

Standards and specifications



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This regular column provides news from standardization bodies and nonprofit associations regarding CAN-related documents. Covered are also recommended practices, application notes, implementation guidelines, technical reports, and open-source projects.

ISO/TC 22/SC 31/WG 4: Network applications for commercial vehicles

The ISO/TC 22/SC 31/WG 4 working group is developing standards for network applications in commercial road vehicles. This includes in particular the ISO 11992 series, a CAN-based communication between towing and towed vehicles. Part 2 of this series (braking and running gear devices) specifies a J1939-based communication, partly mandated by EU regulations. This document is currently under revision. In the history of this document, several functions have been added. If you would implement all of them and use in your vehicle train more than one trailer, the first CAN segment has to manage a very high busload. In order to overcome this, the ISO working group considers to introduce a mechanism to control the busload by means of enabling/disabling J1939 parameter groups (PG).

The basic idea is, to disable by default all not mandated PGs. The towing vehicle scans the provided functionality of the connected trailers and enables optional PGs to the limit of an acceptable busload. The scanning and the enabling can be done by means of CANopen SDO (service data object) services mapped to the PGs CAM11 and CAM21 (CANopen Application Messages). The CAN nodes in the towing and towed vehicles need to implement a CANopen object dictionary comprising 'PDO (process data object) communication parameter sets for the implemented PGs. By SDO read services, you can detect optionally implemented ISO 11992-2 PGs. By SDO write services, these PGs can be enabled. ▶

Of course, in the ISO 11992-2 revision failures will be fixed and new functions will be added. One of the new feature requests relates to e-trailers, equipped with its own battery pack, an electric drive axle, and an electronic control system. These e-trailer extension will be harmonized with the EU regulation.

Body application network

Parameters and J1939 parameter groups (PG) specified in the ISO 11992 series are also used in CAN-based body application networks, e.g., the ISO 25200 standard (formerly: DIN 4630), the DIN 14704 standard (in-vehicle gateway unit for fire-fighting units), or the EN 16815 standard (body application unit for refuse-collecting vehicles, also known as *CleANopen*). In order to avoid double-specifications and the consultation of multiple documents, when implementing external vehicle interfaces and body application units (BAUs), the mentioned ISO working groups intend to develop an electronic document, containing all parameter specifications. This electronic could be referenced by dedicated standards, specifying CANopen- or J1939-based networks. For this purpose, ISO needs to establish a registration authority (RA).

Currently, the ISO 25200 standard covers several BAUs: vehicle-mounted lifting equipment (including tail lifts), refrigerators, containers, tippers, etc. Winter and road-service equipment (EN 15430 series) is under consideration as well as fire-fighting and refuse-collecting implements. The standardization of CANopen-based

fire-fighting device interfaces (DIN 14700/ISO 26343) is also on the agenda of the ISO working group. It currently revises also some documents of the ISO 16844 series (tachograph). This includes Part 7, specifying a J1939/21-based diagnostic.

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CAN simulation model specifications

The CiA 910 series of CAN simulation model specifications has three parts. Part 1 provides definitions and use cases. Part 2 specifies PMA (physical media attachment) sublayer simulation model requirements. Recently, CiA has released Part 3 (PMD simulation model requirements). The PMD (physical medium-dependent) sublayer covers common mode filters and transmission media such as connectors and cables. The CiA 910 documents are in DSP (draft specification proposal) status and are available only for CiA members.

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CAN transceiver for 48-V supply systems

The passenger car industry is moving to 48-V supply systems. This leads to thinner cables and saves weight. On the other hand, CAN transceivers need to be protected against 48-V shorts to network lines (CAN-H and CAN-L). Loss of GND (ground) is an issue, too. In January, CiA has established the SIG (special interest group) 48-V testing. The scope is developing, releasing, and maintaining technical documents related to CAN-based and LIN-based networks in up to 48-V supplied systems. This includes test plan specifications for 48-V physical media attachment (PMA) implementations, in other words stand-alone transceiver chips and system base chips (SBCs). The test set-up should consider impacts of common-mode chokes (CMC) and transient voltage suppression (TVS) diodes.

One of the issues is, if automakers can accept that CAN transceivers may switch off at any time, when the on-chip temperature is too high (thermal protection). The benefit: The PMA sublayer implementations could be realized, using less chip sizes. In most legacy ECU requirements, OEMs (original equipment manufacturers) demanded to continue CAN communication in case of shorts. The CiA group is participated by chipmakers, Tier-1 suppliers, carmakers, and test-service providers.

It is intended to develop the CiA 640 series (48-V supplied PMA sublayer implementations) with following documents:

- ♦ Part 1: Additional parameter requirements to ISO 11898-2 (for CAN);
- ♦ Part 2: Additional parameter requirements to ISO 17987-4 (for LIN);
- ♦ Part 3: Additional test cases to ISO 16845-2 (for CAN);
- ♦ Part 4: Additional test cases to ISO 17897-7 (for LIN).

The SIG is chaired by Marko Moch, working with Cariad, a company of the Volkswagen (VW) group.

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CiA 319: Implementing and configuring CANopen Safety devices

CiA has released the second version of the CiA 319 specification. It specifies how to implement and to configure functional-safe devices compliant to EN 50325-5 (CANopen Safety). CANopen Safety services and protocols are used, for example, in mobile machines and industrial machine control. The European standard does not specify the configuration of functional-safe devices; this is given in detail in CiA 319. The content will be integrated into the EN 50325-5 standard, when it is revised in the near future. CANopen Safety is approved up to SIL 3 (safety integrity level) according to IEC 61508.

IEC 61508 is the base standard for functional safety, covering the complete lifecycle of electrical/electronic/programmable electronic (E/E/PE) safety-related systems across all industries. It defines safety integrity levels (SILs) to quantify safety performance. EN 50325-5 references IEC 61508 and specifies periodically transmitted SRDOs (safety-related data objects) made by two CAN CC (classic) data frames with bitwise inverted data field content, using different CAN-IDs (identifier). The EU standard also specifies several timings.

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