

sera news

The magazine for sera Group customers

Issue 2016





10.5 billion*

This is the number of reliable hours of operation that **sera** dosing pumps have successfully provided for our customers: testament to the great reliability and longevity of our products.

Since the company founding in 1945, the **sera** name has stood for quality, competence, innovation, reliability and flexibility. We have been producing dosing pumps since 1948. **sera** finally made its breakthrough in 1950, with the development and patenting of the world's first dual membrane dosing pump. As one of the world's leading companies in the field of dosing and compressor technology, **sera** now offers efficient application solutions optimally tailored to customer requirements which ensure the precise dosing, conveying and compression of liquids and gases.

*Operating hours over an average operational life of ten years at eight hours per day.

EDITORIAL



Dear readers,

Welcome to the first issue of the newly re-designed **seranews**. A long-familiar format with a fresh makeover. Why the redesign? Since its founding in 1945, **sera** has grown from a small manufacturer of household appliances and agricultural machinery to one of the world's leading providers of dosing and compressing technology, with three international branches and a global presence in more than 80 countries. All of our successes can be traced back to a single quality: the drive to keep constantly improving.

We are once again facing great challenges, and we want to successfully position ourselves to meet these in good time. It is therefore very important for every individual to have comprehensive expertise and for innovations to stand at the forefront of our business. After all, the world around us is not standing still: our target markets and customer structures are changing. Geopolitical problems and crises are having an increasingly direct impact on business developments. For this reason we have to reinvent ourselves a little every day. We have summarised all of these ideas under a single term: **sera in motion**.

This first issue of the new **seranews** addresses precisely this topic. We will look, for example, at the new ground broken by our developers in the construction of an innovative stepper motor pump as well as at our advances in the field of hydrogen technology (page 24). We will also consider the dynamic work carried out by the **sera** branches abroad for the global success of the company group. What began with that first small branch in England in 2006 has grown into the large international **sera** family of today. In this issue, we will be taking a closer look at our branches (page 6).

Of course, none of this would be possible without our committed and motivated employees. Discover the frameworks that help us create new and innovative approaches and put together a team that can respond to challenges at any time with innovative solutions.

Let yourself be inspired by our drive for continuous change. I hope you find this first issue of the new **seranews** to be an interesting and stimulating read.

Yours,
Carsten Rahier



 sera

SERA INTERNATIONAL

sera has been an active player on the international market for decades. Our Spanish branch represents the latest step forward.

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NORTH HESSE: A BOOMING REGION

For a long time, North Hesse was considered a sleepy border region. It is now one of the most dynamic and attractive regions in Germany.

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OUTSTANDING SERVICE

Whether we are working with a local brewery in South Africa or a large industrial production company in Russia, **sera** offers individual solutions for every customer as well as top-class service.

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INNOVATION AND COMPANY IDENTITY

Whether you're opening a new business segment or launching new products, an appropriate sense of your company's identity is a must. Maintaining and further developing our company identity is one of the main driving forces behind our work at **sera**.

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DEMONSTRATE RESPONSIBILITY

sera demonstrates commitment and assumes responsibility. For us, this is a matter of principle.

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SERA IN MOTION

Market forces drive development. Ensuring flexibility in this area makes it possible to meet the challenges of even extreme market dynamics. **sera** has set itself the goal of always moving forward. An interview with our Managing Director Carsten Rahier.

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THINK GLOBALLY – ACT LOCALLY

The foreign markets in the mechanical engineering sector offer huge growth potential. We are aware of this fact and have been aligning ourselves accordingly for some time now. Trade partners and branches ensure that we remain close to the customer, wherever they are in the world.

#intern



The world is continually changing: digitisation and globalisation bring with them new challenges, as well as many new opportunities. Networking is now open to all and anyone can access data, information and products from all over the world. This, in turn, increases the demands on manufacturing companies – and on their distribution channels in particular. While the supply chain relies on standards and efficiency in order to sell products that are profitable at an international level, we must not neglect the most important consideration: the customer. The one-size-fits-all approach works in only a very small number of industries, as customer requirements and wishes vary widely from country to country. Which certificates do we require for our dosing pumps in the UK? What are the biggest challenges in the South African food industry? And what do Spaniards really think of our new iSTEP? Answering these questions is no problem for us. We are close to customers: wherever they are in the world.

sera worldwide

We established our first trading partnerships in other European countries back in 1952 and our sales representatives in Austria, Switzerland, Norway and the Netherlands have been providing support at the local level ever since. In the 1960s and 1970s, we pushed steadily ahead with the training of potential trading partners, allowing us to conquer further European markets including France, Sweden and Great Britain. After expanding our international sales network in Europe to other coun-

tries such as Poland, Italy and Greece in the 1980s, we made major progress in the 1990s and began to train the first trading partners overseas. Since then, we have been supporting our partners in the acquisition and distribution of dosing pumps and systems as well as with the provision of after-sales service, including outside of Europe.

Over the decades, we have built up a reliable and effective trading partner network. Thanks to our worldwide sales and service network, including more than 30 foreign sales representatives in more than 80 countries, we are able to ensure optimal support for our customers at the local level.

However, in order to be even closer to the customer and to fully exploit the potential of foreign markets, it was and is our aim to establish our own branch offices in the most important markets.

The Land of Hope and Glory

In 2007, we launched the first **sera** subsidiary, **sera ProDos UK Ltd.**, in Peterborough, England.

When the company Liquid Dosing Controls – a long-term trading partner – was taken over by the younger generation, **sera** stepped in and established **sera ProDos UK Ltd.** . This represented a great opportunity for us, as we were able to take on the existing staff and thus benefit from their expertise.

Our five colleagues who work there deal with the entire market in Great Britain and Ireland and are mainly active in the wastewater sector. However, there are also companies in the food and drinks sector, such as

ational



whiskey distilleries in Scotland, for example, that rely on our dosing pumps.

Brexit is naturally the topic on everyone's lips at the moment. What will the future hold? Our colleagues in the UK still don't have a clear answer for this question. However, they have reported on a number of uncertainties, as well as the migration of the first non-British companies abroad – to Scotland, for example, which has already declared that it will not participate in Brexit.

Hamba Kakhle Mzansi*

*"Go well South Africa" in Xhosa, one of the official languages of South Africa

In 2010, three years after the establishment of the British subsidiary, the South African **sera** branch **sera ProDos SA (PTY) Ltd.** was opened in Johannesburg. The decision was made in favour of South Africa as the country is considered the "gateway to Africa" and an important export partner – the Federal Statistical Office ranks South Africa 28th amongst Germany's most important export partners. In addition, South Africa has a close relationship with Germany, and many German companies and suppliers already have local offices.

Following a rather bumpy start-up phase while cultural considerations and working methods were brought together, our colleagues now work quickly and hand-in-hand. Although our colleagues in South Africa are still struggling with unstructured conditions, they make up for this with their high levels of commitment. They are always friendly and helpful and take great enjoyment from their work. The extraordinary sense of team spirit amongst our colleagues is actually demonstrable – the

employee turnover rate is well below the South African average.

In contrast to the British branch, the workdays of our South African colleagues mainly revolve around project business. Food and drinks processing plants, such as breweries, rely on **sera** dosing plants, as do companies in the wastewater and petrochemical sectors. Our sales and service operations are not limited to South Africa, however – we serve the entire Sub-Saharan region from our location in Johannesburg.

¡Viva España!

The youngest member of the **sera** family is the **sera Pro-Dos S.L.** branch in Valencia, Spain. Its founding was headed by two Spanish colleagues who had already completed a dual degree programme at **sera** in Germany before working for the company internationally. The pair – a young couple – moved from the tranquil town of Immenhausen in Germany to Valencia in May 2016, where they have worked in their own sales office ever since. The sales potential in Spain is very high: many large companies have their head offices there and we expect considerable project business. The team, which now consists of three colleagues, is responsible not only for the Spanish market, but also for Portugal and parts of South America.

The world never stops spinning – but we are on board and well positioned to meet the challenges of a globalised and digitised world.



With a water surface area of 11.8 km² and 199.3 million m³ of storage space, the Edersee is the second largest reservoir in Germany in terms of surface area, and the third largest by volume.



NORTH HESSE – A BOOMING REGION

Once upon a time, there was a magical and pristine region situated between gentle mountains, littered with blue shimmering rivers and lakes, dominated by ancient tree giants and protected by fairy-tale castles and palaces. Then, at some point, it was awoken with a kiss and today represents one of the most dynamic regions in Germany. This is the story of North Hesse.

A sleepy region awakens

40 years as a zonal border area meant that North Hesse was never considered to be particularly attractive. Many industries gave the region on the outskirts of the old Federal Republic a wide berth. But the region at the heart of Germany has long since awoken from its deep slumber. It was the reunification that breathed life into the now booming region, and key figures have been positive ever since, with growth in the region continuing to show an upward trend.

An unrivalled location

If you take a pin and stick it on a map of Europe, you will quickly notice that North Hesse is not only located at the centre of Europe, but also at the geographic centre of Germany as measured by accessibility, with the smallest cut-off time.

Thanks to ideal motorway access and its location at the centre of the north-south high-speed Deutsche Bahn railway line, it is possible to reach destinations in the north and south, east and west within the same amount of time. This not only favours the establishment of large logistics companies, but also gives companies from other sectors clear competitive advantages. Nowhere can you send out goods in all directions across Europe faster than in North Hesse.

It is not only its geographic location that has resulted in North Hesse becoming a dynamic and economically strong region in recent years, however.

Close cooperation between universities, institutions and companies reflects the structural changes that have been experienced. The region can now compete with the strongest locations in Germany. As a result, North Hesse has already been voted among the most dynamic regions of the past ten years.

The logistical efficiency and the synergy effects resulting from this cooperation create ideal conditions for both the establishment of new and the expansion of existing companies from a wide range of industries. The effect is noticeable: North Hesse is already a pioneer in the development of innovative products and business segments across many sectors.



The Sababurg in the Reinhardswald, also known as Sleeping Beauty Castle after the Brothers Grimm fairy-tale.



STATEMENT

HOLGER SCHACH
Managing Director
Regionalmanagement
Nordhessen GmbH



North Hesse in the Champions League

"North Hesse is now playing in the Champions League of regions – in Germany, Europe and worldwide. In its current 'Innovation Scoreboard', the European Union has ranked 256 regions according to their innovative strength. North Hesse is ranked in first place in the category "Process and product innovations from SMEs". With its future-oriented products, attractive workplaces and the integration of international markets, **sera** represents the success and innovative strength of our region."

STATEMENT

Dr. WALTER LÜBCKE
Regional Governor of Kassel

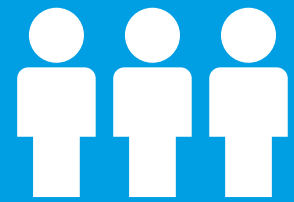


North Hesse setting new standards

"New challenges, a steady product evolution as well as rapid technical innovations require reliable and forward-looking action from all market forces as well as from politics. The world is quite literally getting closer together and new competitors are steadily gaining market shares in this global market economy. I believe that North Hesse is well-positioned to face up to the competition and, as an innovation champion, is setting new standards across Europe."

The documenta in Kassel is the world's most prominent exhibition of contemporary art and takes place every 5 years.

6,908 km²
total surface
area



983,079
inhabitants

The Bergpark Wilhelmshöhe water features and the mountain park in which they are located have been a UNESCO World Heritage Site since 2013 and (unfortunately) do not require the use of pumps.

The Sababurg Wildlife Park was founded in 1571 and is thus the oldest park of its kind in Europe.

46.2 %
export quota

Jost Bürgi from Kassel built the first clock with a second hand in 1585, at a time when the majority of people had no concept of a second as a unit of time.

Source: Regionalmanagement Nordhessen

The Mühlenkopfschanze in Willingen is the largest ski jumping hill in the world. Jumps of over 150 metres have been achieved here.

€29,695
billion
GDP

The Treppenstraße in Kassel was the first planned and executed pedestrian zone in Germany.

€19,294
billion
purchasing
power

Region of thinkers and pioneers

Nordhessen has a long tradition of cunning minds, whose works can be found in many areas.

In the field of architecture, these include architectural monuments such as the Bergpark Wilhelmshöhe (a UNESCO World Heritage Site since 2013), Bad Karlshafen, the baroque thermal salt spa town at the northernmost tip of Hesse, and the Treppenstraße in Kassel, the first pedestrian zone in Germany – to name just a few.

The computer pioneer Konrad Zuse lived in Hünfeld and invented the world's first functioning computer. His company of the same name produced the first computer to be commercially distributed worldwide.

The region also has a long industry tradition: the company Henschel, whose numerous successor companies still operate to this day, was developed here. The company, which was the largest locomotive manufacturer in Europe during its day, invented the technology used in the Transrapid high-speed monorail, which was considered highly innovative for its time. The region is not only a pioneer in the field of renewable energies: many current developments in e-mobility solutions are also taking place in northern Hesse. With its numerous automobile manufacturers and their suppliers as well as large logistics companies, North Hesse possesses a high level of competence in the mobility sector.

Art lovers all over the world associate Kassel with the documenta. First started by art professor Arnold Bode, the documenta is the world's most prominent exhibition of contemporary art and has been opening its doors for 100 days every five years for more than 60 years. The next documenta will take place from 10 June to 17 September 2017.

Names such as Konrad Duden, who made significant contributions to a uniform German spelling, and Jacob and Wilhelm Grimm represent the pioneering spirit in terms of language. The fairy tales of the Brothers Grimm are known all over the world and have strongly influenced the global image of North Hesse. The Grimmwelt Kassel opened an award-winning museum dedicated to the works of the Brothers Grimm in 2015 and has been attracting tourists to North Hesse ever since.

The University of Kassel, founded in 1971 and now with 25,000 students, offers a wide range of study options and is home to extensive research facilities. Subjects range from engineering, natural sciences and mathematics to the humanities, social sciences and art. Over the past 40 years, graduates from the university have founded more than 300 companies based in North Hesse, creating more than 10,000 jobs.

From the heart of Germany all around the world

For over 70 years, we have had our headquarters in Immenhausen, in this wonderful region. From here, we conduct trade throughout the world under the motto "Think globally, act locally". In addition to our three international subsidiaries in England, Spain and South Africa, we work with more than 30 partners worldwide. This sales and service network allows us to provide optimal support for our customers in more than 80 countries.

We want to continue to use the dynamism and innovative strength of North Hesse, each and every day. For this reason, we cooperate with a large number of partners and network ourselves – so that we can continue to develop great products and solutions from North Hesse.

In order to contribute to the attractiveness of the region, we support cultural events, such as the Kultursommer Nordhessen (North Hesse Summer of Culture), and sports clubs such as MT Melsungen, amongst others.

Only in this way can we continue to produce and retain the brightest minds of the future. In order to ensure a

sustainable future for our region and our company, we are working closely with educational institutions such as colleges and vocational schools, high schools, the VSB + Bildungswerk Nordhessen (North Hesse Training Institute), the Arbeitsgemeinschaft SCHULEWIRTSCHAFT Nordhessen (North Hesse School and Industry Working Group), the AfAK (Kassel Marketing Academy) and not least the University of Kassel.



In 2016, the University of Kassel opened its doors to more than 25,000 students – the highest number of students the university has seen to date.



STATEMENT

Dr. OLIVER FROMM
Chancellor of the University of Kassel



University of Kassel: an important partner in the region

"The University of Kassel has successfully developed itself in all areas of research, academic education and knowledge transfer and has become a visible part of the German university landscape. We are successful as an attractive place of study and are prominent both within the region and beyond. With the UniKasselTransfer programme and the Science Park, and as a founding university of the EXIST start-up programme, the university provides a great deal of support in the area of entrepreneurship. The University of Kassel remains a visible partner in the dynamic economic development of the city of Kassel and the region of North Hesse."





HARD AS IRON

In order to protect plant systems in one of the largest iron ore mines in the world against the extreme conditions, pipelines and plants have to be protected and cleaned at high expense. Whether this involves corrosion protection or the use of caustic soda, sera dosing systems ensure that plants operate flawlessly even under difficult conditions.



Iron is by far the most commonly used metal. It is the main component of steel, which is used in the construction of cars, ships, buildings, railways, bridges and many other things that we use every day. A world without these things is hardly imaginable. It is therefore no exaggeration to say that iron ore, the raw material from which iron is extracted, is one of the most important raw materials in the world.

Lebedinsky GOK is one of the largest iron ore mines in the world, and the largest mine in Russia. It is located approximately 700 km south of Moscow, close to the city of Gubkin and is owned by the Metalloinvest group of companies. Lebedinsky GOK produces iron ore concentrate, fluxed and non-fluxed pellets and hot briquetted iron (HBI).

HBI are small iron pellets which are ideally suited to the transport and processing of iron. The pellets last longer and are not as abrasive as, for example, as direct-reduced iron (DRI). HBI is therefore the best option for the longer-term transport and storage of iron.

Both production plants at the Lebedinsky GOK mine had reached the limits of their performance. As a result, in 2014 the foundations were laid for the world's largest HBI production plant with a total output of 1.8 million tonnes per year.

Metalloinvest awarded the contract for the construction of this new plant to Primetals Technologies, among others. We received the inquiry about various dosing systems for the expansion of Lebedinsky GOK through our long-term partner Hennlich, a company from Schärding, Austria.

Iron ore mines require a great deal of water for the production of HBI pellets, as well as for cooling the machines and blast furnaces. This means that the supply of water is essential for the smooth operation of the plant. Corrosion, scale build-up and deposits in the systems and pipelines must therefore be prevented at all costs. This is where **sera** high-quality automated dosing systems come into play.

Standardised CTD (Compact Tank Dosing), CVD (Compact Vertical Dosing) and PolyLine (for polymer dosing) dosing systems were modified according to the customer's requirements. As a result, we were able to offer a solution that was both safe and cost-effective. More than thirty dispensing systems equipped with intelligent C pumps and ProfiBus connections were developed, which are able to adjust the dosage to the changing factors. This allows our **sera** systems to accurately dose corrosion inhibitors, caustic soda and other chemicals which are indispensable for the maintenance of pipelines and systems.



Lebedinsky GOK at night



Above: iron pellets, Below: hot briquetted iron (HBI)

The displays on the pumps and on the control cabinet were implemented in Russian for operation in Gubkin. **sera** also assumed responsibility for the special certification of systems for the Russian market.

The **sera** dispensing systems which we supplied have now been in operation for a considerable length of time, and we have therefore been assisting in the extraction of iron and steel – both of which are indispensable in our daily lives – for just as long.



sera CVD and PolyLine dosing systems

WE HELP TO ENSURE THAT BEER TASTES LIKE BEER

We help to ensure that beer tastes like beer – all over the world. We were recently able to put our many years of competence to good use in the planning and installation of a dosing system for complete water disinfection at a large local brewery in South Africa.

In mid-2015, our subsidiary in South Africa **sera ProDos SA (PTY) Ltd.** received a special request from a large local brewery owned by a global market leader. The brewery was forced to contend with fluctuating water quality as a result of the local conditions, which can of course have a huge impact on the brewing process.

Fluctuating water quality always brings challenges

We were tasked with measuring the fluctuating content of disinfecting agents through the local water supplier and then balancing these accordingly. A control measurement was also taken after dosing in order to confirm



the quality of the adjustment or trigger any necessary readjustment; such measurements are taken regularly throughout the course of the brewing process. We were able to quickly develop a suitable concept for the brewery thanks to our many decades of experience in the design of disinfection systems.

Chlorine dioxide (ClO_2) has been used in the brewing industry as a popular disinfecting agent in the bottling process for years. ClO_2 is a yellowish gas which is dissolved in water and which is produced on site in plants from two basic chemicals. The advantage of ClO_2 compared to other disinfectants is that it ensures a very high level of disinfection in combination with a comparatively long depot effect in the water, and it can thus be assumed that no re-contamination will occur in the subsequent system. What's more, ClO_2 does not form toxic degradation products such as chlorate and, unlike chlorine gas, is odourless and tasteless.

Exact ClO_2 dosage using our sera CDG production plant

One of the challenges in dosing is the precise regulation of dosing quantities. If the volume of disinfectant is too low or too high, this can adversely affect the entire brewing process. Insufficient dosing can lead to contamination or the corrosion of plant components, while concentrations of disinfectant which are too high can impact upon the fermentation process.




The ideal product for this application is the standardised **sera** CDG 250 production plant. In the plant, two diaphragm pumps dose the two starting chemicals sodium chlorite (NaClO_2) and hydrochloric acid (HCl) into a reactor, where they react to form ClO_2 ; this is then diluted with water to create a stable solution with a concentra-



tion of 2 g/l in a downstream storage tank. Any number of dosing pumps for various dosing points throughout the entire brewery can be connected to the storage tank, which minimises investment costs. In addition, the measurements were carried out using tried and tested **sera** AQUASENSO transmitters and suitable sensors.

The project team were faced with another difficult task at the end of the project in 2016. The old measuring and disinfection systems were to be upgraded – including installation, testing and commissioning – in between two brewing processes during ongoing operation. Specialist personnel from **sera** were, of course, on hand to assist the plant planner and operator in the set up of all components and in the control of the plant via ProfiBus. Despite the high time pressure, **sera** was able to successfully upgrade the plant.

Once the plant had been handed back over to the operator, there were no longer any obstacles in the way of the production of consistently high-quality beer. Beer, that tastes like beer.



HYDROGEN FUEL FOR THE FUTURE

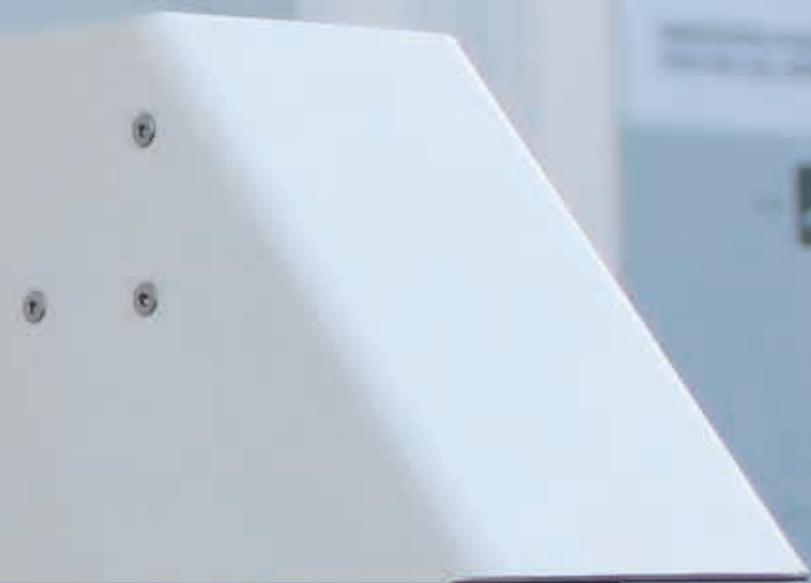


As a result of the progressive development of climate change and the scarcity of resources, Germany's Federal and state governments as well as the media are placing increasing focus on aspects such as environmental protection, renewable energies and sustainability. Public awareness of these issues has been growing steadily for many years. We also wish – in line with our mission statement “We create added value for people and the environment” – to contribute towards and drive forward the future topic of hydrogen technology as an emission-free alternative, particularly in the transport logistics and intralogistics sectors.



Achtung

 **sera**
EXCELLENCE IN FIBER TECHNOLOGY





In Germany, industry has long understood that it can use public awareness of sustainability, environmental protection and renewable energies to its economic advantage and that these future markets are sustainable: With the development of electric vehicles, the automotive industry has provided an environmentally-friendly alternative to the internal combustion engines that have been popular up to now – provided, that is, that the electricity is obtained from renewable energy sources. However, due to the drawbacks such as low ranges and long charging times, electric cars are not suitable for everyone and the spread of e-mobility is rather slow.

Emission-free transport

A similarly environmentally-friendly alternative to the internal combustion engine are engines which run on hydrogen-powered fuel cells. This technology stores energy in the form of elemental hydrogen, which can be converted into electrical energy on site. Because hydrogen can be stored in and dispensed from tanks like petrol, H₂ technology has the potential to offer emission-free transport with a similar fuel range to that offered by petrol and with similar handling. The fuel cell therefore makes it possible to combine the advantages of both petrol and electric engines. An expansion of the infrastructure is currently underway, however the com-

prehensive operation of hydrogen cars is not yet possible.

We believe in the breakthrough of hydrogen technology and are therefore committed to the development of H₂ compressors and filling stations in this future-oriented sector. **sera Compress GmbH**, a company of the **sera Group**, has been leading the charge in the development, production and marketing of compressors in various designs for various markets and applications.

In addition to a market for passenger cars, lorries and buses, hydrogen technology can also be used in industrial trucks.

COST COMPARISON		
	Vehicle with fuel cells	Vehicle with petrol engine
Consumption	0.97 kg /100 km	7 L /100 km
Costs	8.099 EUR/kg	1.29 EUR/L
Costs /100 km	7.86 EUR	9.03 EUR

Comparison based on a Mercedes B-Class and E10 pricing from November 2016

The drawbacks of electrically-operated industrial trucks include long charging times, complex battery management systems and time-intensive battery changes where longer periods of operation are required. What's more, battery-operated vehicles can be operated in low temperature only with restrictions, since their performance will be significantly reduced in such conditions.

The petrol-driven variant, on the other hand, cannot be used indoors due to the environmentally-harmful exhaust gases. Furthermore, the petrol engine variant produces a considerable amount of noise – an issue which is non-existent in the case of both battery-driven and hydrogen-powered trucks.

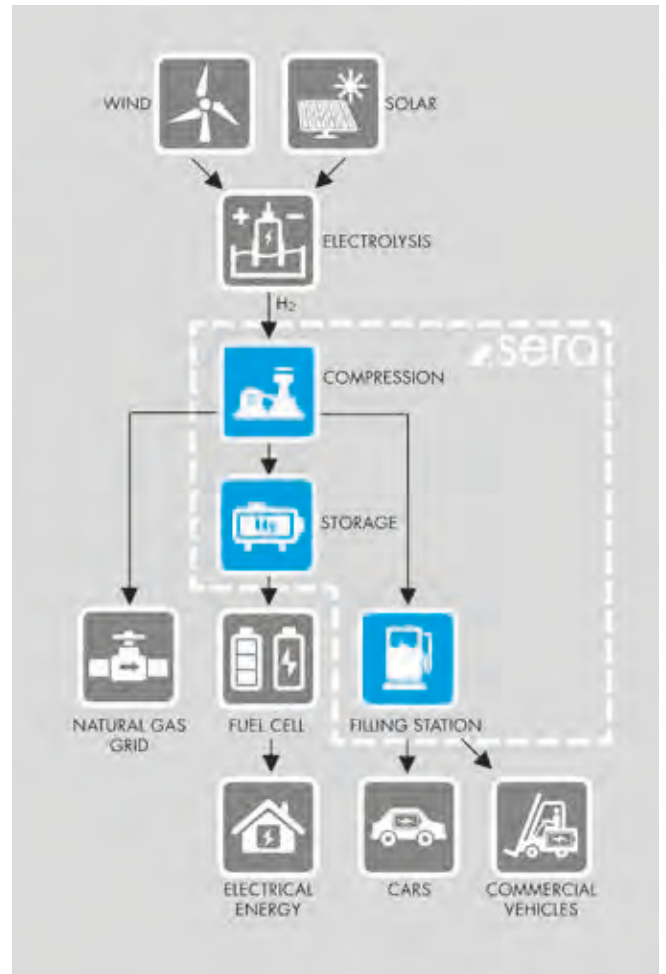
The hydrogen-powered variant stands out above all due to the fact that it combines the advantages of both technologies. Filling times are short and the emissions – pure water vapour – are harmless. As a result, it can be used even in critical applications such as food processing. The only disadvantage is the high investment costs for fuel cells and filling stations. However, these obstacles should fall away in the coming years as the technology becomes more mature and the demand increases.

Sustainable intralogistics

We strive for sustainable production at our Immenhausen factory in line with our mission statement: "We create added value for people and the environment". This also includes striving towards sustainable intralogistics. Our long-term goal is to operate all intralogistics (forklift trucks, etc.) as well as the operating fleet on hydrogen. To this end, we have used our many years of experience in the field of H₂ compression to develop and build an operational H₂ filling station.

In a first step, a 20ft container was installed on the **sera** business premises. Hydrogen from a local gas supplier was then stored here in cylinder bundles, before being compressed for the refuelling process using a standard compact diaphragm compressor. The dispenser was placed in close proximity to the H₂ supply container, and a data interface enabled communication between the vehicle to be refuelled and the filling station control system.

The H₂ filling station is currently equipped with a refuelling nozzle with a pressure stage of 70 MPa; this can be used to refuel the company's own hydrogen vehicle, which has a range of approximately 600 km. In a next step, this will be expanded by a 35 MPa refuelling nozzle, which will allow for the refuelling of trucks. A conversion to green hydrogen (electrolytic hydrogen, potentially produced on site using electrolysis) as well as the integration of a newly developed compressor are also planned.



Above: The **sera** service station overall concept

Below: Dispenser at a **sera** service station





Standard compact diaphragm compressor with cylinder bundles

Gaining experience

Having our own operational H₂ service station will allow us to gain experience in real operation, which is essential for the further development of the relatively new H₂ technology and in order to resolve any remaining issues, such as hydrogen's often intermittent use. Our goal is to help shape the dawn of the era of emission-free transport and logistics, and to expand the hydrogen infrastructure in Germany and Europe with our contribution of hydrogen compressors.

H₂

Fact Check

The use of hydrogen in transport applications will increase safety

- Hydrogen is much safer than you might think. Yes, hydrogen is explosive. However, a concentration of at least 18 % is required for this to occur. Hydrogen is a highly volatile gas due to its low density, which means that it would not be possible for hydrogen to explode in open air under any circumstances.
- Petrol has a significantly lower ignition point (220–280 °C) than hydrogen (585 °C), making it easier for petrol to ignite on hot surfaces, such as on the exhaust manifold or catalytic converter.
- A hydrogen flame gives off less thermal radiation than a petrol flame. It is thus cooler in the vicinity of a hydrogen flame than in the vicinity of a petrol flame, with the advantage that nearby objects, e.g. cars, will not easily catch fire.
- Unlike petrol tanks, the pressure tanks used today are also built to sustain even serious accidents without damage. The tanks are located in the middle of the vehicle and are constructed from a thick metal housing which is incorporated into a cocoon made from carbon and Kevlar fibres.



ME

sera
ComPress GmbH



ALWAYS A STEP AHEAD

Innovative. Intelligent. Intuitive.

Our iSTEP stepper motor pump combines the advantages of a stepper motor with the accuracy of a diaphragm dosing pump, thus significantly increasing both reproducibility and reliability.

Performance requires functionality. Only when a device has the necessary flexibility can a broad range of applications be guaranteed. Our iSTEP stepper motor is committed to achieving this goal: thanks to a broad adjustment range of 1:1000 and a variable frequency control, the possible applications of the dosing pump are almost unlimited. Indeed, connection with the associated micro-processor-controlled electronics allows for a completely

new drive concept, which introduces a multitude of new functions and thus enables options such as low-pulsation dosing of the media. The pump also has a slow-mode setting for viscous media. This therefore opens up for the user a huge number of possibilities for adapting the pump to their individual processes – without the need for external control.

Removable display for greater operating comfort

The dosing pump also offers a number of other functions that simplify operation. The display of the iSTEP can be removed and the pump is fully operable without display thanks to an additional status LED and a start/stop button which communicate key information without the need for a display. The iSTEP is operated by button and click-wheel via a graphic display. The pump can be used worldwide thanks to the intuitive, multilingual menu navigation and a voltage supply of 110-240 V at 50/60 Hz.

A spiral cable also ensures increased ease of operation and a greater degree of safety by allowing the iSTEP to be operated remotely. The operating element can thus be installed outside of any danger zones.

The pump also takes into account the increased demand for communication and digitisation in automated plants: as a result, it is possible to perform a simple transfer of parameters between two or more pumps via the control element. A Bluetooth interface, which is often charged at extra cost by other providers, is not required.

The iSTEP is used in a number of industrial sectors: food processing companies rely on the ease of use of the dosing pump, coupled with its exceptional performance, as



do the chemical and wastewater sectors, among numerous others.



Simple logging and various operating modes

The logging of operating data, such as capacity or chemical consumption, is carried out daily by means of an SD card; a recipe memory makes regular recalibration unnecessary. Various modes can be used to control the pumping capacity and the pump can be controlled using analogue or pulse signals as needed. Timer functions, weekday control and a batch mode are also available.



Messages are displayed on the graphic display in plain text and in several languages. The pump comes equipped with a diaphragm monitoring system as standard. Service recommendations are also displayed, thus minimising downtimes. The status of the iSTEP (ready, active, warning, error message) is indicated by a colour change in the display and is thus instantly recognisable.

All in all, the pump represents an economical and environmentally-friendly solution for dosing applications at the highest technological level.

Prizes and nominations

The sera iSTEP was able to impress both the market as well as the specialist media. We were honoured to receive a nomination for the German Industrial Prize 2016 in the category of Drive and Fluid Technology, confirming all our hard work. The prize is awarded to forward-looking products and solutions by mid-tier industrial pioneers, so we were extremely pleased to have been entered into the final and to ultimately finish third.

This place on the podium secured us another nomination: for the Best of Industry Award, which is awarded to the best of the best. Only innovative products and solutions which have already received a national or international award have a chance of making it onto the list of nominees for the Best of Industry Award. We succeeded in impressing the jury with the iSTEP and are now hoping for the coveted title of Best Industrial Product in the Drive Technology category. Keep your fingers crossed for us at the award ceremony on 16 February 2017!



GERMAN INDUSTRIAL PRIZE INFO

- Awarded to forward-looking products and solutions by mid-tier industrial pioneers
- iSTEP ranked an German Industrial Prize finalist
- 3rd place in the Drive & Fluid Technology category

Accounting for more than 90 percent of all industrial businesses, mid-tier enterprises are the economic backbone of our country. They are a driving force for growth, creating jobs and safeguarding our prosperity as well as our modern way of life.

The Industriepreis, created by Huber Verlag für Neue Medien GmbH, has been awarded since 2006 as a way of celebrating these achievements and stimulating the economy even further.

Prizes are given to the most forward-looking products and solutions with notable economic, social, ecological and technological benefits. By doing so, Huber Verlag für Neue Medien GmbH aims to reward industrial pioneers for their entrepreneurial courage as well as to help less well-known businesses raise their profile, boost their image and extend their reach on a global scale.



4 QUESTIONS FOR OUR DEVELOPMENT DIRECTOR ENRICO ERTLE

How was the new iSTEP stepper motor pump initially developed?

Our well-known controllable diaphragm dosing pumps are particularly efficient, robust and precise. Customers from all areas of industry and from all over the world have been impressed by the quality and wide-ranging potential applications of these controllable models, which are extremely versatile and highly reliable in operation. It was with this in mind that we developed the new iSTEP series of stepper motor diaphragm pumps which use this technology. In doing so, we have filled a gap in the field of high-precision dosing.

What makes the new iSTEP special?

Precise dosing and the exceptionally large adjustment range mean that the potential applications are virtually unlimited. Where customers would have previously used pumps of different sizes, they now have the option of working with just one pump. Customers have a significant advantage here with regard to keeping stores of replacement pumps or spare parts.

Are you already planning further improvements?

We are currently developing further spin-offs using iSTEP technology for smaller and larger capacity ranges. At the same time, we are working on obtaining a number of certifications for various foreign markets.

What did you personally enjoy most about this development project?

The combination of new drive technology with complex electronic controls and an attractive operating interface made product development very exciting. The intensive communication between the individual divisions and colleagues involved in the project – that was extraordinary. As a result, we were able to quickly respond to customer requests or examine technological options that helped improve the iSTEP.



12
years of commitment



5t
of fruit annual

LIVE RESPONSIBLY

Health, training opportunities for young people and the sustainable use of the environment are areas of responsibility which affect us all. We at sera also feel that we must contribute by doing our part. With various measures including an annual Environment Day, free fruit and water for all employees and the provision of professional training opportunities for young people, we are committed to ensuring that future generations can live and work successfully.

"We are not only responsible for what we do, but also for what we fail to do." (Molière)

The sera Environment Day

The environmental impacts of growing industry, the expansion of cities and the associated accumulation of refuse have increased substantially in recent times. Polluted waters, global warming, pollution from waste and deforestation are just a few examples of the ways in which the environment is being severely impacted and destroyed. According to Welthungerhilfe, 28 hectares of land are lost to these problems every day.

Inspired by these issues, we at sera have launched an annual Environment Day. The Environment

Day is supported by our employees and helps to make a small contribution towards improving our direct environment through a number of campaigns. In recent years, our efforts have included clearing litter and weeds from municipal areas such as playgrounds. This year, we decided to devote our Environment Day to preserving the local forest. A large number of young trees have been planted in a section of forest a few kilometres from our headquarters in Immenhausen, in order to replenish the tree population. To ensure the optimal development of these young trees, however, it is necessary to regularly remove surrounding weed growth by hand. Local foresters are often unable to complete this task by themselves. That is why we took on the task this year, and supported the reforestation ini-



2833
apprentices since our
founding

tiative with the energetic help of many of our colleagues. In the coming years, we will continue to be actively involved in contributing our part to preserving the environment.

Training

In the summer of 2016, **sera** was able to once again welcome a number of new apprentices, students and interns. A total of 283 apprentices and students have found their way to **sera** since the company was founded. Our training rate, which is higher than the industry average, shows that we are highly committed to providing professional training opportunities for young people. This is not just a question of combatting the deficit of skilled workers, but has also been pushed forward by us as our contribution to a secure future for young people in the region. We offer a wide range of both commercial and industrial study programmes and apprenticeships. In addition to in-depth training in specialist areas, we also try to ensure that as many of our junior staff as possible are trained across the board. The fact that one of our former apprentices has now been working with the company for 47 years underscores the long-term sustainability of our training courses.

In order to ensure a professional education, our apprentices, students and interns receive regular internal training. In our training courses, in addition to placing an emphasis on the activities and achievements of our trainees, we also believe that fun and a sense of team spirit are important factors for successful development and motivation. In addition to other events, the "Apprentice Outing" takes place once a year. This year, for example, our apprentices and students took a canoe trip

on the Diemel river.

Be healthy

Some time ago, in order to promote the health of our employees, we set up an in-house scheme with the slogan "**be sera – be healthy**". Under this guiding principle, we aim to lay the foundations for our employees to maintain a healthy diet in their daily work. Water from several water fountains is available free of charge to our employees as well as a large range of fruit including bananas, apples, pears, kiwis, strawberries, etc. At the beginning of each employment relationship, new employees are also given their own drinking bottle for them to use with the water fountains.

From January 2017 onwards, we will be expanding on these offers by starting "**... be fit**". In addition to internal activities and relaxation programmes under the guidance of a health and fitness trainer, we will also be offering a fitness programme in a nearby gym. Employees will be able to take advantage of the equipment, fitness courses and sauna at a discounted rate and regular use will be supported by a reimbursement from **sera**. In addition to this, our employees will have the opportunity to rent a squash court. Every two weeks, our footballers from the "**sera Werksself**" train on an indoor artificial pitch in preparation for the company tournaments which run regularly. By expanding the range of facilities and courses on offer, we hope that we will be able to promote the health of each and every employee with something for everyone.



ENGAGED & EFFECTIVE

sera creates added value for people and the environment. It is with this aim in mind that we are engaged in a wide range of activities and also take social responsibility at our locations. For us, it is a matter of principle.

Both the environment and community are fundamental elements of our corporate responsibility. We know that we can only be successful in an intact and future-oriented social and ecological system. **sera** therefore takes social responsibility seriously, particularly in the areas of education, culture and sport. Our commitment to sponsoring activities is aimed specifically at local people.

In the sporting arena, our focus is on the sport of handball. Our company is a partner of German Handball League member MT Melsungen. Fairness, performance, respect and team spirit are important not only in handball. For us, these values are also fundamental aspects of our corporate culture. That is why we support MT as a strong partner. Our focus here is on the promotion of young people, and this is evident for example in the **sera** handball youth camp for MT Melsungen.

We also support the national business plan competition "Promotion Nordhessen". With the Environment Prize



16.

Businessplanwettbewerb

promotion
Nordhessen

which we donated, we aim to provide valuable support through the sustained promotion of new business start-ups, particularly in the field of environmental technology.

Culture breathes life into the region. It is the basis of life and the foundation of our society. That is why we are committed to the North Hesse Kultursommer (Summer of Culture) and support events such as forest concerts and performances by the cellists of the Berlin Philharmonic.

Together with our subsidiary in South Africa, we have been supporting the OMARURU CHILDREN'S HAVEN orphanage in Namibia and the Starfish Greathearts Foundation in Johannesburg. Here, in addition to loving care, children are given an extensive education. In this way, we help to give children a future in education.

We make a difference to people and assume social responsibility through our diverse sponsorship commitments. It is also through our commitments that we emphasise our close ties with the North Hesse region.

sera in motion

sera is a successful and above all long-standing family business. From its small beginnings in Immenhausen, our enterprise has grown to its current size over the course of 70 years. We now have three foreign branches and a global presence. We have had the occasional market crisis to overcome, even in recent times, and have always emerged stronger than before.

Market forces drive development. Ensuring flexibility in this area makes it possible to meet the challenges of even extreme market dynamics. sera has set itself the goal of always moving forward. An interview with our Managing Director Carsten Rahier on the topics of company development and willingness to change.



**“Our opportunity
lies in enduring
change.”**



*Carsten Rahier, **sera** has come to the end of yet another successful year. As in the previous year, the Group will once again see growth and generate a profit. So why change anything?*

We can rightly be proud of what has been achieved. **sera** will perform very well this year, primarily thanks to our Dosing Technology sector. In Compressor Technology, we have added a completely new segment to the company this year, which is already bearing fruit in the current year. This makes us very confident about our future projects and aims. However we must continue to always look to the future. We are at a turning point in terms of technology, geopolitics and society, and our business environment is subject to global change and uncertainty. As a result, our business development is now much more strongly dependent on external influences than it was just a few decades ago.

Along with globalisation, digitisation is increasingly making its way into our day-to-day processes. This phenomenon will shape our companies even more strongly in the future and influence our working worlds. Industrial companies as well as industry and working associations in Germany are working intensively with these developments under the terms Industrial 4.0 and Work 4.0.

What does that mean in concrete terms?

We find ourselves in a time of extreme acceleration and change. Markets develop quickly and disappear again. Globalisation requires globally-oriented corporate and communications structures. New international cooperations and networks are emerging, while others

are changing or disappearing. Increasing digitisation brings businesses and their employees more and more new challenges. Organisations must adapt to these constantly changing conditions in order to remain viable and to be successful on the market. The familiar is soon outdated and no longer in line with market requirements. There are studies that say a good third of manufacturing enterprises will not survive the next ten years without making fundamental changes.

*What does this mean for **sera**?*

We will be increasingly dependent on fluctuating market conditions and constantly changing markets. Geopolitical crises or ad hoc political decisions – such as the energy revolution in Germany or Brexit, for example – can quickly result in the collapse of entire customer business segments and markets in our series and plant business, or bring about long-lasting changes. What's more, the aforementioned challenges and changes with regard to Industry 4.0 and Work 4.0 will not stop before they reach us and our markets. This requires entirely new product innovations and new business models – and quickly, because the potential reaction times to these circumstances are becoming increasingly short.

You mentioned challenges. What are the solutions to these?

One answer is continuous change and the “learning organisation”. Mid-tier enterprises like ours can develop a competitive advantage through innovation, flexibility and adaptability. For that to happen, however, it is important to pro-actively take the reins and not simply react. We have recognised this situation early; our aim is to make **sera** fit for this future in the long-term. Because for all our pride in what we have achieved, we are still not where we need to be.

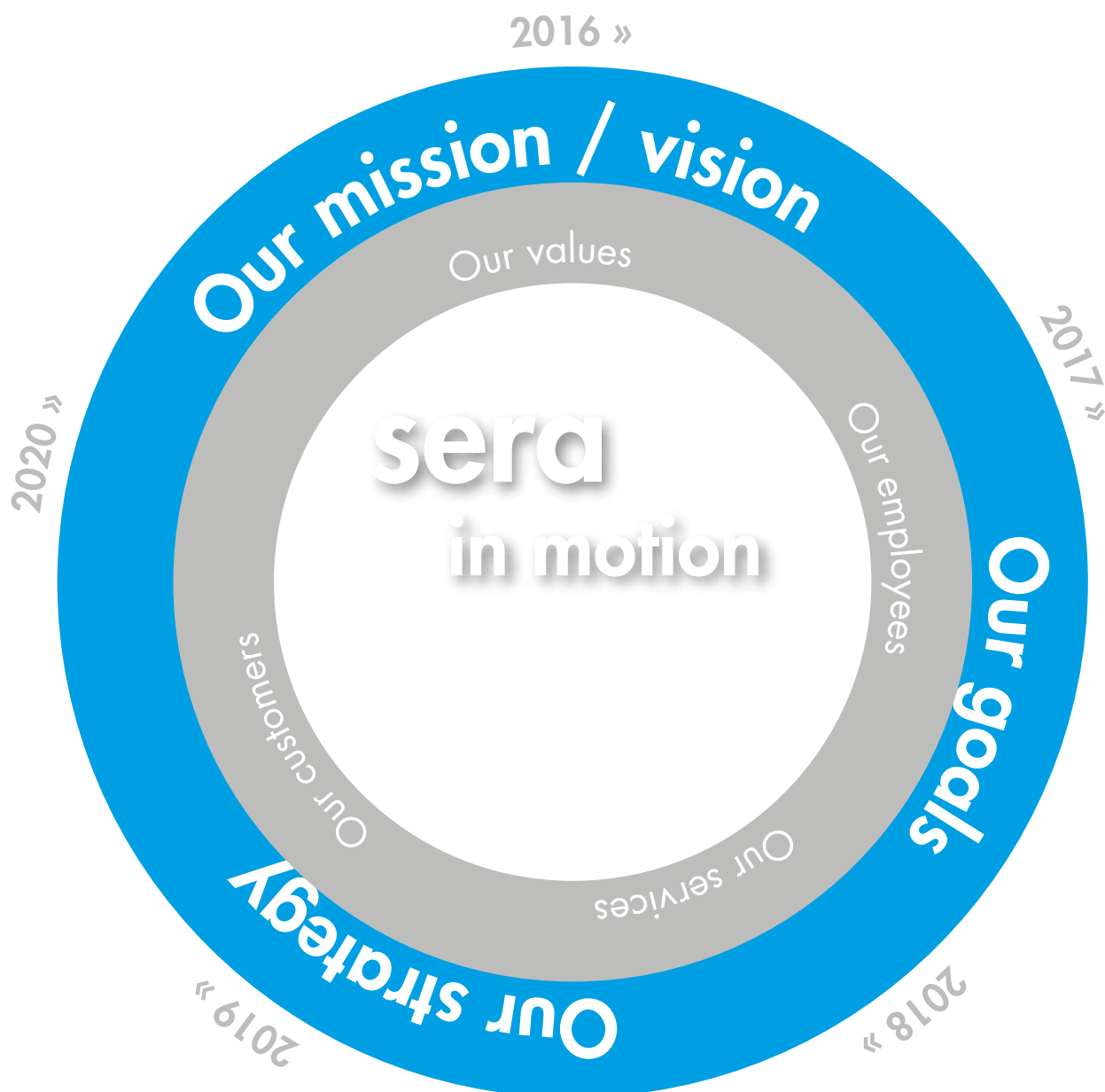
How do we get there?

In the management team, we are currently working on our future strategic goals and a plan for how we can implement them. We are looking further down the road than the coming few years, too. Our benchmark is what we want to accomplish together in 5 or 10 years, because it is only in a more long-term context that we can really change anything. From these plans, we will then develop our vision for the future which will show all employees how we hope to shape the future of the business.

What does the future of the business look like?

We are considering far more than simply our turnover





and earnings trends or budget figures. We want to give all employees an idea of how **sera** should look as a business in the future. And that involves not only numbers, but also a look at our business culture, organisational forms and processes. How do we want to work? What do we want to achieve? How do we deal with each other? How do we deal with our customers? How do we deal with our business partners and stakeholders? Our overarching goal is to transform **sera** in the coming months and years to such a lasting degree that we can become a benchmark for numerous sectors. That may sound illusive at first, but it is what we are actually working towards, since such things are impossible without radical changes.

It almost sounds like a revolution. Will everything change

now? What will happen to tried and tested solutions?

I'm not too big a fan of revolutions personally. It could be considered a dynamic evolution, however. As a traditional family business, tried and tested solutions will always be important to us. Nevertheless, we also need to regularly review such issues in the future. **sera** is very well positioned and delivers excellent product solutions and services to its customers all over the world. This will continue to be the case. However, we have only made it to this point because the company has consistently reviewed and changed things in the past. This will to change is the driving force behind both our actions and our success. We are confident that we can only improve if we truly aim high, with goals that challenge us and could potentially provoke resistance.

In the early 60s, John F. Kennedy set a high-flying objective for the USA – to put an American on the moon within a decade. At the time, it seemed completely impossible. But because the Americans – undoubtedly spurred on by competition with the Soviet Union – saw the lunar landing project not as a crazy idea but as a motivating challenge, they were able to work together and achieve that lofty ambition. In 1969, the Americans were the first to land on the moon.

We too want to set ourselves ambitious goals, look at challenges as motivation and make sure that **sera** has a future. For that we need the help of our **seraners**. After all, we can only make it happen if we all pitch in together with a willingness to change. And so there will be many fascinating and, at times, potentially controversial discussions in the coming months. This discourse is very welcome, so that we might become even better for our customers and stakeholders. I am already aware on a daily basis that many of you are actively participating in such discussions and contributing your ideas, because this is not a project for a few people – it's an ongoing task for all of us.

*What can we expect from **sera** in the future?*

As in the past, **sera** will stand for solid and reliable action, as well as innovative and outstanding product solutions and services for our customers. We will, however, experience this in quite different ways than we might imagine today. One thing is certain, however: we will always be better than before.

Thank you for talking to us Carsten Rahier.



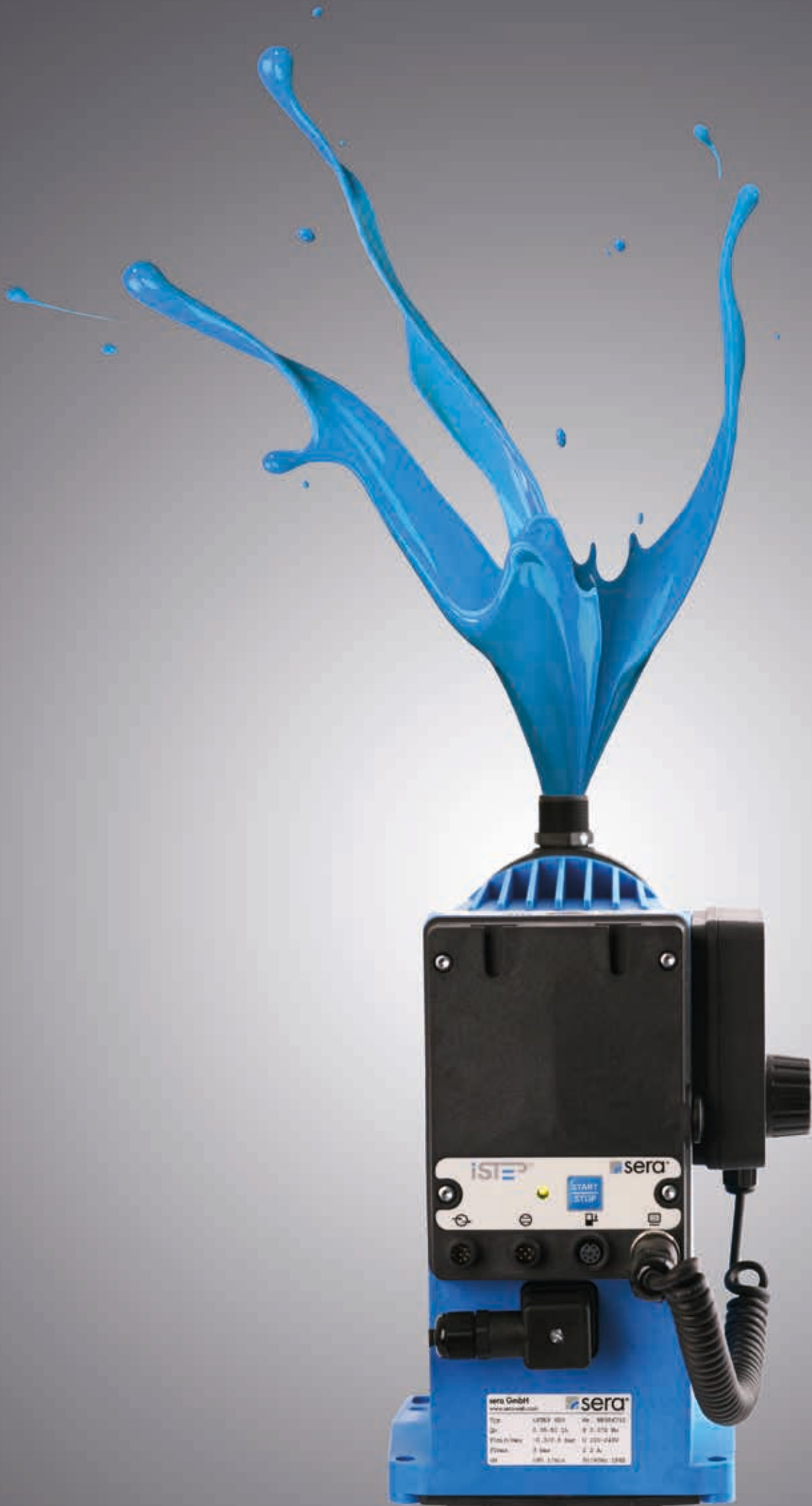
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W	140,3 W/100°C	W	1400W/130°C