In Focus

Working together for success
Partnerships, networks, best practices
A powerful package!

The new EGC electric axis – as a spindle or toothed belt axis – is setting new standards for power, dynamics, precision and smooth running. For loads up to 400 kg and strokes up to 8500 mm – try it for yourself!

www.festo.com
Dear reader,

Difficult times are the ultimate test of a solid relationship – in business life as well as in private life. So now is a good time to review your partners in the supply chain, to evaluate their performance with respect to their stability, their ability to keep promises but also their flexibility to adapt to a changing environment. How are we doing as Festo? Tell us so we can improve further.

The economic downturn requires more cooperation, because resources in all groups and companies are strained and big challenges must be addressed. Improvements are urgently needed. Improvements in efficiency along the entire process chain, from the selection of the right automation components in engineering up to stock management in the warehouse. You will find some ideas on how to increase efficiency in all of these areas further on in this issue. The importance of effectiveness also comes into focus. Improving machine performance, adding real value that the customer can count and feel is a must, and innovation is the key to that. So it is no surprise that in these challenging times the application engineering department of Festo is in great demand. Many companies are using the current reduced operational workload to redesign their machines for higher performance. Festo is participating in many such projects, adding our know-how of automation to the know-how of processes of our customers.

However, such cooperation always requires one important prerequisite: trust. You need the trust that your partners are really adding value to the partnership, that they are reliable and financially stable enough to survive, that they are interested in the long-term benefit of both sides and not just in a quick return for themselves. Such partners are not always easy to find. At Festo, we believe in this kind of partnership, it is what has made us successful. As a family-owned company, we think in generations and not in quarterly results. We believe that making you successful is our best option for the future. We believe in partnership, especially in these difficult times.

In stormy weather, the advantage of a professional team where everyone can blindly trust one another is even more evident. Let’s work together to catch the recovery wave!

Yours,

Ansgar Kriwet
In Focus: Trust and cooperation are vital in order to stay on course, and not only on the high seas. Industry partnerships are also becoming increasingly important. This means that projects which cannot be managed by one company can still be realised. In this edition of “trends in automation”, you will find descriptions of trends and expert opinions on this subject as well as many examples of successful partnerships.

**Compass**

In Focus: Close cooperation for innovation
Studies show that development partnerships are well worthwhile: they help to reduce costs and safeguard technological advances.

Wings, fins and flexibility
Bionic principles open up completely new possibilities in automation technology, as the latest developments by Festo show.
Impulse

Clever combinations
Mechatronic Motion Solutions combines pneumatic, electrical and servopneumatic components. The result is smooth production runs and easy cost calculations. ➔ 20

In Focus Cutting the cost of accessories
A partnership-based logistics solution helps Festo to help its customer optimise their component stock levels and reduce costs. ➔ 24

Step by step to greater safety
The new EU Machinery Directive comes into force at the end of the year. In Part 2 of our series “Safety technology” you will find ideas for implementing many safety functions. ➔ 26

In Focus Benefitting from a partner during a crisis
With Festo as their partner, customers can optimise their business processes and save money. Ten examples of best practices. ➔ 30

Synergies

In Focus Small country – great efficiency
The Netherlands is among the world’s largest agricultural exporters. This is all made possible by the latest automation technology. ➔ 32

Stronger than before
Two Indian machine builders are using the credit crunch as an opportunity for growth. Technology from Festo plays a major role. ➔ 36

In Focus Smart partnerships
Festo provided an expanded VTSA valve terminal to help Beck Automation AG with the development of a handling robot for an in-mould labelling machine. ➔ 38

Tripod for dynamic handling
Space-saving, flexible and fast – G. Ulmer Automation GmbH installed two Tripod handling units on an assembly machine ordered by an automotive components supplier. ➔ 40
Building bridges

The Millau Viaduct across the Tarn Valley in the south of France is without doubt one of the most impressive structures in Europe. It is the result of successful long-term partnerships, ranging from the design by the British architect Lord Norman Foster to the expertise of the suppliers and contractors and the labour of hundreds of workers from all kinds of trades. With a length of 2460 metres and a height of 270 metres, it is the longest and highest cable-stayed road bridge in the world and took more than 2.2 million working hours to build.
Compact and with a high flow rate

The compact solenoid valve VOVG with high flow rates can be used everywhere, whether for compact handling applications or for solutions demanding an extremely high installation density. It also displays its strengths in applications in the electronics or light assembly industries, for example those requiring high cylinder speeds together with a low minimum operating pressure achieved through high-performance dimensioning.

The solenoid valves in the valve range VOVG are available as single valves or for manifold assembly with a wide choice of functions. Its space-saving design enables direct on-site installation, thus reducing the amount of tubing required and boosting system efficiency. The cartridge seal system and spool principle provide a long service life and ensure high system availability. And what’s more, the VOVG can also be produced in application-specific variants.

Electric drives

Ideal for standard applications

The new electric toothed belt axis ELGR is intended for use in automation applications with comparatively modest demands regarding load capacity, dynamics and precision. Its cost-optimised design and easy-to-use end-position sensing for high operational safety open up a broad range of applications with a very good price/performance ratio.

The dimensioning software “Positioning-Drives” and the configuration software FCT enable fast commissioning of this complete solution. The open motor interface means that the axis can be connected not only to Festo motors but also to those by other manufacturers. One long slide and up to two extra slides can be used when a higher load capacity and more precise guidance characteristics are required.

Typical applications for this axis:
- Pick & place tasks
- Centring of packages on conveyor belts, using two slides in opposing directions
- Transport of small loads (< 15 kg)
- Pushing functions on conveyor belts
The EU Machinery Directive comes into force on 29 December 2009. It will affect not only machine builders of pneumatic systems but everyone who expands or modernises pneumatic installations or repairs them using non-original spare parts. Festo is offering a pre-assembled emergency stop control unit for stand-alone operation within a network. The unit makes it possible to activate a safety valve MS6-SV independently, link in emergency-stop command units and connect a light barrier or door protection switch. This mechatronic system conforms to DIN ES ISO 13849-1 and offers the following:

- Protection against unexpected start-up
- Category 4 safe exhaust function
- High performance level PL = e (SIL 3) in risk assessments

**Pre-assembled emergency stop control unit**

Category 4 safe exhaust function and protection against unexpected start-up are provided by this pre-assembled emergency-stop control unit.

**Valve terminals**

**Flexible and modular**

Flexible for use with individual sub-bases: the modular valve terminal MPA-L.

Up to 32 valves size MPA1 with flow rates of up to 360 l/min. can now be fitted on a valve terminal MPA-L. Its very light and corrosion-resistant sub-bases are made of plastic and can be used individually or combined in groups of 4. The valves can be actuated via multi-pin plug connectors or the CPX installation system for field-buses.

**Measuring relative or differential pressures**

There is often a need to measure and evaluate pressures in process and factory automation. Both can be done with the new analogue input module CPX-4AE-P, designed for use with the CPX terminal. Instead of using costly external sensors, which take up space and involve additional installation time, all that’s needed is a 4 mm tube between the measuring point and the pressure sensor module. The module offers integrated functions to IP65/67 and has several benefits, such as simple parameterisation, fast commissioning, and evaluation as absolute values in mbar, psi or kPa without conversion.

- Channel-oriented diagnostics – for reduced downtime
- Lower system costs – thanks to the link to fieldbus/Ethernet networks
- Pressure values and diagnostic data shown on LCD display

Input module CPX-4AE-P: available for measuring ranges 0...+10 bar or -1...+1 bar.
In Focus  Interview

Achieving more together

True professionals when it comes to networks and partnerships – the experts of the Fraunhofer Institute of Production Technology and Automation, in short the Fraunhofer IPA, located in Stuttgart, Germany, prove their worth every day. Prof. Engelbert Westkämper is the Head of the Institute, which is involved in around 300 development partnerships at any one time. In this interview, Prof. Westkämper explains why more progress can be made by working with a suitable partner than alone, and why partnerships in the automotive industry are not necessarily applicable as models for the machine construction sector.

trends in automation: Professor Westkämper, what are the characteristics of successful partnerships?

Prof. Engelbert Westkämper: In general, companies form partnerships in order to exploit particular competencies in the development and production of innovative products for the benefit of both sides. They enjoy the advantages that synergies can bring. The sign of especially successful partnerships is the creation of products and technical systems which could not have been achieved by one company alone, as special know-how is required in order to overcome the obstacles facing us nowadays. Partners share risks and operate without a hierarchy.

The automotive industry shows us how this can be done. OEMs increasingly require their suppliers to supply complete modules and systems directly to the assembly lines of vehicle manufacturers. Can this also be the future of machine and plant construction?

Westkämper: I am not sure that the partnerships and networks in the automotive industry can be a model for the machine construction industry. In machine construction the solutions are generally customer-specific and require close cooperation between the partners at the design stage. This means that trust and reliability play a very large part in every project. The high level of individual solutions together with the small quantities involved demand flexibility and adaptability. I believe that partnerships in the machine construction industry are more like relationships between neighbours in which each partner supports the other to the best of their abilities and avoid exploitation.

What partnership or networking project are you most concerned with at the moment?

Westkämper: At the moment, we are working hard to compete successfully in a competition organised by the German Federal Ministry of Education and Research (BMBF) to encourage partnerships and innovation between science and business. We are striving to create a new generation of machines and a new type of production system which will be characterised by technical intelligence as well as machines and an organisational structure that are capable of learning. Taking the motto of “Knowledge to Create Value and Safeguard Long-Term Production”, some 30 companies in the field of machine construction have already joined this project. The result is a regional network which has set itself the ambitious target of developing and marketing the factories of the future on a partnership basis. With our newly founded association, “Manufuture BW”, we would like to initi-
Engelbert Westkämper studied mechanical engineering at the University of Technology in Aachen (RWTH). After completing his degree, he spent the next eleven years as head of the Production Technology department of the MBB Commercial Aviation Division and of the central Production Technology department at AEG. In 1988, Westkämper accepted a position as professor and head of the Institute of Machine Tools and Production Technology at the Technical University of Braunschweig. Since 1995, Prof. Westkämper, together with Prof. Alexander Verl, has been joint head of the Fraunhofer Institute of Production Technology and Automation (IPA) in Stuttgart and a professor and director of the Institute of Industrial Production and Factory Management (IFF) at the University of Stuttgart.
ate developments in production technology that will be recognised worldwide.

You are currently participating in the “Manufuture” network. What are the aims of the partners in this network?

Manufuture is a European technology platform which aims to bring production research in Europe back up to a level appropriate to the economic importance of European industry. We have already achieved quite a lot through working with industrial companies and associations. Companies hope that this project will generate ideas for their own developments which will lead to greater competitiveness and safeguard the long-term future of their production operations. Many partners hope that Manufuture will produce practical innovations, not only because of pressure from European legislation but also because they recognise that greater efficiency means competitive advantages. In our various preparatory discussions, we noticed great enthusiasm for subjects such as energy saving and intelligent production systems. At the same time, many partners regret the fact that it takes a long time to progress from ideas to concrete projects. In order to reduce this, we have founded a European research association called EFFRA (European Factory of the Future Research Association), which a number of leading companies in the state of Baden-Württemberg have already joined. Festo has played a major role in planning the strategies and initiatives right from the beginning.

Ideally, what form should a partnership between customers and suppliers take?

Westkämper: Ideally, a partnership should be characterised by mutual trust and the will to develop something unique and new. Partners should foster a climate of innovation and technical creativity. Together, partners can achieve far more than as individuals. If partnerships also encompass the necessary breadth and depth of technological know-how, the partners will have nothing to fear from global competition.

In the course of your career, you have not always worked in research and teaching. How does your industrial experience during your time with MBB and AEG benefit you now? Were partnerships also important during that period?

Westkämper: Ten years of working in industry provided me with a good basis for understanding problems and evaluating the potential of innovations. I also developed a feeling for what is possible despite widely-held ideas to the contrary. You cannot
acquire this experience in the academic field. With both companies, I worked in the field of production technology. This enabled me to build up a broad base of knowledge about production technology and business management which is still very valuable, even today.

A personal question: who or what inspires you in your work?

Westkämper: The large measure of freedom which I have and the opportunity to work with young engineers, who are always enthusiastic about new things, make my work enjoyable, despite the heavy burden of my numerous responsibilities at the University of Stuttgart and the Fraunhofer IPA.

Finally, a question about your private life: what do you do in your free time, do you have particular hobbies?

Westkämper: My hobbies are hiking, cycling and reading. Unfortunately, I have very little time for any of these!
**In Focus  Innovation partnerships**

**Close cooperation for innovation**

**At a time when all costs** are being critically examined, research and development budgets are also coming under pressure. It is therefore no surprise that more and more OEMs are working with expert from among their suppliers in order to develop innovations. This allows costs to be reduced while ensuring that companies do not miss out on new technologies.

In many companies today, the conflict between the need to innovate and to reduce costs is sharper than ever before. On the one hand, consumers are less willing to forego the latest technological developments, while on the other, many R&D budgets have been heavily cut back as a result of the credit crunch. One way out of this problem, and one which is being increasingly followed in many areas of the mechanical engineering industry — particularly the automotive industry — is development or innovation partnerships. This means that know-how and resources can be concentrated and results made available quicker.

What is the current situation with such cooperation models? What kinds of partners are preferred and how will the trend continue in the years to come? A study has provided some interesting answers.

**Who is working with whom?**
The study showed, for example, that partnerships are mainly formed between companies who are already in a customer/supplier relationship. In addition, the major form of partnership is one which aims to optimise or restructure production processes, while up to now there has been less demand for other forms of strategic cooperation, for example in purchasing or logistics. Over 80 percent of those companies responding to a survey by the business consultants Capgemini stated that they cooperate with suppliers in order to make development and production processes more cost-efficient. However, a desire to protect their own know-how has made many companies suspicious of broader strategic partnerships.

**Are the desired objectives reached?**
Particularly companies which are successful innovators show that many objectives

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**Importance of partnership with**

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<th>Component suppliers</th>
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<td>Specialist technical service providers</td>
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<td>System suppliers</td>
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<tr>
<td>Other research institutes</td>
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<tr>
<td>High-tech start-ups/spin-offs</td>
<td>3,29</td>
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<td>Competitors</td>
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**Most innovation partnerships** are based on an existing customer/supplier relationship.


**Effects of innovation partnerships** on companies with a high/low rate of innovation success

- Higher sales
  - 1,1
  - -0,1
- Higher profitability
  - 1,1
  - -0,2
- Greater market share
  - 1,0
  - -0,1
- Date for market launch achieved
  - 0,9
  - -0,2
- Lower costs
  - 0,5
  - -0,2

In many cases, innovation partnerships lead to higher sales and profitability and faster times to market. Source: Capgemini 2007
can be achieved through partnerships. In most cases, these companies have been able to increase sales and profitability, expand their market share and reduce costs through partnerships. Furthermore, most of the companies surveyed were positive about the future: around three quarters wish to continue the cooperation with their partners. The reasons why companies would like to consolidate their partnerships are above all the stronger position relative to their end users and the knowledge that they can call on the additional resources of their partners.

Partnerships do not run themselves

However, not all development partnerships run smoothly. In around 30 percent of cases, a planned market launch date was not achieved despite entering into a partnership. The greatest problems with existing partnerships were unclear roles and areas of responsibility and the increased dependence on suppliers. The fact that 56 percent of respondents mentioned high coordination costs shows that attention must also be paid to efficient management of a partnership.

Looking into the future

In conclusion, innovation partnerships must be judged by the degree to which costs can be reduced, intellectual property protected and risks shared. The main benefit of cooperation is clearly in the classic areas of engineering, such as initial development, product development and design. It remains to be seen whether – against the background of extreme market conditions – partnerships will also become beneficial in logistics, production and assembly.

Important motives for cooperation with suppliers

- Lower costs: 80%
- Making up for lack of know-how: 68%
- Safeguarding production capacity: 63%
- Sharing business risks: 34%
- Implementing standards: 24%
- Improving image: 10%
- Access to new markets: 7%
- Other: 12%

The main aim of partnership projects is to save money. Long-term objectives play a subordinate role. Quelle: Capgemini 2007

Innovation partnerships involving companies with high/low level of innovation success

The main emphasis in current partnerships is on classic engineering functions.

Source: Capgemini 2007

The most common reasons for problems with cooperation involving suppliers

- Dependency on supplier: 61%
- High coordination costs: 56%
- Unclear roles/responsibilities: 49%
- Unclear objectives or definitions of objectives: 39%
- Lack of trust: 27%
- Lack of confidentiality: 24%
- Other: 20%

Clearly defined responsibilities and efficient communication are essential if development and innovation partnerships are to deliver the desired results. Source: Capgemini 2007
Wings, fins and flexibility

Festo’s Bionic Learning Network shows the company’s commitment to applying natural principles to industrial practice and to utilising the biomechatronic results of this process in automation systems. The focus is on completely new principles of operation that lead to energy-efficient innovations for the future.
The most impressive new product from the Bionic Learning Network – the association Festo has formed with leading technical universities, institutes and development companies – is without any doubt the FinGripper. This innovative gripper is the perfect complement to the BionicTripod and a successful example of how bionic design principles can be derived from nature to provide efficient flexible automation. The main distinguishing feature of the FinGripper is its adaptive grip. In other words, it adapts its grip to the object which it is picking up.

Fish fins provide the model
The gripper is based on the FinRay® principle, now being used for the first time in automation. This principle involves the reaction between lateral pressure and counterpressure, similar to the way in which a fish fin works. If pressure is exerted on a fish’s tailfin, it will move in the opposite direction to that in which the

The AquaPenguin shows how underwater technology could look in the future. These bionic penguins are autonomous underwater vehicles which can orientate themselves and navigate independently in a group.
efficient shape. Using their wings and movable parts of their heads and tails, they can manoeuvre even in the tightest of spaces, turn on the spot and swim backwards, which is something their biological originals cannot do. Equipped with 3D sonar, they can communicate with one another within a group and also with the outside world and thus avoid collisions.

AirPenguin

In the course of evolution, penguins have forgotten how to fly, but the Bionic Learning Network has managed to teach the penguins’ artificial relatives how to do this again. The AirPenguins are autonomous flying creatures with group behaviour. Invisible ultrasound transmitter stations cover a defined airspace which the flock of penguins can explore, either in accordance with defined rules or independently.

AquaPenguin

AquaPenguin and AirPenguin are two further biomechatronic developments by Festo. The natural creatures on which they are based are unusual in the bird world: they cannot fly but are very agile in water. The spindle-shaped penguins have a flow resistance which is 20 – 30% lower than that of the most efficient artificial flow body, while their wings are capable of elastic deformation and develop thrust highly efficiently. These two factors mean that penguins’ energy consumption is astonishingly low. This came to the attention of Festo’s Bionic Learning Network team, who designed the AquaPenguins – autonomous underwater vehicles. Just like real penguins, the mechatronic versions have a flow-efficient shape. Using their wings and movable parts of their heads and tails, they can manoeuvre even in the tightest of spaces, turn on the spot and swim backwards, which is something their biological originals cannot do. Equipped with 3D sonar, they can communicate with one another within a group and also with the outside world and thus avoid collisions.

FinGripper

The FinGripper – an innovative gripper – is the perfect complement to the BionicTripod and is a successful example of how bionic design principles can be applied to automation. Glue force is acting. Thanks to this mode of operation, FinGripper can even provide an answer to difficult handling tasks and can pick up fragile or irregularly shaped workpieces, such as light bulbs, and set them down safely.

Intelligent, adaptive gripping avoids the need for complex constructions in handling systems, for example, when sorting products of different shapes and sizes in the food industry. FinGripper is also ideal for pressure-sensitive components which need to be transported and placed without damaging them. With conventional grippers, damage to the workpieces being transported is inevitable. FinGripper, on the other hand, adapts to the external shape of workpieces without building up too much pressure. This means that BionicTripod and FinGripper can be adapted to a given application quickly and easily. The lightweight gripper consumes little energy and does not need a rigid, heavy-duty mounting – a truly unique selling point (USP).

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Three glass-fibre rods arranged in the shape of a pyramid – and made more rigid by cross braces – form the basis of the BionicTripod. By advancing or retracting the rods, the device can be guided in any direction. The Festo linear axis EGC and servo motor EMMS ensure that the electrical control and movement of the device is fast and precise. It is controlled via the well-proven robotic control software CMXR, which allows positions to be entered on a computer instead of mechanically. As a result, the new Tripod is very light-weight and thus consumes very little energy.

The working area of a Festo BionicTripod is several times larger than that of a conventional Tripod configuration, which means, for example, that pick & place functions with a 90° offset are also possible.

Aquapenguin and AirPenguin are bionic models that can have genuine benefits for automation systems. For example, the body and tail design of the penguins can be used in automation as a flexible Tripod configuration, opening up new applications for handling technology.

Bionics is a true (r)evolution

In the field of automation, factors such as flexibility, energy efficiency and light-weight relative to the mass to be moved are becoming ever more important. Nature shows us how we can achieve maximum performance with minimal energy consumption. With the help of bionics, Festo is identifying and developing new technologies to make automation technology even more efficient. Bionic principles have great further potential in factory automation, for example, for autonomous, flexible, adaptive and self-controlling processes. In addition to gripper technology, other areas of application include sensors and closed-loop control technology. Nature provides the inspiration for the development of decentralised, self-controlling and self-organising systems. It demonstrates new ways forward in mechanical engineering.
Clever combinations

Pneumatic, electric or servopneumatic, each drive technology has its own advantages and areas of application. A well thought-out combination of all three technologies – Mechatronic Motion Solutions – ensures smooth production runs and cost control. This also applies to the use of linear motor drives.
Mechatronic Motion Solutions is now making possible what was previously unfeasible due to the lack of interfaces or to incompatible interfaces – namely a free choice of drive systems and thus a non-technology-specific automation of all the types of motion required for components, modules and systems, no matter what the control system environment is.

All pneumatic and electric drives have the mechanical, energy and data interfaces to achieve this. What’s more, matching software packages facilitate reliable dimensioning and configuration, from selecting individual components to commissioning complex systems. This means that different technologies can be combined into a system which not only provides the ideal solution to a given automation task but also ensures maximum cost-effectiveness.

Festo’s comprehensive portfolio of Mechatronic Motion Solutions features linear and rotary drives, grippers and vacuum technology to cover all the types of motion and almost all the performance requirements of handling applications:

- Electromechanical and electrical positioning systems
- Gantry axes with toothed belt or spindle drive, cantilever axes
- Scalable motor and controller combinations
- Complex motion-control solutions with a wide range of interfaces
- Rotating and swivelling at angles up to 360°
- Wide choice of designs and performance classes for grippers
- On-site vacuum generation and suction grippers for all applications

All the above components can be combined easily and flexibly, thanks to uniform interfaces.

How much value creation do you need?
Mechatronic Motion Solutions supports customers in their efforts to concentrate on their core competencies and optimises their internal processes. Further advantages include the option to buy complete system packages and to speed up the time to market.

Make your own ...
Users determine the extent of their collaboration with Festo. They can choose from standard components, assemblies and modules and combine these themselves into single or multi-axis systems with the help of specially designed software tools such as “PositioningDrives” or FCT software. These allow fast, systematic solutions to be created that fit perfectly and match individual needs. It is of course also possible to combine individual components, such as a linear drive, with a motor from another manufacturer.

... or buy a ready-to-install handling unit?
The alternative to “make your own” is a fully assembled, ready-to-install and 100%-tested system produced by Festo to the customer’s specifications. The first step is a discussion with Festo;

How linear motors work
In a conventional electric motor (three-phase motor) a ferritic core with defined poles rotates continuously. Linear motors operate on the same principle, except that the electrical exciter windings are not arranged in a circle but are stretched out.

While in a three-phase motor the motion is produced by a rotor, in a linear motor it is produced by the carriage, which is drawn along the base by a magnetic field. In theory, a flat-bed linear motor could be created from any electric motor by sawing it open and rolling it out.
customers can work with Festo experts to develop an optimum overall solution and will then receive a detailed quotation. Once an order is placed, Festo will design and build an appropriate single or multi-axis system, then test it to ensure that all the required features are fully functional. And finally, Festo can also, on request, integrate complete sub-systems directly into customers’ machines and carry out commissioning.

**Linear motor drives – the acceleration champions**

Among the technological highlights of Festo’s Mechatronic Motion Solutions are its linear motor drives. With acceleration values of 125 m/s, they are ideal for high dynamics and maximum precision, as required, for example, in the photovoltaics, medical technology, electronics industries or for assembly of small workpieces in the watchmaking industry.

The new electric motor drives ELGL-LAS, DNCE-LAS and DFME-LAS accelerate at more than one and a half to four times the

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<th>Standard pneumatics</th>
<th>Servo-pneumatics</th>
<th>Toothed belt</th>
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Each drive technology has its specific technical characteristics. Mechatronic Motions Solutions gives users a free choice of the most suitable axis technology as appropriate to the main requirements of the application.
rate of other electric and pneumatic drives. They are also two to three times more dynamic than electric drives with screw or belt drive and at the same time offer an accuracy of 10 μm. This makes the linear motor axes perfect for applications requiring short assembly times, since these not only demand high speeds but also excellent dynamics.

All three linear motor axes are available as ready-to-use complete systems, including a motor controller SFC-LACI or CMMP-AS for the free setting of speed, force and position with various interfaces such as I/O or a fieldbus interface and the commissioning software Festo Configuration Tool (FCT). The linear motor axes incorporate all the necessary components, namely a linear motor, displacement encoder, guide and reference switch. This means that users only need to install the complete axes in their applications; laborious assembly of individual components is no longer required.

Dynamic and precise guidance with linear motor cylinders

The DNCE-LAS is an electric linear motor cylinder which has been specially designed for small loads. It allows positioning operations with short strokes in less than 20 milliseconds. Except for one long side, all the mechanical interfaces of the DNCE-LAS are the same as those of the pneumatic cylinder series DNC. The guided version, the DFME-LAS, offers maximum positioning precision and excellent dynamics with small loads. Both cylinder variants have a guide with an integrated grease reservoir, making them maintenance-free and giving them a long service life. Once again, the interfaces are identical to those of the pneumatic equivalent and thus fit seamlessly with the Festo modular mechatronic multi-axis system. This means that hundreds of freely selectable combinations are possible, both with other electric, pneumatic and servopneumatic drives and with components for gripping, assembling, rotating and positioning. Complete, ready-to-install handling systems can also be developed.

Air bearings with magnetic pretension make the ELGL-LAS precise, more rigid and insensitive to dry dirt particles. As a result, it is very hard-wearing and maintenance-free.

Air bearings – motion without dynamic friction

The flagship of Festo’s linear motor axes is the air-bearing axis ELGL-LAS. Permanent magnets create a powerful force between the carriage and the base of the axis. When compressed air is fed between the magnets and the base, the resulting air cushion generates a counter-force to the attraction of the magnets with the result that the carriage is lifted and can move without dynamic friction. The axis has excellent dynamics, both when positioned horizontally or vertically. It can be fitted with several carriages that can move independently.

The integration of linear motors into the Festo Mechatronic Motion Solutions system means that users benefit from an optimum relationship between technological performance and economy, even in applications requiring extremely high acceleration values. When there is a need for extremely high acceleration values of well over 100 m/s, there is no alternative to linear motors. The limit for pneumatic solutions is 30 m/s for pneumatic solutions, 50 m/s for spindle drives and 100 m/s for toothed belt drives.
Cutting the cost of accessories

**Tubing, fittings and other** pneumatic accessories are seldom at the forefront of users’ minds. They lie out of sight in a store or in maintenance workshops. However, they hide a considerable savings potential. With tailor-made services from Festo customers can cut their logistics costs without running the risk of running out of products.
Festo accessories, such as fittings and tubing, are not particularly expensive in comparison with other components in customers’ stores. However, when these so-called C materials need to be re-ordered, they generate the same process costs as A or B components. Festo is therefore offering a service package which considerably improves the logistics chain for accessories and noticeably reduces the costs of maintaining stocks. The service includes the planning of optimum order quantities and ordering frequencies and the generation of informative stock labels for a faster, error-free purchasing process.

Festo Logistics Optimisation Service
The Festo Logistics Optimisation Service consists of three product-support modules which reduce the costs of the purchasing process and maximise its reliability. In a first step, a Festo expert works with users to determine an ordering history for a particular operational area. Ordering frequencies and order quantities are identified as well as the range of products involved; then a list is drawn up of all the products required and the level of demand for them.

Analysis of ordering behaviour
One of the benefits of this list is that it significantly reduces the number of products being ordered. Customers can see at a glance which products are seldom or never used so that they can either be removed from the ordering portfolio or be replaced with other products. It is also possible to optimise order quantities and ordering frequencies. The following practical example shows the potential savings on process costs: a customer found that placing 45 orders, each for six standard silencers, generated process costs which were four times higher than for 10 orders, each for an average of 30 units.

Customer-specific stock labels
The analysis and subsequent optimisation of the range of products ordered and customers’ ordering behaviour provide the input for the special Festo stock labels. These show the optimum ordering quantity for the product in question and all the data which is of importance for the customer and Festo. Barcodes make this data machine-readable. Codes can be produced in all usual barcode and local languages, which means that they can be easily integrated in customers’ existing stock systems. The labels carry a product photograph which makes product identification much easier and greatly reduces the rate of errors.

Optimised ordering process
Re-ordering in a stores organised with Festo stock labels is very simple. A scanner is used to read the barcodes on the storage boxes of the articles to be ordered. The order number is recorded together with the optimum ordering quantity and this data is then transferred to the Festo Online Shop using a docking station or a USB interface. This virtually eliminates the possibility of incorrect orders. The goods are now ready to be delivered promptly to customers, who benefit from a lean, cost-efficient and error-free ordering process.

This shows how the Festo Logistics Optimisation Service can be used to reduce the costs and time required for re-ordering accessories. At the same time, the service ensures that users always have a stock of those components that they need at all times in the right quantities and in the right place. Word is getting around about these advantages; numerous Festo customers in Australia, Austria, Belgium, Finland, Germany, Ireland, Norway, Poland, Sweden and the USA are now using this service with great success.
Step by step to greater safety

The countdown has begun. By the end of 2009, every company in the machine and plant construction sector must implement the new EU Machinery Directive. It is therefore high time for all those concerned to know how to implement the Directive. Hazards in production equipment must be reduced, for example by introducing technical protective measures. In our series of articles, we provide a few ideas on how to implement different types of safety functions.

This model installation has been divided into five modules and will be used as an example to explain various safety requirements.
The problem now confronting many machine builders is that they cannot be sure that their present safety measures are sufficient to meet future requirements. For example, a risk analysis will have to be carried out for both complete and partly completed machines. Design, technical and informative protective measures must be implemented in order to reduce risk. The verification of these technical protective measures often requires extensive calculations. In this second part of our series of articles on safety technology, we will provide you with detailed information on ways to reduce risks in modules 3 and 4 of the model installation.

**Technical protective measures**
The illustration, although by no means representing all possible hazards, shows a number of typical hazards which can...
In various operating modes. Once all design measures have been exhausted, it is the job of the designer to implement technical protective measures (safety functions). These are always implemented in a similar way, i.e. using a sensor, logic components and outputs.

**Module 3**: The motions of the drives in the cutting station represent a hazard for the machine operators.

**Module 4**: Vertical motion on a production line often presents a risk of crushing for machine operators.

In the model installation, coated plastic sheets are cut into individual workpieces, which are then separated. The operator inputs the size of the pieces to be cut and a cutter blade on the XY gantry cuts the material accordingly. This work step represents two potential hazards: cuts and impacts. Firstly, the machine operator could be injured by the cutter blade as it rapidly moves back and forth; secondly, the moving XY gantry could lead to impact injuries on the hands, arms and upper body. The job of the designer is therefore to define suitable safety functions and implement these with the help of EN ISO 13849-1.

Safety function "safe exhausting" as an integrated solution: pre-assembled valve manifold modules exhaust safety-critical areas of the system after an emergency stop.
**Safe exhaust function**
How can the required risk reduction be achieved on this module? One idea would be to equip the station with a safety guard with a maintenance door in combination with an integrated “safe exhaust” valve manifold. If the maintenance door is opened, this device, supplied by Festo as a pre-assembled, fully tested system, reliably switches the drives to an unpow- ered state. This would, for example, enable a material jam to be cleared up safely.

A second possibility would be to fit a soft-start/quick exhaust valve type MS6-SV from Festo. This valve has an exhaust rate of 9,000 litres a minute, 1.5 times the pressurisation rate, and can exhaust safety-critical areas of a system after an emergency stop. The redundant two-channel design of the valve provides single-fault tolerance. This means that the installation will be exhausted safely even if one fault occurs on the valve. With this solution there is no provision within the system to vary the flow rate; this is done through the valve manifold.

**Braking and stopping**
Module 4 of the model installation could be used for a large number of applications, such as printing of the material or punching out shapes, or as a test station for the material. A common feature of all these operations is a vertical motion, which represents a possible hazard of crushing. In order to prevent any such injuries, stations of this kind are often equipped with a safety function aimed at “stopping a motion”.

This function could be provided by brake units and clamping cartridges for the drives. No matter whether there is an energy supply failure, stops for maintenance work or a pressure failure or drop-out – brake units type KEC-S can brake and hold the motion of Festo drives within precisely defined tolerances, using a clamping component which acts on a round bar by spring force. The brake units are able to operate over long periods, can withstand varying loads and are not affected by fluctuations in operating pressure or leakages.

We will conclude this series of articles in the next edition of “trends in automation”. The topics to be covered will include, among others, safety measures for module 5 of the model installation, a palletising and packing station.
Any company which attempts to fight off the current world economic crisis on its own will soon find that it is fighting a losing battle. The way to achieving a stronger position in this difficult market environment is for companies to ally themselves closely with partners, suppliers and customers and combine their efforts to optimise processes. Festo has given some thought to the current market situation and has developed a comprehensive range of measures which will enable customers to reduce their costs in real terms without endangering quality.

Cost-saving product innovations
Festo has developed a whole new series of products which can genuinely save process and product costs compared with conventional products. One example of this is the new self-adjusting cushioning (PPS) for pneumatic cylinders. In round cylinders with PPS, longitudinal slots on the inside of the cylinders guide the air away in a controlled way, thus allowing gentling cushioning right into the end positions. This design means there no longer is a need to intervene manually and thus makes commissioning considerably faster. For example, by using PPS the commissioning time for a package sorting machine with 60 stations can be reduced by as much as five hours.

Innovative materials, for example the PEN tubing, can also offer considerable savings. Thanks to new material technology and optimised production methods, the characteristics of this tubing are perfect for many automation applications.

Reducing complexity
Festo is also helping its customers to respond with greater flexibility to rapidly changing customer demands. The new VB valve series is a good example. It consists of one basic valve body but offers a wide choice of configurations for every application. Customers thus need to stock only one basic valve body; variants can then be created simply by plugging in the desired configuration.

Festo software tools are a great help in avoiding overdimensioning. The “PositioningDrives” software package, for example, enables the precise characteristic load values for electric drives to be calculated quickly and reliably. The design principle of “air to the top”, which caused increased operating costs in many applications, can now be consigned to history.
Machine and plant builders can also use the current recession to achieve technological leads in a way which would not be possible if they were working at full capacity. For example, now is a good time to change over to fieldbus technology – for any company that hasn’t already done so – without experiencing capacity problems. With its wide range of valve terminals and fieldbus protocols, Festo is the ideal partner for this type of modernisation, which can cut the costs of wiring and installation by up to 65%.

**Services and ready-to-install solutions**

The Festo Energy Saving Services such as Compressed Air Quality Analysis and the Condition Monitoring Services based on the CPX platform help to keep operating costs under control. What’s more, ready-to-install solutions are advantageous as they increase users’ liquidity. With its very wide and graduated range of products and services, Festo makes it possible to minimise the process costs of purchasing and to benefit from numerous additional services.

As every business area is subject to cost pressures, there is another Festo service that will be of interest to many users: the Festo Logistics Optimisation Service. Read more about this in the article on page 24 of this edition of trends in automation.

**Targeted training**

In times of economic downturn, experience shows that training budgets are under particular threat. Cutbacks on the “lawnmower” principle are, however, not the best solution. After all, it’s precisely when market conditions are difficult that companies need to review their processes and make these more efficient. Training can play an important role in achieving this. Festo offers its customer support in the form of a Training Requirement Analysis Service, which identifies appropriate strategic and efficient training measures.

Incorrectly specified products are a waste of time and money: the dimensioning tools from Festo (available free of charge) help users to get it right first time.
The land of windmills: more than 10,000 windmills were in operation in the Netherlands by the end of the 19th century.
Small country –
great efficiency

The Netherlands is among the world’s most densely populated countries. Nonetheless, the country is among the world’s three largest agricultural exporters. This is only made through maximum efficiency – both in terms of machines and equipment and in terms of managing the credit crunch.

The Dutch are extremely logical when it comes to crisis management. The Netherlands was one of the first countries to create a 200 billion euro rescue package for its banks. According to the German foreign trade agency “German Trade & Invest”, this puts the “little” Netherlands ahead even of Germany in the level of support provided to stabilise markets. Even when it came to nationalising banks such as Fortis Nederland and ABN Amro, the Dutch, normally regarded as free marketeers, were not slow to act. Doing business with Dutch companies therefore seems to be financially secure for the foreseeable future.

The segment of the Dutch machine construction industry which has the highest sales in terms of value (more than 3 billion euros a year); up until the credit crunch it had an annual growth rate of 5% in real terms. Activities range from biotech cultivation and harvesting through to the factory processing and packing of foodstuffs.

A broad spectrum

One leading player in the industry is the Visser Group. With over 40 years’ experience, the company combines modules such as stacking and destacking systems, transport and handling systems, packing machines, palletising units, conveyor systems, and systems for complete units. These units can be used to process and pack all kinds of products, such as fruit and vegetables, mushrooms, fish, meat, cut flowers, beverages, dairy products, confectionery, bakery products and chemical and pharmaceutical products. The latest example of enhanced efficiency through automation is a multi-purpose filling machine for tree nurseries to improve the planting process using individual pots and trays (carrier systems for several pots). The use of automated machinery of this
More than just windmills

Mechatronics is the driving force behind the strong development partnerships between Festo and the Dutch machine and plant construction industry – and has done so for over 40 years. These partnerships generate creative ideas such as robotic milking machines or robots for pharmacies. In addition, Festo Netherlands, with its headquarters in Delft, the home of the Royal House of Orange, also counts many well-known brands such as Campina, Heineken and Philips among its customers.

Dutch agriculture represents a vast potential as it accounts for 20% of the country’s total exports. “Tulips from Amsterdam” is not only a hit tune of yesteryear but also underscores the fact that the Netherlands is the world’s greatest exporter of flowers. The sorting of flowers is carried out using automatic handling machines equipped with Festo components.

“Automation also continues to make progress in the cowshed, despite the economic downturn,” explains Thomas Pehrson, General Manager of Festo Netherlands. Lely is the market leader in this field, thanks to its reliable milking robot equipped with a servopneumatic robotic arm able to withstand the harsh environment of a cowshed. Festo was involved in the development of this robotic system right from the start. In addition to conducting joint product development, Lely also had Festo train its staff in pneumatic automation technology.

A partnership between Wilee and Festo prevents confusion when handing out medication in pharmacies. A fully automatic system always picks the right medicine. This jointly-developed solution consists of a 3D gantry with electric toothed belt axes from Festo and includes a manipulator specially developed by Festo Netherlands.

www.visserite.com
www.lely.com
www.wileetechniek.nl

➔ kind is well worth it, as labour costs in the horticultural industry are even higher than the rapidly rising energy costs.

A multi-purpose solution for tree nurseries

“Like all Visser systems, the multi-purpose filler was the result of an enquiry from a customer,” says Cees Visser, one of the company’s senior managers. A Dutch tree nursery wanted a multi-purpose machine which could plant both round pots in six-packs as well as trays of so-called square top round base pots with box trees. Previously, planting machines had only been able to handle either pots or trays and it was always necessary to reset all the lateral guides, conveyor belts and drilling stations for the trays being used. The new development by Visser can do this without the need for resetting. It unstacks the trays and then the pots which are to be filled with earth.
The machine operates cleanly and uses less potting soil to plant the seedlings.

Multiple tasks
In the next step, a drilling machine makes planting holes in the earth in the pots into which a robot then inserts the plants. The pots and trays are then pushed onto a conveyor belt, which transports them to their place in a greenhouse.

The machine operates cleanly and consumes little soil. A brush removes excess soil from the pots and ensures they are accurately filled. “With 9 inch pots, our machine operates to an accuracy of two grams,” notes Visser. The multi-purpose filler can handle 650 trays per hours; with 20 pots to the tray, this is 13,000 pots an hour. According to Visser, no other potting machine can achieve this speed.

Fewer operators, faster commissioning
The multi-purpose filler requires on average only 2.5 operators: one minds the machine, one operates a forklift truck and a “floating” employee fills up the machine with potting soil or pots. Without automation, three times the number of operators would be needed for the same work. What’s more, the prototype operated trouble-free after only two days, whereas a six months’ adjustment period is normally required. It’s thus not only the machine’s operating features but also its ease of commissioning that make it highly efficient.

The flexibility of the box tree planting machine is a good example of the engineering work by the Visser Group. No matter whether it is for filling, sowing seeds, planting, sorting using a vision system or watering, the Visser Group finds high-performance solutions for global agriculture across all five continents.

A modular system for individual solutions
What is Visser’s recipe for flexibility and success? Visser combines standard machine modules again and again to create new customer-specific machines. These incorporate pneumatic valve terminals MPA from Festo, which are ideal for Visser’s modular system since they are themselves modular and can thus be flexibly expanded, depending on the number of drivers and grippers used. Moreover, service units from Festo’s MS series are also used to ensure that the Visser machines never run out of air. With this series, too, the “M” stands for “modular”. These products are important aspect of Visser’s system concept.
“Bad times are bad for many and good for some.” This quotation from the marketing guru Philip Kotler can also be applied to the two Indian companies EEL India and Manugraph. These are among the few companies which are in such a good position that they may well emerge from the worldwide economic and financial crisis stronger than ever before.

Packaging and Printing Industry in India

Stronger than before

“The dusty environment of cement works, nothing would be possible without heavy-duty pneumatics,” says Chander Sethi, Services Manager at EEL India.

The model for success: thanks to its “Roto-Packer”, EEL has quadrupled its sales in two years.

Precise filling: an MFH solenoid valve and a pressure regulator enable EEL customers to fill cement sacks with exactly 50 kg, even when the air quality is poor.
Both EEL Limited, a manufacturer of packaging machinery, and the printing machinery manufacturer Manugraph have a market share of around 90%, making them real “kings of the castle” in their home market of India. They also export large numbers of machines to emerging and developing countries in Asia, Africa and Latin America; but it is their strong presence in their home market which has protected them from the worldwide economic turbulence and credit crunch which has affected so many export-dependent companies.

“Political pressure”
With an electorate of more than 700 million people, India is the world’s biggest democracy. The political parties themselves generate demand for printed material, since in recent years one party after another has founded its own daily newspaper. In addition, a parliamentary election campaign lasting several weeks increased demand for newspapers, election posters and pamphlets. This has meant that the demand for Manugraph offset printing machinery on the Indian market has risen still further in the last few months.

Ready-to-install control cabinets
How has Manugraph reacted to this constantly growing home-market demand? “By raising the proportion of components which we outsource to 90%, we have been able to reduce the throughput time for a printing machine from six months to two and a half,” reports Mohan Harshe, Factory Manager at Manugraph. “It was of course crucial for us to work with pneumatics partners who were absolutely reliable,” explains Harshe with regard to the choice of Festo as automation supplier. Shekhar Shashikant Patil, Area Sales Manager for the Kolhapur region with Festo India, describes the manufacturer’s pneumatics strategy: “Manugraph is more and more often turning to ready-to-install pneumatics in order to save time and money.”

Maximum quality, even in tough environments
EEL India Limited is enjoying similar success. This manufacturer of packing machines for cement sacks has benefitted from the Indian construction boom and was able to quadruple its sales between 2006 and 2008. It built 20 examples of its highly successful Roto-Packer in 2004. EEL now supplies 20 machines every 2 months.

In order to ensure that its machines deliver maximum quality even under the harsh conditions of a construction site, EEL also selected Festo as its partner. Chander Sethi, Services Manager at EEL, describes the advantages of Festo’s pneumatics products: “With an MFH solenoid valve and a pressure regulator, we are able to fill cement sacks with exactly 50 kg, even when the air quality is poor.” And poor air quality is to be expected in a dusty cement works.

EEL India Limited
Dundaheera, Gurgaon,
Haryana (New Delhi)
India
www.eelindia.com
Area of activity: packing machines for cement, chemicals, petrochemicals, fertilisers, sugar and rice.

Manugraph India Ltd.
Maharastra, India
www.manugraph.com
Area of activity: offset printing machinery using 4x1 and 2x1 systems for up to 70,000 pages per hour (“Smartline” model).
In-mould labelling (IML) is a smart solution for plastic packaging as the labels are applied to the packaging while it is being injection moulded. This saves time and money, since it eliminates the need for rework, subsequent printing of the packaging, internal transportation and buffer storage. With IML, labels can be changed without interrupting production. The process is suitable for both round and square-shaped containers. IML is also flexible with regard to size: the robots from Beck Automation can work with containers of up to 40 litres.

The main reason for using in-mould labelling with food packaging is the need to have an attractive design while also including bar codes and mandatory information on the packaging.

One work step during injection moulding

The handling robots from Beck Automation pick labels from a magazine using vacuum grippers and place the complete labels (for side walls and base) in the mould cavity. The labels are rolled onto auxiliary cores outside the tooling before being transferred to the mould by a handling unit. The labels are positioned in the mould by static charges and are bonded at the same time as the packaging is injection-moulded.

With the IML process, the pneumatic functions of vacuum gripping and ejection are of key importance. “Under no circumstances did we want to use different components for vacuum generation and ejection,” emphasises Christian Beck, one of the General Managers of Beck Automation AG. The task of a possible pneumatics partner was thus clear: the two functions were to be integrated into one valve.

**Two functions – one valve**

This application was a spur to Festo to further develop its VTSA valve terminal and VSVA valve coils. The VTSA valve terminal combines the advantages of the compact CPV valve terminal and the modular MPA2 models. “In just six weeks, we were able to present a solution to Beck in which two valves were integrated into one housing,” reports Jochen Krinn, Festo Product Manager. The VSVA valves work with two pressure zones and allow reverse operation.

“Right from the start, we felt we were in good hands with both the staff of Festo Switzerland and those of the R&D department at Festo headquarters in Germany, and we therefore immediately agreed to act as pilot customers for the new valve,” says Beck. Festo product specialist Krinn explains the next step: “We defined the final product design together with Beck,
after incorporating many of their requests and suggestions for improvements.” The former special application product VSVA on a VTSA valve terminal has now become a catalogue product from which all our customers worldwide can benefit.”

More than just pneumatics
“As our business is international, it was important to us to work with an automation partner whose products are available quickly and worldwide via a comprehensive network of branch offices,” adds Beck, describing a further aspect of the partnership between his company and Festo. “The future of plant construction will be decided by customer service. This is why all our service technicians attended the “Service Ambassador” seminar offered by Festo.” During this seminar, the Beck service technicians acquired the necessary communication skills in order to be able to work confidently with international users and their different approaches. “It is not just a question of smart solutions, it is also crucial to deliver these to customers in an intelligent way,” concludes Beck.
Tripod for dynamic handling

“The Tripod needs less space and design time than a handling gantry and is also faster than a SCARA”. That is how Gerd Ulmer, General Manager of G. Ulmer Automation GmbH, summarises the advantages of the new handling system. He has installed two Tripod handling units on an assembly machine for the automotive components supplier.
On a machine which assembles safety relays for diesel engines, two Delta robots equip the relay bodies with seven to nine contacts, depending on the type of relay required. "The components were previously produced abroad and are now – primarily in the interests of better quality – to be produced on a fully automatic machine which includes automatic test stations," explains the client, a special machine builder. The machine comprises 24 stations and was ordered from Ulmer by a component supplier to the automotive industry.

**Quality awareness**
The machine comprises stations to test individual components and carry out continuity and high-voltage tests, tests of soldering flux dosing, monitoring of the soldering process and measurement of the contacts fitted to the relay bodies. "A large number of the assembly cells are test stations, with four integrated vision systems," explains Ulmer.

13 vibration conveyors feed contacts and other assembly components to the machine. It takes only 90 seconds for the contacts and semi-finished relay bodies to pass through all the 24 assembly stations and emerge as fully assembled and tested relay bodies in a process which includes spraying the bodies in an injection-moulding machine and printing them with the date of production. "To be precise, the machine produces four finished modules every 30 seconds, since that is how quickly the injection-moulding
Tripod robot system with CMXR

Precision control: the robotic controller CMXR positions tools and grippers in three dimensions and forms the basis for the ready-to-install handling system Tripod.

Thanks to its low moving mass and the high rigidity provided by the pyramid-shaped, enclosed design, the robot handling system is highly dynamic but at the same time more accessible than Cartesian handling systems or SCARA robots. The Tripod is actuated by the robotic controller CMXR, which is able to position tools and grippers in 3 dimensions. The tool tip is guided along the programmed path at all times, even if the orientation of the tool changes. Operation of the system is made easier by the optional hand-held terminal, equipped with a touch screen and keypad. And what’s more, the controller can be used, for example, to link in vision systems such as the intelligent vision system SBO...Q and thus also handle moving objects.

⇒ machine processes four workpieces,” says Ulmer, describing the performance of his machine.

Flexible and with easy teach-in

“It is also thanks to the Tripod that we have been able to produce around one million relays a year in three variants, working in shifts,” reports the system builder. One of the benefits of the handling system is its flexibility, which is easy to program using the Festo Configuration Tool (FCT) in combination with the programming language Festo Teach Language (FTL). “As we received the revised samples of the workpieces for series production very late from our end customer and needed to carry out all programming in-house, we found the uncomplicated and intuitive programming of the robot system very helpful when it came to modifying the functional sequence and component-fitting position at short notice.”

One million relays a year are produced reliably in different shifts using the Delta robot.

G. Ulmer Automation GmbH
Vaihinger Straße 13
74343 Sachsenheim-Hohenhaslach
Germany
www.ulmergmbh.de

Area of activity: special machine construction, automation technology.
Celebration and education

At the centre of the activities to celebrate the 50th anniversary of Festo Austria is a programme to encourage a new generation of technicians and engineers. Festo starts with the very youngest schoolchildren. "Leonardino" is the name of a competition for technically gifted schoolchildren aged 8-9 in Vienna. The aim of the project – for which Festo provided the schools with pneumatic experimentation kits – is to interest young boys and girls in physics and technology. The children enjoyed a journey into a fascinating world of experience in which they could carry out experiments to their heart’s content and through play become familiar with the phenomenon of air. The finale of the Leonardino Contest will take place in autumn in Vienna’s Technical Museum.

A complete success

Wolfgang Keiner, General Manager of Festo Austria, is delighted that this programme has appealed to the children and won the support of teachers: "It is great to see the kids at work; their enthusiasm is tangible. And for teachers it is also an exciting introduction to the subject of pneumatics."
The Environmental Technology Prize is awarded every two years for outstanding and innovative products in this field.

In June 2009, the Ministry of the Environment of the German state of Baden-Württemberg presented an Environmental Technology Prize for the first time. The winner in the “Measurement and Control” category: Festo Energy Saving Services.

This service enables users to analyse the energy consumption of installations and optimise their compressed air consumption. This helps companies to cut their operating costs and reduce the burden on the environment.

In her congratulatory speech, Environment Minister Tanja Gönner explained the jury’s decision as follows: “Machine construction is a vital part of the economy of Baden-Württemberg. Festo has recognised the signs of the times and through its Energy Saving Services is helping to further extend our international technological leadership to include energy efficiency. A clear gain for the environment and a worthwhile investment for individual users.”

WorldSkills in Calgary
A meeting point for trainees from all over the world

September 2009 saw the arrival in Calgary of the 850 best trainees from 48 countries and over 51 professions to take part in a competition. Gold, silver and bronze medals were awarded for every profession – for the best lathe operator, the best milling machine operator, the best cook, the best EDP specialist ... and for the world’s best mechatronics and mobile robotics team. Among those at the starting line were trainees from Festo, who had taken first place in mechatronics during Skills Germany, the national eliminator.

Festo is a founding partner and global sponsor of WorldSkills International. In addition to the mechatronics competition, which Festo has been supporting since 1991 as an organiser of this discipline and official supplier of competition equipment, the company has also been involved in the mobile robotics competition since 2007.

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VIP visitor
Thai Princess as a guest of Festo

In her home country of Thailand, Princess Maha Chakri Sirindhorn is also called the “Princess of Technology”. Her great interest in and technical knowledge of new technologies and the ways in which these can be used to bring about improvements in her country lead her to visit Germany on a regular basis. In July of this year, Her Royal Highness paid a visit to Festo headquarters in Esslingen.

The Princess took part in events in the Festo Technology Centre and in our training department. The main emphasis was on discussions about the latest trends in technical training. Festo Didactic has been working together with Thai training institutes for many years. Festo’s largest joint-venture project in Thailand was the Thai German Institute (TGI), founded in 1995.

This year there will surely be a reason to celebrate again – as there was at the WorldSkills 2007 in Japan.

Asampipongs Vitoon, General Manager of Festo Thailand, hands Her Royal Highness Princess Maha Chakri Sirindhorn a certificate recording the gift by Festo Didactic of a new technical training system.

Asampipongs Vitoon, General Manager of Festo Thailand, hands Her Royal Highness Princess Maha Chakri Sirindhorn a certificate recording the gift by Festo Didactic of a new technical training system.
The key to success

Saving time and costs in the production of keys and locks

Precision, speed and efficiency – these were the requirements of Chieh Yung Automation Corporation for the construction of a new machine for the production of keys and locks.

The company consequently chose the DGSL mini slide, which increases the cycle times of the machine from 12 to 20 cycles per minute while also ensuring a high degree of stability and improving capacity. Moreover, repetition accuracy was enhanced from 0.05-0.1 mm to 0.01-0.03 mm. Replacing the conventional valve with the VTUB valve terminal, which offers additional pressure sensing, individual valves and additional valves directly on the terminal, resulted not only in cost savings with regard to external wiring, but also time and labour costs for installation, maintenance and operation.

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Have you found some clues, Mrs. Steinlein?

Fortunately, as head of Festo’s Analysis & Diagnostics department, I am not called upon to investigate crimes. My department has the job of thoroughly testing new developments and special applications with regard to their materials properties. We also study components which have developed faults in operation in order to find out their causes.

However, a detective’s instinct is necessary. We must scrutinise components closely, analyse the composition and condition of their materials and draw conclusions from this. And, just like a forensic science laboratory, we use the latest technology in order to do this. With computer tomography, for example, we can very quickly and reliably examine components and measure them without the need to destroy them. One of the benefits of this is a further reduction in the development time for new products. A vital requirement in a study of material structure by photo-optical methods is the correct preparation of a microsection of the material concerned. The way a sample is taken must be appropriate to the purpose of the study. With our latest tool, a gas chromatography mass spectrometer, we can detect even extremely low levels of contamination in a component.

It is also very important for us to have information which is as precise as possible on the environment in which a component is used. In the case of special applications, we clarify in advance whether the intended material and design are suitable for the specific operating conditions. We may need to make on-site visits if the conditions are particularly difficult. For example, for an agricultural customer, we took measurements of the ammonia content of the air in the cowshed. Customers benefit from our work twice over: our analyses help Festo to develop products even faster and match them perfectly to a specific customer’s operating conditions, making the products more reliable. And if faults still occur, we can determine the causes of them quickly and precisely. This enables us, for example, to draw the customer’s attention to the fact that a particular grease or cleaning agent is not ideal for the product concerned and offer an appropriate solution.

Our conclusions are of course also incorporated into product development. Our 20 staff members in the analysis section carry out 800 to 1000 analyses every year and make the results available throughout the company worldwide. That way we ensure not only that any current problems are solved but also that Festo products fulfill customers’ requirements ever more precisely.”
Vision and reality!

Adaptive gripping: ideas from bionic textbooks turned into reality. For more efficiency in handling operations – as for example with our record-breaking, high-speed handling unit.
Working together to stay on course

In sailing, every action must be just right in order to tack successfully and for the boat to stay in the wind. Every crew member knows what he or she has to do. Everyone knows that he or she can rely on the others. Trust and reliability are vital, not only at sea but also when industrial companies work together to drive projects forward. Particularly in difficult times partnerships can help to keep companies on course. The yacht in the picture is from the legendary j-class which dominated the America's Cup in the 1930s. This boat, too, has survived many storms – as well as the hands of time. After being laid up in 1938, it was restored in the 1980s and celebrated its comeback to the high seas.