

The image features a close-up, high-angle view of a complex industrial machine, likely a metalworking tool. The machine is constructed from polished, reflective metal plates and components. A prominent feature is a long, curved metal blade or cutting edge that runs diagonally across the frame. Various bolts, nuts, and threaded holes are visible, some of which are secured with hexagonal nuts. In the lower-left corner, a black, textured hose or cable is connected to a brass-colored fitting. The overall aesthetic is clean, industrial, and technical.

Wittmann innovations

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The cover photo shows a servo rotary unit of a WITTMANN injection molding machine for multi-component applications.

WITTMANN innovations – The magazine for the injection molding world.

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Wittmann

Editorial

Dear Readers,

"Plastic-free into the future!" – The idea of living without plastics is gaining more and more followers. Distressing pictures of trash carpets floating in the oceans and dead marine animals as well as the omnipresence of microplastics in our environment have triggered a global movement. Initiatives to promote living without plastics have become a symbol for responsible management of our environment. It is true that there are many areas where doing without is simply possible and contributes to more sustainability – and that regardless of the material involved.

However, a future entirely without plastics is likely to remain an utopia. Modern life without polymeric materials has become unimaginable. Their versatility and cost efficiency, and above all their energy efficiency have made plastics an integral part of our society. When used correctly and properly recycled at the end, plastics are even making a substantial contribution to sustainable living in many applications. To us who are



working in the plastics industry, this side of the story is very familiar. This is precisely why we are promoting the development of a circular economy for plastics in all parts of the world.

This includes sharing our knowledge, and that beyond our habitual B2B environment. Only by entering into a dialogue with consumers will we succeed in getting more and more people to take a well-balanced view on the issue of plastics.

For instance, a school students' day was organized several weeks ago at our facility in Meinerzhagen in Germany. This event was initiated by a colleague whose daughter has been taking part in a school student exchange with Colombia. For two weeks, the Colombian high school students discussed with their host families the question of how we could better protect our environment and our climate. The project focused on the topic of living without plastics. During the visit to our subsidiary, it quickly became clear that living completely without plastics would not be quite so easy and perhaps not

even be desirable. Without plastics, after all, there would be no sustainable mobility, no efficient communication, no modern medical care and no respectful handling of food products. Of course, on the assumption that we handle plastics materials in a responsible way. The challenges which must be met in order to do so were also discussed openly with the school students.

We organized a similar event with more than 300 students from various technical colleges in June as part of our WITTMANN Competence Days in Vienna. The positive side effect of such students' days: the young people learn about the exciting career opportunities the plastics industry has to offer.

Therefore, we are delighted that there will also be a Career Day at this year's Fakuma. The WITTMANN Group is participating! We would ask you too to invite school and university students as well as young professionals from your environment to attend the Career Friday to be held on October 18 in Friedrichshafen, Germany. A great opportunity to gather information about the job profiles, career opportunities and innovative strength of the plastics.

See you soon! Yours, Michael Wittmann

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WITTMANN Competence Days 2024 – a complete success

Under the motto of “We live injection molding”, in summer, the WITTMANN Group invited its customers and partners to come to Vienna. More than 1,000 guests accepted this invitation and experienced live the WITTMANN Group’s competence by way of interesting specialist presentations, numerous exhibits and company tours.

The two-day event started with specialist presentations centering around the general theme of digitalization. The first speaker was Mikula Thiem from the Association of German Machine manufacturers (VDMA), who considered the topic of digitalization from many different angles. This was followed by specialists from the WITTMANN Group, who showed the guests several interactive presentations to familiarize them with the Group’s current developments in the area of digitalization. The topics included production integration using Wittmann 4.0, as well as data transparency and intelligent assistance systems, plus the use of artificial intelligence for further improvements in customer service.

After the specialist presentations, the visitors were given the opportunity to view the latest developments at WITTMANN via numerous exhibits. The work cells presented gave tangible evidence of digitalization, the use of AI, preservation of resources in the form of in-line recycling, lightweight construction, and also the use of DC energy in the injection molding process, including solutions in the field of automation. In micro injection molding – a specialty of the WITTMANN Group – nano structures could be viewed under a microscope.

Following an exciting keynote speech held by Alexander Kronimus from Plastics-Europe Germany, entitled “AI and Digitalization – the Gamechangers for the Plastics Industry”, the guests were invited to finish the day with social networking during a pleasant, informal dinner party.

Company tours were available on both days and met with lively interest. Sites opened to visitors were the premises of WITTMANN BATTENFELD in Kottingbrunn, where several more injection molding exhibits were on display in operation, in addition to a guided tour through the company’s production plant. Further options were a tour of the robot production plant at WITTMANN Technology in Vienna and a visit to the WITTMANN facility in Hungary.



Dr. Werner Wittmann, founder and Managing Director of the WITTMANN Group, together with Managing Directors Michael Wittmann and Rainer Weingraber, is delighted with the successful event and the lively exchange with business partners from all over the world. “We had the opportunity here not only to show exhibits, but also to hold many personal discussions – with more time than is possible at a trade fair and in

a very relaxed atmosphere,” emphasizes Michael Wittmann. Rainer Weingraber says: “These were two very informative, but also very entertaining days and I and our customers really enjoyed this combination.” The management team is already looking forward to the company’s 50th anniversary, which will be celebrated in two years’ time with an equally large group and equally great atmosphere.



Tomorrow's skilled workers in view – students as guests at the Competence Days

The skilled labor shortage is a challenge pro-actively addressed by the WITTMANN Group. During the Competence Days, there was an event specially organized for school students. The upper classes of technically oriented secondary schools were invited, and the interest was enormous. 300 high school students came to the Marx Hall to gather information about the innovative strength of the plastics and mechanical engineering industries and about the career opportunities at the WITTMANN Group. WITTMANN had compiled an exciting program with trend-setting exhibits and

technology presentations especially for the high school students, including numerous opportunities for active participation. Klemens Reitering, Department Head of Plastics and Environmental Technology at the TGM School of Technology in Vienna, explained in his presentation why plastics are indispensable for a sustainable future, and why it makes sense just now to start a career in the plastics industry. The students made use of the opportunity to riddle the experts with questions and left the event with a different view on the subject of plastics.

Feedback from guests

„We bought a new machine last year and were pleasantly surprised by the extra packages that came with it. The HiQ packages are definitely a benefit. We are busy testing them now. WITTMANN is a good partner for the further development of digitalization.“

Jens Schmied, Schwan Cosmetics

„We definitely want to take a closer look at the new technologies presented here. Digitalization is a very important issue. There is a great amount of data already available for intelligent evaluation and use.“

Harald Zödl, Greiner Bio-One International

„Digitalization broadens our understanding of the process. It has become possible to visualize things we used to do only intuitively, or whose existence we assumed but could never prove. These things are real eye-openers to people.“

Michael Meister, Meister-Quadrat

Performance and efficiency in twin pack



Electric drive technology sets the tone for the machine exhibits at the WITTMANN Group's booth at Fakuma 2024. In addition to all-electric machines from the EcoPower and MicroPower series, a servo-hydraulic SmartPower with electric injection unit will be presented for the first time.

Hall B1, Booth 1204

High dynamics with low energy consumption

The EcoPower is represented with two applications. Darts tips made of POM are produced using a 32-cavity mold supplied by Hasco on an EcoPower B8X 110/525. The machine's high dynamism is achieved by optimizing the toggle system together with a further acceleration of the injection units' top speed. Added to this is the higher clock frequency of the machine's Unilog B8X control system developed in-house to enhance both the machine's precision and speed.

The second EcoPower, an EcoPower B8X 180/750 DC Insider cell, is producing housings of a plug-in connector for DC technology using a 2-cavity mold supplied by HARTING. The special feature: This production cell is supplied with energy via a direct current grid. Using a sodium-nickel-based salt battery with a capacity of over 45 kWh ensures uninterrupted machine operation for the entire eight hours of the trade fair day. Whereas previously only the machine and robot could be operated with direct current, the WITTMANN temperature control unit can now also be powered directly from solar energy via the machine's DC link without any conversion losses.



The new hybrid machine ensures very high reproducibility in multi-component processes.

SmartPower with sophisticated multi-component application

With its electric injection unit, the new hybrid SmartPower machine combines the advantages of the servo-hydraulic SmartPower's generous mold space with those of the all-electric EcoPower to provide highly dynamic regulation with maximum reproducibility. At the Fakuma, this powerful machine will be shown in the Combimould version. On a SmartPower B8X 120/350H/130S the production of a bottle opener made of PC, TPE and a metal insert will be demonstrated, using a mold supplied by FKT Formenbau und Kunststofftechnik. The machine comes as a compact Insider solution with a W918 robot and conveyor belt. The robot inserts the metal parts into

the mold, where they are over-molded with polycarbonate. The resulting base body is subsequently passed on to the second station by a rotary unit and there over-molded with TPE, to give it a better grip.

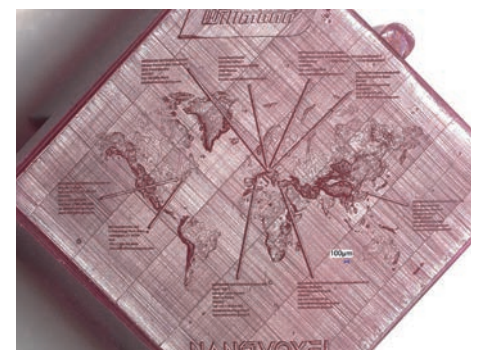
Efficient production of nano structures

Using a MicroPower 15/10, demo tiles measuring 8.5 by 8.5 mm, on which a world map showing the locations of the WITTMANN production sites is depicted, are produced. This is done with a 4-cavity mold with nano structures produced by 3D-printing and supplied by NanoVoxel. The main advantage of this new technology is the ability to produce minute structures within a short time and at low cost.



Left: The connectors are used to connect the new DC-capable temperature control unit to the injection molding machine. (Photo: Harting)

Right: Image greatly enlarged: The demo tiles can accommodate a complete world map on a nanoscale



WITTMANN automation technology at the Fakuma 2024

In automation technology, top performance plus efficiency means less compressed air and energy consumption, compact integration, light-weight construction, easy operation and fast teach-in processes.

A compact package deal

Added performance and more efficiency across the entire range of robots results from the new servo-driven rotary axes. Even more compact and lighter combined rotation sequences have now become possible. Various combinations of axes will be shown at the fair, including A-, B- and C-servo-axis combinations. On the whole, the WITTMANN linear robot models with their new axes and combinations of axes are now able to cover an even greater diversity of applications.

More than just sprue removing

More flexibility is provided by the new WX90 sprue removal system, available from now on in a stand-alone version for use on injection molding machines of all brands. Thanks to its energy efficient servo axes, the unit is amortized in injection molding plants within a short time. A huge advantage

compared to pneumatic sprue pickers are the very smooth, accurate and yet fast movements of the WX90. With these, the unit can do considerably more than a common sprue-picker. The robot is also able to handle simple pick-and-place tasks.

Compressed air consumption reduced

The product developers at WITTMANN have made a special point of focusing on compressed air consumption, since compressed air is the most expensive form of energy in most production plants. With Eco-Vacuum, WITTMANN is offering a vacuum solution for linear robots, by which the consumption of compressed air can be cut down considerably. The resulting efficiency boost is achieved through demand-based vacuum control. Following vacuum build-up, the Venturi nozzle will only come on again before the negative pressure becomes

too low to hold the part safely in place. The vacuum limit values can be calculated individually for each specific part.

Camera integration made easy

Due to the absence of standardization, the integration of camera systems, for example for position detection or quality checks, long presented a great challenge. Now WITTMANN has put an end to that for selected camera systems. Via an interface developed by WITTMANN, cameras coming from the relevant manufacturers are now able to communicate with the robot system. This increases the performance of the production cell. The operating panel of the camera software is visualized on the WITTMANN R9 robot Teachbox. In this way, various entries can be made directly on the robot's operating terminal, and measurement results can also be retrieved there.

News from the periphery

Tempo basic E: space-saving integration

The temperature control units in the new Tempo basis E series are significantly more compact than their predecessor, the C series. They can be easily accommodated underneath the injection molding machine or within the automation cell, for example, and are even easier to service despite their smaller dimensions. The new sealless peripheral impeller pump with a highly efficient asynchronous motor of the latest energy efficiency class contributes to the higher energy efficiency.



complete range of auxiliary program. For the first time at the Fakuma 2024, the Aton plus segmented wheel dryers will be available with EcoDrive. Here, EcoDrive will continually adjust the dry air output dynamically to the current material requirements.

An additional contribution to the high energy efficiency is made by its intelligent dew point control. Compared to standard operation without EcoMode, where the segmented wheel rotates without interruption and must be re-generated continuously, the dryer's energy requirements are significantly reduced without any effect on the drying performance. A constant, low dew point of 40 °C is maintained.



All 'plus' models of the WITTMANN auxiliary program are prepared for integration into Wittmann 4.0 work cells via "plug & produce". For data exchange with injection molding machines of all brands, an OPC-UA interface is available as an option.

Feedmax primus: robust, flexible, economical

Material loaders are expected to be reliable, durable and efficient. The central material loaders of the new Feedmax primus series from WITTMANN are setting new benchmarks in all three categories. Reduced to essentials, the new series of loaders combines easy operation and servicing with outstanding durability. The Feedmax primus vacuum loaders are made entirely of stainless steel and consequently extremely robust even when exposed to abrasive materials.



Geared for growth

A high level of process integration and complete automation are the decisive factors to achieve the required efficiency in manufacturing fuse boxes for agricultural utility vehicles. The production equipment is flexible due to its modularity. The plastics processor REINERT describes the recently completed project as a milestone and praises the excellent teamwork with its partner companies MAIER and WITTMANN.



The W832 pro robot from WITTMANN is the link between injection molding and downstream processing steps.

In terms of technology expertise, REINERT is certainly ahead of the game. With its focus on the automotive industry, the plastics processor can offer a remarkable range of services, including multi-component injection molding, as well as gas injection, various insert molding techniques, clean-room production and even organo sheet processing to make light-weight parts. "We are also often in demand as development partner, especially when the task is tricky", explains Jürgen Hahn, Managing Director of REINERT Kunststofftechnik GmbH & Co. KG, during our visit to the company's headquarters in Bisingen an der Teck, Germany – and the component lying in front of us on the table in the large conference room is certainly rather complex.

It is a fuse box for agricultural utility vehicles, consisting of two black boxes clipped together with sealing, numerous sockets and screws, plus lateral red brackets to hold the cover in place after electrical installation. "Both boxes have come out of the injection molding machine as complete assemblies including sealing and metal inserts, except for the red brackets", Christoph Klement, Deputy Project Manager at REINERT, explains proudly. "This project is really a milestone for our company."

18 variants and other products in quick succession

The challenge in this project was more than just the high-cost pressure, which has long been quite common in the automotive

sector, but rather the necessity to combine lowest possible unit costs with extremely high flexibility of the production cell. In fact, the fuse boxes from REINERT are produced in 18 different variants. Moreover, it was necessary to enable the highly automated production cell to be fully utilized by making some other products as well.

"That is the trend"; emphasizes Alen Cevra, Managing Director of MAIER Maschinen- und Werkzeugbau GmbH, which is in charge of developing the integrated production process and the automation involved. "Especially here in Germany, we are more and more often dealing with a wide range of different products and consequently small batch sizes. This requires fast and simple machine setting processes, as well as the

necessary flexibility for frequent readjustment of the production cell's components to new requirements."

With its headquarters in Markgröningen, Germany, and another facility in the immediate neighborhood of REINERT in Bissingen, MAIER specializes in the design and production of complex customized machinery and automation solutions. MAIER has already supported the injection molding processor REINERT for many years in developing production equipment for extremely complex parts. "Mr. Klement came to us with a CAD drawing of the part", says Cevra. That was in the early summer of 2022. Less than one year later, the fully automated production cell had already been delivered. This success was the result of excellent teamwork between all participating companies. "The key factor is communication. We can discuss everything openly, even in the event of occasional differences of opinion, and we all know that we can rely on each other", emphasizes Andreas Schramm, Managing Director of WITTMANN BATTENFELD Deutschland, the third partner in the project. WITTMANN delivered a large W832 pro linear robot, which handles the inserts as well as the finished parts and thus functions as the link between the injection molding process and the subsequent processing steps.

A linear robot mastering many different tasks

In spite of extensive automation, the production process now starts with manual work while the project is still at the pre-series stage. The inserts must be sorted into exchangeable trays. There are three types of inserts, which are required in different numbers for each fuse box model. Accordingly, there are three different exchangeable trays which are placed into a drawer after being filled, and are then passed on into the production cell. At that point, the robots take over. First, a small six-axis robot chips in, whose task is to arrange the sockets and screws required for one fuse box in the specified grid dimensions. The WITTMANN W832 pro takes up the inserts and places them into the lower cavity of the rotary mold inside the injection molding machine. Immediately afterwards, the gripper removes out of the top cavity the finished molded part from the previous cycle. In the 1+1-cavity mold, the base body is formed first. The hard component is a fiberglass-reinforced, flame-retardant polyamide. After rotating the mold, the second component, a TPE material, is directly molded on to provide the seal for the upper edge of the fuse



During the pre-series phase, the inserts are still being fed manually. But everything has been prepared for using vibrating bowls, hoppers and separators.



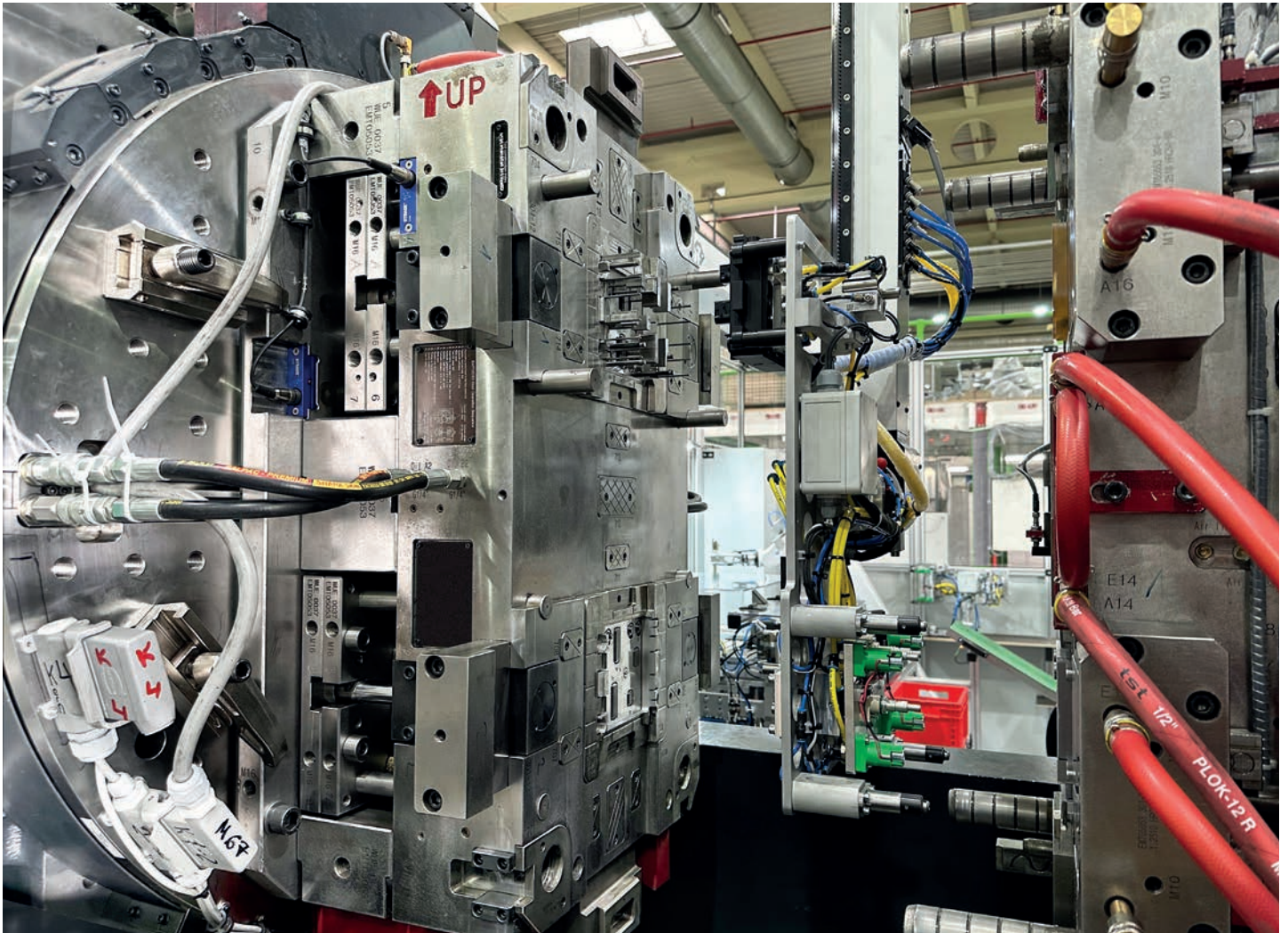
A particularly large amount of coordination work has been invested in the grippers. Here, Fabio D'Amato from MAIER (center), Andreas Schramm (left) and Michael Hans Wittmann (right) from WITTMANN BATTENFELD Deutschland are cooperating closely.

box. Simultaneously, the next base element is formed inside the lower part of the mold.

Parallel to the injection molding process, the W832 pro also performs an assembly task plus a thorough quality check. From the injection molding machine, the robot first takes the part to the assembly station. In the base of the black fuse box model running off the conveyor belt on the day of our visit, there are four small holes. Later on – when installed in the vehicle – these will provide ventilation. They are now covered

with a silicone membrane. To this end, the robot holds the box horizontally above the assembly station, thus enabling the rising stamp to fit the seal onto it accurately.

For the 100 per cent quality check, MAIER has installed a camera system right next to the assembly station. The robot must move the part only 20 centimeters to the right. Here, the W832 pro robot's rotary servo axes play out their strengths, for they are required to present in quick succession three different critical points on the molded



Inside the rotary mold, Polyamide and TPE are processed simultaneously.

part to the camera. First comes the silicone membrane just mounted. It is checked whether the membrane has been fitted correctly and whether the holes below it – each only 1 mm in diameter – are all open. At this point, the LED camera installed on the gripper comes on in order to take perfect pictures for evaluation. After checking the ventilation valve, the robot turns the part to give the camera a clear view onto the TPE seal. The camera focuses precisely on the part of the seal which penetrates most deeply into the hard component. “If this part is completely filled, the rest of the seal is also faultless”, says Fabio D’Amato, COO of MAIER. Finally, the connector coding is checked. If the image processing system signals OK three times, the W832 pro then deposits the fuse box on the conveyor belt and immediately picks up a new set of inserts for the next cycle.

Real-time communication across corporate boundaries

To enable an extremely fast changeover from one fuse box model to another, there

are not 18 different molds, but instead several different mold inserts and grippers. “A particularly large amount of coordination work has been invested in the grippers”, reports Michael Hans Wittmann, Regional Sales Manager of WITTMANN BATTENFELD Deutschland. “Where do we place the valves? How can we guide the energy chain so that the end-of-arm tooling can turn the part in the shortest possible time? And how can we save weight? We have really looked into every detail and fully exploited all efficiency potentials.”

The lighter the robot arm, the more scope is available for the weight of the gripper and the parts to be moved. What is more, light weight has a direct positive effect on energy efficiency – a topic particularly close to the heart of the decision-makers at REINERT. They are pleased to find the WITTMANN linear robot equipped with a sustainable feature. Thanks to EcoMode, the robot varies the speed of its movements. The injection molding machine sets the clock with its cycle time. The robot fully utilizes this time window, which means

that most of the time it moves more slowly than technically feasible. This saves energy and simultaneously protects the mechanism in the interest of a long service life for the robot.

To provide communication between all components of the production cell – including the injection molding machine, the two robots, the assembly station and the image processing system, all coming from different manufacturers and each equipped with their own control systems – they are interconnected via Profinet. This industrial Ethernet standard laid out for real-time communication ensures a smooth process and facilitates the production startup following machine setting. Before the central control unit of the automation cell starts the production process, it checks whether the correct program has been set on the injection molding machine and on the linear robot. The network system also enables fast remote servicing in the event of a malfunction. The specialist engineers from MAIER can access the cell from outside, to check the control system of all individual compo-

nents and to view the camera images from quality assurance. "WITTMANN is the ideal integration partner", says D'Amato. "Not all robots offer so much flexibility and openness."

Easy operation is vital

WITTMANN was already well known to REINERT long before the fuse box project got under way. Many more WITTMANN robots are operating on the production floor in Bissingen, and products from WITTMANN are also in use at the two other plants of REINERT in Czech Republic and Romania. "Our production staff members are top fit as well as familiar with programming and operating the robots from WITTMANN", says Klement. "This is mainly due to the easy operation and continuity in operating logic across many generations of robots."

At the beginning of the project, an articulated robot for the tasks of insertion, removal, assembly and quality checks was briefly considered. But REINERT deliberately decided against this option. "I have always said that things should be kept as simple as possible", explains Jürgen Hahn. "That minimizes the error risk, and our machine operators are very keen and highly motivated." The Managing Director is also familiar with the further advantages of WITTMANN: "The robots are sturdy and long-lasting; we are getting excellent service."

In close teamwork, REINERT, MAIER and WITTMANN have trimmed the automation of the entire process for maximum efficiency and flexibility. "We have analyzed every detail in order to meet all requirements and still keep the costs reasonable", reports Michael Hans Wittmann. Programmers and software experts from WITTMANN were also on board. "Whenever something has to be re-programmed, it took just a telephone call, and the work could go on at once", says D'Amato.

The production cell is laid out to produce up to 400,000 assemblies per year. In the pre-series, 50,000 fuse boxes for agricultural utility vehicles are being produced to begin with. How fast the numbers of units may increase is not foreseeable. For a start, the production cell is to be fully utilized with other, equally complex parts. "The basic concept of the production cell keeps all options open for us", says Christoph Klement. As soon as the fuse boxes really take off, the trays now being filled manually can very easily be replaced by vibrating bowls, hoppers and separators. Then the equipment will be able to maintain autonomous production for up to eight hours.



The camera for the fully automatic 100 per cent quality check is installed between the assembly station and the conveyor belt. Here, the W832 pro robot's rotary servo axes play out their strengths, for they are required to present in quick succession three different critical points.



Jointly exploiting all efficiency potentials: Andreas Schramm from WITTMANN BATTENFELD, Alen Cevra from MAIER, Michael Hans Wittmann from WITTMANN BATTENFELD, machine operators Robil Gün, Christoph Klement and Jürgen Hahn from REINERT, and Fabio D'Amato from MAIER (from left to right).

"We need the best injection molding technology"

In Brazil, the Mueller/Tecnoplast group of companies ranks among the pioneers in plastics injection molding. As a long-standing partner of the country's well-known major automobile manufacturers, Mueller/Tecnoplast faces the daily challenge to combine first-rate quality with maximum efficiency. The technological means to meet this challenge come from injection molding solution partner WITTMANN.

Two large, black injection-molded parts are what Alexandre Ramos, Director of Mueller/Tecnoplast, presents to us on the factory tour during our visit in São Paulo City. The larger of the two has just come off the conveyor belt from a MacroPower 650 injection molding machine. They form a glove compartment with its lid, which the Mueller division is producing for the Toyota plant in Sorocaba, just 100 kilometers away.

These two parts are typical examples of the company's product range. Mueller/Tecnoplast produces parts almost exclusively destined for the automobile industry. Here, the MacroPower from WITTMANN is the preferred machine model.

As Ramos explains, injection molding of glove boxes and their lids places extremely high demands on precision and surface quality: "These two parts are joined together by vibration welding. To get a good weld seam, their geometries must be perfectly matched."

Perfectly reproducible surfaces

With its extremely accurate servo-hydraulic movements and highly consistent injection processes, the MacroPower 650 makes the most of its strengths in producing these parts. Especially combined with Flowcon plus, the intelligent water flow regulator from WITTMANN. This device controls all cooling circuits and detects any disruptive factors such as blocked cooling channels or flow quantity fluctuations. Via proportional valves, the system then automatically compensates these irregularities during ongoing production, accurately down to the tenth. In this way, the temperature remains evenly distributed inside the mold. The result is a very high consistency in quality. "This task could not be accomplished manually, since variations in temperature control conditions only rarely show an immediate effect," explains Marcos Cardenal of WITTMANN BAT-TEINFELD do Brasil. "But with this intelligent



Mueller/Tecnoplast uses MacroPower machines from WITTMANN to produce glove compartments for Toyota. (Photo: Toyota)

assistance system, Mueller/Tecnoplast can intervene before scrap is produced."

The high reproducibility of the surfaces is so very important, because these are visible components required to match precisely the look of the dashboards, which are produced elsewhere. "When it comes to color and gloss, we have zero tolerance", says Ramos.

It was six years ago when Mueller received its first order from Toyota to produce glove compartments. Meanwhile, the processor has become the sole supplier of this interior component for all Toyota models manufactured in Brazil.

"Mueller and Tecnoplast are pioneers in plastics injection molding in Brazil. During the early 1950s, these companies were the first to supply the rapidly developing automobile industry in this country with plastic parts", reports Alexandre Ramos, who has had a hand himself in shaping the company's history for the last 25 years.

Established in 1937 by Dr. Fritz Jacob, a German emigrant, the company first made a name for itself with household goods. In the mid-twentieth century, the new polymeric materials provided new opportunities and extended the product portfolio, thus shifting the focus of the industry. Now they can look back on decades of cooperation with partners such as Ford, Volkswagen, Scania Latin America and Toyota.

Automotive lighting opens up new perspectives

Detecting and making use of new opportunities – this virtue is firmly anchored in the DNA of Mueller/Tecnoplast. A business segment still in the making is automotive lighting, with good growth potential due to the increasing commitment of Japanese automobile manufacturers in South America. New demands, but also more automotive suppliers are coming into the country. But



The glove compartments consist of two injection-molded components, a box and a lid, which are both produced on a MacroPower 650 injection molding machine.



Sprue is partly reground directly beside the machine and subsequently re-processed.



For many years, Mueller/Tecnoplast and WITTMANN BATTENFELD do Brasil have maintained a close partnership based on mutual trust. From left to right: Cássio Luis Saltori from WITTMANN BATTENFELD do Brasil, Directors Pablo Aparecido Rabachini and Alexandre Ramos as well as machine operator Neuza Damasceno from Mueller/Tecnoplast, and Marcos Cardenal, also from WITTMANN BATTENFELD do Brasil.

is responsible for the entire equipment, including injection molding machines as well as automation and auxiliaries, ranging from granulate feeding devices right up to granulators for in-line grinding and recycling of sprue. "For us, WITTMANN is an important contributor to our high competitiveness", Alexandre Ramos emphasizes. And this concerns not only quality standards but also efficiency.

One of these is the high area productivity provided by the MacroPower machines. "More machines fit into the hall", Ramos concludes. "Here we are in the middle of a city, where industrial properties are very expensive."

Quite apart from this, sustainability is gaining more and more significance. Material and energy consumptions are recorded, analyzed and optimized systematically. "We can see that the WITTMANN machines consume very little energy compared to other machines in our plant", says Ramos.

The automobile industry drives its suppliers at high speed towards CO₂ neutrality. With Toyota, for example, Mueller has signed a joint commitment to that effect.

Always quickly on site

"The WITTMANN machines make work very easy for our technical staff", says Alexandre Ramos, meaning not only the robust design of the machines with clever features for easy maintenance and servicing. The manager is thinking primarily about the technical support the companies receive locally in São Paulo. WITTMANN BATTENFELD do Brasil is only an hour's drive from the Mueller/Tecnoplast production plant. "We can always get help very quickly", says Ramos. "This is a great incentive for us to choose WITTMANN again and again for any new projects."

even though competition is increasing, Alexandre Ramos sees this as a positive development. "I don't intend to be the only one here, I'd rather be part of a strong production chain. After all, as the Director I'm not only responsible for the company and its associates. It is very important for me to contribute to the further advancement of our country and our society as well."

Headlights, rear lights, reflectors, lenses and light guides are increasingly produced locally. Both polycarbonate and PMMA are being processed. "For this purpose, we need the best injection molding technology", says Ramos.

Material-friendly plasticizing

With this new business segment, the first SmartPower injection molding machines were added to the machinery. But the MacroPower machines, long proven in the company, are in use here as well. Vehicle

lighting has now become a design element. In some cases, very long light guides are needed – a trend which increases the size of molds.

To combine first-class optical quality with processing efficiency, WITTMANN delivered the SmartPower and MacroPower machines destined for the lighting business segment with Optimelt low-compression screws specially developed for this field of application. "Optimelt screws ensure a gentle plasticizing process to preserve the material undamaged", says Cássio Luis Saltori, Managing Director of WITTMANN BATTENFELD do Brasil.

On course towards CO₂-neutrality

A total of 54 injection molding machines are standing on the production floor in São Paulo. Most of these have come from WITTMANN. As an overall system supplier, at Mueller/Tecnoplast, WITTMANN

High-grade cosmetics packaging produced sustainably and efficiently

Design is his passion, and the products show it. Tomaz dos Santos is the owner and CEO of Thomriss, a major Brazilian manufacturer of make-up packaging focusing on eyelash and eyebrow mascaras. His daily challenge: producing high-grade surfaces sustainably at competitive costs. WITTMANN supports this effort with machines, automation, auxiliaries and extensive application technology expertise.

Tomaz dos Santos is particularly proud of the large clean-room area at the corporate headquarters constructed ten years ago in Lençóis Paulista, just under 280 kilometers north-west of the São Paulo city. "Quality is our top criterion", the CEO explains to us during our visit to the production plant. On the table inside the large, bright conference room, a great variety of packaging items are displayed, such as lipstick cases, eyelash and eyebrow mascaras, make-up jars and dropper bottles for liquid preparations. The company's product range includes more than 50 different types of packaging. For injection molding production, this is an enormous figure, as one lipstick and facial stick alone require more than five different molds, and every product can be ordered in innumerable variants. Many packaging parts are printed on, painted or metallized.

"This can only be achieved by highly accurate and perfectly clean production", explains dos Santos. Even the tiniest dust particle or slightest unevenness would become clearly visible after metallizing and thus cause scrap. The prerequisite for perfect surfaces is high precision in injection molding. 44 injection molding machines are installed. Nearly all of these are SmartPower machines from WITTMANN.

"The SmartPower injection molding machines offer extremely precise machine movements together with strong dynamism and high efficiency" says Cássio Luis Saltori, Managing Director of WITTMANN BATTENFELD do Brasil. "With these attributes, the series is predestined for use in the particularly price-sensitive production of cosmetics packaging."

Their drive-on-demand technology combines fast-responding servo motors with powerful constant displacement pumps to

Packaging made of PET stands out by its transparency, high rigidity and durability.



enable extremely fast and simultaneously precise machine movements with minimal energy consumption. The KERS energy recovery system produces an additional energy-saving effect.

Consistent quality standards to minimize production costs

The cooperation between WITTMANN BATTENFELD do Brasil and Thomriss has long since become friendship. Tomaz dos Santos and Marcos Cardenal from WITTMANN BATTENFELD do Brasil have known each other for 33 years. Tomaz dos Santos founded his company and purchased his first injection molding machines in 1990. Although impressed by WITTMANN BATTENFELD from the very beginning, the company first invested in injection molding machines from a Chinese supplier. For cost reasons,

according to the CEO. But the quality did not convince him. This is why now only machines from the WITTMANN Group are admitted to the plant. Due to their extremely high process stability and quality consistency, they have proved less costly in the end. Not to forget: the application technology support given by Marcos Cardenal and Cássio Luis Saltori.

WITTMANN is the only supplier on the market able to offer turnkey solutions covering the entire injection molding process, including raw material preparation and feeding, as well as injection molding, automation and mold temperature controlling, inline recycling and digitalization. Tomaz dos Santos fully exploits this advantage for his company. The whole range of auxiliary equipment for drying, conveying and dosing of the plastic granulates comes from WITTMANN, as well as the linear robots for demolding and depositing of the molded parts. The automation systems are becoming more and more important for Thomriss in view of the rising quality and efficiency standards.

PET in more and more applications

"WITTMANN is a development partner for us," dos Santos emphasizes. "I can always rely on Cássio and Marcos to find the best possible deal for us." Such as for the dropper bottle lid with an integrated pipette made of two different materials. TPE is used for the flexible dome, while the screw top consists of polypropylene. Both components are produced in multi-cavity molds and directly assembled at the plant. Following extensive testing, the two development partners jointly selected the materials and optimized the process. "With this solution, we are very flexible and inexpensive", says dos Santos.

Wherever permitted by the required functionality, Thomriss follows a strict mono-material strategy. "Sustainability ranks very



A large clean room is available for surface finishing inside the production plant.



A total of 44 injection molding machines are up and running. The lion's share is taken up by servo-hydraulic SmartPower machines.



More than just a customer-supplier relationship. Tomaz dos Santos (center) from Thomriss, Cássio Luis Saltori (left) and Marcos Cardenal (right) from WITTMANN BATTENFELD do Brasil have been development partners for many years.



Everything from a single source: granulate feeding is handled exclusively by WITTMANN auxiliaries.

close to the top of our customers' priority list. In the cosmetics sector, sustainability of the packaging is an important purchasing argument", explains dos Santos.

This is precisely why a material which is relatively new for Thomriss is rapidly entering its product portfolio: PET. "PET has many advantages. Packaging items made of PET offer transparency, rigidity and durability. The decisive factor for us, however, is recycling. For this material, a closed cycle already exists. So, we design more and more packaging items to be made of PET, and go the PET way in high-volume applications as well."

Among the products displayed on the conference table, we find several specimens

of innovative packages consisting of PET and recycled PET. For example, lip gloss packs, which are running off the conveyor belt of a SmartPower machine on the day of our visit, and which we meet for a third time shortly afterwards in the clean room for surface finish.

The modern facility offers 16,000 square meters of floor space, the production is continuously being extended and modernized. In the near future, a new, large central system from WITTMANN will be installed for granulate drying and material feeding. This step will also contribute to a further increase in efficiency and sustainability.



Welcome to Thomriss in Brazil.

Directly from the sun into the injection molding machine

Photovoltaic systems are no longer a rarity on the roofs of industrial companies. High energy prices, quantitative restrictions and unstable grids in some countries and regions make it lucrative to be somewhat independent of the electricity market. Especially as the use of renewable energies also contributes to sustainability goals. Yet, there is still plenty of untapped potential for using renewable energy efficiently. WITTMANN is helping injection molding companies to tap into this potential. The key is to use direct current as a direct energy source.



(Picture: cory930/pixabay)

It is 2022 and we are at the K trade fair in Germany. What visitors to the WITTMANN booth in Hall 15 are experiencing is bordering on a revolution. An injection molding production cell is making electronic parts from a flame-retardant polyamide and boasts eye-catching solar panels – this is a conceptual study presented by WITTMANN in collaboration with its customer Wago in Germany. Supported by the appropriate infrastructure, the injection molding machine and the robot are being powered directly by solar energy via a DC link. The two partners have jointly filed a patent for this development.

Fast-forward a year and, at Fakuma 2023, WITTMANN is again presenting a production cell powered directly by direct current (DC) obtained from solar energy. This is no longer a conceptual study, but a production-ready solution that includes solar power storage.

This presentation at Fakuma 2023 and further international trade shows sets the ball rolling. The injection molding industry is very interested in the direct use of solar

power via DC grids. As a result, WITTMANN is currently evaluating a number of inquiries on specific projects. WITTMANN has pioneered DC technology in the injection molding industry. It is the first supplier to offer injection molding companies machines and production cells that can use solar energy sourced directly from a DC grid.

Focus on security of supply

Like other types of renewable energy, such as that generated in wind farms and biogas plants, solar power is direct current (DC). However, national power grids use alternating current (AC). Before alternative types of power can be used, they need to be converted into AC. DC is converted into AC so that it can be transported and distributed – and in some cases the AC is transformed back into DC at the consumer, many of which work with DC. The converters employed are primarily frequency inverters used for infinitely-variable control over the speed of electric motors, which account for 70 % of power consumption in industrial

environments. Other examples of DC consumers are computers, televisions, LED lamps and electric vehicles. In industrial production as well as in everyday life, DC is constantly being converted into AC and vice versa. With each transformation, there is a loss of energy, in the order of 2 to 4 %. This lowers the energy efficiency of the applications. It was this consideration that prompted the idea of making direct current directly usable via de-centralized DC networks, called DC microgrids, without converting it first into alternating current.

Aside from energy savings and the associated smaller carbon footprint, there are other motivations for looking into the possibilities afforded by DC technology. First and foremost is security of supply. Rising electricity consumption due, among other things, to the proliferation of electric vehicles and heat pumps, as well as advancing electrification of industrial production are placing ever-greater loads on existing power grids, which are often not expanding in line with developments. This situation is being exacerbated by

the rapid rise in feed-in solar power, which is putting additional strain on the grids and making them more unstable. Experts say that even countries which have very good electricity supplies, such as Germany and Austria, could increasingly experience grid failures and restrictions on consumption in the future. Direct-current grids could therefore evolve into an important building block for ensuring security of supply and climate neutrality. One argument supporting this is that direct current is easy to store in batteries, providing an efficient way to cover expensive power peaks.

Another motivation is greater resource efficiency when it comes to the expansion of power grids. Thanks to modern technology,

The DConnect forms the backbone of the DC power supply during operation. It is a self-regulating DC microgrid into which DC producers and DC consumers can be easily integrated and interconnected. DConnect works without an external controller and does not require an internet connection. This means that the system is securely protected against cybercrime.

The task of the Salimax DC storage battery is to ensure a constant voltage, even when different consumers are connected and the supplied power fluctuates. The solar power storage batteries work with common salt (type: sodium-nickel chloride) and come in various sizes and storage capacities of up to 2 MWh. These salt batteries achieve

grids are in ongoing development. At its Competence Days Event in summer 2024, for instance, WITTMANN unveiled DC temperature control units.

The all-electric EcoPower machines, which are equipped with highly dynamic servomotors for driving the main movements, are ideal for use in a DC grid. They feature a patented kinetic energy recovery system (KERS) that converts kinetic energy into electrical energy during braking. In a conventional AC set-up, this recovered energy can only be used inside the machine, e.g. to heat the barrel. When integrated into a DC grid, however, it can also be fed back into the DC grid for use by other consumers or for storage within the battery. The



A pioneer in the injection molding industry, WITTMANN is making solar energy directly usable for processing machines. The company presented a production-ready at several trade shows.

three-wire DC grids require substantially less copper conductor material than five-wire AC grids, as well as fewer electronic parts: There are no rectifiers at all in the equipment.

Solar storage batteries keep output constant

What does the direct use of solar power in injection molding operations look like in practice? WITTMANN's solution is based on three components: A WITTMANN injection molding machine or production cell modified to use DC technology, a DConnect Microgrid, and a Salimax storage battery based on common salt, which has been developed specifically for sustainable use by industrial companies.

the same energy density as similarly sized conventional lithiumion batteries. But they are much more environmentally friendly and safer. They do not contain any hazardous materials and can be fully recycled at the end of their service life. Moreover, the batteries are non-flammable and non-explosive. As a result, they require neither a large cooling system nor a fire protection infrastructure, but can be installed in the immediate vicinity of the consumers.

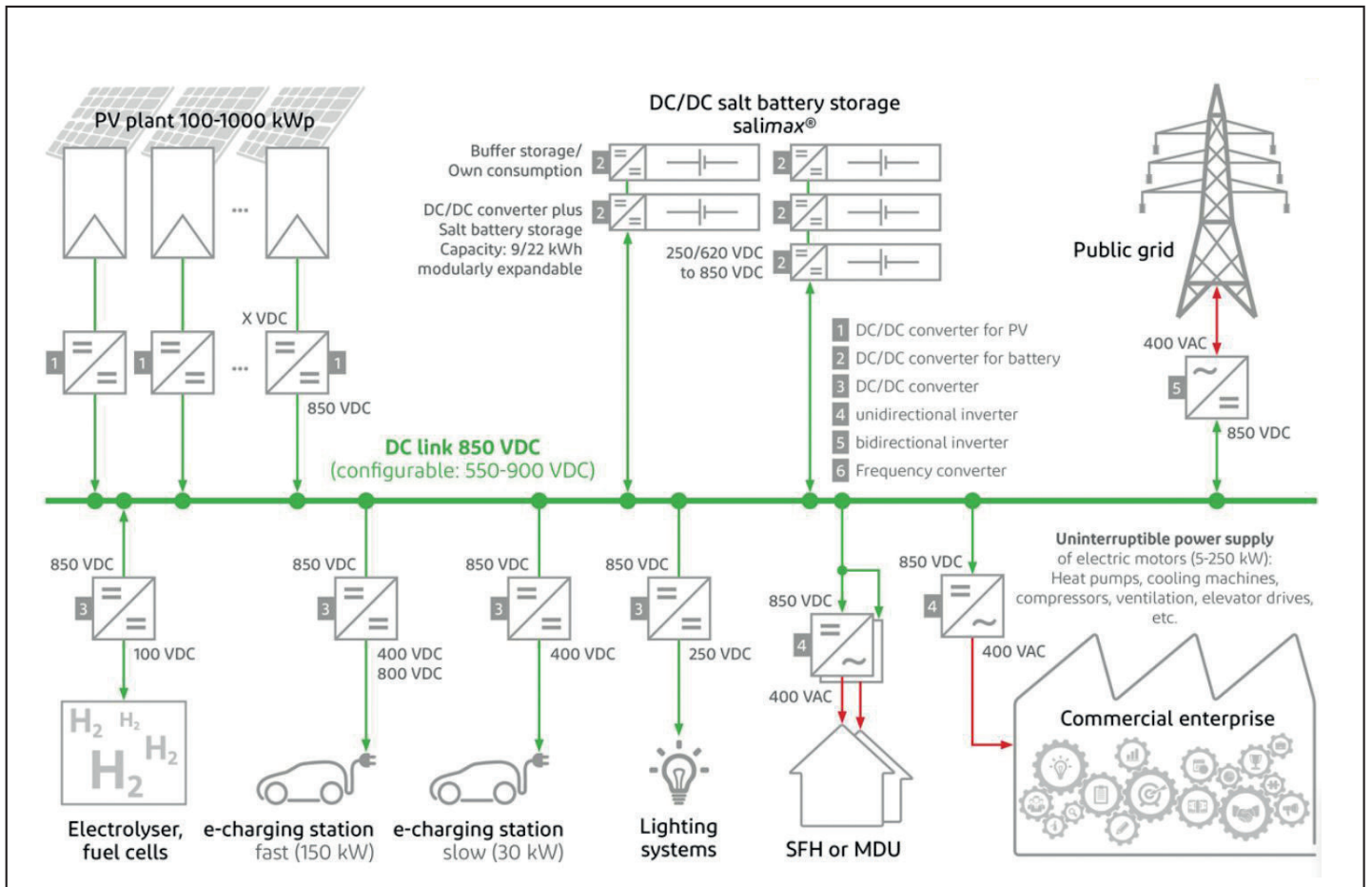
For integration into the DConnect Microgrid, WITTMANN is initially offering its EcoPower series of injection molding machines and the DC models of its WX linear robots. Further machine models and peripheral devices for integration into DC

DC model of the WITTMANN robot, which is supplied directly via the DC link of the EcoPower machine, also feeds excess energy back into the DC link when braking.

The production cell presented at Fakuma 2023 comprised an EcoPower B8X 180/750+ injection molding machine with an installed salt storage capacity of 45 kWh. It operated non-stop over the entire eight-hour trade-fair day without the need to switch to the AC grid at any time.

Cutting energy consumption by up to 15 per cent

Initial practical tests show that the reduction in conversion losses alone shaves up to 15 % off the power demand of a production



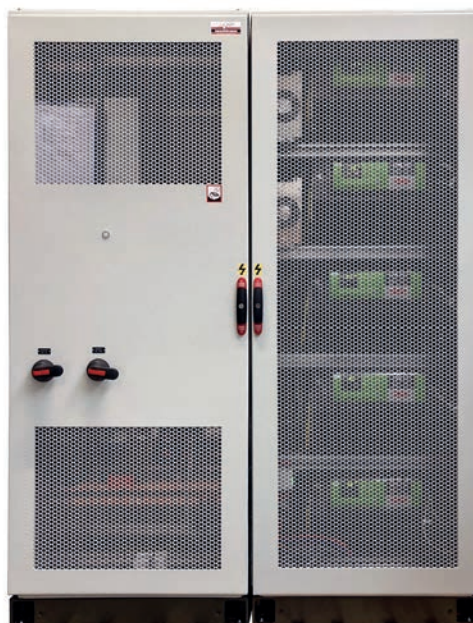
The DC microgrid facilitates simple integration of DC producers and DC consumers.

cell supplied direct with DC. Any decision-making about whether or not to create a DC grid should not focus on whether one technology is superior to the other. Instead, DC grids will be set up alongside AC grids in more and more areas. For example, if the battery storage becomes exhausted at some stage on an overcast day with little sunlight, the system will automatically switch to AC. The switch will not be noticeable in production; the machine will be fed with a continuous, steady supply of power.

In the long term, too, it is likely that AC and DC grids will exist in parallel. This will allow decisions to be made on a case-by-case basis as to which power supply offers the greatest overall efficiency.

ROI Possible in Just a Few Seconds

Although existing photovoltaic systems can be converted to direct DC power, replacing all inverters with DC converters would be a massive undertaking. The fastest return on investment when setting up and operating a DC microgrid is made at the time a new DC-coupled photovoltaic system is being installed. That way, power and load management can be optimally designed from the outset. It is also advisable for the DC network to integrate not only the injection molding production cells, but also the peripherals and parts of the infrastructure, such as the compressed air supply, lighting and air conditioning.



The Salimax DC storage battery ensures that the voltage remains constant.

tion molding production cells, but also the peripherals and parts of the infrastructure, such as the compressed air supply, lighting and air conditioning.

What most affects the ROI, though, is the stability of the power supply on location.

Where power supplies are frequently interrupted or the amount of supplied power is restricted, a DC microgrid with DC-coupled battery storage pays for itself particularly quickly. In the case of very critical components, the payback on a DC power supply can be made in a matter of seconds when a blackout occurs.



The range of DC-capable machines and systems is growing. WITTMANN unveiled a new DC temperature control unit at its Competence Days 2024 in Vienna.

The WITTMANN Group making investments

Production capacity in India boosted

To support the rapid growth of the WITTMANN Group in India, the headquarters of WITTMANN BATTENFELD India has moved into new corporate premises. The new building is located in Chennai, in the Tiruvallur district, about nine kilometers from the previous headquarters. With 5,000 square meters of usable area, it offers twice as much space for offices and production floors as the previous location.

Nanda Kumar, Managing Director of WITTMANN BATTENFELD India, is pleased about this investment: "With our new headquarters, we are now in a better position to meet the current demands and to further expand our customer base in India and in our export markets". In addition to its head office in the country's economically buoyant South, the WITTMANN Group is running two more sales and service facilities in New Delhi and Pune, plus ten sales offices. In this way, it is able to provide good local support in all parts of this vast country.

Due to the local conditions, the requirements of the Indian plastics industry



The new headquarters of WITTMANN BATTENFELD India in Chennai.

sometimes differ significantly from those of other markets. This is why WITTMANN BATTENFELD India also consistently promotes its own product developments, which very effectively complement the global product portfolio of the WITTMANN Group. For example, temperature controllers, material dryers, as well as IML and automation systems specially adapted to local conditions and

coming from local production are on offer in India in addition to the WITTMANN Group's standard product range.

Since 2007, the WITTMANN Group has been present in India with a subsidiary of its own. As well as serving the local market, the subsidiary also supports the company's activities on the Arabian Peninsula and in Central Africa.

Extensions in Hungary, Turkey and China

Production as close as possible to customers brings benefits, such as shorter delivery times or more flexible adjustments of products and technologies to specific regional requirements. This is why the WITTMANN Group continues to drive the decentralization of its production. Main focuses besides India are Hungary, Turkey and China.

For example, the Hungarian sales and service organization in Törökbálint near Budapest has been able to move into a new building. In order to strengthen the capacity in the production plant Mosonmagyaróvár in the western part of Hungary, a second plant will be built shortly 40 kilometers to the south in Ikreny, which will concentrate on sheet metal processing.

A new venture within the global production network is the Dilovası facility in Turkey. Here, the main focus also lies on sheet metal processing and metal working. In addition, auxiliary line-up will be completely

assembled locally. The Dilovası facility has the advantage of a growing labor market not affected by demographic change in the next few years and with large numbers of skilled workers readily available.

Most recently, a new investment project has been started in China. The plant in Kunshan will be extended to prepare for future local production of injection molding machines in Asia, too.



The Dilovası facility in Turkey offers good access to skilled personnel.



The new sales and service organization in Törökbálint, Hungary.



Preparing for the assembly of injection molding machines: the Kunshan plant in China.

