Press release
Munich, December 06, 2021

Digitalization: Knorr-Bremse wins contract for extensive remote condition monitoring of climate control systems on UK train fleets

- **Siemens Mobility has awarded Knorr-Bremse a contract for the remote condition monitoring of heating, ventilation and air conditioning systems (HVAC) on large regional train fleets in the UK**
- **This is the first time anywhere in the world that a leading systems supplier has cooperated with a major vehicle manufacturer to provide remote condition monitoring of HVAC systems**
- **Knorr-Bremse will be responsible for the upgrading and monitoring of 733 HVAC systems installed on 172 Class 444 and Class 450 multiple units**
- **By modifying the HVAC equipment and enabling big data insights, Knorr-Bremse will help to optimize fleet maintenance, reduce the trains' energy consumption and thereby support the wider decarbonization agenda**
- **As a pioneer of remote condition monitoring, Knorr-Bremse will add its solution to Siemens Mobility's Railigent® open ecosystem and the Railigent® application suite, thereby bringing an important new dimension to the long-lasting relationship with Siemens Mobility**

Munich, December 06, 2021 – Knorr-Bremse, the global market leader for braking systems and other rail and commercial vehicle systems, has been awarded a major, long-term remote condition monitoring contract by Siemens Mobility. As Knorr-Bremse is systematically building its expertise in the field of digital Maintenance-as-a-Service (MaaS) for the rail industry, the company will be responsible for providing remote condition monitoring of the HVAC systems on 172 trains built and maintained by Siemens Mobility for UK operator South Western Railway. The upgrading and modernization of the HVAC systems has commenced in 2021 and is scheduled for completion in Q1 2022, so that the new solution can go live in spring of the same year.

Dr. Jürgen Wilder, Member of the Executive Board of Knorr-Bremse AG and responsible for the Rail Vehicle Systems division, explains the order's significance: "The rail industry has huge untapped potential for digitalization due to factors such as high security standards, substantial investment requirements, and the need to become even more efficient. Against this backdrop, we are systematically continuing to develop Knorr-Bremse into a digital systems supplier, and to expand our portfolio of remote condition monitoring solutions. Therefore, we are delighted to have established this digital partnership with Siemens Mobility. The contract is a first for the rail industry, and will help the operator to offer its passengers an even more sustainable, affordable and modern rail service."

Dr. Nicolas Lange, Chairman of the Management Board of Knorr-Bremse Rail Vehicle Systems, expands on these comments: "We are delighted to have signed this important contract, which further strengthens our partnership with Siemens Mobility in the field of digital services. By upgrading several large passenger train fleets with our remote condition monitoring solutions, we are helping to bring them into the digital age. Big data insights and new CO_2 sensors will help to optimize fleet maintenance costs, reduce the trains' energy consumption and control the flow of fresh air into the passenger compartments even more precisely."

Delivering operational optimizations and saving energy with smart data analytics
In 2021, Knorr-Bremse has started upgrading a total of 733 HVAC systems on 172 trains with its digital remote condition monitoring solution, enhancing Siemens Mobility's condition based

maintenance (CBM) capability. The fleets comprise 45 five-car Class 444 and 127 four-car Class 450 regional trains. The original HVAC systems were made by Merak, Knorr-Bremse's global subsidiary for climate control solutions for trains. The upgrade will allow them to capture large quantities of operating data that will then be intelligently analyzed by Knorr-Bremse via the cloud.

The resulting big data insights will enable end-to-end system monitoring, allowing Siemens Mobility's maintenance teams to spot early indications that something may need repairing and proactively make the relevant repairs. In turn, this will help to ensure availability by reducing train downtime and depot turnaround times. All the HVAC systems will also be fitted with CO_2 sensors, allowing them to measure air quality and increase the intake of fresh air as and when required. Because fresh air often has to be cooled or heated, continuously adjusting the fresh air intake to current requirements helps to reduce energy consumption, further improving the trains' overall environmental footprint.

The partnership adds an important new dimension to the long-standing relationship between Knorr-Bremse RailServices and Siemens Mobility's Rail Service unit. Specific cooperation on maintenance projects began four years ago with a multiple friction material order. The relationship was strengthened one year later by a bundled service agreement for the entire braking system covering several countries. It was further consolidated by an agreement to cooperate on Siemens Mobility's Railigent® application suite. As part of the latest project, Knorr-Bremse will add its remote condition monitoring solution to the Railigent® open ecosystem, and thereby create considerable value to optimize rail maintenance and operations.

The new aftermarket contract is another digital maintenance project that Knorr-Bremse has helped to kick off this year. In early 2021, the Company announced a multiannual cooperation agreement with Deutsche Bahn on the intelligent use of vehicle data for condition-based maintenance of components such as entrance systems.

Caption 1: Knorr-Bremse will support Siemens Mobility with remote condition monitoring for climate control systems installed in train fleets in the UK. The Siemens Mobility depot in Southampton plays a central role in the project. | © Siemens Mobility

Caption 2: Knorr-Bremse began upgrading and modernizing the climate control systems in 2021 and will complete the work at the end of the first quarter of 2022 – with much of the work being done at the Siemens Mobility depot in Southampton. | © Siemens Mobility

Knorr-Bremse (ISIN: DE000KBX1006, Tickersymbol: KBX) is the global market leader for braking systems and a leading supplier of other rail and commercial vehicle systems. Knorr-Bremse's products make a decisive contribution to greater safety and energy efficiency on rail tracks and roads around the world. About 29,500 employees at over 100 sites in more than 30 countries use their competence and motivation to satisfy customers worldwide with products and services. In 2020, Knorr-Bremse's two divisions together generated revenues of EUR 6.2 billion. For over 115 years, the company has been the industry innovator, driving innovation in mobility and transportation technologies with an edge in connected system solutions. Knorr-Bremse is one of Germany's most successful industrial companies and profits from the key global megatrends: urbanization, sustainability, digitization and mobility.

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