CAN in Railway Applications

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Knorr-Bremse SfS GmbH is using CAN communication networks within railway applications: within trams, metros, locos or high speed trains.

Typical components used within projects designed by Knorr-Bremse SfS GmbH are as follows:

- Brake equipment (including brake handle, pneumatic panel, air supply)

- Anti skid / anti slip system

- Air conditioning system

- Door control

- Toilet control

- Passenger information system.

When starting the development of the CAN based electronic control system – ESRA (Electronic System for Railway Application) - a central electronic microprocessor system was used. The most significant advantages of the CAN based system are to decrease the costs for complex harness, to get more flexibility and to reach a higher EMI immunity.

Up to now about 250 different projects have been equipped with ESRA technology, over all more than 100.000 boards with CAN interface are in service.

Within the new CAN based system a well defined set of different standard board types has been defined, communicating by CAN communication. According to the project specific requirements a set of standard boards can be chosen to fulfil the project specification.

Different control system architectures exist, all based on CAN. First steps in development have been to realise a "central" multi controller system using CAN for communication. All boards are physically placed inside a rack. Next steps were to connect two racks by an external CAN communication and to connect a remote MMI by CAN to the control system. Actual systems are designed to have a decentralised architecture.

Knorr-Bremse SfS GmbH is using a proprietary CAN protocol, but similar to CANopen standard. In the CAN network Knorr-Bremse SfS GmbH is using the 11 bit identifier only, the bus rate is 250 kbit/s.

In typical project environment a high electromagnetic influence exist. Due to this fact and according to required norms and standards a high level EMC qualification is done with all electronic equipment.

The ESRA control system is able to interface communication systems based on CANopen standard by a gateway.

Future concepts will strongly continue the development to more decentralisation. New steps of development will define decentralised functions combining mechanics and electronics to be mounted in the place the function is needed (next to bogie, etc.).

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