

**AUTOMOTIVE INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

QC/T 1201.2-2023

**Compatibility of on-board battery swap system for battery
electric commercial vehicles - Part 2: Battery swap cooling
interface**

(English Translation)

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1 Scope

This document specifies the requirements, test methods, inspection rules, packaging and packaging markings for a pair of shielded balanced cables with an analog signal bandwidth up to 10 GHz for road vehicles.

This document is applicable to cables for road vehicles using Ethernet communication channels with transmission rates up to 25 Gbit/s (see Appendix A for the correspondence between

Ethernet channel transmission rates and bandwidths).

NOTE: This document is also applicable to cables for other network communication systems used in road vehicles, such as PCIe between ECU systems, GMSL and FPD-link between display systems, etc.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 25085.1-2024 Road vehicles - Automotive cables - Part 1.Vocabulary and design guidelines

GB/T 25085.2-2024 Road vehicles - Automotive cables - Part 2.Test methods

GB/T 25085.3-2020 Road vehicles - Automotive cables - Part 3.Dimensions and requirements for 30 V a.c. or 60 V d.c. single-core copper conductor cables

QC/T 414-2016 Design rule of color and type code for automobile cables

3 Terms and Definitions

The terms and definitions defined in GB/T 25085.1-2024 are applicable to this document.

4 Models/Specifications

The cable models/specifications shall be marked according to QC/T 414.The cable models/specifications shall be indicated in the product data sheet. See Appendix B for examples of cable models/specifications.

5.1 Rated Voltage

The rated voltage is 30 V AC or 60 V DC and below. The rated voltage shall be indicated in the product data sheet.

5.2 Rated Temperature

The cable temperature rating shall be equal to the minimum rating of the insulated core wire and sheath. The rated temperature of the cable shall be selected according to the continuous working time of 3 000 h, and the definition of rated temperature grade shall comply with the provisions of GB/T 25085.1.The rated temperature shall be indicated in the product data sheet.

5.3 Analog Bandwidth

Cables shall be tested at frequencies up to 10 GHz and are backward compatible with applications with equivalent analog signal bandwidths up to 9 GHz, 4 GHz, 2 GHz, 1 GHz, and

0.6 GHz, respectively.

NOTE: See Appendix A for applications of different analog signal bandwidths.

5.4.2.1.2 Conductor structure

The insulated core wire of the cable should adopt the conductor structure specified in GB/T 25085.3 and shall be indicated in the product data sheet.

5.4.2.1.3 Conductor diameter

The insulated core wire of the cable should adopt the conductor diameter value specified in GB/T 25085.3 and shall be indicated in the product data sheet.

5.4.2.1.4 Cross-sectional area (CSA)

The insulated core wire of the cable should adopt the cross-sectional area specified in GB/T

25085.3 and shall be indicated in the product data sheet.

5.4.2.2 Insulating dielectric

5.4.2.2.1

Dielectric material

The insulating dielectric material used for the insulated core wire of the cable shall be indicated in the product data sheet. For standard loss cables, solid materials should be adopted; for low loss cables, foam or foam/solid sheath materials should be adopted.

5.4.2.2.2

Dielectric thickness

Any value of the dielectric thickness of the insulated core wire of the cable shall be no less than the minimum thickness of the dielectric. The minimum dielectric thickness shall be indicated in the product data sheet.

5.4.2.2.3

Dielectric outer diameter

The dielectric outer diameter of the insulated core wire of the cable should comply with the provisions of GB/T 25085.3 and shall be indicated in the product data sheet.

5.4.2.2.4

Monitoring of the dielectric outer diameter of the in-process insulated core wire

The outer diameter of the in-process insulated core wire shall be continuously monitored during the dielectric extrusion process, and any value of the dielectric outer diameter shall not exceed the tolerance of the outer diameter specified in 5.4.2.2.3.

5.4.2.2.5

Insulated core wire color

The dielectric surface of the insulated core wire needs to be colored, and the color shall comply with the provisions of QC/T 414. It is not suitable to use two colors for coloring on the dielectric of the same insulated core wire.

NOTE: The color combination of the two insulated core wires forming a balanced pair is preferably white and green. The use of other color combinations is subject to negotiation between the supply and demand sides.

5.4.3.1 Structure

The balanced part shall consist of two dielectric insulated core wires with consistent structure and performance. The balanced pair structure shall be specified in the product data sheet and determined through negotiation between the supply and demand sides. Balanced pairs include but are not limited to the following structural types.

- Small pitch twisted pair;
- Large pitch twisted pair;
- Unpitched parallel line.

The balanced pair structure shall be specified in the product data sheet and determined through negotiation between the supply and demand sides.

5.4.3.2 Pitch

If the balanced pair is pitched, this shall be indicated in the product data sheet.

5.4.3.3 Outer diameter of the balanced pair

The outer diameter of the balanced pair shall not be greater than 2 times the maximum outer diameter of a single insulated core wire.

NOTE: The outer diameter of the balanced pair is equivalent to the shielding inner diameter.

5.4.4.1 Shielding structure

The shielding shall consist at least of a braided shield composed of multiple metal wires. A metal foil shielding may also be included between the dielectric and the braided layer. The metal surface and the braided fabric shall maintain contact and electrical conductivity. Metal foil, metal-polymer composite foil, or metal-polymer-metal composite foil are permitted.

5.4.4.2 Braiding density

The braiding density shall be no less than 80% and shall be indicated in the product data sheet.

5.4.4.3 Shielding outer diameter

The shielding outer diameter shall be indicated in the product data sheet.

NOTE: The shielding outer diameter is equivalent to the inner diameter of the sheath.