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The new heroes in the fight against coronavirus

Dear readers,

The world is still in the throes of a rapidly spreading pandemic, with devastating consequences for the economy and society at large. And so people are longing for an effective vaccine that will finally bring salvation.

Driven by this hope, they tend to blank out the fact that a vaccine does not herald the end of the battle against Covid-19, but rather the beginning.

For this vaccine's journey from the laboratory to mass production and then to people – and we're talking billions – in the furthest corners of the Earth, will demand a miracle of logistics.

To accomplish such a deed, we will have to rely on the expertise and know-how of experts and specialist firms.

Just like the scientists advising governments now, it will then be these logistical experts who keep the public informed and, ultimately, determine the principles by which we are guided.

The intralogistics sector is well equipped for this challenge, is flexible in structure, and highly innovative.

You can find proof of this in the latest issue of World of Industries. Here, we report on a multifunction picker that is designed not just for distribution, but can also function as an assistant in hospitals.

A newly developed, compact crossbelt sorter, designed for Courier, Express and Parcel services, will be an indispensable aid in sorting and distributing batches of the vaccine.

I have no doubt that logisticians will take on the challenge of global vaccine distribution and give us the benefit of all their expertise, so that the medicine will find its way even to the ends of the Earth.

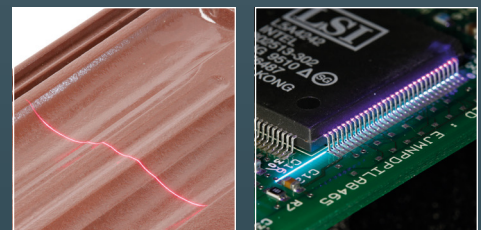
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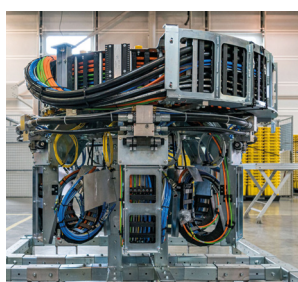


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Advertising



COVER

Beumer Group,
GmbH & Co. KG,
Beckum, Germany

Schmersal India pushes export activities



In the year 2007, Schmersal India was incepted as a 'Sales' only organization and to becoming the youngest production site of the Schmersal group, located at Ranjangaon, Pune, has written a real success story in the last thirteen years. The state of the art manufacturing facility, established in 2012 -2013 with the main goal to provide the Global Players of mechanical engineering with safety switches and safety systems for their local production sites and service units.

Within the next few years, export activities shall be expanded in a large extent. The first step for this aim has been taken: Schmersal has just expanded the Export Oriented Unit" in its factory. The EOU scheme of the Indian government was established to promote export activities by granting a variety of advantages.

www.schmersal.com

Fast and efficient online grocery fulfilment

As a result of the COVID-19 pandemic, the demand for online groceries has increased with a more diversified group of consumers discovering such services. Shoppers demand a wide assortment of high-quality and fresh products, and rapid deliveries, as well as convenience and service at competitive prices. At the same time, food retailers are continuously facing new competitors entering the market. In response, Vanderlande has developed Homepick. It is a solution that seamlessly integrates the company's systems, software and life-cycle services to create a concept that should support food retail operations. Homepick is designed to facilitate the fast and efficient processing of online orders in food retailing. At its core, Homepick is based on a goods-to-person (GtP) picking solution that makes use of Adapto, Vanderlande's 3D, shuttle-based automated storage and retrieval system (AS/RS). Due to its modern configuration, Homepick offers, among other things, high picking efficiency, shorter lead times, higher accuracy. It also supports an omni-channel approach and can seamlessly match any growth strategy.



www.vanderlande.com

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Beckhoff remains fully functional and available

With the large-scale outbreak of the corona virus near Verl, Germany, Beckhoff returned to strict safety measures. The automation technology manufacturer is now working in normal operation again. Production and deliveries were not affected by the renewed precautions and are

running as usual. Since July 20, Beckhoff has relaxed these protective measures again due to the flattening of infection activity in the Gütersloh district. "Due to our rapid response, Beckhoff's production and delivery capacity were not restricted at any time.

We can supply our customers without any restrictions and at the same time take care of new projects and developments. Our customers don't need to fear any bottlenecks due to our foresighted warehousing and our strict safety measures, and receive all deliveries within the usual time frame," assures managing owner Hans Beckhoff (photo).



www.beckhoff.com

Luca Galluzzi becomes new CSO at B&R

Luca Galluzzi (right) will join the executive management team of automation specialist B&R. As the new Chief Sales Officer, he will succeed Peter Gucher, who will be entering a well earned retirement after 34 years at the company.

In his new role, Galluzzi will be responsible for all of B&R's global sales activities and advancing its entry into new markets. In addition to his position on the executive management team, he will retain his current responsibilities as Managing Director for Southern Europe.

"Luca Galluzzi has done an exceptional job in the Southern Europe region and has demonstrated a commitment to expanding our business there. I am very pleased that our executive team will now be able to benefit from his knowledge and experience," says B&R CEO Hans Wimmer.



www.br-automation.com

Kion Group begins work on new plant in China

Kion Group is expanding its business in China and has begun work on the construction of an additional plant for the production of counterbalance trucks in Jinan in Shandong Province. The project is expected to enable the global logistics equipment supplier to extend its product portfolio for industrial trucks in one of the world's most important material handling markets at a cost of approximately 100 mio. €. The Kion Group intends to create over 800 jobs by 2025 with its new plant in eastern China.

"China has recovered quickly from the coronavirus crisis and as one of the fastest growing markets worldwide, it plays a key role in our strategy," said Gordon Riske, Chief Executive Officer of Kion Group, who took part in the ground-breaking ceremony in Jinan via video link. He noted that according to the World Industrial Truck Statistic (WITS), the Chinese economy accounts for around 30 % of the global industrial truck market and that – based on Kion's Group estimates – this share is set to rise.

The Group aims to extend its product portfolio through the new plant, unlocking growth opportunities in the value segment and capitalizing even more on the trend toward greater electrification of industrial trucks in China. The Kion Group has established a new company for this purpose, where Kion has a stake of 95 % and Weichai Power, the primary investor in the Kion Group, has 5 %. The equity investment by Weichai Power, which is also based in Shandong Province and manufactures powertrain systems, commercial vehicles and vehicle electronics, ensures that the Kion Group has a strong local presence in the region.

www.kiongroup.com/en/



Rhenus opens its sixth warehouse in North Brabant

Rhenus Contract Logistics has opened its sixth warehouse in North Brabant in the Netherlands. The additional 31,885 m2 warehouse located in Oirschot is a dedicated operation for a Rhenus customer in the medical device industry.

"We have served this customer for more than ten years; the last seven years in our Eindhoven operation. While discussing our strategy for the coming years, it became clear that we have a strong desire to both expand and focus on our core activities and processes. The dedicated operation will allow us to grow together while continuing to focus on longevity and operational excellence", said Alphons van Erven, Senior Vice President of Rhenus Contract Logistics.

The recently delivered building is located at the Westfields Logistics development in Oirschot, situated in the Brainport Eindhoven area, a technology region in which companies, governments and educational institutions work together to create a brighter future.

Brainport Eindhoven is one of the most important hubs for innovative technology and healthcare activities in the Netherlands and Western Europe with excellent multimodal connections, which ensure efficient and optimal accessibility. The warehouse is conveniently located between the current Rhenus locations in Tilburg and Eindhoven.



www.rhenus.group/

Technology days on single pair ethernet

On September 22 and 23, the SPE System Alliance will be hosting an international, digital exchange of knowledge between experts from different industries and technology sectors on the topic of Single Pair Ethernet. The Technology Days, taking place for the first time this year, provide participants with the opportunity to talk to specialists and find out about the added value of this communication technology.

The program will take place at different times on both days so that everyone around the world who is interested in the Technology Days can visit them virtually. The conference will be held in English. If you want to register for the digital conference, visit www.singlepairethernet.com/TechnologyDays. Partners of the SPE System Alliance are among others Weidmüller, Sick, Dätwyler, Fluke Networks, Microchip and Phoenix Contact.



www.phoenixcontact.com

Igus and Fraunhofer IPA – a perfect Team

In semiconductor manufacturing, components such as energy chains and cables must meet high standards regarding their release of particles. In order to be able to develop new motion plastics that are suitable for use in cleanrooms, the Fraunhofer IPA, working as a development and certification partner on behalf of Igus, has designed and built a tailor-made cleanroom laboratory with an ISO Class 1 cleanroom system in Cologne. With the new lab, customer tests and the development of new products by the plastics specialist can be carried out in advance under realistic conditions in a short time. Igus is a global leading manufacturer of energy chain systems and polymer plain bearings and operates the largest test laboratories and factories in its sector.



www.igus.eu

New eco-efficient harbor crane for port of Trieste

PLT is a partnership formed by local companies to build and operate in a public private partnership (PPP) with the Trieste Port Authority, a new marine terminal in the Port of Trieste, at the very north end of the Adriatic Sea. For the marked increase in intermodal shipping traffic in recent decades, a new flexible crane was needed to provide a gateway to the growing trade with central and eastern Europe. The new terminal with the Konecranes Gottwald Model 5 Mobile Harbor Crane is carrying all types of cargo vessels. The new crane includes two twin-lift spreaders with 60 t capacity for containers. Its working radius of up to 51 m and gives the reach needed for ships up to post-Panamax class. A maximum lifting capacity of 125 t allows both general cargo and heavy project cargo handling. The crane can also lift bulk materials with a motor grab if necessary. Smart crane features, including a hoisting height assistant, and a landside lowering function, make the job of the operator easier and safer. The cranes will have built-in readiness for an external power supply, so conversion to electric operation will be easy when resources allow. Web-based reporting and a remote desktop provide relevant crane data to increase both performance and serviceability. Local service technicians and operators will receive customized Konecranes training as part of the package.



www.konecranes.com/en-uk



Ready for the future

With its BG Sorter Compact CB, Beumer Group promises more flexibility in a tight footprint. This newly developed system from the sortation and distribution technology range optimizes performance and product life-cycle costs. The intelligent software and the possibility of data analysis ensure this. The sorter is easy to integrate and operates with low energy consumption and high precision.

E-commerce is growing worldwide. In addition, more and more customers expect that the goods they ordered in the morning are delivered on the same day – and these are only two trends that drive up the volume of shipment of courier, express and parcel services (CEP). They range from small items and flats to parcels of different sizes and dimensions. With their existing sortation systems, they are often unable to react in time to these changing market conditions, and competition is already in place.

Logistics and distribution centers must also be able to deal safely with changing market conditions. The range of goods to be sorted includes clothing, accessories, food or even spare parts. Parcel sizes are tending to decrease, although large parcels are still being

shipped. In addition, a new middle class is emerging in developing countries, which has a significant impact on the consumer behavior of the population, and as a result, the volume of shipments is rising continuously. Logistics and distribution centers are more and more looking for high-performance sortation and distribution systems, as their existing facilities often no longer achieve the required throughput. Solutions with a zero error rate are needed as well. “A high degree of automation and an ergonomic operation is also becoming increasingly important for companies to relieve their employees and work more efficiently,” says Thomas Wiesmann, Director Sales Logistic Systems at Beumer Group. It is also important to leave the smallest possible ecological footprint.

High flexibility in a tight footprint

In order to respond to these trends and to provide its customers with the best possible support, Beumer Group has developed the BG Sorter Compact CB and presented it to the public for the first time. The system is suitable for a wide range of items: small, light shipments as well as parcels weighing up to twelve kilograms. Even goods that are fragile or have packaging that is difficult for conventional equipment to handle, such as smooth plastic film, can be easily handled thanks to gentle sortation.

The new sorter requires little space and can be flexibly adapted to local conditions, even if space is restricted. For this purpose, the system combines Beumer’s proven cross-belt technology (CB) with



01 Chutes for discharge: Thanks to the high precision with which the items are guided out of the system, the operating speed can be increased

02 The BG Sorter Compact CB is suitable for a wide range of items and handles both small, light-weight shipments and parcels with a weight of up to twelve kilograms

increases throughput. The plant operator is prepared for future capacity forecasts.

During the induction of items, the BG Sorter Compact CB automatically positions them on the belt conveyor and aligns them precisely. The system dynamically adjusts the acceleration and speed of the induction belt conveyors, as well as the discharge times. This further increases the precision and efficiency of the sorting process, ensures optimized and gentle handling and increases the fill level of the destinations. A scanner reads the barcode of each item and sends the information to the control system, assigning each shipment to the correct destination.

Continuously controlled

The control used is integrated into the superordinate warehouse management system and other systems involved in the process. This ensures continuous control from the induction to the discharge of each item. Beumer Group thus provides a flawless interface. "By using smart software that coordinates picking, packing and dispatch, throughput can be additionally optimized during sorting and the handling costs per item can be reduced," describes Wiesmann. "This minimizes dead times at the induction points in CEP operation."

In addition, there is the possibility of data analysis. The findings from this can be used as a basis: "We can use the information obtained, for example, to continuously improve operations, recognize maintenance requirements at an early stage, and optimize system management," says Wiesmann. This has a positive effect on product life-cycle costs.

Energy-efficient drive

The energy supply is contactless – and not, as usual, via contact lines. In addition, the drive system reduces energy consumption and CO₂ emissions by up to 80 percent compared to conventional solutions. Beumer Group attached great value to low maintenance and repair costs when developing the BG Sorter Compact CB. As a result, the system consists of fewer individual parts than other sorters.


Photos: Beumer Group

www.beumer.com

intelligent design. It is characterized by a tight cycle and small radii. It is also possible to integrate feeding units and destinations in a small footprint. The highlight: the operator can easily expand his existing system with the new compact Beumer sorter as required and thus adapt to changing conditions.

Smart sortation for high throughput

"The successful sortation rate of our new compact system is almost 100 percent," promises Wiesmann. "This is because the items are actively discharged, not by weight." With this high precision, operators can reliably supply their customers and thus increase their competitiveness. Moreover, the automated process replaces the strenuous manual sorting process, which also



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Clark Europe is expanding its product range in the area of warehouse technology by introducing a new order-picking vehicle. With the COP1, the forklift truck specialist has launched a real multi-talent.

Regardless of whether it is used for order picking or performing repair, maintenance or cleaning work, the Clark COP1 is the ideal helper that impresses every time thanks to its intuitive and safe operation. The special advantage of the multi-talent: The flowing movement of the vehicle allows it to lift and be driven simultaneously, which saves time and ensures high productivity.

The multifunctional order picker has both a drive motor with 0.65 kW and a lift motor with 2.2 kW. It comes with a maintenance-free 24 volt battery (120 Ah) that provides sufficient energy for one

workday as standard equipment. The battery can be recharged with an integrated charger at any 230 Volt socket. The charging cable is integrated into the vehicle. If the use requires higher availability, the COP1 can also be optionally equipped at the factory with an available lithium-ion battery with 120 Ah, so break times can be easily used for interim charging.

Designed for intuitive and ergonomic work

The height-adjustable shelf of the COP1 has a 90 kg carrying capacity. The lower shelf can carry an additional 110 kg. With the work platform, the operator can go up to a maximum lifting height of 2990 mm and reach a height of up to 5 m. The maximum driving speed of 6 km/h is adapted to the lifting height. Easy-to-reach switches allow safe and productive working when driving diagonally. The vehicle's maneuverability is worth a special mention, as the COP1 turns on the spot. Its total width of only 750 mm and turning radius of just 1260 mm allows the vehicle to be easily maneuvered in narrow aisles or confined work areas – even narrow doors of up to 80 cm are no problem.

The ergonomic steering knob ensures the vehicle's intuitive and precise operation. Small parts can be safely stowed away in the standard storage compartments. Two cup holders and one document storage compartment facilitate the operator's daily work routine.

All around safe

The standard safety features are an additional highlight. They range from electrically monitored safety bars and two optical hand sensors all the way to two dead man's switches in the footwell. In addition, a tilting sensor and a safety sensor under the work platform prevent injuries when the platform is lowered. The flexible warehouse helper can only be started when the operator is standing on

the work platform and the safety bars have been closed. When the work platform is lifted, the safety bars are automatically locked. Safety sensors below the operator platform deactivate the driving, lowering and lifting functions when the operator presses on the motor cover underneath the work platform. The optical sensors ensure that the operator keeps both hands on the controls while driving and lifting and stays within the vehicle contour while operating the vehicle. The dead man's switches ensure that the operator has to stand firmly on the platform. As soon as the dead man's switch loses contact, the driving, lowering and lifting functions are automatically deactivated.

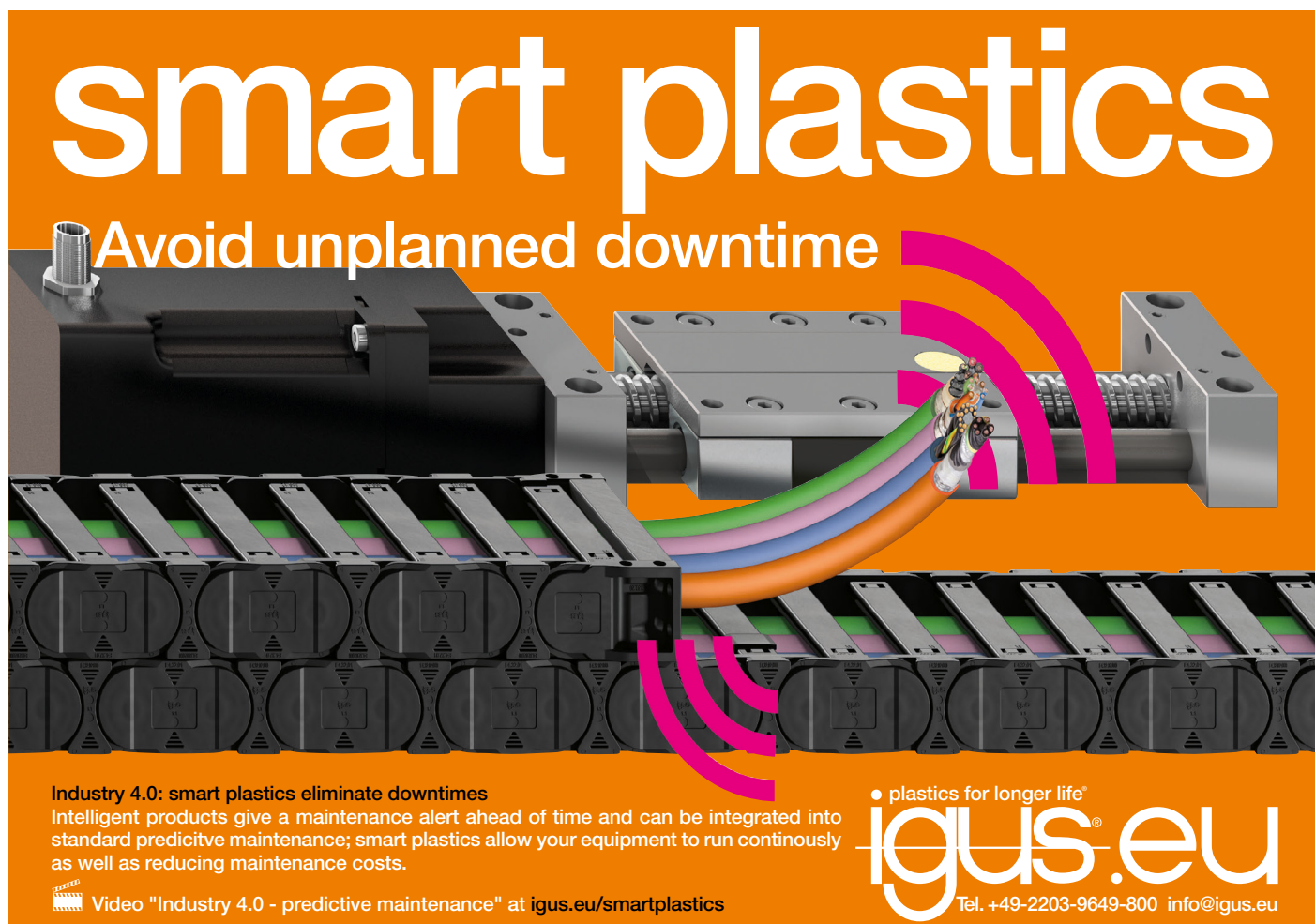
For working in poorly illuminated work areas or as a warning to oncoming traffic, the vehicle is equipped with an LED light integrated into the front vehicle frame. And last but not least, Clark completes the COP1's safety features with the hydraulic emergency lowering and the emergency shutdown, which can be operated from the outside.

Tailor-made for the application

The COP1 can be individually adjusted to the application. Not only the handling, but also the braking, acceleration and counter current braking can be adjusted to the respective situation. The vehicle tray is height-adjustable and has an adjustable range of 485 mm so goods of different sizes can be picked. To increase safety even more, a driving or lowering signal is optionally available on request. In case of failure, the COP1 has an on-board diagnostic system with error codes so the service technician can quickly fix minor malfunctions.

Photo: Clark

www.clarkmheu.com



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Mounted above head height
to leave more space in the hall



In the central warehouse of the Spar Group at St. Gallen in Switzerland, around 100 electric forklift trucks are entrusted with ensuring that a range of around 8,800 different items can be delivered to stores and partners throughout the country. To improve the availability and efficiency of the fleet, the retail chain relies on Fronius battery charging technology. A customized charging infrastructure allows Spar to save valuable space in the hall, as well as greatly reducing the operating costs for the forklift trucks.



01 Fronius Selectiva battery chargers are far smaller and lighter than the 50 Hz devices previously used and allow a flexible and space-saving approach to installation

Spar is one of the world's largest voluntary concentration of grocers in a franchise system. Although the shops, wholesalers and supermarkets bear the same name and have a uniform logo, they are independent companies. The Spar store fir tree emblem is now famous in 49 countries on four continents – including Switzerland.

The retail chain has deep roots here – as far back as 1761, when the predecessor of the present-day Spar Group established a “delicatessen” in St. Gallen, offering products such as coffee, tea, chocolate, spices, imported goods and other everyday items. In 1944, the thriving grocer's shop added fruit and vegetables to its list, and also introduced fresh produce in 1967.

When the franchise agreement was finally signed in 1989, it marked the foundation of the Swiss Spar Group, which now acts as a holding company with three operating companies: Spar Handels AG, TopCC AG and Spar Management AG. The store network now includes 185 neighborhood and convenience stores, as well as eleven TopCC cash-and-carries for caterers, business customers, clubs and public institutions.

These are supplied from the Spar Group central warehouse, which is still located in St. Gallen. The ultra-modern logistics center does not have much in common with the grocer's shop of that time, of course: the 33,000 square meter storage area houses around 8,800 different items with a total value of approx. 26 million Swiss Francs. More than 600,000 roll cages leave these halls every day, transported by lorry to stores and partners across the land. An in-house fleet of 100 electric forklift trucks ensures the fast and efficient flow of goods. As Spar operates a shift system, the forklift trucks and their batteries must be designed for long periods of use. The company does not use back-up batteries.

“No go” charging infrastructure

Until recently, Spar mostly used 50 Hz devices to charge the traction batteries. These huge units occupied a great deal of space, which is why they were kept in a separate basement room. “It was a rather inconvenient solution, though,” remembers Daniel Stohr, the warehouse division manager. “The service lift had to take each forklift truck to the charging room individually for it to be connected up – an extremely time-consuming process for a fleet the

size of ours. Because it was constantly in use, the operating and maintenance costs for the lift were quite considerable too.”

Spar therefore decided to modernize the charging infrastructure. The company came across the Austrian company Fronius at a logistics trade fair. Fronius develops customized complete systems for customers who need to charge traction batteries – always with the objective of saving energy and costs and optimizing intralogistics processes. “The first thing we did was get together and closely scrutinize the actual situation at Spar, so that we could then develop proposed solutions for improving daily working procedures,” explains Reto Baumgartner from the battery charging systems sales team at Fronius Switzerland. “We agreed these with the customer and then implemented them together.”

Space-saving and standards-compliant installation

The most important change was moving the battery charging technology from the basement to the ground floor, to the workspace of the forklift truck fleet. Fronius Selectiva battery chargers are ideal for this: they are far smaller and lighter than the 50 Hz devices previously used, allowing a flexible and space-saving approach to installation.

Fronius set up a number of decentralized charging areas that are within easy reach for forklift operators. Chargers are attached to the wall, for example – or in one case, are even integrated above head height in the steelwork construction of a high-bay warehouse. A spring balancer ensures that the charging cables do not rest on the floor when not connected to a battery. “Of course, we made sure that all safety rules and standards were met for every variant,” notes Baumgartner.

Spar employees also benefit from the chargers' external start/stop function, which means that to charge the batteries, all they have to do is connect the cable – there are no settings that have to be made on the device itself. The Selectiva devices automatically detect the voltage, capacity and state of charge of the connected battery and adapt the charging characteristic accordingly. A pilot contact in the plug also prevents sparking if the charging cable is disconnected prematurely – “after all, highly-explosive oxyhydrogen can be released when charging lead batteries,” remarks Baumgartner. However, Fronius technology makes sure that ware-

houses are as safe as possible – as well as allowing simple and correct operation.

Gentle charging maintains battery capacity

The Ri charging process of the Selectiva devices is also a particularly gentle and efficient way to power traction batteries. The effective inner resistance (Ri) of the batteries – which depends on various factors such as their age, temperature and state of charge – is recorded, so that the level of charge for each battery is exactly what is required. This minimizes harmful warming, maintains battery capacity and extends the service life. Charging times are now also far shorter than before. “This has noticeably improved the availability of our fleet,” explains Thomas Broder, head of logistics technology at Spar. “The forklift trucks do not go to the charging station as often and are also ready for use again more quickly.”

Lower operating costs are another positive effect. Firstly, the new Selectiva devices reduce energy consumption for charging the forklift trucks by as much as 30%. Secondly, Fronius and Spar were able to extend the service life of the traction batteries by around one third – meaning that the expensive batteries had to be replaced less often. Water consumption also fell thanks to the gentle charging process, which in turn reduces maintenance expenditure. “The new charging infrastructure has allowed us to make considerable savings,” says a satisfied warehouse manager Daniel Stohr. “Not only that, we have gained valuable space.”

Expert advice, right from the start

A total of 35 Selectiva battery chargers are now in use in Spar's central warehouse, where managers are completely satisfied with the result – as they are with the collaboration with Fronius. “Right from the start, we were given expert, constructive and results-oriented advice,” praises Stohr. “A particularly positive aspect for us was having our own designated contact person, from planning, to implementation, to operation – this made the conversion far easier for us.”

The warehouse manager also wanted to point out that Fronius looked into the specific situation at Spar before developing a cus-



02 A spring balancer ensures that charging cables do not rest on the floor when not connected to a battery

tomized solution. “I am convinced that after working so successfully with Fronius on this, they will be our first choice for future projects as well.”

Photos: Fronius

www.fronius.com

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Smart Hydraulics: When Power meets Intelligence

Machine manufacturers are uncovering new dimensions in productivity and cost-effectiveness thanks to the fusion of fluid technology with digital control systems. Intelligent, connected hydraulics for plastics processing machines enhances the repetition accuracy, process reliability, energy efficiency and availability in equal measure.

Author: Frank Hoehn, Senior Application Engineer, Bosch Rexroth AG, Germany

The fusion of sensor technology and communication technology is only half a step on the path toward digitalisation. Intelligent, connected hydraulics offers added value thanks to distributed intelligence and application expertise which is replicated in the software. In terms of operation, this enhances productivity and increases availability by means of rapid error diagnosis through to cloud-based predictive maintenance with artificial intelligence. Rexroth bundles this under the term Connected Hydraulics.

Connected Hydraulics drive solutions ensure demand-driven, energy-efficient pressure supply of hydraulic actuators. Digitally responsive, distributed intelligent hydraulic components and subsystems open up new levels of freedom for optimising basic machine functions such as injection, opening/closing of forms, ejectors and nozzle systems.



Application-oriented solutions open up new degrees of freedom for economical digital connection of hydraulic valves

Drive technology: Power meets intelligence

CytroBox, the new generation of hydraulic power units, shows how Connected Hydraulics fluid technology is integrated with the Internet of Things (IoT) and thus simplifies design and commissioning. It provides a new solution approach for the medium performance range from 7.5 to 30 kW. It is also the blueprint for IoT integration of larger power units.

CytroBox brings together all components in a compact housing. Sytronix variable-speed pump drives with inherent intelligence adapt the speed to suit demand using predefined controllers. This reduces the power consumption of the hydraulics in cyclical applications by up to 80 percent. The tank with optimised degassing and flow reduces the oil volume by 75 percent, from 600 litres to a mere

150 litres. In addition, the noise emission of the CytroBox is less than 75 dB(A) – even at full load.

Smart, connected condition monitoring

The integrated CytroConnect software solution uses sensors to record all relevant performance and operating data. The software processes the data decentrally and sends it to the cloud in encrypted form. Using the browser-based interface, maintenance technicians can wirelessly dial into the CytroConnect service and retrieve the information independently of their location. Machine manufacturers and end users can integrate CytroConnect as a module into their own digital IoT maintenance concepts.



As a plug & play solution that is already installed in the CytroBox, CytroConnect provides the basic functions of the software free of charge in a Freemium model. Machine manufacturers and end users can also book additional options in the subscription model. The “Maintain” module reports errors as a push service, processes additional status information and provides maintenance instructions. The “Predict” service package uses rules and algorithms for predictive maintenance concepts, for example by integrating Rexroth’s Online Diagnostic Network (ODiN). Bosch Rexroth has integrated its hydraulic domain expertise as a service package into the software, and uses AI-based analysis algorithms to create a health index for the power unit.

Intelligent solutions for every performance range

Plastics processing machines generally require a high-performance central pressure supply, which provides the necessary energy for the machine axes as energy-efficiently and quietly as possible. The variable-speed pump drives in the Sytronix family, which are also used in the CytroBox, are state-of-the-art in this respect.

Sytronix SvP typically offers the ideal solution for injection moulding machines with small and average closing forces. Synchronous servo motors offer optimum dynamic performance in this context and closed-loop accuracy up to a power level of 80 kW. They cover a wide range of functionalities from pressure control and closed-loop pressure flow control right through to closed-loop position control and force control. A protective pump function extends the life cycle and avoids machine downtime. All Sytronix variants can be integrated in the widest variety of automation architectures via a multi-Ethernet interface for the most commonplace real-time Ethernet protocols.

In the case of machines with large closing forces, Sytronix DFE with p/Q control systems cover the performance range up to 630 kW. The DFE connects an axial piston variable displacement pump optionally with a synchronous or asynchronous motor and harmonised drive controllers. It combines the closed-loop speed control of the drive with a variable displacement pump. Dual-quadrant operation provides access to comprehensive electrical and electro-hydraulic control options to influence the flow smoothly in accordance with demand. A teach-in method can be applied in cyclically operating machines in order to accelerate the system again in good time before an increase in the flow.

Field bus valves with multi-Ethernet interface

IFB directional control valves with multi-Ethernet interface are integrated by machine manufacturers independently of the control system used. As Connected Hydraulics, they reduce system costs and offer integrated safety and additional functions. Users can implement pressure and force control optionally with internal or external pressure sensors. The integrated safety interface (EN13849 Kat4Ple),



01 Higher process reliability and availability through intelligent, connected hydraulics for plastics machines

which allows a single-channel shut-off, also reduces the costs of safety applications.

The intuitive commissioning software tool ensures rapid parameterisation and configuration without unwieldy programming. The short cycle times of the valve controller of < 1 ms improve accuracy and cycle times. Moreover, the valves provide data for condition monitoring and predictive maintenance during operation. Above all, they are already Industry 4.0-ready.

IO-Link: “USB of automation”

With IO-Link, Rexroth offers highly efficient end-to-end communication with sensors and actuators at field level for analogue-controlled valves regardless of the field bus used. This “USB of automation” allows the hydraulic components to be integrated into the bi-directional digital communication. This enables easy connection in hardware and software and allows flexible adjustment of hydraulic valves for varying production processes. IO-Link valves record the running time and temperature and produce a histogram. This information is retrieved by users and service engineers via the IO-Link interface.

Summary

Connected Hydraulics simplifies the engineering phase by relocating functions to the software. In addition, the commissioning outlay is reduced significantly. The connected hydraulics with harmonised components and software modules increases process reliability and repetition accuracy. It is also possible to reduce power consumption and thereby lower operating costs. Manufacturers can uncover new options for condition monitoring thanks to connectivity. End users can use predictive maintenance concepts through cloud-based systems, such as ODiN, and thereby increase the availability of their machines and systems considerably.

Photos: Bosch Rexroth



02 Energy efficient, quiet, space-saving and intelligent: CytroBox covers all requirement profiles finely scaled with series components

www.boschrexroth.com

New functions for Robotics Control Software



The parameterizable Movikit Robotics software module from SEW Eurodrive expands the possibilities for controlling universal robot kinematics. Among other things, it enables workers without higher-level language programming skills to create and edit robot programs directly at the machine. New functions to the software module offer additional for integration into automated processes. There are touchprobe measurement and sensor-based positioning. Time-based and distance-based path events trigger the robot at defined positions. Standardized fieldbus interface can be used to move the robot along a path with ease via a higher-level controller.

www.seweurodrive.com

7 Millimetres for fully integrated Speed Controller

The BXT motor family, consisting of brushless DC-servomotors with especially short design, was expanded in all sizes with a diameter-compliant, integrated Speed Controller. With an additional attachment length of just 6.2 mm, the Motor/Speed Controller combinations are available with the same installation space as the products with the IEF3-4096 (L) integrated encoder. The Speed Controller can be combined with the 2214... BXT H, 3216... BXT H and 4221... BXT H housed BXT



motors. Even with full integration, the robust Speed Controller guarantees the use of nearly the entire power and speed range of the corresponding base motors.

www.faulhaber.com



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Highly precise motion control

Entertainment applications and kinetic digital signage are the business field of the Simtec Group. The massive devices move in 6 degrees of freedom and more. To orchestrate the movements, they are automated with by PC-based control technology provided by Beckhoff.

Simtec Group specializes in custom-tailored motion simulator systems. Founder and Managing Director Bernd Kaugmann used his extensive flight simulator expertise to enter the market for automobile component testing systems and entertainment applications. Today, simulator systems from Simtec can be found in entertainment parks, 4D theaters and museums around the world. With its development of Screenflite, Simtec has entered the digital signage field as well. Resembling a kinetic piece of art, the media information system catches people's attention in airport termi-

nals, train stations or shopping malls – precisely automated with PC-based control from Beckhoff.

Over time, the development and manufacture of custom-tailored simulator systems for the entertainment industry has become Simtex Systems' core business segment with the highest sales, with about 80% going to China. "The Expo 2010 in Shanghai was our entry into the Chinese market," says Andreas Stickel, Director Business Development at Simtec Systems GmbH. "As a result of our strong international growth, we expanded our production site in Braunschweig, Germany and set up a subsidiary in China in 2016," he adds.

New generation of the "Flying Theater"

Adding to the classic attractions of its Funride family of products which deliver a perfect simulation experience by combining visual and mechanical effects, Simtec has developed the next generation of indoor attractions with its Hexaflite Flying Theater. The moving platform featuring six degrees of freedom is surrounded by a spherical projection screen with a diameter of up to 23 meters. After the spectators have taken their seats on the platform, it tilts into a vertical position so that the audience sits directly in front of the giant screen. "Each spectator's centered position in front of the screen ensures that they enjoy the same experience from every seat," says

Author: Michel Matuschke, Vertical Market Manager Entertainment Industry, Beckhoff Automation

Andreas Stickel. Linear acceleration ranging from ± 0.7 g and ± 1 g and rotations of ± 15 to 20 degrees around all axes and the perfect synchronization with the projected images and special effects generate a spectacular, highly dynamic flight-like experience.

The moving platform is controlled by a Beckhoff CX5140 Embedded PC with a multi-touch Control Panel and TwinCAT 3 automation software. EtherCAT is leveraged as a powerful communication system. “The nearly unlimited network expandability of EtherCAT and the high data transmission rate make it the ideal fieldbus system for such a large-scale project,” explains Christian Spoer, Team Leader Software Engineering. The complex safety solution for the motion system is based on approximately 100 digital TwinSAFE terminals in IP20 and local TwinSAFE I/O modules in IP65. Also in use are four EL6910 TwinSAFE Logic terminals that communicate with each other as well as with the higher-level CX5140. “The signal and interface diversity of the Beckhoff I/O modules also allows us to easily integrate the stage lighting control via DMX terminals and the compressed air measurement with appropriate measurement modules,” explains Christian Spoer.

Simtec has developed the closed-loop control technology for this application in-house in C++. The fact that TwinCAT 3 supports the C++ programming language was an additional plus. As a result, Simtec’s entire motion control programming can be easily integrated into the TwinCAT 3 automation software and run in real time. The user interface of the Hexaflite system is another proprietary Simtec solution developed in C++. “One of the great advantages of the Beckhoff technology is the ability of our visualization system to communicate easily with TwinCAT over ADS,” emphasizes Andreas Stickel.

Digital signage interpreted kinetically

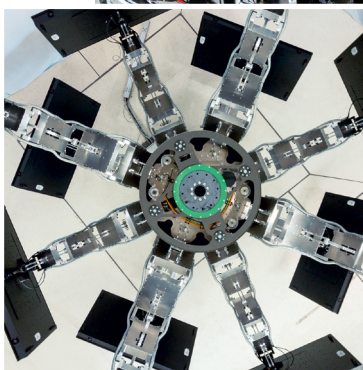
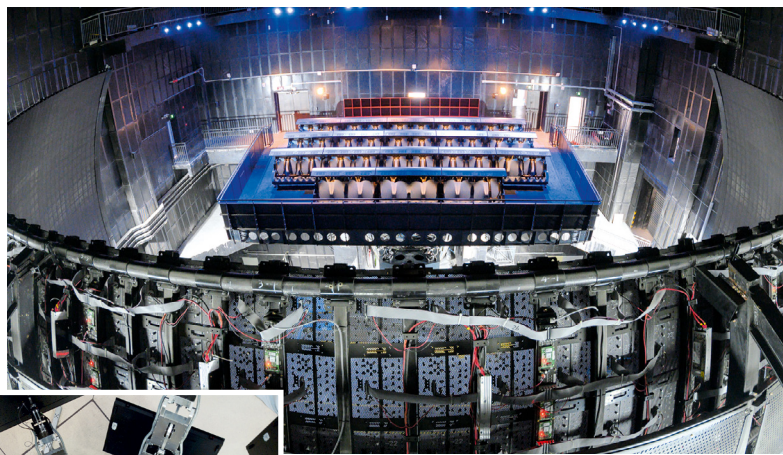
With its Screenflite system, Simtec is now entering a new market. The modular media information system, which weighs 5.3 tons, consists of three circular rotating levels. Each ring holds four LED screens, each with a surface of 2 square meters, that can be moved approx. 1.1 meters in and out with scissor arms and rotated with or against each other. “Based on highly dynamic choreography, the LED screens move toward each other and separate again to form various combinations or shapes consisting of two, three, four or six screens in rapid order,” is how Andreas Stickel describes the kinetic system. “In addition, the flat screens on the upper and lower rings can tilt vertically. The mechanical design ensures that the screens don’t collide with each other.”

On each of the 12 screens, media content can be played in sync with the screens’ motion. Since the motion sequences are determined through programming, sequences in line with the system’s 20 degrees of freedom are possible. “We have created nine different motion cycles for the Screenflite,” adds Andreas Stickel, “but the kinetics are freely programmable and can be adapted by the operator’s content designer.”

Kinetics require exceptionally precise drive control and perfect synchronization

“From a control perspective, the digital signage system is our most complex product,” says Christian Spoer. The challenge lies in the precision of the different motion control speeds and the perfect synchronization. The three rings that move the LED screens via their scissor arms are not linked mechanically but communicate via Wi-Fi using TCP/IP (via ADS). Only the power and the emergency OFF signals are transmitted via slip rings.

Each ring uses an ultra-compact C6015 Industrial PC with an Intel Atom quad-core processor that functions as an EtherCAT master to control the movements of the four LED screens. Because of their high performance, one of these IPCs is able to handle the synchro-



01 The Hexaflite Flying Theater is movable with six degrees of freedom and is surrounded by a circular screen, resulting in a viewing angle of 180 degrees horizontally and 110 degrees vertically

02 To control the smaller motors that rotate the screens, Simtec uses compact drive technology from Beckhoff, the EL7201 servo terminals with One Cable Technology

nization of all three rings over Wi-Fi. “The ultra-compact design of the C6015, which measures only $82 \times 82 \times 40$ millimeters, is ideal for the small amount of space we have in the rotating shapes,” explains Christian Spoer.

The motion control runs in a C++ module with a linked PLC project. “We programmed the axis control algorithms and the synchronization of the motion sequences in a C++ module that integrates seamlessly into TwinCAT 3. The TwinCAT NC library provides the closed-loop controller and profile generator,” adds Christian Spoer.

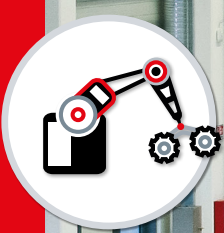
To control all 27 PTP axes on the digital signage system’s three levels, one- and two-channel EtherCAT servo drives from the AX5000 series with integrated safety functionality are used. And to control the smaller motors for rotating the monitors, Simtec uses EL7201 servo terminals with One Cable Technology (OCT) connection because their compact design works perfectly in the limited space available.

Centralized and decentralized control technologies

Simtec has used control technology from Beckhoff in many of its projects. “We use the complete spectrum of Beckhoff control components in our media information system, from the Control Panel and Industrial PCs to I/O terminals and TwinCAT software. The option to employ both centralized and decentralized PC-based control technologies works great for our needs and is an important prerequisite for our applications. We also benefit from the broad range of terminals that Beckhoff offers. For example, by simply inserting a pressure measurement terminal into the I/O segment you can recognize a pressure drop in the system and take appropriate corrective action. And in addition to the high communication speed of EtherCAT, which is a prerequisite for the perfect synchronization of the screens, we also benefit from its diagnostic functions. Other benefits include the direct integration of C++ modules into TwinCAT 3 as well as the ability to run it on top of Visual Studio, which allows us to easily integrate Git for the version management,” says Andreas Stickel, summarizing the many advantages of PC-based control.

Photos: Simtec

www.beckhoff.com/stage



In the new production hall of DMG Mori in Brembate di Sopra, up to twelve Multisprint machines can be produced simultaneously

Technical revolution in automatic turning

After only two years of development time, DMG Mori ushers in a new era of automatic turning machines with multiple spindles and represents a technological revolution in automatic turning. Outstanding performance and quality developed and manufactured in Italy, with support and professional back-up from Germany: igus offers a special energy supply solution for both rotational and linear motion.

Due to globalisation and market dynamics, customer requirements for modern turning machines have changed and now demand the following: shortened processing and tooling times, reduced amount of effort needed for process development and integration and, at the same time, an ability to handle the increasing degree of complexity. The new Multisprint from DMG Mori meets all these challenging requirements. Nozzles for fluid power equipment, implants for dentistry and shafts for motor vehicle manufacturing are just three examples of complex components that can be made on high-tech machines. The result is a manufacturing solution for scalable requirements from initial series production to the high-volume production of complex workpieces.

Due to this machine's performance, which is considerably better than that of others, the worldwide leading manufacturer of machine tools DMG Mori is setting new standards in terms of productivity and efficiency. The combination of three types of machine technology enables the customer to engage in completely new

forms of production. The customer enjoys maximum flexibility for the mass production of components with a diameter of up to 50 mm.

Heavy drum turns with extreme precision and maximum speed

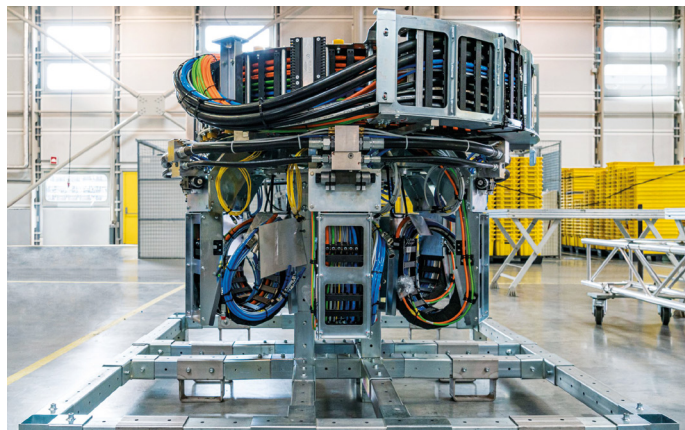
The heart of the machine is the spindle drum with six spindles for simultaneous machining of several workpieces. The main spindles in the drum have a travel of up to 180 millimetres. The drum moves the workpieces to the tools quickly and very precisely. It only takes 0.65 seconds for one of the six spindles to travel to the next position. For spindles to return to the starting position after machining has been completed in the six stations, the drum must turn 300 degrees in reverse. For this, the unit, which weighs over three metric tons, only needs one second. The rods are pushed out of the loader through the drum to get into position for machining. How did DMG Mori manage to implement the different types of movement with this speed and precision?

Iigus readychain enables a reliable energy supply concept

DMG Mori invited tenders for the catalogue of requirements and the Cologne plastics specialist igus was awarded the contract. Mirko Passerini, Technical Director at DMG Mori's Italian location Gildemeister Italiana S.p.A. and responsible for the development and production of the Multisprint, explains the decision in favour of igus: "We have a lot of confidence in the many years of experience that igus has in the development of custom-made energy supply systems. As well as in the company's extensive, high-quality testing facilities." The first meeting of the experts from the two companies



01 A look into the Multisprint shows the complex energy supply system from igus, completely mounted on the spindle drum of the machine



02 For installation of the harnessed cables in the energy supply chains and the metal guides, the igus-technicians need appr. 2.5 days

took place half a year later. “The first meetings were exciting”, says Passerini. “Two igus engineers visited us in Italy for a week. Progress and plans were compared and harmonised several times a day. Ideas for solutions were developed and sometimes rejected”. Plans for the sheetmetal design were made and suitable cables and hoses for supplying the drum with energy, data and fluid were chosen. “The readychain solution from igus was the breakthrough for us”, says Passerini, with conviction.

High requirements regarding precision and speed

The meetings of the experts resulted in a unique energy supply system that rotates with the drum and enables the linear movements of the spindle drums. Consisting of a metal frame, cables, hoses and chains, the system is located in the middle of the machine and is suspended from the drum, which rotates permanently at high speed. “The statics of the metal construction were a new challenge,”

Custom-made: igus uses a special rotary energy supply system that rotates along with the drum

Lukas Czaja, igus GmbH, Köln, Germany

says Volker Beißel. He is one of the central contact persons from the industry management business unit for machine tools at igus and supervised development of the readychain from the very beginning. “After every stage of development, we recalculated the statics in order to be sure that the metal construction would remain stable and not become fatigued.” The goal of igus is to ensure that the energy supply system has a service life of at least five years.

igus uses a rotary energy supply system that rotates along with the drum. These are custom-made systems for circular movements with energy chains, which are used in machine tools and construction machines. The standard rotary modules consist of two circular guide elements. One part of the guide trough is attached to the stationary part of the system and the other part to the rotating part. The reverse bend radius enables movement of the energy chains in two directions. Rotation angle up to 540° on one plane can be made possible here.

“We solve the problem with plastic”

The drum in the Multisprint rotates in a range of 300 degrees and consists of two rotation systems. In the outer system there are the hoses, as they need a somewhat larger bend radius, which is 160 millimetres in this case. In the inner circle, twentyfour cables are guided – twelve encoder cables and twelve servo cables. For

each of the six linear chains, there are therefore two encoder cables and two servo cables. One of the servo cables supplies the energy for the linear movements of the main spindles in the drum and one drives the spindle motor. They can move at a speed of 0.66 m/s and with a maximum acceleration of 10 m/s². The six energy chain systems can be plugged in individually due to distribution boards and are easy to maintain or modify. This was also one of the main requirements of the mechanical engineering company DMG Mori Italiana. Maintenance and service are of prime importance at DMG Mori.

More than 800,000 test cycles without any problems

The engineers from igus had three months to develop the system. During development, a lot of value was placed on the modularity of the individual components. The linear chain systems can be plugged in and the sheetmetal parts designed by igus, for attachment to the machine, are made of several parts. This facilitates handling of the readychain on the customer's premises and makes harnessing in the igus factory easier.

“Before delivery, the entire system was intensively tested for weeks on end”, says Lukas Czaja, Head of Industry Management Machine tools at igus. At its headquarters in Cologne, igus operates the industry's largest test laboratory, which is 3,800 square metres in size. A specially developed test stand simulates the movements of the multispindle automatic turning machine. In the realistic environment used, the readychain has already completed more than 800,000 cycles without any problems.

New developments at DMG Mori and igus prove to be worthwhile

Today, the Multisprint combines the productivity of a production turning machine with the precision of an automatic turning machine and the complexity of a universal turning machine. The Multisprint is therefore able to make complicated turned and milled parts in the areas of bar machining and chuck machining – without a lot of effort being needed to retool the system. In June 2018, the Italian factory delivered the first Multisprint. Today, dozens of Multisprints are in use in Germany, Italy, the US, Spain and other countries. “The customers are thrilled and immediately understand the concept of the new machine”, explains Passerini enthusiastically, “and they especially like the ease of maintenance that the igus energy supply system enables.”

Photos: igus

www.igus.com



Asia's process automation continues to grow

One of the largest growth markets in the world is currently located in Asia. For this reason, Pepperl+Fuchs has been on site for many years and is even growing beyond its own expectations. Shane Parr gives us an insight into the business area of process automation, how Industry 4.0 is developing in Asia and takes a look into the future.

Economy in Asia

Asia is the fastest growing economic region in the world, with China, Japan, India, South Korea, and Indonesia the top five economies in Asia. Due to their rapid economic development since the 1960s, South Korea, Taiwan, Singapore, and Hong Kong are known as the so called "Four Asian Tigers" or "Four Asian Dragons." Hong Kong and Singapore are among the biggest financial centers in the world, whereas South Korea and Taiwan are important hubs when it comes to automotive and electronic component manufacturing and information technology. However, economic development widely differs from country to country in Asia.

Shanghai or Singapore, Seoul or Tokyo – no matter which Asian metropolis you are in, you can feel the hustle and bustle in the streets. It is not only the large populations, impressive sizes, and giant subway systems that makes these cities pulsating hubs. Over the past few decades, Asia's economy has changed rapidly, and China, Southeast Asia, and India have experienced dynamic growth. Today, these countries are among the most important economic centers in the world. This is why Pepperl+Fuchs has a strong presence in Asia, too. Shane Parr, Executive Vice President Asia Pacific for the Process Automation Division, has been living in Singapore since 2002. He has great insight into the Asian economy, its growth, and Pepperl+Fuchs' business there.



Shane Parr, Executive Vice President Asia Pacific for the Process Automation Division

Pepperl+Fuchs is a German-based company. When did it start business in Asia, too?

Shane Parr: In 1979, Pepperl+Fuchs founded the first non-European subsidiary with its own production facilities in Singapore. This foundation was the first step toward gaining access to the Asian market. Singapore is often called the “gateway to Asia” – not only because of its geographic location. The city-state offers excellent conditions to international companies that want to start business in Asia: political stability, anticorruption measures, and protection of intellectual property, for example.

What has changed at Pepperl+Fuchs in Asia since 1979?

Shane Parr: Since then, Pepperl+Fuchs has expanded its businesses in Asia to many more countries. Some countries have grown significantly, and they continue to do so. Since arriving in 2002, I have seen a change in countries such as China, which developed at such a rapid rate that Pepperl+Fuchs managed to expand our growth, beyond our anticipated levels. Today, we have a strong presence in China and India – for instance, manufacturing facilities in Singapore, Vietnam and Indonesia, and an extensive network of local sales offices throughout Asia. Our Asian headquarters continues to be located in Singapore. In 2016, we opened the Global Distribution Center, which also serves as our logistics hub for direct deliveries to customers throughout Asia. With this investment, we can provide our customers more of our product ranges, delivered on time. Now, more than 1,100 employees work at our two sites in the city-state.

In 2017 alone, Pepperl+Fuchs opened three new locations in Asia. Why is Pepperl+Fuchs still expanding its Asian network?

Shane Parr: The largest potential growth markets in the world are currently in Asia, especially China and India. Supporting these markets and continuing to grow our business, with our vast range of products and technologies, can only be effectively done with our own highly trained personnel. This is why we opened three new sales offices in Asia in addition to our existing sites: Kuala Lumpur in Malaysia, Jakarta, Indonesia, joining Taipei in Taiwan. With these new offices, we are able to better support our customers and the growing business opportunities within each of these countries.

How do our Asian customers benefit from this local presence?

Shane Parr: As our products become more complex, we can provide our customers with more in-depth technical knowledge on all our product portfolios, either directly to our end customers or via our distribution networks. More importantly, we can take customer-specific needs directly into our business units more

efficiently and clearly enable our company to develop and adapt our product portfolio to suit the local market needs. With the different cultures and languages throughout Asia, it helps to have locally trained personnel dealing within their own cultural boundaries. Our people can also bring forward the Pepperl+Fuchs quality services directly to our customers, providing a major differentiator to our competitors.

What do you expect for Asia's economy in the upcoming years?

Shane Parr: We believe the larger markets like China and India will continue to grow. There is a high innovation potential in Asia, which I am sure will contribute to a positive development. Japan and South Korea have a history in innovation and continue to be innovation leaders in Asia. And there are countries like Singapore, whose government invests in education and promoting innovative projects. The South East Asian markets have significant potential but face more structural and political reform issues, which will be required to fuel significant international investments into these countries.

What about “Industry 4.0” and the “Internet of Things” (IoT) – how are things going in Asia?

Shane Parr: Indeed, there is a great deal of excitement surrounding IoT, and you might already notice some developments toward Industry 4.0 that are in progress. Process automation business is historically conservative, so we believe that the final move to an IoT platform for controlling a process plant will still take some

The largest potential growth markets in the world are currently in Asia, especially China and India

Shane Parr, Executive Vice President

time. However, there are initial approaches. What we will see are cloud-based data collecting applications to optimize processes. Moreover, we believe the mobile computing and communication devices from our ecom brand are an enabling platform for all these types of IoT implementations.

So is the process automation division at Pepperl+Fuchs looking forward to a positive future in Asia?

Shane Parr: I am sure that the future is extremely bright in Asia. We are looking forward to seeing investments by our traditional core customers. Of course, we will continue to listen to the market and develop or adapt products specifically required by customers throughout Asia. Our company name is synonymous with technology, quality, on-time delivery, and support. With Industry 4.0 and IoT, Pepperl+Fuchs will be at the forefront of the next industrial revolution, placing us in a good position for the future – not only in Asia.

Photos: lead stock.adobe.com, portrait Pepperl+Fuchs

www.pepperl-fuchs.com



The artificial change of the lighting direction makes the materiality of an artwork even more apparent and improves the recognition of image details

A new look at art

Image processing has established itself as an effective method for quality assurance in production and the detection of errors and is used primarily for this purpose. Artmyn proves that this technology is also suitable for applications in completely different areas: The Swiss company uses vision systems based on Stemmer Imaging components to open up new insights into the world of art.

"Re-discover Art" is Artmyn's slogan, and what the Swiss company, born at the Swiss Federal Institute of Technology in Lausanne and based in Saint-Sulpice near Lausanne, has created is in fact a completely new, previously unimagined possibility to give insights into the world of art. With its 5D technology, Artmyn allows art lovers to discover visual artworks in a completely new way and with unprecedented levels of detail.

With only the length, width and height of an artwork as input, Artmyn automatically captures at high resolution the 3D surface topography as well as two additional components describing the material reflectance at each pixel for interactive re-illumination. As a result, Artmyn technology creates interactive 5D images and movies that allow a special and emotional experience when viewing an artwork on screen. "Our scanning process captures something we see as the DNA of an art object by highlighting its unique qualities and presenting them in an innovative way," said Loïc Baboulaz, one of Artmyn's founders and Chief Technical Officer.

Thousands of images combined

The characteristics of a painting or sculpture are captured by a special scanner developed by Baboulaz and his colleagues in 2016. Depending on the physical size of the artwork, a few hundred up to a hundred thousand images are taken and sent to the Artmyn data

processing centre. Different light sources and spectra are used during this process, including ultraviolet and infrared illumination, in order to be able to capture the individual properties exactly.

In the subsequent data processing step, Artmyn's proprietary algorithms bring together data that often spans more than 2 terabytes, combining the information from the large number of images taken to extract the relevant features of the artwork. "In this way, the system calculates, among other things, the 3D topography, the surface reflection and details of the colors used," explains Baboulaz. "The result is then formatted for online visualization and sent to our web server"

The third part of the Artmyn solution is the visualization of the data calculated this way, says Baboulaz: "Our viewer provides interactive real-time visualization of multi-gigapixel images using state-of-the-art WebGL and streaming technologies." WebGL (Web Graphics Library) is an open JavaScript programming interface that enables a hardware-accelerated display of 3D graphics in the web browser. In their viewer, an artwork is for example available in both visible and ultraviolet modes with the same high resolution.

Competent support

In one respect, the requirements for the image processing system used in this application differ significantly from industrial applications: The captured images do not have to be processed in real time. "For us, above all, the reliable processing of the entire data set acquired for an artwork is important," emphasizes Baboulaz. As a demanding part of the task besides the actual image acquisition, he

Author: Peter Stiefenhöfer, Owner of PS Marcom Services, Olching/Germany, for Stemmer Imaging

mentions the development of special algorithms that are able to extract the relevant information effectively from the very large amounts of data.

This requires a great deal of expertise – which is indeed available: The Artmyn team can rely on decades of experience in computing and computer vision in science and industry. According to Baboulaz, the Swiss company also obtained further support for specific questions about image acquisition from relevant experts: “In 2016, we approached Stemmer Imaging with a long list of stringent requirements to find the right camera setup for our scanners. Key elements were the ability to capture at high resolution and high-speed and also to offload the acquired data from RAM memory to disk. Since that time, Stemmer Imaging has provided invaluable support and advice to correctly adapt camera technology to our scanners. We always had a very constructive exchange on technical issues and could also rely on the commercial advice of our partner.”

Numerous applications

The solution that is now available from Artmyn is suitable for many different applications. Thanks to the unique streaming technology, the digital twin of an artwork can be accessed and visualized online and from any device connected to the Internet. In particular, the interactive representation of the 5D images in real time allows a special kind of art enjoyment. The technology also simplifies the creation of interactive, audiovisual guides without incurring costs, risks or constraints, e.g. when a camera hovers over a fragile piece of art.

The option of generating e-catalogs is particularly interesting for museums, galleries and auction houses, Baboulaz emphasizes: “Both our interactive viewer and videos with guided tours can be elegantly embedded into such electronic catalogs, which can be created in an interactive way and designed very appealingly using our technology.”

The Artmyn system also offers unique features for security and sales. Thanks to the high level of precision of the captured image and to its 5D content, an individual fingerprint of an artwork can be produced: “It is practically impossible to falsify a piece of art once it has been scanned by us,” emphasizes Baboulaz.

This feature can also be used for automated damage detection, such as scanning an artwork once each time before and after lending it to a museum for example, Baboulaz points out: “Our algorithms objectively compare the first and second data set and provide a heatmap of potentially damaged areas, which can also serve as the basis for an insurance claim.” In contrast to the human eye, the system reliably detects even the smallest damage.



02 Artmyn's scanners travel around the globe to take pictures of artworks and calculate their digital twins

A digital condition report is also easy to implement by allowing experts to log their remarks and appreciation of the state of an artwork directly in its 5D file. Such a status report can then be shared digitally, interactively and online with potential prospects, e.g. to discuss details of a sale.

A new look at art

Baboulaz is happy to tell that there is huge interest in this new way of looking at art: “Museums and foundations digitizing their collections also like to introduce their art treasures to a broader and younger audience. With our system, this is possible in a novel and attractive way: For visitors it is particularly interesting to see the actual artifact behind a protective glass under a given lighting, and at the same time view the digital twin, which can be manipulated as desired. In addition, interactive guides provide a fantastic way to visually expose both the artwork itself and the artist's technique. “Without the competent support of Stemmer Imaging during the development phase of our system, that would not have succeeded so quickly,” emphasizes Baboulaz.

Photos: Artmyn

www.stemmer-imaging.com



01 Thanks to streaming technology, the digital twin of a piece of art can be viewed and visualized online and from any device connected to the Internet

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