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Electric vehicles - unified diagnostic services specification over CAN bus

电动汽车CAN总线故障诊断规范

(English Translation)

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Foreword

"Electric Vehicle CAN Bus Fault Diagnosis Service Specification" introduces the basic functions and extended functions of the CAN bus of electric vehicles.

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It also stipulates the basic norms of hardware interfaces, in order to provide a basis for the development of enterprise electric vehicles, and is also conducive to China's electric vehicle industry.

Form a unified diagnostic and maintenance standards.

-- Part 1. Scope of application of the document;

-- Part 2. Normative references;

-- Part 3. Abbreviations;

-- Part 4. Introduction to diagnostic system functions;

-- Part 5. Diagnostic communication protocol;

-- Part 6. Definition of diagnostic services.

This specification was proposed by the Electric Vehicle Industry Technology Innovation Alliance.

This specification is under the jurisdiction of the China Automotive Engineering Society.

1 Scope

This specification stipulates that the electric vehicle diagnostic equipment and the electric vehicle controller (not limited to the vehicle controller) are connected by CAN line.

Diagnostic abbreviations and diagnostic application layer services.

This specification is applicable to online diagnosis of pure electric passenger vehicles. Wireless diagnosis can be used for reference.

2 Normative references

The terms in the following documents become the terms of this specification by reference to this specification. Any dated reference document, followed by Some amendments (not including errata content) or revisions do not apply to this specification, however, agreements that are agreed upon in accordance with this specification are encouraged.

The parties studied whether the latest version of these documents could be used. For undated references, the latest edition applies to this specification.

ISO 14229 Road Vehicle Unified Diagnostic Repair Equipment (UDS). Specifications and Requirements ISO 15765-2 Road Vehicles - CAN Diagnostics. Network Layer Services ISO 15765-3 Road Vehicles - CAN Diagnostics. Application Layer Services

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3 Abbreviations

The following terms and abbreviations apply to this specification.

3.17 ST Separation Time Interval

4 CAN diagnostic system function introduction CAN line-based diagnostics provide the ability to quickly access information and the ability to run control units without disconnecting cables.

The diagnostic services provided are.

Communication management. setting the connection status and management information when starting communication, end, and communication test;

Permission settings. provide numerous diagnostic services and different diagnostic information for different customers;

Data monitoring. including reading of information, and obtaining some real-time information, statistical data, etc.;

b) Data calibration. modify or optimize internal parameters according to the performance requirements of the controller or the performance requirements of the vehicle;

c) Input/Output Control. Trigger some predetermined test tasks to obtain the status of the entire vehicle or vehicle component or subsystem;

d) Read the internal information of the controller, such as the contents of the fault storage.

5 CAN diagnostic communication protocol

5.1.1 Classification of data transmission

The CAN diagnostic message is supported using the multi-packet data transfer unit (USDT) specified in ISO 15765-2:2004. That is, two types are supported.

CAN data transmission - single packet data transmission and multi-packet data transmission.

5.1.2 Single Packet Data Transmission

Single packet data transmission consists of a single frame (SF). Its use condition is. single frame length does not exceed 7 or extended search in normal addressing mode in the address mode, the single frame length does not exceed 6. An example of a single packet data transfer is shown in Figure 1.

Figure 1 Single packet data transmission example

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5.1.3 Multi-packet data transmission

Multi-packet data transmission consists of multi-frame segmented CAN messages. Its use condition is. the data length is greater than 7 in the normal addressing mode.

Or the data length is greater than 6 when the addressing mode is extended. The data transmission includes a first frame (FF) and a plurality of subsequent frames (CF). Receiving end A flow control frame (FC) must be sent after receiving the first frame (FF). The information contained in the flow control frame is. block size (BS) and interval Time (ST). The block size (BS) indicates the maximum number of subsequent frames that the receiver allows the transmitter to send. Interval (STmin) Indicates the minimum time that the sender must wait between two subsequent frames. An example of a multi-packet data transfer is shown in Figure 2.

Figure 2 Multi-package data transfer example

5.2.1 Data frame structure

Single frame (SF), first frame (FF), subsequent frame (CF) or flow control frame (FC) contain an 8-byte data field, the number the data field consists of the following two parts. Table 1 shows the structure of the PCI bytes of various CAN messages.

a) Protocol Control Information (PCI) indicating the frame type, frame number, data length, etc.

b) Transfer data, including the data being sent.

Sender recipient

Single frame

Sender recipient

First frame

Flow control

Subsequent frame

STmin

Subsequent frame

Subsequent frame

Subsequent frame

Subsequent frame

Flow control

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