

# Compact economic miracle

## Intelligent: EP 2002

### MASS TRANSIT SOLUTION:

As urban traffic increases, so, too, growing demands are made on the braking systems of metros, trams, suburban trains and multiple units. In the past, the majority of braking systems was controlled by centralized control units. Large numbers of control components, plus complicated piping and cabling were inevitable.

At InnoTrans 2002, Knorr-Bremse is now presenting a new, leading-edge solution: the EP 2002 intelligent brake control system. Its compact mechatronic design and the decentralized location of individual modules mean that EP 2002 considerably reduces the overall cost of the system. And installation is also cheaper – thanks to the reduced amount of cabling and piping required!



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EP 2002

The new EP 2002 brake control system is considerably more compact than traditional systems with bogie-specific control.

### SPACE-SAVING SYSTEM:

EP 2002 puts the electronic and pneumatic control systems – which in the past consisted of several large-scale control units – into two compact pressure-control modules per car decentrally located close to the individual bogies. This makes bogie-specific brake control easier and saves valuable space in the vehicle.

### MORE FLEXIBLE AND ECONOMICAL:

All the electronic and pneumatic control components are contained in the compact mechatronic RBX modules, enabling important functions such as service brake, emergency brake and wheel slide protection, fault monitoring and diagnosis to be decentrally controlled. The individual modules are located close to the bogies and can be easily adapted to a wide range of operating requirements and vehicle types. And the low LCC and overall costs mean that EP 2002 is much more economical than traditional systems with comparable functions.

### Well thought-out

Knorr-Bremse presents the EP 2002 Intelligent brake control system:

- ▶ Reduced installation costs
- ▶ Adaptable to a wide variety of requirements
- ▶ Compact, small and lightweight
- ▶ Significant cost advantages



**ENHANCED PERFORMANCE, REDUCED COSTS:**

The EP 2002 intelligent brake control system was developed to create a standard that meets a wide range of customer requirements and avoids the need to constantly develop new, application-specific components. Performance and availability have been improved and the overall costs reduced for manufacturers and operators alike.

**POINT BY POINT:**

EP 2002 offers ten clear advantages:

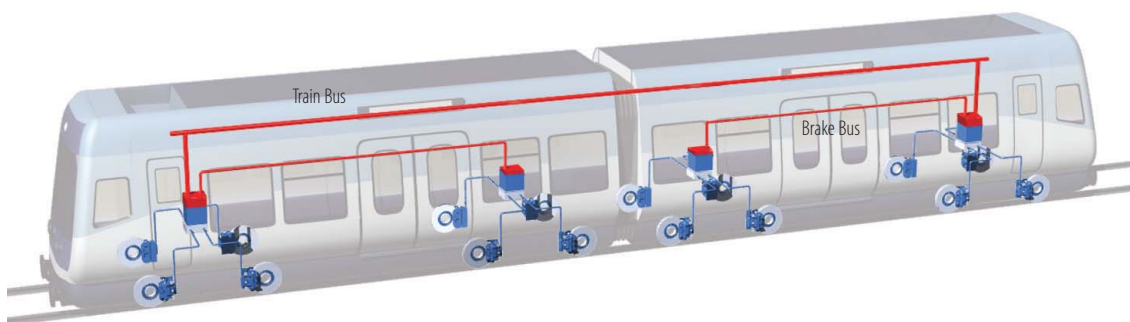
1. Individually adaptable to every train/vehicle without the need for additional product-specific variants.
2. Reduced piping and cabling requirements thanks to decentralized installation close to individual bogies.
3. Under-carriage installation of the entire control unit leaves more space for passengers.
4. Intelligent brake management. CAN-Bus communication between individual units means braking power can be compensated for and redistributed in case of failure of individual components.

5. Load-controlled service/emergency brake for each bogie, with wheel slide protection per axle.
6. Reduced response and activation times thanks to location of control units close to the bogies.
7. Reduced life-cycle costs thanks to improved maintenance and overhaul concept.
8. Improved vehicle availability thanks to greater system redundancy and shorter repair times.
9. Reduced project lead times thanks to simplified approval procedures as a result of the standardized RBX module.
10. Effective fault detection and correction thanks to diagnosis system for entire train.

**Features**

The Knorr-Bremse EP 2002 offers:

- ▶ Enhanced performance
- ▶ Improved availability
- ▶ Greater economy



Each bogie has one RBX module responsible for brake control. Communication between the modules is purely electronic via a Train and Brake Bus.



**POTENTIAL SAVINGS:**

Considerable overall cost savings can be achieved thanks to the system's improved availability, greater compactness and ease of installation and maintenance. Decentralized installation close to individual bogies brings enormous savings in terms of piping and cabling. In a single car, average savings of 25 m piping and 60 m cabling for wheel slide protection valves and speed sensors – and also 35 joints and seals, 18 angle connectors and 4 wheel slide protection valves – can be achieved. Per vehicle, EP 2002 saves manufacturers an average of 40 engineer man-hours and 15 hours for installation and testing of each vehicle.

**SAFE AND SOUND:**

EP 2002 has been designed with tomorrow's EN 50128 safety standards in mind. Equipped with the award-winning WSPER® wheel slide protection system, the brake control system has been subjected to rigorous testing, including intensive endurance tests involving several million operation cycles, combined vibration and temperature tests and wide-ranging software tests. **Highly Accelerated Lifetime Testing (HALT)** involves the braking system being subjected to stress levels well beyond those to be expected under normal operating conditions.

It is compact, economical, high-performance and meets the highest safety standards: EP 2002 - the intelligent brake control system of the future!

**Efficient**

With EP 2002, Knorr-Bremse has improved efficiency while still maintaining its internationally recognized levels of quality:

- ▶ Saves on materials and personnel
- ▶ Subjected to comprehensive endurance testing
- ▶ Developed according to safety standards EN 50128



EP 2002 passes the HALT test

The entire brake control is tested as a system

Successful testing in the vehicle

The content testing team

