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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 43192.1-2023

**Road vehicles - Interchange of digital information on electrical
connections between towing and towed vehicles - Part 1:
Physical and data-link layers**

道路车辆 牵引车和挂车电气连接的数字信息交互 第1部分：物理层和数据链路层

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1 Scope

GB/T 43192.1-2023 is Part 1 of the Chinese series on digital information interchange between towing and towed vehicles, and covers the physical and data link layers. A tractor and a trailer are usually made by different companies and meet for the first time at the coupling, yet they must exchange braking, stability, lighting and load data over a single connector on a harness exposed to spray, salt and vibration for the life of the vehicle. Part 1 fixes what happens electrically and at the frame level. It sets the data link layer requirements - the protocol entity and the device interface - and the physical layer requirements, covering physical signalling, the physical media attachment, the physical media dependent sublayer and the network wiring harness system, based on CAN. It took effect on 1 April 2024.

This document specifies the requirements for the data-link layer (DLL) and physical layer (PHY) based on CAN network interfaces that comply with GB/T 43192 (all parts). The data-link layer (DLL) includes: - DLL protocol entity requirements; - DLL device interface requirements; - DLL network system requirements. Typically, the physical signalling sublayer is implemented in the CAN protocol controller. The physical media connection sublayer is typically implemented in a CAN transceiver or system basis chip (SBC). On request it also includes additional protective circuits. Media-related sublayers include connectors and

cables. Physical signalling (PS) includes: - PS entity requirements; - PS device interface requirements; - PS network system requirements. Physical media attachment (PMA) includes: - PMA protocol entity requirements; - PMA device interface requirements. Physical media dependent (PMD) include: - PMD entity requirements; - PMD device interface requirements; - PMD network system requirements. This document applies to the communication design for digital information exchange between towing and towed vehicles, which have a maximum authorized total mass greater than 3500 kg.

2 Normative references

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, for dated reference documents, only the version corresponding to the date applies to this document; for undated reference documents, the latest version (including all amendments) applies to this document. ISO 4141-

1 Road vehicles - Multi-core connecting cables - Part 1: Test methods and requirements for basic performance sheathed cables

GB/T 5054.1-2008 Road vehicles - Multi-core connecting cables - Part 1: Test methods and requirements for basic performance sheathed cables (ISO 4141-1:2005, IDT) ISO 11898-

1 Road vehicles - Controller area network (CAN) - Part 1: Data-link layer and physical signalling

GB/T 41588.1-2022 Road vehicles - Controller area network (CAN) - Part 1: Data link layer and physical signalling (ISO 11898-1:2015, IDT)

3 Terms and definitions

The following terms and definitions apply to this document. 3.1 1-wire operation Communication via CAN_L or CAN_H referenced to ground and Vs potential, in fault-tolerant operating mode. 3.2 2-wire operation Communication of CAN_L and CAN_H referenced to ground and Vs potential, in normal (non-fault tolerant) operating mode.

3.3 Bus A communication link between two communicating entities.

3.4 CAN_H CAN_H CAN_L CAN_L Special cables and/or terminals for communication connections.

3.5 Differential transmission The transmission of digital information by voltage carrying between two electrically connected conductors.

3.6 Maximum authorized total mass The maximum vehicle mass specified by the administrative authority according to the operating conditions.

Note: The maximum authorized total mass is also called the vehicle total mass rating or

combined total mass rating. [Source: GB/T 3730.2-1996, 4.8, with modifications]

3.7 DLL protocol entity Data-link layer protocol entity Complying with ISO 11898-1, the functional part of electronic components that implements the DLL protocol.

3.8 DLL device interface Data-link layer device interface Electronic device interface that complies with ISO 11898-1 optional function restrictions. Example: Do not transmit remote frames or only transmit messages in extended frame format. Physical media attachment interface Electronic equipment interface including PMA entity and optional additional circuitry.

3.15 PMA network system Physical media attachment network system A network system containing two devices that conform to the physical media connection interfaces of this document.

3.16 PMD entities Physical medium dependent entities Connectors, cables, other electromechanical network components.

3.17 PMD device interface Physical medium dependent device interface Connectors, cables, other electromechanical components.

3.18 PMD network system Physical medium dependent network system Electromechanical interface of a single device.

3.19 Towed vehicle An unpowered vehicle towed by a towing vehicle or other unpowered vehicle. [Source: GB/T 3730.1-2022, 3.4, with modifications]

3.20 Towing vehicle A motor vehicle or unpowered vehicle towing an unpowered vehicle behind it.

4 Symbols and abbreviations

The following symbols and abbreviations apply to this document. AC: Alternating current CAN: Controller area network CEFF: Classic extended frame format Com: Communication successful (receiving and sending) DC: Direct current DLL: Data-link layer ECU: Electronic control unit FHP: Failure handling procedure noCom: Communication interrupted (neither data received nor data sent) PDU: Protocol data unit PHY: Physical layer PMA: Physical media attachment PMD: Physical medium dependent PS: Physical signalling RXD: Receive data TXD: Transmit data 1W-OM: 1-wire operation mode