BRAKING NEWS

KNORR-BREMSE
120 YEARS
1905 - 2025

120 YEARS OF KNORR-BREMSE
From start-up to global leader

BREMSTAR
Well-prepared for the future

E-FLEET PLANNING
Proactive approach

EDITION 67
May 2025 – the Customer Magazine of Knorr-Bremse Systeme für Nutzfahrzeuge GmbH

KNORR-BREMSE

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Dear Reader,

ALEXANDER WAGNER
Head of Aftermarket/TruckServices at Knorr-Bremse Commercial Vehicles

This year, Knorr-Bremse can look back on 120 years of company history - a special anniversary of which we are justifiably proud. Ever since it was first created on January 19, 1905 in Berlin, the Company has had one clear goal: to make mobility on road and rail safe, efficient and sustainable. A combination of entrepreneurial vision and sheer courage enabled the original start-up engineering firm to develop into the global market leader for braking systems and a leading provider of technologies for rail and road vehicles with a world-wide reputation for the quality of its products and services. In this edition we have pleasure in offering some insights into our eventful and inspiring company history.

In addition to the depth of expertise of Knorr-Bremse's engineers, another factor contributing to their success has been their strong customer-focus. In their eyes the economy of your service operations and the efficiency of your work processes are crucial elements – and in future, data-driven services are set to play a central role here. That is why we are expanding our activities in the field of digital aftermarket solutions. One step was our acquisition of a majority holding in diagnostics specialist Cojali. A first result of this collaboration was integration of Knorr-Bremse Diagnostics into the multi-brand company Jaltest Diagnostics. The digital booking platform PleaseFix enables you to optimize use of your labor resources by supporting planning, booking and monitoring of the progress of repair and maintenance work. And the revised Expert Network ensures that all workshops can collaborate even more closely with Knorr-Bremse, ensuring expanded technical support by our experts and more rapid fulfilment of warranties.

The positive impact of Knorr-Bremse on our customers' businesses is demonstrated by portraits of two companies: Wischmann in Brandenburg, and French commercial vehicle parts supplier Bremstar. Engaging with the technologies of tomorrow is part and parcel of our DNA. In this edition of Bremspunkt we explain how important it is for fleet operators to plan for the use of E-trucks - and which experts can help you with this.

Truck racer Jochen Hahn also faces a steep challenge: He is determined - after three runner-up titles in succession in the European Championship - to stand on the top step of the podium once again. In this edition he explains how he intends to achieve this.

I hope you enjoy reading this new edition of Bremspunkt and find it suitably informative.

Alexander Wagner

New additions to the brake family

Knorr-Bremse TruckServices adds the SyA7 (axial) and SyR7 (radial) types to the SYNACT® brake family for heavy-duty commercial vehicles.

As well as weighing less, the new generation of pneumatic disc brakes also boasts an impressive brake torque of 30 kNm. This means that, in addition to reducing operating, maintenance and repair costs, the new SYNACT® sets the technical standard for heavy-duty commercial vehicles, regardless of their drive technology. The new generation is being progressively introduced for OE systems by almost all major OE manufacturers and is set to fully replace current brake generations.

The aftermarket concept also includes a new pad design, for the first time featuring the new ProTecS2.0 pad retention system, which ensures optimized pad wear. In combination with Active Caliper Release (ACR®), the residual drag torque is minimized thanks to a spring system releasing the brake pad from the brake disc more quickly and actively recentering the caliper. As a result, energy consumption, pad wear and CO_2 emissions are all reduced.

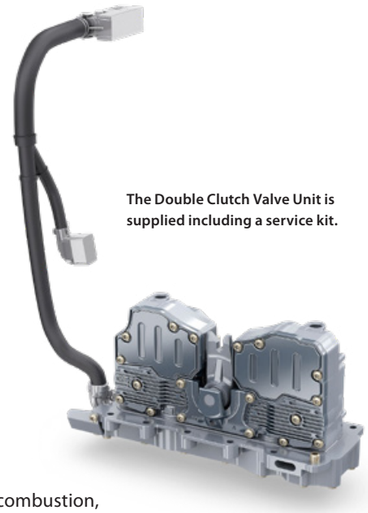
Brakes installed in the vehicles, as well as brake carriers supplied in the aftermarket are already designed for installation of the ACR® system. Repair shops can choose between brake pad kits with or without ACR® as required, and the system can thus also be retrofitted.

And it's not just the calipers – all the necessary wear parts and service kits have been completely redeveloped and tested to OE standards for this brake generation. To provide you with optimal maintenance support, Knorr-Bremse's SYNACT® brake service package is designed to make maintenance and repairs as efficient and user-friendly as possible. Repair shop maintenance is supported by the new SYNACT® tool kit and digital service manual.

The new generation of brakes improves efficiency in operation, repair and maintenance.

DCVU for Volvo dual clutch transmission

Knorr-Bremse TruckServices' valve module enhances driving performance while reducing diesel consumption and emissions.



The Double Clutch Valve Unit is supplied including a service kit.

We are delighted to announce the launch of a tried-and-tested technology in the aftermarket business. Knorr-Bremse's Double Clutch Valve Unit (DCVU) is now also available to repair shops, dealers and fleet operators – complete with a service kit comprising gaskets and all the components needed to carry out a professional replacement.

The valve module was specially developed for Volvo vehicles with a dual clutch transmission (DCT) and is optimized for the Volvo I-Shift transmission. The DCVU is already being used in 18,000 vehicles worldwide. Its precision control helps reduce fuel consumption and improve performance – benefits that make all the difference to anyone who cares about efficiency and sustainability.

The electro-pneumatic control module at the heart of the DCVU makes it possible to shift gears without losing torque. The benefits include faster gear shifts that improve driving performance, especially on routes with frequent gradients. And that's not all. Power loss during gear shifts is minimized and faster gear shifts make for more efficient combustion, reducing fuel consumption and emissions.

In addition, the DCVU combines several gear shift and clutch control functions in a single, compact module. This not only saves space but also minimizes the amount of external cabling.

Knorr-Bremse Diagnostics facilitates professional replacement of the DCVU. The system enables fast and precise fault analysis and provides detailed replacement instructions, supporting efficient vehicle maintenance for repair shops and fleet operators. Once the repair has been completed, the transmission can be professionally calibrated with the Jaltest multi-brand diagnostics.

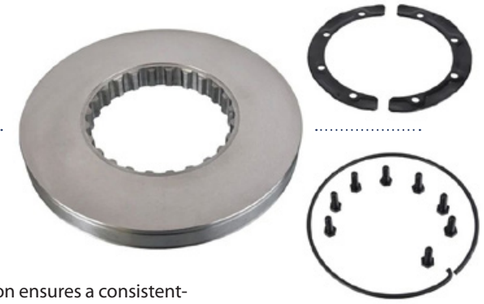
Hubless brake discs for Volvo und Renault

Knorr-Bremse TruckServices will soon be adding OEM-quality hubless brake discs for Volvo and Renault commercial vehicles to its range. The discs are faster to replace and reduce maintenance costs, boosting repair shop efficiency.

With the addition of hubless brake discs to the range, Knorr-Bremse TruckServices is pleased to offer modern, maintenance-friendly solutions for repair shops and spare parts dealers. Similar in design to Knorr-Bremse's tried-and-tested Splined Disc® technology, the new brake discs for Volvo and Renault models enable direct force transmission and reduce thermal stress. Unlike conventional brake discs, where the hub is permanently attached to the disc, in hubless brake discs, it is a separate component. The disc and hub are connected by interlocking teeth or an adapter. This means that only the brake disc needs to be swapped when carrying out a replacement – the hub is retained, saving time, cutting material consumption and significantly reducing maintenance costs.

As well as being user-friendly, hubless brake discs offer a number of technical benefits. The fact that they are lighter than conventional models increases the payload and improves fuel efficiency. Optimized heat dissipation minimizes warping and heat cracks, while even wear distribution ensures a consistently high braking performance throughout the disc's lifetime.

Delivered with all the relevant accessories, TruckServices' five new hubless brake discs for Volvo and Renault applications strengthen its aftermarket portfolio, supporting cost-effective, sustainable and future-proof commercial vehicle maintenance.

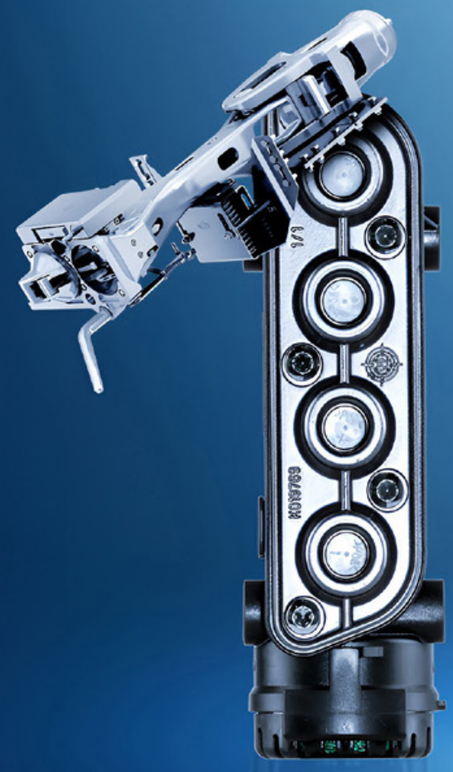


Hubless brake discs improve repair shop efficiency.

RELIABLE

INNOVATIVE

LEADING

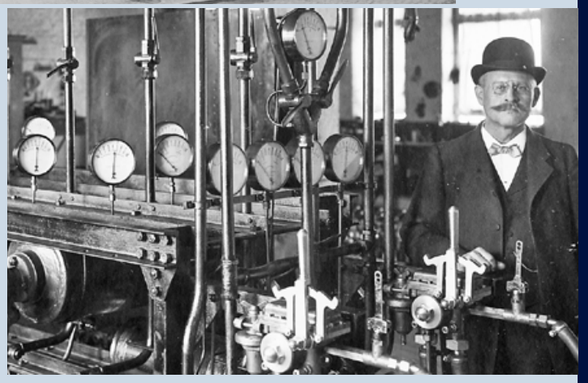


KNORR-BREMSE
1905 - 2025

Always one step ahead

120 years of Knorr-Bremse: A winning combination of ingenuity, in-depth technical know-how and passionate entrepreneurship helped a small engineering firm in Berlin to grow into a global market leader in safety-critical rail and commercial vehicle technologies – with a particular focus on braking systems.

When Georg Knorr founded his company in Berlin in 1905, he had recently launched his first braking system for rail vehicles - a groundbreaking moment. His K1 compressed air brake brought passenger trains to a halt faster, more safely and, crucially, without the usual dreaded jolting. The enhanced safety and comfort provided by the brakes laid the foundations for a company that would go on to revolutionize the world of rail and commercial vehicle braking technology and to this day remains a byword for cutting-edge technology and safety.



Air brakes for trains were Georg Knorr's specialty.

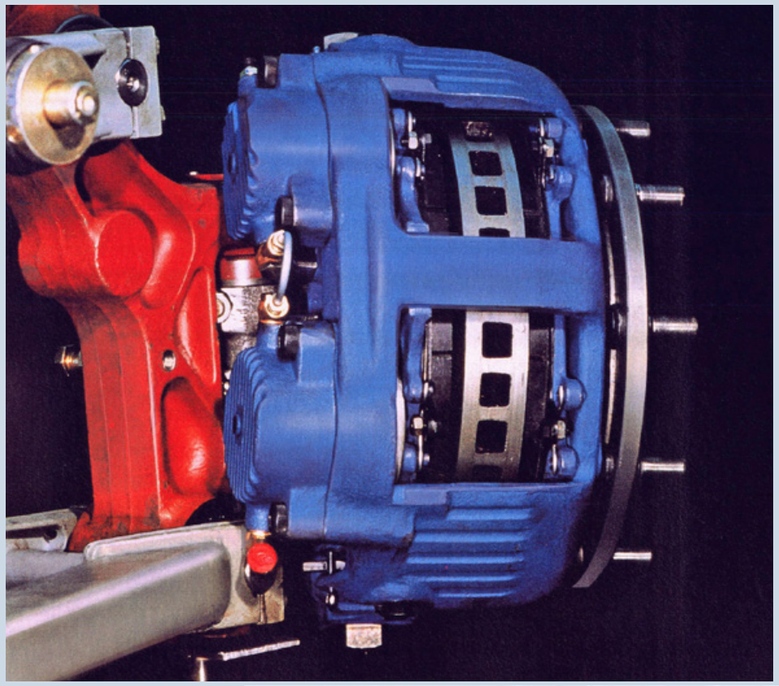
During the first third of the 20th century, rail was the primary mode of transportation.

It all started with rail systems

The Commercial Vehicle Systems division and Rail Vehicle Systems division are two important pillars of the Knorr-Bremse Group. From the first modern freight train air brake developed by Georg Knorr in 1905 to its pioneering braking systems for high-speed trains and its state-of-the-art digital solutions, the Company has consistently contributed to advances in the rail industry over many years. The development of high-performance brakes for high-speed trains in the 1990s was a particularly significant innovation, allowing modern trains traveling at over 300 km/h to be brought safely to a halt. Today, Knorr-Bremse is working on new, intelligent braking systems that combine artificial intelligence and predictive maintenance solutions. As well as braking systems, the Rail division includes other key technologies such as entrance and HVAC systems, sanitary systems, coupling systems, a portfolio of digital solutions and smart services for optimizing rail transportation. In the rail sector, too, Knorr-Bremse is synonymous with safety, efficiency and sustainability. A combination of traditional engineering and modern digital solutions has secured the Company a leading position in this industry as well.

Initially, the Company focused on developing compressed air brakes for rail vehicles, and it was not until the 1920s that Knorr-Bremse also ventured into the commercial vehicle market. The burgeoning automotive industry presented a variety of new challenges,especially in relation to the safety of heavy-duty commercial vehicles. In 1922, Knorr-Bremse achieved a major breakthrough with the development of the first compressed air four-wheel braking system for trucks. This meant that, for the first time, all of a truck's wheels could be braked simultaneously, delivering a quantum leap in road transportation safety and stability. The Company would go on to systematically refine this technology over the course of the next few decades. Knorr-Bremse braking systems became increasingly popular in the truck market, and by the 1950s the Company had become the leading supplier of braking systems for trucks in Europe.

The valve of the K1 air brake developed by Georg Knorr.



The first disc brake for commercial vehicles was introduced in the 1980s.

The air-operated four-wheel brake was an epoch-making advance in terms of road safety.

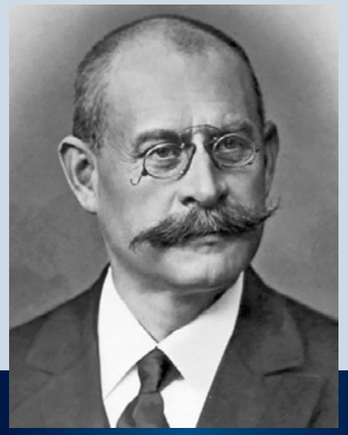
The economic boom in the 1950s raised the bar in terms of the requirements for modern commercial vehicle brakes. Germany's 'economic miracle' led to cars and trucks becoming a widespread means of transportation. The volume of traffic was now six times higher than in the 1930s, and commercial vehicles were bigger, heavier and faster. Failure to adequately upgrade the road network to cope with this huge increase in traffic led to a rise in the number of accidents. In 1953, the automatic load-dependent braking system (ALB) helped to improve safety by adjusting the braking force according to the axle load.

Knorr-Bremse's continued investment in targeted research and development culminated in the launch of another innovation in 1969: the first disc brake for commercial vehicles. However, the brake's hydraulic actuation system meant that it was mainly used in construction machinery and buses. The real breakthrough came in 1987, when Knorr-Bremse presented a prototype of a pneumatically-actuated disc brake for commercial vehicles at the IAA trade fair in Frankfurt. Production of the brake started in 1992, and the rest is history. More than 50 million Knorr-Bremse disc brakes are now in use in commercial vehicles all over the world.

The multi-brand diagnostic system Jaltest Diagnostics supports workshops in reading out battery management systems.

The introduction of electronic braking systems (EBS) that enable more precise braking force control was a further milestone in the Knorr-Bremse success story. Volume production of the brakes began in 1993. This technology paved the way for other innovations such as anti-lock braking systems (ABS) and electronic stability control (ESC) that are now standard in almost all modern trucks. Strategic acquisitions such as Bendix in North America also enabled Knorr-Bremse to position itself as a leading global supplier of air brakes.

Opened in 2016, the Development Center in Munich is a symbol of Knorr-Bremse's commitment to innovation. Covering an area of almost 17,000 square meters and with more than 100 different test rigs and dynamometers, the Center is a state-of-the-art facility for the development and testing of innovative braking systems and components for the rail and commercial vehicle markets. Several hundred engineers from different disciplines work on-site, developing cutting-edge technologies. The investment of over EUR 90 million in the Development Center remains the largest single investment in the Company's history to date. In the same year, Knorr-Bremse presented an autonomous tractor-trailer combination at the IAA in Hanover. Following a virtual handover to the dispatcher, the truck drives to the designated loading ramps and then returns to the driver at the handover point. Sensors and GPS positioning allow the vehicle to detect its surroundings, enabling safe, driverless yard maneuvering.



The founder

Born in Ruda (West Prussia) on October 19, 1859, Georg Knorr was a visionary who pioneered modern rail vehicle braking technology. 120 years after he founded Knorr-Bremse in 1905, his name remains synonymous with groundbreaking innovations in air brake technology. After completing his engineering studies and taking his first steps in the world of work, including a job at the Royal Prussian Railway Administration, in 1884 Knorr joined the Berlin office of air brake pioneer Jesse Fairfield Carpenter. When Carpenter & Schulze found itself facing financial ruin in 1893, Knorr took the company over and successfully steered a new course. With great foresight, he recognized the tremendous potential of rail transportation and devoted himself to the development of safer, more efficient braking systems. His landmark success was the Knorr single-chamber rapid-action brake. As well as enabling faster, smoother braking, the brake was also compatible with existing systems such as the Westinghouse brake. The expansion of the Company through its merger with Kontinentale Bremsen GmbH in 1907 established Knorr-Bremse as a market leader. Despite suffering from ill health, Knorr continued to devote himself to developing new braking technologies. In 1910, he started work on a graduated-release compressed air brake that was completed by his team after his untimely death in 1911.

As the number of commercial vehicles around the world continued to grow, Knorr-Bremse was quick to recognize the importance of the aftermarket business.

An efficient and comprehensive repair shop and spare parts network, combined with customized service solutions, became a key part of the Company's business model. In 2022, the acquisition of a majority stake in the Spanish company Cojali strengthened Knorr-Bremse's position in the field of digital, data-driven aftermarket solutions.

With its Jaltest product division, Cojali is a globally successful developer and manufacturer of multi-brand diagnostics solutions for commercial vehicles. The acquisition has strengthened Knorr-Bremse's current aftermarket business by adding a customized software solution for commercial vehicles that will open up new business opportunities in big data and predictive maintenance.

MAN and Knorr-Bremse develop the first standard anti-lock braking system for trucks in 1981.

The visionary

Born on April 2, 1941, Heinz Hermann Thiele was one of Germany's greatest entrepreneurs and a defining part of the Knorr-Bremse story for many decades. With his single-minded sense of purpose and unquenchable thirst for success, he turned a relatively small business into a global market leader. The cherished principles of discipline, fairness and responsibility that Thiele brought to his work has left their mark on Knorr-Bremse's corporate culture. After joining the Company in 1969 at the age of 28, he quickly rose up through the ranks. In 1985, at a time when Knorr-Bremse was going through a difficult period, he decided to buy the Company, even though he had very little capital of his own. In spite of the tremendous challenges, he trusted in his ability to make his own decisions and steer the right course.

Under his stewardship, Knorr-Bremse was able to continuously grow its business, in part through strategic acquisitions of companies like New York Air Brake and Bendix. Thiele pursued a clear strategy focused on braking technology for rail and commercial vehicles, and drove the Company's international growth, especially in China. His decision to float Knorr-Bremse on the stock exchange in 2018 was an important career landmark, setting the course for the Company's future and securing its independence. Thiele remained a visionary even when he was no longer actively involved in running the Company, and encouraged it to press ahead with digitalizing the business, a step that was also reflected in the construction of a large Development Center in Munich. Heinz Hermann Thiele passed away on February 23, 2021, at the age of 79.

Products & services for today. Solutions for tomorrow.

Knorr-Bremse has been driving innovation for 120 years, and TruckServices is no exception. The aftermarket specialist combines innovative products and sustainable solutions with a strong focus on digitalization.

Knorr-Bremse has been driving innovation for 120 years, and TruckServices is no exception. The aftermarket specialist combines innovative products and sustainable solutions with a strong focus on digitalization.

The commercial vehicle industry is changing apace, with digitalization, efficiency and sustainability playing an increasingly indispensable role. Today's fleet operators want to run their vehicles in a more efficient, environmentally-friendly manner. As well as continuously expanding its product portfolio, the challenge for Knorr-Bremse TruckServices is to develop customized aftermarket solutions that meet today's requirements while also being ready to accommodate future developments – as promised by the company's claim "Future Ready Aftermarket. Products & Services for Today. Solutions for Tomorrow".

Optimizing diagnostics solutions is an important part of this. Repair shops must be able to rapidly identify the causes of failures so they can carry out the relevant repairs as quickly as possible. TruckServices employs innovative software solutions that offer repair shops and fleet operators a deeper level of diagnostics. The ambition is to build a fully digitalized aftermarket ecosystem that encompasses the entire value chain. The development of future-ready diagnostics tools such as "Knorr-Bremse Diagnostics", created in partnership with Jaltest, raises the bar in terms of depth of diagnostics. The software covers both Knorr-Bremse systems and, generally-speaking, more multi-brand systems – the perfect combination for repair shops looking to optimize their processes. Featuring integrated cloud technology and reflecting the latest regulatory requirements, this solution will be an indispensable tool for many years to come.

Tailor-made aftermarket solutions for the digital future – that's what TruckServices offers.

Knorr-Bremse has also joined forces with Dutch company WESP to drive further advances in digital technology. The two partners have developed a benchmarking dashboard for commercial vehicle repair shops. The system identifies opportunities to increase sales and improve process efficiency.

Sustainability is also a key part of Knorr-Bremse TruckServices' plans for the future. With solutions like the APR® (Active Pad Release) system, which reduces brake pad wear and thereby also cuts particulate and CO_2 emissions, the company is showing how efficiency can go hand in hand with environmental protection.

The development of energy-saving compressors for electric commercial vehicles is another example of Knorr-Bremse's commitment to leading the industry towards a greener future.

A combination of experience and precision

Few people can be preparing more thoroughly for the 2025 FIA European Truck Racing Championship than Jochen Hahn. After finishing the 2024 season in second place, he is determined to unseat Norbert Kiss from his European throne.

Jochen Hahn's preparations for this year's racing season have, if anything, been even more intensive than usual – with a laser-like focus on analysis, fine-tuning and precision engineering. "We have been taking a close look at our strengths, identifying room for improvement and using this analysis to develop our objectives for the new season," he explains. It is certainly an approach that has paid off in the past: With no fewer than six European titles, Hahn ranks amongst the world's top truck racing drivers. But in 2024 he fell just short of winning the title – a situation he is determined to rectify in the upcoming season.

The painstaking preparations are reflected in the endless hours of work that Hahn and his team have devoted to the challenge. "We have invested virtually our entire capacity in the new truck," he emphasizes. The main focus has been on improving every single detail, and to do this the team has not only drawn on its own expertise but has also worked more closely with long-standing partners. "This year we have involved them even more intensively in the preparations. In April we carried out tests in conjunction with Knorr-Bremse engineers, checking the entire truck right down to the last nut and bolt."

Another cause of optimism for Hahn are his decades of experience. 25 years of truck racing have not only shaped him, but also helped him develop an extraordinary racing acumen. "It's all about experience – and that is our strength. We know precisely what is needed to stay in front." At the same time, he is keen to pass on his expertise to others. "To hand on my knowledge to my kids - whether Lukas or Jacqueline – is very special." In 2025 Lukas Hahn will be on the starting grid of two of the championship races with a view to gaining more experience. "We are focusing on further developing his talent, but of course the ultimate aim is always to finish at the front of the pack," says Hahn with a twinkle in his eye.

Three European vice-champions in a row.
Others would be satisfied with that. Jochen Hahn wants more.

That's how it should be more often in 2025:
Jochen Hahn on the top step of the podium.

Hahn's passion for his sport is reflected in his love of various racetracks. He feels particularly at home on the traditional course in Jarama, Spain. "It has a special atmosphere that never fails to inspire me." But not every racetrack is like that: "The Slovakia Ring, with its demanding features, is one of the biggest challenges for us drivers."

Rivals go head-to-head in a cornering duel at the truck race.

Jochen Hahn is always looking to the future. Following his runner-up status in 2024, his eyes are now firmly fixed on 2025. "We're going for the title." Even though Norbert Kiss has been the yardstick in recent years, Hahn intends to once again overtake the Hungarian with a combination of experience, technical improvements to his truck and a perfectly coordinated team. Jochen Hahn is entering the new season with experience, technical precision and an unbridled ambition to make it to the top again. Whether he succeeds in winning his seventh European championship title will ultimately be decided on the race tracks of Europe. But one thing is for sure: Team Hahn Racing will put everything they've got into the fight to the finish line.

Jochen Hahn (front) in a heated duel with Norbert Kiss.

State-of-the-art production line

Knorr-Bremse's SYNACT® braking system sets the technological standard for heavy-duty commercial vehicles.

This lightweight brake delivers outstanding performance, with a brake torque of 30 kNm. At the same time, its Active Caliper Release (ACR) system minimizes energy consumption and reduces wear. Easily integrated thanks to its modular design, SYNACT® is the ideal solution for electric mobility. In addition, the durability of this extremely robust product improves on-road sustainability and cost-efficiency. The SYNACT® brake units are produced at Knorr-Bremse's Aldersbach facility in Lower Bavaria on a state-of-the-art line that uses AI and robotics.

SYNACT®brake calipers after completion.

STEP 1

Preparing the order

The planning process for the production of SYNACT® brakes begins with the order management function in SAP APO (Advanced Planning and Optimization). This software helps to optimize production processes by enabling precise planning and control. Customer requirements, delivery dates, specifications, quantities and the number of products already produced are all factored in to ensure that the entire production process runs smoothly. One of the most important functions is inventory-optimized material ordering, where materials are automatically reordered on the basis of demand and inventory levels. This helps reduce excess inventory by enabling a kanban supply system that operates on a pull basis, with materials only being reordered when needed.

STEP 2

Material staging

The material staging solutions used by Knorr-Bremse include a fully-automated high-bay warehouse that communicates with the production team via a kanban signal. Kanban is an inventory management method in which materials are only reordered as and when they are needed. The warehouse automatically transfers the materials for the SYNACT® brakes to the production line based on demand and inventory levels. This ensures a continuous supply of materials while avoiding understocking or overstocking.

STEP 3

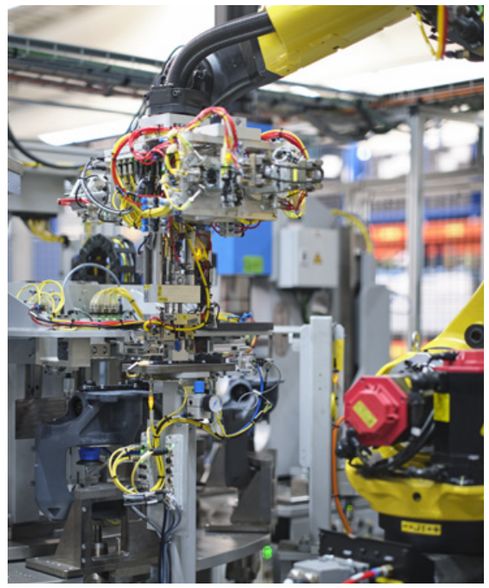
Production line

The production line is designed to ensure that no production time is lost to setup during the changeover from one production batch to the next. This is made possible by machinery that can be flexibly and rapidly adjusted to meet different production requirements. The line is also able to work on multiple jobs at the same time, increasing production capacity and helping to keep production costs down. This flexibility enables "batch size 1 production", where small batches can be produced at the same cost as mass-produced goods.

STEP 4

Production process

The final step of the process is the actual production of the brakes, supported by 24 robots and 67 workstations. Production is optimized by the use of robots to perform repetitive tasks rapidly and precisely, improving both efficiency and quality. The production line is divided into six cells. Each cell has a buffer that mitigates short-term interruptions to the production process. The five-minute disruption buffer comes into play when an interruption occurs, helping to prevent production delays and maintain productivity.



STEP 5

State-of-the-art technology coupled with tried-and-tested methods

The targeted use of advanced manufacturing technology in conjunction with tried-and-tested lean manufacturing methods has opened up new ways of improving operational performance. Digitalization plays a particularly important role by enabling data-driven production line optimization. A prime example of this is the implementation of an end-to-end digital twin, which has been included as a use case in Celonis.

The daily management system (DMS) has also been optimized through automated presentation of data and statistical key figures as graphs and tables. As well as improving transparency, this reduces response times and means that operational tasks can be performed more efficiently.

This integrated approach fully leverages the potential of modern technology to enable leaner, more efficient, data-driven processes.

In a nutshell – the production line highlights

- **Robots: 24 across six cells**
- **Operation: Fully-automated operation with just one operator**
- **Traceability: Full traceability of all safety-critical components**
- **Automation: 3D robot bin picking for large containers such as cage pallets**
- **Quality assurance: Inspections carried out by Knorr-Bremse's proprietary AI vision application**
- **Intralogistics: Automated delivery of individual components and removal of finished containers by automated guided vehicle (AGV) SOP 2026**

Up2Date

- LA9050 Air Dryer for DAF applications (Y583132)
- Tire Pressure Monitoring System (iTPMS) (Y563395)
- Launch of new High Torque Clutch (HTC) Kit (Y581078)
- Knorr-Bremse Screw Compressor Gen.2 for MAN applications (Y578873)
- Addition to the Wheel-End portfolios (Y578657)
- Level and pressure sensors for advanced air suspension systems (Y576522)
- iTEBS® X – The new generation of the Trailer EBS (Y557063)
- iTALK Service extension for diagnosis of iTEBS® X (Y570809)

The documentation is available for downloading at:

https://mytruckservices.knorr-bremse.com

BREMSTAR has a 10,000 square meter warehouse in St. Fargeau Ponthierry, 20 kilometers south of Paris.

BREMSTAR is the national logistics platform for AUTODISTRIBUTION's AD Poids Lourds division, which is responsible for all commercial vehicle activities.

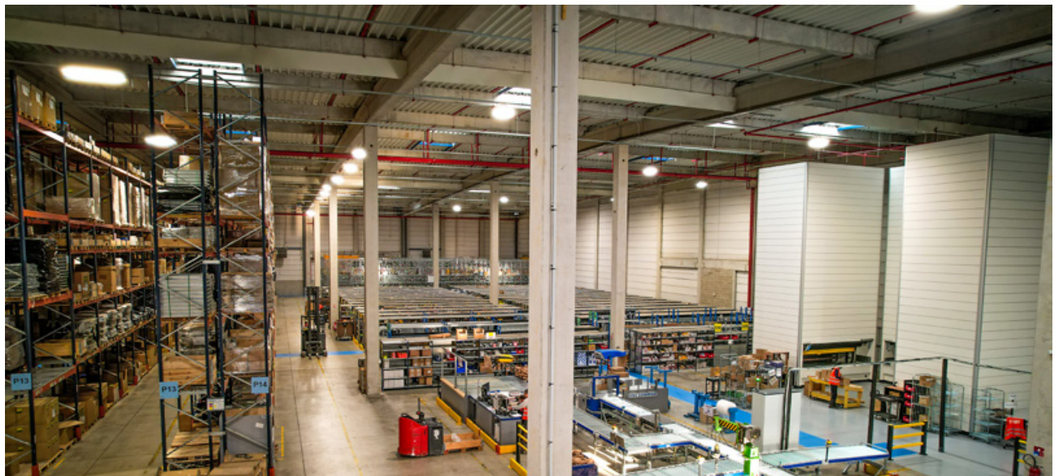
Growing together

Bremstar, part of the Autodistribution group's AD Poids Lourds division, has been working closely with Knorr-Bremse for almost 30 years. Knorr-Bremse supports the French parts dealer in growing its business by helping it put together its product range and assisting it with digitalization processes.

Bremstar Managing Director, Valérie Jorioz: "The partnership with Knorr-Bremse helps Bremstar and AD Poids Lourds to increase our sales and supply our customers with innovative, high-quality products. The technical support provided by Knorr-Bremse experts and the product training for our employees also make a significant contribution to growing our business". The AD Poids Lourds independent multi-brand network is France's leading distributor of parts and services for heavy-duty and light commercial vehicles and buses from the Autodistribution (AD) group. Bremstar has been part of AD Poids Lourds since 2008. Since then, it has developed into the national logistics platform for commercial vehicle parts within the AD Poids Lourds division, which is responsible for all the Autodistribution group's commercial vehicle activities. As such, Bremstar plays a key role in ensuring rapid delivery of customer orders. Many items are delivered to the customer within 24 hours – according to Managing Director Jorioz. Bremstar can even offer overnight delivery of large, heavy parts.

AD Poids Lourds and BREMSTAR: facts and figures

- **1995 BREMSTAR established**
- **1998 AD Poids Lourds established as a division of the AUTODISTRIBUTION group responsible for all commercial vehicle and bus related activities**
- **2008 BREMSTAR taken over by AD Poids Lourds**
- **2014 BREMSTAR becomes national platform for all heavy-duty commercial vehicle related activities in the AUTO-DISTRIBUTION group**
- **AD Poids Lourds has over 200 service points for commercial vehicles and buses**
- **22,000 references from over 50 commercial vehicle suppliers**
- **97 percent availability**
- **Inventory worth EUR 13 million**
- **10,000 m2 commercial vehicle parts warehouse in St. Fargeau Ponthierry, south of Paris**
- **40 percent of all deliveries within 24 hours**
- **2018: Modernization of logistics operations, including inventory management system, conveyor systems and packaging solutions for loose small parts**
- **In 2024, BREMSTAR's 58 employees generated sales of EUR 66 million**



In 2018, BREMSTAR carried out an extensive modernization of its logistics operations and its conveyor and packaging systems to ensure that orders are delivered to the customer as quickly as possible.

BREMSTAR's range initially comprised parts for pneumatic braking and suspension systems. The company gradually expanded its product portfolio, which now includes all the key spare parts.

The French company supplies a large range of products. In its early days, it specialized in parts for pneumatic braking and suspension systems, but as time went by it expanded its portfolio and now supplies all the key spare parts for light and heavy-duty commercial vehicles, as well as some parts for buses. However, Jorioz stresses that Bremstar has maintained its specific expertise in braking and suspension systems and safety-critical components. The close relationship with Knorr-Bremse is also alive and well. The two companies have worked closely together right from the beginning, almost 30 years ago. Their business relationship goes far beyond the delivery of parts and training. For instance, Knorr-Bremse has been actively helping AD Poids Lourds to optimize its digital services for many years. This includes adding Knorr-Bremse products' technical data and cross-references to the group's online identification and ordering tool, "Truckissimo", and to the Bremstar webshop. This makes it even faster and easier for AD Poids Lourds customers to search for and order the right parts. According to Jorioz, Knorr-Bremse has also helped to simplify data sharing via "Golda", a tool used for standardized electronic information sharing in the automotive aftermarket. AD Poids Lourds has also incorporated Knorr-Bremse's online training courses for mechatronics technicians, sales professionals and technology experts into its own learning management system. "We know we can rely on Knorr-Bremse France. The team's vast know-how helps us to support our customers", says Jorioz, adding that Bremstar's and AD Poids Lourds' digital offering will be a particularly important driver of growth in years to come.

» The partnership with Knorr-Bremse helps us increase our sales and supply our customers with innovative, high-quality products. «

Valérie Jorioz,
Managing Director of Bremstar

But that's not all. AD Poids Lourds and Knorr-Bremse are also working together on several other projects to equip the parts wholesaler for the future. One of these involves optimizing inventory in the commercial vehicle network's 18 regional warehouses. "At the end of last year, we carried out a comprehensive review of our parts inventory and added more than 500 references on the national BREMSTAR platform to the 1,400 Knorr-Bremse references specifically for the complete compressed air treatment and braking system – including new original parts and products from the EconX® remanufacturing program. We can now meet our customers' high expectations by supplying 99 percent of their Knorr-Bremse product requirements in the French market", says Jorioz. These also include the latest product innovations such as the SYNACT® disc brake for trucks and the NexTT® disc brake for trailers. The AD Poids Lourds and Knorr-Bremse commercial vehicle teams also cooperate on marketing campaigns. "We include Knorr-Bremse in all our national and local industry events", explains Jorioz, adding that "Knorr-Bremse spare parts are absolutely indispensable as far as we are concerned, due to their high quality and because Knorr-Bremse is a world-leading supplier in this segment."

According to Managing Director Jorioz, joint projects including the expansion of the product range and the sales and service network will go a long way towards strengthening AD Poids Lourds' market leadership. Preparing the company's employees for new commercial vehicle technologies is also included. "There will be a lasting impact on the aftermarket as fleets switch to zero-emission drives and the service business is digitalized. AD Poids Lourds and Bremstar are constantly exploring new business areas to take advantage of this trend. In view of the growing importance of electric vehicles and vehicles with alternative drive systems in the transportation sector, we want to ensure that the Bremstar and AD Poids Lourds product and service portfolio remains relevant for the next generation of vehicles. Solutions like Knorr-Bremse's Active Pad Release (APR®) system for pneumatic disc brakes will play a vital role", she explains. As well as demonstrating that Knorr-Bremse is one of the most innovative companies in the commercial vehicle industry, innovative products like this also show that it has the corresponding aftermarket portfolio – as promised by the company's claim "TruckServices Future Ready Aftermarket. Products & Services for Today. Solutions for Tomorrow".

BREMSTAR supplies parts for commercial vehicles and buses to service companies and dealers in France and its overseas territories.

Wischmann: keeping up with the times

South of Berlin, between two motorways and a major federal highway is the location of Wischmann-Fahrzeugbau. The company can look back on an eventful history. Now, Knorr-Bremse TruckServices is helping it prepare for the future - both digitally and in terms of partnership.

Every time managing director Knut Wischmann walks from the reception desk to the workshop, he passes the document that started it all, four generations ago. He points to a certificate in a dark and richly decorated frame "That's my great-grandfather Carl's master craftsman's certificate." The date on it is 28th April 1909. Carl Wischmann completed his apprenticeship as a blacksmith in 1899 and passed his examination as a farrier in 1907. A few days later, he set up his own small workshop for farriery and horse-drawn carriages, which eventually would become Wischmann Metall- und Fahrzeugbau GmbH & Co. KG.

Grandfather Bernhard continued the blacksmith and farrier trades, focusing after the Second World War on the repair of horse-drawn carriages and trailers. During the GDR era, his father Bernd specialized in trailer repair, carrying out contract work for a state-owned specialized bodywork and trailer manufacturer, as well as constructing trailers, for example for fairground vehicles.

Today, the independent workshop offers a full range of services for commercial vehicles covering all brands. Eighteen employees take care of repairs, collision damage, and maintenance and servicing of trucks and trailers with virtually every conceivable type of bodywork. Statutory inspections, diagnostics, hydraulics, electrics, tires, air-conditioning, engines, and brakes complete the long list of services provided.

It is only a kilometer from the nearest exit of the A10 autobahn to the Wischmann premises in Königs Wusterhausen industrial park. The A13 is nine kilometers away, and between the two is the B179 federal highway. "Anyone who is in the area and sees a warning light flashing on the dashboard can reach us quickly," says Wischmann. In the fall of 1990, shortly after German reunification, the Wischmanns became contractual partners of Knorr-Bremse. "35 years of partnership have really welded us together."

Wischmann-Fahrzeugbau GmbH & Co. employs a total of 18 people in the Königs Wusterhausen industrial park.

Standing next to him, Michael Broszehl nods in agreement. As a technical sales representative for Knorr-Bremse Truck-Services, Broszehl is responsible for the area around Berlin. "Wischmann Fahrzeugbau is one of our Expert Network service partners," he reports. Workshops that want to join have to undergo a rigorous onboarding audit based on a total of 19 criteria. "With them, we ensure that every vehicle is repaired according to Knorr-Bremse quality standards and gets back on the road as quickly as possible," explains Broszehl. "Because not every workshop passes the audit, as a member of the Expert Network, we can distinguish ourselves from other workshops and stand out to our customers," adds Wischmann, "Another advantage is the rapid settlement of damage claims."

» We use PleaseFix to optimize utilization of our workshop capacity and reduce the communication effort required for scheduling. «

Knut Wischmann,
owner of Wischmann-Fahrzeugbau

Knut Wischmann (right) and Knorr-Bremse customer service representative Michael Broszehl (left) have been working together for many years in a spirit of mutual trust and cooperation.

Putting their heads together in the Wischmann workshop: (from left) system administrator Max Wischmann, Knorr-Bremse customer service representative Michael Broszehl, managing director Knut Wischmann and master craftsman Robert Ziegler discuss a repair case with the help of Knorr-Bremse Diagnostics.

Some of the criteria are voluntary: Knorr-Bremse awards expert points for above-average performance. And those who have a good track record in returning old parts for reprocessing and support the Knorr-Bremse voucher system receive an additional bonus.

In the workshop, a truck with a crane superstructure drives over the inspection pit. The warning light on the motor vehicle's EBS has started to flash. What could be the cause? Master mechanic Robert Ziegler plugs in a cable between the laptop and the towing vehicle. Moments later, the Knorr-Bremse Diagnostics software indicates a possible interruption of the connection between one of the wheel speed sensors and the EBS control unit - a minor matter with potentially far-reaching consequences, but one that can be quickly remedied. Shortly afterwards when Ziegler turns on the ignition, the warning light remains off.

Knorr-Bremse Diagnostics is based on the user interface and workflow concept of the cross-brand commercial vehicle diagnostic software Jaltest Diagnostics. What does Ziegler particularly like about it? "It works quickly and accurately and guides you through the process automatically," he replies. "In the past, you had to download the updates individually, save them in the appropriate folder on the laptop and then extract them. Now this also runs automatically and saves us training time." The technical documentation is also included.

The operator of the truck-trailer combination, a haulage contractor from the region, made the appointment using the 'PleaseFix' tool. This is an app-based availability and booking management system for workshop appointments. "We use PleaseFix to optimize the utilization of our workshop and keep the amount of communication required for scheduling appointments to a minimum," explains Wischmann.

The tool allows workshops to specify online which appointment slots they want to make available for which services. This means, for example, that fleet operators can easily coordinate regular maintenance appointments with their route planning. This eliminates the need to call numerous workshops. At the touch of a button, the workshop can create the work order with all the necessary information about the vehicle. The tool also creates greater transparency: Both parties always know what is happening with the vehicle and what the next step is going to be.

With Wischmann's son Max, the system administrator, a fifth generation of the Wischmann family is now working in the business. The 21-year-old holds two smartphones in his hands and a laptop under his arm. Anything that needs to be digitized ends up on his desk. Or he takes the initiative himself. For example? Max Wischmann points to a tablet mounted on a wall between the parts warehouse and the workshop. "Not all of our colleagues are native German speakers," he says. "Many documentation-related issues can be quite challenging."

The solution running on Wischmann's tablet doesn't have a proper name, but it can be described precisely. "Basically, it's a language translation tool that includes recording of order-related times and materials via touchscreen with AI support." Tasks that previously required someone to sit at their desk for several minutes can now be completed quickly and easily – practically in passing. "If a colleague feels more comfortable in their native language, they can simply speak in that language and the system translates everything into German in the background."

VISIT WEBSITE
The QR code takes you directly to the PleaseFix website.

Human-centric, digitally-enhanced

Knorr-Bremse is collaborating with 18 European partners to make remanufacturing work processes more efficient, safer and more sustainable.

Knorr-Bremse's EconX® range has been a fixture in the TruckServices product portfolio for some years. As well as being cheaper than new service products, its remanufactured spare parts also score highly on sustainability. Remanufacturing used parts saves raw materials and energy. But above all, CO2 emissions can be reduced by up to 75 percent compared to production of an equivalent new part. But none of this means that customers have to compromise on quality. This is because Knorr-Bremse's remanufacturing process follows the same standards as OE products.

However, there's no denying the fact that remanufacturing is an extremely labor-intensive manual activity that calls for extensive expertise and is also physically demanding. That's why Knorr-Bremse wants to incorporate cutting-edge technologies into its current work processes in order to improve occupational health and safety and reduce the physical demands on its employees, making their work at once more efficient and more comfortable.

To this end, the Company is taking part in the EU-funded "rEUman" research project alongside 18 other partners. Launched in September 2024, the four-year project aims to optimize the remanufacturing industry in Europe through the use of digitally-enhanced, human-centric solutions. The project is focused on the development of innovative technologies and sustainable practices in order to promote safer, more efficient remanufacturing. This will primarily be accomplished by using digital tools to optimize traceability and quality assurance in the remanufacturing process. The aim is to develop easily replicable processes that can be flexibly applied to different products and industries.

Knorr-Bremse is contributing to the project through a use case focusing on the repair of commercial vehicle ECUs. In addition to the automation of disassembly and reconditioning processes, improving core fault diagnosis, and increasing the regeneration rate and the utilization of both machines and human resources, the main goal is to drive the development of sustainable, circular remanufacturing value chains.

Direct communication between the rEUman's partners also forms an important part of the project. In March, the partners traveled to the Czech Republic and Poland to visit Knorr-Bremse's Czech remanufacturing facility in Liberec and BORG Automotive's Polish remanufacturing facility in Zduńska Wola. A deep dive into the Knorr-Bremse use case was followed by a brainstorming session that discussed some initial ideas about potential solutions. These were subsequently developed and tested on-site after the meeting.

Overall, the visitors were extremely impressed by the know-how and professionalism that Knorr-Bremse brings to its remanufacturing operation. Just under 40 people took part in the visit, also praising the facility's high sustainability standards. The partners will carry out two further site visits in 2025, focusing on the development of digitally-enhanced, human-centric remanufacturing solutions for laser modules, washing machines and heat pumps.

LEARN MORE ABOUT THIS TOPIC
Scan the QR code and discover the latest EconX® video on the topic.

The project participants were able to see the high standard of remanufacturing at Knorr-Bremse for themselves in Liberec.

The representatives of the rEUman partners during the final group photo in Liberec.

The future of remanufacturing was discussed in intensive brainstorming sessions.

Complex subject matter: mobility advice can help when setting up an e-fleet.

Successful electric mobility planning

There's much more to successfully switching your fleet over to electric vehicles than just buying an electric truck and installing a charging point. The key is to ensure proactive planning of every stage from vehicle procurement and installation of your own charging infrastructure – including the power supply – to incorporation of charging planning into your fleet management system.

It all begins when you buy your fleet's first electric truck. It's no longer just a case of choosing between different makes – customers also have to decide on a battery capacity and chassis or tractor unit type. And even once they have got the necessary financing together and potentially also applied for funding, businesses still face the challenge of finding the right operating model for the vehicle and the charging infrastructure. This needs to take several factors into account, including the truck's range, charging times, and individual operational requirements in relation to downtimes and route length.

If the position of the charging socket is not included in the planning, the charging point may be built in an unfavorable location.

Inauguration in Berlin: Cut Power offers Charging-as-a-Service models. This reduces the capital investment required by fleet operators for setting up charging parks.

Then there's the question of whether to charge the vehicles at public charging stations along the route or at the company's own depot, where it will usually be cheaper. In most cases, it is advisable to ensure that the depot charging infrastructure forms part of a comprehensive energy strategy. After all, it's not just the electric truck that needs electricity. The offices and warehouses will also be competing for capacity from the grid connection, and in some cases this capacity may need to be increased. The higher grid fees charged for using more electricity can seriously affect the charging infrastructure's cost-effectiveness, with potential implications for its design. Moreover, electricity prices change constantly throughout the day in response to demand and are generally cheapest during the night, when overall demand is at its lowest. To keep costs down, it is also important to avoid demand peaks. Installing your own solar PV and battery storage system can help to keep costs under control. The solar panels generate cheap, green electricity that can be stored in a battery until it is needed.

When using electric vehicles, it is also usually vital to adapt operational processes such as route planning. This calls for smart coordination of fleet and charging management. One way of reducing the charging infrastructure's operating costs is to make your company's depot available as a charging hub for customers and partners. However, this requires a management system that automatically bills users whenever they charge a vehicle.

Public charging will only account for one of the charging processes.
Depot charging offers greater price transparency and is usually more cost-effective.

Any mistakes in the installation of the charging infrastructure can have costly repercussions, so it is advisable to consult the experts. Vehicle manufacturers, energy suppliers and independent specialists can all provide fleet operators with support. All the OEMs offer this type of service, although not all are equally comprehensive in their approach. While they obviously specialize in their own vehicle technology, their services typically also include vehicle financing and service contracts, charging infrastructure procurement and installation, and charging and fleet management.

» If a customer wants to start with a single electric truck with a view to eventually switching the entire fleet over, we can show them the most efficient way of doing it. «

Michael Voll,
Head of MAN Transport Solutions

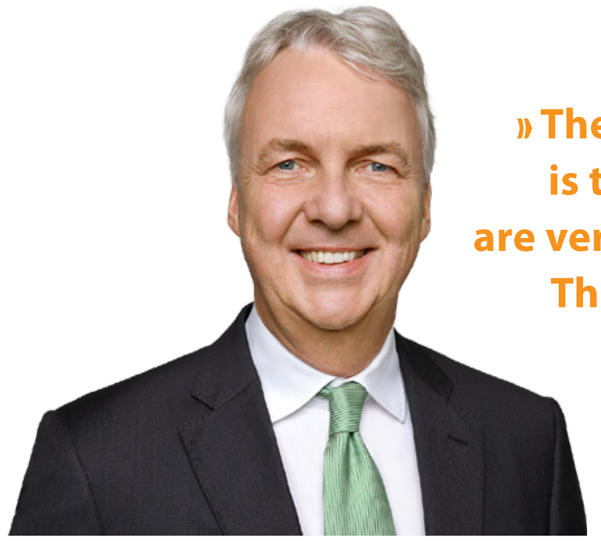
The services provided by MAN are an example of what is available. "As part of our 360° eMobility consulting service, we check whether your routes can be covered using electric commercial vehicles and whether they can be run cost-effectively", says Michael Voll, Head of MAN Transport Solutions. He goes on to explain that, as well as bus and commercial vehicle experts, the 360° eMobility Consulting team also includes specialists from the energy industry and from charger hardware manufacturers. "Having started off with depot planning, we now also provide route planning advice, and are able to tell our customers how far they can travel on a single charge, where they need to charge their vehicle and what the alternative routes are", he adds. The planning takes various factors into account, such as the ambient temperature at different times of year, payload, route topography and driving style. He describes how his team also advises customers on the optimal charging capacity and number of charging points that their depot needs for the number of electric vehicles in the fleet. In addition, MAN will set out the benefits of a solar PV and battery system. And, as Voll explains, the range of services even encompasses smart charging planning. The team calculates how much capacity the depot's grid connection must be able to provide in order to meet demand. Ultimately, however, it is up to the customer to contract the charging infrastructure installers.

The construction work for a charging point at the depot is usually extensive and should be included in the operational processes.

The energy supplier GP Joule also provides a 360-degree consulting service, according to Head of Commercial Vehicles and Fleets, Carl Tüllmann. The company established its own team of commercial vehicle experts in 2020. "We analyze our customer's needs and develop a site-specific plan. We only sell them what they need for their particular purposes and are careful to provide upgrade options. That ensures they get the best value for money", he says. The service also includes submitting an application to one of Germany's 887 distribution network operators (DNOs) and ordering a transformer. "These are the two most complex jobs, and we take care of them so the fleet operator doesn't have to worry about them at all. This also makes it possible to significantly reduce the installation time", says Tüllmann. He sees the company's strength as its ability to implement customized solutions, something he regards as essential in the logistics industry. GP Joule oversees every part of the infrastructure installation just like a general contractor, but it doesn't stop there. "Once the charging infrastructure has been installed, we can service it and provide commercial support, for example if the customer wants a roaming model for their partners", he explains. For, as Tüllmann goes on to say, "In the future, electric trucks will be charged while loading and unloading". Ultimately, however, GP Joule's customers also end up having to invest in energy infrastructure, although Tüllmann does qualify this: "We can help fleet operators who don't want to tie up their own capital to find an investor for their charging station, and we also plan to offer charging-as-a-service in the future".

» Submitting an application for the grid connection and procuring transformers are the most complex jobs, and we take care of them, so the fleet operator doesn't have to worry about them at all. «

Carl Tüllmann,
Head of Commercial Vehicles and Fleets, GP Joule



» The benefit of working with us is that we operate quickly and are very familiar with the process. This means we can coordinate precisely with all the relevant stakeholders. «

Karl Eberhard Hunke,
CEO, Cut Power

This is an area where Cut Power is breaking new ground. The Hamburg-based company claims to be rolling out more than 200 charging hubs across Germany, around half of which are already in operation, with both public and private charging options available. "Most of our customers are early adopters in the logistics industry who want to concentrate on their core business without having to worry about the electricity and technology procurement side of things or the regulatory aspects. They only pay for using the infrastructure – they don't have to invest any of their own capital to install a charging hub. In return, they undertake to pay us a basic connection fee or guarantee a minimum annual level of electricity consumption for their fleet. This provides the basis for calculating the EV charging price", explains CEO Karl Eberhard Hunke. Cut Power provides full-service management of the charging points and only uses certified green electricity. "While we always find a solution that offers our partners value for money, the price reflects the fact that the risk resides with Cut Power", he says.

Hunke explains that in order to plan a future-proof charging infrastructure, Cut Power needs information about how the fleet's switchover to electric vehicles is progressing and what its future requirements will be. "As the investor and long-term owner of the assets, in addition to planning the charging infrastructure we also install it, procure the transformers and batteries, install an integrated solar PV system and implement a smart charging and demand management system. We hire all the contractors and also handle communication with the DNOs", he adds. "The benefit of working with us is that we operate quickly and efficiently and are very familiar with the process. This means we can also coordinate precisely with all the relevant stakeholders", he concludes. However, the sustainable infrastructure investor's services do not include choosing the vehicles and analyzing the operating conditions. It is up to the fleet operators to find a partner on the market, depending on how involved they want to get in operating the charging infrastructure. But here too, proactive planning is key.

Running electric vehicles more cost-efficiently with Jaltest Telematics

Drive technology safety, high rates of vehicle availability and efficient fleet management are key to cost-efficient operation of electric buses and trucks. Cojali's Jaltest Telematics is a solution that is already able to collect the necessary information from vehicles and analyze it using AI, despite an ongoing lack of communication standards.

The number of electric buses operating in urban passenger transportation continues to grow. However, the fact that the drive technology and in particular the battery technology are less mature than in diesel vehicles, poses a number of specific challenges for fleet operators. "These include vehicle safety, for example protecting the batteries against thermal runaway and sudden drops in charge. In addition, the higher downtime and complex operations management compared to conventional vehicles make the fleet less cost-efficient", explains José Ángel Gallego, Global Director Business Development Connectivity & Data Analytics at Jaltest Telematics. According to his figures, the fact that the battery technology is less mature means that electric buses have up to 15 percent more downtime. "This is also partly because there is still only limited technical documentation for electric buses, not to mention a lack of industry standards and efficient aftersales service", he adds. An electric bus fleet management system needs to monitor a number of additional factors in real time, for example battery state of charge (SoC) and state of health (SoH), charging point availability along the route, and power consumption. This is vital if the buses are to provide a reliable transportation service that is as cost-efficient as possible, so that they can fully replace conventional buses.

Knorr-Bremse Diagnostics impresses with its clear and user-friendly interface.

JALTEST TELEMATICS assists in analyzing the battery management system.

The right telematics solution could overcome all three of these challenges by making use of the information from the battery management system (BMS). Until now, however, a lack of vehicle communication standards has prevented efficient use of this data. "The BMS is a black box. There is limited ability to collect and analyze data from the electric vehicle's CAN bus", says diagnostics expert Gallego. However, Jaltest Telematics by Cojali, a Knorr-Bremse Group company, is already able to collect data from the BMS and other electronic control units, thanks to its extensive knowledge of multi-brand diagnostics protocols and vehicle communication.

"Jaltest Telematics provides monitoring and remote diagnostics tools that can anticipate vehicle failures before they occur, enable predictive maintenance and minimize vehicle downtimes. The system thus helps to run truck and bus fleets more cost-efficiently", says Gallego. Jaltest Telematics monitors the battery and other vehicle systems that are controlled by an ECU, analyzes vehicle data in real time, and is able to carry out advanced remote diagnostics with two-way communication. The use of artificial intelligence (AI) is key to this functionality. The Cojali solution's self-learning analytics models allow it to estimate the lifetime of different systems, predict potential failures and determine optimal maintenance windows. The telematics solution also shows the battery state of charge in real time and, depending on the specific operating conditions, provides information about key battery indicators such as voltage, homogeneity, charge distribution, temperature and state of Health. This also allows fleet operators to estimate the vehicle's range. The early warning system and reports help fleet operators to optimize their electric bus fleet's efficiency by anticipating problems and preventing downtime/increasing vehicle availability. Jaltest Telematics is thus driving the transformation toward sustainable vehicle fleets. Satisfied customers who have already been using Cojali's telematics solution for a number of years Include prestigious names such as ETM Valencia, ETM Madrid, ALSA, MZA Warsaw and Transdev.

TRUCKSERVICES

Future Ready Aftermarket

Products & Services for today. Solutions for tomorrow.

KNORR-BREMSE

SHAPING THE CHANGE TOGETHER

Sustainability x Cost Efficiency

Knorr-Bremse's EconX® Genuine Remanufactured brand offers remanufactured vehicle components that ensure older trucks, buses, and trailers remain safe and efficient on the road. EconX® products are as functional as new parts, meeting the same standards as original equipment products. They provide economical repairs for commercial vehicles with limited remaining service life, optimizing total cost of operation by being less expensive to construct due to the use of previously used components.

Remanufacturing is a sustainable practice, saving raw materials and energy, and reducing CO_2 emissions by up to 75% compared to producing new parts. This environmental benefit is confirmed by independent audits. Safety is paramount, and Knorr-Bremse's extensive experience in remanufacturing of more than 10 years ensures the reliability of safety-relevant replacement parts. With over 60 years of expertise and millions of miles of testing, EconX® products offer a trustworthy solution for extending the life of commercial vehicles.

EconX® website

EconX® movie

| truckservices.knorr-bremse.com |

*depending on vehicle application and usage