the bend-back mechanism of its upper arm and the 360-degree rotation of its first axis was key.

At Orion, collapsible boxes are packed in trays. The products are transported from a packaging machine to a handling station where the boxes are grouped and aligned. Meanwhile, in parallel, a tray is made available to the robot for loading by a tray erector. The IRB 140 takes the number of products needed from the handling station and places them in the tray in the configuration required. For this it uses a vacuum gripper, also developed by Skinetta, which can be turned off segment-by-segment. Three grippers are available for the 10-box format. Once the tray is loaded, it is transferred onto a conveyor belt and carried away.

One of the most important specifications for the new system was that it should reduce the amount of packaging material needed. “With the help of the robot, which enables us to use any number of configurations, we have made it possible to pack 10 different formats of collapsible box in only three different tray sizes,” says Bekel.

A further advantage of the Orion system is its capability to change formats rapidly. This can be done in only three minutes, which is several times faster than on conventional systems of this size. With two or three format changes a day required, this means a considerable amount of time is saved. “This was a further advantage for us when we were deciding which company to go with,” says Bekel. “The others competing for our business were offering only conventional solutions.”

Bekel adds that ABB robots impress him particularly for their user-friendly IRC 5 controller, for their high fatigue strength and for their precision.

“ABB is still making robots out of steel, which is highly regarded by us because of its strength and its minimal vibration,” he says. “The robots’ precision is excellent.” On top of that, he says, when you work with ABB, you’re working with the biggest robot producer in the world, the one with the longest experience.

Bekel sees a bright future for Skinetta’s robot-aided systems. “We’ve got several projects waiting for decisions at the moment,” he says. ☉

## > FACTS

### Key advantages

The new end-of-line packaging system at Orion Corporation offers valuable advantages:

- Format change in three minutes, saving time and money
- Individual tailoring for different space and factory layouts
- A reduction in the amount of packaging material required
- High precision and user friendly controls.

### A flexible system

The RobTeqCell typically comprises the following components:

- Infeed and collation
- Case and tray erecting
- Case-loading station
- ABB IRB 140 robot for packaging operations
- Control panel
- Top lid magazine
- Case handling
- Duplex palletizer
- ABB IRB robot for palletizing operations.



### Skinetta - packaging know-how “Made in Ottobeuren”

Skinetta Pac-Systeme GmbH & Co.KG develops and produces packaging machines and lines for the pharmaceutical, cosmetic, food and non-food industries. The company has some 120 employees worldwide. Its range of products includes packaging machines and lines as well as complete concepts for end-of-line packaging for foil, cardboard and pallets.

By Åke Madesäter/Åke Bergstrand  
Photos Lasse Fredriksson

# Meeting meat crate needs

Robots help meat crates get where they need to go for food retailer ICA in Sweden.



> It isn't easy supplying meat to Scandinavia and the Baltic States. For Sweden-based food retailer ICA AB, it means smart logistics and proper handling to make sure the stores, restaurants and institutions the company supplies get what they need.

Since the end of 2004, about 70 percent of ICA stores in Sweden have been receiving meat ready-packed from an ultra-modern facility in the city of Västerås. The facility includes eight large ABB robots and four gantry robots from Cimcorp, which have a combined capacity of as many as 65,000 returnable crates per day. That is the equivalent of 270 metric tons of meat.

ICA cooperates with Hilton Food Group, a major meat supplier, whose meat plant in Västerås is situated adjacent to ICA's robot facility. Pre-butchered and thoroughly tenderized meat is cut into small pieces and placed in consumer packs (trays), which are then placed in returnable crates. This is done in a hygienic and carefully controlled manner at low temperatures. From Hilton Food, the returnable crates are delivered to the robots, which place the plastic crates on dollies. These are sent by truck to ten ICA distribution centers in Sweden. From there, deliveries are made to the stores, which remove the meat packs from the returnable crates.

One of eight IRB 6600 robots stacks meat crates for ICA in Sweden.

**Each robot cell** must be highly flexible and able to cope with a number of different tasks. All of the crates are equipped with machine-readable codes that allow the robots to “know” where they are to be sent. The robot places filled crates of meat at set places within the cell, which can accommodate a total of 60 stacks. A dolly can carry two complete stacks, each containing six to ten crates. When the robot has completed the stacks for a dolly, it lifts out the stacks and places them on a conveyor, which carries them to a unit where they are raised and placed on a dolly. The dollies are then given an address label and strapped before being taken out to a cooled loading bay where they are briefly assembled before being loaded onto transport trucks.

“Twenty-four people are employed at the facility, carrying out the types of tasks not suitable for robots,” says Christer Käll, supervisor for the facility where the robots are located. “I don’t think it would be humane to have people doing the robots’ tasks. They would have major problems with work-related injuries due to all the heavy lifting in the chilly environment. But with an investment of 50 million Swedish kronor in robots and related equipment, we can do the work that would otherwise have required more than 100 people.” In other words, it’s a profitable investment, both economically and ergonomically.

**ICA’s database stores** all information about the packages, from the raw material to the store. This means that all of the meat can be

### About Swisslog

Supply chain system provider Swisslog’s headquarters are in Switzerland. Its main office for northern Europe is in Gothenburg, Sweden. The company employs 1,850 worldwide, including 130 people in Sweden, Norway and Denmark. Swisslog has installed logistics and integrated supply chain solutions for customers in 50 countries.



traced throughout its journey from the farm to the dinner table. With short transports at the right temperature, the quality of the goods is maintained, while the whole handling process becomes rational and cost-efficient.

“We want to ensure that consumers get value for their money. For this reason, we seek to safeguard our brands and our customers,” says Käll.

The fully-automated sorting system was designed by logistics company Swisslog, which secured the assignment from ICA despite fierce international competition.

“Following a brief period of testing, we were able to turn over the entire facility as planned at the end of 2004,” says Swisslog’s project manager Jan Fagerberg. “We were responsible for light goods conveyors, robot cells, control systems, labeling, software and start-up.” ☉



### >FACTS

#### Why automate?

ICA has received a number of benefits after installing eight IRB 6600 robots:

- Huge cost-savings with robots doing the work of 100 people
- Health and safety of workers no longer at risk due to heavy lifting and working in a cold environment
- Flexibility of robots means they can handle a variety of tasks

“I don’t think it would be humane to have people doing the robots’ tasks.”

Christer Käll

### >FACTS

#### ICA Facts

ICA AB is owned by ICA Förbundet Invest AB (40 percent) and Royal Ahold N.V. (60 percent). One of the Nordic region’s leading retail companies, ICA has approximately 17,000 employees and more than 2,600 stores in Scandinavia and the Baltic States. The company also distributes goods to restaurants, institutional caterers and convenience stores.

# This is not a robot.



## It's a packaging machine.



Introducing robot-based automation is the fastest way to build new packaging machines. By complementing your new or existing packaging line with ABB robots, you can cost-effectively improve performance, up-time and reliability. All with increased flexibility to quickly adapt to changing needs.

ABB has the broadest product range in the packaging field, with dedicated robots for picking, packing and palletizing. All of this speed and efficiency is controlled through advanced yet easy to integrate and use software. ABB also brings a comprehensive network of best-in-class machine builders and system integrators to help deliver your optimal packaging solution.

For more ideas on food, beverage, pharmaceuticals and personal care product packaging, please visit [www.abb.com/robotics](http://www.abb.com/robotics).

The **heart**  
of Robotics



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