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

GB/T 28029.1-2020

**Electronic railway equipment - Train communication network
(TCN) - Part 1: General architecture**

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3.1 Terms and definitions

Foreword

GB/T 28029 `` Train Communication Network (TCN) for Electronic Equipment of Rail Transit " is divided into the following 12 parts.

- Part 1. Basic structure;
- Part 2-1. Stranded Train Bus (WTB);
- Part 2-2. Twisted Train Bus (WTB) conformance test;
- Part 2-3. TCN communication protocol;
- Part 2-4. TCN application protocol;
- Part 2-5. Ethernet Train Backbone Network (ETB);
- Part 2-6. Vehicle-ground communication;
- Part 2-7. Radio-based Wireless Train Backbone Network (WLTB);
- Part 3-1. Multifunctional Vehicle Bus (MVB);
- Part 3-2. Multifunctional Vehicle Bus (MVB) conformance test;
- Part 3-3. CANopen Marshalling Network (CCN);
- Part 3-4. Ethernet grouping network (ECN).

This part is the first part of GB/T 28029.

This section is drafted in accordance with the rules given in GB/T 1.1-2009.

This section replaces Part 1 of GB/T 28029.1-2011 "Traction Electrical Equipment Train Bus Part 1. Train Communication Network"

Chapter "General Provisions", compared with GB/T 28029.1-2011, the main technical changes are as follows.

- Modified the "Introduction" section (see Introduction, Introduction to the.2011 edition);
- Modified the content of "Scope" (see Chapter 1, 1.1 of the.2011 edition);
- Revised "normative references" (see Chapter 2, 1.2 of the.2011 edition);
- Modified "terms, definitions, abbreviations and conventions" (see Chapter 3, 1.3, 1.4 and 1.5 of the.2011 edition);
- Deleted the "overall consideration" content (see 1.6 in the.2011 version);
- Removed the "conformance test" content (see 1.7 of the.2011 version);
- Deleted the content of "Real-Time Protocol" (see Chapter 2 of the.2011 edition);
- Deleted the content of the "multi-purpose vehicle bus" (see Chapter 3 of the.2011 edition);
- Deleted the content of "Twisted Train Bus (WTB)" (see Chapter 4 of the.2011 edition)
- Removed "train network management" content (see Chapter 5 of the.2011 edition);
- Removed the contents of Appendix A (see Appendix A of the.2011 edition);
- Added "Basic Architecture" content, network technology added switching technology, and vehicle-ground communication content (see Chapter 4);
- Added the "train backbone network" content, added train backbone network technology based on switching technology (see Chapter 5);
- Added "marshalling network" content, added train marshalling network technology based on switching technology (see Chapter 6);
- Increased the content of "vehicle data communication" (see Chapter 7).

This section uses the redrafting law to modify and adopt IEC 61375-1..2012, Rail Transit Electronic Equipment Train Communication Network (TCN)

Part 1. Basic Structure.

Compared with IEC 61375-1..2012, this section is structurally adjusted. 3.3.1 is deleted, and other numbers are modified in turn.

Compared with IEC 61375-1..2012, there are technical differences in this section. The terms related to these differences have passed through the margins on the outside.

The vertical single line (|) of the location is marked. The specific technical differences and their causes are as follows.

- Increased the content of "regulations" in the scope to meet the requirements of GB/T 1.1 (see Chapter 1).
- Regarding the normative references, this section has made adjustments with technical

differences to adapt to China's technical conditions and the situation of adjustment.

The situation is reflected in Chapter 2 "Regulatory Reference Documents", and the specific adjustments are as follows.

- * Replace ISO /IEC 8824-1..2002 with GB/T 16262.1 equivalent to the international standard (see 3.3.1);
- * ISO /IEC 7498-1, ISO /IEC 9646-1..1994 and ISO /IEC 19501..2005 have been deleted.
- Deleted terms and definitions and abbreviations not used in the text (see Chapter 3).
- Added the abbreviation "GCG" (see Chapter 3).
- Modified Figure 2 of 4.3.2 of IEC 61375-1..2012, Figure 2 of IEC 61375-1..2012 shows multiple formation networks, and 4.3.2

The descriptions in Chinese are inconsistent, and modified to the grouping diagram of the two grouping networks (see 4.3.3).

- Modify the tree topology of Fig. 6.3.2 to linear topology to conform to the actual situation (see 6.3.2).

The following editorial changes have also been made in this section.

- Deleted Note 1 in Chapter 1 of IEC 61375-1..2012, and modified Note 2 as Note, because there is a detailed description in the text.
- Removed the content of 3.3.1 auxiliary verbs in IEC 61375-1..2012 and part of the value base in 3.3.2, adjusted 3.3.2 to
- 3.3.1, 3.3.3 is 3.3.2, and 3.3.4 is 3.3.3.
- Removed the "example" content of 5.5.4.3.
- Modified the errors in IEC 61375-1..2012, video data service parameters, from "small delay, small jitter" to "large delay,
- Large jitter "(see Table 11 in 7.5.3).
- Move UIC556 from Chapter 6 of IEC 61375-1..2012 into the reference, because UIC556 is informative in this part

Quote.

Please note that some elements of this document may involve patents. The issuer of this document is not responsible for identifying these patents.

This section is proposed by the National Railway Administration.

This section is under the jurisdiction of the National Technical Committee for Standardization of Traction Electrical Equipment and Systems (SAC/TC278).

This section was drafted. CRRC Zhuzhou Electric Locomotive Research Institute Co., Ltd., China Railway Science Research Institute Group Co., Ltd.

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Introduction

TCN has a two-level layered architecture, including train backbone network and marshalling network.

a) In order to connect closed or open train vehicles, this part of GB/T 28029 specifies the train bones with different characteristics.

Dry network;

b) In order to connect the vehicle-mounted standard equipment, this part of GB/T 28029 specifies the marshalling network with different characteristics.

This section defines the general architecture of TCN.

a) Establish rules for connecting marshalling networks through train backbone networks, such as.

- * identification interface;

- * Define discovery rules for train topology changes;

- * Define the basic communication services provided by the backbone network to the organization network.

b) Establish basic rules for train backbone network and marshalling network.

c) Establish operational communication rules, such as.

- * Communication mode between users;

- * addressing principle;

- * Supported data classes.

Rail transit electronics train communication network (TCN)

Part 1. Basic Structure

1 Scope

This part of GB/T 28029 specifies the general architecture of the train communication network (TCN) to achieve the marshalling defined by GB/T 28029