

CONNECT'19

The customer magazine for consistent process optimization in industrial production

► FOCUS

DIGITALIZATION: SEIZING OPPORTUNITIES, SHAPING TRANSFORMATION

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EDITORIAL



Digitalization has been shaping economic and social development for several years now. For companies such as the Kistler Group, there are (at least) two sides to this trend. As viewed from within the company, it involves optimizing corporate processes and existing business models to make them as transparent and efficient as possible so that we can meet future challenges.

But if we view ourselves as part of the industrial value chain, the focus shifts to one key question: how can we use digitalization to offer our customers tangible added value through products and services? A critical factor in this context is "Information as a Service": this means making data available to provide the basis for manufacturing processes that can optimize themselves independently. Following our successful transformations from a supplier of products and then systems into a solution provider, Kistler has reacted to this trend by setting itself a new goal: we intend to move increasingly toward the role of information provider.

To learn about the key issues involved and our latest initiatives in response to digitalization, read our lead interview with Marc Schaad, CTO of the Kistler Group, and Dr.-Ing. Robert Vaculik, Head of Kistler's Strategic Business Field Plastics.

In 2018, Kistler acquired LIK, the Chinese special-purpose machinery manufacturer – another major step forward in expanding our expertise and creating synergies within the value chain. Also last year, the Kistler family welcomed our new colleagues from the Aachen-based software company formerly known as IOS, whose MES solutions are an ideal complement to the plastics range within our portfolio.

Alongside these topics, you can also read our regular feature on the latest product innovations, as well as success stories from all over the world that paint a vivid picture of the vast range of potential applications for measurement technology and the varied opportunities it offers for optimizing production.

A handwritten signature in black ink that reads "F.P. Kirgis". The signature is stylized, with the first letters of the first and last names being prominent.

Frank Peter Kirgis, Head of Division IPC



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Enhanced reliability, safety and quality in robotics: process monitoring for robots – technology for tomorrow's world

Mature technological solutions based on piezoelectric sensors give us the capability to monitor industrial robots efficiently, and to continue optimizing assembly and handling processes. The robots of the future will be more precise, flexible, efficient and reliable thanks to miniaturized and integrated systems.



Robotics is constantly becoming more important as a feature of today's industrial world: the use of robots can boost productivity, make manufacturing processes more flexible, and enhance the quality of products. For all these reasons, robotics is a key factor in autonomous, individual production. It is no coincidence that the number of industrial robots in operation throughout the world is growing every year – in 2016, the total increased by 16% to almost 300 000 units. The pace of development on the Asian market is particularly dynamic: the main driving force here is China, which yet again achieved a high double-digit growth rate in 2017. Together with Japan, South Korea, Germany and the U.S., China now accounts for 74% of all robots installed throughout the world.

Here at Kistler, we have the technologies and solutions that can make robots more flexible, precise, efficient and reliable. For example, integrated force-displacement monitoring can optimize assembly processes and make them significantly more efficient. Frank-Peter Kirgis, Head of Division Industrial Process Control (IPC) at Kistler, explains the opportunities: "In the future, we aim to step up our collaboration with manufacturers of peripheral equipment for robots – providers of grippers, assembly technology and tools, for instance. But robot manufacturers will also benefit from our solutions – not least in terms of human-robot collaboration."

Higher precision, greater flexibility

The conditions for achieving these goals are ideal: robotics is already at an advanced stage of development and its use is widespread; the same is true of process monitoring and sensors – so now, the aim is to bring these technologies closer together. After all, we have expertise across the entire measuring chain at our fingertips – from crystals, sensor production and electronics through to signal evaluation and software development.

"If you look at our force sensor measuring chains, you'll see that basic solutions have already been found for many of the technical challenges. In robotics, the technological basis is the same; it's only the form factor that changes. Of course, the systems on a robot arm are smaller – miniaturization is key here – and suitable interfaces and software solutions are needed to communicate signals and data directly to the control."

Intelligent monitoring of assembly processes

Various Kistler systems are already being used on robots. Take the body shop, for example, where our sensors monitor the spot-welding guns on the robot to ensure correct placement of the weld points – because they play a critical part in determining the quality of the

welding process, which in turn influences the cohesion of the vehicle body. The same technological approach can be applied to other assembly methods such as riveting, bolting and clinching, where processes are monitored directly on the robot arm.

And in the future, our electromechanical joining systems will also be available for use on robots. "We're starting out with the niches where we're already active, and we shall gradually expand them by adding more applications. In this way, we aim to continue developing as a partner for mechanical engineers and system integrators, covering not only the peripherals but also the robot system itself. As time goes on, we shall expand our offering of application-oriented solutions focusing on robotics – solutions that make it easy for customers to integrate these systems into their plants," Kirgis emphasizes.

Safety for people and machines

Kistler also identifies enormous potential for development in the field of human-robot collaboration (HRC). Image processing technology by Vester gives us the ideal methods for selective monitoring and control of robots, to optimize their use and ensure that they are operated reliably and safely. "Regarding HRC, it's important to keep an overview of the entire application, and not to focus solely on the robot. We aim to guarantee overall process reliability through holistic monitoring – which means machine reliability and quality assurance in one system," Kirgis explains.

This is why close cooperation with customers and joint development work are crucial factors. User-friendliness and software development are the overriding issues when it comes to developing new, market-ready solutions that offer maximum added value – in other words, solutions that are as fully integrable as possible. The convergence of robotics and process monitoring has only just begun! ■



Source: Riegler GmbH & Co. KG

Cavity pressure monitoring with ComoNeo makes easy work of process monitoring and quality assurance for injection molding

Riegler GmbH & Co. KG

Impeccable manufacture of medical products

Maximum quality is the mandatory requirement in the manufacture of plastic systems for diagnostics and the medical sector. Our cavity pressure sensors, combined with the ComoNeo process monitoring system, are helping Riegler to manufacture its products safely and efficiently. What's more, Kistler's technology also supports this medical technology provider's ongoing development work.

Riegler is a midsize company that belongs to the global Wirthwein Group. With 300 employees at three sites, it produces over one billion plastic parts and systems every year – and all of them go to about 500 customers in application areas such as diagnostics, medical technology, pharmaceuticals and cosmetics. The trend is continuing to move upwards. "Our customers benefit from our

services throughout the entire range of vertical manufacture – from individual products manufactured in large quantities, assembly, toolmaking and contract manufacturing through to joint development, qualification and validation." The speaker is Christoph Merhold, Key Account Manager at Riegler, who is in charge of customer support for a leading pharmaceutical corporation.

Many of the plastic parts produced by Riegler are disposable products that doctors and medical technicians need every day: examples include primary packaging, injectors and syringe systems, along with a host of other application instruments. Riegler's specialties include screw

"As well as enabling automated segregation of short shots, this system achieves a higher level of automation and makes maintenance easier."

Christoph Merhold, Engineer,
Riegler GmbH & Co. KG

closures: single-use closures for bottles or reagent vessels are just one example. "Closures, in particular, are anything but trivial: they call for special molds with the appropriate degree of precision to protect the contents – and at the same time, we have to ensure that the opening mechanism functions as intended," Merhold explains.

Reliable control of multi-cavity molds

Large sections of Riegler's injection molding production line at Mühlthal are highly automated, with cutting-edge machinery and plant. Multi-cavity molds with up to 96 cavities are in use here. End customers have high requirements and expectations: of course, quality and cost are key factors but – for suppliers in particular – a good reputation always plays a critical part as well. Some irregularities occurred recently during the injection molding of a two-part reagent vessel for laboratory analyses that is manufactured with a multi-cavity mold: once in every 200 000 or so parts, there was a pressure loss in the open hot runner, causing the scrap rate to increase to as many as 30 parts.

Thanks to cavity pressure monitoring with our ComoNeo process monitoring system, it was possible to accomplish this task quickly and to segregate the

JAPAN

Intelligent semiconductor production

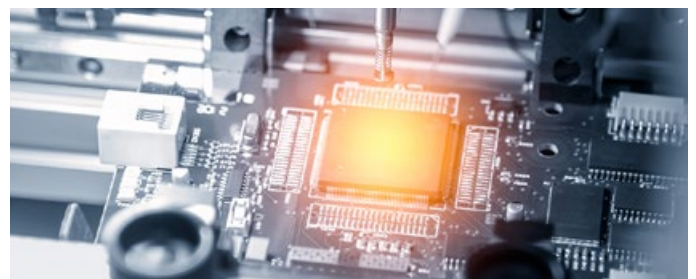
Quality assurance and boosting efficiency top Japan's industrial agenda.

Many companies still adhere to traditional methods of semiconductor production based on knowledge gained from their employees' experience – but others are already setting course for the future, with the Smart Factory as the ultimate destination. They know that production processes must be improved if they want to match up to global competition and generate added value.

New integrated circuit designs such as system-on-a-chip mean that requirements are becoming stricter. Faulty parts and damage can be prevented by appropriate feedback systems coupled with greater sensitivity – and a trend towards these goals is gradually emerging.

One example: as a semiconductor chip passes through the various stations, the chip can often be destroyed due to overloading in operations such as ultrafast pick-and-place. Another problem occurs if the chips are not placed correctly in the tray as soon as they reach the next production step. Process monitoring is essential in order to avoid errors of this sort – especially with costly integrated semiconductor modules.

Our rugged yet highly sensitive piezoelectric force and pressure sensors (with natural frequencies of 30 kHz or more) can detect even the smallest, highly dynamic changes to the load during handling and assembly. The lightweight and compact design of these robust sensors minimizes influence on the machine, and they offer long service lifetimes – key features that make them an essential factor in optimizing semiconductor production for the intelligent factories of the future. ■



Sensitive modules: acute sensitivity is essential when handling and assembling semiconductor chips

faulty parts – known as short shots. Since then, ComoNeo has been integrated into all three of the machines used to produce the special closures, and it is also planned for three more machines. Christoph Merhold is delighted with the results: "As well as enabling automated segregation of short shots, this system achieves a higher level of automation and makes maintenance easier. As the user, you can see exactly what's happening in the mold, which cavity has a problem, how the venting is proceeding, which cavities are lagging behind, and much more besides." Merhold continues: "And I really have to bang the drum for Kistler when it comes to user-friendly operation. You quickly find your way into the system, and most of our employees can manage on their own after brief training."

Given the huge quantities processed in the plastics industry, long service lifetimes are an essential attribute. Our cavity pressure sensors are extremely rugged, and they can easily cope with 10 million cycles. Insights and valuable process data gained thanks to ComoNeo also help Merhold and his colleagues at Riegler with developing new molded parts and systems, especially as regards long flow lines in the injection molding process. Another benefit: thanks to the integrated ComoNeoRECOVER Restart Assistant, tried-and-tested settings can easily be transferred to other machines. "I've rarely known a working relationship that runs as well as our collaboration with Kistler. Their employees are always open to contact, and we've already worked together to implement many small improvements," Merhold notes. Looking to the future, he adds: "As the next step, we intend to improve the connection to a new MES system – so that we can track down the precise cause of parts that might be faulty. It's all about building up the trust of the customers and end users, and guaranteeing safety for the patients." ■

A wireframe map of Europe is shown in the background, overlaid with a network of white lines and dots on a blue gradient. The map is composed of white lines forming the outlines of countries, and a network of white dots connected by thin white lines is superimposed over the map, suggesting a digital or communication network.

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HOW COMPANIES WILL BENEFIT FROM THE DIGITAL TRANSFORMATION

As the fourth industrial revolution unfolds, production is becoming increasingly intermeshed with cutting-edge information and communication technology. This means that manufacturers can meet customers' individual product requirements and ensure maximum quality. The technical basis for this transformation: intelligent, digitally interconnected systems and production processes. Companies equipped with Kistler process monitoring and control systems are ideally placed to overcome these challenges with flying colors.

The Round Table:

MARC SCHAAD

Chief Technology Officer (CTO)

ROBERT VACULIK

Head of SBF Plastics

The interviewer was Julia Seidl,
Project Manager, Corporate
Communications

In this interview, Marc Schaad, Chief Technology Officer (CTO) of the Kistler Group and Dr.-Ing. Robert Vaculik, Head of SBF Plastics, explain how digitalization is impacting the Kistler Group and its customers. They discuss the opportunities that this trend is generating in practice, and they also take a look into the future.

Mr. Schaad, speaking as the Kistler Group's CTO, how do you rate the importance of digitalization?

Marc Schaad We're living in highly exciting and challenging times, and the pace is breathtaking. Digitalization is now opening up possibilities for new products, services and business models that would still have been impossible just a decade ago. At present, this trend is mainly influenced by the automotive industry and other sectors where quality standards are very high. But as the years go on, the digital transformation will gradually spread into every other area as well. As CTO of the Kistler Group, one of my responsibilities is to monitor these developments as a source of information so that we can take the right decisions about technology. Our decisions should be based on our corporate strategy and, of course, they also need to accommodate our customers' requirements.

Mr. Vaculik, as Head of SBF Plastics, what trends and developments do you identify among your customers? What are their requirements?

Robert Vaculik What we see is that the market – and our customers' requirements – are undergoing some very major changes right now. Every business has its own slightly different interpretation of Industry 4.0, and each one focuses on different aspects. But it's very clear that automation and networking are key issues across the board. For a long time, our business was based on two activities: recording relevant measurement data in

the injection molding process, and then making statements about the quality of the manufactured parts. That enabled our customers to identify scrap promptly so they could segregate it. But this function is taken for granted nowadays, so it's gradually receding into the background. The driving force for our customers has now become data acquisition – which also entails new investments so that interfaces and infrastructure can be networked. Our customers want increased data acquisition and more secure storage – although what they actually intend to do with

"Digitalization is now opening up possibilities for new products, services and business models that would still have been impossible just a decade ago."

Marc Schaad

the data later on might not always be clear. In the future, this data should be used in more intelligent ways so as to open the way for automated process optimization.

How is Kistler responding to these challenges?

Marc Schaad Kistler is by no means a newcomer to Industry 4.0. Process automation has already been our home territory for many years, and we've focused consistently on networked processes and quality assurance. At the same time, we've been moving further away from our role as a mere component manufacturer – instead, Kistler is evolving into a provider of systems and solutions. We intend to meet these requirements by offering innovative products, and by continuously expanding our expertise as well as our strategic partnerships. We face a number of challenges at present: we need to respond rapidly to changing technologies – but we have to do so without losing sight of our customers'



requirements. Issues such as big data, data analytics, data mining, machine learning and artificial intelligence will become even more important as time goes on.

How important are innovations?

Marc Schaad Innovation has played a critical part at Kistler ever since our company was founded, and it is firmly enshrined in our corporate values. Over the last 60 years, we've launched many "world firsts" on the market that have revolutionized various sectors of industry. Our profound commitment to technology and our major investments in research and development provide a strong foundation for product innovations in the future. This mindset was already exemplified by Kistler's founding fathers, and our CEO Rolf Sonderegger is still continuing the tradition today.

How important is cooperation with other companies and institutions?

Marc Schaad Cooperation partnerships are necessary as a basis for us to offer appropriate products and solutions. Here too, we're willing to be open to machinery manufacturers, other component producers – and also customers, where appropriate – when standards and open platforms are involved, for instance. Consistency is the basis for networking throughout the factory.

We also have longstanding collaboration arrangements with many renowned universities and colleges in Germany. We view this sort of cooperation as a long-term investment in future generations. If young engineers are already familiar with our products and systems at an early stage in their careers, they are also likely to make use of them later on when they are employed as professionals. At the same time, we collaborate with them

"Our customers want increased data acquisition and more secure storage – although what they actually intend to do with the data later on might not always be clear."

Robert Vaculik

to launch interesting projects that yield benefits for our customers. We will be extending these cooperation partnerships to other countries in the future, as a way of addressing the needs of developing nations.

Mr. Vaculik, how is Kistler managing to build up appropriate expertise to match the innovations and strategic partnerships we've just mentioned?

Robert Vaculik Let me take an example from the plastics processing industry. From our earliest days, we've offered this

sector a comprehensive portfolio of numerous monitoring and data acquisition products for integrated quality assurance. But last year, we went one step further by acquiring IOS GmbH, a provider of Manufacturing Execution Systems (MES): now we can provide end-to-end linkage between corporate management and the production level – which is a key step that any company must take if it wants to become a provider of custom solutions. With the same aim in mind, we recently opened a Center of Competence for production control and management systems in Aachen*.

Our customers will benefit from this merger in many respects: thanks to our combination of software expertise and in-depth understanding of processes, we're able to start taking action directly on the shop floor. That's where we find the real basis for optimizing processes from the inside outwards – helping our customers to improve transparency and boost efficiency in production.

In what ways are MES systems important for our customers?

Robert Vaculik In the plastics processing industry, we mainly deal with midsize businesses that have to work under enormous cost pressure. Investing in an MES is already a major decision for them, but

* See the article on "Opening in Aachen", page 21

there is definitely a need for these systems. That's why it's very important for us to make our system scalable during the product development phase. This means that our customers can start out with a small-scale solution that they will gradually expand later on. And it goes without saying that service has a critical part to play here: we offer our customers support with analyzing their systems, and we visit their premises to advise them individually.

How much do Kistler solutions and products help customers to network their production? What added value do you offer them?

Robert Vaculik The real benefits of digitalization only come into play once different data is merged. Kistler identified this trend at an early stage: we offer our customers suitable interfaces so they can interconnect their equipment and also integrate other systems. In particular, OPC UA (Open Platform Communications Unified Architecture) is increasingly emerging as the industry standard, and we shall continue to implement it consistently in our equipment. We also provide appropriate software to support our customers with downstream processing of their data. Our ComoDataCenter software links all the monitoring systems, combining process- and quality-related

production data for both live and completed orders in one database.

What is your vision of injection molding production in 20 years' time?

Robert Vaculik I don't think anyone can really predict what will happen. But if we go back 20 years, injection molding production didn't look all that different at first glance. So I'm not expecting a real revolution in the future. However, the trend towards networking and integration of data from the product life cycle is set to continue. There will also be advances in automated process management based on internal closed loop controls, and that will make life easier for users. But as things stand at present, I don't foresee the users disappearing altogether! Efficiency-driven optimization at machine level will move up to factory level so that production as a complete system can be optimized, rather than just individual processes.

What steps is Kistler taking to give its customers optimum support in the future as they move towards Industry 4.0?

Marc Schaad Our business is focused on our customers, and that's also true when it comes to Industry 4.0. We aim to create added value with our solutions – whether by monitoring processes to

guarantee 100% quality, or by boosting process efficiency. And in addition, we're committed to offering our customers complete and consistent solutions that are perfectly tailored to their needs. IoT technologies are deployed for end-to-end networking of chained processes and data analysis. Thanks to our investment in the Center of Competence in Aachen that Mr. Vaculik mentioned, we're now also able to offer our customers solutions for the entire factory. This calls for perfect coordination between many areas of expertise ranging from research, development, production and sales all the way through to service. But ultimately, our employees – with their exceptional level of dedication – are the factor that makes all the difference.

Where will Kistler's journey take us in the coming years?

Marc Schaad Our focus in the coming years will be on end-to-end digitalization of our entire portfolio of products and services. As regards products, we're aiming for full digitalization of the measuring chain – from sensors through to data acquisition and evaluation. That will provide the basis for new business models in the "Information as a Service" segment. But that's not all. As you'd expect, we're also devoting a lot of thought to our future products. Our interests go far beyond data acquisition as such. We go one step further – so we're currently asking ourselves questions such as 'What do we do with the data? What information do we derive from the data, and what added value can we generate from it for our customers?'

We're also planning a Smart Factory for piezoelectric sensor technology in Winterthur at present. With the help of cutting-edge equipment and efficient processes, this will be a facility where we can draw on our entire know-how to achieve sustainable, cost-effective production. The ultimate purpose: to guarantee even more quality for our customers. ■

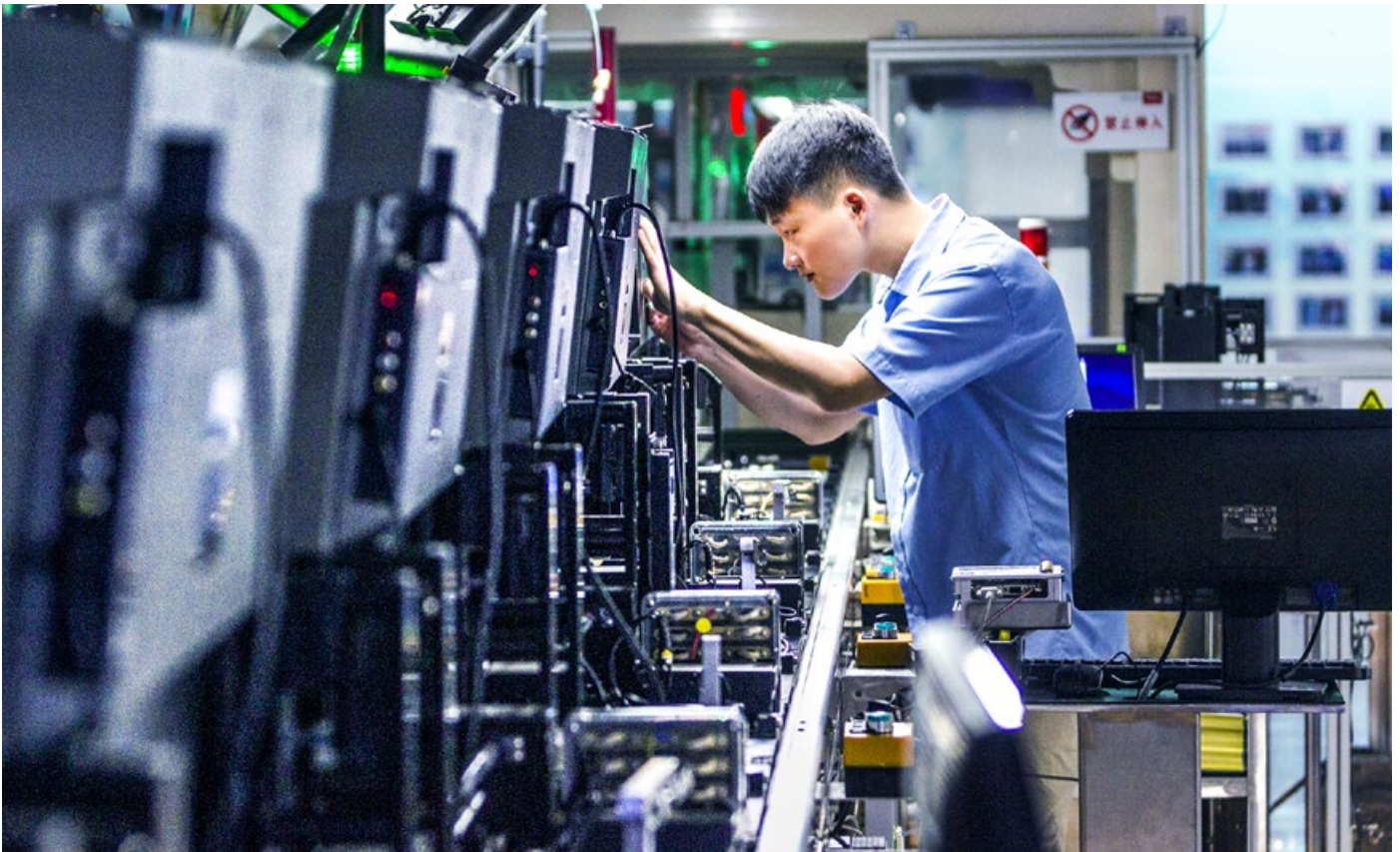


Marc Schaad and Robert Vaculik

CHINA

Quality takes precedence

The electronics industry has traditionally been strong throughout Asia – and in China as elsewhere, it is continuing to gain ground. Kistler has stepped up its presence on the ground so that we can support China's 3C (Computer, Communication, Consumer Electronics) enterprises with a wide range of process monitoring systems: innovations in the display and monitor production segment are just one application example.



Kistler helps companies in China's 3C industry to increase automation and boost their innovative strength

Ongoing development of industry with the help of automated, intelligent production processes plays a key part in China's ambitious plans for the future. The "Made in China 2025" program is comparable to Industry 4.0 in Germany: by adding this issue to the political agenda, the Chinese government has set specific goals for transforming the nation's industry into an infrastructure that is both intelligent and efficient.

The 13th Five-Year Plan, issued by the Chinese Ministry of Finance, already calls for a highly automated production sector to be built up by 2020. China's manufacturers should be as competitive as possible on the global market, and they should also meet more than 50% of domestic market demand. And by that date, the industrial sector should include at least 40 established system and solution providers with sales in excess of

RMB 1 billion. The next five years will therefore be critical in terms of achieving these goals. Constant growth is reported for industrial automation in particular (2016: >RMB 140 billion; 2017: RMB 165.6 billion). Forecasts suggest continuing stable growth of RMB 8 to 10 billion per year for industrial automation and, in line with this trend, salaries in the segment almost doubled between 2010 and 2016.

New technologies set higher requirements

The exceptionally strong 3C industries in Asia and especially China provide an example that makes it easy to grasp the scale of the transformation in automated production. Most of the flat-panel display modules built into smartphones, laptops and televisions are produced in China. Constant growth and new technologies such as OLED and full-screen design are triggering increased investments in production facilities. Leading smartphone manufacturers are already opting for new technologies that rapidly gain market share and are set to become the standard within a few years.

Nevertheless, the manufacturing processes for OLEDs and conventional LCDs differ in several respects. In some cases, for instance, the arrays make use of non-LTPS (low-temperature polycrystalline silicon) glass substrates which call for different processes. There is an even greater difference regarding the production of the individual cells because for OLEDs, an organic light-emitting material is applied to the substrate with a vapor deposition process. There are certain similarities between the processes for the module as a whole, but LCDs need backlighting whereas OLEDs require gamma correction.

The individual phases of production generally account for similar percentages of sums invested in the two processes (LCD: 70%, 25%, 5%, OLED: 65%, 25%, 10%); however, the requirements for OLED and full-screen design during production are substantially higher. Processes such as joining, dispensing and testing call for additional equipment: the average number of equipment units for LCD is two or three, but this rises to about five for OLED. Soaring investments in more complex and costly production processes also entail steadily increasing follow-on costs for faulty parts and production outages. All of this means that the integration of quality monitoring systems is becoming an

essential factor in the intelligent automated production that China is seeking to achieve in the 21st century.

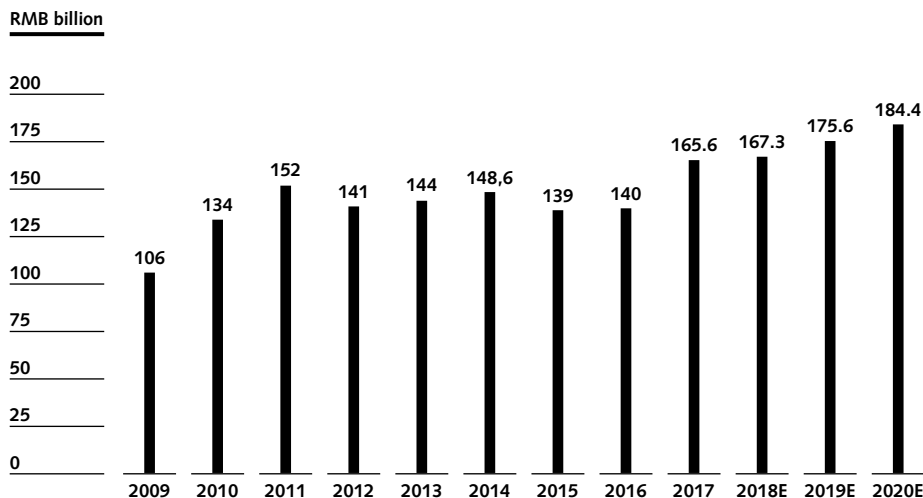
Full process control also available for 3C industries

Alongside automobile manufacturing and medical technology, electronics production is one of the Kistler Group's key application areas. In China too, our efficient cutting-edge monitoring solutions are helping to build up a networked industrial sector that protects resources and makes maximum use of digitalization. At present, we operate from nine locations to make our products and services available nationwide – thus helping to guarantee higher quality standards throughout China. By improving production processes and segregating faulty parts automatically, our process monitoring systems enable customers to achieve significant savings on time and costs – benefits that are increasingly appreciated in Asia's electronics industry.

For example, one major Chinese 3C company has opted for our piezoelectric measurement technology to monitor LCD and OLED production, with the aim of boosting process efficiency. In particular, this firm has benefited from improved income and reliability for its OLED connection technology. Within just a few years, the company has grown to become one of China's largest manufacturers of display equipment – with its own assembly and lamination processes, independent research and development in fields such as wiring, and a stock of in-depth know-how on design and capacity planning for OLED production. As an established technology leader, this firm is now setting standards in areas such as flexible monitors, full-screen, automated optical inspection (AOI) equipment and 3D lamination – making it a decisive influencer of trends such as full-screen display walls with ultra-narrow bezels. ■

Size of the industrial automation market

Unit: RMB billions



Source: Industry Research Institute, Soochow Securities Research Institute

KAMA GMBH

Strain sensor technology: when brute force is at play, sense must prevail

At KAMA in Dresden, our piezoelectric strain sensors make sure that the massive die cutters used for post-press work never become jammed or damaged. Customers are so convinced by Kistler's retrofittable process monitoring technology that it has become established as the de-facto standard in just a few years.

KAMA GmbH, based in the Saxon capital of Dresden, can look back on a long tradition in the post-press sector. For almost 125 years, the Dresden engineers have been developing machines to blank folding cartons and printed materials, as well as folding and gluing machines for the downstream process steps. Key USPs include inline stripping and blanking without the need for tools, and integrated hot foil stamping as an option. This company's history dates back to 1881, when the patent was obtained for the "creasing line" that makes it easy to incorporate bending joints into packaging.

Offset printing still dominates the packaging sector, but commercial printing – individual printed items in small

batches – also offers an enormous variety. KAMA is especially strong in this area: "The emergence of digital printing has generated entirely new impetus. Close collaboration with one of the market leaders has placed us in an excellent position here, and commercial printing has become our main business field," says Steffen Pieper, Managing Director of KAMA GmbH. But there is no shortage of activity in the packaging print segment: short-run packaging – with products that are increasingly individualized and geared to specific events – is creating the need for flexible machines with fast changeover times for small and medium-sized batches: exactly the sort of machines that KAMA develops. With a workforce

of 120, KAMA already numbers among the major post-press solution providers: the firm supplies its machines to customers across the globe, from Los Angeles to Tokyo and even further afield. In Germany alone, KAMA's potential customer base includes over 2 000 printing companies.

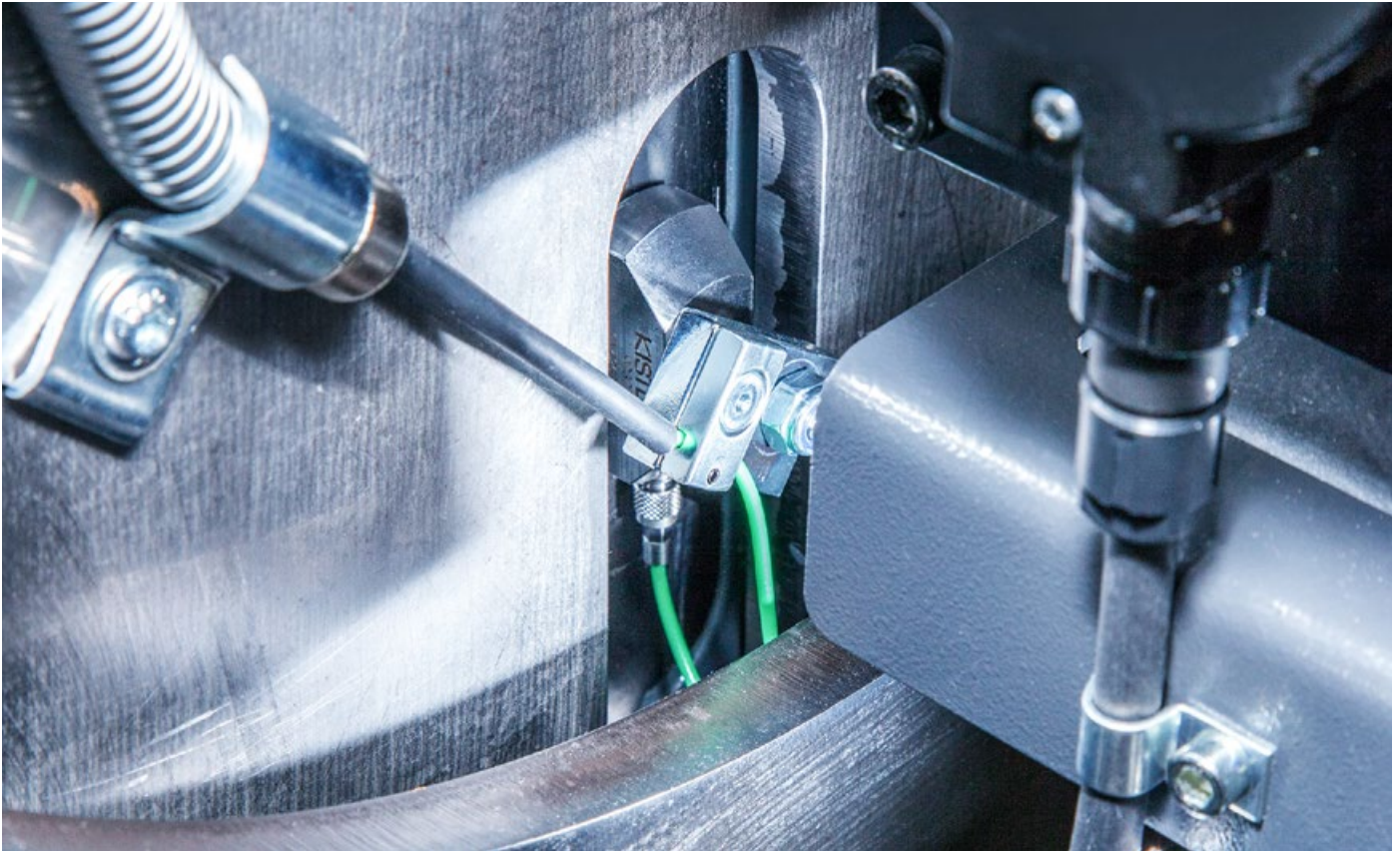
Avoiding costly machine outages

Raik Freudenberg, who heads KAMA's electrical engineering and automation technology team, has been with the company for five years. Ongoing development of the firm's machines is one of his principal tasks. "Two questions regarding development that I had to tackle at a very early stage were these: how can we provide even better protection for our plants, and how can we avoid downtimes? We are quite literally dealing with 'heavy metal' here: with weights of 7.5 tonnes, the punching forces are equally enormous," Freudenberg explains. "One of our first ideas was to use strain gages. In the machine, the force is applied by tie-rods that act more or less like large springs. The motion is highly dynamic but the strain is rather low, so strain gages can't achieve the goal. That's why we soon turned to Kistler, who can offer rugged piezoelectric strain sensors with high sensitivity and accuracy."

Of the 50 or so machines that KAMA builds each year, 30 offer the additional option of hot foil stamping. Two Kistler strain sensors are now installed in almost every one of these machines. "We offer our customers integrated process



Jörg Nimz (left), Sales Engineer at Kistler, in discussion with Raik Freudenberg, Head of Electrical Engineering and Automation Technology Team at KAMA



To prevent the machine from jamming, Kistler strain sensors monitor the forces applied and the process profile

“Retrofitting older machines with Kistler sensors poses no problems: we offer this as a service.”

Raik Freudenberg, Team Leader at KAMA

monitoring as an option. Over 90% of them choose it – and the trend is upwards,” Pieper points out. “As well as protection for the machine, there is an added benefit for operators: an ‘instinctive feel’ for the force needed for punching – and that makes commissioning much easier,” Freudenberg adds. As soon as something is not quite right in the process, the sensors trigger an alarm. For example, it can happen that a cardboard sheet or parts of it are left behind in the

machine while the next sheet is already being fed in. This leads to a significant increase in the forces and unless there is an intervention, the machine will quickly jam.

Robust, durable protection against overloading

Even if there is no damage, it can take days to free a jammed machine and make it ready to operate again – machine downtime that would be very costly for customers. “We’re highly satisfied with the solution from Kistler. Measurements are reliable and stable over long periods; throughout all these years, not a single sensor has failed,” Freudenberg notes. “And retrofitting older machines with Kistler sensors poses no problems: we offer this as a service.”

Industry 4.0 is also a key factor for KAMA. All the firm’s machines and plants are network-capable, so they offer simplified data import and export. A cockpit function gives developers access to the control, opening up extended options for remote maintenance and making it easy to feed in work orders from higher-level systems. Managing Director Steffen Pieper comments: “You simply can’t survive without functions such as these nowadays. Customers are using our machines all over the world – and that’s exactly why KAMA should be able to carry out remote diagnosis and offer support, with no need for one of our technicians to be on site.” ■

DACH (GERMANY-AUSTRIA-SWITZERLAND)

Service: always close to our customers

If you want to give your customers the best possible support, you have to understand them. That's why opportunities for dialog and exchanges of ideas are essential. We make use of various formats to share knowledge and expertise with our business partners and prospective customers, and we also assist them with training their staff. Our activities range from on-the-spot roadshows and Expert Days with well-known presenters through to our goal-oriented training program, which is outlined below using the plastics sector as an example.



Sharing practical experience: Kistler visits customers and equipment users

Plastics processors are faced with growing challenges in areas such as lightweight construction, product quality and manufacturing efficiency. New processes and the megatrend towards digitalization call for expertise and skilled handling of machinery and plant. Kistler aims to gear its services to these customer requirements: rather than merely sharing the knowledge needed to make optimum use of our solutions, we also help users to stay at the forefront of technology.

Kistler on the road

In 2018, we began going on tour to visit our customers in the plastics processing industry in Germany, Austria and Switzerland: a new way of presenting our solutions to interested companies. Peter Jost, Sales Engineer at Kistler, explains: "Through the roadshows, we come into contact with individuals that we wouldn't otherwise reach: trainees, production employees, toolmakers and designers. Our aims are to heighten acceptance of cavity pressure measurement, and to share tips and hints on installation and operation."

Training users to become experts

Interested users who want to deepen their knowledge can also take advantage of our seminar program, with three modules to choose from:

- Fundamentals of cavity pressure measurement
- User training for the ComoNeo process monitoring system
- Exclusive training with a certificate (combined training on fundamentals of cavity pressure / ComoNeo user training)

The basic training course combines theoretical knowledge about cavity pressure measurement with some first practical exercises on an injection molding machine. During these system-based training courses, participants learn step-by-step how to commission, configure and make optimum use of our process monitoring systems. All our training courses can take place either at our center in Sindelfingen, at the Esslingen University of Applied Sciences or at our customers' premises on request.

Optimizing RTM processes

Since 2017, we have been staging an annual "Fiber Composite Expert Day". Guest presenters from the sector offer insights into current challenges in lightweight construction with thermo-setting or thermoplastic fiber-reinforced composite materials. The Expert Day will be taking place again in 2019 – for more details, and further information about other training courses and events, visit: www.kistler.com/training. ■

Focusing on our customers in every way

We intend to continue writing our worldwide success story in the U.S. and Canada – and to achieve that, we are boosting our manpower, offering an open training program and launching a series of strategic sales and service activities. In terms of staffing as well as technology, we are now in a stronger position to respond more effectively not only to our customers' needs but also to market demands.

The U.S. is the world's largest economy and although its industrial sector is relatively small, the Kistler Group is stepping up its presence on this market to bring us even closer to our customers. We are specifically targeting four regions, with the emphasis on different industries and different applications in each one:

- Midwest: automotive industry
- Northeast: medical technology, aerospace industry
- Southeast, including Texas: automotive industry, electronics production, aircraft construction, consumer goods
- West Coast: medical technology, 3C, semiconductor industry, aircraft construction

Canada – and especially Ontario – will also play a more prominent part in the future as our fifth region. Since 2018, we have been operating from an additional Kistler site in Toronto which will concentrate mainly on supporting customers with their assembly, joining and forming processes. We recently added a new member to our family of electromechanical joining systems: the highly cost-effective NCFE – and, like all the products in this range, this innovation helps customers boost productivity while improving product quality and resource efficiency.

Bill Taylor, Kistler's Divisional Sales Manager IPC, outlines some upcoming developments: "Five new employees will be joining us in 2019, including Kistler colleagues from Germany who will contribute their in-depth expertise in the automotive sector. They will help us focus more closely on our customers' requirements, so we can target our application know-how more accurately

at specific manufacturing sectors." Taylor continues: "For the medical devices segment, we're recruiting a specialist sales engineer who will take a holistic approach to market opportunities in component production – ranging from injection molding, joining and forming through to automated quality inspection. His remit will also include developing customized solutions – another area where we see greater potential."

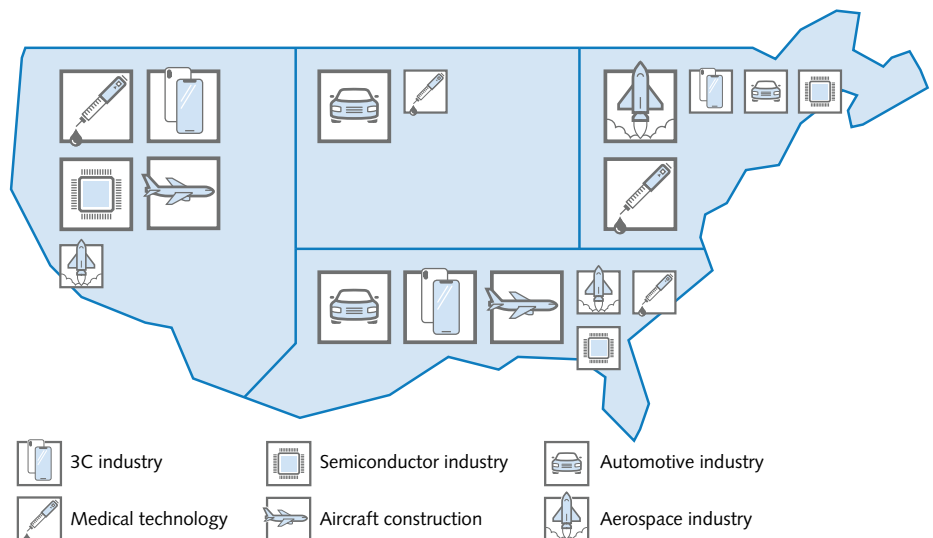
Sharing knowledge, expanding expertise

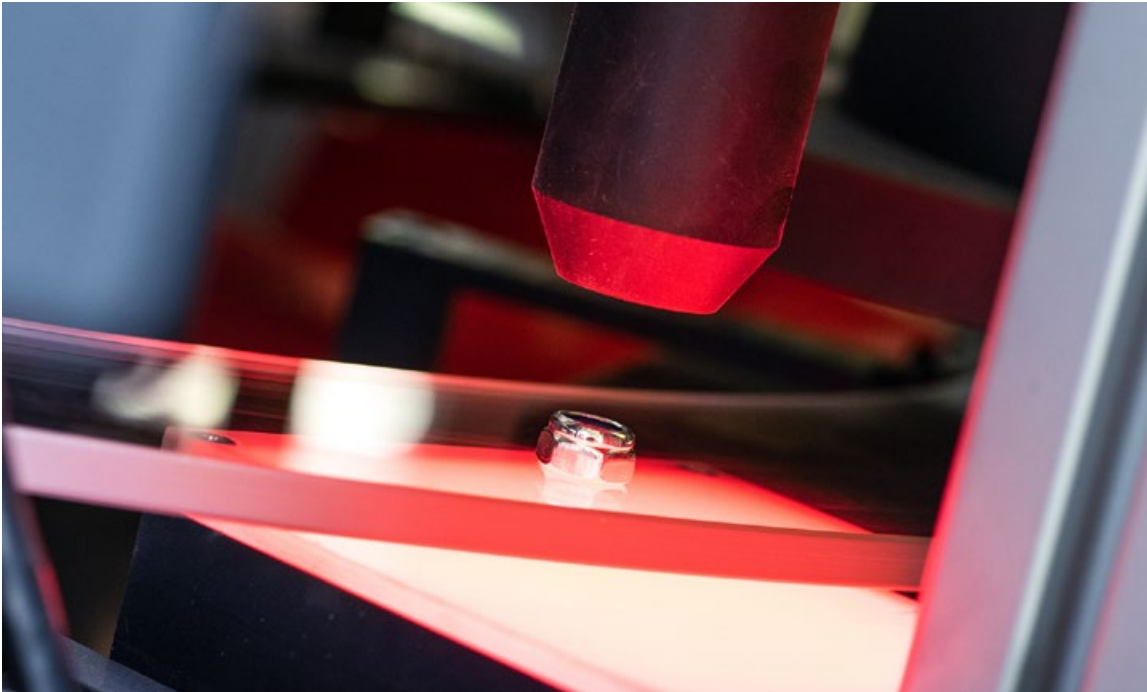
Dedicated know-how is essential in the plastics processing industry, where knowledge of cavity pressure can open up huge opportunities for process optimization and zero defect production. Kistler is joining forces with a partner to offer a training program specifically geared to this sector's requirements. "There is enormous demand from customers for training sessions and courses, but they also inquire about more extensive opportunities for study in this field," Taylor

adds. "That has prompted us to take a thorough look at the issues of basic and advanced training. We aim to offer various formats for two application areas: process monitoring, and optimization of injection molding production. The content of these courses will be universally applicable, and participants can obtain a certificate on completion: the focus will not be exclusively on Kistler's products and solutions."

Closer to our customers – with more service

The Kistler Group also plans to expand its offering and its activities in North America beyond 2019. We will be devoting particular attention to the West Coast of America, with its concentration of emerging industries such as medical technology, 3C and aviation. Kistler plans to open another Service Center here in the medium term – bringing us closer to our customers to provide focus and enabling rapid delivery of our services. ■





Even the smallest series parts are measured accurately thanks to incident-light inspection with high-performance camera systems

PRO-SORT GMBH

Something you can rely on

Day after day, automatic testing and sorting systems by Vester are in operation at pro-sort to inspect millions of mass-produced and series parts, enabling customers to benefit from guaranteed product quality and improve their processes.

For a very long time, the task of assessing whether a manufactured part met the quality standards was carried out exclusively by human beings. But many typical mass-produced parts have dimensions of only a few centimeters or even millimeters. This is why such a repetitive task is increasingly performed by automatic testing machines, with high-performance camera systems to deliver results that are reliable and – most importantly – reproducible.

Jürgen Schwarz is the founder and CEO of pro-sort GmbH, based at Keltern-Dietlingen in Baden (Germany). Virtually from day one, he has played a key role in developing the company's technology: "When I saw the first industrial image processing systems reaching the market in the 1990s, I realized that this was clearly a technology of the future. So I drew up a plan to establish my own business, with the focus on complex testing tasks." pro-sort now has a 14-strong team

of employees, and work on an extension to the company's building is set to start by the end of this year. "At present, we certainly can't complain that our capacity is under-utilized. Quality standards have risen in recent years, and suppliers have to do more to protect themselves against complaints that lead to claims. When production problems are getting too big to handle – that's when people come to pro-sort," Schwarz explains.

pro-sort's services include measurement, sorting, documentation and packaging of screws, bolts, pins and formed or punched parts for customers from all over Europe, ranging from automotive suppliers to electronics manufacturers and medical technology companies. "We're even testing products from China nowadays! But the critical factors are always the same: gaining the customers' trust, and – above all – never disappointing them. Each and every step is accurately documented. And with 380 to 400 million parts per year, that

means over one million parts every day," Schwarz points out. One look at the hall where the machines are housed shows how this huge output is achieved: everything looks very clean and tidy. The layout creates a very clear visual impression, and this is what ensures a reliable material flow. This isn't just a matter of in-house requirements: quite a few customers insist on the possibility of regular on-site audits before they will work with pro-sort.

Feed, measurement and sorting: all fully automated

To handle such huge quantities efficiently and without errors, pro-sort opts for fully automated test cells from Vester Elektronik GmbH, a member of the Kistler Group since 2017. pro-sort's machine hall currently contains 16 Vester test systems of various designs. They meet customers' differing requirements for end-of-line testing of their series parts, which include turned, punched, pressed and plastic components. Alongside dimensional checks, the Vester machines carry out structural testing as well as crack and surface tests. Depending on the type of part and the assignment, the testing equipment can include appropriate feed systems, sorters of various types for good and bad parts, and special camera processes.

"Precise measurements using transmitted-light inspection are now part of the standard," according to Michael Reinkensmeier, Head of the Measurement and Sorting Technology Department at pro-sort. "Incident-light inspection, as it's known, also reveals changes to the material such as the formation of cracks that could never be detected with the naked eye in many cases." Reinkensmeier's overall responsibility for plant and equipment includes planning and programming the Vester automatic testing and sorting systems to ensure optimum capacity utilization and the best possible test results. "These machines can be flexibly adjusted to

meet different requirements, with no need for lengthy changeover times. Operation is intuitive and comfortable – another reason why we have almost always opted for Vester over the years," Reinkensmeier emphasizes. Many successful system types in Vester's VIDEOcheck series are used at pro-sort: examples

"Our tests help customers to improve their processes and redefine tolerances, improve the quality of their products or boost their efficiency."

Jürgen Schwarz, founder and owner of pro-sort GmbH

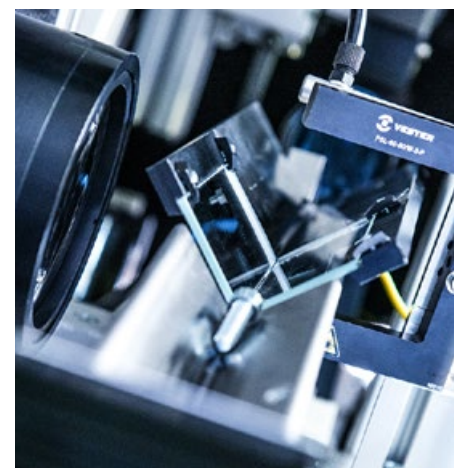
include the VVC-120 based on the inclined-plane testing principle – with positionally stable feed (vertical or horizontal) for series parts – and the VVC 821 with rotary plate architecture for complex surface checks. Thanks to retrofits, the predecessor models continue to be operated at pro-sort.

Fast, accurate, flexible – and honest

What are the particular challenges that face contract sorting providers such as pro-sort, now and in the future? "Fast response times are required for processing complaints. For instance, if a major automobile manufacturer's production line is at a standstill, suppliers contact us so that we can either locate the fault or provide them with arguments to fight off compensation claims. What's more, many of the parts we test are used in safety-critical applications. Car safety belts are one example. So the responsibility and the time pressure shouldn't be underestimated," Schwarz stresses. Another factor that shouldn't be underestimated is the outlay on project planning. The aim here is to work with the customer to define exactly what is to be tested, and how. In this context, honesty is an absolutely essential element of the working relationship. "We tell our customers very clearly

if something they want isn't possible. For this purpose, we carry out precise feasibility analyses in advance – to determine the capabilities of the measuring equipment, for instance," Schwarz adds. "Then we collaborate with the customer to define testing criteria as the basis for sorting into good and bad parts. We benefit greatly from our close working relationship with Vester when it comes to handling difficult assignments and developing suitable testing processes for them," Reinkensmeier notes.

These testing procedures often identify characteristics or faults on parts that were not even noticed by the customer who produced them. "So our tests help customers to improve their processes and redefine tolerances, improve the quality of their products or boost their efficiency," Schwarz explains. "On the basis of precisely documented test results, the customer receives substantiated feedback on any aspects of production that are not running optimally. If our customer can then go to the end customer and show him specifically how he has rectified a fault or improved a product – then we know that pro-sort has done its job properly. And Vester's systems create the conditions for us to achieve successes like that." ■



Automatic testing and sorting systems that feature outstanding precision combined with high throughput rates

CHINA

Machinery manufacturer LIK joins the Kistler Group

By acquiring Chinese mechanical engineering specialist LIK, the Kistler Group will not only strengthen its presence on China's highly dynamic vehicle market but will also broaden its own range of expertise. This acquisition adds automated assembly lines for vehicle components to our portfolio.

Two major milestones for Kistler: LIK Mechanical and Electrical Technology Co., Ltd., founded in 2010 in Shanghai, is our first acquisition in the Far East – and this step also means that our industrial expertise will now include the manufacture of automated production lines, with the focus on the rapidly growing electric vehicle sector. LIK is a young company advancing in directions that fit perfectly with our strategy, and this acquisition will give us faster and wider access to the very dynamic Chinese market. By expanding our capabilities in this way, we shall be able to deliver faster to our Chinese customers – and in addition, we can offer them more comprehensive solutions and even better service at the local level.

Highly integrated production of vehicle components

It has taken LIK only a short time to become a well-established supplier of highly automated assembly lines for vehicle components such as automotive seats, braking and safety systems, as well as test stands for electric motors. LIK's high-profile customers include many international corporations. With over 100 employees and sales in excess of CHF 10 million, the company is set to grow beyond its present limitations. James Wang, CEO of LIK, explains: "With Kistler as our partner, we are very definitely on course for growth. We're looking forward to working together to help shape the mobility of tomorrow's

world, and we aim to make even better use of the diverse opportunities in vehicle production, especially in China."

"By collaborating with LIK, we can offer a holistic range of integrated production systems."

Rolf Sonderegger, CEO

Holistic solutions, faster deliveries, enhanced service

By acquiring LIK, Kistler is consolidating its presence on the world's largest vehicle market and in the future, the Group's quality monitoring and process optimization systems for the Chinese market will also be manufactured locally. The portfolio includes electromechanical joining systems and test stands for electric motors, as well as process monitoring and test automation systems. As Kistler Group CEO Rolf Sonderegger points out: "The China Manufacturing 2025 program attests the nation's clear commitment to quality-focused industry that makes efficient use of resources. Here at Kistler, we have the technologies to realize this vision – so this is a perfectly logical step for us to take. By collaborating with LIK, we can offer a holistic range of integrated production systems to meet the growing demand for turnkey solutions." ■



GERMANY

New Competence Center in Aachen

Kistler is on course for growth – and that includes digitalization. The acquisition of IOS GmbH in May 2017 was a key strategic step towards this goal. Since then, customers have one single source for everything from sensors to MES, including hardware, software and all accompanying services.



To highlight this integration, IOS was renamed Kistler Aachen GmbH in June 2018 – and a Competence Center for production control and management systems opened on the Aachen site. The new Center focuses on the digitalization of plastics processing and other processes.

Dozens of MES systems have been installed for customers in various industrial sectors over recent years. Applications include monitoring the production of safety-critical parts in the automotive, medical devices and consumer goods industries. These systems are also deployed in the manufacture of other high-specification, complex components where quality and scrap must be controlled and optimized.

Kistler supports its customers all along the process chain: from sensor installation, data processing and analysis through to practical improvements in each production step. The ultimate result: yesterday's factories are becoming the Smart Factories of tomorrow's world.

Customers benefit from two decades of all-round expertise based on the firm's own MES, backed by a track record of close collaboration between IOS and Kistler. The result: a constantly expanding Industry 4.0 portfolio of intercoordinated products. Kistler's service offering is also continuing to grow and in future, the Group's advisory expertise will include networking of production with its proprietary MES. ■

CHINA

Shanghai facility that reflects our standing

Another step forward in Kistler's encouraging growth in China: we recently moved into a new building in Shanghai with 4 200 m² of floorspace – almost three times larger than our previous premises.

Since fall 2018, you'll find us in the Hongqiao Business Park – just a stone's throw from China's National Exhibition and Convention Center, with excellent access to expressways, the rail station and the airport. Proudly displaying the Kistler colors, this seven-story building meets the highest standards of design and functionality. The ground floor houses a huge exhibition area showcasing our latest products and an application-based display of our concept for Industry 4.0. As well as the Tech Center, the site includes offices for all three Kistler divisions. Atop

the building is the sixth-floor cafeteria with a roof terrace that affords superb views. The ceremonial opening will take place on 24 and 25 January 2019: as well as a major event for our customers, we shall also be hosting the annual gathering of our staff in China – you're most welcome to join us! ■



Join us on WeChat and keep up-to-date with all our events!



LIEBHERR

The nuts and bolts of success

The world's largest mobile cranes are built by Liebherr in Ehingen. To meet its own high standards, Liebherr opts for our cerTEST mobile test system for all the power tools used on its production lines. cerTEST ensures high quality and end-to-end documentation of all simulated fastening scenarios.

Starting out from its core business with utility vehicles, Liebherr has expanded into business fields such as transportation and traffic technology, mechanical engineering and domestic appliances in recent years, and has even opened its own hotel chain. With sales approaching EUR 10 billion and over 43 000 employees, there can be no doubt that Liebherr numbers among the global players in the sector. All Liebherr's mobile cranes, in all their different versions, are built on the Ehingen site: from all-terrain vehicles with telescopic booms (offering both on-road and off-road capability) to crawler cranes with lattice booms. The largest crawler crane in Liebherr's range, the LR 13000, was recently deployed in Mexico for the construction of a refinery. This machine can lift weights of up to 3 000 tonnes.

"We've now established a quality assurance process that will not only save us money in the long run, but will also offer extra security as regards product liability."

Heiko Springer, Project Engineer in the Plant Planning Department at Liebherr Ehingen

Thomas Nüssle, Head of Plant Planning at the Ehingen site, explains some of this facility's special features: "We manufacture complete vehicles here on four lines – an average of about eight vehicles every day, all of them built to order and just-in-time. Before delivery, they undergo extensive testing on our test sites: we have one for mobile cranes and another for crawlers," he explains. "Quality has top priority in our book. Throughout

the world, Liebherr is appreciated for its outstanding products."

Inhouse testing cuts costs and supplies know-how

Many different torque tools are used in the manufacture of mobile cranes. To ensure their machine capability, Liebherr deploys our cerTEST mobile test system. Thanks to cerTEST, all the facility's power tools can be tested regularly; all results are precisely documented, with torque and rotation angle control. Heiko Springer is the project engineer in the Plant Planning Department at Liebherr Ehingen who heads this project. He explains: "We currently have 128 torque wrenches from different manufacturers in use, and all of them have to be tested. As of 2018, we carry out our own machine capability analyses with four test points based on VDI 2645. We also carry out tests related to fastening points."

The cerTEST system has four simulators (two integrated and two external) to test power tools. This allows dynamic simulation of all joint hardnesses in the range from 250 to 6 000 Nm. And for tests related to fastening points, it delivers precise statements about the current performance of the tested power tools after 25 measurements. The simulator also rotates during the dynamic test. The advantage of this approach over the static method is that it allows simulation of "hard" joints (with a small angle of rotation) as well as "soft" ones (with a large angle of rotation). End-to-end documentation for all tools and the main joints creates an accurate picture of a machine's capability throughout its entire life expectancy.



Fastening the slewing ring on the Liebherr LTM 1160-5.2



Testing related to fastening points on the Liebherr LTM 1450-8.1

Convincing advantages: performance scope, specialization and service

Thanks to cerTEST, Liebherr saves about EUR 30 000 on external testing costs each year and as an added bonus, the company can build up its own valuable know-how on fastening technology here in house. And last but not least, the logistics are more efficient: there are no more costs for sending the tools out and sorting them back in again – testing takes place here on the spot, which saves extra time. Because the test stand is mobile, all the power tools can be tested near the production lines.

Springer singles out the good collaboration with Kistler for special praise. He

recalls that things were difficult at the outset, due mainly to the complexity of the subject and the sheer volume of data to be collected. But now, about one year after the project began, he is highly satisfied with the results: "Thanks to our excellent working relationship with Kistler, we overcame all these challenges. We've now established a quality assurance process that will not only save us money in the long run, but will also offer extra security as regards product liability. And by no means least, it gives us a deeper understanding of the technology. It's highly likely that we'll be using more Kistler fastener inspection systems in the future so that we can continue

to develop our expertise. At the moment, for example, we're thinking about deploying the method known as 'joint scanning'. This involves positioning a plug-on sensor between the nutrunner and the real joint. The nutrunner test stand measures the torque and rotation angle, and stores the data for the power tool. Later on, this precise joint can be simulated dynamically for this same tool on the nutrunner test stand." ■



Digital processing of injection molding operations with Kistler's new MES

From MES to DAkkS: our latest innovations

Here at Kistler, we are constantly working to develop innovations, implement ongoing improvements and provide all-round service. This overview highlights our latest offerings.

MES

Our Manufacturing Execution System (MES) for networked injection molding production supplies machine data, such as quantities produced and cycle times: information to help you ensure improved planning and optimum control of your production processes. This is a modular solution comprising six modules – Operation Data, Machine Data, Workstation-based Staff Time Logging, Batch Traceability, Production Planning and Maintenance Management. The modules can be flexibly tailored to suit each customer's requirements. Another feature: the ERP LINK function, which enables bidirectional exchange of production data between the MES and higher-level systems (PPS/ERP). In addition, we offer an entry-level version – “MES light” – with the Machine Data and Operation Data modules: the fast and easy way to make plastics processing more efficient, cost-effective and transparent.



Digital charge amplifier

Kistler's newly developed Type 5074A charge amplifier breaks new ground in industrial measurement technology. For the first time, machinery and plant manufacturers can now integrate any desired piezoelectric sensors into their Ethernet environment so that settings can be made directly via the control. Kistler's digital charge amplifier offers a vast range of measuring functions and is compliant with the three main Ethernet standards – fully in line with end-to-end digitalization for Industry 4.0. ■

Joining and forming processes

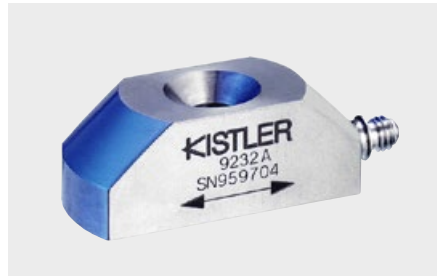
Process monitoring system

Our maXYmos system monitors and controls quasistatic and highly dynamic force processes in machinery and plant: even when ambient conditions are difficult, the results are precise and transparent. With the latest version – maXYmos 1.6 – users can configure the system entirely offline on a PC. Thanks to this feature, the machine or plant only has to be stopped briefly if changes to the production process are wanted: all that is needed is to upload or download the parameterization. Now available for maXYmos TL and NC (joining systems), this new function significantly cuts the total cost of ownership (TCO).



Electromechanical joining systems

Press-fit processes join components together with positive, friction-locked connections. Within its portfolio of seven electromechanical joining systems, Kistler offers the latest updates for two familiar products: NCFE ("E" for Economy) and NCFR. NCFE delivers an exceptionally cost-efficient solution for simple joining processes in the 10 to 80 kN force range, while the NCFR system features hollow-shaft motors for challenging applications where a rotary movement is required in addition to the press-fit process.



Strain sensor technology

Our piezoelectric (PE) strain sensors offer an effective solution to protect machines and tools against overload and damage. Thanks to their high natural frequency and sensitivity, they can capture the very smallest changes in the structure. This enables them to act as an early warning system for anomalies in production and assembly during processes such as press-fitting, punching and forming. Surface strain sensors are mounted directly on the machine structure, and strain measuring pins can even be integrated directly into tools. ■

Product inspection



Torque measuring flange

Yet again, we have enhanced the potential of our high-performance sensors in the KiTorq series: thanks to a transmission rate of 4 kHz, the evaluation unit (stator) is now four times faster (when Profinet or EtherCat is used for the connection). The benefit: real-time communication is now available for isochronous motion control applications – for example,

this makes torque control possible on the test bench. The new stator can be combined as desired with the various rotors in the KiTorq system, such as our KiTorq 4550A to measure torque, speed or rotation angle with exceptionally high resolutions of up to 8 192 pulses per rotation.



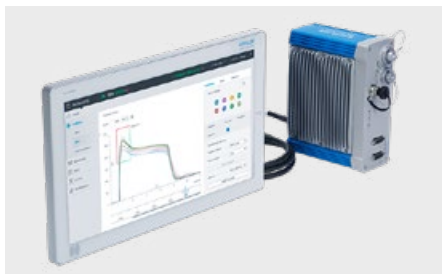
Inspection system for fastener assembly processes

Kistler now offers the portable INSPECTpro system from Schatz – so manufacturers can benefit from a flexible system that ensures efficient control and quality assurance for threaded joints. For the first time, this portable inspection and evaluation unit provides a convenient way to verify torque and rotation angle on threaded joints with wireless data transmission. INSPECTpro offers wide-ranging options for data management, networking and analysis – bringing fastening technology up to Industry 4.0. standard.

Fastener test bench with vibration unit

Our vibration test bench simulates real loading conditions for threaded joints with transversal alternating loads. On this test bench, fasteners can be subjected to transversal shear loads that act externally. With features such as a standard shear force of 50 kN as well as amplitude and frequency adjustment during operation, this vibration test bench is a highly flexible system for analyses in industrial fastening technology. ■

Plastics injection molding



ComoNeo 3.0 process monitoring system

We are constantly developing our ComoNeo process monitoring system – not only to cope with new application cases but also, of course, to ensure comprehensive end-to-end optimization coupled with maximum cost efficiency for injection molding manufacturers. Based on cavity pressure measurement with our tried-and-tested sensors, this modular system offers users a choice of seven functions that can be combined as required. With the help of these functions, users benefit from foresighted control of the injection molding process so they can be sure of optimum results. Support, monitoring, control and prediction: these attributes make Version 3.0 of Kistler's ComoNeo the technology leader – paving the way for the process transparency that is essential for Industry 4.0. The ComoNeoDataCenter database component stores all the process data, which can then be selectively evaluated and made available to higher-level systems. The benefit: users gain an all-round overview of their injection molding operation, opening up scope for targeted optimizations. And development work on ComoNeo never stops: planning for new functionalities is already under way.



Multichannel connector

This new multichannel connector (Type 1722) is simpler to handle because it ensures that single-wire cables are even easier to connect; in addition, it affords better protection against contamination and vibrations. Specified up to 120 °C, this component is also 100% backwards compatible – so as regards installation and connections, the four- and eight-channel design makes it identical to its predecessor. ■

Service

DAkkS calibration for large torques

Our new calibration facility in Lorch now offers an additional service for customers in the drive technology sector: this test stand has a usable measurement range of 1 to 100 kNm and is one of the very few systems in this performance class with accreditation from DAkkS, the German accreditation body. Thanks to the new service, designers of heavy-duty machinery, ship engines and wind power turbines as well as manufacturers of special-purpose machinery can optimize all aspects of their solutions. ■

Plastics Guide

Our new service-app gives you in-depth, methodical guidance on analyzing errors that occur during cavity pressure-based monitoring as quickly as possible, coupled with support on using Kistler products in the correct way.

Your benefits at a glance

- Methodical error analysis
- Step-by-step correction of errors
- Detailed guidance and support
- Product information
- Contact with Kistler

Download the app right now to experience all the benefits of our Plastics Guide! For more information, visit: kistler.com/plasticsguide



Our app is compatible with
Windows 7, Windows 8,
Windows 8.1, Windows 10:
kistler.com/plasticsguide





A special-purpose machine for the embossing process: the leather is positioned centrally and pressed against the embossing die from below

EISSMANN GROUP AUTOMOTIVE

The stamp of success

On the specially designed production lines at Eissmann Group Automotive, our electromechanical joining systems guarantee the high quality of embossed logos and pictograms on genuine leather surfaces.

Eissmann Group Automotive, based in Bad Urach, Swabia (Germany) is always on hand when high-caliber interior trim is required: its center consoles, instrument panels, armrests and door trims are to be found in luxury vehicles from manufacturers such as Porsche and Lamborghini, to name but two. Leather is one of the most frequently used materials. Specialized processes are required to achieve high-quality crafting of genuine leather, given that it is a natural product. This is why the company's global production (at 13 locations worldwide) relies in part on machinery and plant designed in-house.

The embossing process for the leather-covered driver's airbag is one example. In the first step, the leather covering is applied and bonded to the injection-molded part; this is followed by embossing of indentations for the application of the brand logo and also operating symbols (e.g. for the horn). "The challenge is that the symbols should always look identical – and what's more, the whole process is critical for safety, because we're operating in the area of the predetermined breaking point for the driver's airbag," says Oliver Roser, a design engineer at Eissmann.

"In the new machines, the driver airbags are pressed against the embossing die from below. The Kistler joining modules we've installed allow very precise monitoring of force and displacement, so the pressure force can be adjusted accurately. There are spindles positioned behind the tool changer that can move the dies as necessary to establish simultaneous contact with the leather," Roser explains.

Our Type NCFH joining systems with an integrated hollow-shaft motor for fast traverse speeds are used in Eissmann's plants. As well as reducing the outlay on re-embossing, nonproductive time has been cut by about 30%. And there's another benefit: cycle times in the machine are shortened – in fact, they are sometimes halved as compared to the conventional solution.

In combination with our maXYmos NC monitoring system, this solution offers speed and high-quality repeatability; what's more, the stored data improves traceability and can be integrated into the higher-level MES system. "We're so satisfied with this solution that we'll be deploying more Kistler systems in our plants as time goes on. Compared to similar products, they offer exceptional advantages as regards integration and commissioning. The possibilities for adapting the embossing die mean that we already save several hours and quite a few test parts whenever a new tool is introduced." ■



Embossed leather



Again in 2019, Kistler will showcase its latest product innovations at many trade shows for the automated industrial production sector across the globe

Experience Kistler – live!

Which technologies will shape the markets of the future?
In Shanghai, Nuremberg or Detroit – visit us at the leading trade shows for automated industrial manufacturing.

Since day one, Kistler's corporate success has been founded on a combination of premium products, outstanding technical know-how and first-class service. As a renowned manufacturer of sensors and process monitoring systems, we shall therefore continue to devote our efforts to one goal in the future: ensuring that our customers all over the world always have the best possible access to our technological skills.

You'll find us at these trade shows in 2019:

MD & M, Anaheim, California, USA	5–7 February
Fastener Fair, Stuttgart, DE	19–21 March
M-Tech, Nagoya, JPN	17–19 April
Control, Stuttgart, DE	7–10 May
MedTec, Nuremberg, DE	21–23 May
Chinaplas, Guangzhou, CHN	21–24 May
Fastener Fair, Detroit, Michigan, USA	22–23 May
Plast Ex, Toronto, Ontario, CAN	4–6 June
AHTE, Shanghai, CHN	3–6 July
Motek, Stuttgart, DE	7–10 October
K-Messe, Düsseldorf, DE	16–23 October
The Assembly Show, Rosemont, Illinois, USA	22–24 October
SPS IPC Drives, Nuremberg, DE	26–28 November

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