# informer

AUGUST 2018 – THE CUSTOMER MAGAZINE OF KNORR-BREMSE GROUP RAIL VEHICLE SYSTEMS
EDITION 48

SPOTLIGHT

## Knorr-Bremse at InnoTrans 2018

Interview with Klaus Deller on the mindset for the future

Knorr-Bremse product highlights

Highlights from Knorr-Bremse subsidiaries

CUSTOMERS + PARTNERS

## Connected transport

Digitalization in the freight car sector

KNORR-BREMSE

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Mark Cleobury,
Member of the Executive Board
of Knorr-Bremse Systeme für
Schienenfahrzeuge GmbH

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KNORR-BREMSE'S CUSTOMERS
AND BUSINESS PARTNERS

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KNORR-BREMSE
iFE Innovations For Entrance Systems
merak
Microelettrica Scientifica
PowerTech
Selectron
KiepeElectric
New York Air Brake
Westinghouse platform screen doors
ZELISKO
RAILSERVICES

# Dear Reader,

There's no denying it: Working at the InnoTrans exhibition day after day can be an exhausting experience, with talks, presentations and round-table discussions following on in quick succession. The fact is that even in an era of digital communications, you cannot beat personal, face-to-face contact with customers, business partners and industry experts.

When we sat down to organize our diaries in the run-up to Berlin and to consider how to get the most out of the event, we faced quite a challenge: 41 halls crammed with exhibition booths, 3,500 meters of track, plus some 3,000 exhibitors and visitors from around 160 different countries!

But making choices is something I am happy to do – in fact I welcome the challenge. The string of records that InnoTrans has broken in the last few years says a lot about our industry: In an increasingly networked world, rail remains the main source of transport capacity. Indeed, it is the driving force behind tomorrow's mobility.

As you might expect, we are using this edition of the informer to provide a foretaste of what awaits you in Berlin. 'Systems connection', 'Life-cycle efficiency', 'Transport capacity' and 'Eco-design' are our four main themes – reflecting the essence of Knorr-Bremse's DNA: a commitment to making rail transportation even safer, cleaner and more efficient. We look forward to welcoming you, and are pleased to enclose an entrance ticket to InnoTrans with this edition of the informer.

But though our focus over the next weeks will be on an important event like InnoTrans, the world of Knorr-Bremse has more to offer. For example, this edition of the informer also looks at iCOM – our digital platform for the rail sector. In this context we are currently working with DB Cargo and DB Netz AG to integrate live traffic data into our iCOM Assist/LEADER system. You can also read about the scope for using modern digital applications in 30- to 40-year-old freight cars. And we provide details of a new, customized service concept from RailServices.

We hope you find it an interesting read!

Best regards
Mark Cleobury

news

# The sheer speed is fascinating

Dr. Jonathan Paddison has taken up a management post with Knorr-Bremse Asia Pacific

**Dr. Paddison, you are familiar with Asia, as you have already spent some years working for Knorr-Bremse in Japan. How do you feel about returning to that part of the world?**
Ever since I first traveled in Asia as a student in the late 1980s, I have been fascinated by the various Asian cultures. For example I find it really interesting how different cultures shape and influence the way people find technical solutions to problems. Asia – in particular Japan – has become a sort of second home for me after Germany. I can already speak some Japanese, and in Hong Kong I would like to expand my skills.

**What makes the rail market in Asia so special?**
Asia is set to remain one of the drivers of the global economy for the foreseeable future. Because the infrastructure has to keep pace with this development, the countries of Asia are significantly expanding their rail networks. The sheer speed is fascinating: Things that sometimes take decades in Europe can be implemented within a matter of years, particularly in China. Asia is also open to innovative solutions – and that is an opportunity for Knorr-Bremse.

**As a member of top management you will be directly involved from your base in Hong Kong in determining Knorr-Bremse's approach to the Asian market. What will your main focus be?**
I see myself as a bridge-builder between Europe and Asia, for example when it comes to transferring processes, managing customers or networking within our company. There will undoubtedly be a focus on further expanding our on-board business and on integrating Kiepe Electric's expertise into the Knorr-Bremse Group. And above all, of course, it will be important to expand our familiar strengths: outstanding expertise and competence in local markets, customer proximity and excellent localization skills.

## Low-noise freight trains

3,700 out of 33,000 kilometers of railway lines in Germany are considered to be particularly noise-sensitive. These include, for example, those in the Middle Rhine Valley, the Upper Elbe Valley, and the Inn Valley in Bavaria. In order to reduce noise, freight cars are now being equipped with new brake blocks made of composite materials rather than conventional gray cast iron. The new blocks are less abrasive on both wheels and rails – and thus reduce rolling noise.

Retrofitting of the blocks is proceeding smoothly. At their conference in June, German private railway companies announced that over 70% of freight cars had already been modified. The law requires all freight cars operating in Germany to undergo conversion by the end of 2020. There is considerable evidence to suggest that similar regulations will follow in other European countries.

Low-noise organic brake pads are available from Knorr-Bremse both as original equipment and for retrofitting. Thanks to the appropriate manufacturing capacities, many projects have already been successfully completed – including those with VTG and DB Cargo.


Frank Junghans, Vice President RailServices Germany (l.), Holger Berg, Head of Department RailServices (r.)

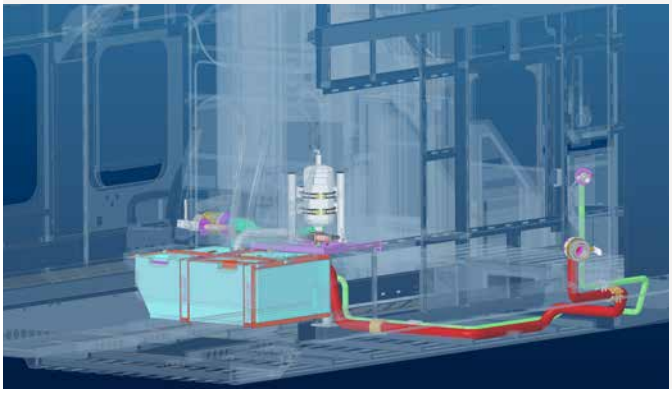
## Closed-circuit toilet system

**Knorr-Bremse RailServices is upgrading the toilet systems on 972 Vivalto double-decker passenger cars (Hitachi) and 204 CTR Minuetto trains (Alstom).**

In one of the Italian regional rail industry's biggest ever upgrade projects, operator Trenitalia is having its regional fleet fitted with new closed-circuit toilet systems in response to increased environmental awareness. Developed by Knorr-Bremse RailServices Engineering in collaboration with vehicle builders Hitachi and Alstom, the systems are being supplied by RailServices, who are also responsible for their installation.

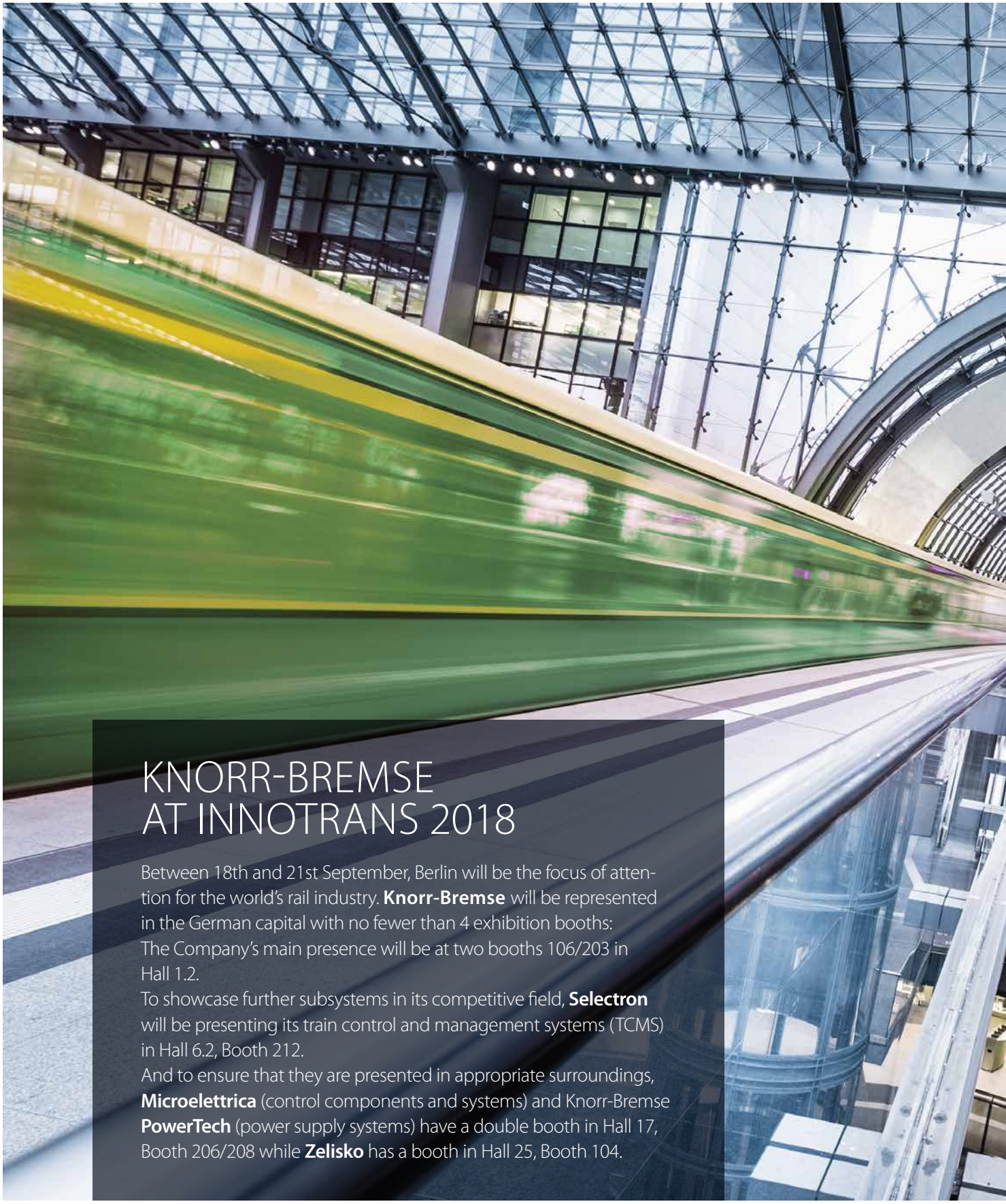
Although it has been considerably enlarged, the waste retention tank – and associated piping – at the heart of the new system is designed to fit into the same installation space as before. The tank is accessible from either side of the train, thus speeding up and simplifying the emptying process during short station stops.

To ensure the fleets will be equipped as soon as possible to a consistently high standard, a rapid implementation plan has been drawn up by the operator. Following delivery of the first upgraded prototypes at the end of 2017, the full project was launched early the following year. Some 200 cars equipped with the new system are currently in operation, with the upgrade of the CTRs due for completion in March 2019, followed by the Vivaltos in September of the same year.



Vivalto coaches, new closed circuit waste water system

# spotlight



## KNORR-BREMSE AT INNOTRANS 2018

Between 18th and 21st September, Berlin will be the focus of attention for the world's rail industry. **Knorr-Bremse** will be represented in the German capital with no fewer than 4 exhibition booths:
The Company's main presence will be at two booths 106/203 in Hall 1.2.
To showcase further subsystems in its competitive field, **Selectron** will be presenting its train control and management systems (TCMS) in Hall 6.2, Booth 212.
And to ensure that they are presented in appropriate surroundings, **Microelettrica** (control components and systems) and Knorr-Bremse **PowerTech** (power supply systems) have a double booth in Hall 17, Booth 206/208 while **Zelisko** has a booth in Hall 25, Booth 104.


Zelisko
Hall 25, Booth 104
Microelettrica & PowerTech
Hall 17, Booth 206/208
Central Knorr-Bremse booths
Hall 1.2, Booth 106/203
Selectron
Hall 6.2, Booth 212
Messedamm
Masurenallee
Neue Kantstraße
Jaffestraße
Palais
Sommergarten
Bus Display
Messe Berlin
Messedamm
Axus
Stadtautobahn

**Klaus Deller** has been Chairman of the Executive Board of Knorr-Bremse AG since 2015 and is also responsible for the Rail Vehicle Systems division. He served as Deputy Chief Executive of Brose Fahrzeugteile GmbH from 2006 until 2009, when he joined the Knorr-Bremse Group as Member of the Executive Board responsible for the Commercial Vehicle Systems division. Deller had previously worked at Robert Bosch. He holds a degree in mechanical engineering, an MSc in mechanical engineering and applied mathematics from the McCormick School of Engineering & Applied Science, and an MBA from J. L. Kellogg Graduate School of Management Northwestern University.

# Mindset for the future

Knorr-Bremse's slogan for InnoTrans 2018 is "Systems.People.xConnected". In this interview, Chairman of the Executive Board of Knorr-Bremse, Klaus Deller, explains why it is more than just a slogan.

**Mr. Deller, can you give us a snapshot of what Knorr-Bremse expects for the future of rail transportation?**
Tomorrow's rail vehicles will still look familiar to us – at least on the outside. On the inside, however, they are undergoing a profound transformation. Digital solutions are fundamentally changing the way rail vehicles operate, bringing the same kind of improvements that are already making our everyday lives so much easier. InnoTrans will give us an indication of the opportunities they could create in the mobility and logistics sector.

**Your slogan for Berlin is "Systems.People.xConnected". What is the idea behind it?**
Urbanization and digitalization are the two megatrends of our time. This means that systems electrification and connectivity are at the heart of the latest developments in the rail industry. At InnoTrans, we are focusing on the human and business aspects as well as the technological dimension. Customers, passengers and a coherent environmental and social responsibility agenda will all be explicitly addressed.

**Could you be more specific?**
Our key themes at InnoTrans are systems connection, life-cycle efficiency, transport capacity and ecodesign. Systems connection refers to vehicle sub-system connectivity. It includes products such as iCOM, our digital platform for the rail industry. Life-cycle efficiency focuses on the potential savings delivered by modular products, longer maintenance intervals and our vehicle modernization solutions. Under the heading of transport capacity, we are going to show how our faster and larger entrance systems and more efficient braking systems make it possible for trains to run more frequently – or how vehicle weight reduction allows more passengers and freight to be transported.

We are implementing intelligent solutions to reduce $CO_2$ and noise emissions, both during the operation of our products and systems and in the manufacturing process. These topics are addressed under the heading of ecodesign. As you can see, "Systems.People.xConnected" is much more than just a trade fair slogan. It is an expression of our mindset as we seek to shape the future of mobility.

spotlight

# Knorr-Bremse product highlights

A brake control system with enhanced functionality, a new system for integrating hydraulic braking systems, new and improved magnetic track brake products, innovative noise insulation for sliding doors, four new friction technology products and the recently designed KEf distributor valve. Here come Knorr-Bremse's product highlights at InnoTrans 2018:


Central Group presence in Hall 1.2, Booth 106/203

# EP2002 3.0 Distributed Brake Control – Evolution of a Success Story

**Knorr-Bremse extends the top-selling Metro Brake Control System with innovative features for use in multiple unit trains**

The market launch of the distributed EP2002 Brake Control System, developed by Knorr-Bremse 15 years ago, fundamentally changed the way rail vehicles are braked. With the EP2002, Knorr-Bremse had developed a genuine mechatronic brake control system featuring seamless interaction of electronics, software and pneumatics in a single unit with a standardized, compact and modular design. The EP2002 was the first brake control system to distribute the braking power across the whole train.

Today, more than 25,000 rail vehicles are equipped with EP2002 technology – from busy metros to monorails to driverless systems. Building on this overwhelming field experience, the successor, the EP2002 3.0, will be launched at InnoTrans 2018. Knorr-Bremse's latest system sets a new global standard in brake control, offering customers groundbreaking, innovative functionality, lower life-cycle costs and a wider range of applications, for example in multiple units.

The EP2002 3.0 is based on the same proven principles and compact, light and robust architecture as the EP2002. However, for the first time the EP2002 3.0 delivers new functionalities such as Electronically Controlled Emergency Brake and Deceleration Control. With the EP2002 3.0, the optimized wheel slide protection system MGS3 designed for very low-adhesion situations is available for the first time for metros and multiple-unit trains. Additional enhancements have been achieved through the integration of the indirect brake, an extended low temperature range and optimized train-wide braking performance.


New EP2002 3.0 brake control unit

# Intelligent electrohydraulic i3HU supply and control unit

**Knorr-Bremse has significantly improved the integration of hydraulic braking systems in light rail vehicles with an innovative system**

INTELLIGENT ELECTROHYDRAULIC I3HU SUPPLY AND CONTROL UNIT

The comparatively small installation space in light rail vehicles makes integration of braking systems a challenge. But help is at hand thanks to the intelligent i3HU electrohydraulic supply and control unit.

When the driver activates the brake, the command is processed by the electronic brake control unit to calculate the correct brake pressure, under consideration of additional parameters such as vehicle load. The electrical control of the components in the hydraulic unit determines the appropriate hydraulic pressure for activating the brake calipers in order to decelerate the vehicle. With the i3HU, the electronic brake control is now integrated into the hydraulic unit, which – depending on the application scenario – is modular and expandable. A module for wheel slide protection with incorporation of speed sensor readings, and a further module to increase hydraulic performance, are currently at the planning stage.

The entire system can be linked via a single standardized electric interface to the train control management system. This development significantly reduces the amount of wiring work necessary in the vehicle, since the same basic devices can be used for different applications with both running and powered bogies. A further benefit is that the integrated system allows data storage to be bogie-oriented as opposed to vehicle-based as previously. Depending on the specific load, this facilitates much more target-oriented maintenance of braking equipment.

In future there will also be a remote-controlled emergency mechanical release as an additional feature for spring-applied compact brake calipers – ideal for installation situations where actuators are difficult to access. As a comfort function, Knorr-Bremse is introducing a highly space-saving level regulation cylinder: This is integrated into the steel springs of the secondary spring modules and facilitates height adjustment between the railcar body and the platform.

# Friction Technologies

**As a systems and full-range friction supplier, Knorr-Bremse designs ideal friction pairings for specific projects**

PROBLOCK UIC AND AAR

Optimum performance, endurance and costs are only possible with the perfect combination of braking system, blending and friction material. As a systems supplier and a supplier of a comprehensive friction product portfolio, Knorr-Bremse is able to develop the most suitable friction pairing for any project-specific application – and for all railway standards worldwide. Knorr-Bremse now groups the individual product technologies – sintered and organic, pads and blocks – into its three new "Friction Technologies" product ranges: Propad, Problock and Optipad. The suffix -pad stands for brake pads, -block for brake blocks. The prefix Opti- signifies a sintered basis and Pro- refers to an organic base material.

Consequently, Knorr-Bremse markets its organic brake pads under the name Propad. In addition to the standard forms, they are also available for use in hydraulic braking systems. The Problock range comprises the organic brake block portfolio, with its characteristic "low-wear" and "low-noise" attributes. Optipads include the high-performance sintered pads, such as the high-temperature ISOBAR® brake pad and Flexpad.

# Innovative electromagnetic track brake

**New GRIP and enhanced MORE magnets with next-generation electromagnetic track brake control system**

ELECTROMAGNETIC TRACK BRAKE
FOR LIGHT RAIL VEHICLES

The GRIP Magnet, a new electromagnetic track brake for standard-gauge, light rail and metro applications, is about to go into series production. In comparison with its predecessor, this standard delivers up to 10% additional braking performance. Our engineers have developed a weight-reduced GRIP variant for installation on modern internally supported bogie equipment. The new customer-friendly cable connection system and the easy-to-service friction elements meet the operators' demands for life-cycle costs to be as low as possible.

The new iRCB track brake control system combines Knorr-Bremse functions from the current MMBC control system with significantly more modular hardware. The result is a flexible concept for a variety of vehicle configurations. An additional new feature is the support of condition-based maintenance concepts for the magnets. As a result, better use can be made of the remaining service life and components can be scheduled for maintenance on a more plannable basis.

Thanks to its extremely low installation height, the MORE Magnet is particularly well suited for compact bogie equipment in low-floor streetcars. Knorr-Bremse has chosen InnoTrans 2018 as the date for the launch of the enhanced concept: The combination of higher braking power and reduced mass produces an improved level of performance, while more service-friendly cable connections and easier-to-replace wearing parts simplify maintenance.

# KEf brake distributor valve

**After selling more than 1.5 million KE distributor valves, Knorr-Bremse has reengineered its number-one distributor valve from the ground up**

NEW KEf
DISTRIBUTOR VALVE

As a result of continuous development of the KE valve launched in 1953 – not to mention the introduction of new technical standards – there are now approximately 500 variants of the KE valve, plus countless components. The number of different variants made overhauls more time-consuming and further development more and more complex. Now Knorr-Bremse has set about tackling development of the new KEf distributor valve with a clear concept. Thanks to a carefully conceived, universal common parts strategy, the KEf flexibly meets the requirements of a wide range of vehicle types with just one distributor valve and a handful of single-stage, two-stage and load-dependent relay valve variants.

Instead of the former solid sand cast design, the KEf will now be made from weight-saving, hot-pressed aluminum parts. Whereas formerly the pilot volumes of the distributor and relay valves used up a lot of space and material in cast housings, this installation space is now integrated in the carrier. This means the valve has a much more compact design than its predecessor. Even the standard construction can be mounted into low-floor installation spaces without special adaptation. The advantages are evident in service and daily operation. Maintenance is simple thanks to innovative interfaces; for example, the KEf or the relay valves can easily be exchanged for maintenance without removing the carrier from the vehicle. The KEf interfaces are of course also designed with the requirements of future rail transportation applications in mind.

Microelettrica Scientifica

## Fully integrated power electrics

**The 'Microbox' integrates switches, circuit breakers and contactors into a ready-to-use unit.**

In response to the increasing demands of fully integrated power electrics on rail vehicles, Microelettrica has introduced its latest family of on-board switchgear in the form of the 'Microbox'. Depending on the application involved, the 'Microbox' combines switches, circuit breakers and contactors in a single roof- or underfloor mounted unit, reducing the technical layout requirements for vehicle builders at the project stage. The system is designed to offer maximum connectivity with other vehicle sub-systems. An inno-vative case design is also planned to reduce time to market and production costs.

As well as presenting the 'Microbox' in **Hall 17, Booth 206**, Microelettrica is also showcasing a wide cross section of its portfolio of electronic and electro-mechanical control components for rail vehicle applications.

POWERTECH

## Smaller, lighter and highly efficient

**Knorr-Bremse PowerTech sets new standards for power supply in rail vehicles**

Knorr-Bremse PowerTech is presenting its new generation of on-board auxiliary power converters "PowerBriX" at its own booth in **Hall 17, Booth 208** as well as in **Hall 1.2, Booth 106**. The converters feature state-of-the-art silicon carbide (SiC) power semiconductors that enable higher switching frequencies and a significant reduction in weight and volume. Power density increases up to 50% compared with previous converter generations based on conventional silicon semiconductors. PowerTech has deployed this technology for the first time in the 55 kVA power class, ideal for use in light rail vehicles and metros. The basis of the PowerBriX product family is a newly developed modular system that uses type-tested standard modules, which can be flexibly and scalably combined. As a result, the customer benefits from significantly reduced application efforts. The combination of effective standardization, modular and highly compact design also increases the overall system efficiency of the auxiliary power supply system and contributes to sustainable resource use throughout the life cycle.

In addition to the first PowerBriX application, Knorr-Bremse PowerTech in **Hall 17, Booth 208** will also be showcasing a new battery energy management system that is the first of its kind to bring together battery charger, vehicle battery and DC power supply in a single, efficient system. Combining these elements into a plug-and-play system considerably simplifies the formerly complex vehicle integration process for customers. Another highlight on display: the solution for decentralized power supply "LITE" that delivers significant improvements in terms of energy efficiency and uptime.


Joint booth for PowerTech and Microelettrica in Hall 17, Booth 206/208

## Highly flexible control families

**New vehicle control unit family and sub-system controllers**

The new **CPU94x** vehicle control unit family from Knorr-Bremse company Selectron Systems features a completely new control concept for rail vehicles. For the first time, it allows several independent, user-programmable controllers (PLCs) – for example TCMS, brake and diagnostics – to be bundled in a single, certified vehicle control unit. This means that safety-critical and non-safety-critical applications can be clearly separated from each other. As well as delivering enhanced performance, this new concept also streamlines the homologation process. Selectron's new Smartio® sub-system controller family adds a SIL0/SIL2 solution to its established Smartio® I/O system for vehicle control unit signal conditioning. The controllers have been developed to meet the highest cybersecurity standards (IEC 62443).

Also on show in **Hall 6.2, Booth 212** is Selectron's Ethernet technology, featuring new, IEC 61375-compliant switches and routers. This technology responds to the heightened security and safety requirements for vehicles, wireless data transmission and diagnostics data.

## High-visibility signals

**Cutting-edge technology from Zelisko for level crossing safety and signaling systems**

An efficient railroad system has to rely on an infrastructure offering optimum levels of safety. In this context, systems and solutions from Knorr-Bremse's Austrian subsidiary, Zelisko, play a central role. A cross section of its portfolio is showcased in **Hall 25, Booth 104**, including the RBÜT computer-controlled level crossing safety system – a fully electronic system that protects level crossings with ultra-safe signaling technology. Also on display is the ZFWS100 remote control used for controlling safety systems like the RBÜT. Further Zelisko exhibits include the company's entire LED-Signal EU trackside signal range, complete with project-specific developments. All these products offer a high level of visibility and maximum operational safety on main and branch lines all over the world.

Other products on display are a barrier drive system and the Modular Magnetic Track Brake Control (MMBC) system, which can be found in operation on the Austrian Railways (ÖBB) Railjet train. This enables the magnetic brake to be fully taken into account during automatic brake testing.


Selectron is presenting its train control systems in Hall 6.2c, Booth 212


Zelisko is exhibiting in Hall 25, Booth 104

IFE Innovations For Entrance Systems

## New sealing system

**IFE enhances passenger compartment comfort**
IFE, the global market leader for rail vehicle entrance systems, is presenting a world first in **Hall 1.2, Booth 106/203**: a sliding door sealing system with improved acoustic insulation that significantly enhances passenger comfort. Conventional seals only seal the doors' front and rear edges, not the guides at the top and bottom. IFE has solved this issue by integrating a lifting mechanism into the standard closing operation. The mechanism raises the door leaf shortly before locking so that the top and bottom edges are sealed.

This has added benefits in summer and in winter, as it reduces the amount of hot or cold air forced into the vehicle by the headwind. At InnoTrans, IFE will be showcasing the sealing system as part of the S4 entrance system display.

Other products being presented by IFE include its innovative FLEX Nano door control unit and a new finger protection rubber that detects people or objects caught in the doors during boarding or alighting. When the system is triggered, it interrupts the start-up sequence, preventing the vehicle from setting off and thus improving passenger safety.

IFE InnoTrans exhibit, with Smart Slide entrance system, obstacle detection and FLEX Nano DCU

KIEPE ELECTRIC

## Integrated systems

**Kiepe Electric presents roof equipment container and driver's cab HVAC unit**
Kiepe Electric's new roof equipment container brings the almost complete electrification of mass transit a step closer, perfectly integrating traction, on-board power supply and control technology in a single system. The extremely low profile of the container, on display in **Hall 1.2, Booth 106/203**, allows vehicle manufacturers to save space by installing it on the vehicle's roof.

Kiepe Electric is also showcasing a driver's cab HVAC unit, as used in the Sofia metro, for example. The unit impresses with its low installation height, high energy efficiency and extremely quiet operation thanks to a built-in silencer. Other key features include damper actuators that reset automatically and an integrated exhaust air unit. The devices communicate with the vehicle bus via the redeveloped MVB-M, making them easily interchangeable throughout the train. Diagnostics are performed via Ethernet using software that meets today's higher IT security requirements.

Kiepe DGG 500 power converter series
Integrated traction and on-board power supply system with standardized design for streetcar and LRV applications

## Ecology meets efficiency

**Knorr-Bremse's air conditioning brands, Merak and Kiepe Electric, demonstrate tomorrow's technologies**

In **Hall 1.2, Booth 106/203**, Knorr-Bremse's subsidiary Merak is showcasing its approach to the HVAC systems of the future, using an air-conditioning demonstrator that brings together samples of the relevant technological concepts. These are based on rigorous benchmarking and a sophisticated function-based system design that Merak has used to increase efficiency compared with other currently available products. Total cost of ownership is central to this design approach, which uses a toolset to minimize the engineering effort and risk, as well as the weight of the HVAC unit. Innovations reduce energy consumption, $CO_2$ emissions and preventive maintenance tasks.

Also on display is a new, ultra-low-maintenance filter offering superior life-cycle efficiency, which reduces maintenance needs whilst at the same time improving HVAC efficiency (energy reduction) and sustainability (less waste).

Innovation also extends to the field of eco-design, where conventional refrigerants can be replaced by $CO_2$, which is natural and considerably more eco-friendly but still offers a comparable performance under normal central European operating conditions.

Merak displayed its first $CO_2$ unit in 2010, and in 2016 Kiepe Electric delivered such units for trial operation with DB Regio. The next step will be implementation for other railway applications.

## Full service portfolio

**New life for legacy rolling stock – and the digital platform for the railway industry**

In **Hall 1.2, Booth 106/203**, RailServices – the brand name for Knorr-Bremse's service offer – is displaying a comprehensive cross section of its full service portfolio. Under the motto of "Be the ONE for us", the focus is on the customer: Troubleshooting, efficient original spare parts management, active service organization or proactive wear management – when it comes to innovative solutions that ensure high levels of vehicle availability and minimize life-cycle costs, RailServices offers one-stop service solutions..

Further areas of focus at this year's InnoTrans are iCOM, the digital platform for the railway industry, and the outstanding modernization solutions offered by RailServices. Currently the only state-of-the-art open platform in the rail sector, iCOM provides the basis for a wide range of applications including on-board monitoring of the train and its components, energy-efficient, punctual driving, and real-time energy consumption calculation.

For modernization projects, RailServices offers innovative new products and component upgrades as well as complete system modernization. Depending on the particular project, a dedicated modernization team can draw on the expertise of the various Knorr-Bremse product groups for support. This results in highly customer-specific solutions – showcased by RailServices at **Booth 106/203**.

Low-profile metro HVAC unit with integrated inverter SRC35/28e

Door modernization in India

customers + partners

# More locomotives, more functionalities

The driver assistance system LEADER/iCOM Assist has been in service in DB Cargo locomotives since October 2016. Not only is the operator now introducing additional functionalities to the systems in use, it is also taking up the option of equipping a further 350 locomotives.

In early summer, 300 DB Cargo locomotives were equipped with the LEADER/iCOM Assist driver assistance system – 145 locomotives from the 152 series, 91 locomotives from the 185 series and 64 locomotives from the 145 series. The system was deliberately not installed in a number of locomotives; these can to be used for comparative purposes to measure the resulting energy savings.

Figures for the first two years of service show that for journeys under the right conditions, on appropriate routes and with the right degree of utilized capacity – and with the motivation and acceptance of locomotive drivers – energy savings of eight to ten percent are entirely possible. Average savings range between three and five percent. "That's a lot," explains Eva Lohmeier, the project manager at Knorr-Bremse RailServices responsible for introducing the driver assistance system with DB Cargo. "Especially because the system really only gives recommendations to locomotive drivers for immediate potential efficient operation, with no active intervention in locomotive control." In addition to analog reduction in $CO_2$ emissions, the three- to five-percent cut in energy consumption also represents a three- to five-percent reduction in energy costs. DB Cargo is now committed to further improving these values.

**Integration of network and infrastructure operator data**

There is significant leverage in this regard through overall optimization of network capacity and the attention paid to network and infrastructure data provided by DB Netz AG. DB Netz AG is also already developing interfaces for driver assistance systems. The operator has just taken a first step in this direction with a new functionality: Locomotive drivers are now able to adapt the system manually and proactively to current operating situations. Where they have information about faster trains coming up behind, for example, they can shorten their journey time – i.e. the time available to the system for optimization. And if they make up time on trains ahead, they can intentionally lengthen their journey time.

The goal is always to maintain as consistent a speed as possible. "If you bring a 4,000-tonne train to a halt and then get it back up to speed a few minutes later, that requires a huge amount of energy," Lohmeier explains. The new functionality has been active since late May. "We have received very positive feedback for the adaptations," says Niels Weigelt, project leader LEADER/iCOM Assist at DB Cargo.

The next development phase is due to follow in the course of this year. This will integrate driver recommendations calculated on the basis of live data provided by DB Netz AG. What locomotive drivers have been able to incorporate into LEADER/iCOM Assist calculations manually since May will then also take place based on actual traffic in the immediate vicinity. There are no concerns that locomotive drivers may be distracted by a constant increase in driving recommendations. "In normal traffic situations, we currently expect one or two additional recommendations from DB Netz per 100 kilometers," says Mr. Weigelt.

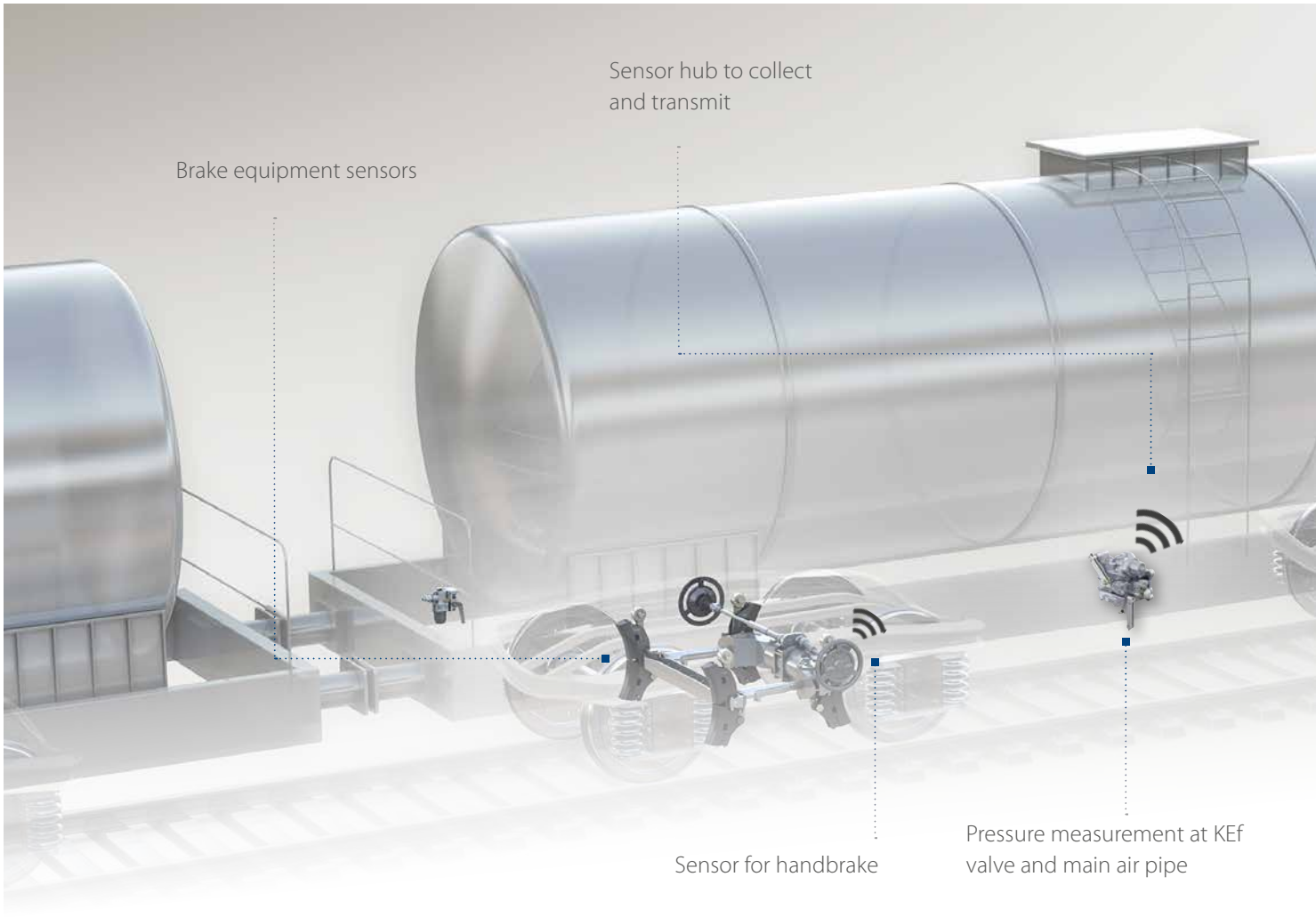
**Cross-border use planned**

In collaboration with Knorr-Bremse, DB Cargo has established what is the first and so far the only driver assistance system for the freight sector in Europe. At the same time as equipping further locomotives and implementing new functionalities, DB Cargo is also working on geographically expanding the system. LEADER will also be available for use in internationally operating locomotives in the future. Knorr-Bremse is currently working on incorporating data from European infrastructure operators with a view to introducing the system on a pan-European basis.

▲ Engineering team
Knorr-Bremse LEADER/iCOM Assist in Budapest


© DB Cargo AG, Steffen Levie

User interface of the driver assistance system LEADER DB Cargo in the locomotive



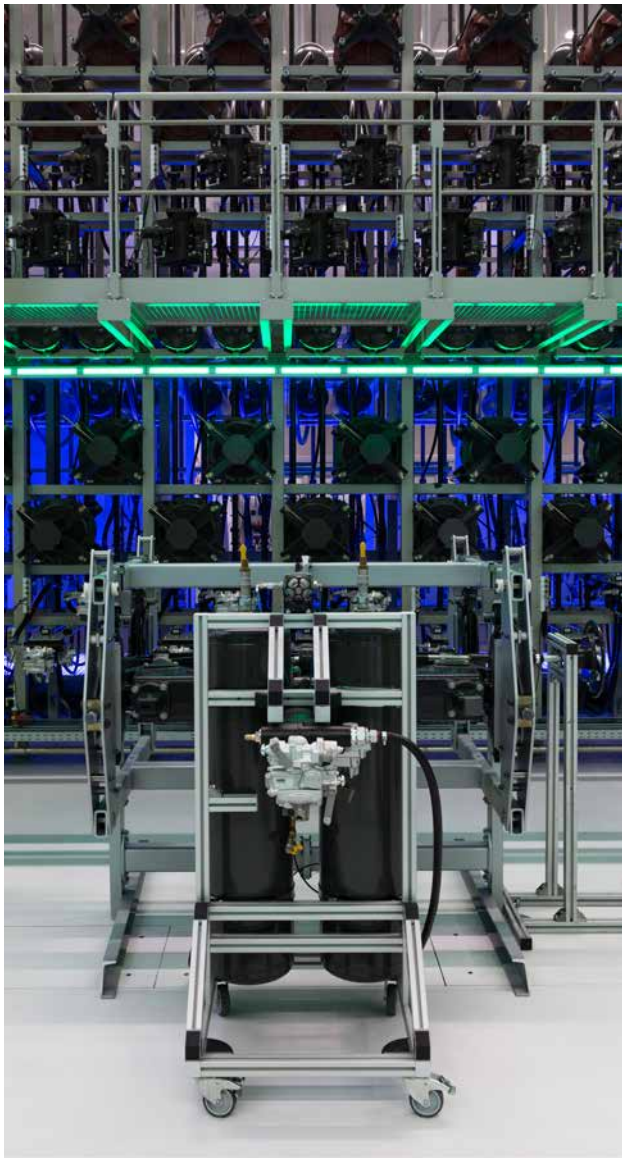

# Connected transport in the freight cars area

The digitalization process doesn't stop with freight cars. Knorr-Bremse is among the leaders when it comes to generating concepts for the future – and is already working on a demonstrator.

Freight cars run in analog mode. At one time this notion was as certain as the stop signal on an occupied line. But where market constraints and practical solutions collide, old certainties come into question. Efficiency in the transport chain on roads has been improved by digital logistics concepts and the extensive use of telematics. So in order to remain competitive and shift the "modal split" in its favor, rail transportation has to come up with something new. At the same time, digitalization has shifted closer to widespread use in freight cars.

Sensors on bogie and car body for wagon and track monitoring

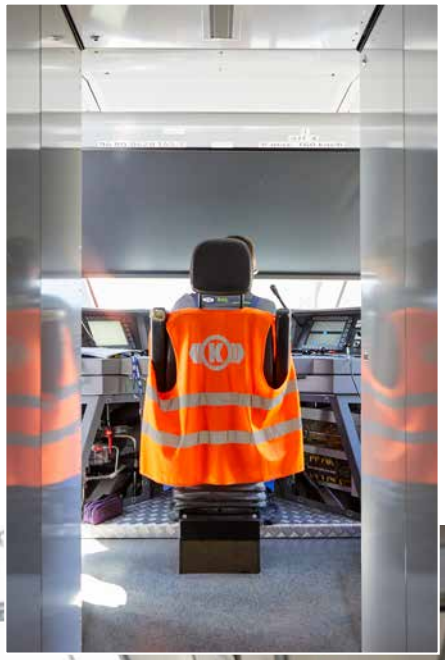
Demonstrator for digitalization concepts for freight cars



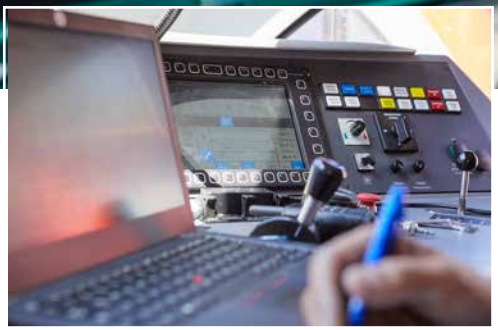
**Automated brake testing and coupling and automated marshaling**

Nevertheless, it is a complex matter. "If we want to integrate modern telematics applications with the aim of creating transparency throughout supply chains, they will have to be as compatible with 30- or 40-year-old cars as with new ones," explains Istvan Hegedus (Director Freight Car Business Segment Europe). "What's more, freight car owners, who are responsible for bearing the brunt of the investments, cannot avail themselves of all the technological benefits.

Here, ways and means have to be found to ensure that the initial investments pay off from the perspective of the freight car owners, too. As an established systems manufacturer, Knorr-Bremse can in any case make a crucial contribution to automating the operating processes: With the KEf, all braking system pressuresare available centrally.



Thomas Thiele (l.) and Michael Obermaier on the roof of a FLIRT preparing the complete compressor housing for replacement



Checking the key brake system status data

Reading the measured values

# The full package

Now that's what you call full service. Rail operator VIAS has contracted Knorr-Bremse RailServices to carry out the major brake servicing for 19 regional trains and all legally required parts replacement in VIAS' own workshop.

High up on the roof of the train, secured by ropes and harnesses, Knorr-Bremse service engineers Thomas Thiele and Michael Obermaier are getting ready to replace a compressor housing. In a moment, the overhead crane will lift off the old compressor and deposit it on the workshop floor, where a replacement unit is already waiting. The two men work like a well-oiled machine – this isn't the first time they've done this. They are experienced specialists who have both been with Knorr-Bremse for some 20 years and form part of a dedicated five-man team. "Our job," says Thomas Thiele, "is to carry out the full braking system servicing for VIAS at their Frankfurt am Main workshop and replace all the parts that are required to be replaced by law."

According to project sales manager Martin Glossner, this is a very special job for RailServices. "Our customers normally carry out major servicing themselves or have it done in an external workshop." But VIAS decided to bring in RailServices experts to its own workshop to carry out the brake servicing of its 19-strong fleet of FLIRT electric multiple units. A concept to ensure that the work is carried out in accordance with the relevant regulations was developed in close cooperation with VIAS. Since the operator is officially responsible for the vehicles' maintenance, it is they who determine the extent and documentation of all maintenance work.

**Overhaul of all 19 FLIRTs due to be completed by early 2019**

VIAS Managing Director Franz Reh believes that this approach has clear benefits. "We need extra personnel to carry out our vehicles' heavy-duty maintenance, but only for a limited period of time. By doing it this way, we avoid having to recruit new personnel of our own." Quality was also a factor. "Experienced employees from the braking system manufacturers obviously know the systems inside out and are much better at dealing with unforeseen problems."

The head of Knorr-Bremse's on-site service team, Christian Baar, highlights an added benefit. "We're fast. Everything is wrapped up within five days. We report to the workshop manager on the Monday morning and officially take charge of the train." It could take as long as three weeks to carry out a major braking system service in an external workshop because of the need to transfer the vehicle and all the other bits and pieces. This is far from ideal for a regional operator where every single train counts. The project started in fall 2017. All 19 trains in VIAS's FLIRT fleet should be completed by early 2019.

Baar hangs his hi-vis jacket over the back of the driver's seat and connects his laptop to the braking system. "The first thing I do is to see if we can detect any damage or faults before we start. The pressure sensors report any values outside the tolerance range." Then it's straight down to work. All manner of parts have to be replaced – on top of, inside and under the train. He opens a large service hatch on the vehicle.

"A lot of safety-critical components are hidden away in here: the complete EP Compact brake control units and all the safety and single check valves," explains Baar. "The hatches in the floor also provide access to the wheel slide protection valves, the train's ABS." The team meticulously remove the old parts and install the reconditioned ones. As they start their work, the new parts are already waiting for them in three well-filled mesh crates alongside the new compressor housing.

**Operator full of praise for Knorr-Bremse team's consistently high standards**

The planning and logistics for the VIAS project are carried out by the Munich field service team in close coordination with the Berlin service center. They strive to make sure that everything is as well prepared as possible on site. The Berlin service center puts the "replacement part kit" together using parts that have been remanufactured at the center. The list of individual items runs to a full ten pages. The old parts removed from the train are sent back to Berlin for reconditioning.

On the Friday, Christian Baar slickly runs through the procedure for returning the serviced vehicle. "We present VIAS with a thick folder containing details of all the tests we have carried out, for instance sand measurement protocols and brake pad protocols, who changed which parts, and all the relevant serial numbers." Once everything has been signed off by a VIAS colleague, the service is complete. "It was a big job," says Michael Obermaier. Like the rest of the team, he is looking forward to getting back home to his family. "The main thing is that the customer is happy."

And he certainly is. VIAS Managing Director Franz Reh is full of praise. "We can't speak too highly of the Knorr-Bremse team's consistently high standards. That is a key success factor. What we have here is a service project that delivers in terms of time, cost and quality. Not many people in our industry can say that."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