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**Road vehicles — Implementation of  
World-Wide Harmonized On-Board  
Diagnostics (WWH-OBD) communication  
requirements —**

Part 3:

**Common message dictionary**

**公共消息字典**

*Véhicules routiers — Mise en application des exigences de  
communication pour le diagnostic embarqué harmonisé à l'échelle  
mondiale (WWH-OBD) —*

*Partie 3: Dictionnaire de messages communs*





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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 27145-3 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

This first edition of ISO 27145-3 cancels and replaces ISO/PAS 27145-3:2006, which has been technically revised.

ISO 27145 consists of the following parts, under the general title *Road vehicles — Implementation of World-Wide Harmonized On-Board Diagnostics (WWH-OBD) communication requirements*:

- *Part 1: General information and use case definition*
- *Part 2: Common data dictionary*
- *Part 3: Common message dictionary*
- *Part 4: Connection between vehicle and test equipment*

The following parts are under preparation:

- *Part 6: External test equipment*

## 0 Introduction

### 0.1 Overview

The ISO 27145 series includes the communication between the vehicle's on-board diagnostics (OBD) systems and external test equipment within the scope of the World-Wide Harmonized On-Board Diagnostics Global Technical Regulations (WWH-OBD GTR).

It has been established in order to apply the unified diagnostic services (specified in ISO 14229-1) to WWH-OBD systems.

The ISO 27145 series includes the communication between the vehicle's WWH-OBD systems and external (off-board) "generic" test equipment within the scope of the country-specific regulatory requirements.

To achieve this, it is based on the Open Systems Interconnection (OSI) Basic Reference Model specified in ISO/IEC 7498-1 and ISO/IEC 10731, which structures communication systems into seven layers. When mapped on this model, the services specified by ISO 27145 are divided into

- diagnostic services (layer 7), specified in ISO 27145-3 with reference to ISO 14229-1,
- presentation layer (layer 6), specified in ISO 27145-2 with reference to SAE J1930-DA, SAE J1939 Companion Spreadsheet (SPNs), SAE J1939-73:2010, Appendix A (FMI), SAE J1979-DA and SAE J2012-DA,
- session layer services (layer 5), specified in ISO 14229-2,
- transport layer services (layer 4), specified in ISO 27145-4 with reference to ISO 13400-2, ISO 15765-2 and ISO 15765-4,
- network layer services (layer 3), specified in ISO 27145-4 with reference to ISO 15765-4, ISO 15765-2 and ISO 13400-2,
- data link layer (layer 2), specified in ISO 27145-4 with reference to ISO 11898-1, ISO 11898-2, ISO 15765-4, ISO 13400-3 and IEEE 802.3, and
- physical layer (layer 1), specified in ISO 27145-4 with reference to ISO 11898-1, ISO 11898-2, ISO 15765-4, ISO 13400-3 and IEEE 802.3,

in accordance with Table 1.

**Table 1 — WWH-OBD specification reference applicable to the OSI layers**

Applicability	OSI seven layer	WWH-OBD document reference		
Seven layers according to ISO/IEC 7498-1 and ISO/IEC 10731	Application (layer 7)	ISO 14229-1, ISO 27145-3		
	Presentation (layer 6)	ISO 27145-2, SAE J1930-DA, SAE J1939 Companion Spreadsheet (SPNs), SAE J1939-73:2010, Appendix A (FMI), SAE J1979-DA, SAE J2012-DA		
	Session (layer 5)	ISO 14229-2		
	Transport (layer 4)	ISO 27145-4	ISO 13400-2 DoIP TCP and IP	ISO 13400-3 DoIP, IEEE 802.3
	Network (layer 3)			
	Data link (layer 2)			
	Physical (layer 1)			

### 0.2 SAE document reference concept

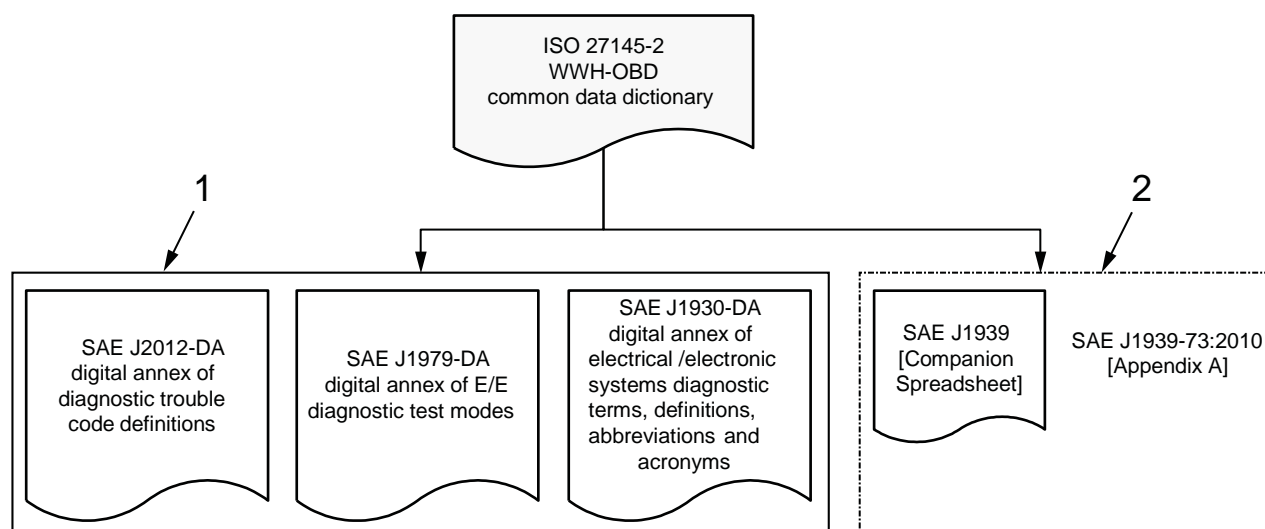
ISO 27145 makes reference to several SAE documents which contain the terms, data and diagnostic trouble code (DTC) definitions.

ISO 27145-2 defines a common data dictionary for the ISO 27145 series, according to the definitions in the following documents (see Figure 1).

- SAE J1930-DA: this digital annex contains all standardized naming objects, terms and abbreviated terms.
- SAE J1939 Companion Spreadsheet and SAE J1939-73: SAE J1939 Companion Spreadsheet indexes names for suspect parameter numbers (SPNs) that provide an alternative presentation format for SAE J2012-DA DTCs. SPNs are combined with failure mode indicators (FMIs) to form the full alternative presentation. FMIs are described in SAE J1939-73:2010, Appendix A.

**NOTE** The SAE J1939 Companion Spreadsheet is a document which supplements the SAE J1939 family of standards and contains SPNs and parameter group numbers (PGNs).

- SAE J1979-DA: this digital annex contains all standardized data items such as data identifiers (DIDs), test identifiers (TIDs), monitor identifiers (MIDs) and infotype identifiers (ITIDs).
- SAE J2012-DA: this digital annex contains all standardized data items such as DTC definitions and FTB (failure type byte) definitions.



**Key**

- 1 SAE digital annexes: data definitions
- 2 SAE J1939 series of documents: DTC definitions

**Figure 1 — SAE digital annex document reference**

### 0.3 SAE digital annex revision procedure

New regulatory requirements drive new in-vehicle technology to lower emissions, improve safety, etc. It is important to standardize new technology-related OBD monitor data and DTCs in order to support the external (off-board) “generic” test equipment. All relevant information is proposed by the automotive industry, represented by members of the appropriate SAE task force.

ISO 27145-2 references a “Change request form” for use with new data items to be defined by the SAE task force for standardization. It is intended that the standardized data items be defined in SAE J1930-DA, SAE J1979-DA, SAE J2012-DA and SAE J1939. It is intended that the documents be published on the SAE store website once the information has been balloted and approved.

The revision request forms and instructions for updating the registers to ISO 27145 can be obtained on the following data registration websites:

- For SAE J1930-DA: <http://www.sae.org/servlets/works/committeeHome.do?comtID=TEVDS7>

The column entitled “Resources” shows a document with the title: J1930-DA\_Revision\_Request\_Form.doc. Double click on the name to download the document with the filename: “SAE\_J1930-DA\_Revision\_Request\_Form.doc”.

- For SAE J1939: <http://www.sae.org/>

Search “J1939 Request”, select “J1939 Request Processing Group”, and select “J1939 Request Processing Form and Guidelines”.

- For SAE J1979-DA: <http://www.sae.org/servlets/works/committeeHome.do?comtID=TEVDS14>

The column entitled “Resources” shows a document with the title: J1979-DA\_Revision\_Request\_Form.doc. Double click on the name to download the document with the filename: “SAE\_J1979-DA\_Revision\_Request\_Form.doc”.

- For SAE J2012-DA: <http://www.sae.org/servlets/works/committeeHome.do?comtID=TEVDS9>

The column entitled “Resources” shows a document with the title: J2012-DA\_Revision\_Request\_Form.doc. Double click on the name to download the document with the filename: “SAE\_J2012-DA\_Revision\_Request\_Form.doc”.

It is intended that the revision request form be filled out with the request.

It is intended that e-mails with completed revision request forms as attachments be sent to:

**E-mail: saej1930@sae.org**

**E-mail: saej1979@sae.org**

**E-mail: saej2012@sae.org**

**E-mail: saej1939@sae.org**

# Road vehicles — Implementation of World-Wide Harmonized On-Board Diagnostics (WWH-OBD) communication requirements —

## Part 3: Common message dictionary通用消息词典

### 1 Scope范围

This part of ISO 27145 defines the implementation of a subset of unified diagnostic services (UDS) specified in ISO 14229-1. The diagnostic services are used to communicate the diagnostic data defined in ISO 27145-2. ISO 27145 的这一部分定义了ISO14229-1 中指定的统一诊断服务 (UDS) 子集的实现。诊断服务用于通信 ISO 27145-2 中定义的诊断数据。

The subset of unified diagnostic services derives from the requirements stated in the WWH-OBD GTR (Global technical regulation No. 5; see Reference [17]). The common message set defined in this part of ISO 27145 is independent of the underlying transport, network, data link and physical layer. This part of ISO 27145 does not specify any requirements for the in-vehicle network architecture.

统一诊断服务的子集来源于 WWH-OBD所规定的要求(全球技术法规No.5; 请参阅参考 [17])。ISO 27145 这一部分中定义的公共消息集独立于底层传输、网络、数据链路和物理层。ISO 27145 的这一部分没有为车载网络体系结构指定任何要求。

This part of ISO 27145 is compatible with ISO 14229-1 and includes provisions to support the data set of SAE J1979-DA and SAE J2012-DA WWH-OBD.

ISO 27145 的这一部分与ISO 4229-1 兼容, 包括支持数据集的规定SAE J1979-DA 和SAE J2012-DA WWH-OBD。This part of ISO 27145 is intended for use with ISO 27145-4, which is the entry point for the protocol initialization and is based on two different data links:

ISO 27145 的这一部分用于ISO 27145-4, 它是协议初始化的入口点, 它基于两个不同的数据链接:

- Diagnostic communication over Controller Area Network (DoCAN), ISO 15765-1, ISO 15765-2, ISO 15765-4; 诊断通信通过控制器区域网络(DoCAN), ISO 15765-1, ISO 15765-2, ISO 15765-4
- Diagnostic communication over Internet Protocol (DoIP), ISO 13400 (all parts). 通过互联网协议 (DoIP) 的诊断通信, ISO 13400 (所有部分)

Due to the usage of standard network layer protocols, future extensions to optional physical layers (e.g. wireless) are possible. 由于使用标准网络层协议, 将来可以扩展到可选物理层 (例如无线)。

Based on the results of the initialization, the external test equipment determines which protocol and diagnostic services are supported by the vehicle's emissions-related system, i.e.

根据初始化的结果, 外部测试设备确定了车辆与排放有关的系统支持哪些协议和诊断服务, 即:

- legislated OBD: ISO 15031 (all parts); 法定的OBD: ISO 15031 (所有部分)
- legislated WWH-OBD: ISO 27145 (all parts). 法定的WWH-OBD: ISO 27145(所有部分)

This part of ISO 27145 includes capabilities required to satisfy OBD regulations for multiple regions, vehicle types, model years, and engine types. Those regulations are not yet final for some regions and are expected to change in the future. This part of ISO 27145 does not attempt to interpret the regulations and does not include applicability of the included diagnostic services and data parameters for various vehicle applications. It is intended that users of this part of ISO 27145 verify the applicability of each of its clauses for a specific vehicle, engine, model year and region.

ISO 27145 的这一部分包括满足OBD规定的多个区域、车辆类型、模型年和引擎类型的可执行性标准所需的功能。这些规定对某些地区来说还不是最后的, 预计将来会发生变化。ISO 27145 的这一部分并不试图解释这些规则, 也不包括对各种车辆应用的包括的诊断服务和数据参数的适用性。这部分 ISO 27145 的用户将验证其每一个条款对于特定车辆、引擎、模型年和区域的适用性。

## 2 Normative references 规范性参考文件

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

以下参考文档对于本文档的应用是必不可少的。对于日期引用, 仅适用引用的版本。对于未注明日期的引用, 引用文档的最新版本 (包括任何修订) 适用。

ISO 14229-1, Road vehicles — Unified diagnostic services (UDS) — Part 1: Specification and requirements

ISO 14229-1:-1) 道路车辆. 统一诊断服务 (UDS). 第1部分: 规范和要求

ISO 14229-2, Road vehicles — Unified diagnostic services (UDS) — Part 2: Session layer interfaces

ISO 14229-2 道路车辆. 统一诊断服务 (UDS). 第2部分: 会话层接口

ISO 27145-1, Road vehicles — Implementation of World-Wide Harmonized On-Board Diagnostics (WWH-OBD) communication requirements — Part 1: General information and use case definition

ISO 27145-1 道路车辆. 全球统一的板载诊断 (WWH-OBD) 通信要求的实施. 第1部分: 一般信息和用例定义

ISO 27145-2, Road vehicles — Implementation of World-Wide Harmonized On-Board Diagnostics (WWH-OBD) communication requirements — Part 2: Common data dictionary (CDD)

ISO 27145-2 道路车辆. 全球统一的板载诊断 (WWH-OBD) 通信要求的实施. 第2部分: 公共数据词典

ISO 27145-4, Road vehicles — Implementation of World-Wide Harmonized On-Board Diagnostics (WWH-OBD) communication requirements — Part 4: Connection between vehicle and test equipment

ISO 27145-4 道路车辆. 全球统一的板载诊断 (WWH-OBD) 通信要求的实施. 第4部分: 车辆与试验设备之间的连接

## 3 Terms, definitions and abbreviated terms 术语、定义和缩写术语

### 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 27145-1, ISO 27145-2, ISO 14229-1 and the following apply. 为本文件的目的, ISO 27145-1, ISO 27145-2、ISO 14229-1 中的条款和定义适用

#### 3.1.1

**global technical regulation 全球技术法规**

**GTR**

agreement establishing global technical regulations for wheeled vehicles and equipment and parts that can be fitted and/or used on wheeled vehicles 为轮式车辆和设备及可安装和或用于轮式车辆的部件制定全球技术法规的协议

### 3.2 Abbreviated terms

ASCII	American standard code for information interchange 美国信息交换标准规范
CDTC	confirmed DTC 确定的DTC
DID	diagnostic data identifier 诊断数据标识符
DoCAN	diagnostic communication over controller area network 基于CAN通信的诊断通信
DoIP	diagnostic communication over internet protocol 基于Internet协议的诊断通信
DTC	diagnostic trouble code 诊断故障代码
DTCHB	DTC high byte 诊断故障代码高字节
DTCLB	DTC low byte 诊断故障代码低字节

## ISO 27145-3:2012(E)

DTCMB	DTC middle byte 诊断故障代码中间字节
DTCS	DTC severity 诊断故障代码严重性
ECM	engine control module 发动机控制器
ECU	electronic control unit 电子控制单元
FMI	failure mode indicator 故障模式指示器
FTB	failure type byte 故障类型字节
GTR	global technical regulations 全球技术法规
MI	malfunction indicator 故障指示器
N/A	not applicable 不适用
PDTC	pending DTC 挂起的DTC
PDU	protocol data unit 协议数据单元
RID	routine identifier 常规标识符
SFID	sub-function identifier 子函数标识符
SID	service identifier 服务标识符
SODTC	status of DTC DTC状态
SPN	suspect parameter number 可以参数编码
TNCSLC	test not completed since last clear 自上次清除后测试未完成
TNCTOC	test not completed this operation cycle 此操作周期测试未完成
UDS	unified diagnostic services 统一诊断服务
VIN	vehicle identification number 车辆标识符
WUC	warm-up cycle 暖机循环
WWH-OBD	world-wide harmonized on-board diagnostics 全球统一的板载诊断程序

## 4 Conventions

The ISO 27145 series is based on the conventions discussed in the OSI Service Conventions (ISO/IEC 10731) as they apply to diagnostic services.

ISO27145 系列基于 OSI 服务公约 (ISO/IEC 10731) 中讨论的约定, 因为它们适用于诊断服务。

## 5 Document overview

Figure 2 shows the reference documents for the ISO 27145 series. 图2显示了 ISO 27145 系列的参考文档。

The ISO 27145 series specifies or includes the following references: ISO 27145 系列指定或包含以下引用。

- a) ISO 27145-1 specifies the general structure of the ISO 27145 series and the use cases applicable to WWH-OBD GTR. ISO 27145-1 指定的 ISO 27145 系列的一般结构和 WWH-OBD GTR的适用用例。
- b) ISO 27145-2 specifies the common data dictionary with references to:  
ISO 27145 的这一部分指定通用数据字典, 引用以下文档
  - 1) SAE J1930-DA, which defines the terms, definitions, abbreviated terms, etc.;;  
SAE J1930-DA 定义术语、定义、缩写词等
  - 2) SAE J1939 Companion Spreadsheet, which specifies the SPNs;  
SAE J1939包含的SPNs电子表格
  - 3) SAE J1939-73:2010, Appendix A, which specifies the FMIs;

SAE J1939-73:2010附录A指定的FMIs

- 4) SAE 1979-DA, which specifies all data items;

SAE 1979-DA, 它指定所有数据项

- 5) SAE J2012-DA, which specifies the DTC definitions and FTB definitions.

SAE J2012-DA, 它指定 DTC 定义和 FTB 定义

NOTE The SAE J1939 series of documents is concerned with the definition of emissions-related SPNs and FMIs for use as DTCs.

注意 SAE J1939系列文件涉及与排放相关的SPN和FMIs的定义用作 DTCs。

- c) This part of ISO 27145 specifies the diagnostic services defined in ISO 14229-1 that are applicable to WWH-OBd GTR.

ISO 27145 的这一部分指定了ISO14229-1 中定义的用于 WWH-OBd GTR 的诊断服务。

- d) ISO 14229-2 specifies the standardized service primitive interface to separate application and session layers from protocol transport and network layers.

ISO 14229-2 指定标准化的服务基元接口, 将应用程序和会话层与协议传输和网络层分开。

- e) ISO 27145-4 specifies the initialization procedure and includes references to:

ISO 27145-4 指定初始化过程, 并包括对

- 1) ISO 15765-4 DoCAN;
- 2) ISO 13400 (all parts) DoIP.

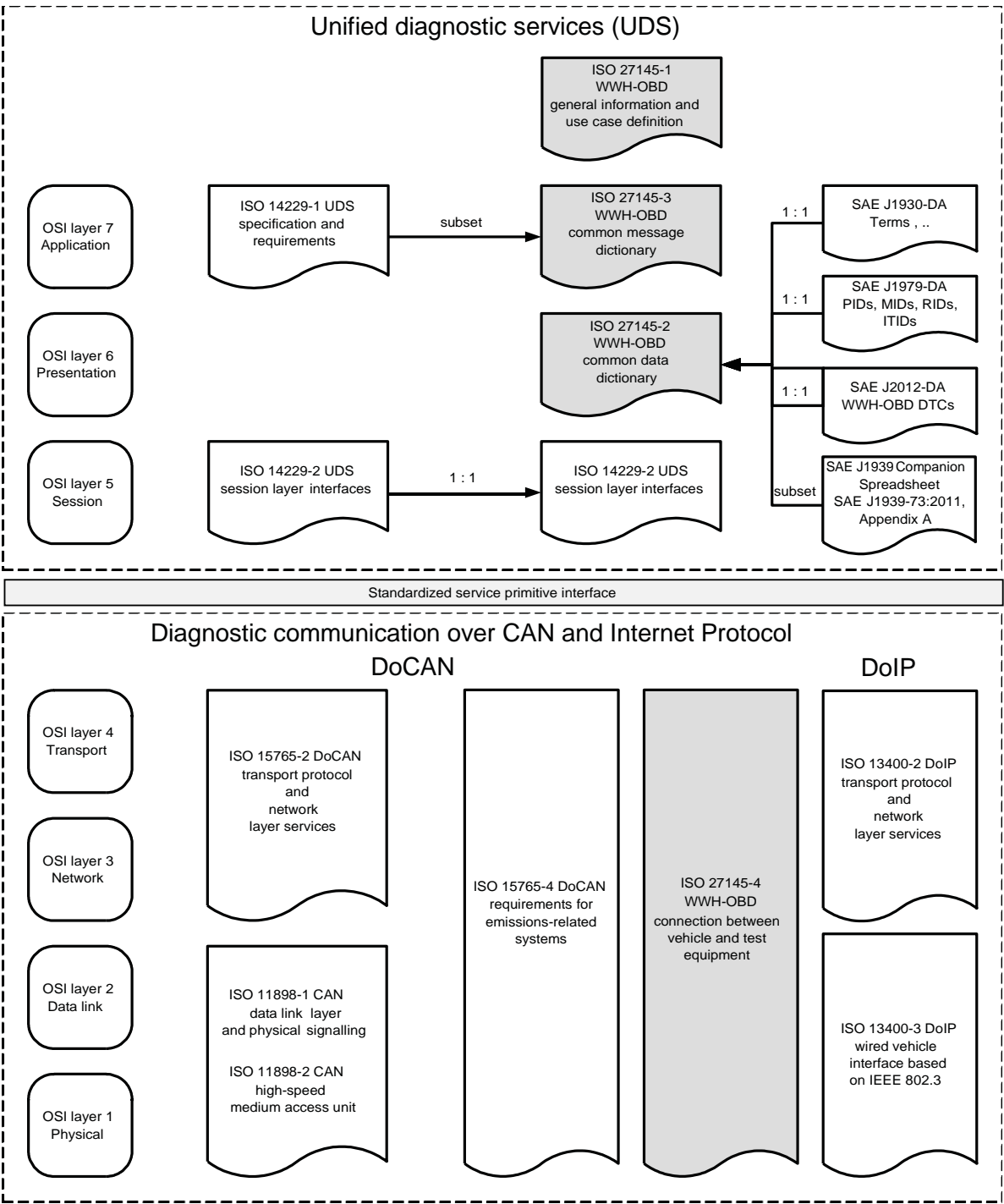


Figure 2 — Reference documents for implementation of WWH-OBDonCAN and WWH-OBDonIP according to the OSI model

## 6 Unified diagnostic services (UDS) applicable to WWH-OBDonCAN

### 6.1 General

This clause defines how the diagnostic services defined in ISO 14229-1 apply to ISO 27145. For each applicable service, the applicable sub-function and data parameters are defined.

该条款定义了ISO14229-1 中定义的诊断服务如何应用于ISO 27145。对于每个适用的服务, 定义了适用的子函数和数据参数。

Subclauses 6.3 to 6.8 define additional requirements and/or restrictions for the ISO 14229-1 services that are supported for WWH-OBD in this part of ISO 27145.

下述条款6.3-6.8定义了ISO14229-1 服务的附加要求和/或限制, 这些业务在ISO 27145 的这一部分支持 WWH-OBD。

**NOTE** The sub-function parameter definitions take into account that the most significant bit is used for the suppressPosRspMsgIndicationBit parameter, as defined in ISO 14229-1.

子函数参数定义考虑到最重要的位用于 suppressPosRspMsgIndicationBit 参数, 如 ISO 14229-1 中定义的那样。

## 6.2 UDS on WWH-OBD overview WWH-OBD的UDS概述

This part of ISO 27145 applies the diagnostic services defined in ISO 14229-1 for WWH-OBD-compliant implementations. Table 2 references the ISO 14229-1 services that apply to UDS implementations which meet WWH-OBD requirements.

ISO 27145 的这一部分将ISO 14229-1中定义的诊断服务应用于 WWH-OBD符合标准的实现。表2引用了适用于满足 WWH-OBD要求的 UDS 实现的 ISO 14229-1 服务。

Table 2 contains all services that apply from ISO 14229-1. For each service, the required support for sub-functions and data parameters is defined. Implementation of additional services from ISO 14229-1, that are not listed in Table 2, is entirely at the discretion of the implementer, except where local regulations define additional requirements. Additional detail for each service is given by the subclause referenced in the rightmost column of Table 2.

表2包含了从 ISO 14229-1 应用的所有服务。对于每个服务, 定义了对子函数和数据参数所需的支持。在表2中没有列出的 ISO 14229-1 的额外服务的执行完全是由实施者自行决定的, 除非地方条例规定了额外的要求。每个服务的附加详细信息由表2最右边的列中引用的小节提供。

**Table 2 — Overview of applicable ISO 14229-1 UDS and data ranges**  
**表2 -适用于ISO14229-1 UDS和数据范围的概述**

UDS name (ISO 14229-1)	SID value	SFID value	Sub-function name	Comment	Ref.
Data transmission functional unit					
ReadDataByIdentifier 按标识符读取数据	0x22	—	N/A	This service provides read capabilities for static and dynamic data. 此服务提供静态和动态数据的读取功能。	6.5
Stored data transmission functional unit					
ReadDTCInformation 读取故障诊断代码信息	0x19	0x04	reportDTCSnapshotRecordBy-DTCNumber 按DTC编号报告DTC快照记录	This service provides read capabilities for DTC information. 此服务为 DTC 信息提供读取功能。	6.6
		0x06	reportDTCExtendedData-RecordByDTCNumber 按DTC编号报告DTC扩展数据记录	The sub-functions are mandatory for WWH-OBD-compliant servers. 子函数对于 WWH-OBD 兼容的服务是必需的。	
		0x42	reportWWHOBDDTCByMask-Record 按掩码记录报告 WWH-OBD DTC		
ClearDiagnostic-Information 清除诊断信息	0x14	—	N/A	This service provides clear DTC information capability. 此服务提供了明确的 DTC 信息功能。  To clear emissions system group information, the parameter groupOfDTC = 0xFFFF33. 要清除排放系统组信息, DTC 的参数组 = 0xFFFF33。	6.7
Remote activation of routine functional unit					
RoutineContro 常规控制	0x31	0x01	startRoutine 开始常规	This service provides control capability for routines. 此服务为常规控制提供功能。  This sub-function is mandatory for WWH-OBD-compliant servers.子函数对于 WWH-OBD符合标准的服务是必需的。	6.8

### 6.3 Electronic control unit (ECU) response message length too long ECU响应消息长度太长

If the ECU response message exceeds the length supported by the underlying network layer that has been implemented, a negative response code 0x14 shall be sent by the ECU instead of a positive response message.

如果ECU响应消息超过了已实现的底层网络层所支持的长度, 则应由ECU发送一个负响应代码0x14, 而不是一个正响应消息。

### 6.4 Message byte order消息字节顺序

Alphanumeric data derived from SAE J1979-DA and SAE J2012-DA shall be transmitted with the most significant byte first (MSB).

从SAE J1979-DA 和SAE J2012-DA 派生的字母数字数据应首先以最重要的字节 (MSB) 传输。

Unless otherwise specified, alphanumeric characters shall conform to the ISO Latin 1 ASCII character set as specified in ISO 27145-2. 除非另行指定, 字母数字字符应符合ISO 27145-2 中指定的ISO拉丁1 ASCII 字符集。

See ISO 27145-2 for the message byte order for DTCs according to SAE J1939 Companion Spreadsheet (SPN) and SAE J1939-73:2010, Appendix A (FMI).

根据 SAE J1939 附属电子表格 (SPN) 和SPN J1939-73:2010 (DTCs) 的消息字节顺序, 请参阅ISO 27145-2。

## 6.5 ReadDataByIdentifier (0x22) service 按标识符读取数据 (0x22) 服务

### 6.5.1 General

This part of ISO 27145 complies with the requirements of ISO 14229-1. Subclause 6.5.2 defines additional requirements or imposes restrictions applicable to the service referenced.

ISO 27145 的这一部分符合ISO 14229-1 的要求。第6.5.2 定义了附加要求或强加了适用于所引用服务的限制。

### 6.5.2 WWH-OBD-specific requirements

#### 6.5.2.1 Requirement — Minimum number of DIDs per request to be supported 要求-每个请求支持的最小 DIDs 数

Table 3 specifies a minimum number of DIDs per request that shall be supported by the server(s) as part of a request message of the service ReadDataByIdentifier, even if the server(s) might not have support for the data referenced by the DID(s).

表3指定了服务作为请求消息的一部分 (按标识符读取) 支持的最小 DIDs 数, 即使服务可能没有对所DIDs参考的数据的支持, 也是如此。

**Table 3 — Requirement definition: Minimum number of DIDs per request to be supported by a server**

表3 --需求定义: 一个服务所支持的每个请求的最小 DIDs 数

Requirement name	Minimum number of DIDs per request to be supported by a server
Affects	WWH-OBD server(s)
Brief description	<p>The ReadDataByIdentifier service allows the client to request data record values from the server(s) identified by one or more DIDs. The client request message contains one or more DataIdentifier values that identify data record(s) maintained by the server (see ISO 27145-2).</p> <p>通过标识符服务读取数据, 客户端可以从一个或多个 DIDs 标识的控制器请求数据记录值。客户端请求消息包含一个或多个标识控制器维护的数据记录的数据标识符值 (请参见 ISO 27145-2)。</p> <p>Upon receiving a ReadDataByIdentifier request, the server shall access the data elements of the records specified by the DID parameter(s) and transmit their value in one single ReadDataByIdentifier positive response message containing the associated dataRecord parameter(s).</p> <p>在通过标识符请求接收读取数据时, 控制器应访问由 "已做" 参数指定的记录的数据元素, 并通过包含相关数据的标识符正响应消息将其值传输到一个单一读取数据中。记录参数。</p>
Requirement	The server shall support at least six DIDs simultaneously in a request and response message if requested by the external test equipment.

## 6.6 ReadDTCInformation (0x19) service 读取 DTC 信息 (0x19) 服务

### 6.6.1 General 一般概述

This part of ISO 27145 complies with the requirements of ISO 14229-1. Subclause 6.6.2 defines additional requirements or imposes restrictions applicable to the service referenced.

ISO 27145 的这一部分符合 ISO 14229-1 的要求。第6.6.2 定义了附加要求或强加了适用于所引用服务的限制。

### 6.6.2 WWH-OBD-specific requirements 特定要求

#### 6.6.2.1 Requirement — DTC format identification DTC格式标识

Table 4 specifies the two DTC formats which shall be supported by the GTR WWH-OBD-compliant server(s) and external test equipment.

表4指定了两种GTR WWH-OBD 符合标准的控制器和外部测试设备支持的DTC 格式。

Table 4 — Requirement definition: DTC format identification

<b>Requirement name</b>	<b>DTC format identification</b>
<b>Affects</b>	Client(s), WWH-OBD server(s)
<b>Brief description</b> <b>简要说明</b>	The DTCFormatIdentifier defined in ISO 14229-1 is a 1-byte parameter value which defines the format of a DTC reported by the server. ISO 14229-1 中定义的 DTC 格式标识符是一个1字节的参数值, 它定义了控制器报告的DTC 的格式。
<b>Requirement</b>	<p>DTCs reported by services and sub-functions in accordance with ISO 27145 shall always use only one of the two formats specified in ISO 27145-2:</p> <p>根据 ISO 27145 的服务和子功能报告的 DTCs 应始终只使用 ISO 27145-2 中指定的两种格式之一:</p> <ul style="list-style-type: none"> <li>— SAE_J2012-DA_DTCFormat_04: This parameter value identifies the WWH-OBD DTC format reported by the server, as defined in the SAE J2012-DA specification. 此参数值标识由控制器报告的 WWH-OBD 的 DTC 格式 (SAE J2012-DA 规范中定义的)。</li> <li>— SAE_J1939-73_DTCFormat: This parameter value identifies the DTC format reported by the server, as defined in the SAE J1939-73 specification. 此参数值标识由控制器报告的 DTC 格式, 如 SAE J1939-73 规范中所定义的那样。</li> </ul> <p>The values of the DTCFormatIdentifier are specified in ISO 14229-1. DTC 格式标识符的值在 ISO 14229-1 中指定。</p>

#### 6.6.2.2 Requirement — Support of DTCStatusAvailabilityMask parameter

##### 需求 --- 支持 DTC 状态可用性掩码参数

Table 5 specifies the bits which are defined in the same way as for statusOfDTC and which represent the status bits that are supported by GTR WWH-OBD-compliant server(s). Bits that are not supported by the server(s) shall be set to 0.

表5指定以与 DTC 状态相同的方式定义的位, 它表示由 GTR WWH-OBD符合标准的控制器支持的状态位。控制器不支持的位应设置为0。

Table 5 — Requirement definition: Support of DTCStatusAvailabilityMask parameter

<b>Requirement name</b>	<b>Support of DTCStatusAvailabilityMask parameter 支持 DTC 状态可用性掩码参数</b>
<b>Affects</b>	WWH-OBD server(s)
<b>Brief description</b>	<p>The DTCStatusAvailabilityMask parameter indicates the statusOfDTC bits supported by GTR WWH-OBD-compliant server(s).</p> <p>DTC状态可用性掩码参数指示由 GTR 支持的 dtc 位的状态WWH-OBD兼容的控制器。</p> <p>NOTE It is up to the manufacturer to support additional bits per DTC as deemed necessary to fully support their diagnostics. 这是由制造商支持额外的比特每 DTC 认为必要的, 以充分支持他们的诊断。</p>
<b>Requirement</b>	<p>The GTR WWH-OBD-compliant server shall support at least the following statusOfDTC parameter</p> <p>GTR WWH-OBD 符合标准的控制器应至少支持 DTC 参数的以下状态</p> <p>bits per DTC: DTC的每个位</p> <ul style="list-style-type: none"> <li>— bit 2, pendingDTC (PDTTC); 待定DTC</li> <li>— bit 3, confirmedDTC (CDTC); 已确认DTC</li> <li>— bit 4, testNotCompletedSinceLastClear (TNCSLC); 自上次清除后测试未完成</li> <li>— bit 6, testNotCompletedThisOperationCycle (TNCTOC). 测试未完成此操作周期</li> </ul> <p>The values of the DTCStatusAvailabilityMask parameter are specified in ISO 14229-1. DTC 状态可用性掩码参数的值在 ISO 14229-1 中指定。</p>

#### 6.6.2.3 Requirement — Support of DTCSeverityAvailabilityMask parameter

##### 支持 DTC 严重性可用性掩码参数

Table 6 specifies the bits which are defined in the same way as for DTCSeverity and DTC Class and which represent the status bits that are supported by GTR WWH-OBD-compliant server(s). Bits that are not supported by the server(s) shall be set to 0. 表6指定的位, 其定义方式与DTC严重性和DTC类相同, 并且表示由GTR WWH-OBD符合标准的控制器支持的状态位。控制器不支持的位应设置为0



Table 6 — Requirement definition: Support of DTCSeverityAvailabilityMask parameter

Requirement name	Support of DTCSeverityAvailabilityMask parameter
Affects	WWH-OBD server(s)
Brief description	The DTCSeverityAvailabilityMask parameter indicates the DTC Class bits supported by GTR WWH-OBD-compliant server(s). DTC严重性可用性掩码参数指示由 GTR WWH-OBD 兼容控制器支持的 DTC 类别。
Requirement	<p>The GTR WWH-OBD-compliant server shall support at least the following DTC Class parameter bits: GTR WWH-OBD符合标准的控制器应至少支持以下 DTC 类参数位</p> <ul style="list-style-type: none"><li>— bit 1, Class_1 (Class A);</li><li>— bit 2, Class_2 (Class B1);</li><li>— bit 3, Class_3 (Class B2);</li><li>— bit 4, Class_4 (Class C).</li></ul> <p>The values of the DTC Class parameter are specified in ISO 14229-1. DTC 类参数的值在 ISO 14229-1 中指定。</p>

6.6.2.4 Requirement — Request mask handling of DTC Severity Mask Record  
DTC 严重性掩码记录请求掩码处理

The requirements specified in this section allow for the implementation of the malfunction classification concept defined in the GTR WWH-OBD, Module B, section 4.5 (see Reference [17]).  
本节中指定的要求允许实现在 GTR WWH-OBD中定义的故障分类概念, 模块 B, 4.5 节 (见参考资料 [17])

Table 7 specifies the WWH-OBD GTR DTC masking requirements. The following definitions apply:

- AND, OR logical operation; 与, 或逻辑操作
- & bitwise AND; 按位和
- && logical AND; 逻辑和
- == equal to (comparison operator); 等于 (比较运算符)
- = assignment operator; 赋值运算符
- != not equal to. 不等于

6.6.2.5 GTR WWH-OBD DTC status diagram 状态图

Figure 3 shows an implementation example of the GTR WWH-OBD DTC state timings depending on operation cycle and monitoring results. Additionally, the diagram describes related states of the DTC status bits defined by ISO 14229-1/ISO 27145. Finally, the diagram illustrates how the client displays GTR WWH-OBD-compliant DTC states based on the ISO 14229-1 status bit definitions. Reusing the DTC status bit definitions forces a specific implementation of the GTR WWH-OBD DTC status requirements but fully satisfies them. 图3显示了基于操作周期和监视结果的 GTR WWH DTC 状态计时的实现示例。此外, 该关系图还描述由ISO14229-1/iso 27145定义的DTC状态位的相关状态。最后, 该关系图阐释了客户端如何根据ISO 14229-1状态位定义显示与WWH兼容的DTC状态。重用DTC 状态位定义会强制特定的GTR WWH DTC状态要求的实现, 但完全满足它们。

The following conditions apply:

- A DTC will be reported as “Confirmed & Active” for this operation sequence where the malfunction occurs again after the DTC has been reported as “Previously Active”. 对于此操作序列,DTC将被报告为 "已确认并处于激活状态", 在将DTC报告为 "以前处于激活状态" 之后再次出现故障。
- Since the DTC status is changed from “Previously Active” to “Confirmed & Active” one operation sequence earlier than required, presuming the DTC was in “Previously Active” state, the related MI (short/continuous) illuminates one operation sequence prior to when required. 由于DTC状态从 "以前活动" 更改为 "已确认和活动" 的一个操作序列比所需的早, 假定DTC处于 "以前处于活动状态", 相关的 MI (短/连续) 照亮了一个操作序列, 然后在必填。
- The warm-up cycle counter indicating the number of cycles during which a DTC was in “Previously Active” status (aging counter) counts upward from zero (0) only if the related MI has been de-activated. 暖机循环计数器指示 DTC 在 "以前活动" 状态 (老化计数器) 中的周期数, 仅当相关 MI 已被取消激活时, 才从零 (0) 开始计数。

The implementation shown in Figure 3 is an example and for illustration purposes only. It shows the discriminatory malfunction indicator (MI) for Class B2 malfunctions. 图3所示的实现是一个示例, 仅供说明之用。它显示了对类 B2 故障的歧视性故障指示器 (MI)。

When mapping the GTR DTC status to DTC status bits (statusOfDTC) defined according to ISO 14229-1, the definitions in Table 8 apply.

将 GTR DTC状态映射到根据 ISO 14229-1 定义的DTC状态位 (DTC状态) 时, 定义在表8中应用。

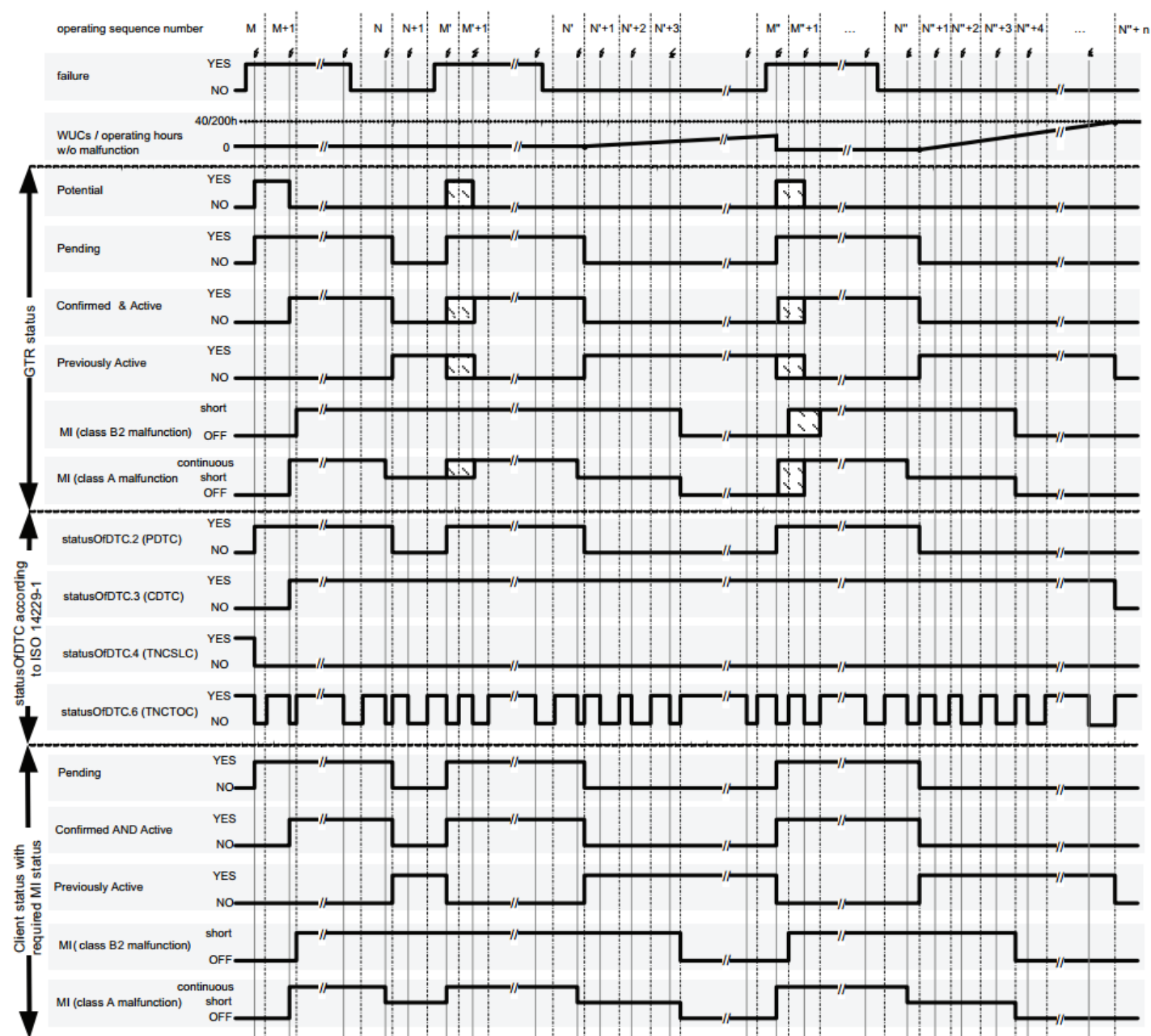
**Table 7 — Requirement definition: Request mask handling of DTC Severity Mask Record**

Requirement name	Request mask handling of DTC Severity Mask Record DTC 严重性掩码记录请求掩码处理
Affects	Client(s), server(s)
Brief description	<p>The DTC Severity Mask Record consists of three different request mask elements, namely the DTC Severity Mask byte and the DTC Status Mask, where the DTC Severity Mask byte is separated into DTC Severity Mask (bits 5-7) and DTC Class Mask (bits 0-4). Each of these three mask elements needs to be processed separately for each individual DTC that an ECU supports. A DTC is only included in the positive response to a sub-function 0x42 request if at least the processing of the DTC Status Mask and the DTC Class Mask yielded a non-zero result.</p> <p>DTC 严重性掩码记录由三不同的请求掩码元素组成, 即DTC严重性掩码字节和 dtc 状态掩码, 其中 dtc 严重性掩码字节被分隔为DTC严重性掩码 (bits 5-7) 和DTC类掩码 (bits 0-4)。每一个这三掩码元素都需要单独处理 ECU 支持的每个单独的 DTC。如果至少处理 dtc 状态掩码和DTC类掩码产生非零结果, 则 DTC仅包含在对子函数0x42 请求的正响应中。</p>
Pre-requisites 先决条件	<ul style="list-style-type: none"> <li>Each individual WWH-OBd-relevant DTC is assigned to a unique fault class (A, B1, B2, C). This means that, for each DTC of functional group 0x33, an ECU shall set one bit out of the four dedicated DTC class bits to one (1), indicating that the respective DTC belongs to one unique fault class. 每个单独的 WWH-OBd 相关的DTC 被分配到一个唯一的故障类 (A、B1、B2、C)。这意味着, 对于功能组0x33 的每个DTC, ECU 应将四专用DTC 类位中的一个位设置为一个 (1), 表明各自的DTC属于一个唯一的故障类。</li> <li>When requesting DTCs by sub-function 0x42, the DTC Severity Mask (bit 5-7) shall only be considered if at least one bit of this mask element is set to one. 当通过子函数0x42 请求 DTCs 时, 仅当此掩码元素的至少一个位被设置为一个时, 才会考虑 DTC 严重性掩码 (bit 5-7)。</li> </ul>
Requirement	<p>If the server does not implement DTC Severity, the GTR WWH-OBd-compliant server/ECU shall perform a bitwise logical ANDing of 如果控制器不实现 DTC 严重性, 则GTR WWH-OBd 符合标准的控制器/ECU 应执行按位逻辑与</p> <ul style="list-style-type: none"> <li>the DTC Status Mask and the actual DTC Status, and DTC状态掩码和实际DTC状态, 以及</li> <li>the requested DTC Class Mask and the actual DTC class 请求的DTC类掩码和实际 DTC 类</li> </ul> <p>for each DTC upon request of the test equipment. 每个 DTC 应要求测试设备。</p> <p>The positive response message shall include only those DTCs for which both ANDing operations yielded a non-zero result. 正面响应信息应只包括那些 DTCs, 这两个与操作产生了一个非零结果。</p> <p><b>(((DTCStatusMask &amp; statusOfDTC) !=0) &amp;&amp; ((DTCClassMask &amp; actual DTC class) !=0)) == TRUE</b></p> <p>If the server implements DTC Severity, the GTR WWH-OBd-compliant server/ECU shall perform a bitwise logical ANDing of 如果控制器实现 DTC 严重性, 则 WWH 符合标准的控制器/ECU 应执行按位逻辑与</p> <ul style="list-style-type: none"> <li>the DTC Status Mask and the actual DTC Status, DTC状态掩码和实际DTC状态</li> <li>the requested DTC Severity Mask and the actual DTC Severity, and 请求的 DTC 严重性掩码和实际 DTC 严重性, 以及</li> <li>the requested DTC Class Mask and the actual DTC class 请求的 DTC类掩码和实际 DTC 类</li> </ul> <p>for each DTC upon request of the test equipment. 对于每个 DTC 应要求测试设备</p> <p>The positive response message shall include only those DTCs for which all three ANDing operations yielded a non-zero result. 正面响应信息应仅包括所有三个与操作产生非零结果的 DTCs。</p> <p><b>(((DTCStatusMask &amp; statusOfDTC) !=0) &amp;&amp; ((DTCClassMask &amp; actual DTC class) !=0) &amp;&amp; ((DTCSeverityMask &amp; actual DTC Severity) !=0)) == TRUE</b></p>

**Table 8 — Mapping of GTR WWH-OB DTC status and ISO 14229-1 statusOfDTC**  
**WWH-OB D 的 DTC 状态和 DTC 的 ISO 14229-1 状态映射**

DTC status according to GTR WWH-OB D	DTC status bits (statusOfDTC) according to ISO 14229-1 根据 ISO 14229-1 的 DTC 状态位 (DTC 的状态)	
Potential 潜在	Pending AND (NOT Confirmed) 待定和 (未确认)	statusOfDTC.2 (PDTC) AND [NOT statusOfDTC.3 (CDTC)] DTC.2 (PDTC) 的状态和 [不存在 DTC.3 的状态 (CDTC)]
Pending 待定	Pending 待定	statusOfDTC.2 (PDTC) DTC 的状态 2 (PDTC)
Confirmed AND Active 确认和活动	Confirmed AND Pending 确认和待定	statusOfDTC.3 (CDTC) AND statusOfDTC.2 (PDTC) DTC3 (CDTC) 的状态 和 DTC2 的状态 (PDTC)
Previously Active 以前活动	Confirmed AND (NOT Pending) 确认和待定	statusOfDTC.3 (CDTC) AND [NOT statusOfDTC.2 (PDTC)] DTC.3 (CDTC) 的状态和 [不存在 DTC.2 的状态. (PDTC)]





## Key

- ⤴ point at which monitoring of the concerned malfunction occurs 发生有关故障的监视点
- ◻ status defined by the manufacturer as allowed by the GTR 由制造商根据 GTR 的允许定义的状态
- // operating sequence 操作顺序
- M first operating sequence during which a malfunction is detected 检测到故障时的第一个操作序列
- N first operating sequence during which no malfunction is detected 未检测到故障的第一个操作序列
- M', N' second operating sequence during which a malfunction is detected/no malfunction is detected  
检测到故障的第二个操作序列/未检测到故障
- M'', N'' third operating sequence during which a malfunction is detected/no malfunction is detected  
检测到故障的第三个操作序列/未检测到故障

**Figure 3 — GTR WWH-OBD DTC status diagram**

Table 9 defines examples based on the minimum requirements for how the client retrieves one or multiple GTR WWH-OBD DTC(s) of a specific status and class. This table covers all use cases required by the GTR WWH-OBD, Module B. The request message has been defined under the assumption that the server does not support DTC Severity (i.e. bits 7–5 = 0). 表9 根据客户端检索特定状态和类的一个或多个GTR WWH DTC 的最低要求来定义示例。本表涵盖了GTR WWH-OBD, 模块 B 所需的所有使用案例。请求消息是在假定控制器不支持 DTC 严重性 (即 bits7–5=0) 的假设下定义的。

Table 9 — WWH-OB DTC retrieval examples WWH-OB DTC 检索示例

DTC status and class as defined in the use cases of ISO 27145-1	Request (Req.) and Response (Resp.) message		DTCStatus-Mask	DTC Severity-Mask byte
			bits 7 ... 0	bits 7 ... 0
Confirmed and Active DTCs for Class A malfunctions  DTC format = SAE_J2012-DA_DTCFormat_04  The client shall identify the DTCs matching the confirmed and active status – remove all other DTCs from the result list. 客户端应识别与确认的和活动状态匹配的 DTCs-从结果列表中删除所有其他 DTCs。  See Figure 4 for a description of client behaviour.	Req.	0x19, 0x42, 0x33, 0x08, 0x02	0000 1000 <sub>b</sub>	0000 0010 <sub>b</sub>
	Resp.	0x59, 0x42, 0x33, 0x5C, 0x1E, 0x04, [0x02, DTCHB, DTCMB, DTCLB, SODTC] ..., [...]		
Confirmed and Active DTCs for Class B (B1 and B2) malfunctions  DTC format = SAE_J2012-DA_DTCFormat_04  The client shall identify the DTCs matching the confirmed and active status – remove all other DTCs from the result list.  See Figure 5 for a description of client behaviour.	Req.	0x19, 0x42, 0x33, 0x08, 0x0C	0000 1000 <sub>b</sub>	0000 1100 <sub>b</sub>
	Resp.	0x59, 0x42, 0x33, 0x5C, 0x1E, 0x04, [0x0C, DTCHB, DTCMB, DTCLB, SODTC] ..., [...]		
Confirmed and Active DTCs for Class C malfunctions  DTC format = SAE_J2012-DA_DTCFormat_04  The client shall identify the DTCs matching the confirmed and active status – remove all other DTCs from the result list.  See Figure 6 for a description of client behaviour.	Req.	0x19, 0x42, 0x33, 0x08, 0x10	0000 1000 <sub>b</sub>	0001 0000 <sub>b</sub>
	Resp.	0x59, 0x42, 0x33, 0x5C, 0x1E, 0x04, [0x10, DTCHB, DTCMB, DTCLB, SODTC] ..., [...]		
Pending DTCs and their associated class  DTC format = SAE_J2012-DA_DTCFormat_04  The client shall identify the DTCs matching the pending status – remove all other DTCs from the result list.  See Figure 7 for a description of client behaviour.	Req.	0x19, 0x42, 0x33, 0x04, 0x1E	0000 0100 <sub>b</sub>	0001 1110 <sub>b</sub>
	Resp.	0x59, 0x42, 0x33, 0x5C, 0x1E, 0x04, [DTCS, DTCHB, DTCMB, DTCLB, SODTC] ..., [...]		
Previously Active DTCs and their associated class  DTC format = SAE_J2012-DA_DTCFormat_04  The client shall identify the DTCs matching the previously active status – remove all other DTCs from the result list.  See Figure 8 for a description of client behaviour.	Req.	0x19, 0x42, 0x33, 0x08, 0x1E	0000 1000 <sub>b</sub>	0001 1110 <sub>b</sub>
	Resp.	0x59, 0x42, 0x33, 0x5C, 0x1E, 0x04, [DTCS, DTCHB, DTCMB, DTCLB, SODTC] ..., [...]		

Figures 4 to 8 illustrate the definition of the client's request message and the server's action in order to provide the requested DTC information in a positive response message.

图4到8说明了客户端请求消息的定义和控制器的操作，以便在正响应消息中提供请求的 DTC 信息。

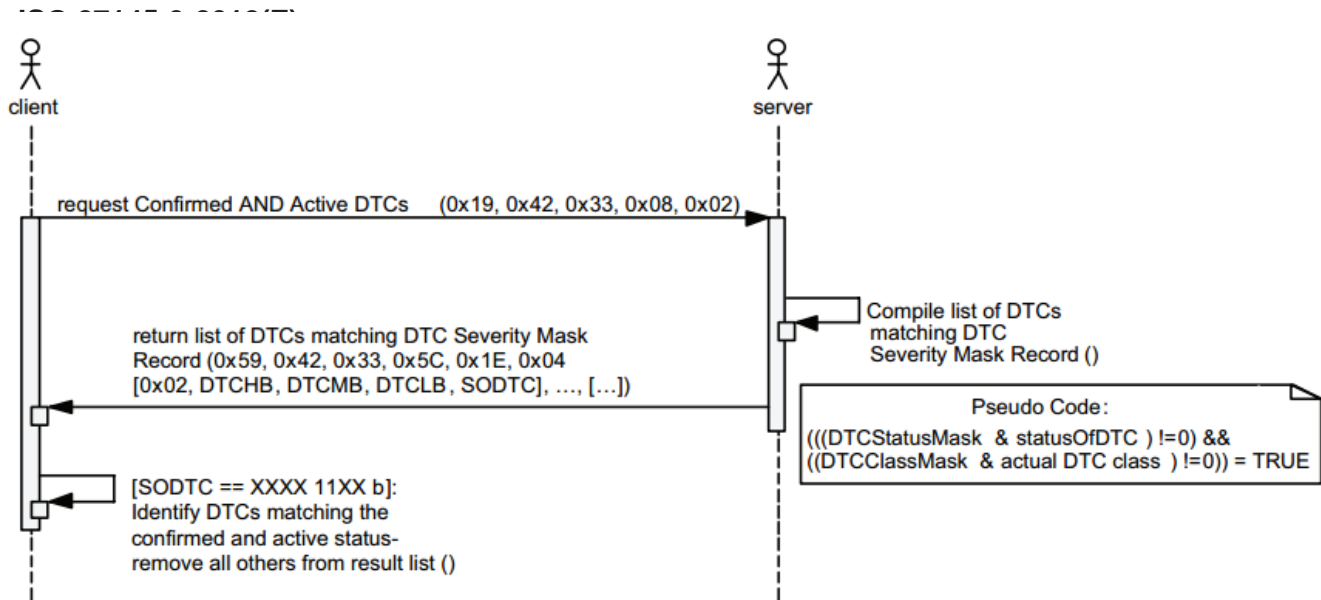


Figure 4 — Retrieval of Confirmed AND Active DTCs of Class A malfunctions

A 类故障确认和主动 DTCs 的检索

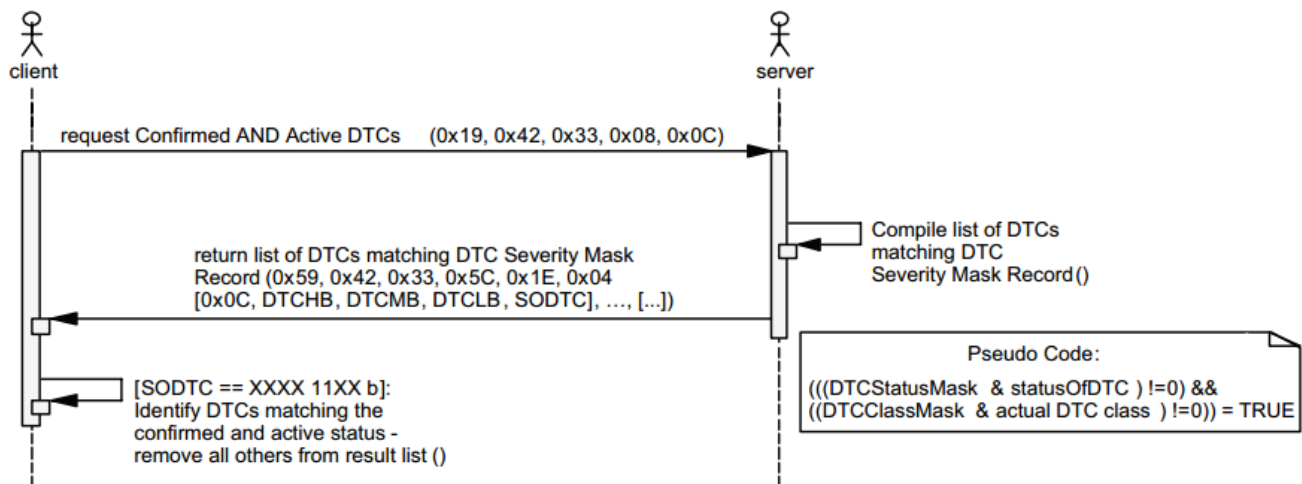


Figure 5 — Retrieval of Confirmed AND Active DTCs of Class B1 and B2 malfunctions

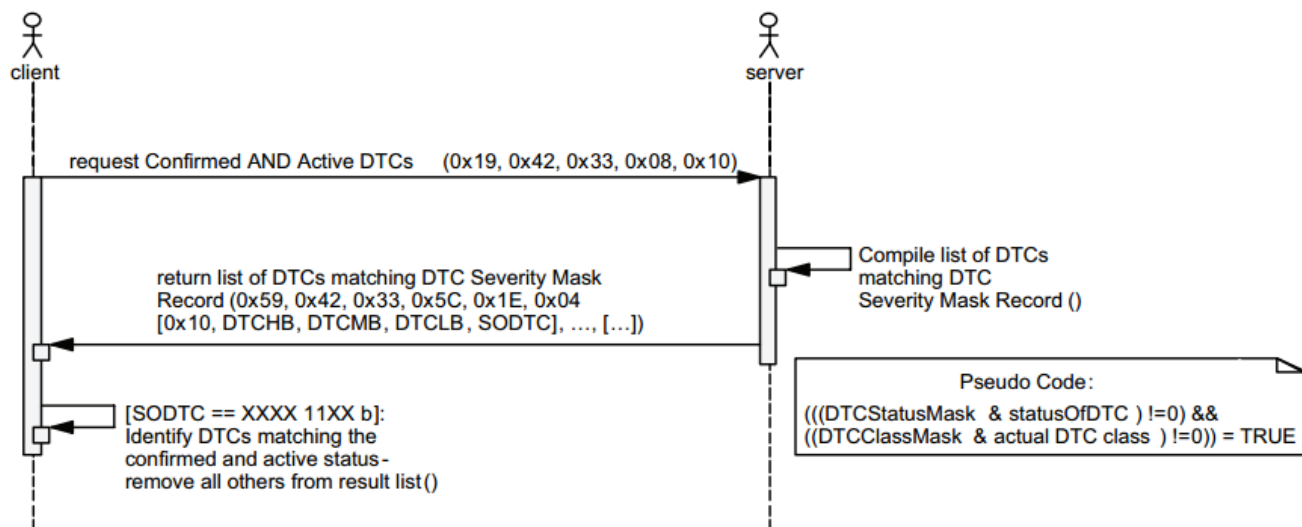


Figure 6 — Retrieval of Confirmed AND Active DTCs of Class C malfunctions

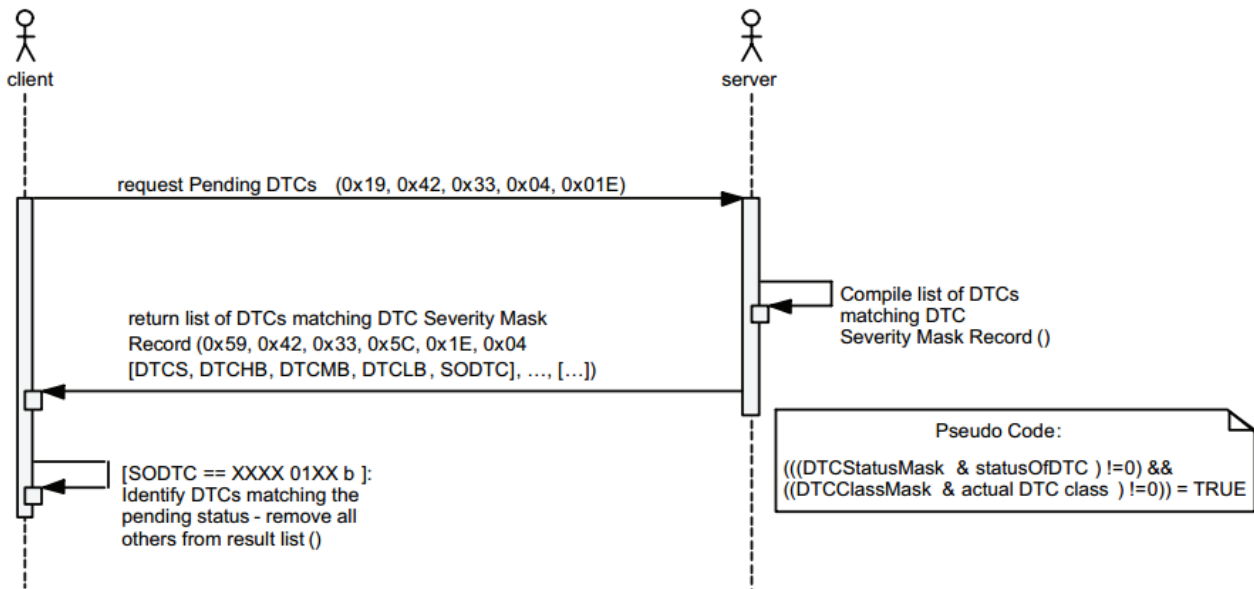
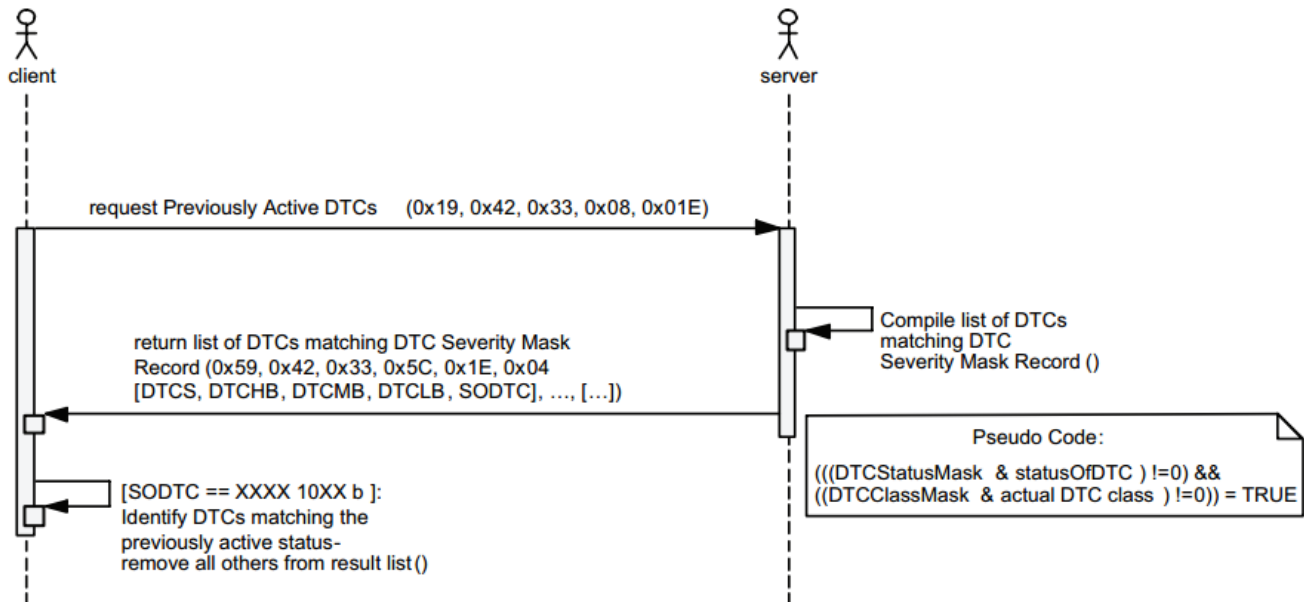


Figure 7 — Retrieval of Pending DTCs and their associated class

Figure 8 — Retrieval of Previously Active DTCs and their associated class  
历史DTCs 及其关联类的检索

#### 6.6.2.6 Requirement — FunctionalGroupIdentifier 功能组标识符

Table 10 specifies the purpose and requirements of the FunctionalGroupIdentifier.  
 表10指定了功能组标识符的用途和要求。

Table 10 — Requirement definition: FunctionalGroupIdentifier

<b>Requirement name</b>	<b>FunctionalGroupIdentifier</b> 功能组标识符
<b>Affects</b>	Client(s), server(s)
<b>Brief description</b>	<p>The FunctionalGroupIdentifier has been introduced to distinguish commands sent by the test equipment between different functional system groups within an electrical architecture which consists of many different servers. If a server has implemented software of the emissions system as well as other systems which may be inspected during an I/M test, it is important that only the DTC information of the requested functional system group is reported. An emissions I/M test should not be failed because another functional system group, e.g. safety system group, has DTC information stored.</p> <p>已引入功能组标识符,以区分由许多不同控制器组成的电气系统结构中不同功能系统组之间的测试设备发送的命令。如果控制器已实现了排放系统的软件以及在I/M测试期间可能检查的其他系统,则只报告请求的功能系统组的 DTC 信息很重要。排放量I/M测试不应失败,因为另一个功能系统组(如安全系统组)已存储 DTC 信息。</p> <p>The values of the FunctionalGroupIdentifier are specified in ISO 14229-1. 功能组标识符的值在 ISO 14229-1 中指定。</p>
<b>Requirement</b>	The FunctionalGroupIdentifier value for the WWH-OBd emissions system group is defined in ISO 14229-1. WWH-OBd 排放系统组的功能组标识符值定义在ISO 14229-1。

### 6.6.3 WWH-OBd-specific ReadDTCInformation service examples

WWH-OBd-specific ReadDTCInformation service examples are described in A.3.

在附件A.3中描述了 WWH-OBd 特定的读取 DTC 信息服务示例。

## 6.7 ClearDiagnosticInformation (0x14) service 清除诊断信息 (0x14) 服务

### 6.7.1 General

This part of ISO 27145 complies with the requirements of ISO 14229-1. Subclause 6.7.2 defines additional requirements or imposes restrictions applicable to the service referenced.

ISO 27145 的这一部分符合ISO14229-1 的要求。第6.7.2 定义了附加要求或强加了适用于所引用服务的限制。

### 6.7.2 WWH-OBd-specific requirements

#### 6.7.2.1 Requirement — Clear all WWH-OBd DTC information

Table 11 defines which DTC-related information shall be cleared in the server's memory when receiving the appropriate request message. 定义了在接受适当的请求消息时,控制器内存中应清除哪些 DTC 相关信息。

Table 11 — Requirement definition: Clear all WWH-OBd DTC information

<b>Requirement name</b>	<b>Clear all WWH-OBd DTC information</b>
<b>Affects</b>	All WWH-OBd system servers/ECUs
<b>Brief description</b>	<p>The purpose of the ClearDiagnosticInformation service is to enable test equipment to erase/reset DTC-related information stored/captured by the server after a malfunction of the GTR WWH-OBd-compliant system was detected. This service is used by technicians after performing a system repair. 清除诊断信息服务的目的是使测试设备在检测到 WWH-OBd符合标准的系统的故障后,能够清除/重置由控制器存储/捕获的 DTC 相关信息。技术人员在执行系统修复后使用此服务。</p> <p>NOTE Depending on the electronic system design, it is not guaranteed that the resetting operations which are linked to the ClearDiagnosticInformation service request will be completed before the vehicle powers down completely, thus a battery supply voltage disconnect immediately after sending the request might result in the information still being available when the vehicle is powered up again. 注意 根据电子系统的设计,不保证与清晰诊断信息服务请求相链接的复位操作将在车辆完全关闭之前完成,因而电池供电电压发送请求后立即断开连接可能会导致在车辆再次通电时仍然可用的信息。</p>
<b>Requirement</b>	<p>The server shall clear the following information after successful reception of the ClearDTCInformation request message with the groupOfDTC parameter set to "ClearAllWWHOBDDTC" and the FunctionalGroupIdentifier set to "emissions system group":</p> <p>控制器应在成功接收清除DTC信息请求消息后清除以下信息,并将DTC参数组设置为 "清除所有 WWHOBDDTC",并将功能组标识符设置为 "排放系统组":</p> <ul style="list-style-type: none"> <li>— malfunction indicator status (value to be reset); 故障指示器状态 (要重置的值)</li> <li>— readiness of the OBD system (value to be reset); 对系统的准备 (将重置的价值);</li> <li>— number of engine operating hours since activation of the malfunction indicator (continuous MI counter) (data to be erased); 自故障指示器激活以来的引擎运行小时数 (连续 MI计数器) (要擦除的数据);</li> <li>— all DTCs (data to be erased);</li> <li>— B1 counter(s) (reset to the value specified in the regulation); B1 计数器 (重置为规则中指定的值);</li> <li>— number of engine operating hours from the B1 counter(s) (value to be reset); 从 B1 计数器 (要重置的值) 中的发动机工作小时</li> <li>— freeze frame data (snapshot record data) requested by this module/ECU (data to be erased).模块或 ECU所要求的冻结帧数据 (要删除的数据)</li> </ul>

NOTE 1 Other manufacturer-specific “clearing/resetting” actions can also occur in response to this request message.

其他制造商特定的“清理/重置”操作也可能在响应此请求消息时发生

NOTE 2 The list given in Table 11 is current at the time of publication of this part of ISO 27145. It is the vehicle manufacturer's responsibility to take into account changes to regulations and additional local requirements in order to address any conflicts between the list above and applicable regulations.

表11所列的清单是本部分 ISO 27145 出版时的最新情况。这是汽车制造商的责任, 考虑到法规和额外的地方要求的变化, 以解决上述清单和适用的条例之间的任何冲突。

### 6.7.3 WWH-OBD-specific ClearDiagnosticInformation service examples

#### WWH-OBD明确的清除诊断信息服务示例

WWH-OBD-specific ClearDiagnosticInformation service examples are described in A.4. 在附件A.4中描述。

## 6.8 RoutineControl (0x31) service 常规控制 (0x31) 服务

### 6.8.1 WWH-OBD-specific requirements

#### 6.8.1.1 General

This part of ISO 27145 complies with the requirements as defined in ISO 14229-1. This subclause defines additional requirements or restrictions applicable to the service referenced.

ISO 27145 的这一部分符合ISO 14229-1 中定义的要求。本小节定义了适用于所引用服务的附加要求或限制。

#### 6.8.1.2 Requirement — Activate on-board control routines and report test results

##### 激活板载控制例程并报告测试结果

Table 12 defines how to activate on-board control routines and report test results.

**Table 12 — Requirement definition: Activate on-board control routine and report test results**

Requirement name	Activate on-board control routine and report test results
Affects	WWH-OBD-compliant ECUs which support control routines specified in SAE J1979-DA WWH-OBD符合的ECUs支持在 SAE J1979-DA 中指定的控制例程
Brief description	The purpose of the RoutineControl service is to enable external test equipment to start a control routine within the server in order to activate an EVAP test, for example. This service is used by technicians, for example to perform a validation of the EVAP system regarding whether a previously performed repair has been completed with success. 常规控制服务的目的是使外部测试设备能够在控制器中启动一个控制例程, 以EVAP (燃油蒸发控制系统)测试, 例如。技术人员使用此服务, 例如, 对EVAP系统进行验证, 了解以前执行的修复是否已成功完成。
Requirement	The server shall start the execution of the requested control routine if the vehicle meets all conditions required to perform the control routine (e.g. engine running/engine not running). 如果车辆满足执行控制例程所需的所有条件 (例如引擎运行/引擎未运行), 则控制器应开始执行所请求的控制例程。  The RoutineControl service can only be commanded by the external test equipment if supported by the server (RIDs supported). 常规控制服务只能由外部测试设备 (如果控制器支持) 来命令 (RIDs支持)。  The sub-function startRoutine shall be supported by RoutineControl service. 子功能启动例程应由常规控制服务支持。  The RoutineInfo byte is mandatory for any routine where the routineStatusRecord is defined by the SAE J1979-DA (i.e. defined in routineStatusRecord of RID 0xE000 – 0xE1FF) even if the defined size of the routineStatusRecord equals zero (0) data bytes. The definition of the RoutineInfo byte shall be left to the vehicle manufacturer and shall not be interpreted by the WWH-OBD-compliant external test equipment. 即使常规状态记录的定义大小等于零 (0) 数据字节, 常规状态记录由 SAE J1979-DA 定义 (即在 RID 0xE000 0xE1FF routineStatusRecord 中定义), 例行信息字节也是必需的。常规信息字节的定义应留给汽车制造商, 不应由 WWH 符合标准的外部测试设备解释。  For a detailed definition of the RoutineControl service, see ISO 14229-1. 有关常规控制服务的详细定义, 请参阅 ISO 14229-1。

### 6.8.2 RoutineControl (0x31) service examples

WWH-OBD-specific RoutineControl service examples are described in A.2.

## 7 Application layer requirements 应用程序层要求

### 7.1 Application layer services

This part of ISO 27145 uses the application layer services defined in ISO 14229-1 for client-server based systems, to perform functions such as test, inspection, monitoring or diagnosis of on-board vehicle servers.  
iso 27145 的这一部分使用ISO14229-1 中为基于客户端控制器的系统定义的应用程序层服务, 以执行在车载控制器上的测试、检查、监视或诊断等功能。

## 7.2 Application layer protocol

This part of ISO 27145 uses the application layer protocol defined in ISO 14229-1.  
ISO 27145 的这一部分使用ISO 14229-1 中定义的应用程序层协议

## 7.3 Addressing and timing requirements寻址和计时要求

### 7.3.1 General

To ensure a clear understanding of the data-link-dependent application layer timings, this document differentiates between two major timing concepts.

为了确保清楚地了解与数据链路相关的应用程序层计时, 本文档区分了两个主要计时概念。

For WWH-OBD-compliant systems using the data link defined in ISO 15765 (DoCAN), the response time is measured at the beginning of the reception of a response message (see the definition of timing parameter P2 given in Table 15).

对于使用 ISO 15765 (DoCAN) 中定义的数据链接的 WWH-OBD符合标准的系统, 响应时间是在响应消息接收开始时测量的 (请参见表15中给定的计时参数 P2 的定义)。

For WWH-OBD-compliant systems using the data link defined in ISO 13400 (DoIP), the response time is measured when the response has been completely received (see the definition of timing parameter P6 given in Table 14).

对于使用 ISO 13400 (DoIP) 中定义的数据链接的 WWH-OBD 符合标准的系统, 响应时间是在完全接收响应时测量的 (请参见表14中给定的计时参数 P6 的定义)。

Consequently, the values to be defined for P6 depend on the response length of the message to be received.  
因此, 为 P6 定义的值取决于要接收的消息的响应长度。

Although the P2 values compared to the P6 values seem to imply a faster application layer timing because the values are smaller, the total time needed to transfer a complete response to the test equipment will generally be faster on DoIP, although the maximum P6 value is initially set to a longer value than the P2 value.

虽然与 P6 值相比, P2 值似乎意味着更快的应用程序层计时, 因为这些值较小, 但将整个响应传输到测试设备所需的总时间通常在 DoIP 上更快, 尽管最大 P6 值为最初设置为比 P2 值更长的值。

ISO 13400 DoIP P6<sub>Client</sub> timeout differs (longer timeout) from that given in ISO 15765-4 DoCAN. (See the calculations defined in Table 14 and Table 15.)

ISO 13400 DoIP P6<sub>Client</sub> 超时 (长时间超时) 与ISO 15765-4 DoCAN 中提供的时间不同。(请参见表14和表15中定义的计算。)

**NOTE** All message timing definitions assume that there is no additional processing time needed for passing data and status information between the individual OSI layers. Thus if the test equipment is running on an operating system that introduces processing delays between the individual OSI layer software stacks, this needs to be taken into account separately by the external test equipment application; it is not specified in this part of ISO 27145.

**注意** 所有消息定时定义假定在各个OSI 层之间传递数据和状态信息时不需要额外的处理时间。因此, 如果测试设备在一个操作系统上运行, 其中介绍了单个OSI 层软件栈之间的处理延迟, 则需要由外部测试设备应用程序单独考虑这一问题;此部分未指定 ISO 27145。

### 7.3.2 GTR WWH-OBD use cases and addressing methods应用案例和寻址方式

Table 13 specifies the GTR WWH-OBD use cases and addressing methods of a WWH-OBD-compliant server/ECU in order to achieve consistent timing behaviour between WWH-OBD-compliant servers/ECUs and WWH-OBD-compliant external test equipment.

表13 指定了一个WWH-OBD符合的服务/ECU的GTR WWH-OBD的使用案例和寻址方法, 以实现WWH-OBD符合标准的控制器/ECUs 和 WWH-OBD符合标准的外部测试设备之间的一致定时行为。

Table 13 — GTR WWH-OBD use cases and addressing methods

Requirement name	GTR WWH-OBD use cases and addressing methods		
Affects	Client/external test equipment based on ISO 27145-6 基于 ISO 27145-6 的客户端/外部测试设备		
Brief description	The purpose of this requirement is to define message length constraints for individual WWH-OBD use cases in order to achieve consistent response timing behaviour between WWH-OBD-compliant servers/ECUs and WWH-OBD-compliant external test equipment. The transmission time of a response message from a server/ECU depends on the payload of the message [length of protocol data unit (PDU)]. The more data bytes included in a response message, the more transmission time is needed. 此要求的目的是为单个WWH OBD的使用案例定义消息长度约束, 以便在WWH-OBD 符合标准的控制器/ECUs 和 WWH-OBD符合标准的外部测试设备之间实现一致的响应定时行为。来自控制器/ECU 的响应消息的传输时间取决于消息的有效负载 (协议数据单元 (PDU) 的长度)。响应消息中包含的数据字节越多, 需要的传输时间就越多。		
Applicability	Applicable use cases 适用用例	Functional addressing 功能寻址	Physical addressing 物理寻址
	a) Protocol-supported identification request 协议支持的标识请求 [SID: 0x22, DID: 0xF810: Read out "protocol identification" (0x01 = ISO 27145-4)]	supported by server/ECU	optional
	b) VIN (vehicle identification number) [SID: 0x22, DID: 0xF802]	supported by server/ECU	optional
	c) ISO 27145-1 use case #1 <b>Vehicle roadworthiness</b> . The WWH- OBD vehicle OBD system information includes consolidated and packeted data items about the vehicle's roadworthiness status to support a functionally addressed request and a single response message including all required data items from one server/ECU at the roadside [SID: 0x22; DID: 0xF490] which contains ISO 27145-1 用例 #1 : 车辆行驶。WWH-OBD车载系统信息包括有关车辆的行车状态的整合和 打包数据项, 以支持功能寻址请求和单一响应消息, 包括来自一台控制器/ECU 的所有必需数据项在路边 [SID: 0x22;DID: 0xF490] 其中包含 — discriminatory/non-discriminatory display strategy, 歧视性/非~显示战略 — presence of a continuous MI, 存在一个连续的 MI — readiness status of the OBD system, and 系统的就绪状态 — number of engine operating hours for which the continuous MI was last activated (continuous MI counter). 上次激活连续MI的引擎运行小时数 (连续MI计数器)。	supported by server/ECU	optional
	d) Clear all WWH-OBD DTCs in all WWH-OBD servers/ECUs of a specific vehicle [0x14 0xFF 0xFF 0x33] 清除所有 WWH-OBD的DTCs在所有WWH-OBD的控制器/ECUs 的特定车辆 [0x14 0xFF 0xFF 0x33]	supported by server/ECU	optional
	e) WWH-OBD ECU OBD system information includes packeted data items about the WWH-OBD-compliant ECU's roadworthiness status in order to support a physically addressed request and a single response message including all required data items from that server/ECU [SID: 0x22; DID: 0xF491] which contains WWH-OBD 的ECU OBD系统信息包括:打包数据项关于 WWH-OBD 符合标准的ECU的车辆状态, 以支持物理寻址请求和单一的响应消息, 包括来自该控制器/ECU 的所有必需数据项的状态, 以满足此要求 [SID: 0x22;DID: 0xF491] 其中包含: — discriminatory/non-discriminatory display strategy, — presence of a continuous MI, — number of engine operating hours for which the continuous MI was last activated (continuous MI counter), and — highest ECU B1 counter. 最高的 ECU B1 计数器	optional	supported by server/ECU
	f) All WWH-OBD data retrieval except the use case in which functional addressing applies. 所有WWH-OBD的数据检索, 除了应用功能寻址的用例。	optional	supported by server/ECU
	<b>IMPORTANT — a) through c) shall only be requested as a single DID per request message, in order to comply with the server/ECU response performance requirement (see Table 14 and Table 15).</b> 重点---- a) 通过 c) 应只要求作为一个单一的DID 每一个请求消息, 以满足控制器/ECU 的响应性能要求 (见表14和表 15)。 NOTE All data items are specified in SAE J1979-DA. 注意: 所有数据项都在 SAE J1979-DA 中指定。		
Requirement	— <b>Functional addressing</b> shall be used by the external test equipment only if use cases a) through d) apply. 只有当用例 a) 到d) 时, 外部测试设备才应使用功能寻址。 — <b>Physical addressing</b> shall be used by the external test equipment if use case e) or f) applies. 如果使用案例 e) 或 f) , 外部测试设备应使用物理寻址		

**7.3.3 ISO 13400 DoIP message timing definition for WWH-OBD use cases****WWH-OBD应用案例中 ISO 13400 DoIP 消息定时定义**

The message timing definition specified in this subclause shall ensure that a WWH-OBD GTR-compliant vehicle can respond within its response performance required. 本款规定的信息定时定义应确保 WWH-OBD GTR符合标准的车辆能够在其响应性能要求内作出反应。

The WWH-OBD message timing definition for the default diagnostic session shall be in accordance with Table 14. 默认诊断会话的 WWH-OBD 的消息定时定义应与表14相一致。

**Table 14 — Message timing definition for ISO 13400 DoIP in defaultSession**

Timing parameter	Definition	Minimum [ms]	Maximum [ms]
$\Delta P6^a$	The $\Delta P6$ parameter is defined to be the worst-case vehicle-network-design-dependent message transmission delay, such as delays introduced by gateways and bus-load arbitration delay. The value of $\Delta P6$ is divided between the time to transmit the request to the addressed server/ECU ( $\Delta P6_{\text{request}}$ ) and the time to transmit the response to the client/tester ( $\Delta P6_{\text{response\_part1}}$ ). It also depends on the request/response message length ( $\Delta P6_{\text{response\_part2}}$ ). $\Delta P6$ 参数被定义为最坏情况下与网络设计相关的消息传输延迟, 如网关引入的延迟和总线负载仲裁延迟。 $\Delta P6$ 的值被划分为将请求发送到寻址控制器/ECU ( $\Delta P6_{\text{request}}$ ) 的时间和将响应传递给客户端/测试人员 ( $\Delta P6_{\text{response\_part1}}$ ) 的时间。它还取决于请求/响应消息长度 ( $\Delta P6_{\text{response\_part2}}$ )。	> 0	50 to 4 950
$P2_{\text{Server}}$	The $P2_{\text{Server}}$ parameter is a performance requirement for the server/ECU to start with the response message after reception of a request message. $P2_{\text{Server}}$ 参数是控制器/ECU 在接收请求消息后从响应消息开始的性能要求。	0	50
$P6_{\text{Client}}^b$	The $P6_{\text{Client}}$ parameter timeout is in order for the client to wait after the successful transmission of a request for the start of incoming response messages. $P6_{\text{Client}}$ 参数超时是为了让客户端在成功传输传入响应消息的请求之后等待。 $P6_{\text{Client\_min}} = P2_{\text{Server\_max}} + \Delta P6_{\text{max}}$	100 to 5 000 <sup>c</sup>	— <sup>d</sup>
$P2^*_{\text{Server}}$	The $P2^*_{\text{Server}}$ parameter is a performance requirement for the server to start with the response message after the transmission of a negative response message with the negative response code 0x78 (enhanced response timing). $P2^*_{\text{Server}}$ 参数是控制器在使用负响应代码 0x78 (增强的响应定时) 传输负响应消息后从响应消息开始的性能要求。	0 <sup>e</sup>	5 000
$P6^*_{\text{Client}}^b$	The $P6^*_{\text{Client}}$ parameter is the enhanced timeout in order for the client to wait after reception of a negative response message with the negative response code (NRC) 0x78 for the start of incoming response messages ( $P2^*_{\text{Server\_max}} + \Delta P2_{\text{max}}$ ). $P6^*_{\text{Client}}$ 参数是增强的超时, 以便客户端在接收到带有负响应代码 (NRC) 0x78 的负响应消息 ( $P2^*_{\text{Server\_max}} + \Delta P2_{\text{max}}$ ) 后等待。 $P6^*_{\text{Client\_min}} = P2^*_{\text{Server\_max}} + \Delta P6_{\text{max}}$	5 050 to 9 950 <sup>f</sup>	— <sup>g</sup>
$P3_{\text{Client\_Phys}}$	The $P3_{\text{Client\_Phys}}$ parameter is the minimum time for the client to wait after successful transmission of a physically addressed request message with no response required before the next physically addressed request message can be transmitted. $P3_{\text{Client\_Phys}}$ 参数是客户端在成功传输物理寻址请求消息后等待的最短时间, 并且在发送下一个物理寻址请求消息之前不需要响应。 $P3_{\text{Client\_Phys}} = P2_{\text{Server\_max}} + \Delta P6_{\text{max}}$	100	— <sup>h</sup>
$P3_{\text{Client\_Func}}$	The $P3_{\text{Client\_Func}}$ parameter is the minimum time for the client to wait after successful transmission of a functionally addressed request message before the next functionally addressed request message can be transmitted, in the case that no response is required or that the requested data is only supported by a subset of the functionally addressed servers. $P3_{\text{Client\_Func}}$ 参数是客户端在功能寻址请求消息成功传输之前等待的最短时间, 在发送下一个功能寻址请求消息之前, 如果不需要响应或请求的数据仅由功能寻址控制器的子集支持。 $P3_{\text{Client\_Func}} = P2_{\text{Server\_max}} + \Delta P6_{\text{max}}$ Note that even if no response is required, the server can send an NRC 0x78 response in the case that the execution of the requested service takes more time and is not possible within $P2_{\text{Server}}$ (50 ms), followed by the final response. If this scenario applies, the client shall enable $P6^*_{\text{client}}$ timeout handling. 请注意, 即使不需要响应, 控制器也可以发送一个 NRC 0x78 响应, 在该情况下, 请求的服务的执行需要更多的时间, 在 $P2_{\text{Server}}$ (50 毫秒) 内是不可能的, 然后最后的响应。如果此方案适用, 客户端应启用 $P6^*_{\text{client}}$ 超时处理。	100	— <sup>h</sup>

Table 14 (continued)

<p><sup>a</sup> The parameter <math>\Delta P6</math> takes into account any (worst-case) vehicle-network-design-dependent message transmission delays and depends on the request/response length: <math>\Delta P6 = \Delta P6_{Request} + \Delta P6_{Response}</math> 参数<math>\Delta P6</math> 考虑到任何 (最坏情况下) 与车辆网络设计相关的消息传输延迟, 并取决于请求/响应长度</p> <p>These delays, introduced for example by gateways, baudrates, transmission times and safety margins, can be mapped on a length-dependent dynamic value: 这些延迟 (例如通过网关、波特率、传输时间 和 安全边距) 可以映射到与长度相关的动态值</p> <p><math>\Delta P6 = \Delta P6_{Request} + \Delta P6_{Response}</math></p> <p><math>\Delta P2 = \Delta P6_{Request} + \Delta P6_{Response\_part1} + \Delta P6_{Response\_part2} = 50 \text{ ms} + [0,85 \text{ ms/byte} \times (\text{response length} - 6 \text{ bytes})]</math></p> <p>where</p> <p><math>\Delta P6_{Request} = 30 \text{ ms}</math> fix value for short requests;  <math>\Delta P6_{Response\_part1} = 20 \text{ ms}</math> fix value for short responses;  <math>\Delta P6_{Response\_part2} = [0,85 \text{ ms/byte} \times (\text{response length} - 6 \text{ bytes})]</math>;  <math>\Delta P6_{Response} = 20 \text{ ms} + [0,85 \text{ ms/byte} \times (\text{response length} - 6 \text{ bytes})]</math>;  with response length <math>\geq 6</math> bytes.</p> <p>The factor 0,85 ms/byte is based on typical values for system design parameters like separation time and baudrate. 因子 0, 85 ms/字节是基于典型值的系统设计参数, 如分离时间和波特。</p> <p>The data length factor (response length – 6 bytes) represents the gain of transmission time due to rising response length (PDU data). 数据长度因子 (响应长度–6字节) 表示由于响应长度的增加 (PDU 数据) 而传输时间的增益。</p> <p>— Minimum value <math>\Delta P6_{min} \approx 50 \text{ ms}</math> (short request with short response and response length <math>\leq 6</math> bytes).</p> <p>— Maximum value <math>\Delta P6_{max} \approx 4\,950 \text{ ms}</math> (4 095 bytes PDU).</p> <p>Based on this calculation the following performance requirement depending on the request/response message length shall be fulfilled by the vehicle: 根据这一计算, 根据请求/响应消息长度, 以下性能要求应由车辆完成。</p> <p><math>\Delta P6 \leq 50 \text{ ms}</math> for all requests with response data length (PDU) <math>\leq 6</math> bytes;</p> <p><math>\Delta P6 \leq 50 \text{ ms} + [0,85 \text{ ms/byte} \times (\text{response length} - 6 \text{ bytes})]</math> for all requests with response data length (PDU) <math>&gt; 6</math> bytes.</p>	<p><sup>b</sup> In ISO 13400 DoIP, the timer for <math>P6_{Client}</math> is started by receiving the Confirmation Acknowledge of the DoIP gateway. <math>P6_{Client}</math> and <math>P6^*_{Client}</math> are stopped when the complete message is received. 在 ISO 13400 DoIP 中, <math>P6_{Client}</math> 的计时器通过接收 DoIP 网关的确认确认来启动。当接收到完整消息时, <math>P6_{Client}</math>和<math>P6^*_{Client}</math> 停止。</p>	<p><sup>c</sup> The <math>P6_{Client}</math> timeout value depends on the addressing method and the kind of data requested: <math>P6_{Client}</math> 超时值取决于寻址方法和所请求的数据类型。</p> <p>— generic timeout for physical request: <math>P6_{Client} = 5\,000 \text{ ms}</math>; 物理请求的一般超时</p> <p>— timeout for functional request for identification with unknown number of responses: <math>P6_{Client} = 100 \text{ ms}</math>; 具有未知响应数的功能请求的超时时间</p> <p>— timeout for selected functional requests with known number of short requests and responses: <math>P6_{Client} = 100 \text{ ms}</math>. 使用已知短请求和响应数的选定功能请求超时</p> <p>Negative responses, including the first response with response code 0x78, follow the performance requirement for the ECU and are expected to arrive at the external test equipment within <math>P6_{Client} = 100 \text{ ms}</math>. 负响应 (包括响应代码0x78 的第一个响应) 遵循 ECU 的性能要求, 预计将到达 <math>P6_{Client} = 100</math>毫秒内的外部测试设备。</p>	<p><sup>d</sup> The maximum value used for <math>P6_{Client}</math> to wait for complete reception of the corresponding response message is left to the discretion of the client as long as it is greater than the specified minimum value of <math>P6_{Client}</math>. However, the vehicle has to respond within the minimum value of <math>P6_{Client}</math>. <math>P6_{Client}</math> 等待接收相应响应消息的最大值是由客户端自行决定的, 只要它大于指定的 <math>P6_{Client}</math> 的最小值。然而, 车辆必须在 <math>P6_{Client}</math> 的最小值内作出反应。</p>	<p><sup>e</sup> During enhanced response timing, the minimum time between transmission of consecutive negative response messages (each with negative response code 0x78) shall be <math>0,3 \times P2^*_{Server\_max}</math> in order to avoid flooding the data link with unnecessary negative response code 0x78 messages. 在增强响应时间时, 连续的负响应消息 (每个带有负响应代码 0x78) 之间的最短时间应为 <math>0,3 \times P2^*_{Server\_max}</math>, 以避免用不必要的负响应代码淹没数据链路。0x78 消息。</p>	<p><sup>f</sup> The minimum value of <math>P6^*_{Client}</math> shall be chosen according to the definition for <math>P6_{Client}</math>:最小值应根据 <math>P6_{Client}</math> 的定义选择。</p> <p>— functional requests: 5 050 ms;</p> <p>— physical requests: 9 950 ms.</p>	<p><sup>g</sup> The maximum value a client uses for <math>P6^*_{Client}</math> to wait for complete reception of the corresponding response message is left to the discretion of the client as long as it is greater than the specified minimum value of <math>P6^*_{Client}</math>. However, the vehicle has to respond within the minimum value of <math>P6^*_{Client}</math>. 客户端使用的最大值<math>P6^*_{Client}</math>等待对响应消息的完全接收时, 只要它大于指定的<math>P6^*_{Client}</math>的最小值, 即可由客户端自行决定。然而, 车辆必须在<math>P6^*_{Client}</math>的最小值内作出反应。</p>	<p><sup>h</sup> The maximum time a client waits until it transmits the next request message is at the discretion of the client. 客户端在发送下一个请求消息之前等待的最大时间是客户端的酌处权。</p>
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**IMPORTANT — For WWH-OBD, the timing definitions in this part of ISO 27145 take precedence over other related documents. 对于 WWH-OBD, ISO 27145 这一部分的时间定义优先于其他相关文档。**

Figure 9 illustrates a functional request message from the client to the DoIP gateway and which the DoIP gateway forwards on to the WWH-OBD-compliant CAN network. The WWH-OBD-compliant servers send response messages which the DoIP gateway transmits to the client. The same sequence also applies to the physical request from the client to the vehicle. 阐释了从客户端到 DoIP 网关的功能请求消息, 以及 DoIP 网关转发到 WWH-OBD兼容的CAN网络。WWH-OBD兼容的控制器发送DoIP网关传送给客户端的响应消息。同样的序列也适用于从客户端到车辆的物理请求。

NOTE The CAN network as part of the entire vehicle network in Figure 9 is an example only. 请注意, 作为图9中整个车辆网络的一部分, CAN 网络只是一个示例。

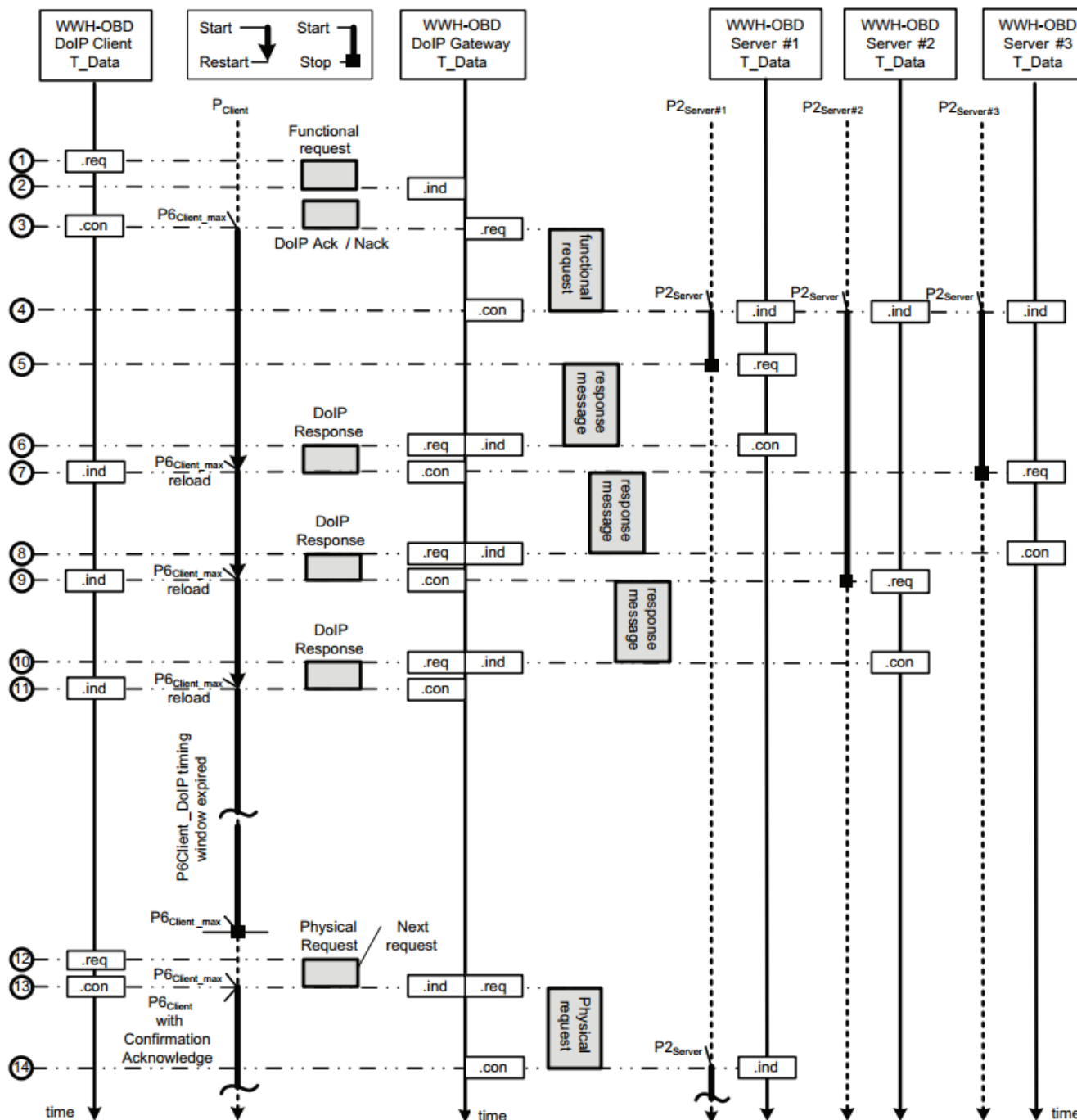


Figure 9 — ISO 13400 DoIP timing diagram

## Key

- 1 **Client T\_Data.req:** diagnostic application issues a functionally addressed request message to the DoIP network layer. 诊断应用程序向 DoIP 网络层发出功能寻址的请求消息。
- 2 **Gateway DoIP T\_Data.ind:** network layer issues to gateway application the indication of the reception of a request message. 网络层问题到网关应用程序接收请求的指示消息。
- 3 **Client T\_Data.con:** network layer issues to diagnostic application the confirmation of the completion of the functionally addressed request message. Client starts the  $P_{Client}$  timer with  $P_{Client} = P6_{Client\_max}$ . 将网络层问题诊断应用于功能寻址请求消息的完成确认。客户端使用  $P_{Client} = P6_{Client\_max}$  启动  $P_{Client}$  计时器。

**Gateway DoIP:** application issues an Acknowledge/No Acknowledge frame to the DoIP client. 应用程序向 DoIP 客户端发出确认/不确认帧。

**Gateway DoCAN T\_Data.req:** gateway application forwards the functionally addressed request by issuing a T\_Data.req to the DoCAN network layer. 网关应用程序通过发出 T\_Data 转发功能寻址的请求给 DoCAN 网络层。

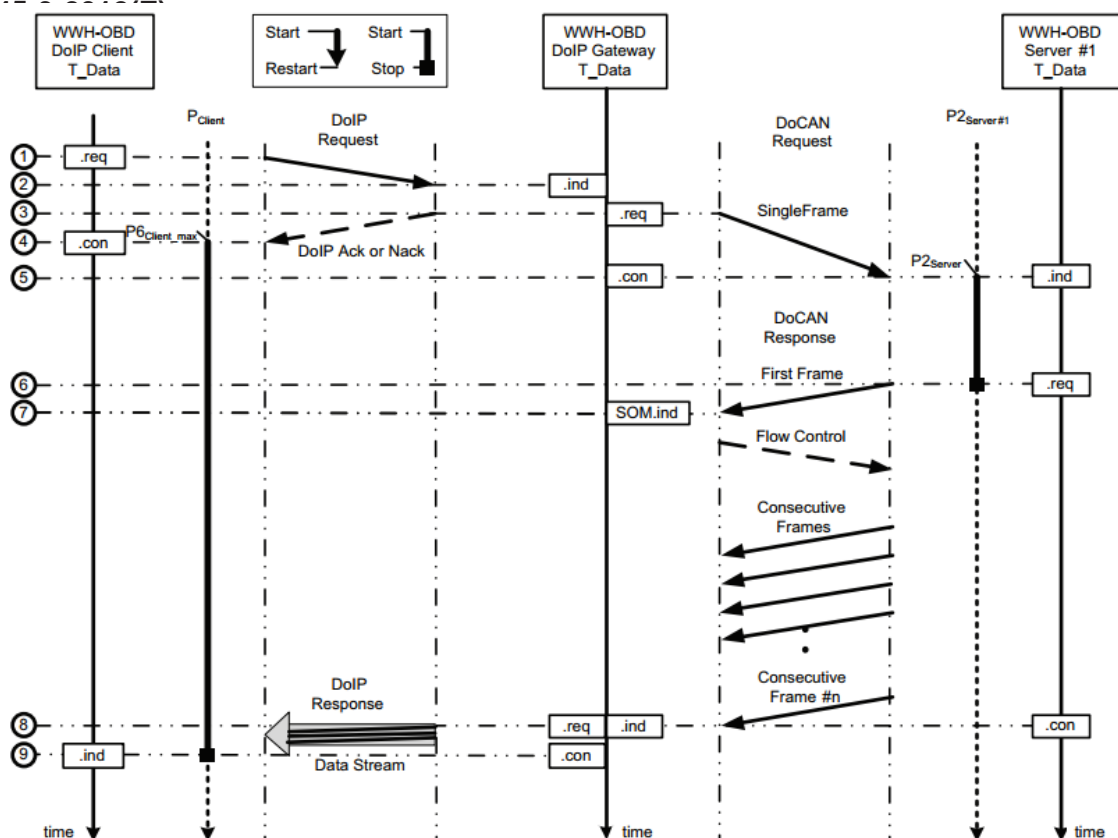
- 4 **Gateway DoCAN T\_Data.con:** network layer issues to gateway application the confirmation of the completion of the request message. 网络层问题到网关应用程序的确认完成请求消息。

**Servers #1, #2, and #3 DoCAN T\_Data.ind:** network layer issues to diagnostic application the indication of the reception of a request message. Servers #1, #2, and #3 start their  $P2_{Server}$  timers using the default reload value  $P2_{Server} =$

P2Server\_max. 网络层问题到诊断应用程序接收请求消息的指示。控制器 #1、#2 和 #3 使用默认重新加载值 P2Server\_max 启动其 P2Server 计时器。

- 5 **Server #1 DoCAN T\_Data.req:** diagnostic application has prepared the response message and issues a T\_Data.req to network layer within P2Server. Server #1 stops the P2Server timer. 诊断应用程序已准备好响应消息, 并向 P2Server 中的网络层发出 T\_Data req。控制器 #1 停止 P2Server 计时器。
- 6 **Server #1 DoCAN T\_Data.con:** network layer issues to diagnostic application the confirmation of the completion of the response message. 网络层问题诊断应用程序确认响应消息的完成。  
**Gateway DoCAN T\_Data.ind:** network layer issues to gateway application the indication of the reception of the response message. 网络层问题到网关应用程序接收的指示响应消息。  
**Gateway DoIP T\_Data.req:** gateway application forwards the response by issuing a T\_data.req to the DoIP network layer. 网关应用程序通过向 DoIP 网络层发出 T\_data 来转发响应。
- 7 **Gateway DoIP T\_Data.con:** network layer issues to gateway application the confirmation of the completion of the response message. 网络层问题到网关应用程序响应消息完成的确认  
**Client T\_Data.ind:** network layer issues to diagnostic application the indication of the reception of the response message. Client reloads the PClient timer with PClient = P6Client\_max. 网络层问题到诊断应用程序接收响应消息的指示。客户端用 PClient = P6Client\_max 重新加载 PClient 计时器。  
**Server #3 DoCAN T\_Data.req:** diagnostic application has prepared the response message and issues a T\_Data.req to network layer within P2Server. Server #3 stops the P2Server timer. 诊断应用程序已准备好响应消息, 并向 P2Server 中的网络层发出 T\_Data。控制器 #3 停止 P2Server 计时器。
- 8 **Server #3 DoCAN T\_Data.con:** network layer issues to diagnostic application the confirmation of the completion of the response message. 网络层问题诊断应用程序确认响应消息的完成  
**Gateway DoCAN T\_Data.ind:** network layer issues to gateway application the indication of the reception of the response message. 网络层问题到网关应用响应消息接收的指示  
**Gateway DoIP T\_Data.req:** gateway application forwards the response by issuing a T\_data.req to the DoIP network layer. 网关应用程序通过向 DoIP 网络层发出 T\_data 来转发响应。
- 9 **Gateway DoIP T\_Data.con:** network layer issues to gateway application the confirmation of the completion of the response message. 网络层问题到网关应用确认响应消息的完成。  
**Client T\_Data.ind:** network layer issues to diagnostic application the indication of the reception of the response message. Client reloads the PClient timer with PClient = P6Client\_max. 网络层问题到诊断应用程序接收响应消息的指示。客户端用 PClient = P6Client\_max 重新加载 PClient 计时器。  
**Server #2 DoCAN T\_Data.req:** diagnostic application has prepared the response message and issues a T\_Data.req to network layer within P2Server. Server #2 stops the P2Server timer. 诊断应用程序已准备好响应消息, 并向 P2Server 中的网络层发出 T\_Data。控制器 #2 停止 P2Server 计时器。
- 10 **Server #2 DoCAN T\_Data.con:** network layer issues to diagnostic application the confirmation of the completion of the response message. 网络层问题诊断应用程序确认响应消息的完成  
**Gateway DoCAN T\_Data.ind:** network layer issues to gateway application the indication of the reception of the response message. 网络层问题到网关应用程序接收响应消息的指示  
**Gateway DoIP T\_Data.req:** gateway application forwards the response by issuing a T\_data.req to the DoIP network layer. 网关应用程序通过向 DoIP 网络层发出 T\_data 来转发响应。
- 11 **Gateway DoIP T\_Data.con:** network layer issues to gateway application the confirmation of the completion of the response message. 网络层问题到网关应用确认响应消息的完成  
**Client T\_Data.ind:** network layer issues to diagnostic application the indication of the reception of the response message. Client reloads the PClient timer with PClient = P6Client\_max. The PClient timer expires when it reaches P6Client\_max, indicating that no more responses are forthcoming. 网络层问题到诊断应用程序接收响应消息的指示。客户端用 PClient = P6Client\_max 重新加载 PClient 计时器。PClient 计时器在到达 P6Client\_max 时过期, 表明不再有响应。
- 12 **Client T\_Data.req:** diagnostic application issues a physically addressed request message to the DoIP network layer. 诊断应用程序向 DoIP 网络层发出物理寻址的请求消息。
- 13 **Client T\_Data.con:** network layer issues to diagnostic application the confirmation of the completion of the physically addressed request message. Client starts the PClient timer with PClient = P6Client\_max. 网络层问题到诊断应用程序完成物理寻址请求消息的确认。客户端使用 PClient = P6Client\_max 启动 PClient 计时器  
**Gateway DoIP T\_Data.ind:** network layer issues to gateway application the indication of the reception of a request message. 网络层问题到网关应用程序接收请求的指示消息  
**Gateway DoCAN T\_Data.req:** gateway application forwards the physically addressed request by issuing a T\_Data.req to the DoCAN network layer. 网关应用程序通过向 DoCAN 网络层发出 T\_Data 来转发物理寻址请求。
- 14 **Gateway DoCAN T\_Data.con:** network layer issues to gateway application the confirmation of the completion of the request message. 网络层问题到网关应用程序请求消息完成的确认  
**Servers #1 DoCAN T\_Data.ind:** network layer issues to diagnostic application the indication of the reception of a request message. Server #1 starts its P2Server timer using the default reload value P2Server = P2Server\_max. 网络层问题到诊断应用程序接收请求消息的指示。控制器 #1 使用默认重新加载值 P2Server = P2Server\_max 启动其 P2Server 计时器。

Figure 10 illustrates a store-and-forward mechanism where it collects multiple frame responses in the DoIP gateway before it transmits a single response to the client. 说明了一种存储转发机制, 它在 DoIP 网关中收集多个帧响应, 然后再将单个响应发送到客户端。



## Key

- 1 **Client T\_Data.req:** diagnostic application issues a physically addressed request message to the network layer. 诊断应用程序向网络层发出物理寻址的请求消息。
- 2 **Gateway DoIP T\_Data.ind:** network layer issues to application the indication of the reception of a request message. 网络层问题应用于请求消息接收的指示
- 3 **Gateway DoIP:** application issues an Acknowledge/No Acknowledge (Ack/Nack) frame to the DoIP client. 应用程序向 DoIP 客户端发出确认/不确认 (Ack/Nack) 帧  
**Gateway DoCAN T\_Data.req:** application issues a physically addressed request message to the network layer. 应用程序向网络层发出物理寻址的请求消息
- 4 **Client T\_Data.con:** network layer issues to diagnostic application the reception of an acknowledge/no acknowledge from the DoIP Gateway. Client starts the  $P_{Client}$  timer with  $P_{Client} = P6_{Client\_max}$ . 网络层问题到诊断应用程序接收确认/不承认从 DoIP 网关。客户端使用  $P_{Client} = P6_{Client\_max}$  启动  $P_{Client}$  计时器。
- 5 **Server #1 DoCAN T\_Data.ind:** network layer issues to diagnostic application the indication of the reception of a request message. Server #1 starts the  $P2_{Server}$  timer using the value of  $P2_{Server} = P2_{Server\_max}$ . 网络层问题到诊断应用程序接收请求消息的指示。控制器 #1 使用  $P2_{Server} = P2_{Server\_max}$  的值启动  $P2_{Server}$  计时器  
**Gateway DoCAN T\_Data.con:** network layer issues to application the confirmation of the completion of the request message. 网络层问题应用于请求消息完成的确认
- 6 **Server #1 DoCAN T\_Data.req:** diagnostic application has prepared the response message and issues a T\_Data.req to network layer within  $P2_{Server}$ . Server #1 stops the  $P2_{Server}$  timer. 诊断应用程序已准备好响应消息, 并向  $P2_{Server}$  中的网络层发出 T\_Data。控制器 #1 停止  $P2_{Server}$  计时器。
- 7 **Gateway DoCAN T\_Data.SOM.ind:** network layer issues to application the indication of the reception of a StartOfMessage, which is initiated by the reception of a FirstFrame indication on CAN (see ISO 15765-2). 网络层问题到应用消息开始的接收信息, 由第一个帧(指示在CAN (见ISO15765-2))开始。
- 8 **Server #1 DoCAN T\_Data.con:** network layer issues to diagnostic application the completion of the response message. 诊断应用程序的网络层问题响应消息的完成  
**Gateway DoCAN T\_Data.ind:** network layer issues to application the indication of the completion of the response message. 网络层问题到应用响应消息完成的指示  
**Gateway DoIP T\_Data.req:** application has prepared the response message and issues a T\_Data.req to network layer. 应用程序已准备好响应消息, 并发出 T\_Data 网络层的信息。
- 9 **Gateway DoIP T\_Data.con:** network layer issues to application the completion of the response message. 网络层问题应用于响应消息的完成。  
**Client T\_Data.ind:** network layer issues to diagnostic application the indication of the completion of the response message and stops the  $P_{Client}$  timer. 诊断应用程序的网络层问题响应消息的完成指示并停止  $P_{Client}$  计时器。

Figure 10 — ISO 13400 DoIP physically addressed short request with long response message

**NOTE** As TCP is a stream-oriented protocol, it is also possible that more than one DoIP response message is sent via a single TCP segment. Also, TCP uses acknowledging and automatic retries which depend on the overall network performance and reliability. Thus it is not possible to map individual responses into individual IP packets. Therefore, the message sequence charts (see Figure 9 and Figure 10) only provide a logical view of multiple messages on the Ethernet/IP/TCP side, which might differ from the actual IP packet transmission. 由于TCP是面向流的协议, 因此也可能通过单个TCP段发送多个DoIP响应消息。此外, TCP使用确认和自动重试, 这取决于整个网络的性能和可靠性。因此, 不可能将单个响应映射到单个IP数据包中。因此, 消息序列图 (参见图9和图10) 只提供以太网/IP/TCP 端上多个消息的逻辑视图, 这可能与实际的 IP 数据包传输不同。

### 7.3.4 ISO 15765-4 DoCAN message timing definition 消息定时定义

The message timing definition for the defaultSession shall be in accordance with Table 15. The values of the DoCAN-defined parameters shall be valid only for ISO 27145 WWH-OBd communication and services. 默认会话的消息定时定义应与表15相一致。DoCAN 定义参数的值应仅对 ISO 27145 WWH-OBd 通信和服务有效。

**Table 15 — Message timing definition for ISO 15765-4 DoCAN in defaultSession**  
默认会话中 ISO 15765-4 DoCAN 的消息定时定义

Timing parameter	Definition	Minimum [ms]	Maximum [ms]
$\Delta P2^a$	The $\Delta P2$ parameter is defined as the worst-case vehicle-network-design-dependent message transmission delay, such as delays introduced by gateways and bus-load arbitration delays. The value of $\Delta P2$ is divided between the time to transmit the request to the addressed server/ECU and the time to transmit the response to the client/tester. $\Delta P2$ 参数被定义为最坏情况下与网络设计相关的消息传输延迟, 如网关引入的延迟和总线负载仲裁延迟。 $\Delta P2$ 的值被划分为将请求发送到寻址控制器/ECU 的时间和将响应传递给客户端/测试人员的时间。	> 0	50
$P2_{Server}$	The $P2_{Server}$ parameter is a performance requirement for the server/ECU to start with the response message after reception of a request message. $P2_{Server}$ 参数是控制器/ECU 在接收请求消息后从响应消息开始的性能要求。	0	50
$P2_{Client}$	The $P2_{Client}$ parameter timeout is in order for the client to wait after the successful transmission of a request for the start of incoming response messages. $P2_{Client}$ 参数超时是为了让客户端在成功传输传入响应消息的请求之后等待。 $P2_{Client\_min} = P2_{Server\_max} + \Delta P2$	100	— <sup>b</sup>
$P2^*_{Server}$	The $P2^*_{Server}$ parameter is a performance requirement for the server to start with the response message after the transmission of a negative response message with the negative response code 0x78 (enhanced response timing). $P2^*_{Server}$ 参数是控制器在使用负响应代码 0x78 (增强的响应定时) 传输负响应消息后从响应消息开始的性能要求。	0 <sup>c</sup>	5 000
$P2^*_{Client}$	The $P2^*_{Client}$ parameter is the enhanced timeout in order for the client to wait after reception of a negative response message with the negative response code (NRC) 0x78 for the start of incoming response messages. $P2^*_{Client}$ 参数是增强的超时, 以便客户端在接收到带有负响应代码 (NRC) 0x78 的负响应消息后等待传入响应消息的开始 $P2^*_{Client\_min} = P2^*_{Server\_max} + \Delta P2_{max}$	5 050	— <sup>d</sup>
$P3_{Client\_Phys}$	The $P3_{Client\_Phys}$ parameter is the minimum time for the client to wait after successful transmission of a physically addressed request message with no response required before the next physically addressed request message can be transmitted. $P3_{Client\_Phys}$ 参数是客户端在成功传输物理寻址请求消息后等待的最短时间, 并且在发送下一个物理寻址请求消息之前不需要响应。 $P2_{Server\_max} + \Delta P2_{min}$	100	— <sup>e</sup>
$P3_{Client\_Func}$	The $P3_{Client\_Func}$ parameter is the minimum time for the client to wait after successful transmission of a functionally addressed request message before the next functionally addressed request message can be transmitted, in the case that no response is required or that the requested data is only supported by a subset of the functionally addressed servers. $P3_{Client\_Func}$ 参数是客户端在功能寻址请求消息成功传输之前等待的最短时间, 在发送下一个功能寻址请求消息之前, 如果不需要响应或请求的数据仅由功能寻址控制器的子集支持。 $P2_{Server\_max} + \Delta P2_{min}$	100	— <sup>e</sup>

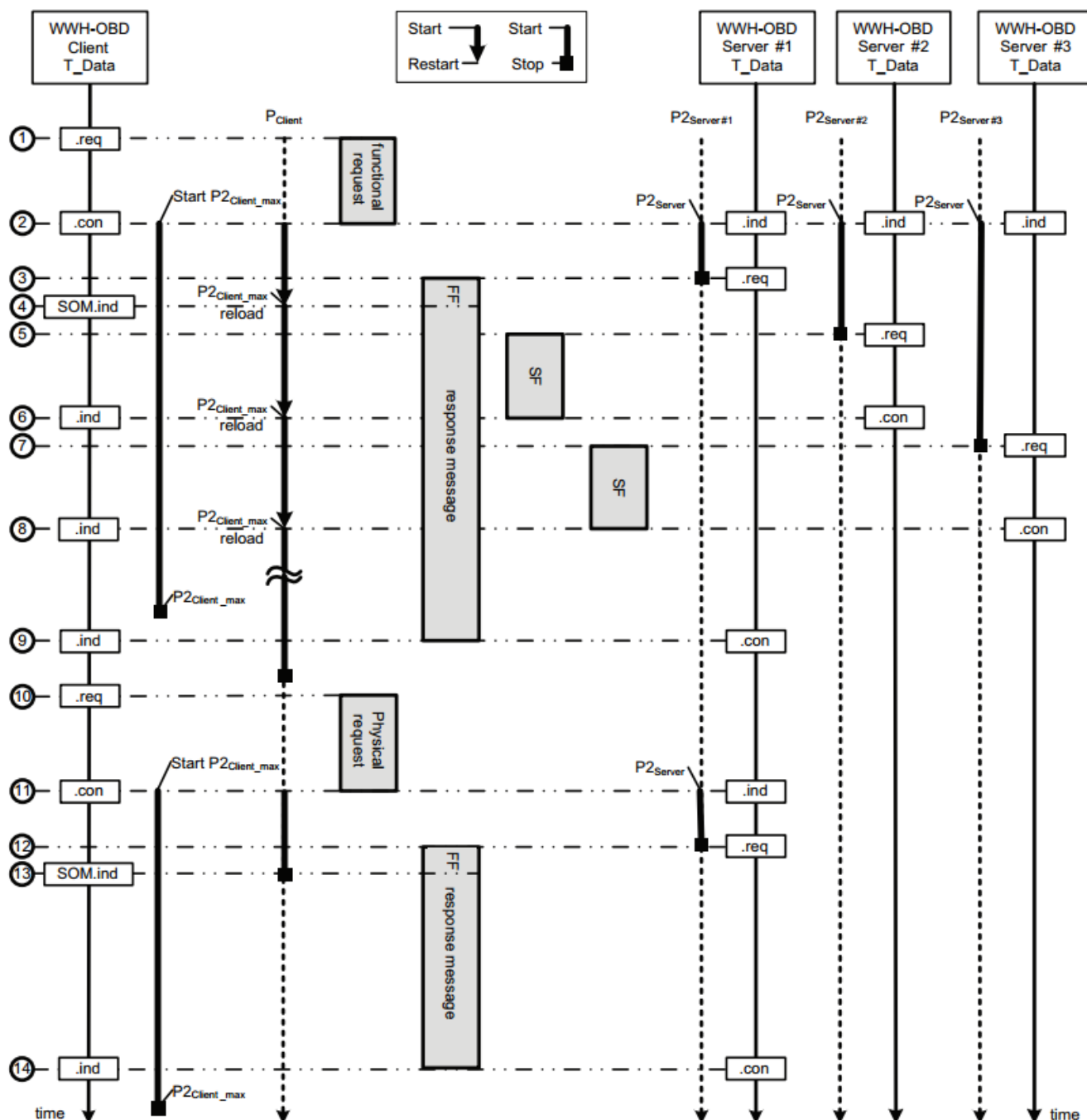
- <sup>a</sup>  $\Delta P2$  is used for a worst-case consideration of in-vehicle delays. In DoCAN a fixed value is used for  $\Delta P2$ :  
 $\Delta P2$ 用于对车内延迟的最坏情况的考虑。在 DoCAN 中, 固定值用于 $\Delta P2$ :  
 $\Delta P2 = \Delta P2_{Request} + \Delta P2_{Response} \leq 50 \text{ ms}$   
 Clearly,  $\Delta P2$  can be reduced to a value of 0 ms, i.e. a gateway will not delay responses to achieve a  $\Delta P2$  of 50 ms!  
 显然,  $\Delta P2$ 可以降低到0毫秒的值, 即网关不会延迟响应, 以达到50毫秒的 $\Delta P2$ !
- <sup>b</sup> The maximum value a client uses for  $P2_{Client}$  to wait for the start of a response message is left to the discretion of the client as long as it is greater than the specified minimum value of  $P2_{Client}$ . However, the vehicle has to start the response within the minimum value of  $P2_{Client}$ .  
 客户端使用的 $P2_{Client}$ 等待响应消息开始的最大值是由客户端自行决定的, 只要它大于指定的 $P2_{Client}$ 的最小值。但是, 车辆必须在 $P2_{Client}$ 的最小值内启动响应。  
 During the enhanced response timing, the minimum time between the transmission of consecutive negative response messages, each with negative response code 0x78, shall be  $0,3 \times P2^*_{Server\_max}$  in order to avoid flooding the data link with unnecessary negative response messages with response code 0x78. 在增强的响应时间内, 连续的负响应消息之间传输的最短时间, 每个都带有负响应代码 0x78, 应为  $03 \times P2^*_{Server\_max}$ , 以避免在不必要的负数相应消息 (带有响应代码0x78) 的情况下淹没数据链路。
- <sup>d</sup> The value a client uses for  $P2^*_{Client}$  to wait for the start of a response message is left to the discretion of the client as long as it is greater than the specified minimum value of  $P2^*_{Client}$ . However the vehicle has to respond within the minimum value of  $P2_{Client}$ .  
 客户端为 $P2^*_{Client}$  等待响应消息的开始所使用的值, 只要它大于指定的 $P2^*_{Client}$ 的最小值, 即可由客户端自行决定。然而, 车辆必须在 $P2^*_{Client}$ 的最小值内作出反应。
- <sup>e</sup> The maximum time a client waits until it transmits the next request message is at the discretion of the client.  
 客户端在发送下一个请求消息之前等待的最大时间是客户端的酌处权。

**IMPORTANT — For WWH-OBD the timing definitions in this part of ISO 27145 take precedence over other related documents.**

重点——对于WWH-OBD，ISO 27145 这一部分的时间定义优先于其他相关文档。

Figure 11 illustrates a client functional request message with a multiple frame response from server #1 and single frame responses from servers #2 and #3.

图11演示了一个客户端功能请求消息，其中有来自控制器 #1 的多帧响应，以及来自控制器 #2 和 #3 的单帧响应。



#### Key

- Client T\_Data.req:** diagnostic application issues a functionally addressed request message to the network layer.  
诊断应用程序向网络层发出功能寻址的请求消息
- All servers T\_Data.ind:** network layer issues to diagnostic application the indication of the reception of a request message. All servers start the P2Server timer using the value of P2Server = P2Server\_max.  
网络层问题到诊断应用程序接收请求的指示消息。所有控制器都使用 P2Server = P2Server\_max 的值启动 P2Server 计时器。  
**Client T\_Data.con:** network layer issues to diagnostic application the confirmation of the completion of the request message. Client starts its P\_Client timer using the default reload value P\_Client = P2Client\_max.  
网络层问题到诊断应用程序的确认完成请求消息。客户端使用默认重新加载值 P\_Client 启动其计时器 P\_Client = P2Client\_max
- Server #1 T\_Data.req:** diagnostic application has prepared the response message and issues a T\_Data.req to network layer within P2Server.  
诊断应用程序已准备好响应消息，并向 P2Server 中的网络层发出 T\_Data 请求。
- Client T\_DataSOM.ind:** network layer issues to diagnostic application the indication of the reception of a

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StartOfMessage which is initiated by the reception of a FirstFrame (FF) indication on CAN (see ISO 15765-2). Client reloads P<sub>Client</sub> with P<sub>Client\_max</sub> value.

网络层问题诊断应用程序接收第一帧 (FF) 指示所启动的消息的提示 (参见 ISO 15765-2)。客户端重新加载 P<sub>Client</sub> P<sub>Client\_max</sub> 值。

- 5 **Server #2 T\_Data.req:** diagnostic application has prepared the response message and issues a T\_Data.req to the network layer within P<sub>2Server</sub>. The response message is a SingleFrame (SF) message.

诊断应用程序已准备好响应消息, 并向 P<sub>2Server</sub> 内的网络层发出 T\_Data 的申请。响应消息是单个帧 (SF) 消息。

- 6 **Server #2 T\_Data.con:** network layer issues to diagnostic application the completion of the response message.  
网络层问题诊断应用程序完成响应消息。

**Client T\_Data.ind:** network layer issues to diagnostic application the completion of the response message. Client reloads P<sub>Client</sub> with P<sub>Client\_max</sub> value.

网络层问题诊断应用程序完成响应消息。客户端重新加载 P<sub>Client</sub> 用 P<sub>Client\_max</sub> 值。

- 7 **Server #3 T\_Data.req:** diagnostic application has prepared the response message and issues a T\_Data.req to network layer within P<sub>2Server</sub>. The response message is a SingleFrame (SF) message.

诊断应用程序已准备好响应消息, 并向 P<sub>2Server</sub> 中的网络层发出 T\_Data 的申请。响应消息是单个帧 (SF) 消息。

- 8 **Server #3 T\_Data.con:** network layer issues to diagnostic application the completion of the response message.  
网络层问题诊断应用程序完成响应消息

**Client T\_Data.ind:** network layer issues to diagnostic application the completion of the response message. Client reloads P<sub>2Server</sub> with P<sub>2Server\_max</sub> value.

网络层问题诊断应用程序完成响应消息。客户端重新加载 P<sub>2Server</sub> 用 P<sub>2Server\_max</sub> 值。

- 9 **Server #1 T\_Data.con:** network layer issues to diagnostic application the completion of the response message.  
诊断应用程序的网络层问题响应消息的完成

**Client T\_Data.ind:** network layer issues to diagnostic application the completion of the response message.  
网络层问题诊断应用程序完成响应消息。

- 10 **Client T\_Data.req:** diagnostic application issues physically addressed request message to network layer.  
诊断应用程序问题物理寻址请求消息到网络层。

- 11 **Server #1 T\_Data.ind:** network layer issues to diagnostic application the indication of the reception of a request message. Server #1 starts the P<sub>2Server</sub> timer using the value of P<sub>2Server</sub> = P<sub>2Server\_max</sub>.

网络层问题到诊断应用程序接收请求消息的指示。控制器 #1 使用 P<sub>2Server</sub> = P<sub>2Server\_max</sub> 的值启动 P<sub>2Server</sub> 计时器。

**Client T\_Data.con:** network layer issues to diagnostic application the confirmation of the completion of the request message. Client starts its P<sub>Client</sub> timer using the default reload value P<sub>2Client\_max</sub>.

网络层问题到诊断应用程序的确认完成请求消息。客户端使用默认重新加载值 P<sub>2Client\_max</sub> 启动其 P<sub>Client</sub> 计时器。

- 12 **Server #1 T\_Data.req:** diagnostic application has prepared the response message and issues a T\_Data.req to network layer within P<sub>2Server</sub>.

诊断应用程序已准备好响应消息, 并向 P<sub>2Server</sub> 中的网络层发出 T\_Data 的申请。

- 13 **Client T\_DataSOM.ind:** network layer issues to diagnostic application the indication of the reception of a StartOfMessage, which is initiated by the reception of a FirstFrame (FF) indication on DoCAN (see ISO 15765-2). Client stops P<sub>Client</sub> because FirstFrame (FF) of response message is received from server #1.

网络层问题到诊断应用接收的征兆消息的开头, 由接收第一帧 (FF) 征兆开始在 DoCAN (参见 ISO 15765-2)。客户端停止 P<sub>Client</sub>, 因为从控制器 #1 接收到响应消息的第一帧 (FF)。

- 14 **Server #1 T\_Data.con:** network layer issues to diagnostic application the completion of the response message.  
网络层问题诊断应用程序完成响应消息。

**Client T\_Data.ind:** network layer issues to diagnostic application the completion of the response message.  
网络层问题诊断应用程序完成响应消息。

Figure 11 — ISO 15765-4 DoCAN timing diagram

## 8 Presentation layer requirements 表示层要求

The presentation layer shall be in accordance with ISO 27145-2. 表示层应符合 ISO 27145-2。

## 9 Session layer requirements 会话层要求

The session layer shall be in accordance with ISO 14229-2. 会话层应符合 ISO 14229-2。

## Annex A (informative)

### WWH-OBD-related unified diagnostic service examples WWH-OBD相关的统一诊断服务示例

#### A.1 ReadDataByIdentifier message flow examples 通过标识符消息流示例读取数据

##### A.1.1 Read protocol identification InfoType identifier 读取协议标识信息类型标识符

The external test equipment uses functional addressing to request the SAE J1979-DA-defined ITID (0xF810) protocol identification. 外部测试设备使用功能寻址请求 SAE J1979-DA 定义的 ITID (0xF810) 协议标识。

This example shows the functionally addressed request message and the response of multiple WWH-OBD-compliant servers/ECUs providing the SAE J1979-DA-defined InfoType “protocol identification”:

本示例显示功能寻址的请求消息和多个 WWH-OBD符合标准的控制器/ECUs 的响应, 提供SAE J1979-DA 定义的信息类型 "协议标识"

— DID = 0xF810 contains the protocol identification. DID=0xF810 包含协议标识。

Table A.1 defines the functionally addressed ReadDataByIdentifier request message to the vehicle.

表 A. 1 通过标识符请求消息定义了功能上寻址的读取数据到车辆。

**Table A.1 — ReadDataByIdentifier functionally addressed request message flow example #1**  
**按标识符读取数据功能寻址请求消息流示例 #1**

<b>Message direction:</b>		client → vehicle	
<b>Message type:</b>		functionally addressed request message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier request SID	0x22	RDBI
#2	DataIdentifier #1 (HB) = ITID = Protocol Identification	0xF8	DID_HB
#3	DataIdentifier #1 (LB) = ITID = Protocol Identification	0x10	DID_LB

Each server that supports the DataIdentifier #1 sends a positive response message to the client.

支持数据标识符的每个控制器 #1 向客户端发送一个正向响应消息。

Table A.2 (server #1) and Table A.3 (server #n) define the ReadDataByIdentifier positive response message.

表 a. 2 (控制器 #1) 和表 a. 3 (控制器 #n) 通过标识符正响应消息定义读取数据

**Table A.2 — ReadDataByIdentifier positive response message flow example #1 — Server #1**  
**通过标识符读取数据正响应消息举例#1—控制器#1**

<b>Message direction:</b>		server #1 → client	
<b>Message type:</b>		response message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier response SID	0x62	RDBIPR
#2	DataIdentifier #1 (HB) = ITID = PROTID	0xF8	DID_HB
#3	DataIdentifier #1 (LB) = ITID = PROTID	0x10	DID_LB
#4	ITID dataRecord[1].ITP_DB1; protocol identification =(0x01 = ISO 27145)	0x01	ITP_DB1

**Table A.3 — ReadDataByIdentifier positive response message flow example #1 — Server #n**

<b>Message direction:</b>		server #n → client	
<b>Message type:</b>		response message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier response SID	0x62	RDBIPR
#2	DataIdentifier #1 (HB) = ITID = PROTID	0xF8	DID_HB
#3	DataIdentifier #1 (LB) = ITID = PROTID	0x10	DID_LB
#4	ITID dataRecord[1].ITP_DB1; protocol identification =(0x01 = ISO 27145)	0x01	ITP_DB1

## A.1.2 Read supported SAE J1979-DA ITIDs 阅读支持的SAE J1979-DA ITIDs

The external test equipment requests from each server/ECU all supported SAE J1979-DA ITIDs. See ISO 27145-2:2012, Annex A for the definitions of supported PIDs/MIDs and ITIDs.

外部测试设备要求从每台控制器/ECU 所有支持 SAE J1979-DA ITIDs。见 ISO 27145-2: 2012, 附件 A 的定义支持 PIDs/MIDs 和 ITIDs。

Table A.4 defines the ReadDataByIdentifier physically addressed request message flow example #2.

表 A.4 定义了根据标识符物理寻址读取数据的请求消息流，如示例 #2。

**Table A.4 — ReadDataByIdentifier physically addressed request message flow example #2**

<b>Message direction:</b>		client → server #1	
<b>Message type:</b>		physically addressed request message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier response SID	0x22	RDBI
#2	DataIdentifier #1 (HB) = ITID	0xF8	DID_HB
#3	DataIdentifier #1 (LB) = ITID	0x00	DID_LB

Table A.5 defines the ReadDataByIdentifier response message flow example #2 — Server #1.

表A.5定义了通过标识符读取数据的响应信息流举例#2—服务#1。

**Table A.5 — ReadDataByIdentifier response message flow example #2 — Server #1**

<b>Message direction:</b>		server #1 → client	
<b>Message type:</b>		response message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier response SID	0x62	RDBI
#2	DataIdentifier #1 (HB) = MID	0xF8	DID_HB
#3	DataIdentifier #1 (LB) = MID	0x00	DID_LB
#4	ITID dataRecord[1].ITP_DB#1; ITIDs supported data byte #A	0x40	ITP_DB1
#5	ITID dataRecord[2].ITP_DB#2; ITIDs supported data byte #B	0x01	ITP_DB2
#6	ITID dataRecord[3].ITP_DB#3; ITIDs supported data byte #C	0x80	ITP_DB3
#7	ITID dataRecord[4].ITP_DB#4; ITIDs supported data byte #D	0x00	ITP_DB4

Server #1 (ECM) supports the following ITID:

- DID = 0xF802 contains the VIN;
- DID = 0xF810 contains the protocol identification;
- DID = 0xF811 contains the WWH-OB D GTR number.

As a result of the supported SAE J1979-DA ITID request, the external test equipment creates an internal list of supported DIDs for server #1. 由于受支持的 SAE J1979-DA ITID 请求，外部测试设备将创建一个给服务#1的内部列表（支持DIDs）。

The same request and response sequence applies to all servers which previously sent a positive response to the functionally addressed request message with the SAE J1979-DA-defined ITID (0xF810) protocol identification (ISO 27145 supported). 相同的请求和响应序列适用于以前通过 SAE J1979-DA 定义的 ITID (0xF810) 协议标识 (ISO 27145 支持) 向功能寻址的请求消息发送了积极响应的所有控制器。

### A.1.3 Read single SAE J1979-DA InfoType identifier 读取单 SAE J1979-DA 信息类型标识符

This example demonstrates the request and response message sequence to retrieve the VIN.

本示例演示用于检索 VIN 的请求和响应消息序列。

Table A.6 defines the functionally addressed ReadDataByIdentifier request message flow example #3.

表A.6定义了根据标识位读取数据的功能寻址请求消息，如示例3

**Table A.6 — ReadDataByIdentifier functionally addressed request message flow example #3 — Vehicle**

<b>Message direction:</b>		client → vehicle	
<b>Message type:</b>		functionally addressed request message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier request SID 按标识符请求读取数据 SID	0x22	RDBI
#2	DataIdentifier #1 (HB) = ITID = VIN	0xF8	DID_HB
#3	DataIdentifier #1 (LB) = ITID = VIN	0x02	DID_LB

Table A.7 defines the ReadDataByIdentifier positive response message from one WWH-OBD GTR-compliant server. 表A.7定义了一个符合WWH-OBD GTR的控制器的根据标识符读取数据的正响应消息

**Table A.7 — ReadDataByIdentifier positive response message flow example #3 — Server #1**

<b>Message direction:</b>		server #1 → client	
<b>Message type:</b>		response message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier response SID	0x62	RDBIPR
#2	DataIdentifier #1 (HB) = ITID = VIN	0xF8	DID_HB
#3	DataIdentifier #1 (LB) = ITID = VIN	0x02	DID_LB
#4	ITID dataRecord[1].ITP_DB1; VIN Digit 1 = "W"	0x57	ITP_DB1
#5	ITID dataRecord[2].ITP_DB2; VIN Digit 2 = "0"	0x30	ITP_DB2
#6	ITID dataRecord[3].ITP_DB3; VIN Digit 3 = "L"	0x4C	ITP_DB3
#7	ITID dataRecord[4].ITP_DB4; VIN Digit 4 = "0"	0x30	ITP_DB4
#8	ITID dataRecord[5].ITP_DB5; VIN Digit 5 = "0"	0x30	ITP_DB5
#9	ITID dataRecord[6].ITP_DB6; VIN Digit 6 = "0"	0x30	ITP_DB6
#10	ITID dataRecord[7].ITP_DB7; VIN Digit 7 = "0"	0x30	ITP_DB7
#11	ITID dataRecord[8].ITP_DB8; VIN Digit 8 = "4"	0x34	ITP_DB8
#12	ITID dataRecord[9].ITP_DB9; VIN Digit 9 = "3"	0x33	ITP_DB9
#13	ITID dataRecord[10].ITP_DB10; VIN Digit 10 = "M"	0x4D	ITP_DB10
#14	ITID dataRecord[11].ITP_DB11; VIN Digit 11 = "B"	0x42	ITP_DB11
#15	ITID dataRecord[12].ITP_DB12; VIN Digit 12 = "5"	0x35	ITP_DB12
#16	ITID dataRecord[13].ITP_DB13; VIN Digit 13 = "4"	0x34	ITP_DB13
#17	ITID dataRecord[14].ITP_DB14; VIN Digit 14 = "1"	0x31	ITP_DB14
#18	ITID dataRecord[15].ITP_DB15; VIN Digit 15 = "3"	0x33	ITP_DB15
#19	ITID dataRecord[16].ITP_DB16; VIN Digit 16 = "2"	0x32	ITP_DB16
#20	ITID dataRecord[17].ITP_DB17; VIN Digit 17 = "6"	0x36	ITP_DB17

#### A.1.4 Read supported SAE J1979-DA DIDs

The external test equipment requests from each server/ECU all supported SAE J1979-DA PIDs. See ISO 27145-2:2012, Annex A for the definition of supported PIDs/MIDs and ITIDs.

外部测试设备要求从每台控制器/ECU 所有支持 SAE J1979-DA PIDs。见 ISO 27145-2: 2012, 附件 A 的定义支持 PIDs/MIDs 和 ITIDs。

**Table A.8 — ReadDataByIdentifier physically addressed request message flow example #4 — Server #1 物理地址请求信息如示例#4**

<b>Message direction:</b>		client → server #1	
<b>Message type:</b>		physically addressed request message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier response SID	0x22	RDBI
#2	DataIdentifier #1 (HB) = PID	0xF4	DID_HB
#3	DataIdentifier #1 (LB) = PID	0x00	DID_LB

**Table A.9 — ReadDataByIdentifier response message flow example #4 — Server #1 响应消息如示例#4**

<b>Message direction:</b>		server #1 → client	
<b>Message type:</b>		response message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier request SID	0x62	RDBI
#2	DataIdentifier #1 (HB) = PID	0xF4	DID_HB
#3	DataIdentifier #1 (LB) = PID	0x00	DID_LB
#4	PID dataRecord[1].DP_DB#1; PIDs supported data byte #A	0x10	DP_DB1
#5	PID dataRecord[2].DP_DB#2; PIDs supported data byte #B	0x10	DP_DB2
#6	PID dataRecord[3].DP_DB#3; PIDs supported data byte #C	0x00	DP_DB3
#7	PID dataRecord[4].DP_DB#4; PIDs supported data byte #D	0x00	DP_DB4

Server #1 (ECM) supports the following DIDs: 控制器 #1 (ECM) 支持以下 DIDs

- DID = 0xF404 contains Calculated Load Value; 包含计算的负载值
- DID = 0xF40C contains Engine RPM. 包含引擎 RPM

**Table A.10 — ReadDataByIdentifier physically addressed request message flow example #4 — 按照标识读取数据的物理地址请求信息，如示例#4 Server #2**

<b>Message direction:</b>		client → server #2	
<b>Message type:</b>		physically addressed request message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier response SID	0x22	RDBI
#2	DataIdentifier #1 (HB) = PID	0xF4	DID_HB
#3	DataIdentifier #1 (LB) = PID	0x00	DID_LB

**Table A.11 — ReadDataByIdentifier response message flow example #4 — Server #2**

按照标识读取数据 响应信息流

<b>Message direction:</b>	server #2 → client		
<b>Message type:</b>	response message		
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier request SID	0x62	RDBI
#2	DataIdentifier #1 (HB) = PID	0xF4	DID_HB
#3	DataIdentifier #1 (LB) = PID	0x00	DID_LB
#4	PID dataRecord[1].DP_DB#1; PIDs supported data byte #A	0x00	DP_DB1
#5	PID dataRecord[2].DP_DB#2; PIDs supported data byte #B	0x08	DP_DB2
#6	PID dataRecord[3].DP_DB#3; PIDs supported data byte #C	0x00	DP_DB3
#7	PID dataRecord[4].DP_DB#4; PIDs supported data byte #D	0x00	DP_DB4

Server #2 (TCM) supports the following DID:

— DID = 0xF40D contains Vehicle Speed Sensor. 包含车速传感器

As a result of the supported SAE J1979-DA PID request, the external test equipment creates an internal list of supported DIDs for server #2. 由于受支持的 SAE J1979-DA PID 请求, 外部测试设备会为控制器 #2 创建一个支持 DIDs 的内部列表。

The same request and response sequence applies to all servers which previously sent a positive response to the functionally addressed request message with the SAE J1979-DA-defined ITID (0xF810) protocol identification (ISO 27145 supported). 相同的请求和响应序列适用于所有控制器 (它此前通过 SAE J1979-DA-defined ITID (0xF810) 协议识别 (支持 ISO 27145) 向功能寻址的请求消息发送了积极响应)

### A.1.5 Read multiple SAE J1979-DA-defined PIDs 读取多个 SAE J1979-DA 定义的 PIDs

The external test equipment requests from each server/ECU all supported SAE J1979-DA PIDs (0xF400). See ISO 27145-2:2012, Annex A for the definition of supported PIDs/MIDs and ITIDs.

外部测试设备要求从每台控制器/ECU 所有支持SAE J1979-DA PIDs (0xF400)。见 ISO 27145-2: 2012, 附件 A 的定义支持 PIDs/MIDs 和 ITIDs。

Table A.12 defines the physically addressed ReadDataByIdentifier request to server #1 message flow example #5. 定义了到控制器#1的按物理寻址的按标识位读取数据请求消息, 如示例 #5

**Table A.12 — ReadDataByIdentifier physically addressed request message flow example #5 — Server #1**

<b>Message direction:</b>	client → server #1		
<b>Message type:</b>	physically addressed request message		
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier request SID	0x22	RDBI
#2	DataIdentifier #1 (HB) = PID = Calculated Load Value	0xF4	DID_HB
#3	DataIdentifier #1 (LB) = PID = Calculated Load Value	0x04	DID_LB
#4	DataIdentifier #2 (HB) = PID = Engine RPM	0xF4	DID_HB
#5	DataIdentifier #2 (LB) = PID = Engine RPM	0x0C	DID_LB

Table A.13 defines the ReadDataByIdentifier positive response from sever #1 message flow example #5.

定义了从控制器#1的按标识读取数据的正响应，信息流如示例#5。

**Table A.13 — ReadDataByIdentifier positive response message flow example #5 — From server #1**

<b>Message direction:</b>		server #1 → client	
<b>Message type:</b>		response message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier response SID	0x62	RDBIPR
#2	DataIdentifier #1 (HB) = PID = Calculated Load Value	0xF4	DID_HB
#3	DataIdentifier #1 (LB) = PID = Calculated Load Value	0x04	DID_LB
#4	PID dataRecord[1].DP_DB#1; Calculated Load Value = 13,7 %	0x23	DP_DB1
#5	DataIdentifier #2 (HB) = PID = Engine RPM	0xF4	DID_HB
#6	DataIdentifier #2 (LB) = PID = Engine RPM	0x0C	DID_LB
#7	PID dataRecord[1].DP_DB#1; Engine RPM = 1500 min <sup>-1</sup>	0x17	DP_DB1
#8	PID dataRecord[2].DP_DB#2; Engine RPM = 1500 min <sup>-1</sup>	0x70	DP_DB2

Table A.14 defines the ReadDataByIdentifier physically addressed request to server #2 message flow example #6.

表A.14定义了向控制器#2按标识读取数据 物理寻址请求信息，如示例 #6

**Table A.14 — ReadDataByIdentifier physically addressed request message flow example #6 — Server #2**

<b>Message direction:</b>		client → server #2	
<b>Message type:</b>		physically addressed request message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier request SID	0x22	RDBI
#2	DataIdentifier #3 (HB) = PID = Vehicle Speed Sensor	0xF4	DID_HB
#3	DataIdentifier #3 (LB) = PID = Vehicle Speed Sensor	0x0D	DID_LB

Table A.15 defines the ReadDataByIdentifier positive response from server #2 message flow example #6.

定义了控制器 #2 消息的按标识读取数据的正响应，6#示例

**Table A.15 — ReadDataByIdentifier positive response message flow example #6 — Server #2**

<b>Message direction:</b>		server#2 → client	
<b>Message type:</b>		response message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier response SID	0x62	RDBIPR
#2	DataIdentifier #3 (HB) = PID = Vehicle Speed Sensor	0xF4	DID_HB
#3	DataIdentifier #3 (LB) = PID = Vehicle Speed Sensor	0x0D	DID_LB
#4	PID_DataRecord[1].DP_DB#1; Vehicle Speed Sensor = 0 km/h	0x00	DP_DB1

## A.1.6 Read single SAE J1979-DA monitor identifier 读取单个SAE J1979-DA 监视器标识符

### A.1.6.1 Step #1: Request supported SAE J1979-DA monitor identifiers 请求支持的 SAE J1979-DA 监视器标识符

The external test equipment requests from each server/ECU all supported SAE J1979-DA MIDs (0xF600). See ISO 27145-2:2012, Annex A for the definition of supported PIDs/MIDs and ITIDs. 外部测试设备要求从每台控制器/ECU 所有支持 SAE J1979-DA MIDs (0xF600)。见 ISO 27145-2: 2012, 附件 A 的定义支持 PIDs/MIDs 和 ITIDs。

**Table A.16 — ReadDataByIdentifier physically addressed request message flow example #7 — 按标识读取数据物理寻址请求信息，如示例#7**

#### Server #1

<b>Message direction:</b>		client → server #1	
<b>Message type:</b>		physically addressed request message 物理寻址请求消息	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier request SID	0x22	RDBI
#2	DataIdentifier #1 (HB) = MID	0xF6	DID_HB
#3	DataIdentifier #1 (LB) = MID	0x00	DID_LB

**Table A.17 — ReadDataByIdentifier response message flow example #7 — Server #1 按标识读取数据相应信息，如示例#7**

<b>Message direction:</b>		server #1 → client	
<b>Message type:</b>		response message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier request SID	0x62	RDBI
#2	DataIdentifier #1 (HB) = MID	0xF6	DID_HB
#3	DataIdentifier #1 (LB) = MID	0x00	DID_LB
#4	MID dataRecord[1].MP_DB#1; MIDs supported data byte #A	0xCC	MP_DB1
#5	MID dataRecord[2].MP_DB#2; MIDs supported data byte #B	0x00	MP_DB2
#6	MID dataRecord[3].MP_DB#3; MIDs supported data byte #C	0x00	MP_DB3
#7	MID dataRecord[4].MP_DB#4; MIDs supported data byte #D	0x01	MP_DB4

MID 0xF620 is supported because data byte #D.0 = "1". In order to identify additional supported MIDs, another request with MID 0xF620 needs to be sent to server #1. 支持MID 0xF620, 因为数据字节 #D. 0 = "1"。为了识别其他受支持的 MIDs, 需要将另一0xF620 中的请求发送到控制器 #1。

**Table A.18 — ReadDataByIdentifier physically addressed request message flow example #7 — Server #1**

<b>Message direction:</b>		client → server #1	
<b>Message type:</b>		physically addressed request message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier request SID	0x22	RDBI
#2	DataIdentifier #1 (HB) = MID	0xF6	DID_HB
#3	DataIdentifier #1 (LB) = MID	0x20	DID_LB

Table A.19 — ReadDataByIdentifier response message flow example #7 — Server #1

<b>Message direction:</b>		server #1 → client	
<b>Message type:</b>		response message	
<b>A_Data byte</b>	<b>Description</b>	<b>Byte value</b>	<b>Mnemonic</b>
#1	ReadDataByIdentifier request SID	0x62	RDBI
#2	DataIdentifier #1 (HB) = MID	0xF6	DID_HB
#3	DataIdentifier #1 (LB) = MID	0x20	DID_LB
#4	MID dataRecord[1].MP_DB#1; MIDs supported data byte #A	0xC0	MP_DB1
#5	MID dataRecord[2].MP_DB#2; MIDs supported data byte #B	0x00	MP_DB2
#6	MID dataRecord[3].MP_DB#3; MIDs supported data byte #C	0x00	MP_DB3
#7	MID dataRecord[4].MP_DB#4; MIDs supported data byte #D	0x00	MP_DB4

MID 0xF640 is not supported because data byte #D.0 = "0". This indicates that no additional MIDs are supported. 不支持MID 0xF640, 因为数据字节 #D. 0 = "0"。这表示不支持其他 MIDs。

As a result of the supported SAE J1979-DA MID request, the external test equipment creates an internal list of supported MIDs for each server/ECU. 由于受支持的 SAE J1979-DA 中请求, 外部测试设备为每个控制器/ECU 创建一个支持 MIDs 的内部列表。

Server #1 (ECM) supports the following OBD monitor identifiers: 控制器 #1 (ECM) 支持以下的OBD监视器标识符

- 0xF601: Oxygen Sensor Monitor Bank 1 – Sensor 1;
- 0xF602: Oxygen Sensor Monitor Bank 1 – Sensor 2;
- 0xF605: Oxygen Sensor Monitor Bank 2 – Sensor 1;
- 0xF606: Oxygen Sensor Monitor Bank 2 – Sensor 2;
- 0xF621: Catalyst Monitor Bank 1;
- 0xF622: Catalyst Monitor Bank 2.

Server #2 (TCM) does not support any OBD monitor identifiers. 控制器#2 (TCM)不支持任何OBD监视器标识符。

The same request and response sequence applies to all servers which previously sent a positive response to the functionally addressed request message with the SAE J1979-DA-defined ITID (0xF810) protocol identification (ISO 27145 supported). 相同的请求和响应序列适用于所有控制器, 该类控制器用SAE J1979-DA定义的 ITID(0xf810)协议标识 (支持ISO27145) 来向功能寻址的请求消息 发送正响应。

#### A.1.6.2 Step #2: Request current powertrain diagnostic data 请求当前动力总成诊断数据

Prior to requesting OBD monitor test results, the external test equipment shall evaluate whether the monitor is complete. The status of the monitor is included in the response message of the service ReadDataByIdentifier, PID 0xF401 data bytes. 在请求OBD检测结果之前, 外部测试设备应评估显监测是否完成。监视器的状态包括在按标识读取数据服务 的响应消息中, PID 0xF401 数据字节。

#### A.1.6.3 Step #3: Request on-board monitoring test results for specific monitored systems 请求OBD测试结果给特定的监测系统

The external test equipment sends a physically addressed ReadDataByIdentifier request message to read on-board monitoring test results for specific monitored systems with one OBD monitor identifier in the request message to server/ECU #1. 外部测试设备向控制器/ECU#1发送一个物理寻址 按数据标识读取数据请求信息, 来读取OBD测试结果, 该结果给带有一个OBD监测标识的特定监测系统。

This example demonstrates the request and response of a single OBD monitor data identifier where MID = 0xF601 contains the Oxygen Sensor Monitor Bank 1 – Sensor 1 with three different OBD test IDs: 0x01, 0x05 and 0x85. 本示例演示了单个OBD检测数据标识符的请求和响应, 该标识符MID=0xF601中包括氧传感器监视BANK1-传感器1和三种不同的测试ID: 0x01、0x05 和0x85。

Table A.20 defines the physically addressed ReadDataByIdentifier request to server #1 message flow example #8.

**Table A.20 — ReadDataByIdentifier physically addressed request message flow example #8 —**  
**按标识符读取数据物理寻址请求消息 如示例#8**  
**Server #1**

<b>Message direction:</b>	client → server#1		
<b>Message type:</b>	physically addressed request message		
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier request SID	0x22	RDBI
#2	DataIdentifier#1 (HB) = MID = Oxygen Sensor Monitor B1 – S1	0xF6	DID_HB
#3	DataIdentifier#1 (LB) = MID = Oxygen Sensor Monitor B1 – S1	0x01	DID_LB

Table A.21 defines the ReadDataByIdentifier positive response from server #1 message flow example #8.  
 定义了从控制器#1的根据标识读取数据的正响应消息，如示例#8

**Table A.21 — ReadDataByIdentifier positive response message flow example #8 — Server #1**

<b>Message direction:</b>	server #1 → client		
<b>Message type:</b>	response message		
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier response SID	0x62	RDBIPR
#2	DataIdentifier#1 (HB) = MID = Oxygen Sensor Monitor B1 – S1	0xF6	DID_HB
#3	DataIdentifier#1 (LB) = MID = Oxygen Sensor Monitor B1 – S1	0x01	DID_LB
#4	MID dataRecord[1].MP_SMTID; Test ID: Rich to lean sensor threshold voltage (constant)	0x01	MP_SMTID
#5	MID dataRecord[2].MP_UASID; Unit and Scaling ID: Voltage	0x0A	MP_UASID
#6	MID dataRecord[3].MP_TVHI; Test Value 0,365 V	0x0B	MP_TVHI
#7	MID dataRecord[4].MP_TVLO; Test Value 0,365 V	0xB0	MP_TVLO
#8	MID dataRecord[5].MP_MINTLHI; Min. Test Limit 0,365 V	0x0B	MP_MINTLHI
#9	MID dataRecord[6].MP_MINTLLO; Min. Test Limit 0,365 V	0xB0	MP_MINTLLO
#10	MID dataRecord[7].MP_MAXTLHI; Max. Test Limit 0,365 V	0x0B	MP_MAXTLHI
#11	MID dataRecord[8].MP_MAXTLLO; Max. Test Limit 0,365 V	0xB0	MP_MAXTLLO
#12	MID dataRecord[1].MP_SMTID; Test ID: Rich to lean sensor switch time (calculated)	0x05	MP_SMTID
#13	MID dataRecord[2].MP_UASID; Unit and Scaling ID: Time	0x10	MP_UASID
#14	MID dataRecord[3].MP_TVHI; Test Value (HB) 0,072 s	0x00	MP_TVHI
#15	MID dataRecord[4].MP_TVLO; Test Value (LB) 0,072 s	0x48	MP_TVLO
#16	MID dataRecord[5].MP_MINTLHI; Min. Test Limit 0,000 s	0x00	MP_MINTLHI
#17	MID dataRecord[6].MP_MINTLLO; Min. Test Limit 0,000 s	0x00	MP_MINTLLO
#18	MID dataRecord[7].MP_MAXTLHI; Max. Test Limit 0,100 s	0x00	MP_MAXTLHI
#19	MID dataRecord[8].MP_MAXTLLO; Max. Test Limit 0,100 s	0x64	MP_MAXTLLO
#20	MID dataRecord[1].MP_SMTID; Test ID: the name of this Test ID shall be documented in the vehicle Service Information!	0x85	MP_SMTID
#21	MID dataRecord[2].MP_UASID; Unit and Scaling ID: Counts	0x24	MP_UASID
#22	MID dataRecord[3].MP_TVHI; Test Value 150 counts	0x00	MP_TVHI
#23	MID dataRecord[4].MP_TVLO; Test Value 150 counts	0x96	MP_TVLO
#24	MID dataRecord[5].MP_MINTLHI; Min. Test Limit 75 counts	0x00	MP_MINTLHI
#25	MID dataRecord[6].MP_MINTLLO; Min. Test Limit 75 counts	0x4B	MP_MINTLLO
#26	MID dataRecord[7].MP_MAXTLHI; Max. Test Limit 65 535 counts	0xFF	MP_MAXTLHI
#27	MID dataRecord[8].MP_MAXTLLO; Max. Test Limit 65 535 counts	0xFF	MP_MAXTLLO

**A.1.6.4 Step #4: Request on-board monitoring test results for specific monitored systems****给特定监测系统请求在线诊断测试结果**

In this example the requested monitor has not been completed once. This example demonstrates the request and response of a single OBD monitor data identifier where:

在此示例中, 请求的监视器尚未完成一次。此示例演示了单个OBD检测数据标识符的请求和响应, 其中

- MID = 0xF621 reports one Test ID: 0x87;
- MID = 0xF621 contains the Catalyst Monitor Bank 1 test results for Test ID 0x87.

Table A.22 defines the physically addressed ReadDataByIdentifier request message to server #1 message flow example #9. 定义了以物理寻址的按标识读取数据的向控制器#1的请求信息

**Table A.22 — ReadDataByIdentifier physically addressed request message flow example #9 — Server #1**

<b>Message direction:</b>		client → server #1	
<b>Message type:</b>		physically addressed request message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier request SID	0x22	RDBI
#2	DataIdentifier#1 (HB) = MID = Catalyst Monitor Bank 1	0xF6	DID_HB
#3	DataIdentifier#1 (LB) = MID = Catalyst Monitor Bank 1	0x21	DID_LB

Table A.23 defines the ReadDataByIdentifier positive response message from server #1 message flow example #9.

定义了从控制器#1的按照标识读取数据的正响应信息, 如示例9

**Table A.23 — ReadDataByIdentifier positive response message flow example #9 — Server #1**

<b>Message direction:</b>		server #1 → client	
<b>Message Type:</b>		response message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDataByIdentifier response SID	0x62	RDBIPR
#2	DataIdentifier#1 (HB) = MID = Catalyst Monitor Bank 1	0xF6	DID_HB
#3	DataIdentifier#1 (LB) = MID = Catalyst Monitor Bank 1	0x21	DID_LB
#4	MID dataRecord[1].MP_SMTID; Test ID: the name of this Test ID shall be documented in the vehicle Service Information!	0x87	MP_SMTID
#5	MID dataRecord[2].MP_UASID; Unit and Scaling ID: Percent	0x2E	MP_UASID
#6	MID dataRecord[3].MP_TVHI; Test Value 0,00 %	0x00	MP_TVHI
#7	MID dataRecord[4].MP_TVLO; Test Value 0,00 %	0x00	MP_TVLO
#8	MID dataRecord[5].MP_MINTLHI; Min. Test Limit 0,00 %	0x00	MP_MINTLHI
#9	MID dataRecord[6].MP_MINTLLO; Min. Test Limit 0,00 %	0x00	MP_MINTLLO
#10	MID dataRecord[7].MP_MAXTLHI; Max. Test Limit 0,00 %	0x00	MP_MAXTLHI
#11	MID dataRecord[8].MP_MAXTLLO; Max. Test Limit 0,00 %	0x00	MP_MAXTLLO

**A.2 RoutineControl message flow examples 常规控制消息流示例****A.2.1 General assumption**

For all examples, the client requests a response message by setting the suppressPosRspMsgIndicationBit (bit 7 of the sub-function parameter) to "FALSE" ("0"). 对于所有示例, 客户端通过设置 suppressPosRspMsgIndicationBit 来请求响应消息(子函数参数的位 7) 为 "FALSE" ("0")。

## A.2.2 Message flow examples — RoutineControl 信息流示例 ---常规控制

### A.2.2.1 Step #1: Request supported RIDs

The external test equipment requests all supported RIDs from the vehicle. 外部测试设备要求所有受支持的常规标识符从车辆。

As a result of the supported RID request, the external test equipment creates an internal list of supported RIDs for each server. Server #1 (ECM) supports the RID 0xE001. Server #2 (TCM) does not support any RIDs.

作为支持RID请求，外部测试设备创建爱你一个内部清单来支持每一个控制器。控制器#1 (ECM)支持的RID是0xE001，控制器#2不支持任何的RIDs。

Table A.24 defines the RoutineControl physically addressed request message flow example #10.

定义了常规控制物理寻址请求信息流示例#10

**Table A.24 — RoutineControl physically addressed request message flow example #10 — Server #1**

<b>Message direction:</b>		client → server #1	
<b>Message type:</b>		physically addressed request message	
A_Data byte	Description	Byte value	Mnemonic
#1	RoutineControl request SID	0x31	RC
#2	sub-function = routineControlType = StartRoutine	0x01	RCTP_STR
#3	RID #1 (HB) = RID	0xE0	RID_HB
#4	RID #1 (LB) = RID	0x00	RID_LB

Table A.25 defines the RoutineControl positive response from server #1 message flow example #10.

定义了控制器#1的常规控制正响应信息流示例#10

**Table A.25 — RoutineControl positive response message flow example #10 — Server #1**

<b>Message direction:</b>		server #1 → client	
<b>Message Type:</b>		response message	
A_Data byte	Description	Byte value	Mnemonic
#1	RoutineControl response SID	0x71	RCPR
#2	sub-function = routineControlType = StartRoutine (echo of request message)	0x01	RCTP_STR
#3	RID #1 (HB) = RID	0xE0	RID_HB
#4	RID #1 (LB) = RID	0x00	RID_LB
#5	routineInfo	0x10	RP_RINF
#6	RID dataRecord[1].RP_DB#1; RIDs supported data byte #A	0x80	RP_DB#1
#7	RID dataRecord[2].RP_DB#2; RIDs supported data byte #B	0x00	RP_DB#2
#8	RID dataRecord[3].RP_DB#3; RIDs supported data byte #C	0x00	RP_DB#3
#9	RID dataRecord[4].RP_DB#4; RIDs supported data byte #D	0x00	RP_DB#4

Server #1 (ECM) supports the following RID:控制器#1 (ECM) 支持下面的常规控制标识

— RID = 0xE001 contains “Evaporative System Leak Test”. 常规标识符 = 0xE001包括 “蒸发系统泄漏测试”

As a result of the supported SAE J1979-DA RID request, the external test equipment creates an internal list of supported RIDs for server #1.由于支持的SAE J1979-DA RID请求，外部测试设备为控制器 #1 创建了支持RID的内部列表。

Table A.26 defines the RoutineControl physically addressed request message flow.

定义了常规控制物理寻址请求信息流

**Table A.26 — RoutineControl physically addressed request message flow example #10 — Server #2**

<b>Message direction:</b>		client → server #2	
<b>Message type:</b>		physically addressed request message	
<b>A_Data byte</b>	<b>Description</b>	<b>Byte value</b>	<b>Mnemonic</b>
#1	RoutineControl request SID	0x31	RC
#2	sub-function = routineControlType = StartRoutine	0x01	RCTP_STR
#3	RID #1 (HB) = RID	0xE0	RID_HB
#4	RID #1 (LB) = RID	0x00	RID_LB

Table A.27 defines the negative response message example #10 — Server #2.

定义了负面响应消息示例#10---控制器#2.

**Table A.27 — Negative response message example #10 — Server #2**

<b>Message direction:</b>		server #2 → client	
<b>Message type:</b>		response message	
<b>A_Data byte</b>	<b>Description</b>	<b>Byte value</b>	<b>Mnemonic</b>
#1	Negative Response Service Identifier	0x7F	NR
#2	RoutineControl request SID	0x31	RC
#3	Negative Response Code: serviceNotSupported	0x11	NR_SNS

The same request and response sequence applies to all servers which previously sent a positive response to the functionally addressed request message with the SAE J1979-DA-defined ITID (0xF810) protocol identification (ISO 27145 supported). 相同的请求和响应序列适用所有的控制器，该类控制器此前通过SAE J1979-DA-定义的ITID (0xF810) 协议识别 (支持 ISO 27145) 向功能寻址的请求消息发送积极响应。

#### **A.2.2.2 Step #2: Request RoutineControl (RID 0xE001) — Appropriate vehicle conditions** 请求常规控制 (RID 0x001) —适用的车辆条件

The external test equipment sends a RoutineControl request message with one supported RID 0xE001 to server #1.

一个外部测试设备用一个支持的RID 0xE001发送一个常规控制请求消息给控制器#1.

Table A.28 defines the RoutineControl physically addressed request to server #1 message flow example #11.

表A.28定义了一个给控制器#1的常规控制物理寻址请求消息流示例#11

**Table A.28 — RoutineControl physically addressed request message flow example #11 — Server #1**

<b>Message direction:</b>		client → server #1	
<b>Message type:</b>		physically addressed request message	
<b>A_Data byte</b>	<b>Description</b>	<b>Byte value</b>	<b>Mnemonic</b>
#1	RoutineControl request SID	0x31	RC
#2	sub-function = routineControlType = StartRoutine	0x01	RCTP_STR
#3	RID #1 (HB) = Evaporative System Leak Test	0xE0	RID_HB
#4	RID #1 (LB) = Evaporative System Leak Test	0x01	RID_LB

Table A.29 defines the RoutineControl positive response message flow example #11 — Server #1.

表A.29定义了常规控制正响应消息流 示例#11——控制器#1

Table A.29 — RoutineControl positive response message flow example #11 — Server #1

Message direction:		server #1 → client	
Message Type:		response message	
A_Data byte	Description	Byte value	Mnemonic
#1	RoutineControl response SID	0x71	RCPR
#2	sub-function = routineControlType = StartRoutine (echo of request message)	0x01	RCTP_STR
#3	RID #1 (HB) = Evaporative System Leak Test	0xE0	RID_HB
#4	RID #1 (LB) = Evaporative System Leak Test	0x01	RID_LB
#5	routineInfo	0x10	RP_RINF

### A.2.2.3 Request RoutineControl (RID 0xE001) — Inappropriate vehicle conditions

请求常规控制 (RID 0xE001) ——不适用的车辆条件

In the following example, the conditions of the system are not appropriate for running the “Evaporative System Leak Test”. Therefore, server #1 (ECM) responds with a negative response message with response code 0x22 – conditionsNotCorrect. 在下面的示例中，系统的条件不适合运行 “蒸发系统泄漏测试”。因此，控制器#1 (ECM)以负响应消息标志0x22来响应——条件不适合（条件不正确）。

Table A.30 defines the RoutineControl physically addressed request message flow example #12 — Server #1.

表A.30定义了常规控制物理寻址请求信息流示例#12—控制器#1

Table A.30 — RoutineControl physically addressed request message flow example #12 — Server #1

Message direction:		client → server #1	
Message type:		physically addressed request message	
A_Data byte	Description	Byte value	Mnemonic
#1	RoutineControl request SID	0x31	RC
#2	sub-function = routineControlType = StartRoutine	0x01	RCTP_STR
#3	RID #1 (HB) = Evaporative System Leak Test	0xE0	RID_HB
#4	RID #1 (LB) = Evaporative System Leak Test	0x01	RID_LB

Table A.31 defines the RoutineControl negative response message flow example #12 — Server #1.

表A.31定义了常规控制负响应信息流示例#12—控制器#1。

Table A.31 — RoutineControl negative response message flow example #12 — Server #1

Message direction:		server #1 → client	
Message Type:		response message	
A_Data byte	Description	Byte value	Mnemonic
#1	Negative Response Service Identifier	0x7F	NR
#2	RoutineControl request SID	0x31	RC
#3	Negative Response Code: conditionsNotCorrect	0x22	NR_CNC

## A3 ReadDTCInformation message flow examples 读取 DTC 信息消息流示例

### A.3.1 General assumption

For all examples, the client requests a response message by setting the suppressPosRspMsgIndicationBit (bit 7 of the sub-function parameter) to “FALSE” (“0”).

对于所有示例，客户端通过设置 suppressPosRspMsgIndicationBit 来请求响应消息(子函数参数的位 7) 为 “FALSE” (“0”)。

### A.3.2 Example of ReadDTCInformation, sub-function = reportWWHOBDDTCByMaskRecord 读取 DTC 信息的示例，子函数=报告基于掩码记录的WWH-OBDDTC

#### A.3.2.1 Example overview

This example demonstrates the usage of the reportWWHOBDDTCByMaskRecord sub-function parameter for confirmed DTCs (DTC status mask 0x08). The vehicle uses a CAN bus which connects two emissions-related servers.

此示例演示 reportWWHOBDDTCByMaskRecord 子函数参数对于已确认的DTCs (DTC状态掩码0x08) 的用法。车辆使用CAN总线连接两个与排放相关的控制器。

Servers #1 and #2 are based on the data set specified in ISO 14229-1. All data (DTCs, DIDs, etc.) are reported in SAE J1979-DA-compliant format.

控制器#1 和 #2 基于 ISO 14229-1 中指定的数据集。所有数据 (DTCs、DIDs 等) 都以 SAE J1979-DA符合的格式报告。

The client uses the following request parameter settings: 客户端使用以下请求参数设置

- FunctionalGroupIdentifier = 0x33 (emissions system group);功能组标识符 =0x33 (排放系统组)
- DTCSeverityMaskRecord.DTCSeverityMask = 0x1E (report DTCs with any Severity and Class status);  
DTC严重性掩码记录DTC严重性掩码 = 0x1E (报告 DTCs 的严重性和类状态)
- DTCSeverityMaskRecord.DTCStatusMask = 0x08 (report DTCs with confirmedDTC status = “1”).  
DTC严重性掩码记录 DTC 状态掩码 = 0x08 (报告DTCs 已确认的DTC状态= “1” )
- The servers support the following settings: 控制器支持以下设置:
- FunctionalGroupIdentifier = 0x33 (emissions system group); 功能组标识符 = 0x33 (排放系统组)
- DTCStatusAvailabilityMask = 0x5C, implying that the servers do not implement bits 0, 1, 5 or 7;  
DTC状态可用性掩码 = 0x5C, 暗示控制器不实现 0, 1, 5, 7位;
- DTCSeverityAvailabilityMask=0xFE, implying that the servers do not implement the DTCSeverityInformation;  
DTC严重性可用性掩码 = 0xFE, 暗示控制器不实现 DTC 严重性信息;
- DTCFormatIdentifier = 0x04 (SAE J2012 WWH-OBDDTC format). DTC 格式标识符 = 0x04 (.....)

#### A.3.2.2 Example assumptions 示例假设

This is a simplified example with two servers which comprise the emissions-related WWH-OBDDTC system. Server #1 supports two SAE J2012-DA WWH-OBDDTC-compliant DTCs and server #2 supports one. The DTCs have the following states at the time of the client request:

这是一个简化的例子，其中包括与排放相关的WWH-OBDDTC系统的两个控制器。控制器#1支持两个SAE J2012-DA WWH-OBDDTC兼容的DTCs 和控制器#2 支持一个。在客户端请求时，DTCs 具有以下状态:

- a) Server #1: The following assumptions apply to SAE J2012-DA WWH-OBDDTC P0805-11 Clutch Position Sensor – circuit short to ground (0x080511):

控制器#1: 以下假设适用于SAE J2012-DA WWH-OBDDTC P0805-11离合器位置传感器 – 短路至地面 (0x080511):

- 1) statusOfDTC byte definition (0000 0100<sub>b</sub>): 0x04      DTC字节定义的状态 (0000 0100<sub>b</sub>): 0x04

Table A.32 defines the server #1 SAE J2012-DA-compliant DTC P0805-11 statusOfDTC = 0x04.

表A.32定义了控制器#1 SAE J2012-DA符合的DTC P0805-11 DTC状态 = 0x04

**Table A.32 — Server #1 SAE J2012-DA-compliant DTC P0805-11 statusOfDTC = 0x04**

statusOfDTC: bit field name	Bit #	Bit state	Description
testFailed	0	0	Not applicable
testFailedThisOperationCycle	1	0	Not applicable
pendingDTC	2	1	DTC failed on the current or previous operation cycle
confirmedDTC	3	0	DTC is not confirmed at the time of the request
testNotCompletedSinceLastClear	4	0	DTC test was completed since the last code clear
testFailedSinceLastClear	5	0	Not applicable
testNotCompletedThisOperationCycle	6	0	DTC test completed this operation cycle
warningIndicatorRequested	7	0	Not applicable

- 2) DTCSeverity byte definition (0001 0000<sub>b</sub>): DTCSeverity = 000<sub>b</sub>, DTCClass 10000<sub>b</sub>  
DTC 严重性字节定义

Table A.33 defines the server #1 SAE J2012-DA-compliant DTC P0805-11 DTCSeverity byte = 0x10.

表A.33定义了控制器#1 SAE J2012-DA符合的DTC P0805-11 的 DTC严重性位 = 0x10.

**Table A.33 — Server #1 SAE J2012-DA-compliant DTC P0805-11 DTCSeverity byte = 0x10**

DTCSeverity	Bit #	Bit state	Description
DTCClass_0	0	0	No class information available because of DTC
DTCClass_1	1	0	No class A information available because of DTC
DTCClass_2	2	0	No class B1 information available because of DTC
DTCClass_3	3	0	No class B2 information available because of DTC
DTCClass_4	4	1	Class C information available because of DTC
DTCSeverity	5	0	Not applicable
	6	0	
	7	0	

b) Server #1: The following assumptions apply to SAE J2012-DA DTC P0A9B-15 Hybrid Battery Temperature 控制器#1: 以下假设适用于SAE J2012-DA DTC P0A9B-15 混合电池温度

Sensor – circuit short to battery or open (0x0A9B15): 传感器——短路到电池或开路(0x0A9B15)

1) statusOfDTC byte definition (0000 0100<sub>b</sub>): 0x04 DTC字节定义的状态 (0000 0100<sub>b</sub>)

Table A.34 defines the server #1 SAE J2012-DA-compliant DTC P0A9B-15 statusOfDTC = 0x04.

表A.34定义了控制器#1 SAE J2012-DA符合的DTC P0A9B-15的 DTC状态 = 0x04

**Table A.34 — Server #1 SAE J2012-DA-compliant DTC P0A9B-15 statusOfDTC = 0x04**

statusOfDTC: bit field name	Bit #	Bit state	Description
testFailed	0	0	Not applicable
testFailedThisOperationCycle	1	0	Not applicable
pendingDTC	2	1	DTC failed on the current or previous operation cycle
confirmedDTC	3	0	DTC is not confirmed at the time of the request
testNotCompletedSinceLastClear	4	0	DTC test has been completed since the last code clear
testFailedSinceLastClear	5	0	Not applicable
testNotCompletedThisOperationCycle	6	0	DTC test completed this operation cycle
warningIndicatorRequested	7	0	Not applicable

2) DTCSeverity byte definition (0000 0100<sub>b</sub>): DTCSeverity = 000<sub>b</sub>, DTCClass = 00100<sub>b</sub>

DTC严重性字节定义(0000 0100<sub>b</sub>): DTC严重性 = 000<sub>b</sub>, DTC类 = 00100<sub>b</sub>

Table A.35 defines the server #1 SAE J2012-DA-compliant DTC P0A9B-15 DTCSeverity byte = 0x04.

表A.35定义了控制器#1 SAE J2012-DA符合的DTC P0A9B-15, DTC严重性字节 = 0x04

**Table A.35 — Server #1 SAE J2012-DA-compliant DTC P0A9B-15 DTCSeverity byte = 0x04**

DTCSeverity	Bit #	Bit state	Description
DTCClass_0	0	0	No class information available because of DTC
DTCClass_1	1	0	No class A information available because of DTC
DTCClass_2	2	1	Class B1 information available because of DTC
DTCClass_3	3	0	No class B2 information available because of DTC
DTCClass_4	4	0	No class C information available because of DTC
DTCSeverity	5	0	Not applicable
	6	0	
	7	0	

c) Server #2: The following assumptions apply to SAE J2012-DA DTC P2522-1F A/C Request “B” – circuit intermittent (0x25221F):

控制器#2: 以下假设适用于SAE J2012-DA DTC P2522-1F A/C Request “B” — 电路间歇性(0x25221F)

1) statusOfDTC byte definition (0000 1100<sub>b</sub>): 0x0C

DTC字节定义的状态(0000 1100<sub>b</sub>): 0x0C

## ISO 27145-3:2012(E)

Table A.36 defines the server #2 SAE J2012-DA-compliant DTC P2522-1F statusOfDTC = 0x0C.

表A.36定义了控制器#2的SAE J2012-DA符合的 DTC P2522-1F, DTC的状态 = 0x0C

**Table A.36 — Server #2 SAE J2012-DA-compliant DTC P2522-1F statusOfDTC = 0x0C**

statusOfDTC: bit field name	Bit #	Bit state	Description
testFailed	0	0	Not applicable
testFailedThisOperationCycle	1	0	Not applicable
pendingDTC	2	1	DTC failed on the current or previous operation cycle
confirmedDTC	3	1	DTC is confirmed at the time of the request
testNotCompletedSinceLastClear	4	0	DTC test was completed since the last code clear
testFailedSinceLastClear	5	0	Not applicable
testNotCompletedThisOperationCycle	6	0	DTC test completed this operation cycle
warningIndicatorRequested	7	0	Not applicable

- 2) DTCSeverity byte definition (0000 1000<sub>b</sub>): DTCSeverity = 000<sub>b</sub>, DTCClass = 01000<sub>b</sub>  
DTC严重性字节定义(0000 1000<sub>b</sub>): DTC严重性 = 000<sub>b</sub>, DTC分类 = 01000<sub>b</sub>

Table A.37 defines the server #2 SAE J2012-DA-compliant DTC P2522-1F DTCSeverity byte = 0x08.

表A.37定义了控制器#2 的SAE J2012-DA符合的DTC P2522-1F, DTC严重性字节 = 0x08

**Table A.37 — Server #2 SAE J2012-DA-compliant DTC P2522-1F DTCSeverity byte = 0x08**

DTCSeverity	Bit #	Bit state	Description
DTCClass_0	0	0	No class information available because of DTC
DTCClass_1	1	0	No class A information available because of DTC
DTCClass_2	2	0	No class B1 information available because of DTC
DTCClass_3	3	1	Class B2 information available because of DTC
DTCClass_4	4	0	No class C information available because of DTC
DTCSeverity	5	0	Not applicable
	6	0	
	7	0	

### A.3.2.3 Example message flow

In the following example, server #2 only reports DTC P2522-1F A/C Request “B” – circuit intermittent (0x25221F) because the statusOfDTC of 0x2F (0010 1111<sub>b</sub>) matches the client-defined status mask of 0x08 (0000 1000<sub>b</sub>).  
在下面的示例中, 控制器#2 只报告 DTC P2522-1F A/C 请求 "B"---电路间歇 (0x25221F)故障码, 因为DTC的状态 0x2F (0010 1111<sub>b</sub>) 与客户端定义的 0x08 (0000 1000<sub>b</sub>) 的状态掩码匹配。

Table A.38 defines the ReadDTCInformation physically addressed request to server #2.

表A.38定义了读取DTC信息物理寻址请求给控制器#2。

**Table A.38 — ReadDTCInformation physically addressed request to server #2**

<b>Message direction:</b>		client → server #2	
<b>Message type:</b>		physically addressed request message	
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDTCInformation request SID	0x19	RDTCI
#2	sub-function = reportWWHOBDDTCByMaskRecord, suppressPosRspMsgIndicationBit = FALSE	0x42	RWWHOBDDTC- BSMR
#3	FunctionalGroupIdentifier (emissions = 0x33)	0x33	FGID
#4	DTCSeverityMaskRecord[] = [ DTCStatusMask ] Confirmed status	0x08	DTCSM
#5	DTCSeverityMaskRecord[] = [ DTCSeverityMask ] All Classes	0x1E	DTCSVM

Table A.39 defines the ReadDTCInformation positive response from server #2.

表A.39定义了读取DTC信息正响应 从控制器#2

**Table A.39 — ReadDTCInformation positive response from server #2**

<b>Message direction:</b>	server #2 → client		
<b>Message type:</b>	response message		
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDTCInformation response SID	0x59	RDTCIPR
#2	reportType = reportWWHOBDDTCByMaskRecord	0x42	RWWHOBDDTC-BSMR
#3	FunctionalGroupIdentifier (emissions = 0x33)	0x33	FGID
#4	DTCStatusAvailabilityMask	0x5C	DTCSAM
#5	DTCSeverityAvailabilityMask	0x1E	DTCSVAM
#6	DTCFormatIdentifier = SAE_J2012-DA_DTCFormat_04	0x04	DTCFID
#7	DTCAndSeverityRecord[ DTCSeverity #1 ] Class B2	0x08	DTCASR_DTCS
#8	DTCAndSeverityRecord[ DTCHighByte #1 ]	0x25	DTCASR_DTCHB
#9	DTCAndSeverityRecord[ DTCMiddleByte #1 ]	0x22	DTCASR_DTCMB
#10	DTCAndSeverityRecord[ DTCLowByte #1 ]	0x1F	DTCASR_DTCLB
#11	DTCAndSeverityRecord[ statusOfDTC #1 ]	0x0C	DTCASR_SODTC

Table A.40 defines the ReadDTCInformation physically addressed request to server #1.

表A.40定义了读取DTC信息 按物理地址请求 给控制器#1.

**Table A.40 — ReadDTCInformation physically addressed request to server #1**

<b>Message direction:</b>	client → server #1		
<b>Message type:</b>	physically addressed request message		
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDTCInformation request SID	0x19	RDTCI
#2	sub-function = reportWWHOBDDTCByMaskRecord, suppressPosRspMsgIndicationBit = FALSE	0x42	RWWHOBDDTC-BSMR
#3	FunctionalGroupIdentifier (emissions = 0x33)	0x33	FGID
#4	DTCSeverityMaskRecord[] = [ DTCStatusMask ] Confirmed status	0x08	DTCSM
#5	DTCSeverityMaskRecord[] = [ DTCSeverityMask ] All Classes	0x1E	DTCSVM

Server #1 reports no DTCs which match the filter criteria requested by the external test equipment.

控制器#1报告 没有与外部测试设备请求筛选条件相匹配的DTCs。

Table A.41 defines the ReadDTCInformation positive response from server #1.

表A.41定义读取DTC信息正响应从控制器#1.

**Table A.41 — ReadDTCInformation positive response from server #1**

<b>Message direction:</b>	server #1 → client		
<b>Message type:</b>	response message		
A_Data byte	Description	Byte value	Mnemonic
#1	ReadDTCInformation response SID	0x59	RDTCIPR
#2	reportType = reportWWHOBDDTCByMaskRecord	0x42	RWWHOBDDTC-BSMR
#3	FunctionalGroupIdentifier (emissions = 0x33)	0x33	FGID
#4	DTCStatusAvailabilityMask	0x5C	DTCSAM
#5	DTCSeverityAvailabilityMask	0x1E	DTCSVAM
#6	DTCFormatIdentifier = SAE_J2012-DA_DTCFormat_04	0x04	DTCFID

**A4 ClearDiagnosticInformation message flow examples 清除诊断信息消息流示例****A.4.1 General assumption 一般假设**

For all examples, the client requests a response message by setting the suppressPosRspMsgIndicationBit (bit 7 of the sub-function parameter) to “FALSE” (“0”).

**A.4.2 Message flow examples — ClearDiagnosticInformation清除诊断信息**

The client sends a ClearDiagnosticInformation request message with the groupOfDTC parameter set to “ClearAllWWHOBDDTC” and the FunctionalGroupIdentifier set to “emissions system group” to erase all emissions-related WWH-OBDDTCs. The emissions-related WWH-OBDDTC system consists of two servers. Both servers send a positive response to confirm that they have cleared all emissions-related WWH-OBDDTC system DTC information.

客户端发动一个“清除诊断信息”请求信息，该组DTC参数设置为“清除所有WWH OBD DTC”，并将功能标识符组设置为“排放系统组”，以清除所有与排放相关的WWH-OBDDTC系统的DTCs。排放相关的WWH-OBDDTC系统包括两个控制器。两个控制器都发送一个积极响应报文，以确定他们已经清除了所有与排放相关的WWH-OBDDTC系统的DTC信息。

Table A.42 defines the ClearDiagnosticInformation functionally addressed request message.

表A.42定义了清除诊断信息 功能寻址请求信息

**Table A.42 — ClearDiagnosticInformation functionally addressed request message**

<b>Message direction:</b>	client → vehicle		
<b>Message type:</b>	functionally addressed request message		
A_Data byte	Description	Byte value	Mnemonic
#1	ClearDiagnosticInformation request SID	0x14	CDTCI
#2	groupOfDTC [ DTCHighByte ]	0xFF	DTCHB
#3	groupOfDTC [ DTCMiddleByte ]	0xFF	DTCMB
#4	groupOfDTC [ DTCLowByte ] (FunctionalGroupIdentifier = emissions-related systems)	0x33	DTCLB

Table A.43 defines the ClearDiagnosticInformation positive response from server #1.

表A.43定义了控制器#1的 清除诊断信息正响应

**Table A.43 — ClearDiagnosticInformation positive response from server #1**

<b>Message direction:</b>	Server #1 → client		
<b>Message type:</b>	response message		
A_Data byte	Description	Byte value	Mnemonic
#1	ClearDiagnosticInformation response SID	0x54	CDTCIPR

Table A.44 defines the ClearDiagnosticInformation positive response from server #2.

表A.44定义了控制器#2的清除诊断信息正响应

**Table A.44 — ClearDiagnosticInformation positive response from server #2**

<b>Message direction:</b>	Server #2 → client		
<b>Message type:</b>	response message		
A_Data byte	Description	Byte value	Mnemonic
#1	ClearDiagnosticInformation response SID	0x54	CDTCIPR

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1) Under preparation.

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### ICS 43.040.10; 43.180

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