

EP2002 Distributed Brake Control



Applications

- Metro Trains
- Compact Light Rail Vehicles
- Monorails



KNORR-BREMSE



EP2002 Distributed Brake Control

EP2002 is an “intelligent”

Distributed Brake Control (DBC) system, delivering per bogie or axle control in a unique package. Smaller, lighter and easier to install and commission than conventional systems, EP2002 has set new standards in advanced brake control.

In use on Metro trains around the world, EP2002 employs advanced mechatronic technology to maximise brake performance across the entire train. EP2002 self compensates in real time to address variable car operating conditions such as passenger loading and wheel spin and slide.

THE BENEFITS OF EP2002 FOR TRAIN BUILDERS (AGAINST CONVENTIONAL SYSTEMS)

- Low cost
- Faster installation
- Faster commissioning
- Lighter
- Smaller
- Integrated system
- Optimised braking performance

THE BENEFITS OF EP2002 FOR TRAIN OPERATORS

- Reduced operational costs
- In-service availability is maximised
- Optimised braking performance
- Wheel Slide Protection (WSP) virtually eliminates wheel damage
- Specially developed EP2002 Brakes Consultant software provides system status information
- Improved under-car access
- Overhaul periodicity of 9 years



EP2002 TECHNICAL AND QUALITY FEATURES

- “Intelligent,” per bogie braking
- Modular EP2002 valve is configurable to suit most Train Management system protocols
- Fully integrated system
- WSP (Wheel Slide Protection)
- Operational temperatures from - 40° C to + 55° C
- Complies with latest EN Safety and Software standards
- EP2002 manufacturing facility is TÜV certified
- EP2002 product engineering is TÜV certified for functional safety



EP2002 FEATURES

	SMART	GATEWAY	RIO
Service Brake Control	S	S	S
Emergency Brake Control	S	S	S
Wheel Slide Protection	S	S	S
Digital I/O (8 digital input and 4 relays)		S	S
Analogue Interface (PWM, 4-20mA)		O	O
TMS Interface (MVB ESD, MVB EMD, FIP, RS485, LONBUS)		O	
All valve types are line replaceable			

S = Standard
O = Optional



EP2002 Smart Valve



EP2002 Gateway Valve



EP2002 RIO Valve

THE EP2002 VALVES

EP2002 Smart Valve

contains all of the mechatronics (mechanical and electronic elements) to deliver Service Brake, Emergency Brake and WSP control on an individual bogie.

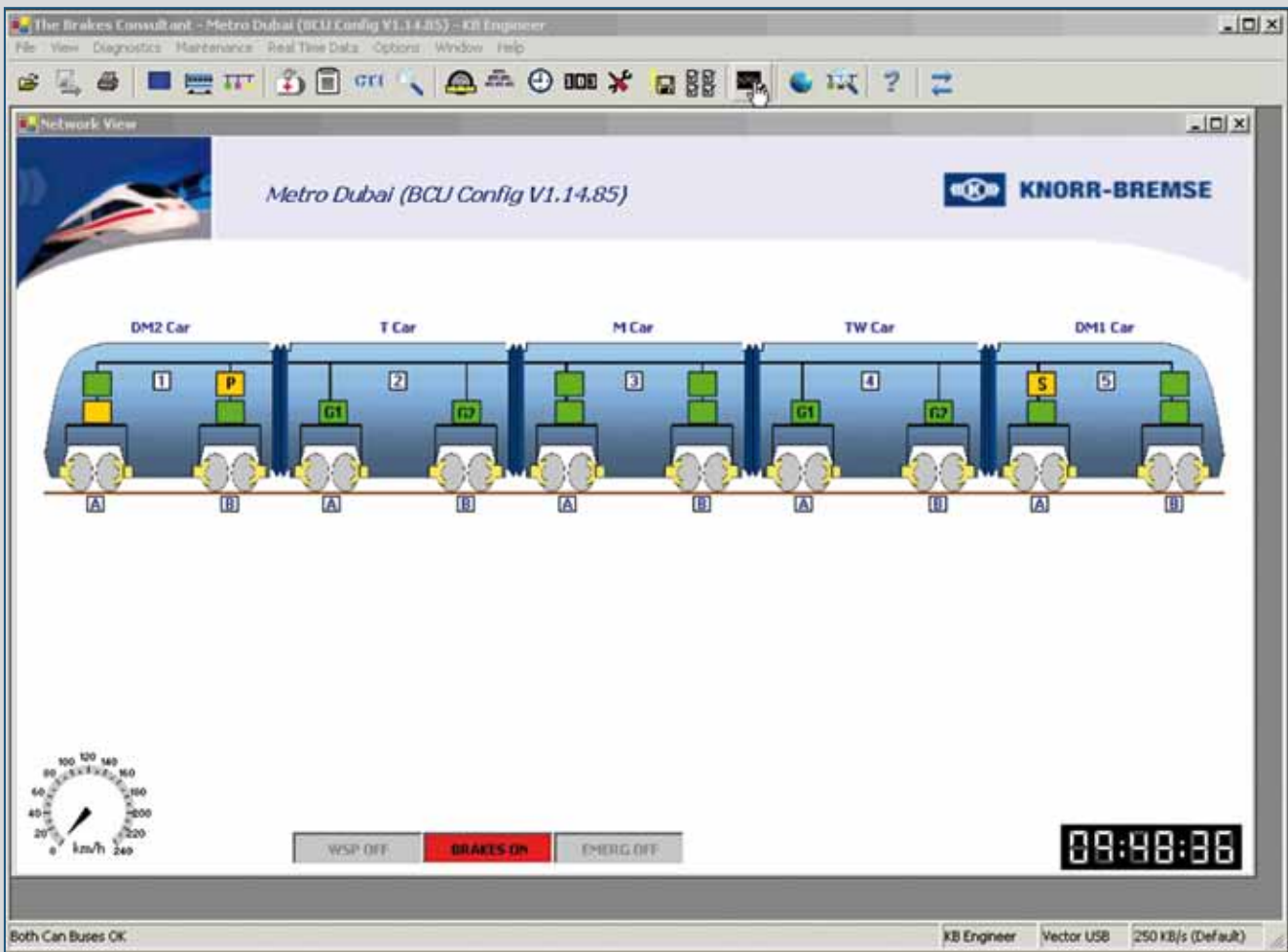
EP2002 Gateway Valve

delivers all of the functions of the Smart valve and in addition provides both the interface of the EP2002 system with the Train Management System and also the management of the whole train braking effort, including the Dynamic Brake.

The network of communication required between the EP2002 Gateway and EP2002 Smart valves is provided by a dedicated Brake Bus. Each EP2002 Smart Valve provides service brake control in accordance with demands, distributed by the EP2002 Gateway Valves.

EP2002 RIO Valve

delivers all of the functions of the EP2002 Smart Valve but with additional interfaces to wired train lines (analogue or digital).



EP2002 BRAKES CONSULTANT SOFTWARE

Compatible Integrated Diagnostic Software

Knorr-Bremse EP2002 Brakes Consultant is a Compatible Integrated Diagnostic Software product package which uses clear on-screen graphics. The package contains software developed specifically to facilitate the interrogation of the EP2002 systems and allows integration maintenance procedure diagnosis to take place trackside.

The EP2002 Brakes consultant is sold as a complete package and contains the bespoke software, PC interface adaptor and leads needed to install the software "tool" and use it straight "out of the box."

The software is easy to install and use and allows an "inside view" into how each EP2002 valve is performing.



EP2002 was developed in response to the increasing demands being made on urban mass transit systems. The system for metro systems, which also achieved certification in 2005, demonstrates just what it means when CENELEC requirements are fulfilled throughout the development process.

Lower cost, higher performance

EP2002 combines mechanical and electronic elements into a single compact unit. Compared to conventional technology the same high safety standards are maintained, but it is more economical to operate, requires less space, is lighter and its decentralized layout improves system performance.

Certification during development

During the five-year development process, regular safety audits and reviews were carried out on all the hardware and software involved, with the main focus on detailed safety analysis and extensive reliability testing. The system was repeatedly subjected to comprehensive testing at extreme temperatures and exposed to strong vibration and other stresses.

The result is an extremely robust system with reduced life cycle costs. The number of components has been significantly reduced and the maintenance and overhaul concept adapted to the needs of operators. Decentralized installation, close to the bogie, means reduced piping requirements and improved pneumatic performance, with shorter brake reaction times.





EP2002 implements the following safety design principles:

- Network of connected EP2002 units forms a system based on an inherent fail-safety and redundancy
- Comparison of the brake calculation results of different EP2002 units
- Independence of software functions between brake management and brake control
- “Watch-dog” for all micro-processors
- Protection against over-voltage and under-voltage
- Memory management unit for protection of WSP memory area
- Self-tests executed at start-up of the system
- Running tests to monitor all safety functions
- Comparison of speed signals between smart valves to detect faulty tachometers
- Safety critical data sent via the CAN bus protected by a safety protocol to EN50159-1



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