trends in automation

The Festo customer magazine **Issue 32**

FESTO

In focus

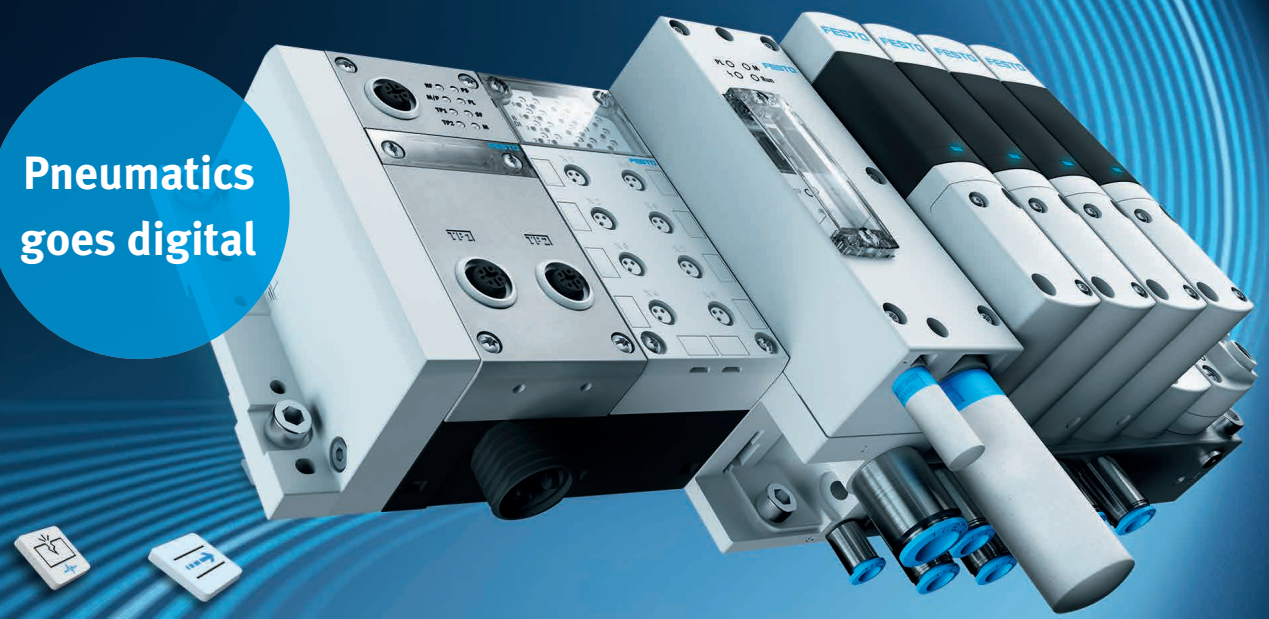
Flexibility

Compass
Connectivity
With electric automation

Impulse
SupraMotion
First-hand insight and outlook

Synergies
Applications
Innovative electric automation in action

FESTO



Pneumatics goes digital

You rely on maximum flexibility.
You are looking for intelligent and intuitive solutions.
We are making pneumatics go digital.

→ WE ARE THE ENGINEERS OF PRODUCTIVITY.

Pneumatics goes digital: world first Festo Motion Terminal VTEM

The Festo Motion Terminal VTEM is opening up new dimensions in the world of automation. It's the world's first valve to be controlled by apps. It combines the advantages of electrics and pneumatics. Thanks to the fusion of mechanics, electronics and software, this technology incorporates the functionality of over 50 individual components.

www.festo.com/motionterminal

Discovering spaces

Eliza Rawlings,
General Manager, Festo GB

Dear reader,

Flexibility – this term applies to all aspects of life and business, as indicated by more than 14 million search results in Google; it is also a common theme throughout this magazine. The cover image shows how flexibility in the animal kingdom is an advantage during the growth phase. Examples like this are a source of inspiration for scientists. They learn from them and then apply this knowledge to technical disciplines. Architects are also inspired by nature when they want to create flexible objects and the materials to support them. Take bamboo, for example, which is extremely flexible yet incredibly strong, see on page 4.

Flexibility also is a highly relevant theme for industry trends and reacting quickly to market demands. See page 10 to read about work we've been doing with Horizon Instruments and Warwick Manufacturing Group to prepare for critical change in the automotive sector to make the commercial production of battery modules feasible for electric vehicles.

The manufacturing and engineering industries are on the cusp of the fourth industrial revolution. Only the most agile organisations will thrive, while those with one foot in the past will be left behind. To be successful, leaders and managers must put in place new strategic thinking to exploit business opportunities and respond to threats. But what are the potential implications of Industry 4.0 for those who must implement change on the ground? See page 20 where Neil Lewin, Consultant for Festo Training & Consulting explores this topic.

As for flexibility and automation, the Bionic Learning Network has used nature to develop a number of objects that have found their way into the world of automation. The research that is being carried out into the superconductor-magnet combination focuses on the world of automation. Developments such as the SupraShaker can be tilted in any direction and, despite its shaking motion, prevents vibration from being transferred to the entire system. Flexibility is equally important in industry. Flexible and modular automation concepts from Festo help to enhance competitiveness. Flexibility makes it possible to have batch sizes as small as one with virtually no retooling times.

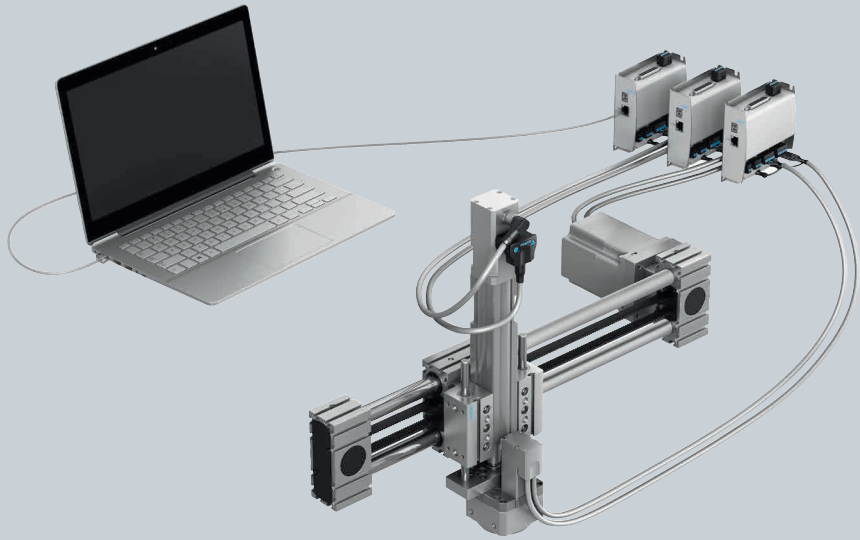
Find out more about the many flexible options on offer to you and your business in this issue.

Eliza Rawlings

In focus Flexibility Snakes are virtually unique in the animal kingdom in terms of their flexibility of movement and adaptability. In this issue, we show how customer applications in industrial installations can be made more flexible with enhanced modularity and rapid changeovers.

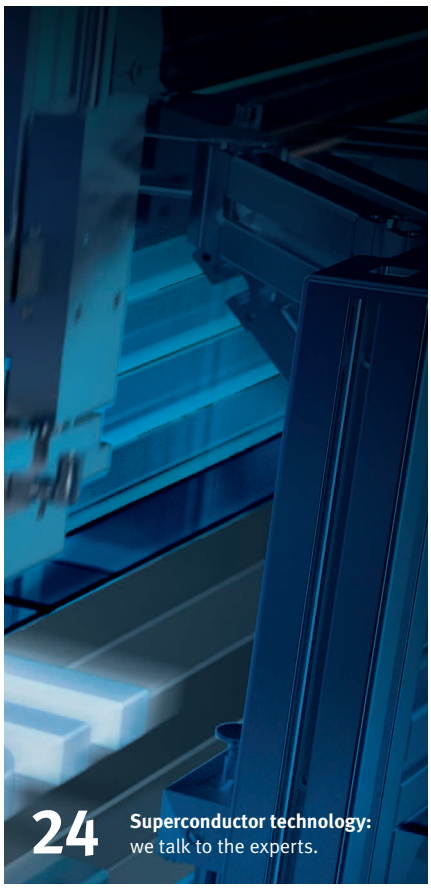
trends in automation

Issue 32



Compass

Easy to select, easy to connect, easy to configure
Warren Harvard, Product Manager for Electric Drives at Festo, discusses the challenges facing machine builders and what can be done to improve the easier selection, connection and configuration of electric drives solutions. ➔ **6**



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we talk to the experts.

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Potential implications of Industry 4.0

Impulse

SupraMotion
Festo presented three new future concepts at Hannover Messe. Project Managers Dr. Susanne Krichel and Stephan Schauz talk about the challenges and the potential of superconductor technology. ➔ **24**

Synergies

Preparing for critical change in the automotive sector
Warwick Manufacturing Group work with Horizon and Festo to make commercial production of battery modules feasible for electric vehicles. ➔ **10**

Batch size 1 – setup time 0
Highly flexible: the integrated automation solution and the fully automated tool changer reduce setup times for the mill-turn centres from Stama. ➔ **14**

Compact precision
The mini planar surface gantry plays to its strengths in the mobile device test platform developed by Finnish equipment manufacturer PKC. ➔ **17**

Leadership 4.0 – Training for a revolution
Neil Lewin, Consultant for Festo Training & Consulting, looks at the potential implications of Industry 4.0 for those who must implement change on the ground. ➔ **20**

Tension guaranteed
The production of elastic bandages requires consistent fabric tension. Swiss manufacturer of bandages, Wernli AG, makes full use of the strengths of the fluidic muscle. ➔ **28**

A perfect combination
Close cooperation: the automated installation of air intake controls is the result of joint development work and the optimal combination of cylinders, valve terminals and other components. ➔ **32**

A new departure

Terminal 4 at Madrid-Barajas Airport offers travellers a unique sense of space. The striking roof design resembling birds' wings covers a total of 200,000 square metres extending over 1.2 kilometres, making the interior feel light and airy. The choice of bamboo as the material for lining the curved structure is also unusual. Its properties make it the ideal choice: hard on the outside, hollow on the inside and extremely flexible, while at the same time durable and strong.

The wood itself is 25 per cent harder than oak. The outer layers of the bamboo poles are the hardest and provide the stability. The hollow insides are what give the material its elasticity and low weight. Bamboo can grow up to a height of 40 metres, with a pole circumference of up to half a metre. A member of the grass family, it is one of the fastest growing plants in the world.

Photo: © Tarmo Haud, www.TarmoHaud.ee

Simplifying and accelerating the implementation of electric drives solutions

...to select, connect and configure

Sourcing all control chain elements, mechanical and electrical, from one supplier ensures an integrated solution with easy connectivity, guaranteed system performance and compatibility. To simplify your next electric drive application, Warren Harvard, Product Manager for Electric Drives at Festo, discusses the challenges facing machine builders and what can be done to improve the easier selection, connection and configuration of electric drives solutions.

What are the biggest challenges currently facing machine builders?
For special purpose machine builders, being able to specify a solution quickly and easily with total confidence in the performance is key to winning business in an efficient manner. For the replicating machine builder, the challenge is to find a way to build a standard solution that can be re-configured easily and cost effectively to meet customer standards in terms of fieldbus and connectivity protocols. In both cases it's a highly competitive environment. Cost is critical but it's often the first to respond with a quote that gains the advantage.

However, there is an inherent conflict between reducing time and reducing cost. Shopping around multiple suppliers can identify lower cost components; but the all-important final price often masks the associated engineering sourcing, procurement, design and compatibility costs. Building a solution using multiple components from different suppliers is actually complex, time consuming and risky. There is always the potential that a mistake has been made – particularly when trying to 'marry up' different manufacturers' data, which is frequently presented in different formats, units etc. The potential for issues to arise around compatibility and connectivity is high and, with multiple suppliers involved, it is often unclear where ownership of that risk lies.

▸ **How does this affect the end users?**
Time pressures and a desire to avoid risks can lead to disadvantages for end users. It reduces the opportunities for machine builders to consider all the options and add real value at the design stage. Instead, the tendency is to stay with a proven specification and often to adopt a 'belt and braces' approach. This can mean that the recommended solution is not optimised, may be over-engineered to provide a safety factor, and is more expensive than it needs to be.
As a result, the end user can get a less efficient, more complex solution than necessary – creating potential service, maintenance and life time cost issues.

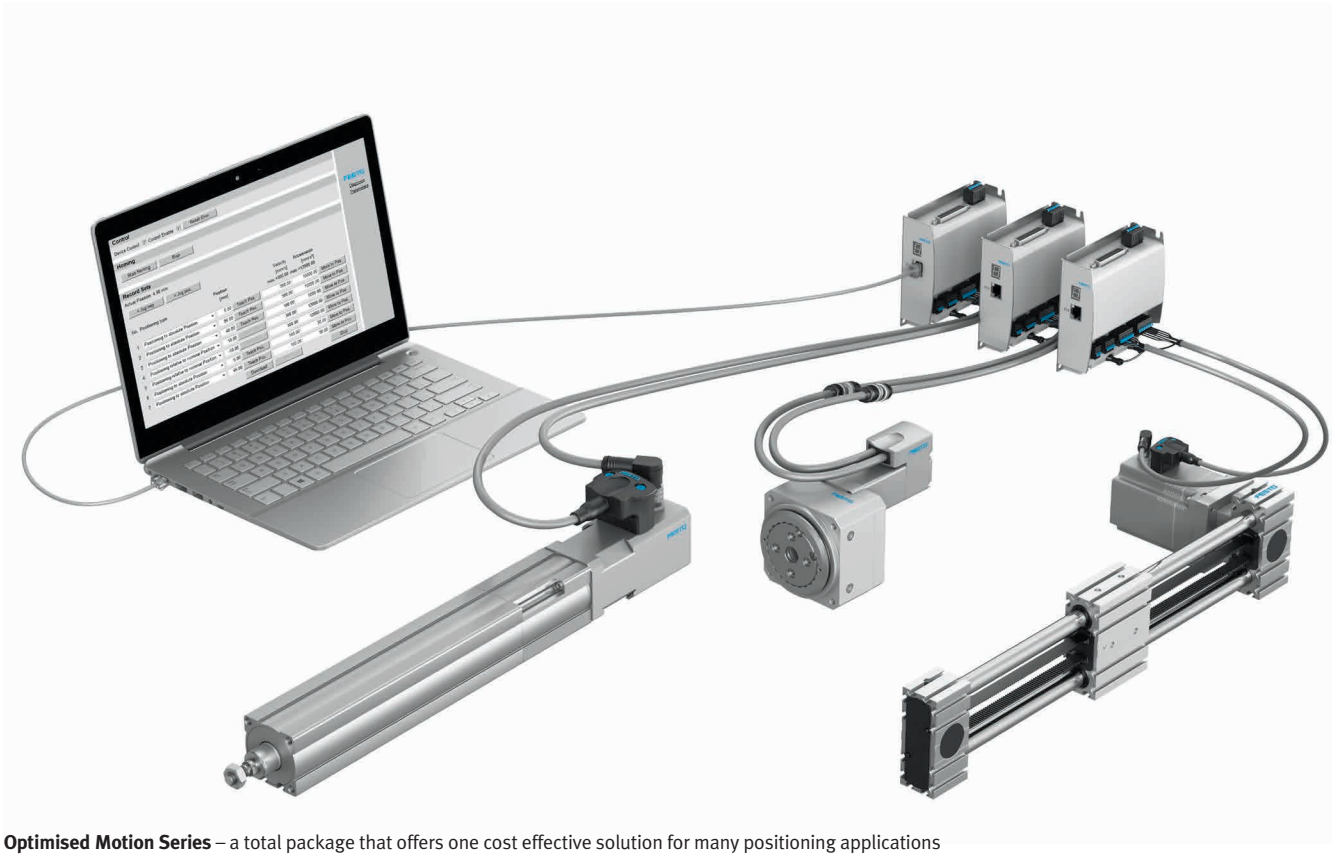
▸ **Can you give an example?**
Electrical positioning systems are a good example. They are commonly used in almost any machine that needs to position and move objects. Typically consisting of a positional controller, motor, gearbox and mechanical axis, cables and connections, their overall system performance is a result of the combined performance of the individual components. Machine builders frequently source these different elements from two, three or more suppliers; introducing questions around performance, compatibility and connectivity. Because of this it is often easier, quicker and safer to stick to previously used solutions, rather than look for new ones.

The effort and risk involved in deviating from a known solution is a real barrier to cost and performance optimisation. As a result, a machine builder may choose to stick to a known servo electric system that provides top end performance even when the application doesn't require it – and when there are other, more cost-effective technologies that can be used. For example, if dynamic movement requirements are not onerous, closed loop stepper motor technology offers the same control capability and can manage similar loads to servo systems, at a lower cost.

▸ **What can be done to improve this situation?**
Suppliers need to make it easy for machine builders to match components in order to deliver the required performance: easy to select, easy to connect, easy to configure. Manufacturers of electric drive components can play an important role by providing the tools and products to make it easier for designers and machine builders to make the right choices. There needs to be more understanding of designers' needs by the component manufacturer so that they can provide fast, knowledgeable support through the specification, buying and machine-building process.

▸ **What does Festo have to offer the electric drives market?**
Festo offers a wide range of motion solutions, from simple positioning to high -end servo electrics. Our overall approach is to focus on the needs of the machine builder. We want to make it quick and easy for designers to select the various components and understand their combined performance and overall costs. We do this by supplying all the elements in the control chain that are needed to make the solution work, both mechanical and electrical. The result is an integrated and joined up solution – easy connectivity, guaranteed system performance and compatibility, plus technical and customer support – all from one source. And because we offer all the elements, machine builders and designers can take advantage of a free simulation tool that provides a range of technical solutions based on the application requirements. The results provide guaranteed performance, known costs and, critically, the opportunity to make fast, optimised risk-free decisions.

A good example of our ability to offer performance oriented solutions is our Optimised Motion Series (OMS). We used our expertise to develop a total package that offers one cost effective solution for many positioning applications. Based on closed loop stepper motor technology, the Optimised Motion Series of electric drives has been developed to provide easy to use, multi-position control at a highly focused price point. So, OEMs and machine builders can order a complete ➔



Optimised Motion Series – a total package that offers one cost effective solution for many positioning applications

electric drive system using one product code and get all the components they need – including the cables, connectors and gearbox – delivered in one box. Because you are dealing with one supplier for all the components, compatibility is guaranteed.

▶ **What about connectivity?**
The OMS Series uses Festo technology to facilitate connection to various end user protocols. Machine builders can therefore design a standard electric drive system that, with a simple inexpensive change to the connectivity node, can communicate directly with a wide range of systems such as:
– I/O-link
– CANopen
– DeviceNet
– EtherCAT
– PROFIBUS
– PROFINET

Even the programming is supported with simple, modern, Web-config tools. All parameters are downloaded from the Festo web-server rather than having to be entered manually, significantly reducing programming time and the potential for error.

The Festo advanced CMMO stepper technology enables lower cost motor technology but with advanced control capability, including force and position control delivered in a smooth and optimised motion profile. Open loop control is the lowest cost option; but where accuracy and continuous monitoring is required then encoder feedback enables the system to operate in a cost effective and full closed loop servo mode.

▶ **The technology sounds great, but what about support with specification and commissioning?**
Festo has an online software tool called Positioning Drives that is freely available and will help OEMs and machine builders select the optimum OMS package for their application.

You just enter the application details and the software comes up with a range of technically matched solutions. The software's inbuilt mechanical knowledge and understanding takes into account the mechanical axis – whether piston rod, rodless gantry, cantilever-based linear drives or guided rotary tables – and provides the optimum product choice in terms of bearings, guidance and application demands such as mass, centre of gravity, off-sets, velocity, etc. Electrical compatibility is assured because once the optimum mechanical drive is selected the motor and gearbox are matched to the performance requirement.

The Positioning Drives software provides information about the safety margins offered by the proposed solutions so the designer can make an informed decision – making electric drive selection quick, simple and risk free. There is also simple, free access to CAD drawings in all standard native formats, electronic datasheets for easy technical file compilation, performance assurance and a single complete system price, so all the information is available in one place.

Once the machine builder has taken delivery, the chosen OMS package can be assembled out of the box using one tool – a simple Allen key. Because all the components come from one manufacturer the mechanical interfaces are designed to work together to provide secure, aligned axes; so there is no need for additional, expensive brackets and adaptors. When installation is complete, Festo's free Web config tool makes it fast and error free for

“Being able to specify a solution quickly and easily with total confidence in the performance is key to winning business.”

Warren Harvard, Product Manager for Electric Drives at Festo

the controls or commissioning engineer to set-up and prove the solution.

▶ **What are the benefits of using the OMS electric drive package?**

- Speed to design, thanks to our free software selection tool
- Modularity in terms of connectivity options to fieldbus systems
- Fast to quote customers with different fieldbus options – no need to redesign whole electric drive system, just change the fieldbus node
- Fast delivery – one week
- Performance guarantee of the system – proven in the software
- Cost effective technology (closed loop stepper appropriate for many applications)
- Simpler process – one supplier, one order, one purchase number, one delivery.

The philosophy behind the OMS range is simplicity. Before you consider specifying your next electric drive, watch our latest short video to find out more about easier selection, connection and configuration. ■

www.festo.co.uk/oms

WMG work with Horizon Instruments and Festo to make commercial production of battery modules feasible for electric vehicles

Preparing for critical change in the automotive sector

The trend for electric vehicles is clear, with many countries and manufacturers looking to adopt electric and hybrid drive technologies for future car propulsion. For example, Volvo has announced that it is switching from 100% reliance upon the internal combustion engine to electric based propulsion. The recently completed London Taxi Company factory will be producing electric taxis, supported by a government funded network of charging points. In Europe, France has announced it wants all cars sold after 2040 to be electric.

(A) High speed battery cell pick and place with the Festo H-handler.

(B) Electric vehicles only from 2040.

(C) Individual battery cells need to be tested and batched into modules with speed and accuracy.

The UK government has recognised the opportunity and the need to develop indigenous capabilities to manufacture the critical battery assembly technologies on which electric vehicles depend. In July, it announced a significant investment programme to develop the battery technology that will enable more energy storage and support a low-carbon industrial economy[1]. With regard to electric vehicles, a project to demonstrate that commercial production of batteries for electric vehicles is both feasible and cost competitive is now under way. It is using Festo automation technology to achieve the levels of speed and accuracy required to pick, place and handle components.

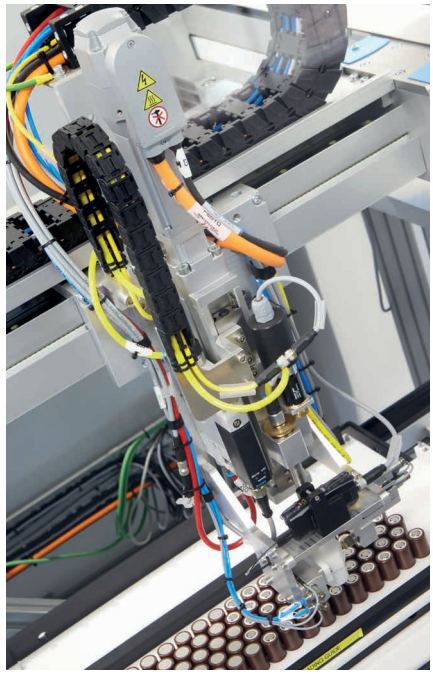
The £14 million AMPLiFII (Automated Module-to-pack Pilot Line for Industrial Innovation) project aims to create a proof of concept for a new automotive battery pack assembly line. The project is being led by leading research and education group WMG, at the University of Warwick, and brings together Jaguar Land Rover, JCB, Alexander Dennis (ADL), Ariel Motor Company, Delta Motorsport, Potenza Technology, Trackwise, HORIBA MIRA, The University of Oxford, Axion Recycling and Augean. The work also supports the UK Advanced Propulsion Centre (APC) National Spoke for Electrical Energy Storage, hosted by WMG, and has received £10 million in funding from Innovate UK, the UK's innovation agency, and the UK Government Office for Low Emission Vehicles (OLEV).

Within the AMPLiFII pilot battery assembly line, special purpose machine builder and system integrator Horizon Instruments Ltd, has developed a high-speed cell picker system using Festo's H-handler technology. Setting a new precedent for battery pack manufacturing, the cell picker presented several unique challenges.

Daniel Bolton, Technical Director at Horizon Instruments, explains: "We faced a number of technical and practical constraints when designing the battery module production line. These included a relatively confined space in which to ➔

[1] Business Secretary Greg Clark announced details of the first phase of a four-year £246m investment into battery technology on 24th July 2017. The initiative falls under the Industrial Strategy Challenge Fund (ISCF) to drive innovation across six key areas, as announced in the 2017 Spring Budget.

Automation solutions provider Horizon Instruments designed and integrated the Festo Handler and conveyor system



EXCH 60 H-Handler: a highly dynamic 2D planar surface gantry, controlled by a Festo CPX valve terminal.

fit the equipment and strict budget parameters, as well as a lead-in time of just seven months. We also needed to find a way of electrically testing each cell, rotating cells on demand and placing the cells into each module with high degrees of accuracy and at speed."

Put to the test

The pilot line required groups of 30 cells to be tested simultaneously for current and voltage before each cell was picked and placed in the battery modules. WMG had identified a standard battery testing unit as being fit for purpose, but unit costs and space constraints meant that it was not possible to accommodate 30 individual battery testers. To solve this problem Horizon and WMG developed a bespoke multiplexer interface which allowed a single battery tester to be used. This not only delivered savings on space and capital cost, but enabled data collation regarding test status.

The area available for battery assembly system is rectangular and measures approximately 1.2 metres by 2.0 metres. The system spans a through flow conveyor. Following testing, the battery cells need aligning accurately and sometimes inverting before being inserted into the module located on the conveyor. The number of battery cells required for a module varies and is configurable via a recipe. 100 individual cells per module is typical, with a total weight of approximately 9kg once assembled.

Again, space was at a premium. There was not sufficient room to employ a standard robotics solution, which would require a circular movement around the module in order to place all the components. Another novel solution was required.

Horizon considered a number of options to arrive at a bespoke design, but Festo automation won for several reasons. "We were confident in the quality of the technology, having worked with Festo on previous occasions," says Daniel. "More importantly for this project, Festo were capable of delivering a total Cartesian robot solution; so we didn't need to co-ordinate multiple suppliers or worry about product compatibility. They delivered a custom, cost-competitive system within eight weeks of the order being placed and also provided technical support throughout the design, installation and commissioning process."

Festo automated solution

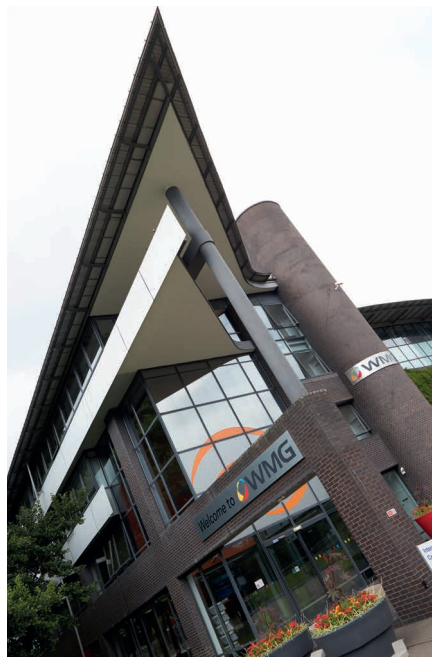
At the heart of the AMPLiFII battery pick and place system is the Festo EXCH 60 H-Handler, a highly dynamic 2D planar surface gantry, controlled by a Festo CPX valve terminal.

The EXCH is aimed at high-speed assembly operations where small, light mass-produced items need to be positioned quickly and flexibly. The gantry has a rectangular working area, which makes it more economical than SCARA and delta kinematic robots: both in terms of mass – around 150kg – and space requirements. The EXCH has a standard XY axis, but its single belt enables precise positioning at high speeds within a compact envelope. It also features a connector so that Z axis equipment such as a gripper can be integrated into the handling system with ease.

Powered by two fixed motors, the EXCH H-Handler delivers an optimum dynamic response when compared with other Cartesian gantry systems. By eliminating the need to use separate gantries for each axis, the EXCH delivers very precise alignment. It operates at speeds of up to 5m/s and acceleration rates of up to 50m/s^2, and is capable of 100 picks per minute with a repetition accuracy of +/- 0.1mm.

The CPX terminal used to control the cell picking activity is Festo's flagship automation platform, allowing state of the art electronics and pneumatics to sit on a single, stand alone base. With modules available for PLC control, multiple fieldbus standards, motion control, inputs and outputs, the CPX reduces the number of components on the machine whilst giving the controls engineer all the flexibility they could need.

This combination of control, speed and precision was critical to the success of the battery pack assembly line in demonstrating commercial viability.



“The project will help to develop the next generation of traction batteries for electric and hybrid vehicles.”

Professor Robert Harrison, Professor of Automation Systems at WMG

Using this combination of Festo automation technology means that each cell can be picked, rotated, aligned and placed in the modules within 1.2 seconds.

Steve Sands of Festo says: “This project is very significant for us because it is the first time our EXCH H-Handler has been applied in the UK. However, the automation technology now incorporated in this pilot line for electric vehicle batteries was originally developed for the construction of solar panels; so it has already proven its ability to handle delicate components and place them with great precision at speeds compatible with commercial production. This technology also has great potential to bring the benefits of automation to other industrial processes, such as high speed assembly, materials handling and palletising.”

Charging ahead

In addition to the pick and place system, the pilot line includes a Bosch Rexroth conveyor system and a Siemens control system, as specified by WMG. Festo servo motors are also used to provide vertical movement, and the transportation system for the battery input trays relies on Festo actuators.

Commenting on the successful commissioning of the new automotive battery pack pilot line, Professor Robert Harrison of WMG says:
“The UK government recognises that it is critical for the UK to embrace the opportunity created by the shift to electric vehicles. This is a proof-of-process pilot-line that, via the high-speed cell picker and other stations, will allow us to demonstrate our ability to automate the cell-to-module packaging process and to help pave the way to upscale to a full production plant in the Midlands region.”

“AMPLiFII will develop the new knowledge, skills, technology and facilities to support UK industry as it seeks to use new technologies and processes in vehicle battery systems. The project will help develop the next generation of traction batteries for electric and hybrid vehicles. It will combine the best human and automated assembly methods to manufacture battery packs and lay the foundations of a new UK automotive supply chain based around automated technology.” ■

WMG

www.wmg.warwick.ac.uk

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Horizon Instruments

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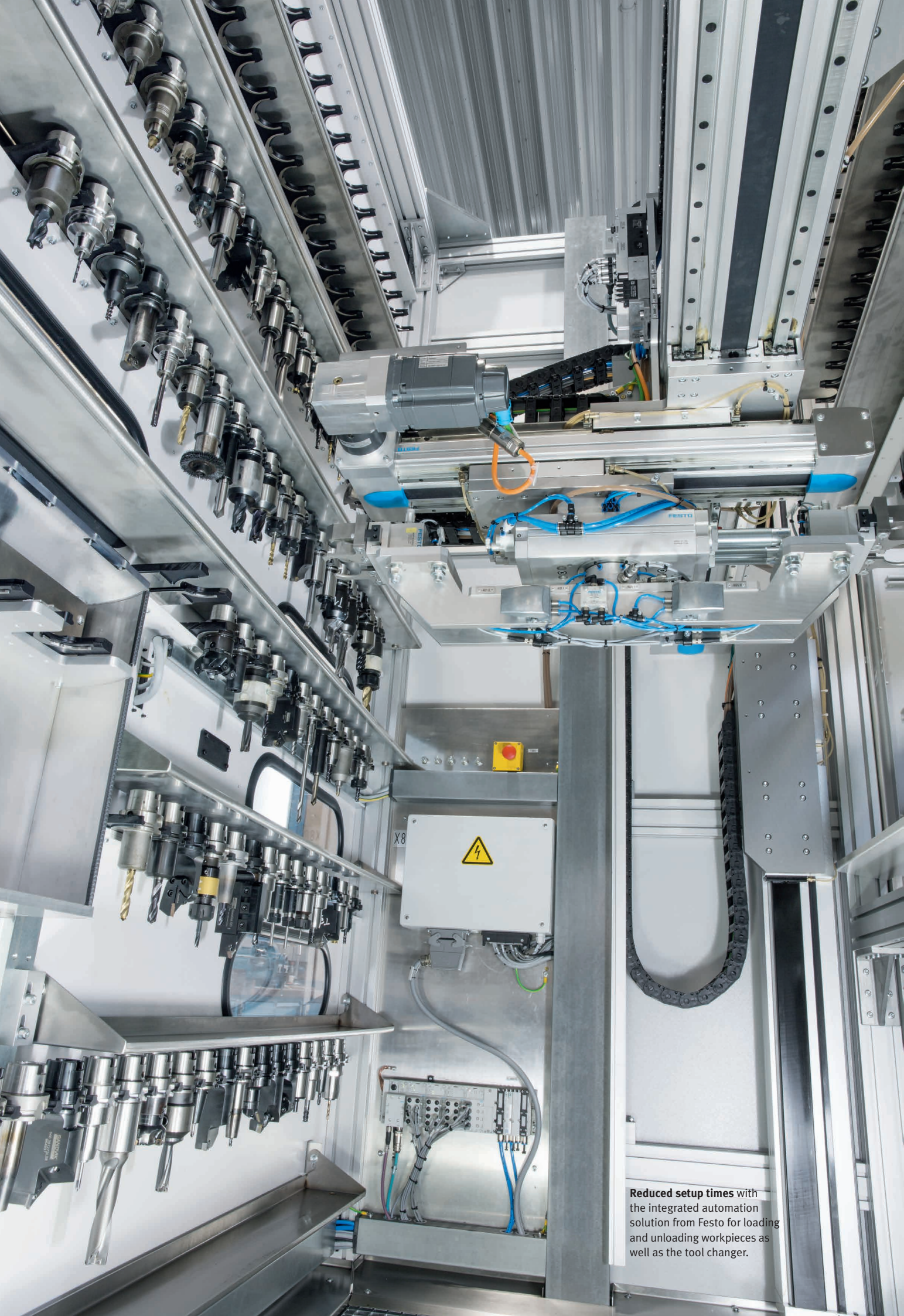
Area of business:
Design and build of integrated automated solutions.



Reduced setup times with the integrated automation solution from Festo for loading and unloading workpieces as well as the tool changer.

Highly flexible mill-turn centres

Batch size 1 – setup time 0

Many users of mill-turn centres from Stama are reporting time savings of up to 70% and unit cost reductions of 50%. This is all thanks to the high flexibility of the machines and their virtually negligible setup times. The integrated automation solution from Festo for loading and unloading the workpieces as well as the tool changer in the additional magazine contribute to this success.

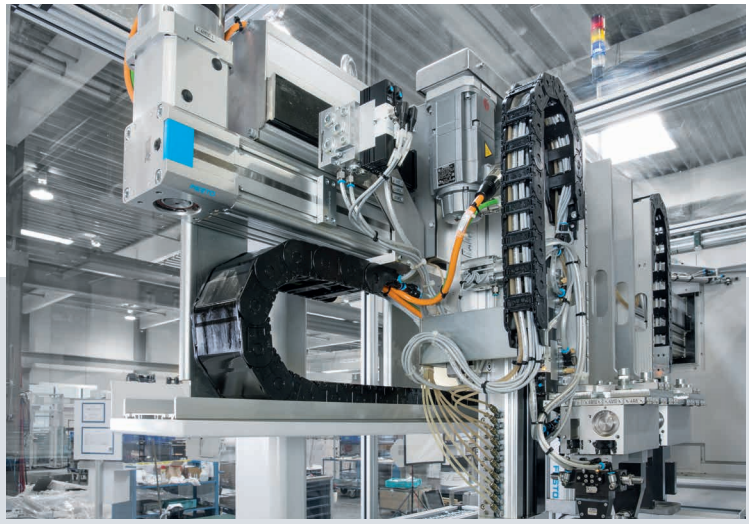
The big advantage of machine tools from Stama is that small batch sizes and high-volume series can be processed one after the other in almost any combination. "What makes our mill-turn centres stand out is the fact that workpieces can be fully milled, turned, drilled, reamed, ground, deburred and polished on all six sides in one operating cycle," explains Gerhard Schweicker, Sales Engineer at Stama. "With our 5-axis processing unit, the workpiece and tool are freely positioned and swivelled in the working space," adds the machine expert.

Vertical part loading

"The machines from the MT series MT726-2C and MT734-2C use two tools independently in parallel. The rotating spindles enable parts to be loaded vertically," according to Schweicker. "The parts are loaded by the integrated automation solution, a linear gantry from Festo with suitable grippers," says Jochen Boscher from the project management team at Stama. The loader and unloader places the workpiece at the processing station where it is automatically clamped. This enables optimum use of the operating cycles: while one workpiece is still being processed, the integrated automation solution can move into the processing area, unload parts and remove them once they have been processed, all independently of the other workpiece. The result is shorter unit times and lower unit costs, since loading no longer needs to be done manually. Instead, the ready-to-install linear gantry is opening up new perspectives. A 4.5-metre long horizontally placed axis DGE as well as two independently working vertical axes EGC with grippers HGPL from Festo enable the workpieces to be transported directly to the working space for processing, and to be simultaneously loaded and unloaded. Festo delivers the loader and unloader to the machine complete and ready-to-install.

Tool changer reduces setup times

Stama mill-turn centres from the MT726 and MT734 series are also available with an additional magazine for holding further tools in order to significantly reduce setup times when frequent component changes are required. Here too, fully automated tool changes are carried out by a complete and ready-to-install handling solution from Festo. This tandem gripper/rotary unit comprises axes EGC, the pneumatic semi-rotary drive DRRD and the heavy-duty tool gripper HGPT. "It's a big advantage to be able to get all the solutions we need for workpiece and tool handling from a single source during the project planning process," emphasises Boscher. ➔



Integrated automation: part loading is carried out by a linear gantry from Festo with suitable grippers. (above)

Tool changer reduces setup times: this tandem gripper/rotary unit comprises axes EGC, the pneumatic semi-rotary drive DRRD and the heavy-duty tool gripper HGPT. (left)

“The integrated automation solution with the loader and unloader as well as the tool changer from Festo helps to achieve a space-saving machine layout.”

Gerhard Schweicker, Sales Engineer at Stama

“In Festo, we have a competent development partner for all of our machine automation needs.”

Ready-to-install system solutions

When designing the system solutions for the mill-turn centres, the specialists from the Festo Technology and Application Centres were able to call on a wealth of experience gained while designing thousands of ready-to-install handling solutions. This experience is hugely valuable in projects of this kind, as it ensures the trouble-free integration of various bus systems or the I/O interface in the machine controller. Customer specific solutions for installation interfaces and disconnection points are adapted to the requirements. In this case, the loader and unloader as well as the tool changer in the additional magazine provide a highly flexible solution as the front end can be adapted to the customer’s requirements.

“The integrated automation solution with the loader and unloader as well as the tool changer from Festo help to achieve a space-saving machine layout,” says Schweicher.

“Since three quarters of our machines are used around the world, it is even more important that we work with a global partner like Festo with its extensive sales and service network. This is particularly true for China, where we as a machine tool manufacturer are experiencing especially strong growth,” adds Boscher from Stama. ■

- www.festo.com/catalog/dge
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- www.festo.com/grippers

Stama Maschinenfabrik GmbH

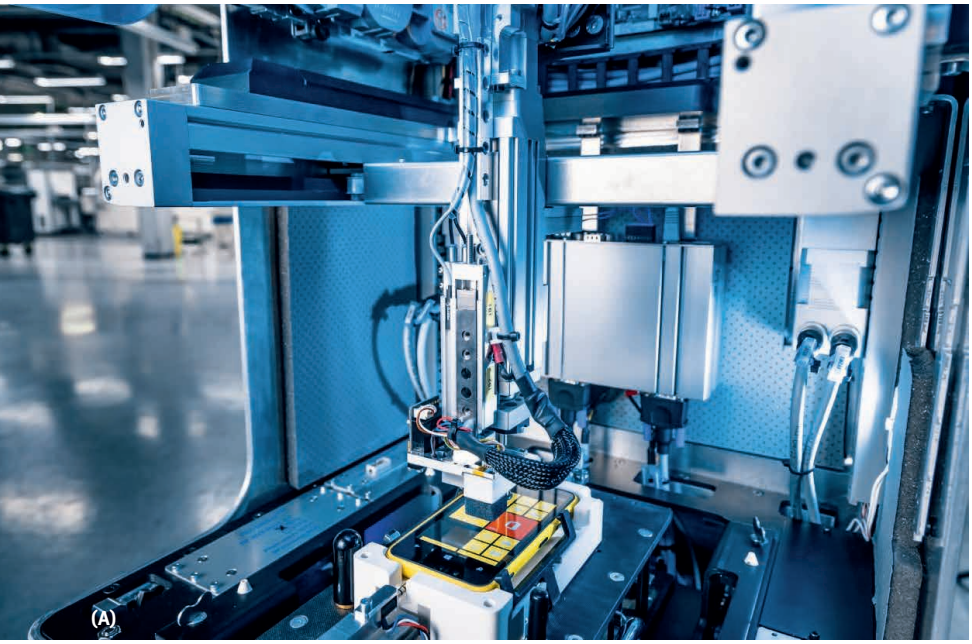
Siemensstraße 23
73278 Schlierbach
Germany
www.stama.de

Area of business:
Manufacture and distribution of vertical CNC machining centres, devices, tools and measuring technology.

Test platform for mobile devices with the mini planar surface gantry EXCM

Compact precision

Mobile electronic devices are developed in highly automated processes. Yet their touchscreens and keys are generally still tested manually. PKC Electronics decided to go in a completely new direction with its Chameleon test platform. It offers automated, fast and reliable testing of mobile devices using different adapters. The mini planar surface gantry EXCM is completely in its element in this environment.


(A)


(B)

(A) Approaches any position within its working space: the mini planar surface gantry EXCM.

(B) Highly automated: the only task performed manually is positioning of the mobile devices.

The adaptive test platform from Finnish equipment manufacturer PKC Electronics heralds a new era in the testing of electronic devices, which until now was mostly still carried out manually. As mobile devices such as smartphones, tablet PCs or navigation devices with their touch displays and sophisticated audio or video functions become more and more complex, so too does the task of thoroughly testing them. The user interface performance tests, touchscreen swipe tests, operation of the keys and switches on the sides of the mobile devices and the speaker and microphone tests require extensive and quality-assured test procedures. The rapid expansion of the smartphone and tablet PC market is also set to further heighten the demand for reliable test devices. In 2013 alone, 1.4 billion smartphones were in use worldwide. The number of tablet computers grew from 17 million in 2010 to 195 million last year.

Demand calls for automation

"Today, it is important for us to be able to offer turnkey test devices where all you have to do is quickly change the adapter for the different terminal formats and retrieve the right software for the test routine at more or less the touch of a button", explains Kimmo Hyrynkangas, Test Solution Business Area Manager at PKC Electronics in Finland. "Many end users need to change the adapters and associated programs twice a day on average", continues Hyrynkangas.

"With the Chameleon brand name, PKC Electronics has developed exactly the flexible test device we require", states Marko Anttila, Operation Manager at Elektrobit. Elektrobit is a Finnish manufacturer of mobile devices and infotainment systems for vehicles. "Equipped with the corresponding adapters, the solution allows even small and medium-sized series consisting of 10,000 to 100,000 units to be tested quickly and reliably", he adds.

Highly flexible solution

The high level of flexibility and adaptability of the test device enables customers to respond to the wide variety and ever decreasing product life cycles of mobile devices. Development times are shortening all the time. Extensive tests now have to be carried out as early as the development phase. Ideally, the test systems should be able to be used in both the development phase and during series production. End customers also need to integrate multiple test functions in a

“We couldn’t have developed our test platform without the compact mini planar surface gantry EXCM.”

Kimmo Hyrynkangas, Test Solution Business Area Manager at PKC Electronics

single test phase in order to guarantee fast throughput in volume production. These include display/touch tests, performance tests, audio tests and radio frequency tests, as well as thorough evaluations such as the fully integrated analysis of the audio test results. The Chameleon system thus sets a new standard in integrated test instruments, allowing tests to be performed on a single compact platform.

Integrated in a single unit
Another industry trend is also on the horizon: as the test facilities are integrated in the production cells, the test devices need to be made smaller and smaller. It is also important to have enough test capacity, so that the test process does not lead to supply bottlenecks. “This is another way in which the test devices from the Chameleon series set themselves apart from others on the market – because they can analyse the tests within the device”, explains Hyrynkangas.

Perfect position
“The mini planar surface gantry EXCM from Festo appeared on the market at exactly the right time”, says Risto Mäkelä, Chief Engineer at PKC Electronics. “With this compact, ready-to-install planar surface gantry, precise and fast positioning in tight installation conditions is now extremely easy.”

Jukka Merisalo, Key Account Manager at Festo Finland, adds: “The planar surface gantry EXCM really shows off its strengths in situations where every millimetre counts.” The compact planar surface gantry can travel to any position within its working space. It just needs an area equivalent to a DIN A4 sheet. The recirculating toothed belt moves the slide within a two-dimensional area (X and Y axes). The fixed motors are connected to the slide and thanks to the parallel-kinematic drive principle, the moving masses remain low. This allows fast positioning at speeds of up to 500 mm/s and repetition accuracies of the order of ±0.05 mm.

Together with the electric slide EGSL, the Z-axis is responsible for the correct functioning of the touch and swipe tests. The pneumatic slide DGSL is equipped with a microphone and light cube, allowing audio, camera and display tests to be performed.

Ready-to-install system solution
The gantry is quick to commission and can be integrated quickly into machines. The pre-parameterised drive and controller package gives users the security of knowing that they can concentrate on their own core competencies without having to concern themselves with the details of automation technology. “The fact that Festo could offer us a complete package consisting of hardware, software and a consultancy service is what tipped the balance in their favour”, says Mäkelä.

www.festo.com/excm

PKC Electronics Oy

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92120 Raahe
Finland
www.pkcelectronics.com
www.pkcgroup.com

Area of business:
Turnkey solutions for testing and power management as well as the design and manufacturing of electromechanics.

Neil Lewin, Consultant for Festo Training and Consulting

Leadership 4.0 – Training for Revolution

Industry 4.0 is the latest buzzword. It's the fourth industrial revolution and represents the future where intelligent machines are self-aware and automation challenges can be solved by the machinery itself.

The manufacturing and engineering industries are on the cusp of this revolution. Only the most agile organisations will thrive, while those with one foot in the past will be left behind. To be successful, leaders and managers must put in place new strategic thinking to exploit business opportunities and respond to threats.

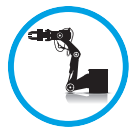
But what are the potential implications of Industry 4.0 for those who must implement change on the ground? Neil Lewin, Consultant for Festo Training and Consulting explores this issue.

At Festo, we believe that even change itself is changing. The amount of activity, the frequency of projects, and the requirement to adapt quickly is ever increasing. And that's just on a day-to-day basis. To consider the long-term strategic change required by Industry 4.0 we need a different form of leadership – Leadership 4.0.

Leadership 4.0 looks at the capabilities and qualities that will be required in the factories of tomorrow. The leaders of the future will need to adapt to five environmental changes:

1. Competition – react quickly to faster, younger and dynamic organisations emerging to challenge market leaders.

2. Hierarchy – free up the decision-making process to speed up the pace of change.



3. Technology – harness the talents of individuals to maximise technological advancements.

4. Hyper connectivity – quickly take advantage of the opportunities of hyper connectivity.

5. Transparency – manage change with open and honest communication.

Preparing for Industry 4.0 requires a proactive and flexible approach to managing change. New competition, an increase in customer complaints, low employee morale and low productivity are all signs that your organisation is falling into reactive change - significantly increasing your risk of failure.

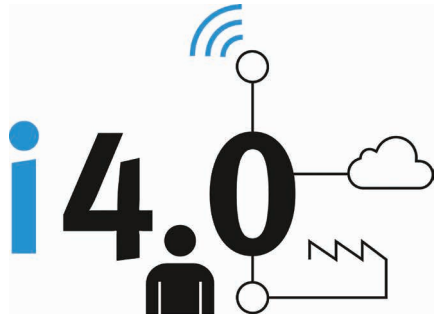
So how can you mitigate your risk of failure? Before you set out on your journey you need to make sure that your organisation, your team and your people are ready for change. Completing a change readiness assessment will help you understand how fit your company is for change.

The next step is to map your change journey, starting with setting your destination. You need to take your employees on the journey with you and give them a compelling vision of what you're trying to achieve. In change processes, we often explain the 'what', maybe even the 'how', but don't always talk about the 'why'. Why is it necessary for the business and the individual?

Once you have your destination in mind, you can start to work backwards. Map the journey, plan the key waypoints and look out for where you're most likely to be able to engage your people, or might lose their commitment. Link the overall business objective to individual Balance Score Cards. This will provide you with an understanding of how every individual in your company contributes to the project.

Once you're in the midst of a change management journey, you will be relying on your managers to Plan, Organise, Lead and Evaluate (P.O.L.E.) the project, the process and their people. Expecting your managers to be proficient in all of these areas is a tall order. Yet successful change will only be delivered if they are. That's why training in change management is fundamental. And that's where managers are frequently let down by organisations.

When senior leaders instigate change, it is often cascaded down through an organisation for managers and their teams to implement. This puts enormous pressure on managers, many of who feel ill equipped or unsupported to handle major change projects. ➔



Over one third of managers suffered stress and anxiety because of a conflict with someone they were managing.

Managers need to be adept at handling difficult people and tricky situations. And yet these skills are often lacking. In recent Festo research, we found that over one third of managers suffered stress and anxiety because of a conflict with someone they were managing.

So what can managers do to deal with the challenges?

• Take a step back and dispassionately analyse the situation.

• Break the cycle. It's difficult for managers to understand that it is usually their behaviour and attitude that needs to adapt and change first.

• Have courageous conversations. A manager needs to be firmly committed to helping their employee.

• Develop a coaching culture. If employees feel respected, supported and valued they are more prepared to change their own behaviour.

• Speak to the problem. Address the problem, rather than criticising the individual.

• Always follow-up. It's unlikely that a single conversation will have a miraculous effect on behaviour.

Change is often seen as a negative so it's no wonder that business leaders, managers and employees view any type of change with a degree of trepidation. There is, however, tremendous potential in any change project. Change is never delivered solely from the top of the business. It needs to engage leaders, managers and the whole team. To do this you need to consider how you communicate. You need to put in place a communication plan that starts when you're mapping your journey and continues all the way through and beyond the change project. And for communication to be successful, you need to communicate more than just facts and figures. You need to engage people in why the change is necessary and you need to be there to guide people through the change. We call this communicating to the head, the heart and the hand.

We are facing the fourth industrial revolution. It will alter the very trajectory of manufacturing and engineering. We've already seen many customers fail in the last 20 years because they have been unable to adapt to changes in the environment.

Driving change through a business in a way that makes us agile, with people and the organisation willing to adapt, is the new challenge. Managers are critical to steering and delivering change. Get them on board and only then can we set

“In change processes, we often explain the ‘what’, but don’t always talk about the ‘why’”

Neil Lewin, Consultant for Festo Training and Consulting

ourselves on the journey to success and be better prepared for the unexpected. And it seems that the unexpected is happening more often.

Festo has developed a new workshop focused on implementing Industry 4.0, understanding the core elements and the challenges that Industry 4.0 presents. See page 37 for more info and www.festo-didactic.co.uk/TCM261

Festo has also produced a White Paper on Getting ready for Industry 4.0 which can be downloaded at: www.festo-didactic.co.uk/I40 ■

The Five Essential Qualities of Leadership 4.0

Change and uncertainty is becoming the norm for manufacturers, not only in the onwards march towards Industry 4.0, but also in light of domestic and international political changes. Those most likely to flourish are already pre-disposed to change.

While some organisations seem more able to cope with and respond to change, others are left floundering and at the mercy of their more agile competitors. So what is it that makes an organisation more likely to embrace the implementation of Industry 4.0 projects?

It is the leadership and the readiness to embrace ‘the new’ and develop a culture that embraces change. We call this Leadership 4.0 and it is a style of leadership that will move an organisation through rapid advancements in technology with a high level of employee engagement.

Neil Lewin at Festo Training and Consulting highlights five essential skills required to effectively push through Industry 4.0:

- The need for speed: The speed of change is increasing and new entrants to the market can quickly erode market share. Leaders need to react quickly to new competition on the horizon
- Autonomy of decision-making: Leadership 4.0 is about dispersed leadership. Today’s leaders need to be able to make decisions, maximise opportunities, react to change and keep clear communication flowing, free from the shackles of hierarchy and politics
- Communication: With change and uncertainty comes anxiety and fear for the future. Good leaders recognise this and keep lines of communication open, even when they don’t have all the answers
- Harness talent: There is a plethora of talent and experience within today’s manufacturing organisations. Effective leaders recognise talent and utilise it to fully explore and maximise new technology
- Provide training: New technology requires new technical knowledge. Effective leadership identifies gaps in knowledge and equips the team with the right skills to optimise Industry 4.0 implementation.

Festo has been demonstrating the effect of the superconductor-magnet combination with a wide range of motion and handling units at trade fairs since 2013. This year, the company presented three new future concepts for automation with superconductor technology. Dr. Susanne Krichel and Stephan Schauz head a development team that is exploring the exciting possibilities and characteristics of this technology. They talk to trends in automation about the challenges and the potential of their work.

Stephan Schauz and Dr. Susanne Krichel
head the SupraMotion project team.

▶ **trends in automation**: What attracted you both to this technology – how did you first come into contact with it?

Dr. Susanne Krichel: The first time I saw a superconductor was at an open day hosted by the physics institute at my university. It was wrapped in a cooling nitrogen package and moved contactlessly over a magnetic rail. At the time I could never have imagined that one day I would be working with this technology at Festo, with the aim of actually developing a product. So I am delighted to have the opportunity to exploit the potential of this technology together with my colleagues.

Stephan Schauz: Before SupraMotion, my department was working on new processes in technical ceramics, among other things. Because the semiconductors we were using at the time are also made of a ceramic material, preparing a study of this technology became part of my responsibilities, which now also include other areas of superconductivity and magnet technology.

▶ **trends in automation**: What are the technical characteristics of this technology and what is the development goal? What types of products are you hoping to create?

Schauz: SupraMotion utilises the effect of saving spatial fields, specifically in the case of so-called second-generation superconductors. The position of any magnetic field relative to the superconductor can thus be saved by the superconductor and used without the need for additional sensors or controllers. The development goal is to provide our customers with products and functional units that enable them to enjoy the benefits of this technology in new applications without having to understand its complexity. They should in principle be able to integrate our SupraMotion products into their automation environment just as they could any other product from Festo. ➔

Krichel: The exhibits demonstrate very realistically how the effect of a superconductor magnet combination can be used in various applications. However, we are still some way off from the technology being used in industry. At the end of the day, our customers want reproducible data and reliable components and modules. We are therefore currently working out the fundamental relationships of this technology and using them to create system models. Although we are still at a very early stage in the product development process, we are already engaged in detailed discussions with pilot customers about applications in current and future generations of systems. This will help us to assess market potential and to develop our technology accordingly.

> "Our challenge is to take the most promising ideas and to develop them into the automation products of tomorrow."
>
> Dr. Susanne Krichel,
> Portfolio Management Business Opportunities, Festo

▶ **trends in automation**: What are the possible application areas for this technology? What potential does Festo see in superconductivity for automation technology?

Krichel: There are both advantages and disadvantages to using a completely new technology. Right now, it is difficult to predict with complete accuracy what applications will develop – it varies significantly depending on the industry. Having said that, the technology has opened up a whole new world of possibilities, and it is exciting to be involved in working out the requirements and a possible product portfolio. In the biotechnology/pharmaceutical or food industries, for example, handling systems that can intervene in processes without any abrasion or contact would be of enormous benefit. In other areas, complete electrical insulation is very exciting, while the frictionless and therefore low-energy transport of heavy loads would be useful in traditional machine building.

▶ **trends in automation**: How are you dealing with these challenges and what do you see as the key task in the development of superconductor technology?

Schauz: In addition to getting to grips with the actual SupraMotion technology – which is a challenge in itself – we have to meet requirements for industrial use. Because saving magnetic fields is an area with many as yet unknown applications, it is important that the basic modules be kept as multi-functional, compact and efficient as possible so they can then be joined and combined in different ways to create function modules with specific characteristics. We could use this technology to provide our customers with linear or rotary axes with defined characteristics, for example.

▶ **trends in automation**: You are doing a lot of development in cooperation with (future) users of the technology. Why? What input do you receive from them?

Krichel: In product development, focussing on the needs of the customer is extremely important, particularly in the case of new technologies, as it ensures that the development process is steered in the right direction from the very beginning. This is much easier to do with pilot customers, as they provide us, as developers, with clear guidance and direct feedback on the progress of the project. This in turn leads to the technologies being accepted more easily, both internally and externally.

▶ **trends in automation**: What are the main challenges when developing products based on superconductivity?

Schauz: In automation technology, having control over the object to be manipulated is crucial. We must therefore be able to precisely determine and directly influence the levitating state of objects. In addition to ensuring that the levitating objects are securely held in place, we also want to supply suitable sensors and drives. The six possible degrees of freedom of a levitating system mean that specific parameters become important or must even be redefined, such as spring stiffness or maintaining a position during acceleration.

▶ **trends in automation**: Is cooling not expensive?

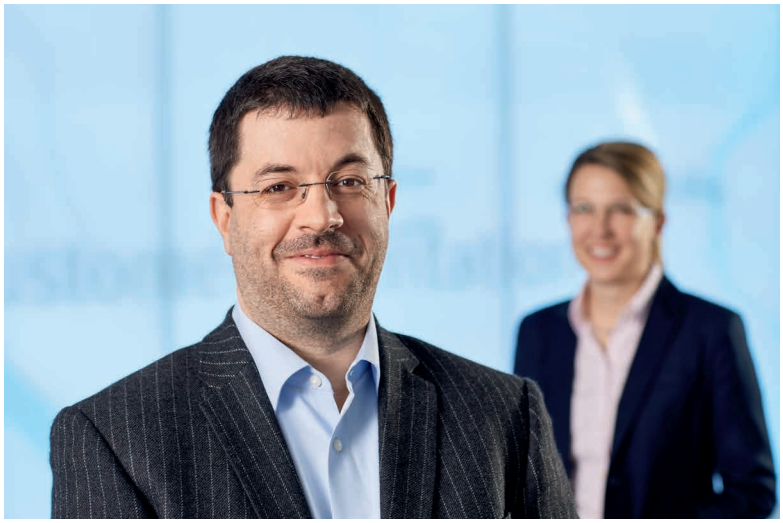
Krichel: We are often asked this question at trade fairs. Temperatures in the region of –200 °C may initially sound like they require a lot of energy consumption. It's always great to be able to pleasantly surprise customers, as one of our milestones in recent years has been the switch from nitrogen-cooled to electrically cooled cryostats, which can easily be integrated into existing

SupraShaker, SupraLoop, SupraDrive

At Hannover Messe 2017, Festo presented three exciting new concepts for using superconductor technology in industrial applications. In these concepts, superconductivity supports the highly dynamic operation of a levitating slide as well as a levitating vibration system with tilting option. They also show how superconductor technology can be easily combined with other transport systems. All of the exhibits draw on the unique properties of superconductors, which allow a levitating motion that combines low energy consumption and high efficiency.

SupraShaker: one of three new future concepts

In the SupraShaker (see picture), a plate levitates above a cryostat containing superconductors. An electric motor with eccentric cam converts this into a shaking motion via a magnetic coupling. In addition, by transferring a magnetic field it can be tilted in any direction. The gap between the plate and the automation system ensures that the tool and the machine are mechanically separated, and prevents vibrations from being transmitted to the entire system. More information about the individual concepts can be found at www.festo.com/supramotion.



processes. The power consumption of the coolers that we use is 80 W in full-load operation. When the required temperature of –180 °C is reached, however, power consumption can be reduced.

▶ **trends in automation**: What has been your most surprising moment in the project so far?

Krichel: I always enjoy touching a levitating magnetic puck and feeling the forces that hold it in place. That's why I try to bring customers directly into contact with our systems, although you do have to be careful when handling the magnets – the forces are immense. You have to experience it for yourself to truly appreciate it.

> "Levitation implies freedom – whereas automation requires maximum control."
>
> Stephan Schauz,
> Product Concept Evaluation, Festo

Schauz: If you were to tell an engineer that he can only work with electric currents and cannot use electric voltage or resistance, his initial reaction would be one of shock. Superconductors operate in a very demanding physical range, which differs enormously from the real world that we live in. We suddenly find ourselves in an entirely unfamiliar branch of physics, and the approaches that we are adopting in product development are extremely exciting.

▶ **trends in automation**: So what happens next?

Krichel: We have countless ideas that we could spend years working on in our development laboratory. Our challenge is to take the most promising ideas and to develop them into the automation products of tomorrow. That is why we are asking customers who are interested to contact us. We look forward to receiving their suggestions and the opportunity to exchange ideas. ■

Further information and animations can be found at **www.festo.com/supramotion**

Textile industry: producing bandages using the fluidic muscle DMSP

Tension guaranteed

The production of elastic bandages requires consistent fabric tension. Swiss manufacturer of bandages, Wernli AG, previously achieved this using manually suspended compensating weights. With the fluidic muscle from Festo, this process is now simpler, more precise and safer.

“Thanks to the precise closed-loop control of the fluidic muscle DMSP, the yarns are now optimally tensioned.”

Ruedi Leutert, Head of Prework/Weaving, Development and Yarn Purchasing at Wernli AG

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. Pioneering new developments such as bandages with sensors for measuring fever or for therapeutic pressure regulation – coupled with an app for intuitive operation – have played a major role in the company’s success. 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.

Complex balancing act using weights

For long-term success, however, you need more than just product innovations. According to Ruedi Leutert, Head of Prework/Weaving, Development and Yarn Purchasing at Wernli, the flexibility to custom-manufacture small-scale series and deliver quickly is also important. The company’s readiness to continuously develop its production processes plays a key role here. 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 uneven 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.

Optimally tensioned

Thanks to the fluidic muscle there is no longer a need for the weights and the yarn tension is set precisely using pressure regulators. The innovative pneumatic drive has clear advantages for this

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

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. Textile expert Mr Leutert can also see further optimisation potential for this solution: the fully automatic closed-loop control using the proportional valve VPPM and corresponding sensors could replace the manual adjustment of the muscle using a pressure regulator, thus completely automating the tensioning process.

Safety in a small space

The force of the fluidic muscle is also many times greater than that of a traditional pneumatic cylinder of comparable size. As a hermetically sealed tube, the muscle is also insensitive to particles and dirt, which is important in the dusty environment of a textile factory. Without the weights used previously, the quality of the products is improved and the risk of accidents is reduced. Employees no longer have to worry about bumping into the weights as they walk past them or injuring themselves as they attach or remove them. A further advantage is that the fluidic muscle needs much less installation space compared with the weights. ■

www.festo.com/fluidicmuscle

Wernli AG

Egggasse 4
4852 Rothrist
Switzerland
www.weroswiss.com

Area of business:
Manufacturer of innovative bandages and technical dressings

Automated assembly of air intake controls

A perfect combination

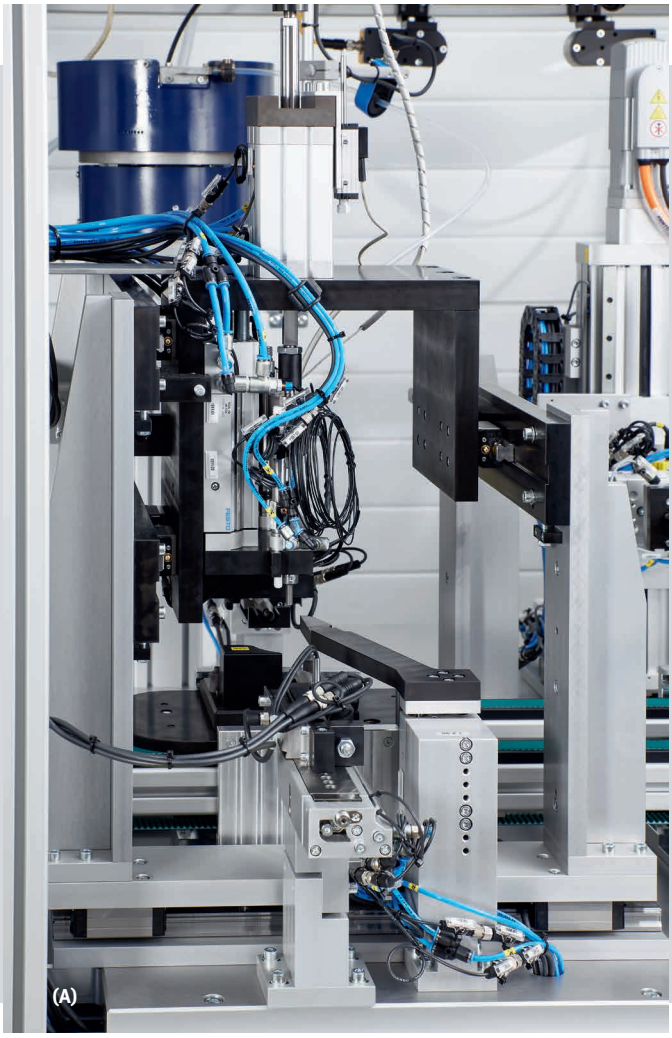
Two small, innovative companies have been leading suppliers to the automotive industry for many years. Their success has been built on using the latest technology as well as close cooperation. The jointly developed production system for air intake control for petrol and diesel engines is a perfect example.

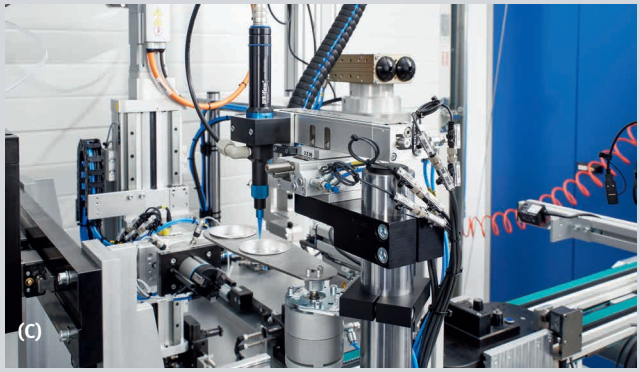
Vögele Industriesteuerungen and LTW Automatisierungstechnik were founded almost simultaneously in 2003. Since 2007, both companies have been working closely together. The specialists in special machine construction, control and automation technology develop and implement solutions for major companies in the automotive, electronics, dispensing and distillation technology industries.

One of the reasons for their successful partnership is the use of innovative technologies. "We always try to integrate the latest technology into our systems, as standing still means going backwards," says Martin Wolf of LTW. "By making our machines amongst the most powerful and efficient available, we are securing our position in the market despite being a small company – and we really enjoy working with the latest technological advances. A new system for producing air intake controls for petrol and diesel engines is proof that cooperation with a complete solution provider such as Festo can benefit both companies. The successful mix of electric and pneumatic components means that they can concentrate on their core business in design, assembly, commissioning and maintenance. The components, which are used in the smallest of installation spaces, include the service unit MS, motor controller CMMP-AS, electric linear axis EGC, semi-rotary drive DRVS and mini slide DGSL with intermediate stop.

Manual and automated

On a new system from LTW and Vögele that is integrated in a production line for the manufacture of air intake controls for one of the world's biggest automotive suppliers, the housing, shaft and throttle valve as well as the locating pins are joined. Air intake controls regulate the supply of combustion air for diesel and petrol engines and consist of a plastic or metal





(A) The first of the three fully automated workstations rotates the workpiece carrier 180 degrees using a cylinder DRSL and fixes it in place using a holding unit controlled by a mini slide DGSL.

(B) Twin-piston semi-rotary drive DRRD with three-point gripper DHDS for picking up the workpiece for machining.

(C) A semi-rotary drive DRVS moves two drip trays below the dosing nozzle, thus protecting the system against contamination.

housing with an integrated, shaft-mounted control flap. The system comprises a semi-automatic manual workstation and a fully automated module with three workstations. As the air intake controls come off the conveyor, a rotary and swivel unit first rotates the workpiece carrier 180 degrees so that the information from the reading head can be analysed. A compact cylinder ADN designed as a holding unit fixes the plastic housing of the air intake control in place. A worker then inserts the shaft for the throttle valve, which is added later in the process. An electric linear axis EGC moves the workpiece carrier into the correct position for the shaft length, which varies depending on the type. The pneumatic linear drive DGC moves a pilot mandrel into the end position. The shaft is then pushed into the component with the pilot mandrel by pressure switching. After the joining process, the worker manually inserts the throttle valve into the fitting holes of the shaft.

Precision fixing

At the first of the three fully automated workstations, the workpiece carrier is rotated 180 degrees using a cylinder DRSL and then fixed in place using a holding unit controlled by a mini slide DGSL. The next step involves checking the presence of the needle bearing case and needle bearing, which enclose the throttle valve shaft on both sides. At the same time, they are correctly aligned and positioned so the locating pin can then be pressed in. To ensure that the pin can be inserted at different points, a round cylinder DSNU moves the complete workpiece carrier into position.

The second automated workstation first removes the workpiece from the conveyor using semi-rotary drive DRRD with three-point gripper DHDS, so that the machining forces do not have a negative impact on the conveyor. After being moved to the machining position, the ends of the locating pins are drizzled with a synthetic resin. To reach the pin ends on both sides of the air intake control, the workstation swivels the workpiece 180 degrees and then back into the initial position. Meanwhile, a semi-rotary drive DRVS moves two drip trays below the dosing nozzle to protect the system against contamination.

Intelligent time savings

At the third workstation for curing the adhesive using UV light, two workpieces can be processed at the same time. After one workpiece has been gripped, rotated 180 degrees and transported to the UV station, the next one can be picked up ➔

“Thanks to the use of new Festo products and our close cooperation with Festo, we are always up-to-date with the latest technology.”

Albin Vögele, Vögele Industriesteuerungen

“When it comes to quality, we make no compromises. As a small company, we need to focus our resources and keep potential repair and maintenance costs to a minimum.”

Martin Wolf, LTW Automatisierungstechnik

and taken for curing. With a system cycle time of just 13 seconds, the curing time can be doubled. The intermediate stop of the mini slide DGSL ensures optimum positioning of the upper of the two UV lights. The slide DGSL is equipped with short shock absorbers for space reasons. Once all adhesive points have been cured, the air intake control is placed back on the workpiece carrier and transported to the next machining line. The valve terminal MPA/CPX together with the service unit MS and the new motor controller CMMP-AS M3 with safety plug-in card ensure good performance, high energy efficiency and maximum safety. ■

www.festo.com/catalog/drvs
www.festo.com/catalog/dgsl

The new system from LTW and Vögele mounts the housing, the shaft and the throttle valve as well as a locating pin in just 13 seconds.

Vögele Industriesteuerungen

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88677 Markdorf
Germany
www.voegele-industriesteuerungen.de

Area of business:
Control and automation technology

LTW Automatisierung-stechnik

Mühlbachstraße 23
88697 Bermatingen/Ahausen
Germany
www.ltw-automatisierungstechnik.de

Area of business:
Special machine construction and automation

[In brief]

News from around the world

Suzhou, China
In a joint initiative, Festo Didactic SE and Suzhou Industrial Park Human Resources Development Co., Ltd. (SIPHRD) have developed a learning centre for providing training to specialists from the China-Singapore Suzhou Industrial Park (SIP). There are 5,000 companies based at the SIP. Half of them are international companies – among them global players including Audi, Logitech, Apple and Bosch. A total of 710,000 specialists and managers work at the SIP.

Youtube, worldwide
With the new YouTube video series "service2see", Festo is providing a support tool for service technicians and engineers in the areas of maintenance, commissioning and configuration.

The online tutorials show, for example, how to replace the toothed belt of an EGC axis or how to update the firmware of the Festo Configuration Tool. The channel was launched with around two dozen tutorials in German and English and will be gradually extended. The objective is to create a YouTube library that covers the topics and questions that the Festo Technical Customer Hotline are asked most frequently.

www.festo.com/youtube/service2see

At your fingertips: on our YouTube channel Festo Service, you will find practical and user-friendly video tutorials on frequently asked questions and topics.

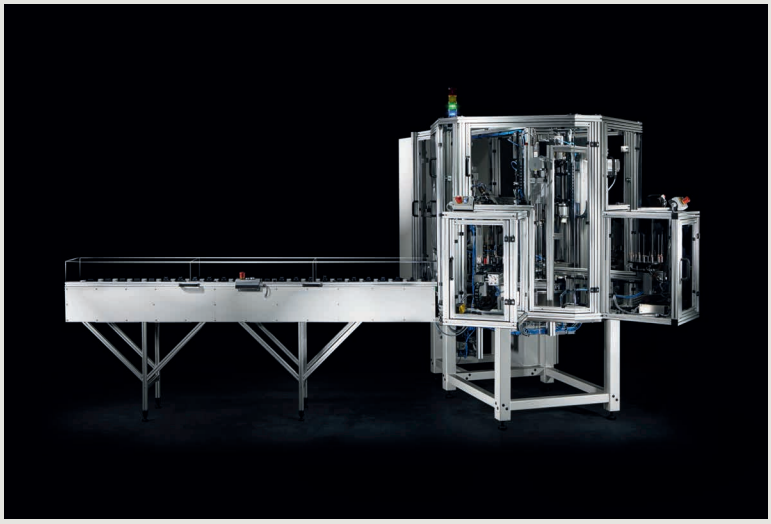
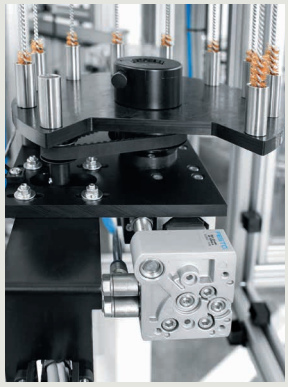


Photo: © EM-Technik

Perfectly polished

Austria // Cleaning the inside of tall, narrow glasses or bottles is not an easy task. Polishing and deburring the insides of narrow pipes is even trickier. Tyrolean company EM-Technik has developed the ideal solution, which features components from Festo at every processing step. Semi-rotary drive DRRD, stroke cylinder DGSL and parallel gripper HGPD are used to feed the pipes.

To process the pipes, small brass brushes are picked up automatically using three-jaw grippers and guided through the pipe with vertical movements. They are then alternately rotated in a clockwise and anti-clockwise direction. At this and all downstream processing stations, electric toothed belt axes ELGR with stepper motors EMMS ensure perfect precision in motion sequences along the Z-axis. An additional station is reserved for smaller quantities for special designs. With these variants, part of the outer contour also needs to be processed. An electric cylinder type EPCO ensures that the tool is precisely tilted until it reaches the required angle. A toothed belt axis ELGA aligns the entire station to compensate for the tilting movement.



DGC axes feed the brush magazine from the magazine set-up to the processing station.

www.em-technik.co.at

Electric Automation mobile on tour

Great Britain// The Festo Electric Automation Mobile tours the UK from the 25th September to the 6th October. The vehicle is fitted with Festo's innovative electric automation products, including our automation pyramid which describes a variety of (electro)mechanical systems for most application requirements in automation. This also shows our harmonised and scalable motor and controller range including suitable software tools to support the hardware. Some highlights being that of the Optimised Motion Series from Festo with dynamic displays showing how easy it is to select, connect and configure.

"The display vehicle allows us to demonstrate the latest technology innovations that help end users, Original Equipment Manufacturers and system integrators improve equipment design and operational performance," says Warren Harvard – Product Manager for Electric Automation at Festo. "By visiting our customers on site, we minimise the disruption to our customer's working day and avoid the inconvenience, time lost and costs of visiting trade shows."

Visitors on-board the display vehicle will be greeted by industry specialists ready to discuss their specific application needs. "I am sure the innovations on the Electric Automation Mobile will inspire all the engineers who come on board" adds Warren.

LED it be

Austria// Austrian plant engineering firm Vescon developed a solution for producing full LED headlights for the plant of Slovakian automotive supplier ZKW Group. The solution is an LED light module that avoids dazzling other road users thanks to a "matrix arrangement" of the LEDs and the ability to dip individual LED segments, while at the same time ensuring good visibility for the road ahead.

Photo: © GM Company

The design had to take processes such as the tricky application of a two-component thermally conductive paste into account. Thermally conductive paste is used here because powerful LEDs produce heat that must be dissipated. It is important to check whether the correct amount of heat-conducting paste has actually been applied to all required surfaces. A second particularly challenging part of the headlight assembly system is hot riveting.

DSL swivel/linear drive units pull on the light module and check that it is firmly positioned.

A three-axis handling system from Festo is used for applying the thermally conductive paste. The basic axes are two toothed belt axes type EGC. The Y-axis is a heavy-duty axis with sturdy double guide. An electric slide EGSL operates in the Z-direction. All axes are equipped with servo drive packages. The controllers are motor controllers type CMMP. The operator places the heat sink in the station and the thermally conductive paste is applied automatically on both sides using the Festo handling system. It always brings the two-component dosing system to exactly the right position on the right track. The second handling system is responsible for moving the rivet head tools. These are mounted on the handling system and are moved the last bit of the way by cylinders ADN controlled by VTUG. Both handling systems were designed, built and delivered by Festo as a subsystem – complete with documentation.

A ready-to-install handling system ensures even application of a two-component thermally conductive paste.

www.vescon.at

Implementing Industry 4.0 workshop

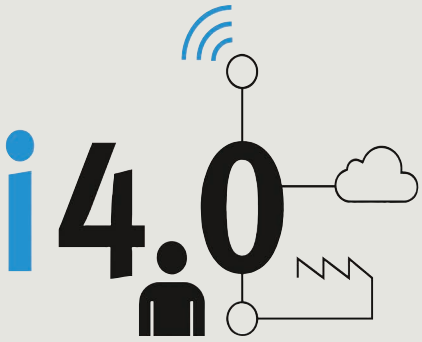
Great Britain// This new workshop is focused on understanding the core elements in Industry 4.0 and the business opportunities it presents.

Currently everybody is talking about Industry 4.0 and there are many different explanations of its meaning. Leaders in organisations are increasingly confronted with Industry 4.0 and have to be aware of its potential impacts.

There are many ways companies can improve their productivity, quality and processes. However, before starting an implementation, managers need to have a basic understanding of the core elements and technologies and how their interaction leads to Industry 4.0. Subsequently, they can think of new business models and specific strategies to implement Industry 4.0.

Neil Lewin from Festo Training & Consulting says, “This course is specifically designed for business leaders who want to make the most of the opportunities presented by Industry 4.0. During the two days, we help leaders assess how Industry 4.0 can be applied in their organisations, working in small groups and teams, as well as understanding and debating the challenges posed by Industry 4.0. It is for leaders who want to make better investment decisions that will equip their organisations for the future.”

For more information and course dates see www.festo-didactic.co.uk/TCM261



The new two-day course from Festo Training & Consulting will help leaders assess how Industry 4.0 can be applied in their organisations.

The intelligent glove

Germany// For the tugger train drivers who supply material to the assembly stations at the Festo Scharnhausen Technology Plant, the routine task of loading and unloading boxes, sorting them, and then scanning each one using a scanning device was a laborious and tedious procedure. Relief is now on the way in the shape of a glove featuring an integrated scanner. Following successful completion of a test phase, the ProGlove is now being used for all tugger trains.

At first glance, the ProGlove looks just like any glove you might find in a DIY store. However, beneath the glove's surface lies sophisticated technology in the form of sensors that trigger a scanner on the back of the hand. These sensors automatically detect containers as the tugger train is loaded and unloaded and throughout the processing steps. Thanks to the glove, the tugger train driver can use both hands to grip the boxes. The glove also protects against injury. Another advantage is that workers can work more quickly. It takes much less time to scan using the glove than with a separate scanning device.

The ProGlove allows bar codes to be read quickly and easily.

www.proglove.de

Photo: © shotshop.com

Flexible snake armour

Snakes are a classic example in terms of their flexibility of movement and adaptability. However, because they are limbless, their bodies have to permanently endure friction forces. A snake's skin must last two to three months until it is shed. It was these properties that prompted researchers at Kiel University, Germany, to explore the idea of snake skin as a model for wear-resistant materials. So they decided to examine the skin of four snake species with very different habitats.

They discovered that although the thickness and structure of snake skin vary depending on the species, the skin of all species has a stiff and hard outside, and becomes softer and more flexible towards the inside. A material that changes from being stiff on the outside to more flexible on the inside can distribute an impact force over a larger area. This combination of hard and soft creates a "flexible armour".

The frictional properties of snake skin are an important model for the bionics research being conducted at Kiel University for the development of new and the optimisation of already existing materials.

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