

trends in automation

The Festo customer magazine Issue 30

FESTO

Inspiration
10⁴⁰ variations
Behind the scenes at the new
Scharnhausen Technology plant

Impulse
Flexible transport
Multi-Carrier-System

Synergies
All in good taste
Automatically filling antipasti
specialities

In focus

Diversity

From diversity in nature to
production of multiple variants

A detailed, close-up photograph of industrial machinery, likely a robotic assembly line. The image shows various mechanical components, including metal frames, pneumatic cylinders, and a blue hose. The lighting is dramatic, highlighting the metallic surfaces and the precision of the equipment.

FESTO

You need maximum productivity.
You want excellent process flexibility.
We make sure your intralogistics are fit for the future.

→ **WE ARE THE ENGINEERS
OF PRODUCTIVITY.**

Productive flexibility

The revolutionary Multi-Carrier-System MCS® for highly flexible production guarantees individual movement and simple system integration.

www.festo.co.uk/mcs

Communication promotes productivity



Eliza Rawlings,
General Manager, Festo GB

Diversity is the key to a company's long-term success no matter what size it is. Different perspectives generate new ideas, concepts and strategies. Diversity gives companies the freedom they need to shape their future.

The new Scharnhausen Technology Plant in Germany enables us to better meet this demand for diversity in the future. The Scharnhausen Technology Plant as no other building, symbolises the future direction of Festo. It is an investment in customer-oriented, highly flexible production capacities, fast delivery and high quality. It also embodies our vision of the learning and research factory, where process-oriented employee training and the development of new products and production concepts go hand in hand. The networked production environment, energy-efficient organisation and integrated training at Scharnhausen will create a direct link to Industry 4.0. Federal Chancellor Dr. Angela Merkel, was also very impressed by the Scharnhausen Technology Plant when she visited in March of this year.

Our studies on SupraMotion give you an insight into the future of automation. Starting on page 14, you can read about the diverse range of completely new motion concepts based on the use of superconductors.

Diversity in nature is key to survival. Within a company people are the key asset to be developed and supported. Coaching is the tool to unleash the potential. See the article by Gary Wyles on page 22.

We hope that the diverse range of topics in this issue of trends in automation will provide you with inspiration for your business too.

Enjoy your read.

A stylized, handwritten signature in black ink, likely belonging to Eliza Rawlings.

Eliza Rawlings



In focus Diversity The richness of life presents itself in different ways – as seen here in the varying colours and shapes of the Caribbean brain coral. In this issue of our customer magazine we look at diversity in nature and in the world of automation. We cover topics including modular production, system design and an antipasti multi-filling machine.

trends in automation

Issue 30

Editorial → 1
Panorama → 4
Festo worldwide → 35

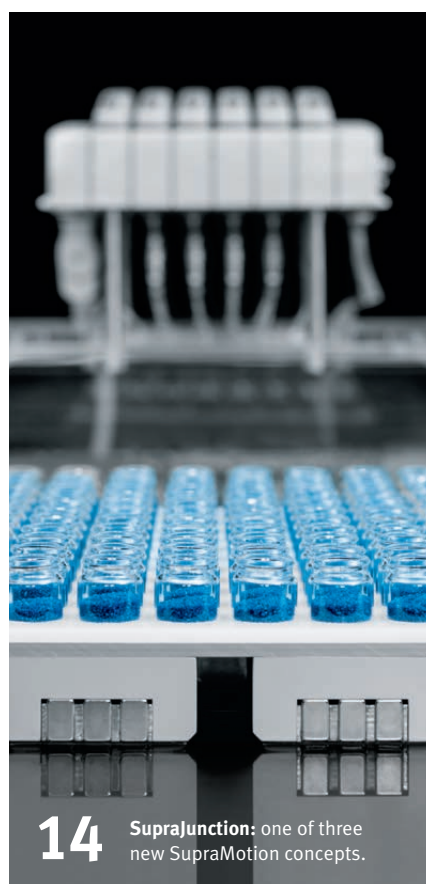


6 **Highly flexible:**
the new Festo Scharnhausen
Technology Plant.

Inspiration

10⁶⁰ variations

The new Festo Scharnhausen Technology Plant shows how flexibility and speed go hand in hand. The production range extends from manual production at the Customer Solutions Performance Centre to highly flexible, energy-efficient assembly lines. → 6



14 **SupraJunction:** one of three
new SupraMotion concepts.

Compass

SupraJunction & Co.

SupraMotion allows objects to be moved whilst levitating. Festo presented three concepts at Hannover Messe 2016. → 14

What is coaching?

Gary Wyles, Managing Director of Festo Training & Consulting, explores his definition of coaching and what it means in Festo. → 22



25 Compressed air: adding up the cost.

Impulse

Flexible transport

Multi-Carrier-System: this innovative transport system supplements traditional transport solutions and offers greater flexibility in production processes. → 12

Bringing energy efficiency into view

Gary Fuller, Training & Consulting Programme Manager at Festo, investigates why so many companies struggle to fulfil their energy saving KPI's. → 25



28 High precision with the compact handling system YXMx.

Synergies

All in good taste

Filling antipasti specialties such as peppers is time-consuming and expensive. A new machine from Karb Maschinenbau GmbH dispenses cream cheese automatically. → 18

Perfect curves

The “mini-dis” desktop machine from bdtronic allows high-precision dispensing processes for casting resin in a very small space – thanks, among other things, to the compact handling system YXMx. → 28

Handling viscous substances with precision

The Modular Sample Processor from global laboratory equipment manufacturer Anton Paar is a reliable solution for automated specimen preparation. The solution uses electric axes and control systems from Festo. → 32



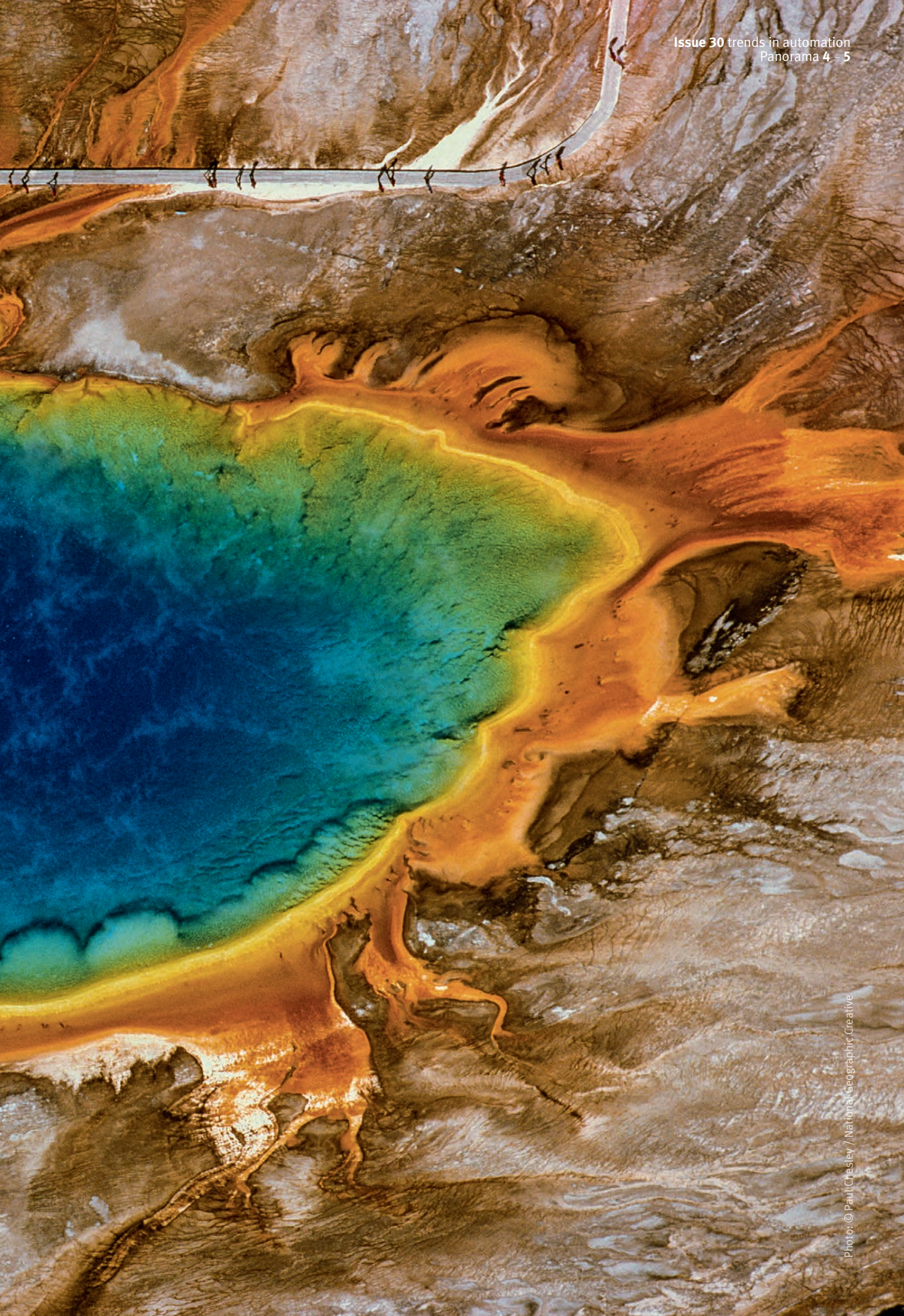
Nature's play of colours


A unique natural wonder awaits visitors to the western part of Yellowstone National Park in the US state of Wyoming. Grand Prismatic Spring is the largest hot spring in the United States and the third largest in the world. The basin measures approximately 75 × 91 metres and is 50 metres deep. The spring discharges an average of 2,000 litres of 71 °C water per minute.

Apart from its impressive size, what makes this spring so special is the range of colours, which resemble a rainbow. This is due to the single-cell microorganisms that

form a biofilm around the edges of the mineral-rich hot spring. They adapt to the water temperature and concentric circles in colours ranging from dark green to orange and red can be seen in the water depending on the ratio of chlorophyll to carotenoids as well as the time of year. The centre of the spring is free from microorganisms. The deep blue colour stems from the purity of the water in the centre of the pool.

177 years after it was first discovered by a group of trappers, Grand Prismatic Spring is today one of the top five hot spots in Yellowstone National Park.





Highly flexible assembly lines at the Scharnhausen Technology Plant

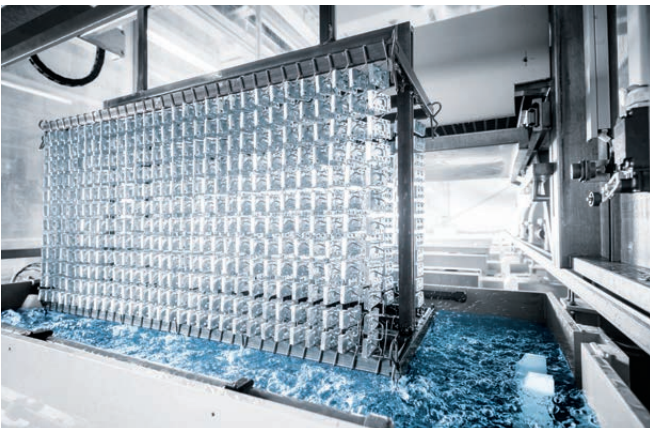
10⁴⁰ variations

Whether it is a batch size of one or an annual production volume of 2.5 million, the new Festo Scharnhausen Technology Plant shows how flexibility and speed go hand in hand. Industry 4.0 has been implemented wherever possible. Thanks to the synergy between manual production and modular assembly lines, the plant can produce 10⁴⁰ product variations.





Valves are automatically assembled in the production cells of the large modular lines.



The components are immersed in electroplating tanks to give them the necessary surface properties.

Machining department with electroplating

In an area covering 14,000 square metres, the highly automated production lines work around the clock to produce the basic parts for Festo components.

The new Festo Scharnhausen Technology Plant symbolises cutting-edge automation: 66,000 square metres, 1,200 employees, a sophisticated, highly efficient value chain, open communication with the Learning Factory and creative think tanks. Networked systems enable the first Industry 4.0 technology solutions to be created. Every day employees interact directly and safely with a flexible robot. Information and materials flow quickly, flexibly and reliably in seamless value streams.

Short routes

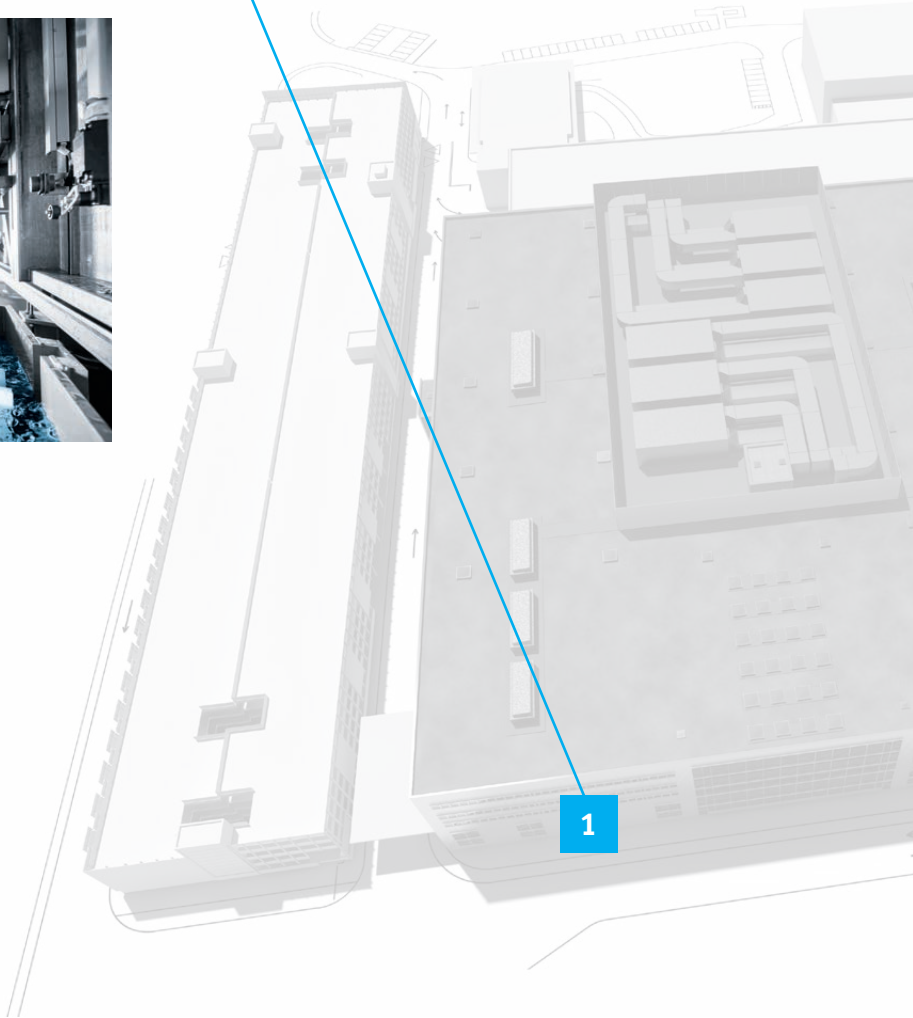
In the lean Technology Plant, the individual manufacturing processes are linked to each other by the shortest of routes. They are arranged so that, as far as possible, there is no need for interim buffering across warehouse stocks. For example, while some processes used to be distributed across several plants over a distance of 32 kilometres, they now take

place in a space measuring just 120 metres inside the Technology Plant. High-quality products, valves and valve terminals, electronic components and customer solutions are thus produced under one roof in a very short space of time.

In perfect shape

The Technology Plant is divided into four areas: (1) machining, (2) assembly, (3) electronics manufacturing and (4) customer solutions.

Metal-cutting machines weighing several tons stand in an area covering 14,000 square metres on the ground floor of the Technology Plant. Turning, milling, drilling and grinding – in the machining department, precision components made of metal are manufactured for further processing in the assembly process. The production lines work around the clock to produce the basic elements for Festo products, such as valve housings and individual components for linear units. They produce millions of valve sealing



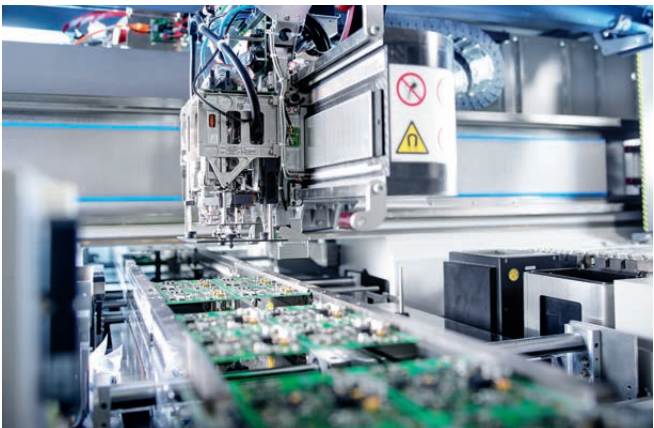


Electronics manufacturing

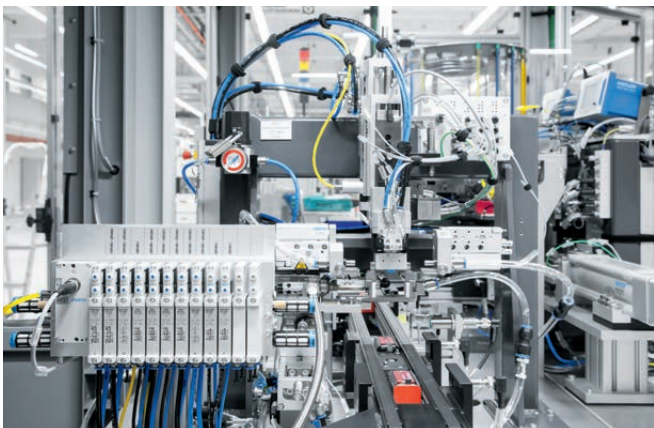
In an area covering 6,000 square metres, 200 employees produce complex electronic assemblies and products.

3

2



Fully mounted: the circuit boards are manufactured using the latest production and soldering.



Assembly

Small, compact solenoid valves VUVG are automatically assembled on state-of-the-art assembly lines.



The latest information technology is used consistently throughout the Technology Plant – for example, tablets are used for service, maintenance and monitoring energy consumption.

cartridges for valves per year and tens of thousands of valve housings per day. The components are given their surface finish in the plating tanks, which are housed in the same building.

Fully automated and manual

The production range of the Technology Plant extends from manual production at the Customer Solutions Performance Centre to highly flexible, energy-efficient assembly lines, such as the two modular assembly systems for manufacturing →

Human-machine interaction

Many of the aspects of Industry 4.0 – such as human-machine interaction – are already a reality in the Scharnhausen Technology Plant. The assembly robot grips housings, joins cartridges and frames together and passes the component on to a worker for further processing. Such teamwork poses no risk for the individual. Sensors continuously monitor all the robot's actions. It does this thanks to a specially developed plastic "skin" fitted with highly sensitive sensors. As soon as an employee comes too close to it, the robot slows down or just stops. Thanks to effective safety mechanisms, the robot does not have to be behind bars.



An employee works with the assembly robot in an intuitive and safe manner.



“The Scharnhausen Technology Plant has flexible, highly automated and energy-efficient production processes.”

Stefan Schwerdtle, Head of the Global Production Centre Scharnhausen

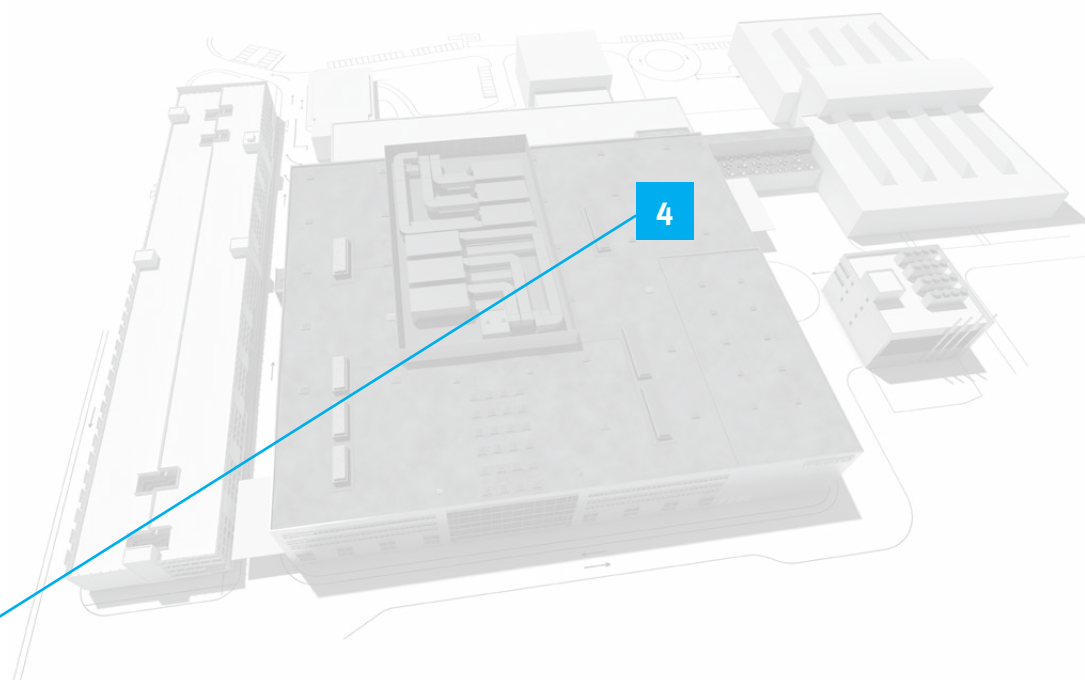
valves from the VUVG series. Here, eight production cells spread over 30 metres operate in sequence. Several million valves can be assembled annually, with cycle times of less than 15 seconds. Many of the company's own products and solutions are used here. In other words, Festo products are used to manufacture Festo products. Each line produces over 50 individual variations of different sizes, with 20 variations making up over 80 per cent of the total volume.

Manual work is still required when it comes to assembling the valves into valve terminals as well as for special solutions and single components for individual customer needs. Quantities vary from a

few thousand a year or a small batch of several hundred to just a single item. For some products, which have to be made according to individual customer specifications in a very short space of time, there may be as many as 10^{40} variations.

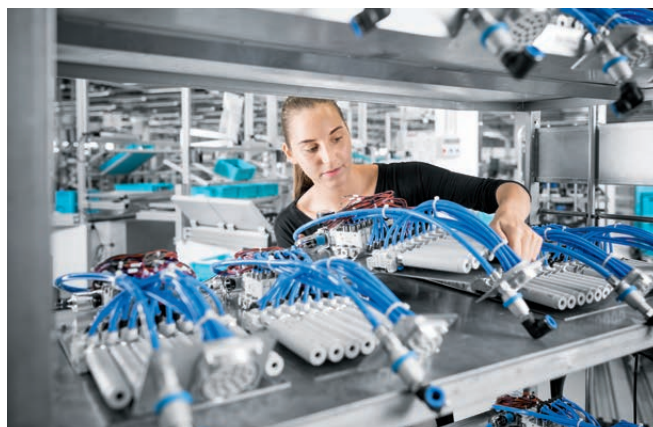
Electronics included

Many products simply wouldn't exist without electronics. In the Technology Plant, 200 employees produce complex electronic assemblies and products in an area covering 6,000 square metres. 2.5 million of them are produced each year for use by the company itself. The areas responsible for further processing receive either complete assemblies in their



Customer solutions

At the customer's request: special solutions and individual components for individual customer needs are produced by hand.



housing or mounted circuit boards. Here too, the variations run into the hundreds.

Innovation in automation

Besides offering highly efficient and competitive production, the new plant also sets an example. It is used by Festo as a reference factory for its customers to demonstrate the latest automation technology. The Technology Factory is characterised by lean and energy-efficient processes as well as highly sustainable and environmentally-friendly production. The plant's green credentials were acknowledged with a Platinum Certificate by the German Sustainable Building Council (DGNB) which was awarded in September 2015.

The high degree of adaptability of the production site and the creation of efficient value chains and value streams were decisive factors for the overall plant concept. Plant manager Stefan Schwerdtle is positive about the future: "With the Technology Plant we are well prepared for future requirements. We have created the space necessary for co-operative technology and product development and considerably improved the time to market through optimised procedures and reoriented core processes." ■

🌐 www.festo.com/technologyplant

Find out more about the **Learning Factory** as an integral part of the Technology Plant in the next issue.



Intralogistics system for flexible transport

Multi-Carrier-System MCS®

Today filling and packaging thousands of bottles of perfume, tomorrow just a few tubes of cream and the day after batch size 1 – everything on one and the same system. The Multi-Carrier-System, a joint project between Festo and Siemens, has been put to work in a filling and packaging machine from the machine manufacturer Optima.

The days when large quantities of the same product were produced day in, day out on one line are very much in the past. A growing number of product and packaging variants, ever shorter product life cycles as well as the trend towards customised packaging and products are posing huge challenges to manufacturers of filling and packaging machines and their end customers. The Multi-Carrier-System now offers them a solution which provides more flexibility and greater competitiveness. Siemens and Festo are launching the Multi-Carrier-System together, a new linear motor track system which delivers a flexible and modular

transport solution for industrial automation. The collaboration brings together the extensive controls expertise of Siemens with Festo's linear motor and mechanical guidance technology.

Carriers within the system can be rapidly and easily adapted to deal with different formats, sizes and types of product – down to batch sizes of one. Applications include cosmetics packaging with its huge number of product variants, food and beverage processing with quick seasonal changes or industrial manufacturing of customised one-off products ordered via online configurators.

On track to Industry 4.0

The Multi-Carrier-System already incorporates options which are relevant for Industry 4.0. These include the particularly flexible electromechanical design for cost-effective manufacturing down to batch sizes of 1, as well as the decentralised sensor and intelligence systems of the workpiece carriers and drives. Even the simulation function, including a virtual twin, is fully prepared for future system optimisation and dimensioning. Program data can even be generated from the simulation.

Maximum flexibility

Within the system, the containers that

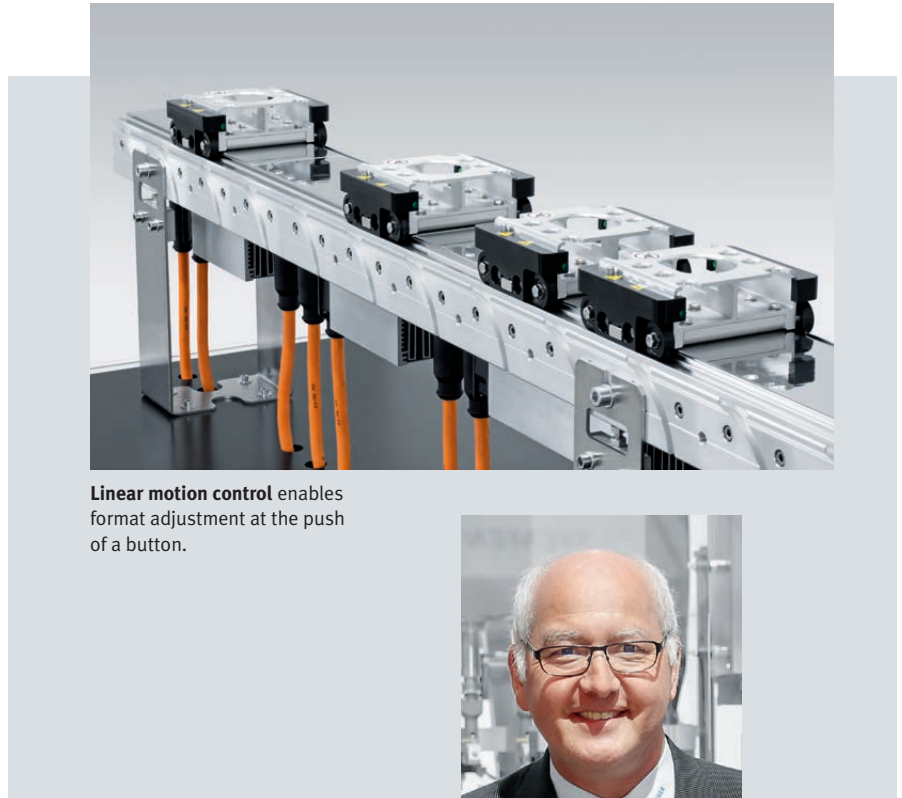


Application example: Optima filling and packaging machine.

need to be filled, such as bottles, cans or flacons, move one by one on carriers that can handle multiple formats and are individually actuated. The self-propelled carriers are driven by linear motors. In order to avoid jams, they move according to the rules of swarm behaviour and in synch with the process – either individually or in groups. The carriers can be freely and seamlessly fed in and out of the Multi-Carrier-System. Linking to an existing intralogistics system couldn't be simpler. The carriers can be accelerated, slowed down and freely positioned, independently of one another. Thanks to integrated RFID chips, they carry all the information that the machine needs to produce the end product. As a result, single-unit productions are thus, mechanically speaking, possible.

The Multi-Carrier-System in action

The Optima packaging machine comprises three modules: filling, closing and laser engraving. The modular machine design requires flexible transport: the machine can fill six bottles during transport and subsequently seal two of them at the same time. This means that carriers need to



Linear motion control enables format adjustment at the push of a button.



“The Multi-Carrier-System anticipates three trends of the future: batch size 1 as standard, flexibility in the software and intelligent, self learning machines.”

Rainer Feuchter, Managing Director of Optima

move in groups of two so that production can continue without pile-ups. For customised laser engraving, the system requires only one carrier – something that can be easily achieved with the Multi-Carrier-System.

The possibilities are endless

The Multi-Carrier-System travels at up to 3 m/s and achieves acceleration of up to 40 m/s² – completely jerk-free and with optimum precision. Shorter set-up times, reduced maintenance costs, lower rates of wear, and the ease of cleaning are further advantages of this versatile transport system.

The potential applications of the Multi-Carrier-System are practically unlimited; it is suitable for all industries that manage a large product diversity. These include the cosmetics industry with its huge number of product variants, the food and drinks industry with its quick seasonal changes and industrial manufacturing of one-off products ordered by end customers using an online configurator. ■

Superconductors: transporting and gripping whilst levitating

SupraJunction & Co.

Superconductors allow objects to be moved whilst levitating – even through walls or water. At Hannover Messe 2016, Festo presented three new concepts for industrial use – SupraJunction, SupraGripper and SupraTube. From transport across water to movement within an enclosed liquid-filled tube, these new developments show what is currently happening with superconductor technology in the field of automation.





Suprajunction transports objects across enclosed surfaces and through sluice gates without contact.

Superconductors allow objects to be held in position contactlessly without any control technology and to be moved with only very little energy. Entirely new forms of movement can be generated that until now seemed impossible. With the new SupraMotion exhibits, Festo has further extended the range of options for positioning and movement shown to date. With superconductor technology, effective and constant cooling is important. The three new applications have electrically regulated coolers with a maximum power rating of 80 watts.

“As soon as we get below the transition temperature, we can precisely determine the necessary cooling temperature with the regulator, in accordance with the system requirements,” explains Georg

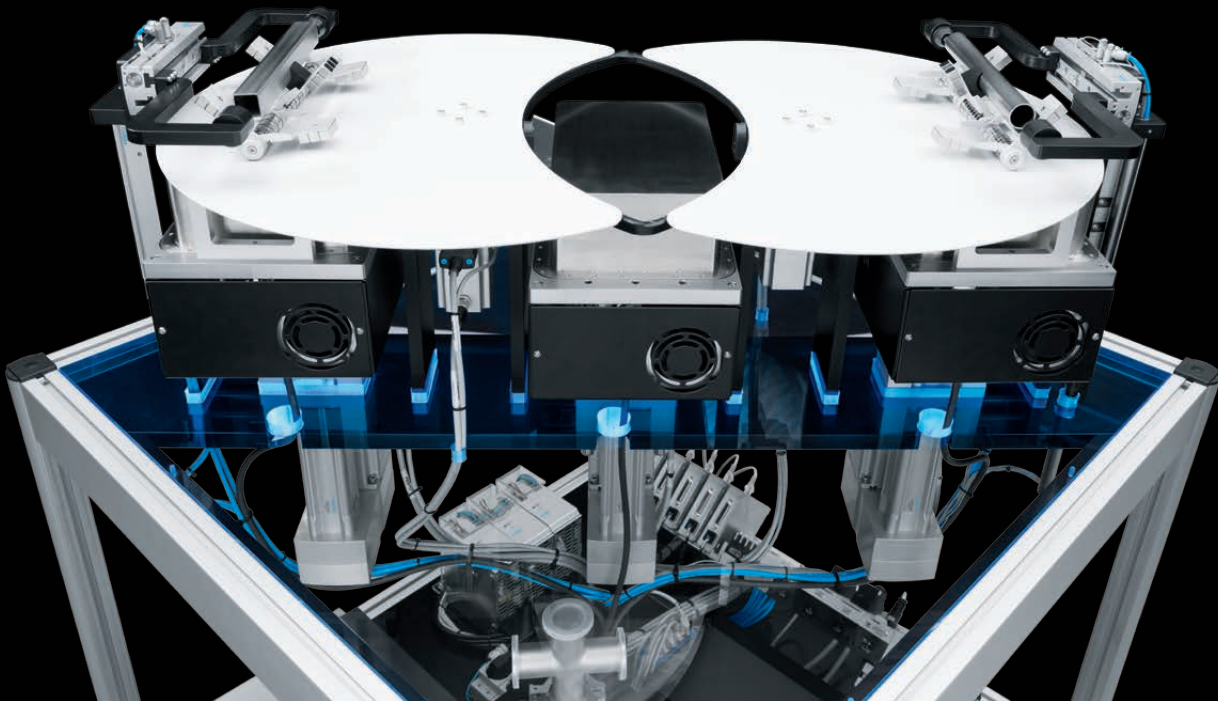
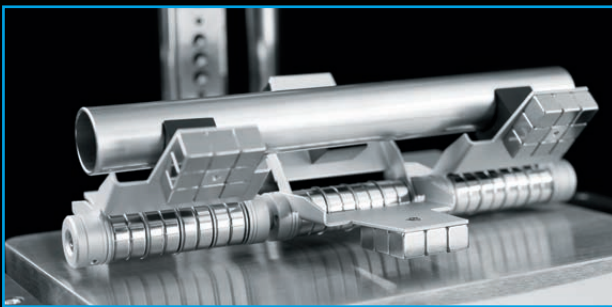
Berner, Head of Strategic Corporate Development, Group Holding Festo and Project Coordinator for the SupraMotion concepts. “If the superconductor is to carry a greater load, we can cool it to a lower temperature, for example.”

SupraJunction levitates above water

With SupraJunction, Festo demonstrates the contactless transport of objects across enclosed surfaces and through sluice gates. Two carrier plates levitate above the superconductors thanks to magnetic rails mounted on the underside of the plates. They transport small glass containers around a circuit and are transferred from one superconductor element on one transport system to the next element on a different handling system.

During the contactless transfer from one cooling tank – the cryostat – to the next, an electromagnet attached to an electric axis draws the carrier plate in the effective direction of the magnetic rails. Festo has thus for the first time realised automated transfer from one system to another in the horizontal plane and is making suspended transport possible in long process chains and across system boundaries.

The levitating SupraGripper also grips and transports objects across enclosed surfaces.



Throughout this process, the plates hover over a flat basin of water. The carrier system and the automation mechanism are thus entirely separated from each other. This protects the components against dirt and facilitates cleaning – ideal for applications in the packaging industry, laboratory automation, medical technology, or the food and pharmaceutical industries.

SupraGripper works in separate spaces

With SupraGripper, two grippers, each with three gripper fingers, levitate freely above two semicircular plates. This technology enables objects to be grasped and transported within enclosed spaces – a practical solution for cleanrooms or for working in liquids, gases or in a vacuum. The levitating effect is generated by three cryostats, which are installed beneath the plates and can be driven up or down. The grippers thus either levitate above the plates or are placed on them. In addition, the two plates can be rotated and precisely positioned by two rotary drives, so that the two grippers can be transported from one cryostat to the next.

To grasp an object, electric coils fitted on the cryostats emit an impulse, which either severs the stored connection to the magnetic gripper elements or restores it as required. This impulse causes the individual finger elements to fold up or down, making the grippers open or close.

SupraTube rotates within a tube

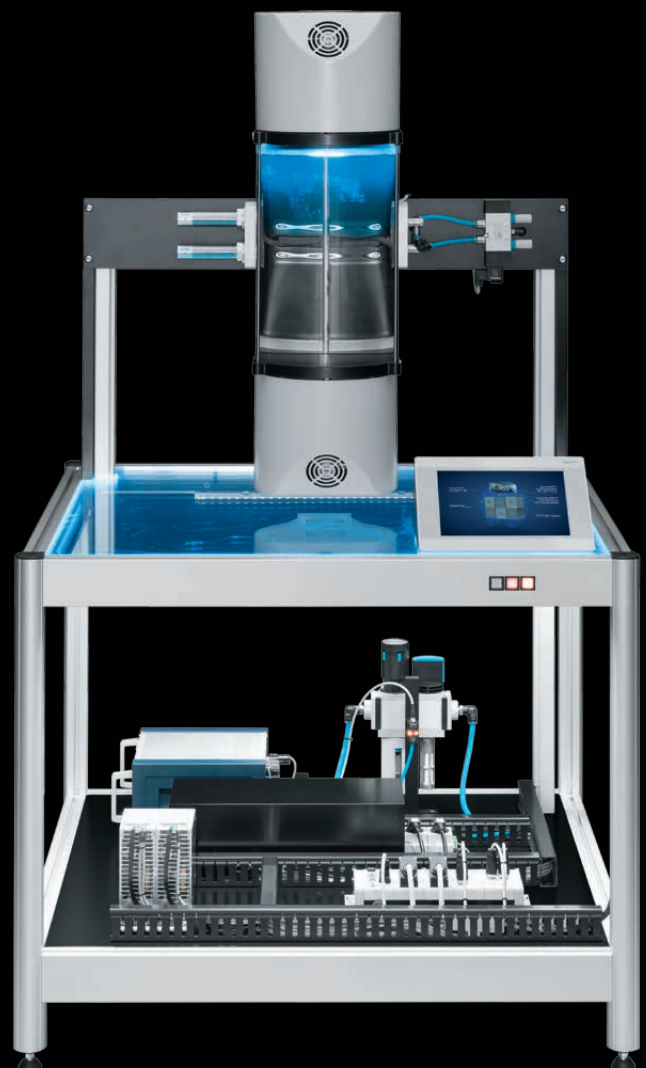
The SupraTube exhibit shows how a controlled movement can be executed within a tube without direct intervention from the outside. A round cryostat with superconductors is attached to the outside of each end of a liquid-filled glass tube. Inside the vertical tube is a magnetic puck that is virtually tethered to the two cryostats with a levitation gap of around five millimetres and is initially suspended beneath the upper cryostat. A ring magnet, which surrounds the cryostats, is set to rotate by a stepper motor, and transfers the motion to the suspended magnet. The magnet is repelled from the cryostat by an electrical impulse and drifts downwards in a spiral motion. At the lower end, it is captured once more and centred by the superconductor in the other cryostat.

In a slightly modified SupraTube configuration, drive units with superconductor magnetic couplings can be fitted along the longitudinal axis of the tube in order to draw a cleaning unit through it, entirely free of contact. Alternatively, the contents of a closed container – such as hazardous substances or explosive gases – can be set in rotation.

Research for the production of the future

After several years of intensive research and three years of experience in this field at trade fairs, Festo is now meeting with partners and customers to discuss and explore their specific ideas for application. “We have now created 12 different concepts that have really inspired our customers and given them lots of ideas for new applications,” says Georg Berner. He and his team are currently working on getting the first pilot projects off the ground. ■

More information on
superconductor technology
and the new projects
can be found at
www.festo.com/supramotion



SupraTube executes a movement inside a tube without direct intervention from the outside.



Automatic antipasti multi-filling machine

All in good taste

Filled antipasti specialities are becoming increasingly popular, and an ever-expanding range of these products can be found on our supermarket shelves. The job of filling these tiny delicacies used to be done by hand, and was therefore time-consuming and costly. A new machine from Karb Maschinenbau GmbH has made this process easier. Equipped with cylinders, valves and valve terminals from Festo, it fully automatically fills peppers and other choice foods with cream cheese.



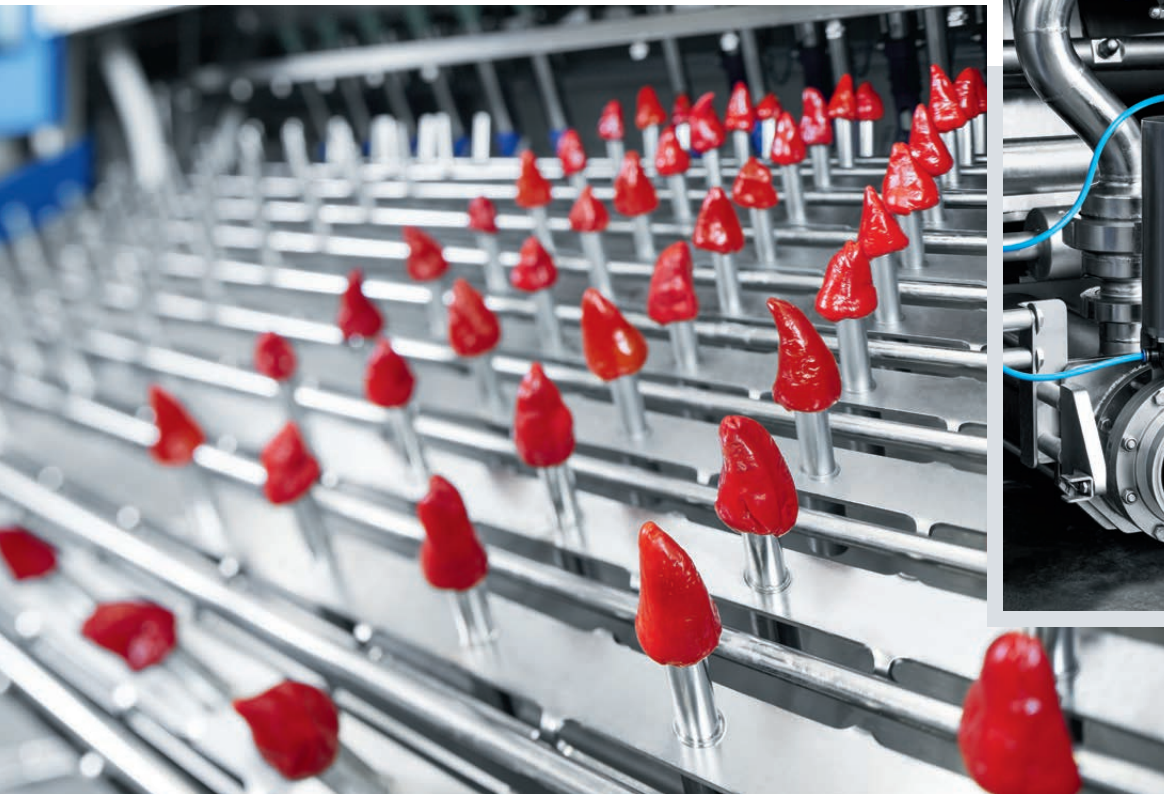
Peppers, chillies and olives are classic Mediterranean antipasti. Many consumers are familiar with Mediterranean cuisine and therefore expect high standards from these delicacies – they must be fresh, tasty and a feast for the eyes. To meet the demands of their customers, food producers must work quickly and hygienically. Thanks to a new antipasti multi-filling machine from Karb Maschinenbau GmbH, which according to the manufacturer, is the only one of its kind. Production is now more than 3.5 times faster. Festo components are used to ensure smooth movements at process and production level.

14,500 items per hour

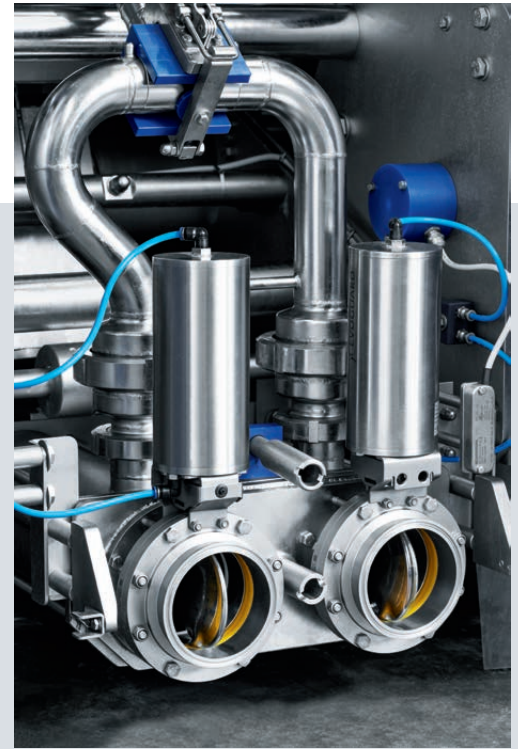
Despite so many work steps in industrial food production being automated, the filling of vegetables is still done by hand. Trained employees can produce up to 1,000 items per hour, but it is a tedious process, and the manual aspect means it requires high standards of hygiene. Each item must be picked up by hand and then filled with cream cheese. Thanks to the new automatic antipasti multi-filling machine from Karb, this job is now much easier and, above all, faster. Employees simply need to place the vegetables on the filling nozzles. The machine does the rest – producing up to 14,500 items per hour. Although the system is currently being used to fill pointed peppers, it can be used to process all kinds of vegetables. The only requirement is that the vegetables have a cavity for the filling.

Automatic filling and cleaning

Sophisticated, highly sensitive sensor technology – details of which Karb Maschinenbau is keeping under wraps for product protection reasons – ensures that the correct amount of filling is dispensed. The sensors automatically detect when the pepper is full and report it to the machine controller within a fraction of a second. The machine controller then sends the stop signal to the Festo cylinder EPCO, which is responsible for the filling process. Because hygiene is as important as speed in the food industry, the system has an automatic cleaning program. A solution of water and cleaning agent instead of cream cheese is flushed through the pipes to clean them. →



Peppers in neat rows: the vegetables stand on filling nozzles waiting to be filled with cream cheese.



The EvoGuard valve controls the butterfly valves for feeding the cream cheese.



“It was important for us to have a partner like Festo to guide us through the entire process of developing a new machine.”

Erhard Karb, CEO of Karb Maschinenbau

20 peppers in one go

Two EvoGuard valves, 20 EPCO cylinders, five valve terminals CPX/MPA, 20 cartridge cylinders EGZ and an MS series service unit keep the process running smoothly. The hygienic EvoGuard valves, which are tailored precisely to the requirements of the food industry, control the infeed of the cheese at process level, while the EPCO electric cylinders take care of the actual filling process. They draw cream cheese into a type of syringe and inject it into the vegetable. The combination of system controller and sensors ensures the perfect fill quantity. 20 vegetables can be filled at a time in this way. Because the cavities of peppers, chillies, etc., vary in size, the system uses its sophisticated sensor technology to detect the level of each individual vegetable and waits until the last is filled to the top with cream cheese before placing all the vegetables onto a



Everything under control: the grippers developed by Karb Maschinenbau use Festo cartridge cylinders EGZ.



Fills 14,500 fresh vegetables in an hour: the new antipasti multi-filling machine from Karb Maschinenbau.

conveyor at the same time. The valve terminal CPX/MPA, which controls the proportional valves for the grippers, ensures highly sensitive gripping without pressure marks. The grippers developed by Karb Maschinenbau use Festo cartridge cylinders EGZ.

Expertise and worldwide availability

The machine took around five years to develop from the initial idea to final fine-tuning. Behind the smooth running system that makes the filling process look so easy lies a lot of complex and time-consuming work that had to be accomplished on the journey from the initial concept to commissioning, including design, manufacture and control. Throughout this period, Karb Maschinenbau was supported by Festo employees. Along with their expertise, they provided sample parts for extensive testing and carried out trials

in the Festo test laboratory. The many years of cooperation with Festo together with the high quality of the products and their availability worldwide were pivotal to the project. The machine building experts are already working on the next step of automating the feeding and packaging process. ■

🌐 www.festo.com/oms

Karb Maschinenbau GmbH

Lochmühlenstraße 112-113
97357 Prichsenstadt
Germany
www.karb-maschinenbau.de

Area of business:
Planning, consulting, design and
manufacture of special-purpose
machines, tools and equipment



Gary Wyles, Managing Director, Festo Training & Consulting

What is coaching?

Coaching is releasing a person's potential to maximise their own performance. It is helping them to learn rather than teaching them. Every coaching interaction is different and indeed every coach's approach is diverse.



It is easy to become immune to the jargon that we use everyday in our role in training and development. Just because we've been speaking about coaching for decades, we assume that the industries in which we work and the people we are talking to, have a similar amount of knowledge.

In manufacturing and engineering, some of the main sectors we operate in, this is certainly not the case. Perhaps at senior

leadership levels in large corporations it might be different. Here they would have read about coaching, they could have experienced coaching themselves, but in smaller companies and in the middle and first time management positions, there is still confusion over coaching.

Yes, we can use the sporting analogy but what that fires in people's imagination, is a manager and coach jumping up and down on the side-lines and shouting

loudly and berating the players. That's about as far from the truth as you can get. When Festo first decided to instil a coaching culture throughout our engineering organisation, it wasn't enough just to tell people what we were doing. We had to first of all convince them why the organisation needed to change and why their behaviour needed to adapt. In our situation, we had to find a way to differentiate ourselves from the myriad of other manufacturers who could offer



great coach, although there's plenty of inspiration about how to refine your coaching practice.

We also have to recognise that coaching does not come naturally to most people, especially those who are new to a management position. Here the overriding urge is to fix things, to tell people what to do, to continue to be the technical expert, to have all the answers.

Instead of bandying around the coaching word we need to break it down into its component parts. At Festo we link coaching to leadership, communication, team working, tolerance, role model, leadership motivation and employee

development. Coaching is a required competency of every leader. Perhaps it's because we are a firm of engineers, that our people have to understand the process. They've got to see the benefit to help realise their own potential as coaches.

Know who you are

Every coaching interaction is different and indeed every coach is different. To be an effective coach you have to recognise and understand who you are and how you engage most effectively with your team. Self-reflection helps individuals recognise that to be effective as coaches they must also 'live' the coaching culture. ➔

similar goods and services cheaper. We had to become a consultative sales organisation and this required a total shift in the culture, attitude and behaviour of our sales team.

To do that, the sales team needed to experience coaching first hand. Coaching is not something that can be learnt by reading books. It cannot be taught standing up in front of a classroom. There is no definitive manual about how to be a





“Every interaction is different and indeed every coach’s approach is diverse”.

Gary Wyles, Managing Director, Festo Didactic Training & Consulting

Understanding the coaching process

Because every coach is different, there will be a myriad of different coaching models and processes that can be followed. Indeed, a Google search found 48 million references to coaching models.

Models are important because coaching does not happen as a ‘one off’ engagement. It cannot happen on the hoof. It absolutely needs to be a fully engaged commitment – both by the coach and the coachee – and then rigorously instigated and continuously improved. Individuals can either adopt or create their own coaching model. They need to find a process and a method of engagement that works for them.

Getting to know your team members

We all believe we know our team well. We know how they perform at work. We might have a personal relationship with them. We believe that we understand their personality.

However, we can easily make false assumptions. We can forget that just like ourselves, people might present themselves differently at work to how they’re actually feeling inside. That over-confident 22 year old graduate could easily be masking a highly insecure individual. When a stalwart team member’s performance suddenly takes a dive perhaps you don’t really know what is the cause.

Coaching requires a deep understanding of the personalities of your team. While personality assessments, such as DiSC®, can play a part, it’s only through a high level of trust and empathy, effective and active listening and understanding both verbal and non-verbal communication, that a real understanding of your team emerges.

Explore coaching skills

Effective questioning is the basis of most coaching conversations. Using a mixture of open and closed probes, the power of silence and reflection, to dig deeper into the thoughts of the coachee.

Common coaching errors

An important skill is how to summarise discussions without the coach spinning information to fit their own agenda. Equally, coaches need help to recognise and avoid entering into a coaching conversation with preconceptions. These ‘thinking errors’ can cause the coach to lose objectivity and can include:

- Labelling
- Discounting the positive
- Magnification
- Mind-reading
- Fortune-telling
- Blame

Coaching the coach

Just like any skill, coaching takes practice. But it’s not really fair that these practice sessions are played out on coachees themselves. By collectively working with coaches not only are there opportunities for them to practice the skills through role and real plays, but they can also get feedback directly from other coaches.

When we created our coaching culture in Festo, this was the break through point. We created communities of coaches nationally and internationally. They all had the same experience; they were all coaching their team. They established virtual and real groups where they could continue to practice, hone and refine their coaching skills. So while coaching is indeed a skill that can be learnt. It’s never one that’s totally nailed. There’s always more to learn and more that can be done. That is what makes it such an exciting area to be involved with. ■

www.festo-didactic.co.uk

Find out more about
Festo Training & Consulting
courses and programmes at
www.festo-didactic.co.uk



Gary Fuller, Training & Consulting Programme Manager, Festo

Bringing energy efficiency into view

Many companies struggle to reach their energy saving targets, even a 5-10% KPI to reduce energy spend is a big ask.

As a manufacturer ourselves, we are focused on eliminating waste, improving productivity and reducing our environmental impact. We are naturally very high users of our own automation equipment and strive to do so in the most efficient way possible. To do this we have implemented a diverse and wide ranging strategy to reduce energy consumption and have gained a lot of experience internally. We also work with many other leading

manufacturers and there's one thing that we've found – saving costs on compressed air is not simple. Here are some of the reasons why.

Compressed air costs aren't understood
Many users don't know or appreciate the cost of energy, compressed air in particular has frequently been seen as a fixed cost asset, "the compressor is there anyway" and therefore a "free" resource. However, with the cost of electricity nearly

doubling over the last 12 years and electricity consumption being 60-70% of the total cost of compressed air it can be an expensive resource and certainly not one to be squandered. The low hanging fruit for reducing compressed usage is always considered to be leaks – where we're literally blowing money away.

There are some great headline grabbing figures which are frequently quoted often resulting in excitement about fixing →



leaks in compressed air systems. Typically purely electric drive manufacturers will cite older European reports showing that 42% of the cost of compressed air is lost in leakages. That's when leak identification reports are commonly commissioned.

However, alone, this rarely produces the anticipated results, in fact frequently the identified leaks aren't fixed at all. It's not unusual when surveying pneumatic systems that we'll see leakage tags still there years after being marked.

Consciously or unconsciously incompetent?

Not understanding the value of compressed air means that it is frequently forgotten and overlooked, this 'unconscious incompetence' means engineers, operators, maintenance staff or the many other people who walk past leaks, poorly designed or maintained machinery day after day, don't see it as part of their job to report or fix problems.

Energy reduction has to become a shared and embedded responsibility using tools such as Balanced Score Cards and KPIs.

If the team know that something needs to be done and they're being measured on it, they can take the next step to becoming 'consciously incompetent'; a vital step as they will now seek ways to improve the situation and start to be part of the cure rather than the cause.

To make significant changes in the culture of an organisation the change and focus has to come from the top. Whether it's light bulbs, kettles, machines in stand-by or an over pressurised regulator it's only by everyone taking personal responsibility that substantive savings can really be made.

Education is key

The key to this is education; understanding what can be achieved, to believe it can be done. It's about turning the invisible resource of air into a visible asset and showing viable ways to reduce costs. That's when you'll make serious savings and hit your KPIs to reduce the cost of your energy.

Once this need has been established the team will need energy consumption visibility and transparency and the ability

to invest in energy saving measures. Understanding and monitoring energy consumption enables the team to implement actions throughout the consumption phases. This can start in the compressor house, investing in the latest combined heat and power plant, optimised load sharing compressors and distribution systems. Capturing and using the heat energy generated when compressing air considerably improves the overall system efficiency. Heat pumps can even convert this energy into cooling if that is required or utilised as heating or an energy source in other processes such as plating.

Start at the design stage

Retrofitting and upgrading equipment should be considered but has to be done against a background of OEM warranties and the possible need to re-CE mark equipment if substantial changes are made. Clearly the best time to optimise the energy consumption is at the design / purchase stage. Capital equipment purchase specifications must lay down clear expectations in terms of the use of best energy practise in the selection and layout of the machine elements.



“It’s only by every person being responsible that substantive savings can really be made.”

Gary Fuller, Training & Consulting Programme Manager, Festo

Short pipe runs, correctly sized actuator / pressure combinations, intelligent use of vacuum etc. This doesn’t mean the elimination of pneumatics but the best use of pneumatics. It is a gross simplification to think electric actuators are more efficient than electric, they can be, but the opposite can also often be true, it depends upon the application. Even where electric actuators are more efficient, consideration still has to be given to the payback time, if this is excessive then it is clearly better to invest elsewhere.

Energy transparency and control at the point of use

In our own production plants energy transparency and regular analysis are key. Setting individual zone targets means each team make proposals for improvements and can track their progress. Fitting intelligent flow monitors with auto shut off in stand-by conditions can have impressive results. Condition monitoring pressure decay within the system when the supply pressure is isolated enables the clear indication of leaks, wear and potential causes of failure. Individual teams propose their

own measures and share best practise across the plant and internationally.

In sales and marketing the acronym A-I-D-A is frequently used to describe the journey from Attention to Interest, Desire and Action. For energy reduction with compressed air a similar path has to be followed. It cannot be tackled with a single action or even in one dimension. It requires a sustained, continuous effort.

Our workers in our latest Scharnhausen factory are proud of their impressive reductions in energy consumption. They are motivated by their environmental conscience and their ability to have an impact. It starts with the drive from the top, education and awareness. It is sustained, through the engagement of the team and their commitment to the goals they set themselves. ■

www.festo-didactic.co.uk/eee

Take action on energy saving now

Energy Efficiency Experience

The aim of our Managers’ Energy Efficiency Experience that takes place at your premises is to establish your actual energy saving needs in relation to air consumption and usage in the production areas.

See how these savings can be made ‘sustainable’ without the need for expensive initial outlay.

Free guide

Our ‘Energy efficiency in compressed air systems’ guide highlights the hidden costs associated with compressed air and provides practical advice on how to lower your costs and maximise your energy efficiency.



Visit www.festo-didactic.co.uk/eee for useful information to help you reduce your energy costs.

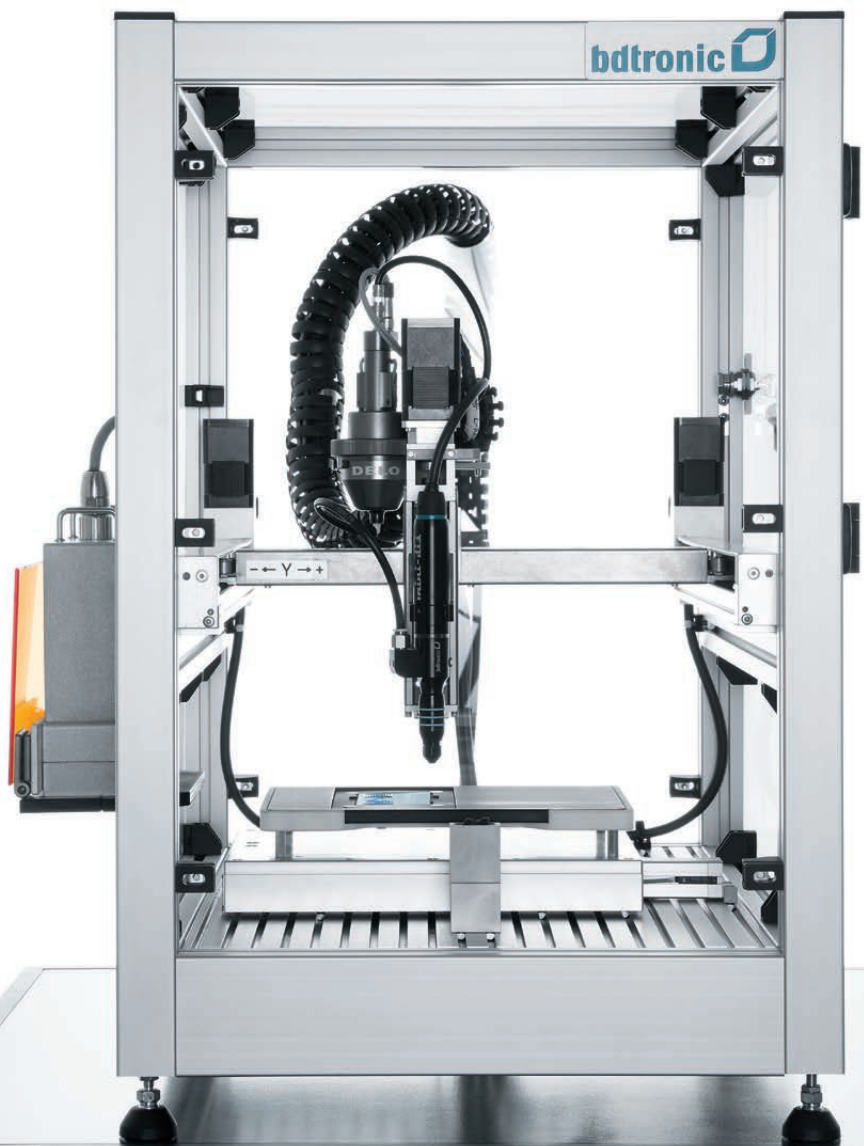
Dispensing casting resin

Perfect curves

From car parking sensors through to smartphones and electric toothbrushes, sensitive electronic components need protection against undesirable substances. That is why special casting resins are used. The “mini-dis” desktop machine from bdtronic allows high-precision dispensing processes in a very small space – thanks, among other things, to the compact handling system YXMx from Festo.



Casting resins protect high-quality electronic components against undesirable penetration by dirt and moisture. Precise and reliable dispensing technology is essential for the automatic application of these resins. bdtronic GmbH, a company located in Southern Germany, is one of the world's leading suppliers of dispensing systems, including complete systems for automating the assembly and production of electronic components. bdtronic has now worked with Festo on a ground breaking project to expand its product portfolio. The new mini-dis from bdtronic, based on the compact handling system YXMx, opens up another field of application in the front-end processing of electronic and telecommunications products. The integrated CECC-X controller allows curved travel paths, thus making it possible to produce even complex casting patterns. Designed as a space-saving and flexible desktop application, the new complete solution from Festo facilitates cost-effective production of extremely short production runs.



Precision and reliability

The microdispensers and the mini-dis are used with semiconductor products and circuit boards, with the electronic components of numerous automotive modules and sensors, in medical technology and with smartphones. The mini-dis processes single- or two-component materials with an epoxy, polyamide, silicon or acrylate base and soldering pastes in the μl range. Across the world, several thousand different casting materials are used.

process is the optimum preparation of the casting resins. These must first be homogenised and then evacuated. This avoids even the smallest air pockets.

Flexible and compact

An important criterion for bdtronic when selecting handling systems for dispensing is an interpolated actuator control system which allows travel along radii and thus



“With the compact handling systems from Festo, we have a complete unit consisting of kinematics, a controller and software from a single source. This saves us time and money.”

André Hellinger, Head of Development, Dispensing Technology, bdtronic

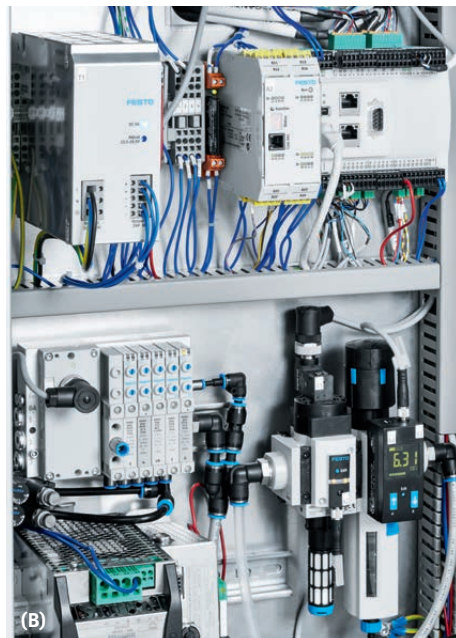
When it comes to the dispensing technology itself, two criteria are especially important: precision and process reliability. To achieve these, bdtronic works extremely closely with its clients' experts. In the company's own application and technical centre, each product is extensively tested to check the interaction between the casting resin, the dispensing technology and the components to be processed. One of the greatest challenges in the dispensing

flexible contours. This is the only way to define precise dispensing points, create intricate patterns and fully encapsulate components of different shapes. The new desktop application with a Festo controller CECC-X with SoftMotion functionality fulfilled this need. A key role was played by the programming language CODESYS, with which the bdtronic software engineers had already been working for many years. Since the CECC-X can be integrated via CODESYS, it could be added to the company's component family in no time at all. A further important criterion is easy reading in and fast processing of CAD data. →



(A) On the move: the compact planar surface gantry provides maximum working space coverage. And it can travel to any required position within the working space.

(B) Just as compact as the handling system is the interior of the control cabinet, with a controller CECC-X (top right), a valve terminal VUVG (bottom left) and a service unit from the Festo MS series (bottom right).



bdtronic GmbH

Ahornweg 4
97990 Weikersheim
Germany
www.bdtronic.de

Area of business:
Production of complete solutions in
the areas of dispensing technology,
plasma pre-treatment, hot sealing,
impregnation technology and
process automation.

With its compact dimensions, the controller is a perfect match for the planar surface gantry EXCM-30, which offers many functionalities for working loads of up to 3 kg. The gantry provides maximum working space coverage. And it can travel to any required position within the working space.

Perfectly matched

Festo has designed its compact handling systems as a kit with perfectly-matched standard components. The bdtronic mini-dis uses a planar surface gantry EXCM-30 with additional Z-axis EGSK as a kinematic mechanism including the controller CECC-X. It also includes a comprehensive software package for

simple programming and commissioning, which is an integral part of the Festo complete solution. Having a large number of functions available in a very small space avoids the problems of both under- and over-dimensioning. The controller software, based on CODESYS, offers the most important basic functions that are needed to program travel paths even without an in-depth knowledge of programming. The controller interfaces allow the compact USB cameras, sensors, actuators and valves all to be connected. All of this results in great efficiency and saves considerable amounts of time and money. ■

www.festo.com/hgo

www.festo.com/cecc

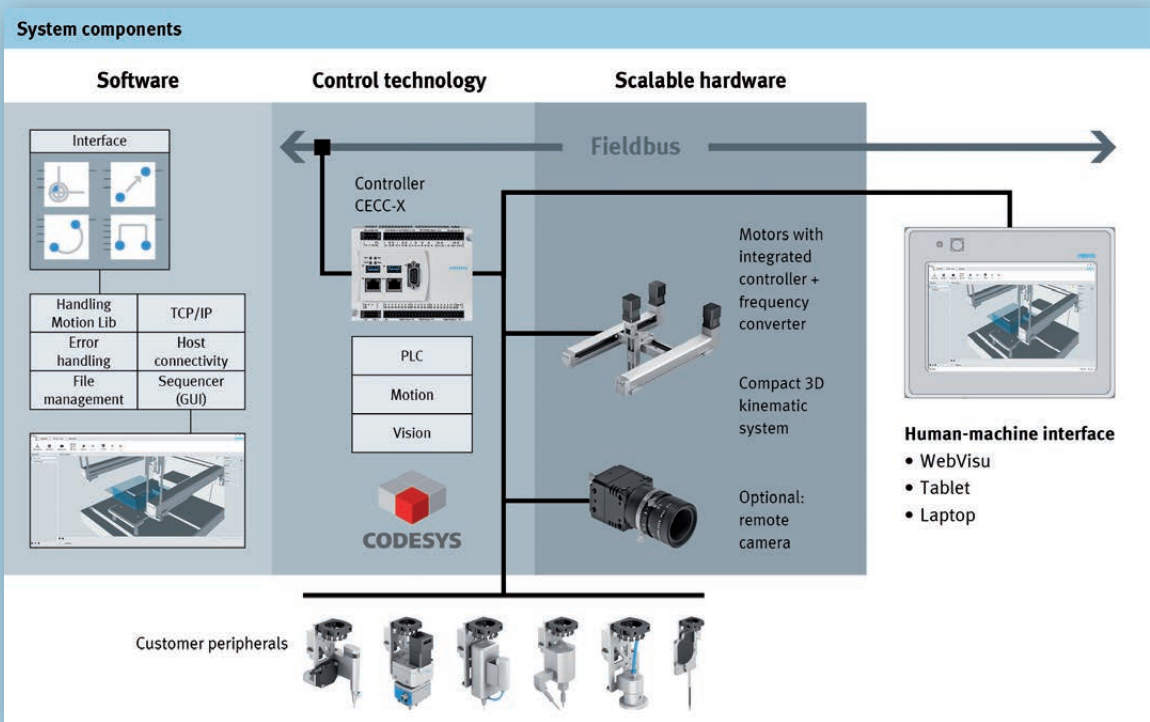
Kinematics, controller and software in one package

Compact handling systems for moving workpieces or tools help machine and system builders in electronics and small parts manufacturing to significantly reduce their engineering costs – and they get a cost-effective system thanks to standard components. Predefined function modules from the software library and intuitive application programming with the sequencer simplify programming and commissioning.

The system kit from Festo consists of perfectly matched components and functions from a single source. These components can be used to simply combine complete systems, consisting of kinematics, controller and even software. Systems of this kind open up entirely new potential for savings. They enable machine and system builders to concentrate fully on their core business.

Programming and commissioning with the predefined function modules of the Handling Motion Lib is quick and easy. The following functions are possible: parameterisation, reference travel and jogging operation for the interfaces for communication with host systems, file management and a message system for error handling and sequence processing.

Included in the system kit is a compact controller CECC-X. This allows numerous functions to be carried out in very small spaces. It contains a range of predefined interfaces to a master control system – including the OPC-UA interface for Industry 4.0.





Automation of laboratory sample preparation

Handling viscose substances with precision

Laboratories in the chemical, petrochemical, pharmaceutical and food technology industries are increasingly relying on automation for sample preparation. The Modular Sample Processor, a development from the global laboratory equipment manufacturer Anton Paar, is one such solution – and uses electric axes and control systems from Festo.



Precise pipetting processes: thanks to compact handling gantries with electric axes from Festo.

The advantages of laboratory automation are plain to see: it frees up laboratory technicians from monotonous, repetitive tasks, and eliminates the need for them to handle hazardous substances. It permits 24-hour operation seven days a week, and increases the quality, reproducibility and traceability of samples. But the most important advantage for the majority of laboratories is that automation not only saves time and money, but also guarantees an error-free analyses and therefore accurate results.

Compact bench-top platform

The Modular Sample Processor is a system for preparing samples, such as for chromatographic analysis with high-pressure throughput for samples within a range from a few up to 100 millilitres – as required in the petrochemical, food or fragrance industries. The compact bench-top platform prepares samples which are then tested, for example, for their water content, density, viscosity, suspended particles or pH value. “We use it for

automating time-consuming manual work such as pipetting, sampling, dosing and weighing across a wide range of volumes and for many different types of samples,” explains project manager Markus Schöllauf from the Automation and Robotics division of Anton Paar. This ensures the volumes, concentrations and mixtures are correct. The Modular Sample Processor can be used as a bench-top unit for liquid media and solids, or integrated into complete automation solutions.

Precise pipetting procedures

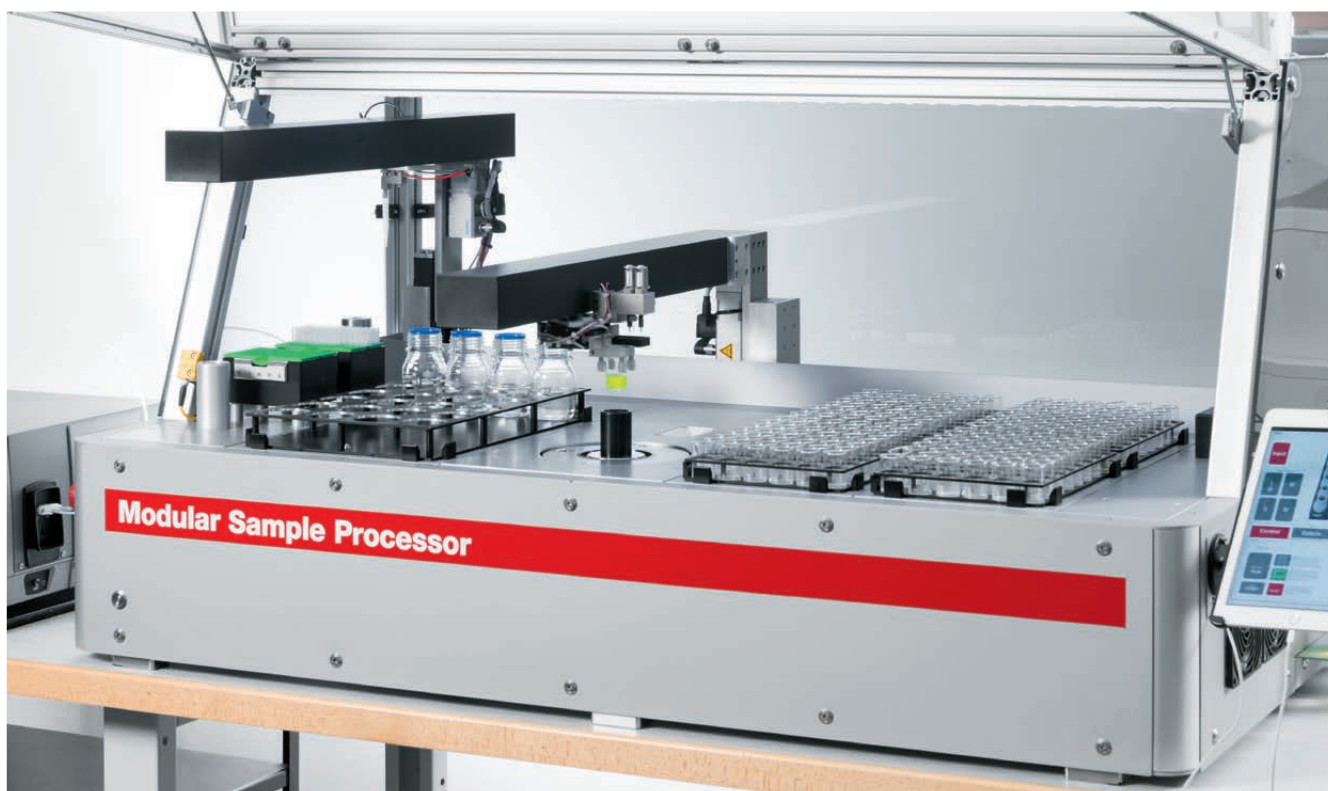
Compact handling gantries with electric axes from Festo – the DGEA axis in the X-direction and the EGSK axis in the Y-direction, equipped with motors of the type EMMS-ST – ensure precise pipetting procedures. Once a pipetting procedure has finished, a pneumatic AEN cylinder from Festo ensures that the used pipette is ejected into a waste chute.

Another handling system equipped with the same axes takes the sample holders from the output trays and places them on

the weighing unit. There, a pipette provides the sample holders with the exact amount and volume of the substance to be tested. The sample holder is then held by the handling gantry over a scanner so that the sample can be allocated using a data matrix code. This integrated barcode reader enables the samples to be traced throughout the entire specimen preparation process. At the end of this process, the sample is placed on the output tray.

Tested complete solution

“Festo didn’t just supply us with the axes, but also a complete system solution including a CECC CODESYS controller,” says project manager Schöllauf, reporting on the cooperation with Festo. He continues by adding, “Without that, it would not have been possible for us to meet the extremely short development deadline of four months.” This also made it possible to program the two handling gantries so they would never collide despite the fact that they move within the same working space. This was checked and tested by Festo before delivery. ➔



Compact bench-top platform: the Modular Sample Processor can be used as a bench-top unit for liquid media and solids, or integrated into complete automation solutions.



“Right from the initial CAD concept we worked closely with our system partner Festo to create the platform.”

Project manager Dipl.-Ing. Markus Schöllauf
from the Automation and Robotics division of Anton Paar

Developing the dispensing head was no minor task either. This is where Festo VODA valves come in. These media valves are directly actuated diaphragm valves. Depending on how the pressure is defined, the metering of the fluid to be transported is higher or lower. The opening pressure of the valve is therefore defined by the pretension and flexibility of the diaphragm. This enables the medium used to be dispensed extremely accurately. With the Modular Sample Processor the samples are precisely assigned to the correct container – to the last millilitre.

Reliability worldwide

“In this sub-project, the engineers from the Medical Technology and Laboratory

Automation division of Festo demonstrated their level of expertise combined with high commitment,” continues Schöllauf. This provides reliability for follow-on projects, adds the project manager – as does the fact that products, solutions and services from Festo can be supplied quickly almost anywhere in the world. This is also important for companies like Anton Paar, so that the Modular Sample Processor can be marketed on a worldwide basis. ■

🌐 www.festo.com/laboratoryautomation

Anton Paar

Anton-Paar-Straße 20
8054 Graz
Austria
www.anton-paar.com

Area of business:
Development and manufacture
of highly accurate laboratory
instruments and process measuring
systems and custom-tailored
automation and robotic solutions.

Switzerland



Clever solution: thanks to the fluidic muscle there is no longer a need for the weights and the yarn tension can be set precisely.

Tension guaranteed

Producing bandages using the fluidic muscle DMSP

Wernli AG was founded in 1932 and was the first textile manufacturer in the world to produce coloured dressing materials. Today, it is cohesive and adhesive elastic bandages, as well as compression bandages, that are securing Wernli a leading position in the global market. The company processed 336 tons of yarn in 2014. Laid end to end, the finished bandages would reach over 51,000 km. 85% of the 10 million bandages produced each year are exported. According to Ruedi Leutert, Head of Prework/ Weaving, Development and Yarn Purchasing at Wernli, for long-term success, you need more than just product innovations. The flexibility to custom manufacture small-scale series and deliver quickly is also important. New efficiencies are being identified all the time and implemented gradually. This was the case with the looms for the Bi-Flex type bandages, which are elastic both lengthways and crossways. The warp beams from which the yarn is continuously unwound must move under constant tension. Without the use of compensating lead weights, the speed of the warp beams would increase as more yarn is unwound and produce an unevenly elastic bandage fabric. The weights, which weigh between 2.5 and 15 kg, previously had to be hung manually on the warp beams by employees. The fluidic muscle DMSP from Festo has revolutionised this complex process.

The innovative pneumatic drive has clear advantages for this application compared with a conventional pneumatic cylinder. Since there is no need for a piston rod, friction and therefore the stick-slip effect – the jerking motion that can occur while two solid objects are rubbing against each other – are not a problem. This means that, together with the precise closed-loop control provided by the fluidic muscle DMSP, the yarns are now optimally tensioned. This guarantees the high quality of the finished bandages. Without the weights used previously, the quality of the products is improved and the risk of accidents is reduced. A further advantage is that the fluidic muscle needs much less installation space compared with the weights.





All wrapped up

Fully automatic stretch wrapping

Movitec Wrapping Systems based in the Spanish city of Lleida specialises in manufacturing automatic rotary ring stretch wrapping machines for wrapping palletised loads. The fastest model in this range of packaging machines is capable of handling 160 loads per hour fully automatically. Wrapping the products protects them if they are dropped during transport or storage and protects them against moisture and dust. The machine also optimises film consumption, as it requires up to 10 per cent less film compared with manual wrapping.

The rotary ring stretch wrapping machines are based on a stable four column design. The load sits in the centre. The roll is mounted on the rotary ring, which rotates in concentric circles at over 40 rpm until wrapping is completed. Despite the system's high speed, it still succeeds in saving significant amounts of energy. The system features a modular automation platform CPX, various pneumatic cylinders and a service unit for compressed air preparation.

www.movitec-ws.com



The stretch wrapping machine achieves high speeds and optimises film consumption.



The modular automation platform CPX is a key component of the stretch wrapping machine from Movitec. It integrates pneumatic and electrical control chains easily, quickly, flexibly and seamlessly into all automation concepts and company-specific standards.

Argentina

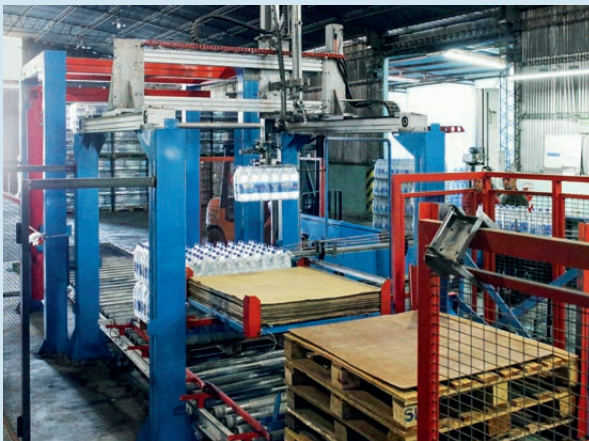
A lot of bottle

Efficient process for bottling drinks

The new palletising system from Gaudium used at a drinks filling plant in San Juan in western Argentina handles 5,200 bottles per hour. Palletising the bottle packs is the last stage of the PET bottle production process. The process used to involve a lot of manual work. By changing the plant layout and using Festo components, the cycle time was shortened and the process was made more efficient. It is now possible to switch between up to eight different formats, depending on the bottle shape and the arrangement of the packs on the pallet.

The plant contains numerous technical solutions, including classic pneumatic drives for linear movement and rotation, electric drives for positioning, toothed belt axes as well as magnetic, inductive and optical sensors. Valve terminals are used to control the processes.

www.grupogaudium.com.ar



Palletising, which used to be the manual bottleneck of the system, has now been fully automated thanks to Festo components.



Up to 5,200 bottles per hour are handled by the new palletising system from Gaudium.

USA



Modern workplace: in the manual packaging area, Festo products are packaged according to customer specifications and prepared for delivery.

From New York to Ohio

New Regional US Service Centre is opened

The new Regional Service Centre (RSC) in Mason, Ohio, has 9,000 square metres of logistics space, a manufacturing area of 7,000 square metres and 2,600 square metres of office space.

The site in Mason sets new standards in the areas of automated stock management, software technology and product configuration. The automated distribution system will enable even very large order volumes to be processed efficiently. The high technical standards and optimised processes guarantee fast and reliable delivery to customers. The location was chosen for its good infrastructure thanks to numerous highway links, several airports in the region as well as distribution centres for large shipping providers.

Hauppauge will remain the corporate head office in the United States. As well as the Sales, Customer Service, Engineering, Marketing, Finance and IT areas, Prototype Development and Assembly as well as current Process Automation projects will remain in Hauppauge.

Germany/International

Awarding performance

Festo as a Bosch Preferred Supplier

The Bosch group, high-tech company and the world's largest supplier to the automotive industry, has chosen Festo as a preferred supplier of pneumatic technology. Festo has received the Preferred Supplier status for above average performance in collaboration with the Bosch group. The supplier evaluation criteria includes strong delivery reliability, advanced technical solutions, fulfillment of international standards and global orientation.

Bosch honours its best suppliers each year with the Preferred Supplier status. The Preferred Supplier status is valid worldwide for all Bosch plants and all business divisions.



BOSCH

Invented for life



Fascinating underwater world

Coral reefs are called the rainforests of the sea because of their diversity, colours and shapes as well as their inhabitants. With 6,500 different species, they are the most diverse group of the so-called coelenterates. Their variety of colours and shapes is reflected in the scientific name “Anthozoa”, which literally means “flower animals”. In addition to being biodiverse, coral reefs provide new habitats for many marine animals. The world’s largest coral reef, the Great Barrier Reef, located off Australia’s northeast coast, is home to around 5,000 species of mollusc, 1,500 species of fish and 1,500 species of sponge as well as 800 species of echinoderm.

The Caribbean brain coral (pictured above and on the cover) certainly lives up to its name. Its incredible diversity makes it not only fascinating to divers, but also something of a scientific enigma. Even specimens from the same coral colony appear to have different shapes and colours, as the photo taken by Evan D’Alessandro shows. Whether they are genetically identical despite their different appearance and the reason why they take on another shape despite being in the same habitat remains a mystery.

About the magazine

All images, graphics and texts are protected by copyright law or other intellectual property rights. Any reproduction, modification or use in other print or electronic publications is prohibited without the express consent of Festo AG & Co. KG.

Great Britain

Festo Ltd

Applied Automation Centre
Caswell Road
Brackmills Trading Estate
Northampton
NN4 7PY

Phone +44 (0) 800 626422
Fax +44 (0) 1252 775015
E-mail info_gb@festo.com
www.festo.com/gb

Ireland

Festo Ltd

Unit 5
Sandyford Park
Sandyford Industrial Estate
Dublin 18

Phone +353 (0) 1 2954955
Fax +353 (0) 1 2955680
E-mail sales_ie@festo.com
www.festo.com/ie



www.festo.com/facebook



www.festo.com/twitter



www.festo.com/youtube



www.festo.com/linkedin