Infopaper

AUCOTEC

Image: iStock / haruliki

"Paths are made by walking"

How pioneers are "making" engineering and how the right engineering is making pioneers

The above quote is from Franz Kafka, who had little to do with engineering – although he did write technical documentation also – but it is apt: from the paths of settler tracks in 19th-century North America, which are now convenient highways for everyone, via famous pioneers like Columbus, Lilienthal or Ford, whose first steps opened up opportunities that have long been a matter of course for us, up to state-of-the-art engineering.

Wanting change - and just doing it

The path to digitization has also been and continues to be paved by people who not only think about new ideas, courage to change and entering into uncharted territory. They just do it. Since its foundation, AUCOTEC has contributed a lot to this progress. Since the cooperative platform Engineering Base (EB) was launched on the market, it has supported many pioneers in the most diverse range of industries, and has even made some of them into pioneers. Examples of this support can be found here in the Infopaper.

All of these pioneers have the desire to change their own engineering processes and all of them rely on digitization. They realize that processes can only be significantly improved by leaving the pure presentation or document level. Instead, a plant's complete data model should be editable and, as a "digital twin", it should accurately reflect the future, planned or present reality of the plant.

That the path to the digital future is now quite well developed is also due to the fact that AUCOTEC with EB is not only an "enabler" for pioneers, but has itself provided pioneering work. This has been achieved by the development of this still unique and consistent, versatile data model for highly cooperative, modular engineering. EB's data-driven principle emerged long before digitization and Industry 4.0 went from being rather diffuse buzzwords to becoming trendsetters.

Design follows function

Another typical feature of digital pioneers is their early realization that the purely mechan-

ical and thus external plant mapping does not do justice to a digital twin, but that yet again the "inner values", thus the data, is much more important. The desire for a functional image of machines or plants that specifically reflects their tasks has primarily led pioneers to EB. Its data model, which serves as the single source of truth of all plant information, also supports the function-oriented modular design in a highly efficient manner.

Whether involving an entire transformer unit for a substation or the orderable detail function for a series car, or individual tags in a process plant with sensors, cables, converters and control cabinet input or the "cooling" function which has a complete cooling circuit with all devices, lines and cables, EB can be used to show the functional link between any number of devices and connection elements. Modules, no matter how large, are functional units which – together with a convenient variant handling – make a plant or machine configurable virtually at the touch of a button..

Mature

The trend is towards increasingly complex modules as pre-configured standards. The more complex the modules, the higher quality they are and the more efficient their repeated use becomes.

However, the system must be all the more flexible at the same time. Anyone who wants to significantly accelerate their tendering stages and engineering with modules that can be freely structured hierarchically now uses the mature system EB, thanks to various earlier pioneers. It has long since outgrown its infancy and is ready for the really big steps of its users.

Hall 6, Booth K28
We are looking forward to meeting you!

HANNOVER MESSE
01.04. - 05.04.2019

Your path to digitization

Dear readers,

Economic experts expect a slowdown in growth in 2019. Thankfully, AUCOTEC is not experiencing any such effect. This is because the issue of digitization is playing an increasingly important role in the global industry. According to a study by Dell Technologies, 78% of the surveyed decision-makers want to advance the digital transformation, with only 5% of companies classified as "digital leaders". Anyone who wants to develop in this area now, thus far more than just pioneers, will find the necessary consistent processes, data models and tools in our platform Engineering Base (EB). This is another reason why AUCOTEC has grown significantly. Last January

was the month with the highest turnover in the company's history spanning over 30 years! This continued growth requires the high utilization of our experts. Structured growth takes a certain amount of time, especially since skilled workers are hard to find. Thus we need to focus on specific segments and even ask some interested parties to be patient until we can successfully tackle their projects.

This makes reusable standard solutions all the more important. We create such standards through joint committee work during which we bring together customers of a segment. You too can start developing your digitization with us. You will find that AUCOTEC is a reliable partner who knows the path - while the

unique EB is the right "vehicle" to handle it safely and comfortably.

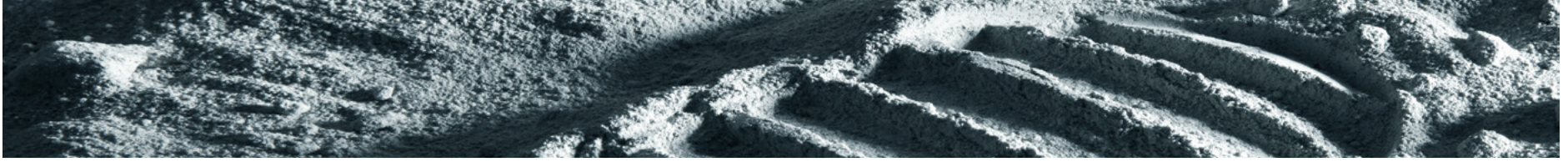**Yours faithfully,**
Uwe Vogt
Executive Officer

Image: AUCOTEC AG

Further topics:

Accessing the tender and project as quickly as possible

In the tendering stage, for example, it is crucial to be able to offer an optimal solution and realistic figures quickly and cost-effectively. Ready-made standard modules in EB are ideal for this purpose. Engineers can then develop the real project directly with the technical configuration of the "winner's" tender. Not only is every subsequent customer request implemented quickly, but also in a comprehensible manner due to the highly efficient change management (execution management).

Pioneers wanted

Incidentally, AUCOTEC has not only performed pioneering work with the data-driven EB. The company was one of the first CAD developers whose system ran on a PC and the first one that switched to Windows, the first provider of a CAE tool that combined graphic and tabular editing, and provided the first certified SAP connection. Engineering Base emerged from this experience, but has been repeatedly put to the test.

The most capable software is of no use to anyone if it does not fit the user processes. That is why AUCOTEC has always relied on close cooperation with its customers. Pioneers who develop their own ideas, set trends and try new things are always welcome. In doing so, as Columbus once did, you may not always find what you are looking for, but you will find new paths, if not worlds, in any event.

Seize your lead in the market with the future-oriented EB. Progress from being a local lone fighter to a globally-active company, from a product provider to a solution provider, from a plant engineer to a full-service company. Experienced AUCOTEC professionals will support you with process analyses, secure cloud solutions, flexible licensing and mobile apps. The path to the future is already here, walk and help shape it!

High tech for increased sustainability
Smart farming and autonomous mobility need smart engineering

Image: Lemken

An impressive example of pioneering spirit in the mobility area is illustrated by the manufacturers of agricultural engineering, and by the producers of machines for municipal tasks, such as street cleaning or park maintenance, where the focus is on autonomous electromobility.

Agricultural engineering manufacturers in Germany are now regarded as high-tech companies which are international leaders in technology, innovation and quality. The industry generated more than 65% of its turnover abroad in 2016, while the approximately 200 German manufacturers with more than 20 employees achieved almost 11% of the global agricultural engineering turnover.*

Pioneer in digitization

While still shaped by steel construction just a few decades ago, the degree of digitization in agricultural engineering at 30% in 2015 was already three times higher than in the automotive industry according to VDI. Advanced sensor technology, electronics and software are essential for GPS-controlled orientation systems, procurement of information on weather conditions or for robotic and drone use.

If a field sprayer had just one cable for the indicator 20 years ago, it is now full of automation engineering and corresponding cabling. Due to precise measurements of the current wind speed and direction, around one hundred individual spray nozzles are often automatically and individually aligned so that the fertilizer precisely reaches only those areas of ground that need it. Seed drills operate in a similar manner. This saves seeds and fertilizers while protecting the environment. The seed requirement is also precisely calculated on the basis of topology analyses of the field. Thus today's cockpit of a modern tractor with its monitors looks more like a control room, than a towing vehicle.

Spanner and notebook

With these and many other developments, agricultural engineering manufacturers are facing environmental regulations as well as optimization constraints due to limited, increasingly expensive agricultural land and growing demand for food. An engineering system that meets these requirements must be able to develop, handle and maintain an enormous amount of complexity. 30 km of cables per machine are not uncommon. The number of sensors and actuators is enormous. At the same time, export-oriented manufacturers must offer a wide range of variants because each country has its own regulations and agricultural conditions. Since the maintenance of such mobile high-tech "plants" not only requires a spanner now, but also a notebook, reliable data on the control devices, connectors and wiring is a must.

Speed and reliability are also essential engineering requirements as innovation and quality are core elements of the success of agricultural engineering manufacturers. They also include Amazone and Lemken, leading names in their field – and Engineering Base (EB) users!

Innovation trends of the "cleaning brigade"

In a completely different mobility area, creative innovation and digitization are also gaining new ground. This involves special machines for cleaning buildings or municipal tasks, such as street cleaning and park maintenance. Whoever is the fastest here will be able to dominate the limited market. Electrically-powered all-rounders, which drive autonomously and perform everything from clearing snow via lawn mowing to waste collection and do their rounds at night coordinated as a swarm, are currently being developed. Their manufacturers have already drawn up new business models where, as a full-service provider, they manufacture the devices, lease them to the municipality and maintain them themselves.

Whether involving machines that can be configured with modular accessories depending on the task, or robots that wipe, dry and polish corridors, large market or factory areas in only a single operation and move back on their own to their charging station as required, the enabling of such ideas requires modern engineering that can develop complexity for the smallest rooms as quickly as possible. This is made possible by the highly flexible change and variant management and web-based data availability for efficient maintenance. Kärcher and Hako are among the EB pioneers in this area.

*Source: Ulrich Hartl, Industry Analysis of Agricultural Engineering, November 2017 Publisher: Hans Böckler Foundation

Reliability for big data professionals

Brownfield digitization, downtime, maintenance and revamping efficiency, expertise backup: process engineering rapidly needs smart data!

If one industry knows what "big data" means, then it has to be the process engineering industry. Designers and operators have been juggling for decades with often more than 100,000 tags, thousands of associated follow-up documents, as well as corresponding amounts of devices, cables, cores, wires and terminals. Most objects naturally appear in multiple disciplines but, in some cases, each discipline uses its own system for data development and management. This is not only time-consuming for data transfers and interface maintenance. It also complicates changes and consistent overall documentation, which must provide reliable proof of the current as-built status of each plant as a prerequisite for an operating license.

How much is time worth?

Downtime is often planned more than a year in advance. The downtime of just one cracker for naphtha splitting can cause a loss of profit of around €1 million per day. The fastest data availability and also absolute reliability are crucial here, for the revamping as well as for the subsequent as-built documentation, in order to be able to start up the plant again.

Transfer of expertise upon change of ownership?

In addition, there has been a growing fluctuation among operators of brownfield plants for a number of years. Trillions of hardware values have changed hands in Europe in recent years – but where is the expertise to operate the plants? Large sites with individual chemical giants have given rise to chemical parks with various plant or sub-system owners serving niches of specialty chemicals since the minerals processing industry focused on Asia and the USA. A central chemical park operator often supplies the infrastructure. The pioneers are already thinking about offering engineering software and data management as a service in order to be able to optimally present themselves as a constant during transfers of ownership. A pioneering idea!

Using PDFs to create a digital twin?

Up to now, most new plant operators have received the documentation only as "dead" PDFs or even paper plans. However, these formats do not do justice to the intelligent logic of a process engineering plant. Data should be "aware" of its context, thus should be "smart". Even without a change of ownership, more and more operators want to transfer the legacy data of their plants, which have often existed for decades, to a system that is able to consistently display the digital plant twin – with all its networks, logic and I&C-relevant information. Ineos once put the data value of its Cologne site alone at €5 million. This is surely a good reason to modernize it to optimum added value. Automation configuration also plays an important role in the efficiency of plant design and operation. The consistent interaction between engineering and distributed control system (DCS) software is one of the prerequisites for efficient predictive maintenance.

Reliable data, but how?

The most important consequence of all these challenges is that reliable, smart data is everything! This requires an engineering system that provides it as quickly as possible, at the highest level of digitization. The system must also transfer changes immediately, consistently and securely to a new as-built status for day-to-day maintenance tasks as well as for large revampings. It needs to secure plant expertise, seamlessly integrate automation into engineering, efficiently support commissioning, and provide web services for maintenance and management tasks, while also offering secure engineering in the cloud. Chemical specialists, such as Solvay, Hexion, Ineos, Dow and many others, are thus relying on Engineering Base (EB) as well as large chemical park operators, such as InfraServ Gendorf.

Image: InfraServ GmbH & Co. Gendorf KG

➤ **Gendorf Chemical Park encompasses nearly 2 million square meters**

Consistency pioneer

A valuable saving of time is achieved due to the fact that EB also standardizes the system environment and eliminates sources of error because the platform consistently supports all core disciplines of plant design. From the design via automated simulation data integration, process and detailed engineering to DCS configuration, EB covers all tasks with its versatile data model. As the first and only platform without synchronization or interface effort, it is the pioneer for the big-data-driven process industry!

Image: iStock/Maxiphoto

Engineering Base hosting model saves hardware investments and time
New "housing" with complete service

Engineering Base (EB) has new quarters in the cloud. As of now, EB's entire license portfolio can be used via a hosting service without hardware installation, administration and maintenance effort. It is offered in collaboration with Mod IT Services GmbH, which has been involved in the areas of workplace management and IT security for over 25 years.

Software usage without implementation effort
"The new cloud model offers designers completely new engineering flexibility," explained Eike Michel, who is responsible for the hosting project as Head of Research and Development at AUCOTEC. "The linearized costs are easier to calculate and you can start working with EB immediately. Without time-consuming hard-

ware analysis and acquisitions, without waiting for EB's implementation into your own IT environment."

The model is of particular interest to new customers who are initially starting with a few key users. Before using new software, server capacities usually have to be estimated and expanded without precise knowledge of the future scope of usage. This not only ties up capital, but can also turn out to be inappropriate. "You often have to retrofit, sometimes capacity remains unused," said Michel.

The service can be scaled from an individual workstation to a large cooperative solution. Teams which are already working with EB can also "move" to the cloud, for example, to

avoid investing in server upgrades. The bring-your-own-license concept adopts any license agreements and can be customized at any time.

Security through concentrated IT knowledge
Almost every workstation computer is now connected to the Internet, thus an in-house server solution is not more secure than the cloud model. On the contrary: security is just one out of many points for your own IT. In contrast, a professional hosting service means concentrated IT knowledge in a company whose core business is precisely these services and related technologies. "Mod IT is an experienced partner. Which mechanical or plant engineer alone employs over 100 IT professionals?" said Eike Michel.

The German-based cloud solution also "houses" EB according to the highest data security standards that apply here.

EB has allowed its full use via web services for some time. However, the various apps and online solutions ran up to now via private clouds.

Image: AUCOTEC AG

› Eike Michel, AUCOTEC AG

"No alternative with similar options"
How BS Netz is modernizing its engineering and how to save 75% of time

Image: Michael Wedde

› Michael Wedde, BS Netz

Michael Wedde (47), Group Manager of Plant Documentation in the Department of Planning, Documentation, Construction is a real "homegrown product" of Braunschweiger Netz GmbH (BS Netz). He started his career there in 1994 in the area of fault detection, protection and maintenance engineering and, after four years as a draftsman, switched to the office service of the electricity division. About 280 employees in total now ensure that the operation of the electrical, gas, water, district heating and telecommunications networks runs smoothly around the clock, for private households, trade and industry. The engineering software used for this from the outset was from AUCOTEC. Since migrating to RUPLAN EVU in 2002, BS Netz has also offered its planning and design expertise to third-party companies. Engineering Base (EB) has been used intensively since 2014 and has not only enabled BS Netz to advance, but also its customers.

You have been working with AUCOTEC software since 1997. What has changed?
Requirements have become much more complex. The pressure on grid expansion by the distributed generation of renewable energy requires much faster project completion times. In addition, there is the shortage of skilled workers. At the same time, quality standards have increased significantly. Single-line development is becoming increasingly important and, without standardization, especially with reusable modules, the whole thing cannot be managed efficiently. The close link to other systems, such as the equipment database and the maintenance system in our case, has also become even more important.

What conclusions did you draw from this?
With EB, we have switched to a system that supports cooperation and parallelization in a highly efficient manner. Thanks to the database and application server, up to five colleagues are working on the same project at the same time, which is extremely valuable for complying with deadlines! The use of the native EB alone with its reliable up-to-dateness saves us about 20% of time. In addition, the single-line design is very convenient. We're moving more towards a function-oriented approach, especially for typical creation and use, for which EB offers very special and entirely new options.

Interestingly, our various divisions have moved independently in the same direction. Our colleagues from the gas and water sectors sought more consistency, came across EB and then learnt that the electricity division was already using EB. Their migration in just 18 months is a real success story. There used to be more than five systems, including Excel. That meant time-consuming data transfers and errors, not to mention the effort involved in changes. Almost all divisions now work solely with EB, which maintains all master data in a centralized manner.

What do you mean by a function-oriented approach?
Documenting in an equipment-oriented and location-oriented manner remains important but, with today's complexity, it is only the functional orientation which contributes the decisive added value. We preconfigure modules that form functional units. For example, for separating or switching in a substation or for an entire transformer unit. Our sheet identifiers have always contained function codes, but now we are virtually extracting the functions and bundling them into modules that EB's Advanced Typical Manager uses to automatically document the plants. These modules can be used repeatedly, thus are standardized. Later, we would also like to use the modules for targeted troubleshooting in operation because a signal is much easier to find via its function name.

What specific effect does the functional orientation with EB already have today?
The ready-made function objects reduce master data maintenance by around two thirds. That alone is a significant plus for clarity and a significant reduction in sources of error – in each of our divisions. But what we have achieved for the first time for a service customer is gigantic: EB's typical management reduced the documentation work involved in a major project from a few weeks to a few days. The customer himself spoke of a 75% saving of time!
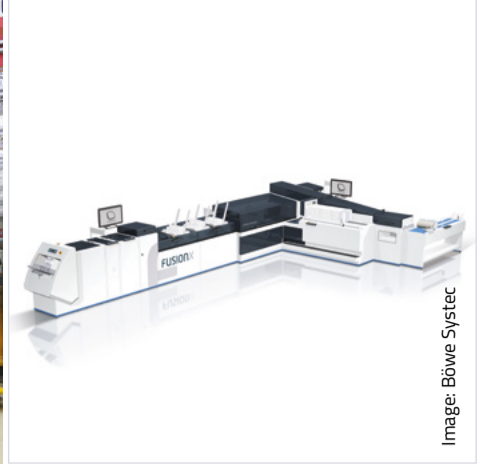
Why did you go down this path with AUCOTEC?
Because a high level of trust has developed from our long cooperation. Our cooperation is very close. For 15 years, I have been sitting in AUCOTEC's energy supply working group (EVU-Arbeitskreis), a type of development advisory board with participants from various energy supply companies, which has also played a major role in shaping EB. That's why we know that AUCOTEC's developments suit our needs perfectly. We don't know of any software alternative with similar options.

Where else do you want to go with the solution?
Thanks to the faster project completion times, we are creating more with our team. This is enabling BS Netz to advance, which is of course an elementary goal. In order to ensure that this remains the case in the future, we still have a few requests, for example, QA tools for typical creation, standardization in data exchange, circuit diagrams "on the fly" for guided troubleshooting or even mobile solutions. And we would like our work to be completely paperless at some point. We know that EB has the potential for this. However, the day-to-day business sometimes keeps us too busy.

Thank you very much for this interview, Mr Wedde!

In the interview

Image: Brückner Maschinenbau

Image: Maschinenfabrik Niehoff

Image: Böwe Systec

Image: Claudius Peters

Image: Kaeser Kompressoren

Traditionally innovative

Success through leading through quality through EB

Mechanical and plant engineering has a long tradition in Germany and a particularly good reputation. It has earned this via manufacturers, such as Brückner, Niehoff, Böwe Systec, Claudius Peters and Kaeser, who have distinguished themselves for decades in their fields as leading companies. One of their most important challenges is to continue to secure their lead in quality, reliability and product longevity despite increasing competitive pressure and certain growth limits as a result of too few junior skilled workers. This is because it is precisely these features that are among the most important decision-making criteria for potential customers for high-quality plants with impressive services:

From 0 to 40 in one second
There are 150 m long, highly complex plants which create in one minute high-quality packaging, display or battery sepa-

rating foils of up to 600 m, thus almost six football pitches long. Added to that are wire drawing machines that produce 30–40 m of wire per second for up to 42 wires at the same time. There are also machines that fill a good 400 envelopes per minute with multiple individual inserts, around 25,000 per hour. Then there is the over 100-year-old traditional company, recently awarded "Innovator of the Year", which, for example, has been able to increase the capacity of its gigantic clinker coolers by 2,600% in recent decades from 500 to 13,000 tonnes per day. Last but not least, there is the leading compressor specialist, also with a 100-year-old tradition, which is conquering new business areas thanks to digitization with the full-service operator concept "compressed air at a fixed price", including predictive maintenance and optimization analyses.

Digital makes companies fast and innovative
In addition to a certain "just do it" mentality, so much innovative capacity also needs the right software. It is no coincidence that all these pioneers work with Engineering Base (EB): its central, cross-disciplinary, highly detailed digital data model enables, even in the plant concept, fast, realistic tenders whose initial engineering can be easily expanded to the real desired plant. It builds bridges from mechanical to electrical engineering. Its data is used for automated DCS configuration and also for achieving efficient predictive maintenance. Last but not least, EB is so closely linked to ERP, 3D and other supplementary systems that no expert has to leave "his" system to obtain information from the other systems. All this, together with EB's always up-to-date digital plant twin, gives innovators the decisive lead and the quality required for sustainable, global competitiveness.

"Global availability from sales to commissioning"

Kongsberg Maritime standardizes its engineering with AUCOTEC

Kongsberg Maritime Engineering AS (KME), a 100% subsidiary of Norwegian technology enterprise Kongsberg Maritime AS, has opted for AUCOTEC AG's solution for the engineering and design of its maritime automation systems. As a standardized CAE system to be used globally, the software platform Engineering Base (EB) is to replace previous isolated solutions at KME.

Global data availability
The company requires absolutely reliable global availability of engineering data for international interdisciplinary project editing. "The database-driven nature of EB creates this availability beyond pure engineering from sales to commissioning," said Cato Strandin, Department Manager, Engineering & Studies at KME when the cooperation was announced. "We expect a significant improvement in the data quality as a result," he explained.

Distributed engineering via central database
The numerous discussions, multiple entries and corrections that were required due to the use of different engineering tools in globally distributed engineering departments would now be a thing of the past according to Strandin. All those involved will work in future with the same database. In this context, EB allows constant control of data quality and project progress via special data tracking. KME also regards the particularly efficient and clear configuring based on standardized templates as a major advantage.
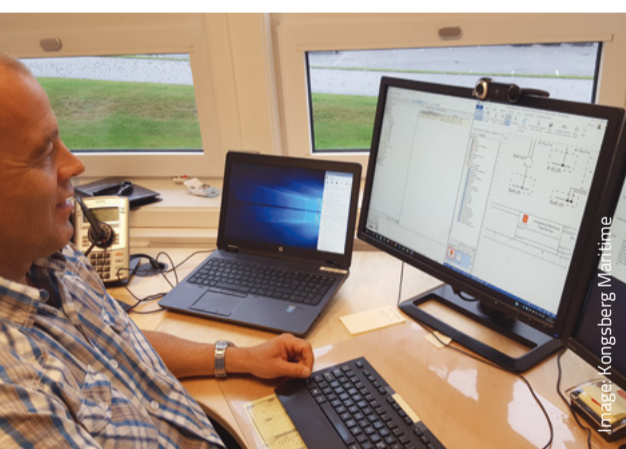
Future of engineering
"We are proud to be able to support Kongsberg Maritime en route to the future of engineering. EB can fully exhibit its special flexibility in such an innovative and versatile technology enterprise. The more complex the task, the more our customers benefit from the platform," explained Uwe Vogt, Executive Officer for Sales at AUCOTEC AG.

After a pilot phase during which KME engineers developed the initial live projects with EB and prepared the productive environment, full commissioning of the software took place at the end of 2016. "The experiences confirm our assessment of EB's potential," reported Strandin. "From the integration into our IT environment via the connection to ERP or other project tools up to the adaptation to customer or KME requirements, the system proves to be very flexible and open. This is of interest to the whole group."

Image: Kongsberg Maritime

> **Engineering workstation with EB in use at KME**

Image: Kongsberg Maritime

> **OOS Gretha, sister ship of two other KME projects. KME uses AUCOTEC's platform EB for the engineering of new constructions.**

In addition … we would like to welcome the following new customers to the AUCOTEC family:

Arriva Tog A/S
Varde | Denmark

Gwangju Technopark
Gwangju | South Korea

Dongfeng Yueda KIA Motor Co., Ltd.
Yancheng | China

Neo-Tec Sp. z o.o.
Płock | Poland

Hans K. Schibli AG
Kloten | Switzerland

Schneider Electric Systems India Private Limited
Mumbai | India

wibres Energietechnik GmbH
Schönefeld | Germany