

Sibas PN vehicle control system

A completely new electronic Sibas PN vehicle control system (Siemens' Profinet rail automation system) has been developed for the ICE 4. The communications network consists of the ETB (Ethernet Train Backbone) and the Profinet IO train communication network. Both communication systems use Fast Ethernet (100 Mbit/s, switched Ethernet) and offer redundancy features to ensure maximum reliability. In addition, the cars have various control devices and conventional vehicle controls such as control cables, protectors and switches. The control system takes over control, regulating, protective and information functions for the vehicle. In addition, systems for vehicle diagnostics, maintenance and commissioning support are fully integrated.

The central controls are located in the end car. All cars are integrated into the train communication network and have their own controls that handle only the functions of the respective car. In comparison to conventional trains in which the controls of a number of cars are interconnected, each car of the ICE 4 operates autonomously to enable flexible combinations of individual cars.

The ETB train communication network is a further development of the Ethernet-based Wired Train Bus. This allows standard IT protocols, such as TCP/IP, to be used along with communications protocols for automation systems. And this, in turn, enables extensive configuration possibilities and network-wide maintenance and service functions with Web technology. The advantage with this solution is that the cars of the train can be exchanged and reconfigured without any problems, and various train lengths are possible. Furthermore, the cars can be tested to a large extent autonomously.

To secure availability of communications in the end car for controlling the train, the train communication network in the end car is designed as a ring. Since communica-

tion between users functions via both sides of the ring, a failure in one part of the ring, such as caused by a defective cable, does not interrupt communications. Each side of the ring is installed separately in different parts of the end cars in order to prevent common cause failures.

In the trailer cars, the train communication network isn't installed as a ring, since most users aren't located there and a failure of the system in one car caused by a problem with the vehicle and car computer structure would not lead to a failure of the trainset. The train communication network in each car and the network hubs in the end cars are redundant in order to secure availability. The two lines of the train communication network are installed separately in different parts of the cars.

With its redundant system structure, Sibas PN guarantees the highest possible availability and its modular design ensures the flexible operation of the ICE 4.

Contact for journalists:

Ellen Schramke, Tel.: +49 30 386 22370

E-mail: ellen.schramke@siemens.com

Die **Siemens AG** (Berlin und München) ist ein führender internationaler Technologiekonzern, der seit mehr als 165 Jahren für technische Leistungsfähigkeit, Innovation, Qualität, Zuverlässigkeit und Internationalität steht. Das Unternehmen ist in mehr als 200 Ländern aktiv, und zwar schwerpunktmäßig auf den Gebieten Elektrifizierung, Automatisierung und Digitalisierung. Siemens ist weltweit einer der größten Hersteller energieeffizienter ressourcenschonender Technologien. Das Unternehmen ist Nummer eins im Offshore-Windanlagenbau, einer der führenden Anbieter von Gas- und Dampfturbinen für die Energieerzeugung sowie von Energieübertragungslösungen, Pionier bei Infrastrukturlösungen sowie bei Automatisierungs-, Antriebs- und Softwarelösungen für die Industrie. Darüber hinaus ist das Unternehmen ein führender Anbieter bildgebender medizinischer Geräte wie Computertomographen und Magnetresonanztomographen sowie in der Labordiagnostik und klinischer IT. Im Geschäftsjahr 2015, das am 30. September 2015 endete, erzielte Siemens einen Umsatz von 75,6 Milliarden Euro und einen Gewinn nach Steuern von 7,4 Milliarden Euro. Ende September 2015 hatte das Unternehmen weltweit rund 348.000 Beschäftigte. Weitere Informationen finden Sie im Internet unter www.siemens.com.