


 Tetra Pak

HAVE YOU HAD YOUR MILK TODAY?

Milk is good for us. This bit of wisdom is handed down by our parents and teachers when we are children. This high-quality product is an important source of the basic nutritional needs required by the body, but only when it contains sufficient vitamins and minerals. In order for milk to arrive to our refrigerators as fresh as possible, milk packaging plays an important role. For example, milk packaging shields milk from the effects of light; investigation has shown that light reduces the vitamin concentration in fresh milk. Light also accelerates the oxidation of unsaturated fatty acids, negatively affecting the taste.

From Product Processing to Distribution

In 1952, Tetra Pak became one of the first packaging companies to begin manufacturing milk cartons. Today, they have risen to become one of the largest worldwide providers of packaging systems for all kinds of foodstuffs. Almost everyone recognizes their cartons, especially since Tetra Pak produced an unbelievable amount of them – 100 billion – in 2003. If these packages were to be divided among the entire world population, every man, woman, and child on the planet would receive 15 packages! In addition to manufacturing these cartons, developing the machines which prepare the products to be packaged is also a core part of Tetra Pak's business. Tetra Pak is the only company in the world that can provide food and beverage manufacturers with integrated solutions and systems which cover the entire production process – from processing to packaging and distribution.

Tetra Pak R&D Introduces a New Packaging Machine Generation

As with the packaging materials, Tetra Pak also sets the standard for the packaging machines themselves. In keeping with this, the Tetra Pak R&D department has set a new goal: the development of a completely new automation solution

for an entirely new machine generation that totally integrates motion and control tasks. To keep costs low and performance high, the system architecture must have a high degree of scalability for many types of different machines. As for the software – designed by Tetra Pak – it needs to be standardized and must be able to be reused systematically. This requires a suitable software tool which supports this kind of development.

Electrically-driven Machine Sequences are a prerequisite

Electrically-driven machine sequences will allow complex demands to be met in addition to the various requirements of different users. Depending on the product, packages must meet varying demands: different forms and sizes, increased shelf life, heat-resistance, the ability to be resealed and stacked, low weight, etc. These different variables for each individual end-product also cause the demands on machine flexibility to rise accordingly. Machine functions that are partly controlled mechanically are not able to reach this goal economically. Readapting machines to manufacture different end-products would take too long and, in some cases, would be impossible. Introducing electrically-driven axes in all areas of the machine provides the freedom needed for customers, the

actual users of the packaging machines, to modify production to meet their own requirements. New challenges naturally result with regard to the mechanical construction of the machine. Together with

Tetra Pak R&D breaks new ground in control cabinet design: an integrated automation solution by B&R with local and remote control, drive and visualization technology allows the flexible construction of mechatronic modules. Complex machines with more than 50 coupled axes are implemented on the basis of ETHERNET Powerlink.




the software they use, modern packaging machines represent a classic implementation of “mechatronic technology”.

A Stringent Evaluation Period

Potential providers of this new automation solution had to be able to meet precise testing guidelines that reflected the many complex situations that occur during the daily operation of packaging machines. Testing ordinary high-speed machine cycles and behavior during unexpected power failures are just two examples used from the evaluation library. Representative reaction tests in worst case scenarios involving the control and motion systems documented the timing stability and the ability to precisely repeat control and motion tasks. Motion specialists particularly emphasized the control performance of electrical drives when motors were placed under extreme stress. The entire test comprised 48 real axes, 24 virtual axes, 1,024 digital inputs/outputs, and 176 analog signals.


The ETHERNET Powerlink Solution

As early as 2001, B&R distinguished themselves from a long list of other well-known automation providers thanks to their innovative ETHERNET Powerlink real-time communication solution. Although this system was brand-new at that time, it was fully functional and ready for service. In addition, the Tetra Pak R&D department realized that this solution had amazing potential. Their entry into the ETHERNET Powerlink Standardization Group (EPSG) was one indication that this leading worldwide manufacturer of packaging systems expected great things from ETHERNET Powerlink in the future.


The entire new machine generation is now being developed based on the new automation solution. The concept has already proven itself on the first machines. This is sure to be a lasting working relationship. 



Anders Sundberg,
Senior Motion Control/Mechatronic Specialist,
Tetra Pak R&D


 **Mr. Sundberg, the Tetra Pak R&D department has set a goal of developing a completely new automation concept for packaging machines. Tetra Pak R&D had decided that the new automation concept should be based on an integrated control solution with standardized interfaces. At that time, it was still completely open as to whether ETHERNET Powerlink could prove itself on the market. Wasn't the decision to use a design with this new technology risky?**

Sundberg: It was definitely risky. However, successful research and development makes it a point to be farsighted, and the risk could be estimated based on the results of comprehensive testing. For us, ETHERNET Powerlink was a part of a package offered by B&R, and the complete solution was chosen as a result of an overall risk assessment.


 **How do you view your experiences with B&R so far?**

Sundberg: During the entire machine development phase, the employees at B&R really showed an interest in and responded to the feedback that we gave. In addition, they always implemented our instructions to the best of their ability. Successful cooperation between

our team of developers and B&R can be seen in the functional efficiency of the new packaging machines based on this new design. Today, we are in a position to say that the complete integration of motion and control with ETHERNET Powerlink has proven itself.

 **How would you rate the level of technology used in B&R automation products?**

Sundberg: I would say that B&R is definitely ahead of the curve. For one thing, the highest performance demands are able to be met today using ETHERNET Powerlink. Not only that, but we highly value their precision and efficiency in the area of multiple-axes motion applications as well as the scalability of the system architecture. These things allow us to offer a complete system for compact, mid-size, and large machines.

 **What significance does Tetra Pak place on ETHERNET Powerlink becoming an international standard?**

Sundberg: This is extremely important to us and is the reason that we've decided to join the EPSG. Now we can play a role in and help shape the standardization process itself.

In 1951, Tetra Pak was founded by Dr. Ruben Rausing in Lund, Sweden. His founding idea was to form drink cartons from a tube. With a turnover of 7.543 billion euros, 20,900 employees all over the world provide complete solutions for product processing, filling and distribution. Over 100 billion packages are produced on Tetra Pak machines.

www.tetrapak.com

