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UDS 诊断规范

目　次

前　言

本标准按照GB/T 1.1给出的规则，并结合本企业实际情况进行起草。

本标准由一汽海马汽车有限公司研发本部提出并归口。

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本标准所代替标准的历次版本发布情况为：

—首次发布。

UDS 诊断规范

1 范围

本标准规定了UDS诊断的使用规范。

本标准适用于基于CAN总线的节点。

2 规范性引用文件

下列文件对于本文件的应用是必不可少的。凡是注日期的引用文件，仅注日期的版本适用于本文件。凡是不注日期的引用文件，其最新版本（包括所有的修改单）适用于本文件。

ISO 14229 道路车辆.统一诊断设备(UDS).要求和规范

ISO 15031-5 道路车辆.排放相关诊断用车辆和外部设备之间的通信.第5部分:排放相关的诊断服务

3 术语及定义

ISO 14229 、ISO 15031-5 界定的术语和定义适用于本文件。

3.1

例程控制（Routine Control）

由测试设备给控制器发送操作请求，控制器按操作请求完成相关操作的控制过程。

3.2

符号缩写的含义

ISO	International Standards Organization国际标准组织
CAN	Controller Area Network控制器局域网
UDS	Unified Diagnostic Services统一诊断服务
DID	数据标识符
ECU	Electronic Control Unit电子控制单元
TBD	To Be Define待定
BS	Block Size块大小
SF	Single Frame单帧
SF_DL	Single Frame Data Length单帧数据长度
SN	Sequence Number序列号
STmin	Separation Time min.分离最小时间
FF	First Frame首帧
FF_DL	First Frame Data Length首帧数据长度

CF   Consecutive Frame连续帧

FC   Flow Control流控制帧

FS   Flow Status流状态

Confirm   Confirmation service primitive确认服务原语

Indication Indication service primitive指示服务原语

L_Data   Data Link Layer service数据链路层服务

Mtype   Message type报文类型

N_AE   Network Address Extension网络寻找范围

N_AI   Network Address Information网络寻址信息

N_Ar   Network layer timing parameter Ar网络层时序参数Ar

N_As   Network layer timing parameter As网络层时序参数As

N_Br   Network layer timing parameter Br网络层时序参数Br

N_Bs   Network layer timing parameter Bs网络层时序参数Bs

N_ChangeParameter   Network layer service name网络层服务名称

N_Cr   Network layer timing parameter Cr网络层时序参数Cr

N_Cs   Network layer timing parameter Cs网络层时序参数Cs

N_Data   Network Data网络数据

N_PCI   Network Protocol Control Information网络协议控制信息

N_PCItype Network Protocol Control Information type网络协议控制信息类型

N_PDU   Network Protocol Data Unit网络协议数据单元

N_SA   Network Source Address网络源地址

N_SDU   Network Service Data Unit网络服务数据单元

N_TA   Network Target Address网络目标地址

N_TAtype Network Target Address type网络目标地址类型

N_USData Network layer Unacknowledged Segment Data transfer service name
          网络层未回复段数据传输服务的名称

NWL   Network Layer网络层

request   Request service primitive请求服务原语

4 Basic Diagnostic Requirement 基本诊断请求

4.1 hexDiagnostic Communication Protocol 诊断通讯协议

The diagnostic communication protocol defines the diagnostic test services, message command structure and format and data parameter, identifier used in the communication between the external test tool and the onboard control unit.

诊断通讯协议定义了诊断测试服务、报文命令结构、格式、数据参数及标识符，用于外部测试工具与在线控制单元的通讯。

The enhanced diagnostics protocol to be used for HAIMA CAN project ECUs is the UDS protocol.

海马 CAN 项目的 ECU 使用的主要诊断协议为 UDS 协议。

The other diagnostic protocol to be used needs to get the agreement from HAIMA related department if the ECUs can't support the UDS protocol.

如果 ECU 不能支持 UDS 协议，要求使用别的诊断协议，必须得到海马开发部门总线组的认可。

All the new developing ECU should support the UDS protocol.

所以新开发的 ECU 应该支持 UDS 协议

4.2 Diagnostic Address Identifier 诊断寻址标识符

Diagnostic Address Identifier used to physically and functionally address each ECU. Functional requests means sent by of a global diagnostic address identifier and is intended to address multiple ECUs. Physical requests are used to address one single ECU.

诊断寻址标识符用于每个 ECU 的物理寻址和功能寻址。功能请求意思是发送一个全局诊断寻址标识符目的在于访问多个 ECUs.物理请求意思是只寻址一个单独的 ECU

Each ECU shall support physical and functional addressing methods for all supported diagnostic services.

每个 ECU 必须支持所有诊断服务的物理和功能寻址模式。

Each by an ECU supported diagnostic protocol (pair of enhanced and legislative protocol) shall be assigned a unique pair of diagnostic identifiers for physical communication corresponding to a single diagnostic request identifier and a single diagnostic response identifier.

每个 ECU 支持的每个诊断协议（包括推荐和法规协议）关于物理相关通讯必须被分派唯一一对诊断标识符，为信号诊断请求标识符和信号响应标识符。

Each ECU shall be assigned functional diagnostic identifier(s) defined for each supported diagnostic protocol.

每个 ECU 必须被分派一个功能诊断标识用于每个支持的诊断协议。

An ECU shall respond with its assigned physical diagnostic identifier (according to the protocol) if a response from the diagnostic test tool is required.

如果一个 ECU 的响应被诊断测试请求，ECU 必须使用分派给它的物理诊断标识来做响应（根据协议）.

The diagnostic identifiers will be assigned by the HAIMA responsible department and can be abstracted out of the database file according to the specific project.

海马开发部门分派诊断标识符，并且可以根据特有的项目具体来定义

4.3 Network Transport Communication Protocol 网络传输通讯协议

All information about the network transport protocol can be found in the ISO15765-2 and the HAIMA CAN Requirements.

所有关于传输协议的信息参考 ISO15765-2 和海马的要求。

4.4 Diagnostic Connector 诊断连接器

The diagnostic connector definition shall follow the ISO 15031-3.

诊断连接器的定义必须符合 ISO 15031-3

The reserved terminals need to be used should define by HAIMA related department.

预留的终端，当需要被使用时，必须有海马相关开发部门定义.

5 Diagnostic Communication 诊断通讯

5.1 General 一般

This section describes the general service message format for UDS.

The primitive of diagnostics are service requests and service responses.

The general diagnostic application data exchange between the diagnostic tool and an ECU located in a car network is an inquiry – response cycle whereas the request direction is always from the Diagnostic Tester to the ECU and the response from the ECU to the Tester.

此部分描述 UDS 一般服务报文格式。

基本诊断是服务请求和服务响应。

常规诊断应用数据在诊断设备和 ECU 之间进行交换，在汽车网络是一个请求—响应循环，但是请求描述总是从诊断设备发给 ECU,响应总是从 ECU 发给设备。

5.2 Message Description 报文描述

All types of messages specified in this document conform to one of the message description formats given in the Table 2 – Table 6 below.

所有报文的类型规定在本文档中，表2至表6给出了报文格式的描述。

The meaning of the columns in the format description tables is defined in Table 1 below.

在格式描述表格中，每列项的意思定义在下面的表1中。

表1

Column Header	Parameter 参数
Data Byte No.	This column defines the byte number for each parameter in the data stream. No data link or transport layer specific information is included. The numbering in this document starts with Byte 1 (one). 这项定义了在数据流中每个参数的字节编号。不包含数据链接层或传输层规定的信息。在本文档中这些编号是从字节1开始。
Data Value	This column defines the hexadecimal data value for each parameter in the data stream. 这项定义了在数据流中每个参数的十六进制数据值
Parameter Name	This column defines the name of each message parameter. The meaning of the respective message parameter is defined in the section data parameter / sub-function type description of each service. The message parameter type is in bold text. The options that are available for each parameter appear directly below the parameter name. 这项定义了每个报文参数的名称。各个报文参数的意思是会在每个服务的会话数据参数或子功能类型描述。报文参数在原文中，有用的选择出现在下面每个参数名称里的参数

Message Usage	This column defines whether or not a particular parameter must be used in the data stream. The options are as follows:
	这项定义了是否一个特定参数必须用于数据流，选择如下：
	Mandatory (M) – Each byte must appear in the message structure as specified. There are no exceptions. Is does not reflect the service is mandatory for implementation.
	强制的（M）——规定每个字节必须出现在报文结构中，无一例外。它不反映服务，是在执行时强制的。
	Conditional (C) – Each byte can conditionally appear in the message structure based on the selection of other parameters passed within the message or based upon implementation requirements.
	有条件的（C）——规定每个字节有条件地出现在报文结构中，基于报文里其他传递参数的选择或根据执行的要求。
	Optional (O) – Each byte can be optionally included in the message structure without an ECU or diagnostic tool "complaining" if the data is excluded.
	可选择的（O）——每个字节可以被选择在每个报文结构中，除了诊断设备不接受的数据

5.3 Diagnostic Service Request Message Format 诊断服务请求报文格式

A service request message is sent by the diagnostic tool when requesting an ECU to perform a specific action (e.g. report diagnostic data or execute diagnostic test procedures).

当请求 ECU 执行规定的行动（例如，报告诊断数据或者执行诊断测试程序）时，诊断设备发生一个服务请求报文。

The two different types of request messages are in Table 2 and Table 4 below.

请求报文的两种不同类型在下面的表 2 和表 4 中。

5.3.1 Diagnostic Request Message with Sub-function 带有子功能的诊断请求报文

表 2

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Service ID 请求服务 ID	M	XX
2	Sub-Function Parameter 子功能参数	M	
	Option 1: Sub-Function Type No.1 选择 1：子功能类型编号 1		XX
	Option n: Sub-Function Type No. n 选择 n：子功能类型编号 n		XX

3 . . . n	Data Parameter No. 1 . . Data Parameter No. n 数据参数编号 1 : 数据参数编号 n	0 . . 0	XX . . XX

The table below describes the structure of the Sub-function parameter byte included in service requests messages providing a sub-function parameter as defined in the table above.

上面表 2 描述子功能参数字节的结构，包括服务请求报文提供的子功能参数也定义在表 2 中。

The Suppress Positive Response Message Indication Bit（Bit 7）influences the ECU's response behavior.

禁止肯定响应报文指示位（比特 7）影响 EUC 的肯定响应行为。

表 3

Sub-Function Parameter Byte 子功能参数字节							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Suppress Pos Rsp Msg Indication Bit 禁止肯定响应报文指示位	Sub-function type as specified in the sub-function type description of the service 子功能类型规定在服务的子功能类型描述						

5.3.2 Diagnostic Request Message without Sub-function 不带子功能的诊断请求报文

表 4

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Service ID 请求服务 ID	M	XX
2 . . . n	Data Parameter No. 1 . . Data Parameter No. n 数据参数编号 1 : 数据参数编号 n	M . . 0	XX . . XX

5.4 Diagnostic Service Response Message Format 诊断服务响应报文格式

The ECU shall send a service response message confirming the previously received service request positively or negatively, the response behaviors are defined in the following section.

ECU 将发送一个肯定或者否定的服务响应报文，来确认之前接收到的报文请求，该响应行为定义在

下面部分中。

The next two tables depict the positive and negative response message structure.

下面表 5 和表 6 描述了肯定和否定响应报文的结构。

5.4.1 Diagnostic Positive Response Message 诊断肯定响应报文

表 5

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Response Service ID 响应服务 ID	M	Request service ID value + 40
2	Request Sub Function Type or Data Parameter no. 1 子功能类型或者数据参数编号 1	M	XX
3 . . . . n	Data Parameter No. a . . Data Parameter No. x 数据参数编号 a : 数据参数编号 x	O . . . O	XX . . . XX

5.4.2 Diagnostic Negative Response Message 诊断否定响应报文

表 6

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response Service ID 否定响应服务 ID	X	7F
2	Request Service ID 请求服务 ID	X	XX
3	Negative Response Code 否定响应代码	X	XX

6 Application Layer and Session Layer Timing 应用层和会话层时序

6.1 Prerequisites 必要条件

This section specifies the application layer and session layer timing parameters.

此部分规定应用层和会话层时序参数。

It has to be distinguished between the following communication conditions:

必须区别下面的通讯条件：

a) physical communication (uni-cast)物理通讯（一对一模式）

1) during default session 默认会话期间

　　　　2) during non-default session (session handling required)非默认会话期间（会话处理请求）

　　b) functional communication (broadcast)功能通讯（广播）

　　　　1）during default session 默认会话期间

　　　　2）during non-default session (session handling required) 非默认会话期间（会话处理请求）

The following timing parameter definitions use the service primitives as defined in ISO 15765 - 2.

下面在 ISO 15765－2 里定义的时序参数定义用于原始服务。

6.2 Application Layer Timing Parameter Definition 应用层时序参数定义

表 7

Timing Parameter	Description 描述	Type	min	max
P2$_{CAN\ Tester}$	Timeout for the diagnostic tool to wait after the successful transmission of a request message (indicated via N_USData.con) for the start of related incoming response messages。 诊断设备等待时间在一个请求报文的成功发送后（表示经由 N_USData.确认），开始于相关引入响应报文 (N_USDataFF.ind for a multi-frame message or N_USData.ind for a Single Frame message). （N_USDataFF.ind 用于一个多帧报文或 N_USData.ind 用于单帧报文） Name of Parameter in ISO 15765-3: P2$_{CAN\_Client}$ 在 ISO 15765-3 参数的名称为：P2$_{CAN\_Client}$	Timer reload value 定时器装载值	*	*
P2*$_{CAN\ Tester}$	Enhanced timeout for the diagnostic tool to wait after the reception of a negative response message with response code 78 hex (indicated via N_USData.ind) for the start of incoming response messages 诊断设备加强等待时间用于在接收一个响应代码为 78 hex 的否定响应报文后（表示经由 N_USData.指示），开始于相关引入响应报文。 (N_USDataFF.ind for a multi-frame message or N_USData.ind for a Single Frame message). （N_USDataFF.ind 用于一个多帧报文或 N_USData.ind 用于单帧报文） Name of Parameter in ISO 15765-3: P2*$_{CAN\_Client}$	Timer reload value 定时器装载值	*	*

	在 ISO 15765-3 参数的名称为：P2*_{CAN_Client}			
P2_{CAN ECU}	Performance requirement for the ECU to start with the response message after the reception of a request message (indicated viaN_USData.ind). ECU 执行要求在一个请求报文的接收之后，起始于响应报文，（表示经由 N_USData. 指示） Name of Parameter in ISO 15765-3: P2_{CAN_Server} 在 ISO 15765-3 参数的名称为：P2_{CAN_Server}	Performance requirement 执行要求	0ms	50ms
P2*_{CAN ECU}	Performance requirement for the ECU to start with a further response message after the transmission of a negative response message (indicated via N_USData.con) with response code 78 hex (enhanced response timing). ECU 执行要求在一个响应代码为 78hex 的否定响应报文接收之后，以多个报文响应为开始，（表示经由 N_USData. 确认） Name of Parameter in ISO 15765-3: P2*_{CAN_Server} 在 ISO 15765-3 参数的名称为：P2*_{CAN_Server}	Performance requirement 执行要求	0ms	5000ms
P3_{CAN Tester Phys}	Minimum time for the diagnostic tool to wait after the successful transmission of a physically addressed request message (indicated via N_USData.con) with no response required (Suppress Pos Rsp Msg Indication Bit = TRUE) before it is allowed to transmit the next physically addressed request message 诊断设备等待最小时间在成功发送一个物理寻址无响应要求（禁止接收方响应报文指示位 TRUE）的请求报文之后（表示经由 N_USData 确认），在允许发送下一个物理寻址请求报文之前。 Name of Parameter in ISO 15765-3: P3_{CAN_Client_Phys} 在 ISO 15765-3 参数的名称为：P3_{CAN_Client_Phys}	Timer reload value 定时器装载值	*	*

P3$_{CAN\ Tester\ Func}$	Minimum time for the diagnostic tool to wait after the successful transmission of a functionally addressed request message (indicated via N_USData.con) before it is allowed to transmit the next functionally addressed request message. 诊断设备等待最小时间在成功发送一个功能寻址请求报文（表示经由 N_USData 确认）之后，在在允许发送下一个功能寻址请求报文之前。 Name of Parameter in ISO 15765-3: P3$_{CAN\_Client\_Func}$ 在 ISO 15765-3 参数的名称为：P3$_{CAN\_Client\_Func}$	Timer reload value 定时器装载值	*	*

注 1：*: For details on this timing see ISO 15765-3。这些时序详细见 ISO 15765-3.

Example:例子：The following figure is an example of how P2$_{CAN\ Tester}$/ P2$_{CAN\_Client}$ can be composed of the single frame request and response message.

图 1 是一个单帧请求和响应报文是 P2$_{CAN\ Tester}$/ P2$_{CAN\_Client}$ 如何实现的例子.
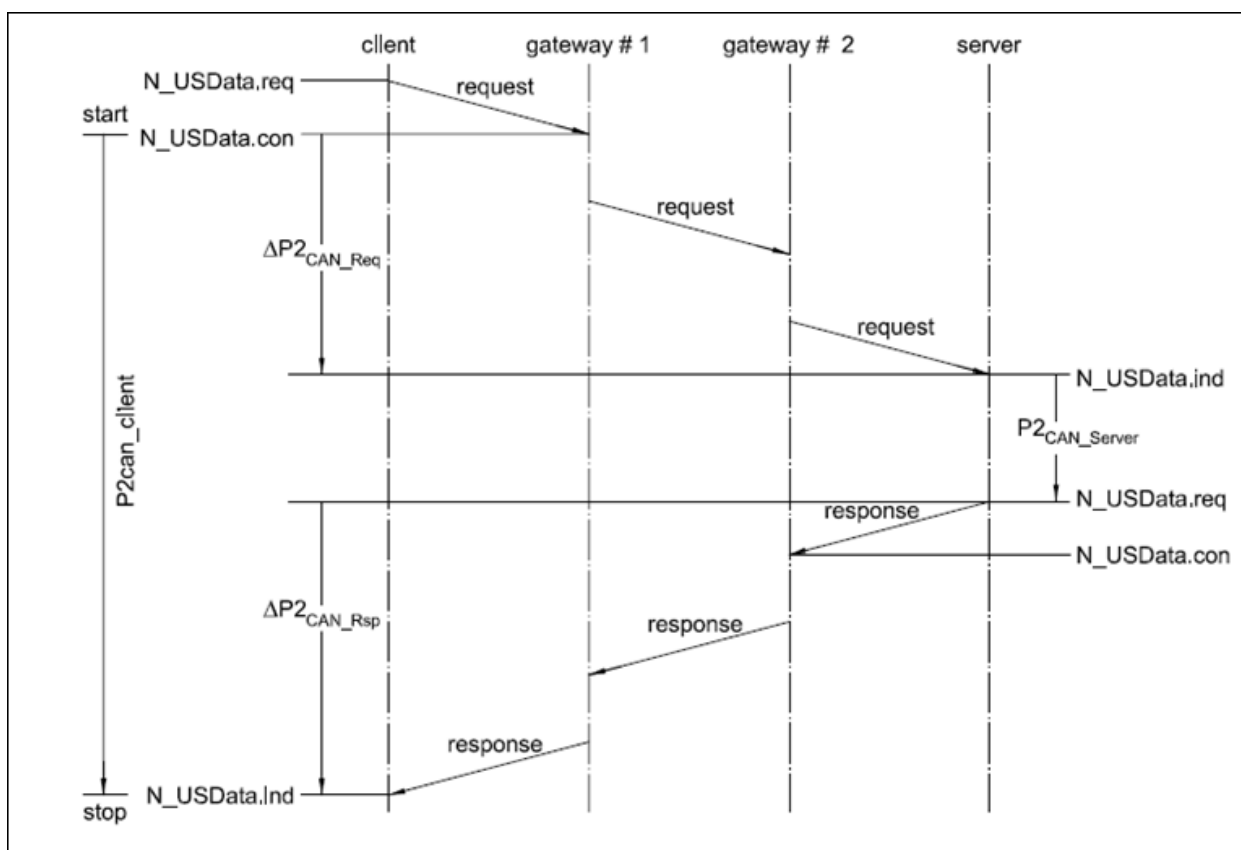
图 1 单帧请求响应时序图

6.2.1 Physical Communication Timing Behaviour 物理通讯时序行为

If the diagnostic tool's network layer has successfully transmitted a service request message onto the bus (signalized by N_USData.confirm), the diagnostic tool application shall

start its P2$_{CAN\_Tester}$ timer, using the default reload value P2$_{CAN\_Tester}$.

如果诊断设备的网络层通过总线已经成功地发送一个服务请求报文（通过 N_USData 确认告知），诊断设备的应用应该由它的启动 P2$_{CAN\_Tester}$ 定时器，使用默认负载值 P2$_{CAN\_Tester}$。

The ECU's diagnostic application layer shall start with its response message within P2$_{CAN\_ECU}$ after the reception of N_USData.indication; this means that in case of a multi-frame response message the First Frame has to be sent within P2$_{CAN\_ECU}$ and for single frame response messages that the Single Frame has to be sent within P2$_{CAN\_ECU}$.

ECU 的诊断应用层应该在接收 N_USData.indication 之后，在 P2$_{CAN\_ECU}$ 期间，它的响应报文必须启动。意思是假如是一个多帧响应报文，在 P2$_{CAN\_ECU}$ 期间，它的首帧必须发出；假如是一个单帧报文响应，在 P2$_{CAN\_ECU}$ 期间，它的单帧必须发出。

If the diagnostic tool application receives a N_USDataFF.indication or N_USData.indication of its network layer it shall stop its P2$_{CAN\_Tester}$ (P2*$_{CAN\_Tester}$) timer.

如果诊断设备应用层在接收到它网络层的一个 N_USDataFF.indication 或 N_USData.indication，应用层必须停止 P2$_{CAN\_Tester}$（P2*$_{CAN\_Tester}$ ）

注: In certain cases the ECU is not required to respond on a diagnostic request message sent by the diagnostic tool (for details please refer to section 7). Assuming the ECU does not respond, the requirements in section 6.3 shall apply.

某些指令 ECU 不被要求响应诊断设备发送的诊断请求报文（详细参考 7 部分）。假设 ECU 不响应，6.3 部分提供具体要求。

In case the ECU cannot provide the requested information within the P2$_{CAN\_ECU}$ response timing it shall request an Enhanced Response Timing window by sending a negative response message including response code 78 hex to the diagnostic tool.

The reception of a negative response message with NRC 78 hex causes the diagnostic tool to restart its P2$_{CAN\_Tester}$ timer, but using the enhanced reload value P2*$_{CAN\_Tester}$.
The ECU shall start with its response message within the enhanced P2*$_{CAN\_ECU}$ following the N_USData.confirm of the previously transmitted negative response message with NRC 78 hex.

假如在响应时间 P2$_{CAN\_ECU}$ 期间 ECU 不能提供被请求的信息，它必须发一个响应代码为 78hex 的否定响应报文给诊断设备，请求加长响应时间窗口。

在接收到响应代码为 78hex 的否定响应报文时，诊断设备重新启动 P2$_{CAN\_Tester}$ 定时器，但是如果诊断设备正使用加强值 P2*$_{CAN\_Tester}$，ECU 必须在之前发送的携带 N_USData.confirm 否定响应代码为 78hex 否定响应报文后，开始进入加强 P2*$_{CAN\_ECU}$。

In case the ECU's diagnostic application can still not provide the requested information within the enhanced P2*$_{CAN\_ECU}$ then a further negative response message including NRC 78 hex shall be sent by the ECU.

假如在延长时间窗口 P2*$_{CAN\_ECU}$ 期间，ECU 的诊断应用层依然不能提供请求的信息，那么 ECU 必须再发送响应代码为 78hex 的否定响应报文。

As long as the diagnostic tool receives negative response messages with NRC 78 hex it shall restart its P2$_{CAN\_Tester}$ timer again using the enhanced reload value P2*$_{CAN\_Tester}$.

只要诊断设备接收到响应代码为 78hex 的否定响应报文，它就必须再次重新启动 P2$_{CAN\_Tester}$ 定时器，

使用加长装载值 P2*$_{CAN\_Tester}$。

> 注：The extended response timing is kept active in the diagnostic tool as long as no final response message was received or a P2*$_{CAN\_Tester}$ Timeout occurred.
>
> 诊断设备只要没有接收到终止响应报文或发生 P2*$_{CAN\_Tester 超时}$，延长响应时间保持激活状态。

6.2.2 Function Communication Timing Behaviour 功能通讯时序行为

In comparison with the physical communication condition the functional condition only requires changes in the diagnostic tool's timing behavior. The ECU's timing behavior does not differ. Therefore this section only describes the tool's timing behavior.

与物理通讯条件对比，功能条件之要求改变诊断设备的时序行为。ECU 的时序行为没有不一致，因此此部分只描述了设备的时序行为。

If the diagnostic tool's network layer has successfully transmitted a service request message on the bus (signalized by N_USData.confirm) the diagnostic tool application shall start its P2$_{CAN\_Tester}$ timer, using the default reload value P2$_{CAN\_Tester}$ as described already for physical communication.

如果诊断设备的网络层通过总线已经成功地发送一个服务请求报文（通过 N_USData 确认告知），诊断设备的应用应该由它的启动 P2$_{CAN\_Tester}$ 定时器，使用默认负载值 P2$_{CAN\_Tester}$。

When receiving N_USDataFF.indication or N_USData.indication of an incoming response message the diagnostic tool's application either shall stop its P2$_{CAN\_Tester}$ timer in case it knows the number of ECU's to be expected to respond and all these ECU's have responded or it shall restart its P2$_{CAN\_Tester}$ timer in case not all expected ECU's responded yet or in case the diagnostic application does not know the number of ECU's to be expected to respond.

当诊断设备的应用层接收到响应报文携带 N_USDataFF.indication 或 N_USData. Indication 时，假如诊断设备知道 ECU 被要求响应的数量并且这些响应都已经执行，那么设备必须终止定时器 P2$_{CAN\_Tester}$ 定时器;或者假如诊断设备不是执行了 ECU 被要求的所有响应或者不知道 ECU 被要求响应的数量,那么诊断设备必须重新启动 P2$_{CAN\_Tester}$ 定时器。

> 注：The expiration of the P2$_{CAN\_Tester}$ timer before a further N_USData.indication or N_USDataFF.indication was received from the Network Layer signalizes either that at least one ECU that is expected to response has not responded yet (diagnostic tool knows the number of ECU's expected to respond) or all possible responses were received (diagnostic tool does not know the number of ECU's expected to respond).
>
> 在从网络层接收下一个 N_USData.indication 或者 N_USDataFF.indication 之前，P2$_{CAN\_Tester}$ 定时器溢出，说明至少有一个 ECUM 并没有执行被要求的响应（诊断设备知道 ECU 被要求响应的数量）或者接收了所有可能的响应（不知道 ECU 被要求响应的数量）。

When receiving a negative response message with response code 78 hex the diagnostic tool's application shall restart its P2$_{CAN\_Tester}$ timer, using the enhanced reload value P2*$_{CAN\_Tester}$. In addition it has to store an ECU label in a list of ECUs, which currently send negative response messages with NRC 78 hex (pending ECU). Every ECU that sends a negative response message with NRC 78 hex shall be stored in this list.

当诊断设备的应用层接收响应代码为 78hex 的否定响应报文，则它必须重新启动 P2$_{CAN\_Tester}$ 定时器，用于延长装载值 P2*$_{CAN\_Tester}$。另外诊断设备必须存储某些 ECU 标志清单，即当前发送响应代码为 78hex

的否定响应报文的 ECU(未响应请求的 ECU).每个发送响应代码为 78hex 的否定响应报文的 ECU,必须存储这些清单。

Once an ECU that is stored as pending starts with its final response message (positive response message or negative response message including a response code other than NRC 78 hex) it shall be deleted from the list of pending response messages. In case no further response messages are pending the diagnostic tool's application re-uses the default reload value for its P2$_{CAN\_Tester}$ timer (enhanced response timing is no longer active).

一旦一个 ECU 在它的最后响应报文（肯定响应报文或者是携带否定代码不是否定 78 hex 的响应报文）才开始存储未响应请求的信息，ECU 必须删除存储的为响应请求的清单。假如没有下一个不响应请求的报文，诊断设备应用层可以重复使用 P2$_{CAN\_Tester}$ 定时器（不在激活延长报文响应时序）的默认装载值 。

As long as there is at least one ECU label stored in the list of pending response messages any start of a further response messages from any ECU that was addressed by the preceding request will cause a restart of the P2$_{CAN\_Tester}$ timer using the enhanced reload value P2*$_{CAN\_Tester}$.

从任何被之前请求访问的，将重新启动用于延长装载值 P2*$_{CAN\_Tester}$.的 P2$_{CAN\_Tester}$ 定时器的 ECU，任意启动下一个响应报文 至少有一个响应报文未响应请求的 ECU 存储清单。

6.3 Minimum Time of Diagnostic Tool Request Message 诊断设备请求报文的最小时间

The minimum time between request messages transmitted by the diagnostic tool is required in order to allow for a specific diagnostic service data interpretation rate in the ECU, because based on its normal functionality an ECU might process diagnostic request messages with a certain scheduling rate (e.g. 10 ms).

为了考虑到 ECU 中一个特定的诊断服务数据解析速度，最小时间在要求诊断设备发送的请求报文期间，因为基于正常的功能，一个 ECU 可能处理请求报文在确定的时间速度内。

The time for the diagnostic service data interpretation scheduler shall be less than the performance requirement P2$_{CAN\_ECU}$ in order to meet the ECU requirements specified in section 7.2.

为了在 7.2 部分符合的 ECU 特定要求诊断服务数据的解析程序的时间必须小于执行请求 P2$_{CAN\_ECU}$ 。

In case of physical communication requiring an ECU's response or in case a response is received independent of the Suppress Pos Rsp Msg Indication Bit value, the diagnostic tool is allowed to transmit the next request immediately after the complete reception of the final response message.

假如物理层通讯要求一个 ECU 的响应或者一个响应被接收时，不依赖于减小 Pos Rsp Msg 指示比特位值，在完全地接收最后的响应报文后，允许诊断设备立即发生下一个请求。

Receiving a final response means the diagnostic tool's request was completely executed by the addressed ECU.

接收最后响应意思是诊断设备的请求被寻址 ECU 完全地实施。

The value of P3$_{CAN\_Tester\_Phys}$ shall be equal to the ECU specific P2$_{CAN\_ECU\_max}$ for the physically addressed ECU. The timing applies to any physically addressed request message in any diagnostic session (default and non-default session) and in case no response is required by the ECU (Suppress Pos Rsp Msg Indication Bit = TRUE).

The P3$_{CAN\_Tester\_Phys}$ timer shall be started in the diagnostic tool each time a physically addressed request message with no response required is successfully transmitted onto the bus indicated by N_USData.confirm.

对于物理寻址 ECU,P3$_{CAN\_ECU\_Phy}$ 的值应该等于 ECU 规定的 P2$_{CAN\_ECU\_max}$，该时间应用于在任何诊断会话（默认和非默认会话）中任何物理寻址请求报文和假设没有 ECU(减小 Pos Rsp Msg Indication 比特位=TRUE) 响应请求.

在每次一个物理寻址请求无响应要求的报文，在总线上由 N_USData.confirm 指示发送成功时，诊断设备 P3$_{CAN\_Tester\_Phys}$ 定时器应该被启动。

An additional N_USData.request requesting the network layer to transmit a physically addressed request message following the preceding request is only allowed if the P3$_{CAN\_Tester\_Phys}$ timer is no longer active at this point in time.

如果 P3$_{CAN\_Tester\_Phys}$ 定时器不再及时激活，未响应要求的请求只能被允许。之后，另外的 N_USData.request 请求网络层发送一个物理寻址请求报文。

If the P3$_{CAN\_Tester\_Phys}$ timer would still be active at the point in time the diagnostic tool would like to transmit a new physically addressed request message（N_USData.request）the transmission shall be postponed until P3$_{CAN\_Tester\_Phys}$ is timed out.

如果 P3$_{CAN\_Tester\_Phys}$ 定时器依然及时处在激活状态，诊断设备将发送一个新物理寻址请求报文（N_USData.request），发送一直被延期，直到 P3$_{CAN\_Tester\_Phys}$ 时间超时。

The value of P3$_{CAN\_Tester\_Func}$ shall be the maximum (worst-case) value of all functionally addressed ECU's P2$_{CAN\_ECU\_max}$ for any functionally addressed request message in any diagnostic session (default and non-default session).

P3$_{CAN\_Tester\_Func}$ 的值应该是所以功能寻址 ECU 的 P2$_{CAN\_ECU\_max}$ 的最大值(最差情况)，用于任何诊断会话（默认和非默认会话）的任意功能寻址请求。

The P3$_{CAN\_Tester\_Func}$ timer shall be started in the diagnostic tool each time a functionally addressed request message with response required or with no response required is successfully transmitted onto the bus indicated by N_USData.confirm.

在每次一个物理寻址请求无响应要求的报文，在总线上由 N_USData.confirm 指示发送成功时，诊断设备 P3$_{CAN\_Tester\_Func}$ 定时器应该被启动。

An additional N_USData.request requesting the network layer to transmit a functionally addressed request message following the preceding request is only allowed if the P3$_{CAN\_Tester\_Func}$ timer is no longer active at this point in time.

如果 P3$_{CAN\_Tester\_Func}$ 定时器不再及时激活，未响应要求的请求只能被允许。之后，另外的 N_USData.request 请求网络层发送一个物理寻址请求报文。

If the P3$_{CAN\_Tester\_Func}$ timer would still be active at the point in time the diagnostic tool would like to transmit a new functionally addressed request message（N_USData.request）the transmission shall be postponed until P3$_{CAN\_Tester\_Func}$ is timed out.

如果 P3$_{CAN\_Tester\_Func}$ 定时器依然及时处在激活状态，诊断设备将发送一个新物理寻址请求报文（N_USData.request），发送一直被延期，直到 P3$_{CAN\_Tester\_Func}$ 时间超时。

6.4 Session Layer Timing Parameter Definition 会话层时序参数描述

A specific diagnostic session enables a certain set of services, functionality and timing within the ECU.

一个具体的诊断会话使能 ECU 的一个确定的服务，功能和时序的设定。

The diagnostic tool starts the respective diagnostic session by means of the Diagnostic Session Control service in one individual ECU or a group of ECUs. When a diagnostic session other than the Default Session is started then a so-called session handling is required.

诊断设备启动特定的诊断会话意味着诊断会话控制在一个单独的 ECU 或一组 ECU。当一个诊断会话与启动的默认会话不同，那么它将请求所谓的会话处理。

The following table defines the session layer timing parameter values for session handling during non-default sessions.

表 8 诊断非默认会话的会话处理定义了会话层时序参数值

表 8

Timing Parameter	Description 描述	Type	Value/ms
S3$_{Tester}$	Time between functionally addressed Tester Present (3E hex) request messages transmitted by the diagnostic tool to keep a diagnostic session other than the Default Session active in multiple ECUs (functional communication) or maximum time between physically transmitted request messages to a single ECU (physical communication). 诊断设备发送诊断在线（3E hex）的功能寻址的请求报文，保持多个 ECU（功能通讯）保持处在非默认会话诊断激活的时间；或者物理寻址的请求报文，保持单个 ECU（物理通讯）处在非默认会话诊断激活的时间。 Name of Parameter in ISO 15765-3: S3$_{Client}$ 在 ISO 15765-3 中的参数名称：S3$_{Client}$	Timer reload value 定时器装载值	2000
S3$_{ECU}$	Time for the ECU to keep a diagnostic session other than the Default Session active while not receiving any diagnostic request message. 当 ECU 没有接收到任何请求报文时，ECU 保持一个非默认诊断会话激活的时间。 Name of Parameter in ISO 15765-3: S3$_{Server}$ 在 ISO 15765-3 中的参数名称：S3$_{Server}$	Timer reload value 定时器装载值	5000

After starting a specific diagnostic session other than the Default Session the diagnostic tool is responsible to keep this non-default session active.

在启动一个特定的非默认诊断会话之后，诊断设备需要保持这非会话诊断模式的激活。

Such a session handling implementation shall use the session layer timing parameters according to the definition given in the table above.

一个会话处理的执行应该使用根据上表定义的会话层时序参数。

If after $S3_{ECU}$ no Diagnostic Request (any Diagnostic Request) is received, each ECU shall timeout and return to a Default Session.

如果在经过 $S3_{ECU}$ 之后，ECU 没有接收诊断请求（任意诊断请求），每个 ECU 应该记录超时并且返回默认会话。

The appropriate start and stop conditions for the ECU session timer shall be implemented according to the table below.

ECU 会话定时器适合启动和终止的条件，应该根据表 9 来执行

The session handling according to the table below shall be active until a transition to default session takes place. This may be caused by the execution of a Diagnostic Session Control request including sub-function "Default Session".

根据表 9 会话处理应该激活，直到发生转换到默认会话。这种情况可能发生在包含子功能为"默认会话"的诊断控制请求时。

For Session Layer start/stop conditions for the Tester ($S3_{Tester}$) see ISO 15765-3.

测试设备的会话层启动或终止的条件，见 ISO 15765-3。

表 9

Timing Parameter	Action	Physical and functional communication 物理和功能通讯
$S3_{ECU}$	Initial start	N_USData.con that indicates the completion of the transmission of a Diagnostic Session Control positive response message for a transition from the Default Session to a non-default session, in case a response message is required. N_USData.con 指示：如果有请求响应报文，一个诊断会话控制由默认会话转换为非默认会话的肯定响应报文完成发送。
		Successful completion of the requested action of the service Diagnostic Session Control (10 hex) for a transition from the default session to a non-default session, in case no response message is required/allowed. 如果没有请求或运行的响应报文，一个服务诊断会话控制由默认会话转换为非默认会话的请求活动的成功完成发送。
	Subsequent stop	N_USDataFirstFrame.ind that indicates the start of a multi-frame request message or N_USData.ind that indicates the reception of any Single Frame request message. N_USDataFirstFrame.ind 指示多帧请求报文的启动，或者指示任意单帧请求报文的接收
	Subsequent start	N_USData.con that indicates the completion of any response message that concludes a service execution (final response message) in case a response message is required/allowed to be transmitted (this includes

		positive and negative response messages). A negative response with response code 78 hex does not restart the S3$_{ECU}$ timer. N_USData.con 指示假如在响应报文（包括肯定和否定响应报文）被请求或允许发送中，任意终止服务执行的响应报文（最后响应报文）的完成。一个响应代码为 78hex 的否定响应不能重新启动 S3$_{ECU}$ 定时器。
		Completion of the requested action (service conclusion) in case no response message (positive and negative) is required/allowed. 假如没有响应报文（肯定和否定）被请求或者允许情况下，请求任务（服务结论）的完成。
		N_USData.ind that indicates an error during the reception of a multi-frame request message. N_USData.ind 指示在一个多帧请求报文接收期间的错误。
	Stop	N_USData.con that indicates the completion of the transmission of a Diagnostic Session Control positive response message for a transition from any non-default session to Default Session, in case a response message is required. N_USData.con 指示假如一个响应报文被请求，为了由任何非默认会话变为默认会话的转换，一个诊断会话控制肯定响应报文发送的完成。
		Successful completion of the requested action of the service Diagnostic Session Control (10 hex) for a transition from from any non-default session to Default Session, in case no positive response message is required/allowed. 如果没有请求或运行的响应报文，为了由任何非默认会话变为默认会话的转换，服务诊断会话控制（10hex）的成功完成。

注：For the diagnostic tool it has to be distinguished between a periodically transmitted functionally addressed Tester Present [3E 00/80 hex] request message and a sequentially transmitted physically addressed Tester Present [3E 00/80 hex] request message, which is only transmitted in case of the absence of any other diagnostic request message. For the ECU there is no need to distinguish between that kind of Tester Present [3E 00/80 hex] handling. The table furthermore shows that the S3$_{ECU}$ timer handling is based on the network layer service primitives, which means that the S3$_{ECU}$ timer is also restarted upon the reception of a diagnostic request message that is not supported by the ECU.

针对诊断设备，必须区别一个周期性发送的功能寻址诊断在线【3E 00/80 hex】历程请求报文和一个连续发送的物理寻址诊断在线【3E 00/80 hex】请求报文，这些报文只在没有其它任何诊断请求报文的时才能发送。针对 ECU，没有必要区分不同的诊断在线[3E 00/80 hex]处理。表 9 另外表示 S3$_{ECU}$ 定时器基于网络服务原语进行处理，这意味着 S3$_{ECU}$ 定时器与 ECU 不支持的诊断请求报文接收有关。

6.5 Timer Resource Requirements 定时器资源要求

The ECU shall provide the respective timer resources listed in the next table in order to meet the

application layer timing requirements given in section6.2 above.

表 10 ECU 应该提供接收定时器资源列表为了给 6.2 部分在碰到应用层时序提供要求

表 10

Timing Parameter	ECU
P2$_{CAN\_ECU}$	An optional timer might be required for the enhanced response timing in order to make sure that sub-sequent negative response messages with response code 78 hex are transmitted prior to the expiration of P2*$_{CAN\_ECU}$. 一个可以选择的定时器可能被要求去延长响应时序，在 P2*$_{CAN\_ECU}$ 溢出时. 为了保证 sub-sequent 否定响应代码 78hex 响应报文优先被发送。

The ECU shall provide the respective timer resources listed in the next table in order to meet the session handling timing requirements given in section 6.4 above.

表 11 ECU 应该提供接收定时器资源列表为了给 6.4 部分在碰到会话处理时序时提供要求

表 11

Timing Parameter	ECU
S3$_{ECU}$	A single timer is required in the ECU, because only a single diagnostic session can be active at a time in a single ECU. 在 ECUZ 中要求一个独立定时器，因为只有在独立的 ECU 中，单独诊断会话才会及时激活。

6.6 Error Handling 错误处理

The ECU shall implement the error handling according next table.

ECU 应该根据下表要求执行错误处理。

表 12

Communication phase 通讯阶段	ECU error type ECU 错误类型	ECU handling ECU 处理
Request reception	N_USData.ind from network layer with a negative result value. N_USData.ind 来自带有否定结果值的网络层	Restart S3$_{ECU}$ timer (because it has been stopped based on the previously received First Frame indication). The ECU shall ignore the request. 重新启动 S3$_{ECU}$ 定时器（因为定时器必须停止基于之前接收的第一帧指示）。ECU 应该忽视请求。
P2$_{CAN\_ECU}$	Timeout 超时	N/A 不涉及
Response transmission	N_USData.con from network layer with a	Restart S3$_{ECU}$ timer (because it has been stopped based on the previously received

| negative result value. N_USData.con 自带有否定结果值的网络层 | request message). The ECU shall not perform a retransmission of the response message. 重新启动 S3ECU定时器（因为定时器必须停止基于之前接收的请求报文）。ECU 应该不执行重新发送响应报文。 |

7 ECU Response Implementation Rules ECU 响应执行规则

This section gives an overview how the ECU has to react on the different Request and Response combinations and for physically functional addressed ECU's.

此部分给出，ECU 如何必须起作用于不同请求和联合响应和 ECU 的物理和功能寻址。

7.1 Request Message with Sub-function Parameter 带子功能参数的请求报文

In general the Sub-Function Parameter presets the type of the response. E.G. the suppress Positive Response Message Indication Bit determines if a response has to be sent or not.

通常子功能参数预先设置响应类型。例如，设定肯定响应报文指示位决定一个响应是否必须被发送或者不被发送 。

7.1.1 Physical Address Diagnostic Request Message 物理寻址诊断请求报文

If a physically request is received, that means that the request is a uni-cast to a single ECU, and the request includes a Sub-Function Parameter field the response has to be in accordance with next table.

如果一个物理请求被接收，意味着该请求是一对一地发给单独 ECU，该请求包括一个子功能参数域，必须根据表 13 做出响应。

表 13

ECU Case no.	Diagnostic Tool Request Message 诊断设备请求报文		ECU Capability ECU 特性		ECU Response ECU 响应		Comments to ECU Response ECU 响应内容
	Addressing scheme 寻址项	Sub-Function (Suppress Pos Rsp Msg Indication Bit) 子功能（设置 Pos Rsp Msg 指示比特位）	Service ID supported 是否支持服务 ID	Sub-function supported 是否支持子功能	Message 报文	NRC (Hex value) 否定响应代码	
1	Physical 物理	FALSE (bit0) 错误（比特=0）	YES	YES	Pos Rsp	---	ECU sends positive response ECU 发送肯定响应

2			YES	YES	Neg Rsp	NRC = XX	ECU sends negative response ECU 发送否定响应
3			NO	---	Neg Rsp	NRC=11	Negative response with NRC 11 hex - service not supported NRC 为 11 hex 的否定响应——不支持服务
4			YES	NO	Neg Rsp	NRC=12	Negative response with NRC 12 hex - sub-function not supported NRC 为 12 hex 的否定响应——不支持子功能
5		TRUE (bit=1) 正确（比特=1）	YES	YES	No Rsp	---	ECU does NOT send a response ECU 不发送一个响应
6			YES	YES	Neg Rsp	NRC=XX	ECU sends negative response ECU 不发送否定响应
7			NO	---	Neg Rsp	NRC=11	Negative response with NRC 11 hex - service not supported NRC 为 11 hex 的否定响应——不支持服务

8			YES	NO	Neg Rsp	NRC=12	Negative response with NRC 12 hex – sub-function not supported NRC 为 12 hex 的否定响应——不支持子功能

注：NRC = XX means that the ECU responds negatively with a particular negative response code unequal to 11 hex – Service Not Supported) or 12 hex – Sub-function Not Supported.

NRC = XX 意思是 ECU 响应是否定的，且否定响应代码不能为 11 hex—不支持服务或者 12 hex—不支持子功能。

7.1.2 Function Address Diagnostic Request Message 功能寻址功能诊断请求报文

If a functional request is received, that means that the request is a broadcast to all ECU's, and the request includes a Sub-Function Parameter field the response has to be in accordance with next table.

如果一个功能请求被接收，意味着该请求是广播式地发给所有 ECU，该请求包括一个子功能参数域，必须根据表 14 做出响应。

表 14

ECU Case no.	Diagnostic Tool Request Message 诊断设备请求报文		ECU Capability ECU 特性		ECU Response ECU 响应		Comments to ECU Response ECU 响应内容
	Addressing scheme 寻址项	Sub-Function (Suppress Pos Rsp Msg Indication Bit) 子功能（设置 Pos Rsp Msg 指示比特位）	Service ID supported 是否支持服务 ID	Sub-function supported 是否支持子功能	Message 报文	NRC (Hex value) 否定响应代码	
1	Physical 物理	FALSE (bit0) 错误(比特=0)	YES	YES	Pos Rsp	---	ECU sends positive response ECU 发送肯定响应
2			YES	YES	Neg Rsp	NRC = XX	ECU sends negative response ECU 发送否定响应

3			NO	---	No Rsp	---	ECU does NOT send a response ECU 不发送响应
4			YES	NO	No Rsp	---	ECU does NOT send a response ECU 不发送响应
5			YES	YES	No Rsp	---	ECU does NOT send a response ECU 不发送响应
6		TRUE (bit=1) 正确(比特=1)	YES	YES	Neg Rsp	NRC=XX	ECU sends negative response ECU 发送否定
7			NO	---	No Rsp	---	ECU does NOT send a response ECU 不发送响应
8			YES	NO	No Rsp	---	ECU does NOT send a response ECU 不发送响应

注：NRC = XX means that the ECU responds negatively with a particular negative response code unequal to 11 hex – Service Not Supported or 31 hex – Request Out Of Range.

NRC = XX 意思是 ECU 响应是否定的，且否定响应代码不能为 11ex—不支持服务或者 31hex—请求超出了范围。

7.2 Request Message without Sub-function Parameter 不包含子功能参数的请求报文

A request without Sub-Function Parameter has to be responded in accordance to the next two tables whether the request is a physical or functional one.

一个没有带子功能参数的请求必须根据下面两个表做出响应，不管是该请求是物理请求还是功能请求的。

7.2.1 Physical Address Diagnostic Request Message 物理寻求诊断请求报文

表 15

ECU Case no.	Diagnostic Tool Request Message Addressing scheme 诊断设备请求报文寻址项	ECU Capability ECU 特性		ECU Response ECU 响应		Comments to ECU Response ECU 响应内容
		Service ID supported 是否支持服务 ID	Message Parameter supported 是否支持报文参数	Message 报文	NRC (Hex value) 否定响应代码	

1			All	Pos Rsp	---	ECU sends positive response ECU 发送肯定响应
2			At least 1	Pos Rsp	---	ECU sends positive response ECU 发送肯定响应
3	Physical 物理	YES	At least 1, more than 1 or all	Neg Rsp	NRC = XX	ECU sends negative request because error occurred reading data parameters of request message ECU 发送否定请求因为读请求报文数据参数时发生错误
4			None	Neg Rsp	NRC=31	Negative Response with NRC 31hex - request out of range 带有 NRC 31hex 否定响应。NRC 31hex—请求超出范围
5		NO	---	Neg Rsp	NRC=11	Negative Response with NRC 11hex - service not supported 带有 NRC 11hex 否定响应。NRC 11hex—不支持服务

注：NRC = XX means that the ECU responds negatively with a particular negative response code unequal to 11 hex – Service Not Supported or 31 hex – Request Out Of Range.

NRC = XX 意思是 ECU 响应是否定的，且否定响应代码不能为 11ex—不支持服务或者 31hex—请求超出了范围。

7.2.2　Function Address Diagnostic Request Message 功能寻址诊断请求报文

表 16

ECU Case no.	Diagnostic Tool Request Message Addressing scheme 诊断设备请求报文寻址项	ECU Capability ECU 特性		ECU Response ECU 响应		Comments to ECU Response ECU 响应内容
		Service ID supported 是否支持服务 ID	Message Parameter supported 是否支持报文参数	Message 报文	NRC (Hex value) 否定响应代码	
1	Functional 功能	YES	All	Pos Rsp	---	ECU sends positive response ECU 发送肯定响应

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						ECU sends positive response ECU 发送肯定响应
2			At least 1	Pos Rsp	---	ECU sends positive response ECU 发送肯定响应
3			At least 1, more than 1 or all	Neg Rsp	NRC = XX	ECU sends negative request because error occurred reading data parameters of request message ECU 发送否定请求因为读请求报文数据参数时发生错误
4			None	No Rsp	---	ECU does not send a response ECU 不发送响应
5		NO	---	No Rsp	---	ECU does NOT send a response ECU 不发送响应

7.3 Response Pending of Request Correctly Received 请求正确接收但未响应

If an ECU is responding negatively with NRC 11 hex - Service Not Supported, NRC 12 hex – Sub Function Not Supported or NRC 31 hex - Request Out Of Range this ECU must not send any negative response message with NRC 78 hex – Request Correctly Received Response Pending before.

如果一个 ECU 响应是否定的，携带的 NRC 11 hex—不支持服务或者 NRC 12 hex—不支持子功能或者 NRC 31 hex—请求超出范围。那么之前，这个 ECU 必须不能发送任意一个携带 NRC 78 hex—请求正确接收但未响应的否定响应报文。

After a request correctly received response pending negative response message the ECU has to send a final negative or positive response message within the given timing.

一个请求正确接收但未响应报文之后，在给定的时间内，ECU 必须发送一个终止或者肯定响应报文。

8 Diagnostic Services 诊断服务

This section lists the whole set of possible diagnostic services for an ECU to support. Reverse this does not mean that an ECU must support this set of services.

此部分列出了一个 ECU 尽可能支持设定的诊断服务，但是并不意味着 ECU 必须支持这些设定的诊断服务。

The supported services an ECU must support are defined in the specific ECU Diagnostic Requirements.

ECU 必须支持的服务，可以定义在 ECU 诊断要求规范中。

8.1 SID 10 – Diagnostic Session Control 诊断会话控制

The Diagnostic session control service shall be used to enable different diagnostic sessions in an ECU or a group of ECU's. A diagnostic session represents a set of diagnostic services which are able to be executed in this session. In general this means that a session defines an applicable amount of functionality.

在一个 ECU 或者一组 ECU 中，诊断会话控制服务用于使能不同诊断会话。一个诊断会话能替代一组诊断服务设定，该服务在此会话中都可能被执行，通常意味着这会话定义的是许多功能类的应用。

8.1.1 Diagnostic Session Type Description 诊断服务类型描述

Possible Diagnostic sessions are 可能的诊断会话：

a）Default session: This session type is active at startup and during normal ECU operation a basic set of diagnostic Services shall be supported in this session. For this session no diagnostic timeout handling provisions like Tester present are necessary. Therefore the default session must not support any safety relevant or customer perceivable functionality.

默认会话：在启动时或者 ECU 正常运行一个在此会话中被支持的基本诊断设定此期间，默认会话类型被激活。在这种会话中，不提供类似必要的诊断在线的诊断超时处理。因此默认会话必须不支持任何安全相关或者消费者可见性的功能类。

b) Programming Session: With entrance of this session all service needed to flash an ECU are supported.

编程会话：带有进入此会话的所有服务需要映射到被支持的 ECU。

c) Extended Session: The extended Session enables all diagnostic services supported by an ECU

扩展会话：扩展会话使能所有被 ECU 支持的诊断服务

d) Stand By Session: This session switches the ECU into a state of constant current consumption. All automatic regulation of Actuators connected to the ECU has to be switched off. This is needed for current measurements.

支持会话：此会话转换 ECU 进入在线使用者的恒定状态。所有执行器连接 ECU 的自动规则都必须关闭，此会话用于在线测试

e) User defined Session: Specific session types with specific sets of supported services may be defined additionally.

用户定义会话：带有支持服务特别设定的特定会话类型可能另外定义。

8.1.2 Session Transition Requirement 会话转换请求
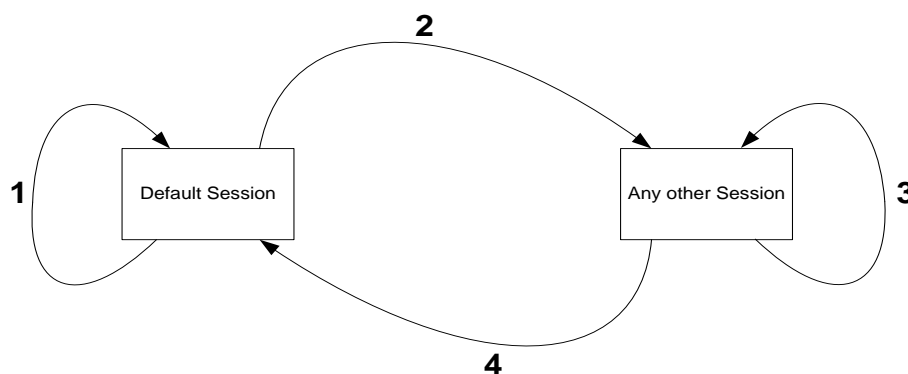
图 2 各个会话状态转换图

Session state transitions are allowed in accordance to the state diagram above.

会话状态允许根据图 2 的状态图进行转换。

If state transition 1 (from default to default session) is performed, on reentering default session it has to be reinitialized completely. This means the ECU shall reset all activated, initiated or changed settings and controls and routines during the activated session. This does not include long term changes programmed into non-volatile memory.

如果状态 1（从默认到默认会话）被执行，在重新进入默认会话中必须重新完全地初始化。这意味着在激活默认会话期间，ECU 应重新设定所有激活，初始化或者改变设置、控制及历程。这不包括长时间改变编程进入不可变的存储。

When the ECU transitions from any diagnostic session other than the Default session to another session other than the Default session (including the currently active diagnostic session) then the ECU shall (re-) initialize the diagnostic session. This means the security feature shall be (re)-enabled and routines as well as controls shall be reset. The states of the Communication Control and Control DTC Setting services shall not be affected. The described behavior is referred to as state transition（3）in the figure above.

当 ECU 从任意非默认会话的诊断会话转换为其它非默认会话的诊断会话（包括当前激活诊断会话），则 ECU 应该（重新）初始化诊断会话。这意味安全特性应（重新）使能和重新设置历程及控制。通讯控制和控制 DTC 设置服务的状态不应受到影响。这些描述的行为如图 2 的状态转换 3.

When the ECU transitions from any diagnostic session other than the Default session to the Default session then the ECU shall initialize the new diagnostic session. This means the security feature shall be enabled, the states of the Communication Control and Control DTC Setting services shall be reset and the ECU shall reset all activated, initiated, changed settings and controls and routines during the activated non-default session. This does not include long term changes programmed into non-volatile memory. The described behavior is referred to as state transition（4）in the figure above.

当 ECU 从任意非默认会话转换为默认会话，则 ECU 应该初始化新诊断会话。这意味着在激活非默认会话期间，安全特性应被使能，通讯控制和控制 DTC 设置服务的状态应重新设置所有激活，初始化，改变设置，控制及历程。这不包括长时间改变编程进入不可变的存储。这些描述的行为如图 2 的状态转换 4。

8.1.3 Service Request 服务请求

This service shall support a Sub-Function parameter and shall therefore comply to section 7.1 Request Messages with Sub-Function parameter.

此服务应支持子功能参数和遵守 7.1 部分的带有子功能参数的请求报文

The Diagnostic Session Control Request format looks like the following:

诊断会话控制请求格式见表 17.

表 17

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Diagnostic Session Control Request Service ID 诊断会话控制请求服务 ID	M	10

2	Sub Function = [Diagnostic Session Type] 子功能=【诊断会话类型】	M	
	Default Session – Positive Response Required 默认会话——肯定响应要求		01
	Programming Session – Positive Response Required 编程会话——肯定响应要求		02
	Extended Diagnostic Session – Positive Response Required 扩展会话——肯定响应要求		03
	Stand By Session – Positive Response Required 支持会话——肯定响应要求		49
	Manufacturer Specific – Positive Response Required 主机厂规定——肯定响应要求		40-48
	Supplier Specific – Positive Response Required 供应商规定——肯定响应要求		60-68
	Default Session – No Positive Response Required 默认会话——无肯定响应请求		81
	Programming Session – No Positive Response Required 编程会话——无肯定响应请求		82
	Extended Diagnostic Session – No Positive Response Required 扩展会话——无肯定响应请求		83
	Stand By Session – No Positive Response Required 扩展会话——无肯定响应请求		C9
	Manufacturer Specific – No Positive Response Required 主机厂规定——无肯定响应请求		C0-C8
	Supplier Specific – No Positive Response Required 供应商规定——无肯定响应请求		E0-E8

注：Other than the above listed Session types shall not be supported by ECU's and must be rejected with the adequate negative response code.

不是上述表格列举的会话 ECU 不能被支持，而且必须用带有合适的否定响应代码拒绝。

8.1.4 Positive Response 肯定响应

If a proper request is received by an ECU and a state transition is allowed the ECU shall send a positive response matching the following format.

如果 ECU 接收一个特有的请求，且允许状态转换，ECU 应发送一个肯定响应报文，格式如表 18：

表 18

Byte No.	Parameter Name 参数名称	Message Usage	Data Value

1	Diagnostic Session Control Response Service Id 诊断会话控制请求服务 ID	M	50
2	Sub Function = [Diagnostic Session Type] 子功能=【诊断会话类型】	M	00-FF
3 : : n	Session Parameter Record[] =　　[　　P2Can_ECU_max (high byte) 　　　P2Can_ECU_max (low byte) 　　　P2*Can_ECU_max (high byte) 　　　P2*Can_ECU_max (low byte)] 会话参数记录=【2Can_ECU_max（高字节） 　　　P2Can_ECU_max（低字节） 　　　P2*Can_ECU_max（高字节） 　　　P2*Can_ECU_max（低字节）】 】	M : : M	00-FF : : 00-FF

注：The Diagnostic Session Type in the response message must match the diagnostic type of the associated request.

在响应报文中的诊断会话类型必须与关联请求的诊断类型一致。

8.1.5 Negative Response 否定响应

A negative response on a Diagnostic Session Control Service Request must meet the following format description:

一个诊断会话控制服务请求的否定响应必须符合表 19 的格式描述：

表 19

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Diagnostic Session Control 诊断会话控制	M	10
3	sub-function = [Negative Response Trouble Code] 子功能-【否定响应故障代码】	M	00-FF
	Sub Function Not Supported 不支持子功能		12
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件错误		22

注：The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持的最少否定响应故障代码。

8.2 SID 11 — ECU Reset ECU 复位

The ECU Reset Service is used to request an ECU Reset according to the reset type parameter transmitted in the request.

ECU 复位服务用于，在请求中根据传输的复位类型参数，请求 ECU 复位。

8.2.1 Reset Type Description 复位类型描述

Hard Reset:This type of reset shall simulate a complete power on startup sequence same as performed when the ECU has been disconnected from its power supply.

硬件复位：当 ECU 没有连接供电电源时，此复位类型应模拟一个完整的供电，按照启动顺序执行上电。

Soft Reset:Forces the ECU to restart its application and to store any data in non volatile memory which might be lost on the application restart.

软件复位：强制 ECU 重新启动它的应用程序，且在固定存储器中任何数据存储

Enable Fast Power Shutdown: Is used to shorten the stand-by time an ECU applies to meet the requirements before it switches to a state of minimum current consumption. The minimum shutdown time an ECU needs to guarantee functionality (e.g. store values in non volatile memory which are needed for next key cycle) shall not be influenced by this Reset.

快速供电关闭使能：在 ECU 转换到最低电流功耗之前，用于缩短 ECU 的必要应用的维持时间。一个 ECU 的最小关闭时间需要保证其功能性（例如：存储在固定存储器的存储值用于下一个点火循环）不受此复位的影响。

8.2.2 Behavior 行为

Before a Reset is performed a positive response has to be sent to the diagnostic test tool; The ECU must ensure that the response is put correctly onto the bus before performing the reset.

在执行复位之前，一个肯定响应必须被发给诊断设备；ECU 确保在执行复位前改响应能正确的发送到总线上。

Following actions shall be performed if an ECU Reset request with reset type Hard Reset is received:

如果一个 ECU 复位类型为硬件复位请求被接收，则应执行下面操作：

a) immediately restart program execution

立刻执行重新启动应用程序

b) re-initialize volatile memory which is also initialized during the power-up sequence

在上电序列期间，正在初始化的非固定存储器应再重新初始化

c) re-initialize non-volatile memory which is also initialized during the power-up sequence

在上电序列期间，正在初始化的固定存储器应再重新初始化

d) re-initialize electronic sub-components directly connected to the ECU which are also initialized during the power-up sequence

在上电序列期间，正在初始化的直接连接 ECU 的电子化部分应再重新初始化

Following actions shall be performed if an ECU Reset request with reset type Soft Reset is received:

如果一个 ECU 复位类型为软件复位请求被接收，则应执行下面操作：

a) save volatile data not to be lost during the ECU reset in non-volatile memory (e.g. fault memory and variant coding parameters which are needed beyond a reset)

在 ECU 固定存储器复位期间，存储变化数据不一定丢失。（例如：存储器和不同的译码参数，需要超出一个复位之外）

b) immediately restart application program

立刻执行重新启动应用程序

Following action shall be performed if an ECU Reset request with reset type Enable Fast Power Shut Down is received:

如果一个 ECU 复位类型为快速供电关闭使能复位请求被接收，则应执行下面操作：

a) switch to ECU sleep mode (ECU state of minimal current consumption) either directly or after a reduced stand-by-time (power down time) when the ECU has switched to bus sleep mode (sleep acknowledge).

当 ECU 已经转换到总线睡眠模式（睡眠应答确认）时，不管是直接转换还是在一个维持时间减少之后（电源掉电时间）转换到 ECU 的睡眠模式（ECU 的最低电流功耗状态）。

8.2.3 Service Request 服务请求

This service supports a Sub-Function parameter and therefore complies to section 7.1 Request Messages with Sub-Function parameter.

此服务应支持子功能参数和遵守 7.1 部分的带有子功能参数的请求报文

The Request format shall match the following description 请求格式应该符合表 20 的描述：

表 20

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	ECU Reset Request Service Id ECU 复位请求服务 ID	M	11
2	Sub Function = [Reset type] 子功能=【复位类型】	M	
	Hard Reset - Positive Response Required 硬件复位——肯定响应请求		01
	Key On Off Reset - Positive Response Required 钥匙由开到关闭复位——肯定响应请求		02
	Soft Reset - Positive Response Required 软件复位——肯定响应请求		03
	Enable Rapid Power Shutdown - Positive Response Required 快速供电关闭使能——肯定响应请求		04
	Supplier Specific - Positive Response Required 供应商规定——肯定响应请求		60-7E

Hard Reset - No Positive Response Required 硬件复位——无肯定响应请求		81
Key On Off Reset - No Positive Response Required 钥匙由开到关闭复位——无肯定响应请求		82
Soft Reset - No Positive Response Required 软件复位——无肯定响应请求		83
Enable Rapid Power Shutdown - No Positive Response Required 快速供电关闭使能——无肯定响应请求		84
Supplier Specific - No Positive Response Required 供应商规定——无肯定响应请求		E0-FE

注：Other than the above listed reset types shall not be supported by ECU's and must be rejected with the adequate negative response code.

不是上述表格列举的会话 ECU 不能被支持，而且必须用带有合适的否定响应代码拒绝。

8.2.4   Positive Response 肯定响应

If a positive response is allowed according to section 7.1 Request Messages with Sub-Function Parameter the Positive Response format shall match the following description:

如果一个肯定响应允许依照 7.1 部分中带有子功能参数的请求报文，则肯定响应报文格式应该符合表 21 的描述：

表 21

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	ECU Reset Response Service Id ECU 复位响应服务 ID	M	51
2	Sub Function = [Reset type] 子功能=【复位类型】	M	00-FF
3	Power Down Time 电源掉电时间	C	00-FF

If an ECU supports Enable Rapid Power Shutdown the ECU shall support the Power Down Time message data parameter (byte no. 3) in the positive response message.

如果一个 ECU 支持快速供电关闭使能，则 ECU 应支持在肯定响应报文中电源掉电报文数据参数（字节编号 3）.

注：This parameter indicates to the diagnostic tool the maximum time the ECU will need to switch to ECU sleep mode.

此参数指示诊断设备，ECU 将转换为 ECU 睡眠模式的最长时间。

The scaling of the Power Down Time parameter shall be according to the following:Size: 1Byte

Resolution: 1s/bit Min Value: 0s Max Value: 254s   No time available: 255

电源掉电时间参数缩放要求如下：大小：1 字节　　分辨率：1 秒/比特位　　最小值：0 秒　　最大值：254 秒

无效时间：255

8.2.5　Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合下表描述：

表 22

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	ECU Reset　ECU 复位	M	11
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Sub Function Not Supported 不支持子功能		12
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件错误		22

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持的最少设置否定响应故障代码。

8.3　SID 14 – Clear Diagnostic Information 清除故障信息

This service can be used to clear the DTC memory in one or multiple ECU's.

此服务可用于清除一个或多个 ECU 中存储器的 DTC.

8.3.1　Parameter Description 参数描述

The parameter appended to this service defines a group of ECU's in which the DTC memory shall be cleared.

该服务定义了一组清除已存储 DTC 参数。

It is a 3 byte value which defines groups like Powertrain, Body or Chassis or the particular DTC to be cleared.

定义了 3 个字节值，用于清除类似动力总成、车身或者底盘或者特定等各族的 DTC.

8.3.2　Behavior 行为

The positive response shall be sent after the request is completely processed.

在完全处理请求之后应该发出肯定响应。

If no DTC are stored the ECU shall send also a positive response.

如果 ECU 没有存储 DTC,也应该发送肯定响应。

If there are different locations of copies of the DTC stack first the one that is read to report stored DTC shall be cleared and after that the remaining copies shall be cleared.

如果有不同堆栈位置的重复的 DTC，首先，被读取去报告的存储 DTC 应被清除，之后，剩下重复的 DTC 也要清楚

All DTC information stored shall be deleted on processing this service request.

在处理清除服务请求时，所有 DTC 的储存信息因被删除。

8.3.3 Service Request 服务请求

This service does not support a Sub-Function parameter 。

此服务部支持携带子功能参数。

The Request format shall match the following description:

请求格式应该符合下表描述：

表 23

Byte No.	Parameter Name 参数名字	Message Usage	Data Value
1	Clear Diagnostic Information Request Service Id 清除诊断信息请求服务 ID	M	14
2 3 4	Group Of DTC [] = [Group Of DTC High Byte Group Of DTC Middle Byte Group Of DTC Low Byte] DTC 组=【DTC 高字节组 DTC 中字节组 DTC 低字节组】	M	00-FF 00-FF 00-FF
	Emission Related Systems 排放相关系统	C	000000
	All Groups / All DTCs (000001 - FFFFFF hex) 所有组/所有 DTCs	M	FFFFFF
	Individual DTC 单独 DTC	M	XXXXXX

注：C: If the ECU is required to meet the emission related diagnostic requirements according to ISO 15031 the ECU shall support additionally a Group of DTC parameter value equal to 000000 hex that means Clear all Emission Related DTC within an emission related systems.

C:如果 ECU 被请求访问排放相关诊断要求，根据 ISO 15031，应支持额外一组 DTC 值为 000000 hex 参数，这意味着在排放相关的系统中清除所有相关 DTC.

8.3.4 Positive Response 肯定响应

The Positive Response format shall match the following description:肯定响应格式应该符合下表的描述

表 24

Byte No.	Parameter Name 参数名称	Message Usage	Data Value

1	Clear Diagnostic Information Positive Response Service ID 清除诊断信息肯定响应服务 ID	M	54

8.3.5 Negative Response 否定响应

The Negative Response format shall match the following description:
否定响应格式应该符合下表的描述

表 25

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Clear Diagnostic Information Rquest Service ID 清除诊断信息请求服务 ID	M	14
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件不正确		22
	Request out of Range 请求超出范围		31

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.
上述根据诊断服务列出了 ECU 支持的最少设置否定响应故障代码。

8.4 SID 19 – Read DTC Information 读 DTC 信息

This service enables the diagnostic tool to read DTC information of present errors out of one or multiple ECU's.
此服务使能诊断设备去读取一个或多个 ECU 非在线错误的 DTC 信息。

8.4.1 Request Type Description 请求类型描述

The following table lists the possible DTC information request types:
下表列出了可能 DTC 信息请求类型：

表 26

DTC Information request type DTC 信息请求类型	Description 描述
Report Number Of DTC By Status Mask [19 01 hex] 状态掩码报告 DTC 数量 [19 01 hex]	This type specifies that the ECU shall transmit to the diagnostic tool the number of DTCs matching a diagnostic tool defined status mask. This functionality is used to read the number of DTCs stored in the chrono-stack. 此类型详细说明 ECU 发送给诊断设备 DTC 的数量应与诊断设备定义状态掩

	码匹配。这功能性用于读取存储在长期堆栈中 DTC 的数量。
Report DTC By Status Mask ［19 02 hex］ 状态掩码报告 DTC［19 02 hex］	This type specifies that the ECU shall transmit to the test device a list of DTCs and corresponding statuses matching a diagnostic tool defined status mask. This functionality is used to read the DTCs stored in the chrono-stack. 此类型详细说明 ECU 发送给测试设备 DCT 的列表，而且通讯的状态与诊断设备定义状态界面匹配。这功能性用于读取存储在长期堆栈中 DTC。
Report DTC Snapshot Identification ［19 03 hex］ 报告 DTC 快照证明［19 03 hex］	This parameter specifies that the ECU shall transmit to the diagnostic tool all DTC Snapshot data record identifications (DTC number(s) and DTC Snapshot record number(s)). This functionality is typically used to read freeze frame data from emissions related ECUs. 此参数详细说明 ECU 发送给测试设备所有 DCT 快照数据记录证明（DTC 数量和 DTC 快照记录数量）。此功能性具有代表性用于从排放相关的 ECU 读取冻结帧数据.
Report DTC Snapshot Record By DTC Number ［19 04 hex］ 用 DTC 数量报告 DTC 快照记录［19 04 hex］	This parameter specifies that the ECU shall transmit to the diagnostic tool the DTC Snapshot record(s) associated with a diagnostic tool defined DTC number and DTC Snapshot record number (FF hex for all records). This functionality is typically used to read freeze frame data from emissions related ECUs. 此参数详细说明 ECU 发送给诊断设备 DTC 快照记录，联合诊断设备定义的 DTC 数量及 DTC 快照记录数量（FF hex 用于所有记录）。此功能性具有代表性用于从排放相关的 ECU 读取冻结帧数据。
Report DTC Snapshot Record By Snapshot Record Number ［19 05 hex］ 用 DTC 快照记录数量报告快照记录 ［19 05 hex］	This parameter specifies that the ECU shall transmit to the diagnostic tool the DTC Snapshot Record(s) associated with a diagnostic tool defined DTC Snapshot Record number (FF hex for all records). This parameter can only be supported if the DTC Snapshot Record Number is unique to the ECU (each record number exists only once in the ECU) and not unique to a DTC. This functionality is typically used to read freeze frame data from emissions related ECUs. 此参数详细说明 ECU 发送给诊断设备 DTC 快照记录，联合诊断设备定义的 DTC 快照记录数量（FF hex 用于所有记录）。如果 DTC 快照记录数量针对 ECU（在 ECU 中每个记录数量只存在一次）来说是唯一的，但 DTC 不是唯一的，那么此参数只能被支持。此功能性具有代表性用于从排放相关的 ECU 读取冻结帧数据。
Report DTC Extended Data Record By DTC Number ［19 06 hex］ 用 DTC 数量报告 DTC 扩展	This type specifies that the ECU shall transmit to the diagnostic tool the DTC Extended Data record(s) associated with a diagnostic tool defined DTC number and DTC Extended Data record number (FF hex for all records). This functionality is used to read environmental data from chrono-stack.

数据记录 〔19 06 hex〕	此类型详细说明 ECU 发送给诊断设备 DTC 扩展数据记录，联合诊断设备定义的 DTC 数量及 DTC 扩展数据记录数量（FF hex 用于所有记录）。此功能性用于从长期堆栈中读取环境数据。
Report Supported DTCs 〔19 0A hex〕 报告支持的 DTCs 〔19 0A hex〕	This parameter specifies that the ECU shall transmit to the diagnostic tool a list of all DTCs and corresponding statuses currently supported within the ECU. 此参数详细说明 ECU 发送给诊断设备一列所有 DTC 和当前 ECU 支持通讯状态。
Report Mirror Memory DTC By Status Mask 〔19 0F hex〕 用状态掩码报告映射到存储器的 DTC 〔19 0F hex〕	This type specifies that the ECU shall transmit to the diagnostic tool a list of DTCs out of the DTC mirror memory and corresponding statuses matching a diagnostic tool defined status mask. This functionality is used to read the DTCs stored in the historical stack. 此类型详细说明 ECU 发送给诊断设备一列非映射到存储器的 DTC，而且通讯状态与诊断设备定义的状态掩码匹配。此功能性用于读取存储在历史堆栈中的历史故障。
Report Mirror Memory DTC Extended Data Record By DTC Number 〔19 10 hex〕 用 DTC 数量报告映射到存储器的 DTC 扩展数据〔19 10 hex〕	This type specifies that the ECU shall transmit to the diagnostic tool the DTC Extended Data record(s) – out of the DTC mirror memory – associated with a diagnostic tool defined DTC number and DTC Extended Data record number (FF hex for all records). This functionality is used to read environmental data from historical-stack. 此类型详细说明 ECU 发送给诊断设备 DTC 扩展数据记录—非映射到存储器的 DTC—联合诊断设备定义的 DTC 数量级 DTCK 扩展数据(FF hex 用于所有记录)。此功能性用于读取存储在历史堆栈中的环境数据。
Report Number Of Mirror Memory DTC By Status Mask 〔19 11 hex〕 用状态掩码报告映射到存储器的 DTC 数量	This parameter specifies that the ECU shall transmit to the diagnostic tool the number of DTCs out of mirror memory matching a diagnostic tool defined status mask. This functionality is used to read the number of DTCs stored in the historical stack. 此参数详细说明 ECU 发送给诊断设备非映射到存储器且与诊断设备状态掩码匹配的 DTC 数量。此功能性用于读取存储在历史堆栈中的 DTC 数量。

8.4.2 Request Data Parameter Type Description 请求数据参数类型描述

表 27

Request data parameter type 请求数据参数类型	Description 描述

DTC Status Mask DTC 状态掩码	The DTC Status Mask eight (8) DTC status bits. The definitions for each of the eight (8) bits can be found in section 6.4.4 Status of DTC. This byte is used in the request message to allow a diagnostic tool to request DTC information for the DTCs whose status matches the DTC Status Mask. A DTC's status matches the DTC Status Mask if any one of the DTC's actual status bits is set to '1' and the corresponding status bit in the DTC Status Mask is also set to '1'. (i.e., if the DTC Status Mask is bit-wise logically ANDed with the DTC's actual status and the result is non-zero, then a match has occurred). If the diagnostic tool specifies a status mask that contains bits that the ECU does not support, then the ECU shall process the DTC information using only the bits that it does support. DTC 状态掩码(8) DTC 状态比特位。在 6.4.4 部分中 DTC 状态中可以找到这 8 个比特的定义.这个字节用于请求诊断设备允许请求的与状态掩码匹配的 DTC 信息。如果任意一个 DTC 的实际状态比特位设置为"1"且在 DTC 状态掩码中相对应的比特位设置也为"1"(也就是如果 DTC 状态掩码是比特位方式逻辑与上 DTC 实际状态,结果不为 0,说明已经发生匹配),则表示一个 DTC 的状态与 DTC 状态屏蔽匹配。如果诊断设备规定了一个状态屏蔽,此屏蔽包含 ECU 不支持的比特位,则 ECU 应处理只用于不支持比特位的 DTC 信息。
DTC Mask Record DTC 掩码记录	DTC Mask Record either contains DTC High Byte, DTC Middle Byte and DTC Low Byte or a DTC according to SAEJ1939. DTC High Byte, DTC Middle Byte and DTC Low Byte together represent a unique identification number for a specific diagnostic trouble code supported by an ECU. The coding of the 3-byte DTC number can either be done: – by using the decoding of the DTC High Byte, DTC Middle Byte and DTC Low Byte according to the ISO 15031-6 [8.] specification. This format is identified by the DTC Format Identifier = ISO15031-6DTCFormat, or DTC 掩码记录包含 DTC 的高字节,DTC 中字节和 DTC 低字节或者根据 SAEJ1939 一个 DTC。 DTC 的高字节,DTC 中字节和 DTC 低字节一起重新出现在 ECU 支持的特定诊断故障代码一个单独标识数量。这三个字节 DTC 数量可以译码如下: 使用根据 ISO 15031-6 [8.]规范中 DTC 的高字节,DTC 中字节和 DTC 低字节的译码。格式被 DTC 格式标识符等于 ISO15031-6DTC 格式定义。或者 – by using the decoding of the DTC High Byte, DTC Middle Byte and DTC Low Byte according to the ISO 14229-1 specification which does not specify any decoding method and therefore allows a vehicle manufacturer defined decoding method. This format is identified by the DTC Format Identifier = ISO14229-1DTCFormat. 使用根据 ISO 14229-1 规范中 DTC 的高字节,DTC 中字节和 DTC 低字节的译码。此规范不规定任何译码模式,所以允许汽车制造厂定义编码模式。格式被 DTC 格式标识符等于 ISO14229-1DTC 格式定义。

	A DTC within the ECU matches the DTC Mask Record if the two values are identical (exact match required). 如果两个值被识别（准确匹配要求），那么在 ECU 中一个 DTC 匹配 DTC 界面记录
DTC Extended Data Record Number DTC 长期的数据记 录数量	DTC Extended Data Record Number is a 1-byte value indicating the number of the specific DTC Extended Data record requested for a diagnostic tool defined DTC Mask Record via the Report DTC Extended Data Record By DTC Number sub-function. For ECUs that do not support multiple DTC Extended Data records for a single DTC, the diagnostic tool shall set this value to 0. For ECUs that do support multiple DTC Extended Data records for a single DTC, the diagnostic tool shall set this to a value ranging from 1 to the maximum number supported by the ECU (which may range up to FE hex, depending on the ECU). A value of FF hex requests the ECU to report all stored DTC Extended Data records at once. DTC 扩展数据记录数量是一个字节值，指示特定 DTC 扩展数据记录被请求的数量，为了诊断设备经过由 DTC 数量子功能报告 DTC 扩展数据记录定义 DTC 界面记录。针对不支持多个 DTC 扩展数据记录支持单独 DTC 的 ECU，诊断设备应该设置该值为 0. 针对支持多个 DTC 扩展数据记录且支持单独 DTC 的 ECU，诊断设备应该设置该值范围从 1 到 ECU 支持的最大数量(ECU 支持范围可能达到 FE hex). 一个值为 FF hex 表示请求 ECU 立刻报告所有存储 DTC 扩展数据记录
DTC Severity Mask DTC 安全掩码	The DTC Severity Mask contains three (3) DTC severity bits. The definitions for each of the three (3) bits can be found in section 6.4.5 DTC Severity Mask and DTC Severity Bit Description. This byte is used in the request message to allow a diagnostic tool to request DTC information for the DTCs whose severity definition matches the DTC Severity Mask. A DTC's severity definition matches the DTC Severity Mask if any one of the DTC's actual severity bits is set to '1' and the corresponding severity bit in the DTC Severity Mask is also set to '1'. (i.e., if the DTC Severity Mask is bit-wise logically ANDed with the DTC's actual severity and the result is non-zero, then a match has occurred). DTC 安全界面包含 3 个 DTC 安全比特位。在 6.4.5 部分 DTC 安全界面和 DTC 安全比特位描述中可以这 3 个比特位每一位的定义。为了 DTCs 安全定义与 DTC 安全界面匹配，此字节使用请求报文允许一个诊断设备请求 DTC 信息。如果任意一个 DTC 的实际安全比特位设置为"1"且在 DTC 安全界面中相对应的比特位设置也为"1"（也就是如果 DTC 安全界面是比特位方式逻辑与上 DTC 实际安全，结果不为 0，说明已经发生匹配），
DTC Severity Mask Record DTC 安全掩码记录	DTC Severity Mask Record is a 2-byte value containing the DTC Severity Mask and the DTC Status Mask (see section 8.4.5 Severity Mask and Severity Byte Description). DTC 安全界面记录是一个 2 字节值，包含 DTC 安全界面和 DTC 状态界面（见 8.4.5 安全界面和安全字节描述）。

	DTC Snapshot Record Number is a single byte value indicating the number of the specific DTC Snapshot Data Record either associated with one particular DTC or as global unique identification of a Snapshot Data Record within the individual ECU. For ECUs that do not support multiple DTC Snapshot Data Records for a single DTC, the diagnostic tool shall set this value to 0. For ECUs that do support multiple DTC Snapshot Data Records for a single DTC, the diagnostic shall set this to a value ranging from 1 to the maximum number supported by the ECU (which may range up to FE hex, depending on the ECU). A value of FF hex requests the ECU to report all stored DTC Snapshot data records at once
DTC Snapshot Record Number DTC 快照记录数量	DTC 快照记录数量是一个单独字节值，指示特定快照数据记录，不管是一个联合特定 DTC 或者是在单独 ECU 中作为一个快照数据记录的全局独特证明。针对不支持多个 DTC 快照数据记录支持且单独 DTC 的 ECU，诊断设备应该设置该值为 0. 针对支持多个 DTC 快照数据记录且支持单独 DTC 的 ECU，诊断设备应该设置该值范围从 1 到 ECU 支持的最大数量(ECU 支持范围可能达到 FE hex). 一个值为 FF hex 表示请求 ECU 立刻报告所有存储 DTC 快照数据记录

8.4.3 Response Data Parameter Description 响应数据参数描述

表 28

Response data parameter type 响应数据参数类型	Description 描述
Report Type 记录类型	This parameter is an echo of the sub-function parameter provided in the request message from the diagnostic tool. 此参数是一个来自诊断设备请求报文提供的重复子功能参数
DTC Record DTC 记录	This parameter record contains either one or more groupings of DTC High Byte, DTC Middle Byte and DTC Low Byte or one or more DTCs according to SAEJ1939 Format. (for further details concerning DTC formats see DTC Mask Record description above). 此参数记录包含一或多组的 DTC 高字节，中字节和低字节，或者包含一或多个 DTCs ，格式根据 SAEJ1939。（更多关于 DTC 格式的细节见上术 DTC 界面记录描述）
Status Of DTC DTC 状态	The status of a particular DTC. The definition of the bits contained in the Status Of DTC byte can be found in section 8.4.4 Status of DTC of this specification 一个特定 DTC 的状态，比特位定义包含在 DTC 字节的状态中，DTC 的描述可以在 8.4.4 部分中找到.
DTC Status Availability Mask DTC 状态有效掩码	This parameter indicates which bits of the Status of DTC byte are supported by an individual ECU. Bits that are not supported by the ECU are returned as 0. The definition of the bits contained in the Status Of DTC byte can be found in section 8.4.4 Status of DTC of this specification.

	此参数指示 DTC 的状态比特位被单独 ECU 支持。比特位不被 ECU 支持返回 0。包括 DTC 在字节状态比特位定义可以在 8.4.4 部分 DTC 规范中找到。
DTC And Status Record DTC 和状态记录	This parameter record contains one or more groupings of DTC Record and Status Of DTC. (See DTC Record and Status Of DTC definition for further details.) 参数记录包括一或多组 DTC 记录和 DTC 状态。（更详细定义见 DTC 记录和 DTC 状态）
DTC Format Identifier DTC 格式标识符	This 1-byte parameter value defines the format of a DTC reported by the ECU. 一个字节参数值定义一个通过 ECU 报告 DTC 的记录格式 ISO15031-6DTCFormat: This parameter value identifies the DTC format reported by the ECU as defined in ISO 15031-6［8.］specification. ISO15031-6DTC 格式：在 ISO 15031-6［8.］规范中定义此参数值识别 ECU 报告的 DTC 格式 ISO14229-1DTCFormat: This parameter value identifies the DTC format reported by the ECU as defined in this table by the parameter DTC Record. ISO14229-1DTC 格式：在参数 DTC 记录表格中，定义此参数值识别 ECU 报告的 DTC 格式 SAEJ1939-73DTCFormat: This parameter value identifies the DTC format reported by the ECU as defined in SAE J1939-73. SAEJ1939-73DTC 格式：在 SAE J1939-73 规范中定义此参数值识别 ECU 报告的 DTC 格式。
DTC Extended Data Record Number DTC 扩展数据记录数量	Either the echo of the DTC Extended Data Record Number parameter specified by the diagnostic tool in the Report DTC Extended Data Record By DTC Number request, or the actual DTC Extended Data Record Number of a stored DTC Extended Data record. 在通过 DTC 数量请求报告 DTC 扩展数据记录中，诊断设备指定重复的 DTC 扩展数据记录数量参数，或者存储 DTC 扩展数据记录的实际扩展数据记录数量。
DTC Extended Data Record DTC 扩展数据记录	The DTC Extended Data Record is an ECU -specific block of information that may contain extended status information associated with a DTC. DTC Extended Data contains DTC parameter values, which have been identified at the time of the request. DTC 扩展数据记录是一个 ECU 指定信息的块，该信息可能包括扩展状态信息联合一个 DTC。DTC 扩展状态数据包括在请求时已经识别的参数值。
DTC Count DTC 计算	This 2-byte parameter refers collectively to the DTC Count High Byte and DTC Count Low Byte parameters that are sent in response to a Report Number Of DTC request. 该 2 个字节参数完全依据 DTC 计算高字节和 DTC 计算低字节参数，此参数是通过相应发送来报告请求 DTC 数量。

DTC And Severity Record DTC 和安全记录	This parameter record contains one or more groupings of DTC Severity, DTC Functional Unit, DTC Record and Status Of DTC. The DTC Severity identifies the importance of the failure for the vehicle operation and/or system function and allows to display recommended actions to the driver. The definitions of DTC Severity's can be found in section 6.4.5 DTC Severity Mask and DTC Severity Bit Description. The DTC Functional Unit is a 1-byte value which identifies the corresponding basic vehicle / system function which reports the DTC. For further details on Status Of DTC see description of this parameter in this table. 此参数记录包括一或者多组 DTC 安全，DTC 功能单元，DTC 记录和 DTC 状态。DTC 安全识别重要特征是为了车辆运行和/或系统功能，允许显性推荐操作给驾驶员。DTC 安全的识别可以在 6.4.5 部分中 DTC 安全界面和 DTC 安全比特位描述找到。DTC 功能单元是一个 1 字节值用于识别基于整车或系统报告 DTC 功能的通讯。更详细的 DTC 状态见本表格参数的描述。
DTC Snapshot Record Number DTC 快照记录数量	Either the echo of the DTC Snapshot Record Number parameter specified by the diagnostic tool in the Report DTC Snapshot Record By Record Number request, or the actual DTC Snapshot Record Number of a stored DTC Snapshot Record. 在通过数量请求报告 DTC 快照记录中，诊断设备指定重复的 DTC 快照记录数量参数，或者存储 DTC 快照记录的实际 DTC 快记录数量。
DTC Snapshot Record DTC 记录	The DTC Snapshot Record contains a snapshot of data values captured at the time of the system malfunction occurrence. The DTC Snapshot Data Record may contain one or multiple data records identified by the respective Data Identifier. The number and the combination of Data Records within one individual DTC Snapshot Record is defined within the application specific document. DTC 快照记录包含在系统发生故障时，及时捕捉一个数据值的快照。DTC 快照数据记录可能包含一个或者多个通过各个数据标识符识别的数据记录。在一个单独 DTC 快照记录的数据记录数量和联合定义在应用规范文件中。
DTC Snapshot Record Number Of Identifiers DTC 快照记录数量的识别	This single byte parameter shows the number of Data Identifiers in the DTC Snapshot Record. 此号字节参数显示数据数量在 DTC 快照记录中。

8.4.4 Status of DTC DTC 状态

表 28

Bit	Description 描述	ECU Support Mandatory / Optional

		强制或者可选的 ECU 支持	
		Emission Related 排放相关	Non-Emission Related 排放不相关
0	**Test Failed 测试失败** This bit shall indicate the result of the most recently performed test. A logical '1' shall indicate that the last test failed meaning that the failure is completely matured. Reset to logical '0' if the result of the most recently performed test returns a "pass" result meaning that all de-mature criteria have been fulfilled. 此比特位指示最近执行测试的结果，逻辑"1"标识最后测试失败，意思是失败是完全地到期。如果最近执行测试返回是一个"通过"结果意思是所有不到期的标准已经被处理，则复位转换为逻辑"0" 1 : most recent result from DTC test indicated a failed result. 1：来自 DTC 指示失败结果的最近结果 0 : most recent result from DTC test indicated no failure detected. 0：来自 DTC 指示没有探测到失败结果的最近结果	M	M
1	**Test Failed This Operation Cycle 这次操作循环测试失败** This bit shall indicate either that a diagnostic test has reported a Test Failed result at any time during the current operation cycle. Reset to 0 when a new operation cycle is initiated or after a call to Clear Diagnostic Information. Once this bit is set to 1, it shall remain a 1 until a new operation cycle is started. 此比特位指示在电流运行循环期间任意时刻,诊断测试已经报告时一个失败结果。当一个新运行循环初始化或者在一个命令清除诊断信息之后，复位为 0.一旦这个比特位设置为 1,它应保持到新的运行循环启动。 1 : Test Failed bit = 1 has failed at least once during the current operation cycle. 1：测试失败比特位=1 , 在当前运行循环中至少有一次失败。 0 : Test Failed bit = 0 has not failed during the current operation cycle or after a call was made to Clear Diagnostic Information during the current operation cycle. 0：测试失败比特位=0, 在当前运行循环期间或者在一个命令清除	M	O/C1

	诊断信息后，没有出现失败。		
2	**Pending DTC 未响应的DTC** 　　This bit shall indicate whether or not a diagnostic test has reported a Test Failed result at any time during the current or last completed operation cycle. The status shall only be updated if the test runs and completes. The criteria to set the Pending DTC bit and the Test Failed This Operation Cycle bit are the same. The difference is that the Test Failed This Operation Cycle is cleared at the end of the current operation cycle and the Pending DTC bit is not cleared until an operation cycle has completed where the test has passed at least once and never failed. If the test did not complete during the current operation cycle, the status bit shall not be changed. For example, if a monitor stops running after a confirmed DTC is set, the Pending DTC must remain set = '1'. For an OBD DTC, a pending DTC is required to be stored after a malfunction is detected during the first driving cycle. 　　此比特位指示诊断测试是否已经报告，当前任意时刻或者最近运行的完成循环中的一个测试失败的结果。如果测试运行和完成，此比特位状态只能被更新。当前运行循环测试失败与未响应 DTC 的区别在于，前者在当前运行循环结尾清除运行循环，后者直到测试至少通过一次且不再出现失败才能清除。 如果在当前运行循环期间测试未完成，状态比特位不改变。例如如果在确认一个 DTC 被设置之后监控停止运行，则未响应的 DTC 必须保持设置等于"1"。针对一个 OBD DTC，在第一个驱动循环期间探测到一个故障之后，要求 存储未响应的 DTC。 1：This bit shall be set to 1 and latched if a malfunction is detected during the current operation cycle. 1：如果在当前运行循环期间探测到一个故障，则此比特位应设置为 1 和锁止 0：This bit shall be set to 0 after completing an operation cycle during which the test completed and a malfunction was not detected or upon a call to the Clear Diagnostic Information service 0：在测试完成并且为检测到一个故障或者在命令清除诊断信息服务期间，完成一个运行循环之后，该比特位设置为 0	M	O

3	**Confirmed DTC 确认 DTC** This bit shall indicate whether a malfunction was detected enough times to warrant that the DTC is stored in long-term memory (Pending DTC has been set = '1' one or more times for emission relevant electronic control units). This information can be used by the external test tool to request additional diagnostic information such as Extended Data Records or Snapshot Records. A Confirmed DTC does not indicate that the malfunction is present at the time of the request (Pending DTC or Test Failed can be used to determine if a malfunction is present at the time of the request.). 此比特位指示一个故障不管是否有被检测足够次数来保证DTC存储在长期存储器中(针对排放相关电子控制单元,未响应DTC已经设置等于"1"一或多次)。 外部诊断设备使用这信息去请求其他诊断信息例如扩展数据记录或者快照记录。 Reset to logical '0' after a call to Clear Diagnostic Information or after aging criteria have been satisfied (e.g. 40 engine warm-ups without another detected malfunction). Furthermore this bit is reset when the fault record associated with this DTC is overwritten by a newer DTC with higher priority due to a fault memory overflow. 一个确认DTC代码不能指示请求时出现的故障(如果请求时出现一个故障,未响应DTC或者测试失败可以被检测)。在一个命令清除诊断信息或者老化标准已经满足(例如40:发动机热启动间没有检测到其他故障)之后,应该复位为逻辑"0"。此外,由于错误存储器溢出,优先级更高的新DTC重写错误记录联合DTC,此比特位重新设置。 1 : DTC has failed at least once since the last call to Clear Diagnostic Information and aging criteria have not yet been satisfied and the DTC has not been removed from the fault memory due to an overflow of the available fault records 1:自从最后命令清除诊断信息和老化标准不满足且因为有效错误记录的溢出,DTC不从错误存储器被移除,DTC至少失败一次。 0 : DTC has not failed since the last call to Clear Diagnostic Information or after the aging criteria have been satisfied for the DTC. 自从最后命令清除诊断信息或者DTC老化标准已经满足之后,DTC	M	M

	没有失败。		
4	**Test Not Completed Since Last Clear 最后的清除时测试没有完成** This bit shall indicate whether a DTC test has ever run and completed since the last time a call was made to Clear Diagnostic Information. One (1) shall indicate that the DTC test has not run to completion. If the test runs and passes or fails (Test Failed This Operation Cycle = 1) then the bit shall be set to a Zero (0) (and latched). Reset to One (1) after a call to Clear Diagnostic Information. 此比特位指示一个 DTC 测试是否曾经运行和在最后 时间里是否完成清除诊断信息。1 指示 DTC 测试没有运行和完成。如果测试运行通过或者失败（测试失败运行循环=1），则此比特位应该设置为 0（且锁止）。在一个命令清除诊断信息之后复位为 1. 1 : DTC test has not run to completion since the last time diagnostic information was cleared. 1：在最后一次诊断信息被清除，DTC 测试没有运行完成。 0 : DTC test has returned either a passed or failed test result at least one time since the last time diagnostic information was cleared. 0：在最后一次诊断信息被清除，至少有一次 DTC 测试返回不是通过就是失败的测试结果。	M	M
5	**Test Failed Since Last Clear 最后清除时的测试失败** This bit shall indicate whether a DTC test has ever returned a Test Failed = 1 result since the last time a call was made to Clear Diagnostic Information (latched Test Failed This Monitoring Cycle =1). Zero (0) shall indicate that the test has not run or that the DTC test ran and passed (but never failed). If the test runs and fails then the bit shall remain latched at a 1. Reset to Zero (0) after a call to Clear Diagnostic Information. In contradiction to the Confirmed DTC this bit is <u>not</u> reset by aging-criteria or when it was overwritten due to an overflow of the fault memory. 此比特位指示自从最后一次命令清除诊断信息(锁止监控循环=1 的测试错误)，DTC 测试是否已经返回一个结果测试错误=1。0 应该指示测试已经不运行或者 DTC 测试运行且通过（从没失败）。如果测试运行且失败，则该比特位应该保持 1 锁止. 在一个命令清	0	0

	除诊断信息之后，复位为 0. 另外确认此比特位的 DTC 不是通过老化标准复位或者因错误存储器的溢出而重写 DTC. 1：DTC test returned a Test Failed This Operation Cycle = 1 result at least once since the last time diagnostic information was cleared. 1:在最后一次清除诊断测试,至少有一次 DTC 测试返回结果为运行循环=1 的测试错误。 0：DTC test has not indicated a Test Failed This Operation Cycle = 1 result since the last time diagnostic information was cleared 0：在最后一次清除诊断测试，DTC 测试不指示返回结果为运行循环=1 的测试错误。		
6	**Test Not Completed This Operation Cycle 此运行循环测试没完成** This bit shall indicate whether a DTC test has ever run and completed during the current operation cycle. One (1) shall indicate that the DTC test has not run to completion during the current operation cycle. If the test runs and passes or fails then the bit shall be set (and latched) to 0 until a new operation cycle is started. Reset to 1 after a call to Clear Diagnostic Information. 此比特位指示在当前运行循环，一个 DTC 测试是否已经运行且完成。1 将指示在当前运行循环，DTC 测试没有运行完成。如果测试运行且通过或者失败，则此比特位将被设置（且锁止）为 0 直到新运行循环启动。在一个命令清除诊断信息之后，复位为 1. 1：DTC test has not run to completion this operation cycle (or since the last time diagnostic information was cleared this operation cycle). 1：在此次运行循环中，DTC 测试没有运行完成。（或者此次运行循环，最后一次的诊断信息被清除） 0：DTC test has returned either a passed or Test Failed This Operation Cycle = 1 result during the current operation cycle or a call was made to Clear Diagnostic Information. 0：在当前运行循环或者一个命令去清除诊断信息期间，此次循序=1，表示 DTC 测试已经返回不是通过就是测试错误。	M	O
7	**Warning Indicator Requested 请求警告指示器** This bit shall report the status of any warning indicators associated with a particular DTC. Warning outputs may consist of indicator lamp(s), displayed text	M	O

information, etc. If no warning indicators exist for a given system or particular DTC, this status shall default to a logic "0" state. Conditions for activating and deactivating the warning indicator are defined by the application specific document. Reset to a logical '0' after a call to Clear Diagnostic Information. 　　此比特位将指示报告警告任意指示联合一个特定 DTC 的状态。输出警报可能由指示灯类，显示文本信息等组成。如果针对一个特定系统或者特定 DTC,没有警报指示存在,则此状态将默认为逻辑 0 状态。警告指示器的激活和关闭条件通过应用层规范文件定义。在一个命令清除诊断信息之后，复位为 0. 1 : Warning indicator requested to be ON. 1：警告指示器请求被激活 0 : Warning indicator requested to be OFF. 0：警告指示器请求被关闭 If the warning indicator is on for a given DTC, then Confirmed DTC shall be also be set to 1. 针对一个特定 DTC,如果警告指示器激活,则确认 DTC 将被设置为 1.		

注：C1: Bit 1 (Test Failed This Monitoring Cycle) is Mandatory if Bit 2 (Pending DTC) is supported. Bit 1 (Test Failed This Monitoring Cycle) is Optional if Bit 2 (Pending DTC) is not supported.

　　C1:如果比特 2（为响应 DTC）被支持，则比特 1（监控循环测试错误）是强制的. 如果比特 2（为响应 DTC）不被支持，则比特 1（监控循环测试错误）是可选择的.

　　M: Status bits marked as "M" – Mandatory shall be supported by each individual ECU. (attention should be paid to the difference between emission related and non-emission related ECUs)

　　M:状态比特位设定为"M"—每个单独的 ECU 将支持该项是强制的。（请注意排放相关于排放不相关的区别）

　　O : Status bits marked as "O" – Optional may be supported by the ECU if applicable.

　　O：状态比特位设定为"O"—如果合适，ECU 可能支持改项为，可选择

8.4.5 Severity Mask and Severity Byte Description

The Severity Information is coded in the upper three bits of the Severity Bytes according to the following table.

在上面严格字节的三个比特位中，严格信息的根据下表进行编码.

表 29

Hex Value	Severity Description
0	No Severity Information available 没有严格信息有效
20	Maintenance only Indicates that the failure requests maintenance only

	只能维持表示此故障请求只维持
40	Check at Next Halt Indicates that the failure requires a check at next halt 在下一个中断的确认表示该故障需要在下一个中断确认
80	Check Immediately Indicates that the failure requires an immediate check of the vehicle 立即确认表示要求该故障需要立即确认

8.4.6 Service Requests 服务请求

The Request format to report Number Of DTC By Status Mask, Number Of Mirror Memory DTC by Status Mask, DTC by Status Mask and Mirror Memory DTC by Status Mask shall match the following description:

用状态掩码报告 DTC 的编号，状态掩码映射到 DTC 存储器的编号，状态掩码的 DTC 和状态掩码映射到 DTC 存储器的 DTC 的请求格式应该符合下表描述：

表 30

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Read DTC Information request Service ID 读取 DTC 信息请求服务 ID	M	19
2	sub-function = [Request Type] 子功能=【请求类型】	M	00-FF
	Report Number Of DTC By Status Mask - Positive Response Required 用状态掩码报告 DTC 的数量—肯定响应要求		01
	Report Number Of Mirror Memory DTC By Status Mask - Positive Response Required 用状态掩码报告映射到存储器 DTC 的编号——肯定响应要求		11
	Report DTC By Status Mask - Positive Response Required 用状态掩码报告 DTC——肯定响应要求		02
	Report Mirror Memory DTC By Status Mask - Positive Response Required 用状态掩码报告映射到存储器 DTC——肯定响应要求		0F
3	DTC Status Mask DTC 状态掩码	M	00-FF

The Request format to report DTC Extended Data By DTC Number and Mirror Memory DTC Extended Data By DTC Number shall match the following description:

通过 DTC 编号报告 DTC 扩展数据和映射到存储器中 DTC 数据的请求格式要求符合下面描述：

表 30

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Read DTC Information request Service ID 读取 DTC 信息请求服务 ID	M	19
2	sub-function = [Request Type] 子功能=【请求类型】	M	00-FF
	DTC Extended Data By DTC Number – Positive Response Required 用 DTC 编号报告 DTC 扩展数据—肯定响应要求		06
	Mirror Memory DTC Extended Data By DTC Number – Positive Response Required 用 DTC 编号报告 DTC 扩展数据—肯定响应要求		10
3 4 5	DTC Mask Record[] = [DTC high Byte 　　DTC middle Byte 　　DTC low Byte] DTC 掩码记录【】=【DTC 高字节 DTC 中字节 DTC 低字节 】	M	00-FF 00-FF 00-FF
6	DTC Extended Data Record Number DTC 扩展数据记录编号	M	01-FF
	ECU supports multiple Extended Data Records per DTC – Report one specific Record ECU 支持每个 DTC 的多个扩展数据记录——报告一个特定记录		01-FE
	ECU supports multiple Extended Data Records per DTC – Report all records ECU 支持每个 DTC 的多个扩展数据记录——报告所有记录		FF

The Request format to report Snapshot Identification or DTC Snapshot Record By DTC Number shall match the following description:

通过 DTC 编号报告快照标识或者和 DTC 快照记录的请求格式要求符合下面描述：

表 31

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Read DTC Information request Service ID 读取 DTC 信息请求服务 ID	M	19
2	sub-function = [Request Type] 子功能=【请求类型】	M	00-FF

	Report DTC Snapshot Identification - Positive Response required 报告 DTC 快照标识——肯定响应要求		03
	Report DTC Snapshot Record By DTC Number - Positive Response Required 通过 DTC 编号报告 DTC 快照记录——肯定响应要求		04
3 4 5	DTC Mask Record[] = [DTC high Byte 　　　DTC middle Byte 　　　DTC low Byte] DTC 掩码记录【】=【DTC 高字节 DTC 中字节 DTC 低字节】	C	00-FF 00-FF 00-FF
6	DTC Snapshot Record Number DTC 快照记录编号		01-FF
	ECU supports multiple Snapshot Records per DTC - Report one specific Record ECU 支持每个 DTC 的多个快照记录——报告一个特定记录	C	01-FE
	ECU supports multiple Snapshot Records per DTC - Report all records ECU 支持每个 DTC 的多个快照记录——报告所有记录		FF

注：C: The DTC Mask Record and DTC Snapshot Record Number parameters are only present in case the sub-function parameter is equal to Report DTC Snapshot Record By DTC Number.

C：如果子功能参数等于通过 DCT 编号报告 DTC 快照记录，DTC 掩码记录和 DTC 快照记录编号参数才能出现。

The Request format to report DTC Snapshot Record by Record Number shall match the following description:

通过记录编号报告 DTC 记录的请求格式要求符合下表描述：

表 32

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Read DTC Information request Service ID 读取 DTC 信息请求服务 ID	M	19
2	sub-function = [Request Type] 子功能=【请求类型】	M	00-FF
	Report DTC Snapshot Record by Record Number 通过记录数量报告 DTC 快照记录		05
3	DTC Snapshot Record Number DTC 快照记录编号	M	01-FF

	ECU supports multiple Snapshot Data Records per DTC - Report one specific Record ECU 支持每个 DTC 的多个快照数据记录——报告一个特定记录	01-FE
	ECU supports multiple Snapshot Records per DTC - Report all records ECU 支持每个 DTC 的多个快照记录——报告所有记录	FF

8.4.7 Positive Responses 肯定响应

The Positive Response format for Report DTC By Status Mask, Report Mirror Memory DTC By Status Mask or Report Supported DTCs shall match the following description:

通过状态掩码报告 DTC, 映射到存储器 DTC, 支持的 DTC 的肯定响应请求格式要求符合下表的描述:

表 33

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Read DTC Information Response Service ID 读取 DTC 信息请求服务 ID	M	59
2	**Report Type 报告类型**	M	00-FF
	Report DTC By Status Mask 用状态掩码报告 DTC		02
	Report Mirror Memory DTC By Status Mask 用状态掩码报告映射到存储器的 DTC		0F
	Report Supported DTCs 报告支持的 DTCs		0A
3	DTC Status Availability Mask DTC 状态有效掩码	M	00-FF
4	Data Record[]数据记录[] = [DTC no.1 high Byte 　　　　　　　　　　DTC 编号 1 高字节	C1	00-FF
5	DTC no.1 middle Byte DTC 编号 1 中字节	C1	00-FF
6	DTC no.1 low Byte DTC 编号 1 低字节	C1	00-FF
7	Status of DTC no.1 DTC 编号 1 的状态	C1	00-FF
8	DTC no.2 high Byte DTC 编号 2 高字节	C2	00-FF
9	DTC no.2 middle Byte DTC 编号 2 中字节	C2	00-FF
10	DTC no.2 low Byte DTC 编号 2 低字节	C2	00-FF
11	Status of DTC no.2 DTC 编号 2 的状态	C2	00-FF
:	:	:	:
n-3	DTC no.m high Byte DTC 编号 m 高字节	C2	00-FF
n-2	DTC no.m middle Byte DTC 编号 m 中字节	C2	00-FF
n-1	DTC no.m low Byte DTC 编号 m 低字节	C2	00-FF
n	Status of DTC no.m DTC 编号 m 的状态]	C2	00-FF

注：C1: This parameter is only present if solely one DTC information is available to be reported.

C1：如果单独一个 DTC 信息被报告有效，则此参数才能出现。

C2: This parameter is only present if more than one DTC information is available to be reported.

C2：如果多过一个 DTC 信息被报告有效，则此参数才能出现。

The Positive Response format for Report Number Of DTC By Status Mask or Report Number Of Mirror Memory DTC By Status Mask shall match the following description:

通过状态掩码报告DTC的编号,映射到存储器DTC的编号的肯定响应请求格式要求符合下表的描述：

表 33

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Read DTC Information Response Service ID 读取 DTC 信息响应服务 ID	M	59
2	Report Type 报告类型	M	00-FF
	Report Number of DTC By Status Mask 通过状态掩码报告 DTC 的编号		01
	Report Number of Mirror Memory DTC By Status Mask 通过状态掩码报告映射到存储器 DTC 的编号		11
3	DTC Status Availability Mask DTC 状态有效的掩码	M	00-FF
4	DTC Format Identifier DTC 格式标识符	M	00-FF
	ISO 15031-6 DTC Format ISO 15031-6 DTC 格式		00
	ISO 14229-1 DTC Format ISO 14229-1 DTC 格式		01
	SAE J1939-73 DTC Format SAE J1939-73 DTC 格式		02
5 6	Data Record[] = [DTC Count High Byte DTC Count Low Byte 数据记录=【DTC 计算高字节 DTC 计算低字节】	M M	00-FF 00-FF

The Positive Response format for Report Extended Data Record By DTC Number or Mirror Memory Extended Data Record By DTC Number shall match the following description:

通过 DTC 数量报告扩展数据记录或者映射到存储器的扩展数据记录的肯定响应格式要求符合下表描述：

表 34

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Read DTC Information Response Service ID 读取 DTC 信息响应服务 ID	M	59

	Report Type 报告类型		00-FF
2	Report Extended Data Record By DTC Number 通过 DTC 编号报告扩展数据记录	M	06
	Report Mirror Memory Extended Data Record By DTC Number 通过 DTC 编号报告映射到存储器的扩展数据记录		10
3 4 5 6	DTC and Status Record[] = [DTC high Byte 　　DTC middle Byte 　　DTC low Byte 　　Status of DTC] DTC 和状态记录【】=【DTC 高字节 DTC 中字节 DTC 低字节 DTC 的状态 】	M M M M	00-FF 00-FF 00-FF 00-FF
7	DTC Extended Data Record Number no.1 DTC 扩展数据记录编号 1	C1	00-FF
8 : 8+(p-1)	Data Record[] = [Extended Data no.1 byte no.1 　　: 　　Extended Data no.1 byte no.p] 数据记录【】=【扩展数据编号 1 字节编号 1 : 扩展数据编号 1 字节编号 p 】	C1 : C1	00-FF : 00-FF
:	:	:	:
no.t	DTC Extended Data Record Number no. x DTC 扩展数据记录编号 X	C2	00-FF
no.t +1 : no.t+1+(q-1)	Data Record[] = [Extended Data no.x byte no.1 　　: 　　Extended Data no.x byte no.q] 数据记录【】=【扩展数据编号 x 字节编号 1 : 扩展数据编号 x 字节编号 p 】	C2 : C2	00-FF : 00-FF

注：C1: The DTC Extended Data Record Number and the Extended Data in the DTC Extended Data Record parameter are only present if at least one DTC Extended Data Record is available to be reported.

C1:如果至少有一个扩展数据记录报告有效，则在 DTC 扩展数据记录参数中 DTC 扩展数据记录和扩展数据才能出现。

C2: The DTC Extended Data Record Number and the Extended Data in the DTC Extended Data Record parameter are only present if all records are requested to be reported and more than one record is available

to be reported. (DTC Extended Data Record Number set to FF hex in the request).

C2:如果所有记录被请求报告且多过一个记录报告有效，则在 DTC 扩展数据记录参数中 DTC 扩展数据记录和扩展数据才能出现。（请求中 DTC 扩展数据记录编号设置为 FFhex）

The Positive Response format for Report Snapshot Identification shall match the following description:

报告快照标识的肯定响应格式要求符合下表的描述：

表 35

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Read DTC Information Response Service ID 读取 DTC 信息响应服务 ID	M	59
2	Report Type 报告类型	M	00-FF
	Report DTC Snapshot Identification 报告 DTC 快照标识		03
3 4 5	DTC Record no.1[] = [DTC no.1 high Byte 　　DTC no.1 middle Byte 　　DTC no.1 low Byte DTC 记录编号 1【】=【DTC 编号 1 高字节 DTC 编号 1 中字节 DTC 编号 1 低字节 】	C1 C1 C1	00-FF 00-FF 00-FF
6	DTC Snapshot Record Number no.1 DTC 快照记录编号 1	C1	00-FF
:	:	:	:
n-3 n-2 n-1	DTC Record no.m[] = [DTC no.m high Byte 　　DTC no.m middle Byte 　　DTC no.m low Byte DTC 记录编号 m【】=【DTC 编号 m 高字节 DTC 编号 m 中字节 DTC 编号 m 低字节 】	C2 C2 C2	00-FF 00-FF 00-FF
n	DTC Snapshot Record Number no.m DTC 快照编号 m	C2	00-FF

注：C1: The DTC Record and DTC Snapshot Record Number parameter is only present if at least one DTC Snapshot record is available to bem reported.

C1:如果至少有一个 DTC 快照记录被有效报告，则 DTC 记录和 DTC 快照记录数量参数才能出现。

C2: The DTC Record and DTC Snapshot Record Number parameter is only present if more than one DTC Snapshot record is available to be reported.

C2:如果多过一个 DTC 快照记录被有效报告，则 DTC 记录和 DTC 快照记录数量参数才能出现。

The Positive Response format for Report DTC Snapshot Record By DTC Number shall match the following description:

通过 DTC 编号报告 DTC 快照记录的肯定响应格式要求符合下表描述：

表 36

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Read DTC Information response Service Id 读取 DTC 信息响应服务 ID	M	59
2	Report Type 报告类型	M	00-FF
	Report DTC Snapshot Record By DTC Number 通过 DTC 编号报告 DTC 快照记录		04

3
 	
4
5
6
	DTC And Status Record no.1 [] =
	[DTC High Byte
	    DTC Middle Byte
	    DTC Low Byte
	    Status Of DTC]
	DTC 和状态记录编号 1【】=【DTC 高字节
	DTC 中字节
	DTC 低字节
	DTC 状态】
		M
		M
		M
		M
			00-FF
			00-FF
			00-FF
			00-FF

7	DTC Snapshot Record Number no. 1 DTC 快照记录编号 1	C1	00-FF
8	DTC Snapshot Record Number Of Identifiers no 1 DTC 快照记录编号标识符编号 1	C1	00-FF

	DTC Snapshot Record [] no. 1 = [Data Identifier no. 1 [High Byte] 　　Data Identifier no. 1 [Low Byte] 　　Snapshot Data no. 1 Byte no. 1 　　: 　　Snapshot Data no. 1 Byte no. p 　　:		
9	1Data Identifier no. w [High Byte]	C1	00-FF
10	1Data Identifier no. w [Low Byte]	C1	00-FF
11	Snapshot Data no. w Byte no. 1	C1	00-FF
:	:	:	:
11+(p-1)	Snapshot Data no. w Byte no. m]	C1	00-FF
:	DTC 快照记录【】编号 1=【	:	:
r-(m)-2	数据标识符编号 1【高字节】	C2	0 0-FF
r-(m)-1	数据标识符编号 1【低字节】	C2	00-FF
r-(m-1)	快照数据编号 1 字节编号 1	C2	00-FF
:	:	:	:
r	快照数据编号 1 字节编号 p	C2	00-FF
	: 1 数据标识符编号 w【高字节】 1 数据标识符编号 w【低字节】 快照数据编号 w 字节编号 1 : 快照数据编号 w 字节编号 m 】		
:	:	:	:
t	DTC Snapshot Record Number no. x DTC 快照记录编号 x	C3	00-FF
t+1	DTC Snapshot Record Number Of Identifiers no x DTC 快照记录编号标识符编号 x	C3	00-FF

	DTC Snapshot Record [] no. x = [Data Identifier no. 1 [High Byte]		
	Data Identifier no. 1 [Low Byte]		
	Snapshot Data no. 1 Byte no. 1		
	:		
	Snapshot Data no. 1 Byte no. p		
	:		
t+2	Data Identifier no. v [High Byte]	C3	00-FF
t+3	Data Identifier no. v [Low Byte]	C3	00-F F
t+4	Snapshot Data no. v Byte no. 1	C3	00-FF
:	:	:	:
t+4+(p-1)	Snapshot Data no. v Byte no. u]	C3	00-FF
:	DTC 快照记录【】编号 x=【	:	:
n-(u-1)-2	数据标识符编号 1【高字节】	C4	00-FF
n-(u-1)-1	数据标识符编号 1【低字节】	C4	00-FF
n-(u-1)	快照数据编号 1 字节编号 1	C4	00-FF
:	:	:	:
n	快照数据编号 1 字节编号 p	C4	00-FF
	:		
	1 数据标识符编号 v【高字节】		
	1 数据标识符编号 v【低字节】		
	快照数据编号 v 字节编号 1		
	:		
	快照数据编号 v 字节编号 u		
	】		

注：C1: The DTC Snapshot Record Number and the first Data Identifier/Snapshot Data combination in the DTC Snapshot Record parameter is only present if at least one DTC Snapshot record is available to be reported (DTC Snapshot Record Number unequal to FF hex in the request or only one record is available to be ported if DTC Snapshot Record Number is set to FF hex in the request).

C1: 如果至少有一个 DTC 快照记录被有效报告，则 DTC 快照记录编号和第一个数据标识符/快照数据联合 DTC 快照记录参数才能出现。（在请求中 DTC 快照记录编号等于 FFhex，或者在请求中如果 DTC 快照记录编号设置为 FFhex，只有一个记录被报告有效）。

C2/C4 : There are multiple Data Identifier/Snapshot Data combinations allowed being present in a single DTC Snapshot Record e.g.: This can be the case for the situation where a single Data Identifier only references an integral part of data. When the Data Identifier references a block of data then a single Data Identifier / Snapshot Data combination can be used.

C2/C4 :有多个标识符/联合快照数据允许出现在一个单独的 DTC 快照记录中。例如：此情况为一个单独数据标识符只能参考完整的数据部分。当数据标识符参考一批数据，则一个单独数据标识符/联合快照数据被使用。

C3: The DTC Snapshot Record Number and the first Data Identifier / Snapshot Data combination in the

DTC Snapshot Record parameter is only present if all records are requested to be reported.

C3：如果至所有 DTC 记录被请求报告，则 DTC 快照记录编号和第一个数据标识符/联合快照数据在 DTC 快照记录参数才能出现。

The Positive Response format for Report DTC Snapshot Record By Snapshot Record Number shall match the following description:

通过快照记录编号报告 DTC 快照记录的肯定响应格式要求符合下表描述：

表 37

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Read DTC Information response Service Id 读取 DTC 信息响应服务 ID	M	59
2	Report Type 报告类型	M	00-FF
	Report DTC Snapshot Record By DTC Number 通过 DTC 编号报告 DTC 快照记录		05
7	DTC Snapshot Record Number no. 1 DTC 快照记录编号 1	M	00-FF

3
4
5
6
	DTC And Status Record no.1 [] =
	[DTC High Byte
	  DTC Middle Byte
	  DTC Low Byte
	  Status Of DTC]
	DTC 和状态记录编号 1【】=【DTC 高字节
	DTC 中字节
	DTC 低字节
	DTC 状态】
		C1
		C1
		C1
		C1
			00-FF
			00-FF
			00-FF
			00-FF

8	DTC Snapshot Record Number Of Identifiers no 1 DTC 快照记录编号标识符编号 1	C1	00-FF

	DTC Snapshot Record [] no. 1 = [Data Identifier no. 1 [High Byte]		
	Data Identifier no. 1 [Low Byte]		
	Snapshot Data no. 1 Byte no. 1		
	:		
	Snapshot Data no. 1 Byte no. p		
	:		
9	1Data Identifier no. w [High Byte]	C1	00-FF
10	1Data Identifier no. w [Low Byte]	C1	00-FF
11	Snapshot Data no. w Byte no. 1	C1	00-FF
:	:	:	:
11+(p-1)	Snapshot Data no. w Byte no. m]	C1	00-FF
:	DTC 快照记录【】编号 1=【	:	:
r-(m)-2	数据标识符编号 1【高字节】	C2	0 0-FF
r-(m)-1	数据标识符编号 1【低字节】	C2	00-FF
r-(m-1)	快照数据编号 1 字节编号 1	C2	00-FF
:	:	:	:
r	快照数据编号 1 字节编号 p	C2	00-FF
	:		
	1 数据标识符编号 w【高字节】		
	1 数据标识符编号 w【低字节】		
	快照数据编号 w 字节编号 1		
	:		
	快照数据编号 w 字节编号 m		
	】		
:	:	:	:
t	DTC Snapshot Record Number no. x DTC 快照记录编号 x	C2	00-FF
	DTC And Status Record no.x [] = [DTC High Byte		
	DTC Middle Byte		
t+1	DTC Low Byte	C2	00-FF
t+2	Status Of DTC]	C2	00-FF
t+3	DTC 和状态记录编号 x【】=【DTC 高字节	C2	00-FF
t+4	DTC 中字节	C2	00-FF
	DTC 低字节		
	DTC 状态】		
t+5	DTC Snapshot Record Number Of Identifiers no x DTC 快照记录编号标识符编号 x	C3	00-FF

	DTC Snapshot Record [] no. x = [Data Identifier no. 1 [High Byte]		
	Data Identifier no. 1 [Low Byte]		
	Snapshot Data no. 1 Byte no. 1		
	:		
	Snapshot Data no. 1 Byte no. p		
	:		
t+6	Data Identifier no. w [High Byte]	C3	00-FF
t+7	Data Identifier no. w [Low Byte]	C3	00-F F
t+8	Snapshot Data no.w Byte no. 1	C3	00-FF
:	:	:	:
t+8+(p-1)	Snapshot Data no. u Byte no. u]	C3	00-FF
:	DTC 快照记录【】编号 x=【	:	:
n-(u-1)-2	数据标识符编号 1【高字节】	C4	00-FF
n-(u-1)-1	数据标识符编号 1【低字节】	C4	00-FF
n-(u-1)	快照数据编号 1 字节编号 1	C4	00-FF
:	:	:	:
n	快照数据编号 1 字节编号 p	C4	00-FF
	:		
	1 数据标识符编号 v【高字节】		
	1 数据标识符编号 v【低字节】		
	快照数据编号 v 字节编号 1		
	:		
	快照数据编号 v 字节编号 u		
	】		

注：C1: The DTC Snapshot Record Number and the first Data Identifier/Snapshot Data combination in the DTC Snapshot Record parameter is only present if at least one DTC Snapshot record is available to be reported (DTC Snapshot Record Number unequal to FF hex in the request or only one record is available to be reported if DTC Snapshot Record Number is set to FF hex in the request).

C1：如果至少有一个 DTC 快照记录被有效报告，则 DTC 快照记录编号和第一个数据标识符/快照数据联合 DTC 快照记录参数才能出现。（在请求中 DTC 快照记录编号等于 FFhex，或者在请求中如果 DTC 快照记录编号设置为 FFhex，只有一个记录被报告有效）。

C2/C4：There are multiple Data Identifier / Snapshot Data combinations allowed being present in a single DTC Snapshot Record. This can e.g. be the case for the situation where a single Data Identifier only references an integral part of data. . When the Data Identifier references a block of data then a single Data Identifier / Snapshot Data combination can be used.

C2/C4：有多个标识符/联合快照数据允许出现在一个单独的 DTC 快照记录中。例如：此情况为一个单独数据标识符只能参考完整的数据部分。当数据标识符参考一批数据，则一个单独数据标识符/联合快照数据被使用。

C3: The DTC Snapshot Record Number and the first Data Identifier / Snapshot Data combination in the

```
DTC Snapshot Record parameter is only present if all records are requested to be reported.
```

C3：如果至所有 DTC 记录被请求报告，则 DTC 快照记录编号和第一个数据标识符/联合快照数据在 DTC 快照记录参数才能出现。

8.4.8 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合下表描述：

表 38

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Read Data by IdentifierRequest Service ID 通过标识符请求服务 ID 读取数据	M	19
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Sub-Function not supported 不支持子功能		12
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Request out of Range 请求超过范围		31

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.5 SID 22 - Read Data by Identifier 通过标识符读数据

The service is used to Read data record values from the ECU identified by data record identifiers.

此服务用于通过数据记录标识符，从 ECU 标识区读取数据记录值。

8.5.1 Parameter Description 参数描述

Data Identifier: This parameter identifies a corresponding data record which is addressed by this identifier.

数据标识符：此参数识别一个通过此标识符寻址的相应数据记录

Data Record: The data record parameter is used in the positive response message and contains the requested data record valued.

数据记录：此数据记录参数用在肯定响应报文和包含请求数据记录值中。

8.5.2 Behavior 行为

On receiving the Read Data By Identifier Service Request Message the ECU shall respond

with the requested data record values.

在接收到读数据标识符的服务请求报文，ECU 将以请求数据记录纸响应。

8.5.3 Service Request 服务请求

The Request format shall match the following description:
请求格式要求符合下表描述：

表 39

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Read Data By Identifier Request Service ID 通过标识符读数据的请求服务 ID	M	22
2	Data Identifier[] = [byte 1 (MSB) byte 2	M	00-FF
3	数据标识符【】=【字节 1（MSB） 字节 2	M	00-FF

The parameter Data identifier shall be used according to the above definition. If not, the request must be rejected with the adequate negative response code.

根据上表定义使用参数数据标识符。如果不符合上表要求，ECU 必须以合适否定响应代码拒绝请求

8.5.4 Positive Response 肯定响应

The Positive Response format shall match the following description:
肯定响应格式要求符合下表描述：

表 39

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Read Data By Identifier Response Service ID 通过标识符读取数据的响应服务 ID	M	62
2	Data Identifier[] = [byte 1 (MSB) byte 2	M	00-FF
3	数据标识符【】=【字节 1（MSB） 字节 2	M	00-FF

4
:
(K-1)+4
	Data Record[] = [data no. 1
	        :
	    data no. k
	数据标识符【】=【字节 1（MSB）
	:
	字节 K
		M
		:
		0
			00-FF
			:
			00-FF

The Data identifier value shall be an echo of the one sent in the request message. The

Data Record value shall be the value that is linked to the requested data identifier value.

在请求报文中数据标识符值应该是一个发送的应答。数据记录值应该是连接请求数据标识符值。

8.5.5 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合下表描述：

表 40

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Read Data by IdentifierRequest Service ID 通过标识符读取数据的请求服务 ID	M	22
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件不正确		22
	Security Access Denied 安全访问不通过		33
	Request out of Range 请求超出范围		31

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.6 SID 23 – Read Memory by Address 通过地址读取存储

This request is used to read memory from an ECU via provided address and size of memory to be read.

此请求用于通过地址从 ECU 里读存储和用于读取存储的大小。

8.6.1 Parameter Description 参数描述

Address and Length Format Identifier: This format identifier is a one byte value with each nibble coded separately

寻址和长度格式标识符：此格式标识符是一个携带每四个比特位为独立代码的字节值。

high nibble: Number of byte of the Memory Size Parameter

高 4 比特位：存储大小参数的字节的编号

low nibble: Number of byte of the Memory Address Parameter

低 4 比特位：存储地址参数的字节的编号

Memory Address: Memory address from where the data shall be read. The size of this parameter is defined in the low nibble of the Address and Length format identifier

存储地址：从将要读取的数据寻址存储，此参数的大小被定义在地址和长度标识符的低 4 比特位中。

Memory Size: Number of bytes which shall be read starting from the address in the Memory Address parameter. The size of this parameter is defined in the high nibble of the Address and Length format identifier

存储大小：字节编号将从地址中的存储寻址参数开始被读取，此参数的大小被定义在地址和长度标识符的高 4 比特位中。

Data Record:Provides the content of the ECU memory that was requested with the Memory Address and Size parameters.

数据记录：提供 ECU 存储的内容， 此内容可以被带有存储地址和大小参数请求。

8.6.2 Service Request 服务请求

This service does not support a Sub-Function parameter and therefore complies to section 7.2 Request Messages without Sub-Function parameter.

此服务代码不支持子功能参数，因此可以遵守 7.2 部分的不带子功能参数的请求报文。

The Request format shall match the following description:

请求格式要求符合下表描述

表 41

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Read Memory By Address Request Service Id 通过寻址读取存储的请求服务 ID	M	23
2	Address And Length Format Identifier 地址和长度格式标识符	M	00-FF
3 : (m-1)+3	Memory Address[] = [　byte 1 (MSB) 　　　: 　　byte m] 存储地址【】=【字节 1（MSB） : 字节 m】	M : C1	00-FF : 00-FF
n-(k-1) : n	Memory Size[] = [byte 1 (MSB) 　　　: 　　byte k] 存储大小【】=【字节 1（MSB） : 字节 k】	M : C2	00-FF : 00-FF

注：C1: The presence of this parameter depends on the address length information parameter of the Address And Length Format Identifier. （m equals the decimal value of the low nibble)

　　C1:此参数的存在依赖于地址和长度格式标识符的地址长度信息。（m 等于低 4 比特位的十进制值）

　　C2: The presence of this parameter depends on the memory size length information of the Address And

Length Format Identifier. (k equals the decimal value of the high nibble)

C2:此参数的存在依赖于地址和长度格式标识符的大小长度信息。（k 等于高 4 比特位的十进制值）

8.6.3 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应格式要求符合下表描述：

表 42

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Read Memory By Address Response Service ID 通过寻址读存储的响应服务 ID	M	63

2
:
(K-1)+2
	Data Record [] = [data no. 1
	
	   :
	  data no. k
	数据记录【】=【数据编号 1
	:
	数据编号 k】
		M
		:
		O
			00-FF
			:
			00-FF

The data record contains the requested data.

此数据包含请求的数据。

8.6.4 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合下表描述：

表 43

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Read Memory by Address 通过寻址读存储	M	23
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件不正确		22
	Security Access Denied 安全访问不通过		33
	Request out of Range 请求超出范围		31

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.7 SID 24 - Read Scaling Data by Identifier 通过标识符读测量数据

With this service the Diagnostic Test Tool can request scaling data record information from an ECU identified by one or more Data Identifiers.

关于此服务,诊断测试设备可以请求通过可识别的一个或多个数据标识符从一个 ECU 的读取测量记录信息。

This service is only needed for ECU's which must support on-board diagnostic functionality.

此服务只用于必须支持在线诊断功能的 ECU .

8.7.1 Parameter Description 参数描述

Data Identifier: A two byte Identifier which identifies data records. The format and definition of these Scaling Data Records shall follow the requirements defined by the respective model line requirements specification.

数据标识符:一个可识别数据记录的 2 字节标识符。这些测量数据记录的格式和定义应遵循诊断需求规范中各个模式定义的要求。

Scaling Byte: This Data Record is used in the response message of the ECU to provide the requested scaling data record values to the diagnostic test tool.

测量字节:针对诊断设备请求测试数据记录值时,此数据记录用于 ECU 的肯定响应报文中。

This parameter is used to provide additional information for Scaling Bytes.

此参数为测量字节提供额外信息。

8.7.2 Behavior 行为

When receiving a Read Scaling Data By Identifier request from the diagnostic test tool the ECU shall response with the scaling information associated with the specified Data Identifier parameter.

当从诊断测试设备接收到一个读测试数据的标识符请求,ECU 将做出带有测试信息联合特定数据标识符参数的响应。

8.7.3 Service Request 服务请求

This service does not support a Sub-Function parameter.

此服务不支持子功能参数。

The Request format shall match the following description:

请求格式要求符合下表描述:

表 44

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Read Scaling Data by Identifier Request Service ID 通过标识符读测量数据的请求服务 ID	M	24

| 2 | Data Identifier[] = [byte 1 (MSB)

        byte 2] | M | 00-FF |
| 3 | 数据标识符【】=【字节 1（MSB）

字节 2】 | M | 00-FF |

8.7.4 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应格式要求符合下表描述：

表 45

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Read Scaling Data by Identifier Response Service ID 通过标识符读测量数据的响应 ID	M	64
2 3	Data Identifier[] = [byte 1 (MSB) byte 2] 数据标识符【】=【字节 1（MSB） 字节 2】	M M	00-FF 00-FF
4	Scaling Byte No.1 测量字节编号 1	M	00-FF

5
:
(p-1)+5
	Scaling Byte Extension[] No.1 = [scaling byte extension parameter no.1 (MSB)
	       :
	      scaling byte extension parameter no. p]
	测量字节扩展【】编号 1=【测量字节扩展参数编号 1
	:
	测量字节扩展参数编号 p】
		C1
		:
		C1
			00-FF
			:
			00-FF

:	:	:	:
n-r	Scaling Byte No.k 测量字节编号 k	C2	00-FF

n-(r-1)
:
n
	Scaling Byte Extension[] No.k = [scaling byte extension parameter no.1 (MSB)
	       :
	      scaling byte extension parameter no. r]
	测量字节扩展【】编号 k=【测量字节扩展参数编号 1
	:
	测量字节扩展参数编号 r】
		C1
		:
		C1
			00-FF
			:
			00-FF

注：C1: The presence of this parameter depends on the scaling byte high nibble.

　　C1：此参数存在依赖测量字节高 4 位。

　　C2: The presence of this parameter depends on whether the encoding of the scaling information requires

more than one byte

C2：此参数存在依赖于测量信息请求的编码而不是一个字节。

8.7.5 Negative Response 否定响应

The Negative Response format shall match the following description:

肯性响应格式要求符合下表描述：

表 46

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Read Scaling Data by Identifier 通过标识符读测量数据	M	24
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件不正确		22
	Request out of Range 请求超出范围		31

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.8 SID 27 – Security Access 安全访问

The purpose of this service is to provide a mechanism to restrict access to specific data and or services due to security, safety and or emissions. The service uses a seed – key technique.

此服务的目的是提供一个机制，约束地区访问特定的数据或安全或排放。此服务使用种子-密钥技术。

8.8.1 Security Access Type and Parameter Description 安全访问类型和参数描述

Two different Request types are valid:

a）Request Seed:By sending this parameter to the ECU, the diagnostic test tool requests a so called seed value with a defined security level for calculating a key value to unlock parts of the ECU diagnostic functionality. Different Request Seed type values represent different security levels and formats.

b）Send Key:This parameter signalizes to the ECU that now a calculated key is sent within this request. Different Send Key Type values represent different security levels and formats.

有效的两种不同类型的请求：

a）请求种子：诊断测试设备通过发送给 ECU 的参数，请求一个说明安全级别计算密钥的种子，用于去解锁 ECU 部分诊断功能。不同请求种子类型值会表现出不同安全级别和格式。

b）发送密钥：此参数通知 ECU，目前此请求的计算密钥被发送。不同发送密钥类型值会表现出不同安全级别和格式。

Two different data parameter types are defined:

a) Security Seed: The Seed parameter is a data value that is sent from the ECU to the diagnostic test tool and is the basis for the Key calculation.

b) Security Key: The Security Key parameter is the result of the key calculation and is sent from the diagnostic test tool to the ECU. After reception of the key, the ECU compares the received key with an internal calculated one and if equal unlocks the requested functionality.

定义的两种不同数据参数类型：

a）安全种子：此种子参数 ECU 发送给诊断测试设备的数据值，是密钥计算的基础。

b）安全密钥：此密钥参数是诊断测试设备发送给 ECU 的密钥技术结果。在接收到密钥之后，ECU 比较接收到的密钥和自己内部技术的密钥，如果相等则就解锁请求的功能。

8.8.2 Behavior 行为

The default session does not support any Security Access feature. Also every diagnostic session transition locks all previously unlocked features again.

默认会话不支持任何安全访问特性，每个诊断会话也要再次锁住所有之前解锁的安全特性。

The specific Security Access type values shall be used as follows:

a) the range of odd numbers out of the interval 01 - 7D hex is reserved for the Security Access type Request Seed

b) the range of even numbers out of the interval 02 - 7E hex is reserved for the Security Access type Send Key

c) one odd number and the directly following even number out of the above specified ranges represent one applicable pair of Security Access request types, that specifies one specific level of security; disabling the ECU's security feature principally requires one of those specific Security Access request type pairs

特定的安全访问类型值按下面要求使用：

a) 不在01-7D hex 范围内的奇数编号范围被保留用于安全访问类型请求种子。

b) 不在02-7E hex 范围内的偶数编号范围被保留用于安全访问类型发送密钥。

c) 一个不在以上特别定义范围内的奇数和与它相连的下一个偶数出现适用一对安全访问请求类型，此类型规定一特定的安全级别；要使 ECU 的安全特性失效，主要需要这两种安全访问请求类型中的一种。

The following procedure describes how to unlock functionality of an ECU:

下面描述如何解锁一个 ECU 的功能：

The ECU shall be put into a diagnostic session other than default with a Diagnostic Session

Control Request.

ECU 应该进入一个带有诊断会话控制请求的非默认会话的诊断会话。

The diagnostic tool sends a Security Access Request 27h with the sub-function parameter set to Request Seed.

诊断设备发送一个带有子功能参数的安全访问请求 27h，此参数设置区请求种子。

The ECU responds with a Security Access Positive Response message including the Seed parameter value.

ECU 做出的响应是安全访问肯定响应报文携带一个包含种子参数值。

With this seed value the diagnostic test tool calculates a key and then sends the key in the Security Access Request message, with sub-function parameter set to Send Key.

诊断测试设备根据这种子值计算出一个密钥,并且发送一个用子功能参数设置密钥的安全访问请求报文。

After reception of the key from the diagnostic test tool the ECU compares the internally calculated key with the key received from the test tool. If both numbers match, the ECU unlocks the requested functionality. This shall be indicated to the test tool via the Security Access Positive Response service.

ECU 从诊断测试设备接收一个密钥之后，比较与自己内部计算的密钥。如果两个密钥号码匹配，则 ECU 接收请求的功能。这表示测试设备通过了安全访问的肯定响应服务。

If an ECU is already unlocked for a specific functionality and a Security Access Request message is received with sub-function Request Seed. The ECU responds with Security Access Positive Response message with a seed value equal to zero (0).

如果一个 ECU 解锁某个特定功能，并且接收了一个携带子功能请求种子的安全访问请求报文。则 ECU 响应一个携带种子值等于 0 的安全访问肯定报文。

The ECU shall support a security delay as follows:

ECU 应支持一个安全延迟如下：

After 2 unsuccessful attempts of Security Access procedures the ECU shall insert a 10 seconds delay timer before allowing further unlocking attempts. A power loss or key cycle must not reduce or stop the remaining timer. It is allowed to restart the timer if the ECU is powered up and there have been 2 unsuccessful attempts to unlock the ECU before.

在两次尝试安全访问失败后，在下次尝试解锁前 ECU 内部计时应该延长 10s。功率损耗或者密钥循环必须不能减少或者停止计时。如果 ECU 上电且之前有两次安全访问尝试成功解锁，则允许重新启动计时。

If it cannot be determined if prior to a power up/reset there have been 2 unsuccessful attempts to unlock the ECU, then the delay timer shall always be active after power up/reset.

已经两次安全访问尝试成功解锁如果还不能确定是否优先上电或者复位,则在上电或者复位之后延迟计时应该总是被激活。

All unsecured diagnostic functionality and normal communication shall always be supported independently of the delay timer. After a successful Security Access Request sequence the ECU shall reset the indication bit invoking a time delay on power up/reset.

所有未确认诊断功能和正常通讯应该被支持且独立于延迟定时器。在成功通过安全访问请求序列之后，ECU 将复位那指示比特位调用延迟上电或者复位。

A Security Seed parameter value equal to FF…FFhex or 00..00hex shall not be supported (00..00hex only on requests for already unlocked functionality see above.)

不支持参数值等于 FF…FFhex 或者 00..00hex 的种子。（00..00hex 只能请求已经解锁功能）

8.8.3 Service Request 服务请求

This service supports a Sub-Function parameter and therefore complies to section 5.1 Request Messages with Sub-Function parameter.

此服务支持一个子功能参数，可以参考 5.1 部分中带有子功能参数的请求报文。

The Request format shall match the following description:

请求格式要求符合下表描述：

表 47

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Security Access Request Service ID 安全访问请求服务 ID	M	27
2	Sub Function = [Security Access Type] 子功能=【安全访问类型】	M	00-FF
	Request Seed - Positive Response Required 请求种子—肯定响应要求		01, 03, 05, 07-7D
	Send Key - Positive Response Required 发送密钥—肯定响应要求		02, 04, 06, 08-7E

3
:
n
	Security Key[] = [key byte no. 1 (MSB)
	    :
	    key byte no. m (LSB)]
	安全密钥【】=【密钥字节编号 1（MSB）
	:
	密钥字节编号 m（LSM）
	】
		C
		:
		C
			00-FF
			:
			00-FF

注：C: The presence of this parameter depends on the sub-function parameter. It is mandatory to be present
    if the Security Access type parameter indicates that the diagnostic tool transmits a key value to
    the ECU.

C:此参数的存在依赖于子功能参数。如果安全访问类型指示诊断设备发送一个密钥值给 ECU,则为强制的。

8.8.4 Positive Response 肯定响应

The Positive Response format shall match the following description:
肯定响应格式要求符合下表描述：

表 48

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Security Access Response Service ID 安全访问响应服务 ID	M	67
2	Security Access Type 安全访问类型	M	00-FF
3 : n	Security Seed [] = [seed byte no. 1 (MSB) : seed byte no. m (LSB)] 安全种子【】=【种子字节编号 1（MSB） : 种子字节编号 m（LSB）】	C : C/0	00-FF : 00-FF

注：C: The presence of this parameter depends on the Security Access Type parameter. It is mandatory to be present if Security Access Type parameter indicates that the ECU transmits a seed value to the diagnostic tool.

C:此参数的存在依赖安全访问类型参数。如果安全访问类型指示诊断设备发送一个种子值给诊断设备,则为强制的。

8.8.5 Negative Response 否定响应

The Negative Response format shall match the following description:
肯定响应格式要求应符合下表要求

表 49

Byte No.	Parameter Name 参赛名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Security Access 安全访问	M	27
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Sub-Function not supported 不支持子功能参数		12
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件不正确		22
	Request Sequence Error 请求系列有误		24
	Invalid Key 密钥无效		35
	Exceeded number of attempts 超过尝试数量		36
	Required Time Delay not Expired		37

	不终止要求时间延迟		

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.9 SID 28 – Communication Control 通讯控制

This Service is used to switch on and off the transmission of certain ECU messages.

此服务用于特定 ECU 报文发送的开关的打开和闭合。

8.9.1 Control Type Description 控制类型描述

Normal Communication Messages: This type references all application-related messages.

常规通讯报文：此类型参考所有应用程序相关的报文。

Network Management Messages: This type references all network management communication messages.

网络管理报文：此类型参考所有网络管理通讯报文

8.9.2 Behavior 行为

On receiving a communication control request message the ECU shall perform the requested communication type control after sending the positive response message to the diagnostic tool. (if positive response is requested, if no response requested the ECU shall perform the communication type control immediately after successful evaluation of the request message)

在接收到一个通讯控制请求报文时，在发送一个肯定响应报文给诊断设备之后，ECU 将执行通讯类型控制的请求。（如果诊断设备请求肯定响应，ECU 没有响应请求，则在成功评估请求报文之后将执行立刻执行通讯类型控制）

The ECU switches back to normal communication only on one of the following measures:

a) A request is received to switch the communication on again.

b) On power loss or normal power down event.

c) On transition to default diagnostic session.

ECU 只有符合下面任意一个条件才能返回正常通讯：

a）再次接收到一个请求，要求切换到正常通讯。

b）在功率消耗或者正常掉电事件

c）发送一个默认诊断会话

8.9.3 Service Request 服务请求

This service supports a Sub-Function parameter and therefore complies to section 5.1 Request Messages with Sub-Function parameter.

此服务支持一个子功能参数，可以参考 5.1 部分中带有子功能参数的请求报文。

The Request format shall match the following description:

请求格式要求符合下表描述：

表 50

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Communication Control Request Service Id 通讯控制请求服务 ID	M	28
2	Sub Function = [Control Type] 子功能=【控制类型】	M	00-FF
	Enable Rx And Tx - Positive Response Required 使能接收和发送—肯定响应要求		00
	Enable Rx And Disable Tx - Positive Response Required 使能接收和发送无效—肯定响应要求		01
	Enable Rx And Tx - No Positive Response Required 使能接收和发送—没有肯定响应要求		80
	Enable Rx And Disable Tx - No Positive Response Required 使能接收和发送无效—没有肯定响应要求		81
3	Communication Type 通讯类型	M	00-FF
	Normal Communication Messages 常规通讯报文		01
	Network Management Messages 网络管理报文		02

The Communication Type is bit encoded and can also be combined.

The Communication Control request shall apply to all physical busses the ECU is connected to.

此通讯类型是比特位编码，也可以联合。此通讯控制请求将申请所有 ECU 连接物理层总线

8.9.4 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应格式啊哟去符合下表要求：

表 51

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Communication Control Response Service ID 通讯控制请求服务 ID	M	68
2	Control Type 控制类型	M	00-FF

8.9.5 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合下表描述：

表 52

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 肯定响应	M	7F
2	Communication Control 通讯控制	M	28
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Sub-Function not supported 不支持子功能		12
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件不正确		22
	Request out of Range 请求超出范围		31

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.10SID 2C — Dynamically Define Data Identifier 动态说明数据标识符

The Dynamically Define Data Identifier service allows the diagnostic tool to dynamically define in an ECU a Data Identifier that can be read via the Read Data By Identifier service at a later time.

动态说明数据标识符服务允许诊断设备动态定义 ECU 中数据标识符。定义完的某个时刻，通过读数据标识符服务来读 ECU 定义的数据标识符。

Consequently the diagnostic tool is able to group one or more data elements into a data sup reset that can be requested at once via the Read Data By Identifier.

因此通过读数据标识符立刻请求诊断设备能聚合一个或多个数据因素成一个数据进入复位。

8.10.1 Dynamic Data Identifier Definition Type Description 动态数据标识符说明类型描述

Define by Identifier: This type shall be used to specify to the ECU that the definition of the Dynamic Data Identifier takes place by means of a Data Identifier reference.

定义标识符：此参数将用于说明 ECU 动态数据标识符的定义依赖参考标识符发生。

Define by Memory Address : This type shall be used to specify to the ECU that the definition of the Dynamic Data Identifier takes place by means of an address reference. This type shall only be used during the development phase of the ECU.

定义存储地址：此参数将用于说明 ECU 动态数据标识符的定义依赖参考地址发生。此类型只能用在 ECU 的开发阶段。

Clear Dynamically Defined Data Identifier: This type requests the ECU to clear the specified Dynamic Data Identifier.

清除动态定义数据标识符：此类型请求 ECU 清除特定的动态数据标识符

8.10.2 Parameter Type Description 参数类型描述

Dynamically Defined Data Identifier: This parameter specifies how the dynamic data record, which is being defined by the diagnostic tool, will be referenced in future calls to by the service Read Data By Identifier. The Dynamically Defined Data Identifier shall be handled just as a Data Identifier in the Read Data By Identifier service.

动态定义数据标识符：此参数说明由诊断设备定义的动态数据是如何由记录的，将要参考下次请求服务数据标识符。动态定义数据标识符将仅仅当一个在读数据标识服务中的数据标识符被处理。

Source Data Identifier: This parameter logically specifies the source of information to be included into the dynamic data record

源数据标识符：此参数逻辑说明信息源包含在动态数据记录中。

Position In Source Data Record: This 1-byte parameter is used to specify the starting position of the excerpt of the source data record to be included in the dynamic data record. A position of one (1) shall reference the first byte of the data record referenced by the Source Data Identifier.

源数据记录的位置：这一个字节参数用于说明引用源数据记录的起始位，包含在动态数据记录中。一个位置为1表示将参考源数据标识符的数据记录的第一个字节。

Address And Length Format Identifier: This parameter is a one byte value with each nibble encoded separately:

bit 7 – 4: Length (number of bytes) of the Memory Size parameter(s)

bit 3 – 0: Length (number of bytes) of the Memory Address parameter(s)

地址和长度格式标识符：此参数是一个半个字节值的编码，分别如下：

bit 7 – 4:存储大小参数的长度（字节编号）

bit 3 – 0:存储地址参数的长度（字节编号）

Memory Address: This parameter specifies the memory source address of information to be included into the dynamic data record. The number of bytes used for this address is defined by the low nibble (bit 3 – 0) of the Address Format Identifier.

存储地址：此参数说明存储信息的源地址包含在动态数据记录中。字节编号用与通过地址格式表示低半字节(bit 3 – 0)定义的地址。

Memory Size: This parameter is used to specify the total number of bytes from the source data record/memory address that are to be included in the dynamic data record.

存储大小：此参数用于说明从字节的总数量，此字节来自动态数据记录中的源数据记录或者存储地址

In case of sub-function = Define By Identifier [01 hex] the Position In Source Data Record parameter is used in addition to specify the starting position in the source data identifier from where the Memory Size applies. The number of bytes used for this size is one (1) byte. In case of sub-function = Define By Memory Address [02 hex] this parameter reflects the number of bytes to be included in the Dynamically Defined Data Identifier starting at the specified Memory Address. The number of bytes used for this size is defined by the high nibble (bit 7 – 4) of the Address Format Identifier.

假如子功能等于标识符[01 hex]的定义，源数据记录参数的位置用于另外说明来自存储大小应用的源数据标识符的起始位。字节数量用于说明此存储大小是一个字节，假如子功能等于存储地址[02 hex]的定义，此参数体现包含在动态定义数据标识符中起始于存储地址的字节数量。字节数量用于说明存储大小是地址格式标识符的高半个字节（bit 7 – 4）。

8.10.3 Behavior 操作

The definition of the dynamically defined data identifier can either be done via a single request message or via multiple request messages. Multiple requests allow for the definition of a single dynamically defined data record referencing data records or elements associated with one or multiple source identifier(s) and memory addresses. In this case the ECU has to concatenate the source data definitions for the respective dynamically defined data identifier.

动态定义数据标识符的定义可以经过任意一个单独请求报文或者多个请求报文来实现。多个请求允许一个单独动态定义数据记录参考,数据记录或者联合一个或多个源标识符元素和存储地址。既然这样,为了接收动态定义标识符，ECU 必须连接源数据标识符。

Requests to clear a data record shall be positively responded to if the specified data record identifier exists at the time of the request, and is within the range of valid dynamic data identifiers supported by the ECU.

如果在请求时存在规定的数据记录标识符，则请求请求数据记录要求得到肯定响应，并且在 ECU 支持有效动态数据标识符的范围内。

The ECU shall keep the dynamically defined data identifiers and data records until a Dynamic Data Identifier Request including sub-function Clear Dynamically Defined Data Identifier is received.

ECU 应保持动态定义数据标识符和数据记录，直到接收到一个包含子功能为清除动态定义标识符的动态数据标识符请求。

8.10.4 Service Request 服务请求

This service supports a Sub-Function parameter.

此服务支持一个子功能。

The Request format with sub-function parameter value set to Define By Identifier shall match the following description:

带有设置定义标识符的子功能参数值的请求格式要求符合表 53 的描述：

表 53

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Dynamically Define Data Identifier Request Service ID 动态定义数据标识符的请求服务 ID	M	2C
2	Sub Function = [Dynamic Data Identifier Definition Type]	M	00-FF

	子功能=【动态数据标识符定义类型】		
	Define By Identifier – Positive Response Required 由标识符定义—肯定响应要求		01
3 4	Dynamically Defined Data Identifier[] = [byte 1 (MSB) byte 2(LSB)] 动态定义数据标识符【】=【字节1（MSB） 字节2（LSB）】	M M	F3 00-FF
5 6	Source Data Identifier[] no. 1 = [byte 1 (MSB) byte 2(LSB)] 源数据标识符【】编号1=【字节1（MSB） 字节2（LSB）】	M M	00-FF 00-FF
7	Position in Source Data Record no. 1 源数据记录中的位置编号1	M	00-FF
8	Memory Size no. 1 存储大小编号1	M	00-FF
:	:	:	:
n-3 n-2	Source Data Identifier[] no. m = [byte 1 (MSB) byte 2(LSB)] 源数据标识符【】编号m=【字节1（MSB） 字节2（LSB）】	O O	00-FF 00-FF
n-1	Position in Source Data Record no. m 源数据记录中的位置编号m	O	00-FF
n	Memory Size no. m 存储大小编号m	O	00-FF

The Request format with sub-function parameter value set to Define By Address shall match the following description:

带有设置由定义地址的子功能参数值的请求格式要求符合表53的描述：

表54

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Dynamically Define Data Identifier Request Service ID 动态定义数据标识符的请求服务 ID	M	2C
2	Sub Function = [Dynamic Data Identifier Definition Type] 子功能=【动态数据定义标识符类型】	M	00-FF

	Define By Address – Positive Response Required 由地址定义—肯定响应要求		02
3 4	Dynamically Defined Data Identifier[] = [　　byte 1 (MSB) 　　　byte　2(LSB)] 动态定义数据标识符【】=【字节 1（MSB) 字节 2（LSB)】	M M	F3 00-FF
5	Address and Length Format Identifier 地址和长度格式标识符	M	00-FF
6 : (m-1)+6	Memory Address[] no. 1 = [　　byte 1 (MSB) 　　　: 　　　byte　m (LSB)] 存储地址【】编号 1=【字节 1（MSB) : 字节 m（LSB)】	M : C	00-FF : 00-FF
M+6 : m+6+(k-1)	Memory Address[] no. 1 = [　　byte 1 (MSB) 　　　: 　　　byte　k (LSB)] 存储地址【】编号 1=【字节 1（MSB) : 字节 k（LSB)】	M : C	00-FF : 00-FF
:	:	:	:
n-k-(m-1) : n-k	Memory Address[] no. x = [　　byte 1 (MSB) 　　　: 　　　byte　m (LSB)] 存储地址【】编号 x=【字节 1（MSB) : 字节 m（LSB)】	0 : C	00-FF : 00-FF
n-(k-1) : n	Memory Address[] no. x = [　　byte 1 (MSB) 　　　: 　　　byte　k (LSB)] 存储地址【】编号 x=【字节 1（MSB) : 字节 k（LSB)】	0 : C	00-FF : 00-FF

注：C: The presence of these parameters depends on the format information provided by the Address And

Length Format Identifier.

这些参数的存在依赖于地址和长度标识符提供的格式信息。

The Request format with sub-function parameter value set to Clear Dynamic Identifier shall match the following description:

带有设置清除动态标识符的子功能参数值的请求格式要求符合表 55 的描述：

表 55

Byte No.	Parameter Name 参数名字	Message Usage	Data Value
1	Dynamically Define Data Identifier Request Service ID 动态定义数据标识符的请求服务 ID	M	2C
2	Sub Function = [Dynamic Data Identifier Definition Type] 子功能=【动态数据标识符定义类型】	M	00-FF
	Clear Dynamically Defined Data Identifier - Positive Response Required 清除动态定义数据标识符—肯定响应要求		03
3 4	Dynamically Defined Data Identifier[] = [　byte 1 (MSB) 　byte 2(LSB)] 动态定义数据标识符【】=【字节 1（MSB） 字节 2（LSB）】	M M	F3 00-FF

8.10.5 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应格式要求符合表 56 描述：

表 56

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Dynamically Define Data Identifier Response Service ID 动态定义数据标识符的响应服务 ID	M	6C
2	Dynamic Data Identifier Definition Type 动态数据标识符定义类型	M	00-FF
3 4	Dynamically Defined Data Identifier[] = [　byte 1 (MSB) 　byte 2(LSB)] 动态定义数据标识符【】=【字节 1（MSB） 字节 2（LSB）】	M M	F3 00-FF

The Dynamically Defined Data Identifier value in the response shall be an echo of the identical request message parameter.

响应中的动态定义数据标识符值应该是一个识别请求报文参数的应答。

8.10.6 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式应该符合表 57 的描述：

<p align="center">表 57</p>

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Dynamically Define Data Identifier 动态定义数据标识符	M	2C
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Sub-Function not supported 不支持子功能		12
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件不正确		22
	Request out of Range 请求超出范围		31
	Security Access Denied 不通过安全访问		33

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.11 SID 2E – Write Data by Identifier 通过标识符写数据

This service is used to write data into the ECU at locations specified by the provided Identifier.

在此规定中提供的标识符，此服务用于往 ECU 中写数据。

8.11.1 Parameter Description 参数描述

Data Identifier: This parameter identifies the data record the diagnostic test tool is requesting to write.

数据标识符：此参数标识诊断设备请求去写的数据记录。

Data Record: The data record contains the value the test tool wants to write. Associated to the Data Identifier.

数据记录：数据记录包含的值为测试设备想要去写的，联合数据标识符。

8.11.2 Behavior 操作

On receiving the Write Data By Identifier Service Request Message the ECU shall write the data at the location associated to the received Data Identifier and shall respond with the correct positive response message.

在通过标识符接收到写数据的服务请求报文，ECU 将联合接收的数据标识符往本地中写数据。而且以携带一个正确的肯定响应报文作为响应。

8.11.3 Service Request 服务请求

The Request format shall match the following description:

请求服务格式应该符合表示 58 的描述：

表 58

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Write Data By Identifier Request Service ID 通过标识符写数据的请求服务 ID	M	2E
2	Data Identifier[] = [byte 1 (MSB) byte 2]	M	00-FF
3	数据标识符【】=【字节 1 (MSB) 字节 2】	M	00-FF

4
:
(K-1)+4
	Data Record[] = [data no. 1
	        :
	    data no. k]
	数据标识符【】=【数据编号 1
	:
	数据编号 k】
		M
		:
		0
			00-FF
			:
			00-FF

The parameter Data identifier shall be used according to the above definition. If not, the request must be rejected with the adequate negative response code.

参数数据标识符应该根据表示 58 使用，如果不符合表 58，请求必须用带有合适的否定响应代码拒绝。

8.11.4 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应格式要求符合表 59 的描述：

表 59

Byte No.	Parameter Name 参数名称	Message Usage	Data Value

1	Write Data By Identifier Response Service ID 通过标识符写数据的响应服务 ID	M	6E
2	Data Identifier[] = [byte 1 (MSB) 　　byte 2]	M	00-FF
3	数据标识符【】=【字节 1（MSB） 字节 2】	M	00-FF

The Data identifier value shall be an echo of the one sent in the request message. The Data Record value shall be the value that is linked to the requested data identifier value.

那数据标识符应该是发送请求报文中的一个应答。数据记录值将是连接请求数据标识符的值。

8.11.5 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合表 60 的描述

表 60

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Write Data by Identifier Request Service ID 通过标识符写数据的请求服务 ID	M	2E
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件不正确		22
	Security Access Denied 不通过安全访问		33
	Request out of Range 请求超出范围		31

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.12 SID 2F – I/O Control by Identifier 通过标识符控制 I/O

The Input Output Control By Identifier service is used by the diagnostic tool to substitute a value for an input signal, internal ECU function and/or control an output (actuator) of an electronic system.

诊断设备通过标识符控制 ECU 的输入输出，替代没信号的输入值，内部 ECU 功能和/或者控制电子系统的输出（激励）。

8.12.1 Parameter Description 参数描述

Data Identifier: This parameter identifies either a group of an ECU's local input signal (s), internal parameter(s) and/or output signal(s) or one individual input signal, internal parameter or output signal.

数据标识符：此参数识别 ECU 的任意一组逻辑输入信号，内部参数和或者输出信号，或者识别单独输入信号，内部参数或者输出信号。

Input Output Control Type: This type controls the I/O operation which shall take with the request.

a) Return Control to ECU: This type indicates that the control of I/O's is given back to the ECU – and therefore should behave normal and as before.

b) Reset to default: This type shall indicate to the ECU that it is requested to reset the input signal, internal parameter or output signal referenced by the Data Identifier to its default state.

c) Freeze Current State: This type shall indicate to the ECU that it is requested to freeze the current state of the controlled signal/parameter referenced by the Data Identifier.

d) Short Term adjustment: This type shall indicate to the ECU that it is requested to adjust the input signal internal parameter, or output signal referenced by the Data Identifier in RAM to the value(s) included in the Control Option parameter(s).

输入输出控制类型：此类型控制 I/O 的运行，请求中携带这些类型。

返回控制 ECU ：此类型指示控制的 I/O 权利交回给 ECU—因此运行应正常如诊断设备控制之前。

复位到默认模式：此类型指示 ECU 被请求参默认状态数据标识符去复位输入信号，内部参数或者输出信号。

冻结当前状态：此类型指示 ECU 被请求参考数据标识符冻结控制信号或参数的当前状态。

短事件调整:此类型指示 ECU 被请求参考 RAM 中包含控制选项参数的数据标识符，调整输入信号，内部参数，或者输出信号。

Control Option Record: The Control option record of each Data Identifier consists of one or multiple byte with each byte or bit representing the respective adjustment value associated with one individual input signal, internal parameter or output signal out of the group of parameters referenced by the particular Data Identifier. The byte number complies with the order of parameters grouped together within one data record referenced by the Data Identifier. In the case of bit value adjustments the assignment of adjustment values stars always with the MSB of Control State no.1.

控制选项记录：每个数据标识符的控制选项记录由一个或多个字节，带有每个字节或者比特位代表联合一个单独输入信号各自调整值，非组参数的内部参数或者输出信号参考特定数据标识符。那字节编号遵照参数组顺序和一个参考数据标识符的数据记录。假如有分配任务为调整比特位值，调整总是从控制状态编号 1 的 MSB 开始。

Control Enable Mask Record: The Control Enable Mask of each Data Identifier consist of one or multiple bytes. There shall be one bit in the Control Enable Mask corresponding to each

individual parameter defined within the Data Identifier (Note: the parameter could be any number of bits.). The value of each bit shall determine whether the corresponding parameter in the Data Identifier will be affected by the request. A bit value of '0' in the Control Enable Mask shall represent that the corresponding parameter is not affected by this request and a bit value of '1' shall represent that the corresponding parameter is affected by this request. The most significant bit of Control Mask no. 1 shall correspond to the first parameter in the Control State starting at the most significant bit of Control State 1. The second most significant bit of Control Mask no. 1 shall correspond to the second parameter in the Control State, and continuing on in this fashion utilizing as many Control Mask bytes as necessary to mask all parameters. For example, the least significant bit of Control Mask no. 2 would correspond to the 16th parameter in the Control State.

控制使能掩码记录：每个数据标识符的控制使能掩码有一个或多个字节组成。在控制使能掩码中应有一位比特位对应每个单独的参数定义在数据标识符中。（注：此参数可以是任意一个比特位的编号）。每个比特位的值将确定在数据标识符中对应的参数是否受请求的影响。在控制使能掩码中一个比特值为"0"将代表对应参数是不受请求影响，值为"1"将代表对应参数是受请求影响。控制掩码编号1的最重要比特位将对控制掩码编号1的应控制状态第一个参数。控制掩码编号1的第二个重要比特位对应控制状态中的第二个参数，且继续照这样最大限度与控制掩码字节一样多地屏蔽所有参数。例如,控制掩码编号最小的重要比特位将对应控制状态中的第16个参数。

For bit mapped Data Identifiers, unsupported bits shall also have a corresponding bit in the Control Enable Mask so that the position of the mask bit of every parameter in the Control Enable Mask shall exactly match the position of the corresponding parameter in the Control State.

针对比特位映射的数据标识符，在控制使能掩码中，不支持的比特位也将有一个对应的比特位，所以在控制 使能掩码中每个参数掩码比特位的位置将严谨匹配控制状态中对应参数的位置。

If a Control Option Record consists of only one parameter the Control Enable Mask is not necessary. If a Control Option Record references more than one Control State the Control Enable Mask can optionally be used to determine which of the adjustments included in the Control Option Record of the ongoing request shall be actually carried out.

如果一个控制选项记录只有一个参数控制使能掩码组成，那是没有必要的。如果一个控制选项记录由多过一个控制状态，控制使能掩码可以被用于选择确认，包含正在进行请求控制选项记录的调整实际上将被执行。

Control Status Record: The Control State parameter of each Data Identifier record consists of one or multiple bytes (Input Output Control Type, Control State no. 1 to Control State no. m) which include the e.g. current parameter values of the controlled Inputs and/or Outputs. The Input Output Control Type in the response message is the echo of the Input Output Control Type value given in the request message.

控制状态记录：每个数据标识符记录的控制状态参数由一个或多个字节组成（输入输出控制类型，控制状态编号1去控制状态编号m），这些字节包括例如控制输入和/或者输出的当前参数值。在响应报文中输入输出控制类型是请求报文中给出输入输出控制类型说明。

8.12.2 Behavior 操作

After the ECU sends a positive response to this service, the diagnostic test tool shall assume control over the inputs/outputs specified by the Input Output Data Identifier.

在 ECU 发送一个肯定响应给这个服务之后，诊断测试设备将采取通过输入输出数据标识符控制规定的输入输出。

8.12.3 Service Request 服务请求

This service does not support a Sub-Function parameter.

此服务不支持子功能参数。

The Request format shall match the following description:

请求格式要求符合表 61 的描述：

表 61

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Input Output Control By Identifier Request Service ID 通过标识符进行输入输出控制的请求服务 ID	M	2F
2 3	Data Identifier [] = [byte 1 (MSB) byte 2 (LSB)] 数据标识符【】=【 字节 1（MSB） 字节 2（LSB）】	M M	00-FF 00-FF
4	Sub-Function = [Input Output Control Type] 子功能=【输入输出控制类型】	M	00-FF
	Return Control To ECU 控制返回给 ECU		00
	Reset to Default 复位至默认模式		01
	Freeze Current State 冻结当前状态		02
	Short Term Adjustment 短事件调整		03

5
:
4+(m-1)
	Control Option Record[] = [control state no. 1 (MSB)
	    :
	    control state no. m (LSB)]
	控制选项记录【】=【控制状态编号 1（MSB）
	:
	控制状态编号 m】
		C
		:
		C
			00-FF
			:
			00-FF

4+m : 4+m+(r-1)	Control Enable Mask Record[] = [control mask no. 1 (MSB) : :	O : O	00-FF : 00-FF

control mask no. r (LSB)] 控制使能掩码记录【】=【 控制掩码编号 1（MSB） ： 控制掩码编号人（LSB）】			

C: The presence of those parameters depends on the respective Input Output Control Type and the number of Input / Output parameters identified by one individual Data Identifier.

C: 这些参数的出现依赖接收的输入输出控制类型和通过一个单独数据标识符标识的输入/输出参数的编号。

8.12.4 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应格式要求符合表 62 的描述

表 62

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Input Output Control By Identifier Response Service ID 通过标识符进行输入输出控制的响应服务 ID	M	6F
2 3	Data Identifier [] = [byte 1 (MSB) byte 2 (LSB)] 数据标识符【】=【 字节 1（MSB） 字节 2（LSB）】	M M	00-FF 00-FF
4	Input Output Control Type 输入输出控制类型	M	00-FF
5 ： 4+(m-1)	Control Status Record[] = [control state no. 1 (MSB) ： control state no. m (LSB)] 控制状态记录【】=【控制状态编号 1（MSB） ： 控制状态编号 m（LSB）】	C ： C	00-FF ： 00-FF

C: The presence of those parameters depends on the number of Input / Output parameters identified by one individual Data Identifier.

C: 这些参数的出现依赖通过一个单独数据标识符标识的输入/输出参数的编号。

The Data Identifier and the Input Output Control Type of the positive response message shall be an echo of the values transmitted in the request message.

数据标识符和肯定响应报文的输入输出控制类型将是一个请求报文中发送的反馈值。

8.12.5 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合表 63 的描述：

表 63

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Input Output Control by Identifier 通过标识符进行输入输出控制	M	2F
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件不正确		22
	Security Access Denied 安全访问不通过		33
	Request out of Range 请求超出范围		31

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.13 SID 31 – Routing Control 历程控制

Via this service it is possible to start, stop a routine and to request a routine's results. Routines are identified via a two byte identifier.

通过此服务，可能启动或者停止一个历程，请求一个历程的结果。历程通过一个 2 字节的标识符来标识。

8.13.1 Behavior 操作

Routines can be executed instead of normal operating code or at the same time with normal operation application. It has to be considered to use security access and or specific diagnostic sessions to match safety and or security issues.

执行历程能替代正常运行代码或者同时运行正常应用程序。它必须考虑使用安全访问且或规定诊断会话去匹配安全或安全问题。

Routines do not replace Read Data I/O Control and Variant Coding.

历程不能替代读数据 I/O 控制和变量代码。

The handling of routines can be done in two different ways.

历程处理可以通过两种不同的方式实现。

After start of a routine the completion of the routine takes a considerable amount of time to run to completion, then the ECU shall respond to the request immediately and then complete the routine. By this the ECU can process other requests after sending the Routine Control Start Routine positive response. To be able to retrieve the results of the routine the Diagnostic

Test Tool has to send a Routine Control request with Sub-Function parameter value set to Request Routine Results which on the other hand has to be supported by the ECU.

在启动一个历程之后，完成历程需考虑足够的运行时间，ECU 应立即响应请求和完成历程。在发送历程控制启动历程肯定响应之后，ECU 可以处理其他请求。能接收历程的结果，诊断测试设备必须发送一个子功能参数值设置为请求历程结果的历程控制请求，另外 ECU 必须支持子功能参数。

The other way to support Routine Control functionality is to provide the routine results already with the positive response to a Routine Control service request with Sub-Function parameter value set to Start Routine. For that it is possible that the ECU must send a negative response 78hex Request correctly received Response pending, to get more time to run the routine. After completion of the routine the positive response to the request is sent. By using this scenario no Request Routine Results parameter functionality has to be supported and no other requests are processed during an active routine.

支持历程控制功能的另外一种方式是,提供已经肯定响应一个带有子功能参数值设置为启动历程服务请求的历程结果。因此很有可能 ECU 必须以 78hex 发送一个否定响应说明正确接收请求不能响应,争取更多的时间运行历程控制。在历程完成之后,针对请求的肯定响应被发送。通过使用特定物请求历程结果参数功能的,在历程激活期间必须被支持和没有其他请求被处理。

The stop routine functionality parameter has to be supported in case the routine cannot be stopped by itself. To match safety requirements it must always be able to stop a routine whether by a stop routine command from the diagnostic test tool or by direct ECU access via keys etc.

如果历程不能被支持,停止历程功能参数必须被支持。为了匹配安全要求,ECU 必须总是可以通过来自测试设备的停止历程命令停止历程,或者通过直接通过密钥访问 ECU 来停止历程,等等。

8.13.2 Service Request 服务请求

This service supports a Sub-Function parameter.
此服务支持子功能。

The Request format shall match the following description:
请求格式要求符合表 64 的描述:

表 64

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Routine Control Request Service ID 历程控制请求服务 ID	M	31
2	Sub Function = [Routine Control Type] 子功能=【历程控制类型】	M	00-FF
	Start Routine - Positive Response Required 启动历程—肯定响应要求		01
	Stop Routine - Positive Response Required		02

	停止历程—肯定响应要求		
	Request Routine Results - Positive Response Required 请求历程结果—肯定响应要求		03
	Start Routine - No Positive Response Required 启动历程—无肯定响应要求		81
	Stop Routine - No Positive Response Required 停止历程—无肯定响应要求		82
	Request Routine Results - No Positive Response Required 请求历程结果—无肯定响应要求		83
3 4	Routine Identifier[] = [byte 1 (MSB) byte 2 (LSB)] 历程标识符【】= 【字节 1 (MSB) : 字节 2 (LSB) 】	M M	00-FF 00-FF
5 : n	Routine Control Option Record [] = [routine control option no.1 (MSB) . routine control option no.m] 历程控制选项记录【】=【 历程控制选项编号 1 (MSB) : 历程控制选项编号 m】	C/O : C/O	00-FF : 00-FF

C: This parameter is user optional to be present for sub-function parameter Start Routine and Stop Routine.

C:此参数是使用者可以选择的，存在时为了子功能参数为启动和停止历程。

The user optional parameter record Routine Control Option Record shall be used for those requests where additional entry/exit option parameters are needed. 使用者可以选择参数记录历程控制选项记录，将被用于请求另外进入和退出现象参数需要的。

8.13.3 Positive Response 肯定响应

The Positive Response format shall match the following description:
肯定响应格式要求符合表 65 的描述：

表 65

Byte No.	Parameter Name 参数名称	Message Usage	Data Value

1	Routine Control Response Service ID 历程控制响应服务 ID	M	71
2	Routine Control Type 历程控制类型	M	00-FF
3 4	Routine Identifier[] = [byte 1 (MSB) byte 2 (LSB)] 历程标识符【】= 【字节 1（MSB） : 字节(LSB) 】	M M	00-FF 00-FF

5
:
n
	Routine Status Record [] =
	[routine status no.1 (MSB)
	     :
	     routine status no.m]
	历程状态记录【】=
	【历程状态编号 1（MSB）
	:
	历程状态编号 m
	】
		O
		:
		O
			00-FF
			:
			00-FF

8.13.4 Negative Response 否定响应

The Negative Response format shall match the following description:
否定响应格式要求符合表 66 的描述：

表 66

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Routine Control 历程控制	M	31
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Sub Function not Supported 不支持子功能		12
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件不正确		22
	Security Access Denied 安全访问不通过		33
	Request out of Range 请求超出范围		31
	General Programming Failure 常规程序错误		72

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.14 ID 34 - Request Download 请求下载

With this service the diagnostic test tool initiates a data transfer (download).

带有此服务的诊断测试设备开始发动一个数据传递（下载）。

8.14.1 Parameter Description 参数描述

Data Format Identifier: The high nibble of this one byte identifier specifies the compression method and the low nibble specifies the encryption method. 00 specifies that no compression and no encryption is used (default).

数据格式标识符：一个字节标识符的高四位规定压缩方法，四地位规定加密方面。00 表示没有使用压缩和加密（默认）。

Address and Length Identifier: The high nibble of this Parameter specifies the length (number of bytes) of the Memory Size Parameter. The low nibble specifies the length of the Memory Address Parameter.

地址和长度标识符：此参数的高四位规定存储大小参数的长度（字节数量）。低四位规定存储地址参数的长度。

Memory Address: The starting address of the ECU memory where the transmit data is to be stored.

存储地址：ECU 存储器中存储发送数据的起始地址。

Memory Size (Uncompressed): This parameter specifies the amount of data which will be transferred and stored in the ECU memory starting at the memory address encoded in the Memory Address Parameter.

存储大小（不压缩）：此参数规定将要发送的批量数据，存储在 ECU 存储器中的起始于存储地址，编码在存储参数中。

The Positive Response Parameter for this service response are:

Length Format Identifier:The high nibble specifies the Length (number of bytes) of the Max number of Block Length parameter. The low nibble must be set to zero (0).

Max Number of Block Length:This parameter is used to inform the diagnostic test tool how many data bytes shall be sent with each Transfer Data Request. The amount of data byte includes the whole message length, including service identifier and data parameters in the Transfer Data Request message.

此服务响应的肯定响应参数：

长度格式标识符：高四位规定块长度参数的长度（字节数量），低字节必须设置为 0.

块长度最大数量：此参数用于通知在每次传递数据请求时，诊断测试设备有多少数据字节将要被发送。批量的数据字节包含在传递数据请求报文中的所有报文长度，服务标识符和数据参数。

8.14.2 Behavior 操作

After receiving a Request Download service request message the ECU shall take all necessary actions (check memory address and data size, prepare download process, etc.) to receive data before it responds positively.

在接收到一个请求下载服务请求报文时，ECU 在肯定响应之前，需要先做所有的确认行动（确认存储地址和数据大小，准备下载处理等）

When an ECU receives a Transfer data request during an ongoing download process the ECU shall behave as follows:

It shall check the Block Sequence Counter value included in every message. If the value is equal to the previously received block counter value or incremented by one, the ECU shall process this request. Otherwise the ECU shall negatively respond to the message with "Wrong Block Sequence Counter" 73hex and discard all download data. If the ECU has received a Transfer Data Request with the Block Sequence Counter identical to the one received before it shall discard the current Request and respond positively to the diagnostic test tool, including the received Block Sequence Counter value. If the ECU receives the same Block Sequence Counter value 5 times in a row it shall abort the ongoing download process with a negative response 71hex. A by one incremented Block Sequence Counter value shall lead the ECU to process the download data in the Transfer Data Request and respond positively.

正在执行下载处理期间，ECU 接收到一个传递数据请求，应按照下面操作：

ECU 应确认包含在每个报文中的块序列计数器的值。如果值等于之前接收的值或者比之前的值小1，则 ECU 应处理本次请求。否则，ECU 将以 73hex 作出携带"错误块序列计数"否定响应且放弃下载数据。如果 ECU 接受到一个带有块序列计数的数据请求与之前一个相同，那么它将放弃当前请求并且包含接收到的块序列计数值对诊断测试设备作出肯定响应。如果 ECU 连续 5 次接收到相同的块序列计数值，它件终止正在下载行程，并且以 71hex 作出否定响应。块计数器值增加 1 将导致在传递数据请求中 ECU 处理下载数据，且作出肯定响应。

8.14.3 Service Request

This service does not support a Sub-Function parameter 。
此服务部支持子功能参数。
The Request format shall match the following description:
请求格式要求符合表 68 的描述：

表 68

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Download Request Service ID 请求下载请求服务 ID	M	34
2	Data Format Identifier 数据格式标识符	M	00-FF
3	Address and Length format identifier 地址和长度格式标识符	M	00-FF

4
:
(m-1)+4
	Memory Address[] =
	[byte 1 (MSB)
	      :
	    byte m]
	存储地址=【
	字节 1（MSB）
	:
	字节 m】
		M
		:
		C1
			00-FF
			:
			00-FF

n-(k-1)
:
n
	Memory Size[] =
	[byte 1 (MSB)
	      :
	    byte k]
	存储大小=【
	字节 1（MSB）
	:
	字节 m】
		M
		:
		C2
			00-FF
			:
			00-FF

注：C1: The presence of this parameter depends on address length information parameter of the Address And Length Format Identifier.

C1:此参数存在依赖于寻址的地址长度信息参数和长度格式标识符。

C2: The presence of this parameter depends on the memory size length information of the Address And Length Format Identifie

C2：此参数存在依赖于寻址的存储大小长度信息参数和长度格式标识符。

8.14.4 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应格式要求符合表 69 要求：

表 69

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Download Response Service ID 请求下载响应服务 ID	M	74
2	Length Format Identifier 长度格式标识符	M	00-F0

	Max Number of Block Length =
	
	[byte 1 (MSB)
	
	    :
	
	    byte m]
	
	块长度的最大编号=【
	
	字节 1（MSB）
	
	:
	
	字节 m】		

3 : n		M : M	00-FF : 00-FF

8.14.5 Negative Response否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合表 70 的描述：

表 70

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Request Download 请求下载	M	34
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件不正确		22
	Security Access Denied 安全访问不通过		33
	Upload Download Not Accepted 不接受上传下载		70
	Request out of Range 请求超出范围		31

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.15 SID 35 — Request Upload 请求上传

This service is used to initiate a data upload from the ECU to the Diagnostic test tool.

此服务用于启动数据从 ECU 上传到诊断测试设备中。

8.15.1 Parameter Description 才是描述

8.15.2 Behavior 操作

After receiving a Request Upload service request message the ECU shall take all necessary actions (check memory address and data size, prepare upload process, etc.) to receive data

before it responds positively.

在接收到一个请求上传服务请求报文时，ECU 在肯定响应之前，需要先做所有的确认行动（确认存储地址和数据大小，准备上传处理等）

8.15.3 Service Request 服务请求

This service does not support a Sub-Function parameter.

此服务不支持子功能参数。

The Request format shall match the following description:

请求格式要求符合表 71 描述：

表 71

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Upload Request Service ID 请求上传请求服务 ID	M	35
2	Data Format Identifier 数据格式标识符	M	00-FF
3	Address and Length format identifier 地址和长度格式标识符	M	00-FF

4
:
(m-1)+4
	Memory Address[] =
	[byte 1 (MSB)
	    :
	    byte m]
	存储地址【】=
	【字节 1（MSB）
	:
	字节 m
	】
		M
		:
		C1
			00-FF
			:
			00-FF

n-(k-1)
:
n
	Memory Size[] =
	[byte 1 (MSB)
	    :
	    byte k]
	存储大小【】=
	【字节 1（MSB）
	:
	字节 k
	】
		M
		:
		C2
			00-FF
			:
			00-FF

注：C1: The presence of this parameter depends on address length information parameter of the Address And Length Format Identifier.

C1:此参数存在依赖于寻址的地址长度信息参数和长度格式标识符。

C2: The presence of this parameter depends on the memory size length information of the Address And

`Length Format Identifie`

C2：此参数存在依赖于寻址的存储大小长度信息参数和长度格式标识符。

8.15.4 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应格式要求符合表 72 的描述：

表 72

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Upload Response Service ID 请求上传响应服务 ID	M	75
2	Length Format Identifier 长度格式标识符	M	00-F0

3
:
n
	Max Number of Block Length =
	[byte 1 (MSB)
	     :
	   byte m]
	块长度的最大编号=【
	字节 1（MSB）
	:
	字节 m】
		M
		:
		M
			00-FF
			:
			00-FF

8.15.5 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合表 73 的描述：

表 73

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Request Upload 请求上传	M	35
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件不正确		22
	Security Access Denied 安全访问不通过		33
	Upload Download Not Accepted 不接受上传下载数据		70
	Request out of Range 请求超出范围		31

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.16SID 36 — Transfer Data 传递数据

This service is used to transfer data from the ECU to the Diagnostic Test Tool (upload) or from the Test Tool to the ECU (download).

此服务用于从 ECU 到诊断测试设备（上传）或者从测试设备到 ECU(下载)传递数据。

8.16.1 Parameter Description 参数描述

Block Sequence Counter: This is a counter which starts from 01 with the first Transfer Data Request after a Request Download/Upload service request. Its value is incremented by one with each subsequent Transfer Data request. When receiving its maximum (0xFF) it starts at 0hex with the next Transfer Data request.

块序列计数器：在请求下载或者上传服务请求之后，此计数器从第一个传递数据请求起从 01 开始计数。每次传递一个数据请求，计数器的值就加 1，当接收到最大值（0xFF）时，在下一个传递数据请求来时，计数器值从 0hex 开始。

Transfer Request/Response Parameter Record : This data record contains parameters which are required by the ECU to support the transfer of data. Format and length of this parameter are application specific.

传递请求或响应参数记录：此数据记录包含 ECU 请求支持传递数据的参数。参数的格式和长度有应用规范。

8.16.2 Behavior 操作

If a Request Upload/Download process was initiated. The data to be transmitted shall be included in the Transfer Data Parameter Record in the Transfer Data message. The Block Sequence Counter ensures the data consistency in cases of multiple Transfer Data requests.

如果一个上传或者下载处理的请求被启动，被发送的数据将包含在传递数据报文中的传递数据参数中。假如有多个传递数据请求块序列计数器确保数据连贯性。

8.16.3 Service Request 服务请求

This service does not support a Sub-Function parameter.

此服务不支持子功能参数。

The Request format shall match the following description:

请求格式要求符合表 74 的描述：

表 74

Byte No.	Parameter Name	Message Usage	Data Value

1	Transfer Data Request Service ID 传递数据请求服务 ID	M	36
2	Block Sequence Counter 块序列计数器	M	00-FF
3 : n	Transfer Request Parameter Record [] = [　　transfer request parameter no. 1 　　　　: 　　transfer request parameter no. m] 传递响应参数记录【】=【 传递响应参数编号 1 : 传递响应参数编号 m】	0 : 0	00-FF : 00-FF

8.16.4 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应格式要求符合表 74-1

表 74-1

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Transfer Data Response Service ID 传递数据响应服务 ID	M	76
2	Block Sequence Counter 块序列计数器	M	00-FF
3 : n	Transfer Response Parameter Record [] = [　　transfer response parameter no. 1 　　　　: 　　transfer response parameter no. m] 传递响应参数记录【】=【 传递响应参数编号 1 : 传递响应参数编号 m】	0 : 0	00-FF : 00-FF

8.16.5 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合表 75 的描述：

表 75

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F

2	Transfer Data 传递数据	M	36
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件不正确		22
	Request out of Range 请求超出范围		31
	Transfer Data Suspended 发送数据序列		71
	General Programming Failure 常规程序错误		72
	Wrong Block Sequence Counter 块序列计数器错误		73
	Voltage too high/low 电压过高/过低		92/93

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.17 SID 37 – Request Transfer Exit 请求退出传递

This service can be used to terminate a data transfer between the diagnostic test tool and an ECU.

此服务用于终止诊断测试设备和 ECU 之间传递数据。

8.17.1 Behavior 操作

If an ECU receives a Request Transfer Exit service request while a download or upload is active and the programming process is done the ECU shall terminate the data transfer.

当激活一个下载或上传且在信息软件处理时，如果 ECU 接收了一个请求退出传递服务请求，ECU 将终止数据传递。

8.17.2 Service Request 服务请求

This service does not support a Sub-Function parameter 。
此服务不支持子功能参数。

The Request format shall match the following description:
请求格式要求符合表 76 的描述：

表 76

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Transfer Exit Request Service Id 请求退出传递请求服务 ID	M	37

	Transfer Request Parameter Record [] =		
	[transfer request parameter no. 1		
	:		
2	transfer request parameter no. m]	0	00-FF
:	传递请求参数记录【】=【	:	:
n	传递请求参数编号 1	0	00-FF
	:		
	传递请求参数编号 m】		

8.17.3 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应格式要求符合表 77 的描述：

表 77

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Transfer Exit Response Service ID 请求传递退出响应服务 ID	M	77
2 : n	Transfer Response Parameter Record [] = [transfer response parameter no. 1 : transfer response parameter no. m] 传递请求参数记录【】=【 传递请求参数编号 1 : 传递请求参数编号 m】	0 : 0	00-FF : 00-FF

8.17.4 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合表 78 的描述：

表 78

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Request Transfer Exit Request Service Id 请求退出传递请求服务 ID	M	37
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF

Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
Conditions Not Correct 条件不正确		22
Request Sequence Error 请求序列错误		24

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.18SID 3D – Write Memory by Address 通过地址写存储器

This Service is used by the diagnostic test tool to write data into the ECU memory identified by given memory address and size of data to write.

此服务用于诊断测试设备往 ECU 存储器中写数据，标识符提供写的存储地址和存储大小。

8.18.1 Parameter Description 参数描述

目前为定义。

8.18.2 Behavior 操作

This service shall only be used for development and not be part of series software. Adequate security mechanism has to be implemented.

此服务只用于开发，不是系列软件中的部分，重要的安全件，不行执行。

8.18.3 Service Request 服务请求

The Request format shall match the following description:
请求服务格式要求符合表 79 的描述：

<div align="center">表 79</div>

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Write Memory By Address Request Service ID 通过地址写存储器请求服务 ID	M	3D
2	Address and Length format identifier 地址和长度格式标识符	M	00-FF

3 : m+2	Memory Address[] = [　byte 1 (MSB) 　　: 　byte m] 存储地址【】=【 字节 1 (MSB) : 字节 m】	M : C1	00-FF : 00-FF
n-r-2-(k-1) : n-r-2	Memory Size[] = [　byte 1 (MSB) 　　: 　byte k] 存储大小【】=【 字节 1 (MSB) : 字节 k】	M : C2	00-FF : 00-FF
n-(r-1) : n	Data Record[] = [　data no. 1 　　　: 　data no. r] 数据记录【】=【 数据编号 1 : 数据编号 r】	M : 0	00-FF : 00-FF

注：C1: The presence of this parameter depends on address length information parameter of the Address And Length Format Identifier.

C1：此参数存在依赖于寻址的地址长度信息参数和长度格式标识符。

C2: The presence of this parameter depends on the memory size length information of the Address And Length Format Identifie

C2：此参数存在依赖于寻址的存储大小长度信息参数和长度格式标识符。

8.18.4 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应格式要求符合表 80 的描述：

表 80

Byte No.	Parameter Name 参数名称	Message Usage	Data Value

1	Write Memory By Address Response Service ID 通过地址写存储器响应服务 ID	M	7D
2	Address and Length format identifier 地址和长度格式标识符	M	00-FF

3
:
(m-1)+3
	Memory Address[] = [byte 1 (MSB)
	      :
	      byte m]
	存储地址【】=【
	字节 1（MSB）
	:
	字节 m】
		M
		:
		C1
			00-FF
			:
			00-FF

n-(k-1)
:
n
	Memory Size[] = [byte 1 (MSB)
	      :
	      byte k]
	存储大小【】=【
	字节 1（MSB）
	:
	字节 k】
		M
		:
		C2
			00-FF
			:
			00-FF

注：C1: The presence of this parameter depends on address length information parameter of the Address And Length Format Identifier.

C1:此参数存在依赖于寻址的地址长度信息参数和长度格式标识符。

C2: The presence of this parameter depends on the memory size length information of the Address And Length Format Identifie

C2：此参数存在依赖于寻址的存储大小长度信息参数和长度格式标识符。

8.18.5 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合表 81 的描述：

表 81

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Write Memory by Address Request Service ID 通过地址写存储器请求服务 ID	M	3D
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】 Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效	M	00-FF 13

Conditions Not Correct 条件不正确		22
Security Access Denied 不通过安全访问		33
General Programming Failure 常规程序错误		72
Request out of Range 请求超出范围		31

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.19SID 3E – Tester Present 诊断仪在线

This service is used by the diagnostic test tool to indicate to an ECU or a group of ECU's that a diagnostic test tool is connected to the bus and therefore certain diagnostic sessions and/or communication that have been activated have to remain active.

此服务用于诊断测试设备指示连接一个 ECU 或者一组 ECU，诊断测试设备连接总线，因此已经激活的某些诊断会话和/或者通讯必须保持。

8.19.1 Behavior 操作

The message of this service shall keep ECU's in a non default diagnostic session。

此服务的报文将保持 ECU 在非默认会话诊断模式。

8.19.2 Service Request 服务请求

This service supports a Sub-Function parameter。

此服务支持子功能参数。

The Request format shall match the following description:

请求格式要求符合表 82 的描述：

<div align="center">表 82</div>

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Tester Present Request Service Id 诊断仪在线请求服务 ID	M	3E
2	Sub-Function = [Zero Sub-Function] 子功能参数=【0 子功能】	M	XX
	Positive Response Required 肯定响应要求		00
	No Positive Response Required 无肯定响应要求		80

8.19.3 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应要求符合表 83 的描述：

表 83

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Tester Present Response Service ID 诊断仪在线响应服务 ID	M	7E
2	Sub-Function = [Zero Sub-Function] 子功能参数=【0 子功能】		00

8.19.4 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合表 84 的描述：

表 84

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Tester Present 诊断仪在线	M	3E
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Sub-Function Not Supported 不支持子功能		12
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.20 SID 84 – Secured Data Transmission 安全数据发送

The purpose of this service is to transmit data that is protected against attacks from third parties – which could endanger data security – according to ISO 15764. The Secured Data Transmission service is applicable if a diagnostic tool intends to use diagnostic services defined in this document in a secured mode. It may also be used to transmit external data, which conform to some other application protocol, in a secured mode between a diagnostic tool and an ECU A secured mode in this context means that the data transmitted is protected by cryptographic methods

本服务的目的是发送保护数据，对抗来自第三方的入侵—危及数据安全—根据 ISO 15764。如果诊断设备想要使用本文档中定义安全模式的诊断服务，则安全数据发送服务是可用的。也可能使用发送的额外数据，该数据与其他几个应用协议一致，本文中在诊断设备和 ECU 之间的安全模式，通过密码方法保护发送的数据。

8.20.1 Parameter Description 参数描述

Security Data Request Record – This parameter contains the data as processed by the Security Sub-Layer and is defined in ISO 15764.

安全数据请求记录—此参数包含数据根据在 ISO 15764 中的安全子层和定义进行处理。

Security Data Response Record - This parameter contains the data as processed by the Security Sub-Layer and is defined in ISO 15764.

安全数据响应记录—此参数包含数据根据在 ISO 15764 中的安全子层和定义进行处理

8.20.2 Behavior 操作

The security sub-layer generates the application layer Secured Data Transmission request message parameters according to the rules defined in ISO 15764.

安全子层根据 ISO 15764 定义规则产生应用层安全数据发送请求报文参数。

8.20.3 Service Request 服务请求

The Request format shall match the following description:

请求格式要求符合表 85 的描述：

表 85

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Secured Data Transmission Service Id 安全数据发送服务 ID	M	84

2
:
n
	Security Data Request Record [] =
	[Security data parameter no. 1
	      :
	     Security data parameter no. m]
	安全数据请求记录【】=【安全数据参数编号 1
	:
	安全数据参数编号 m】
		M
		:
		M
			00-FF
			:
			00-FF

8.20.4 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应格式要求符合表 86 的描述：

表 86

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Secured Data Transmission Response Service ID 安全数据发送响应服务 ID	M	C4
	Security Data Response Record [] =		

2	[　　Security data parameter no. 1	M	00-FF
:	:	:	:
n	Security data parameter no. m]	M	00-FF

安全数据响应记录【】=

【安全数据参数编号 1

:

安全数据参数编号 m】

8.20.5 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合表 87 的描述：

表 87

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Secured Data Transmission Service Id 安全数据发送服务 ID	M	84
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	The negative response codes within this range are described by the Extended Data Link Security Document（ISO 15764）and therefore this range is limited to use with Secured Data Transmission only. 否定响应代码在扩展数据连接安全文件描述范围内，因此此范围只限制用于安全数据发送。		38-4F

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

8.21 SID 85 – Control DTC Setting 控制 DTC 设置

With this service it is possible to stop or resume the setting of Diagnostic Trouble Codes。

此服务可能终止或者恢复诊断故障代码的设置。

8.21.1 DTC Setting Type Description DTC 设置类型描述

On:This request type commands to switch the setting of DTC's on.

On：此请求类型命令转换为启动设置 DTC.

Off:This request type commands to stop the setting of DTC's off.

Off：此请求类型命令转换为关闭设置 DTC.

8.21.2 Behavior 操作

When receiving a Service request with DTC Setting Type "Off" the ECU shall stop to set new DTC. All present DTC shall stay in the error stack and remain untouched. The setting of DTC and changing of already present DTC shall continue once a Control DTC Setting Request service message is received with DTC Setting Type Description "On". The setting of DTC's shall always resume when the diagnostic session is changed to default.

当接收到一个带有 DTC 设置类型为"Off"的服务请求时，ECU 将停止设置新的 DTC.所有出现的 DTC 将留在错误堆栈中且保持不变。一旦接收到一个带有 DTC 设置类型为"On"的控制 DTC 设置请求服务报文，DTC 将继续设置和已经出现的 DTC 继续变化。当诊断会话变为默认会话时，DTC 设置应恢复。

8.21.3 Service Request 服务请求

This service supports a Sub-Function parameter。

此服务支持子功能参数。

The Request format shall match the following description:

请求格式要求符合表 88 的描述：

表 88

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Control DTC Setting Request Service Id 控制 DTC 设置的请求服务 ID	M	85
2	Sub-Function = [Zero Sub-Function]子功能=【0 子功能】	M	00-FF
	ON - Positive Response Required ON—肯定响应要求		01
	OFF - Positive Response Required OFF—肯定响应要求		02
	ON - Positive Response Required ON—无肯定响应要求		81
	OFF - Positive Response Required OFF—无肯定响应要求		82

8.21.4 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应格式要求符合表 89 的描述：

表 89

Byte No.	Parameter Name 参数名字	Message Usage	Data Value
1	Control DTC Setting Response Service ID 控制 DTC 设置的响应服务 ID	M	C5
2	Sub-Function = [DTC Setting Type] 子功能=【DTC 设置类型】	M	XX

The DTC Setting type in the response message shall be the same as the one sent in the request.

在响应报文中的 DTC 设置类型将与请求中发送类型一样。

8.21.5 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合表 90 的描述：

表 90

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Control DTC Setting 控制 DTC 设置	M	85
3	sub-function = [Negative Response Trouble Code] 子功能-【否定响应故障代码】	M	00-FF
	Sub-Function Not Supported 不支持子功能		12
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件不正确		22
	Request Out Of Range 请求超出范围		31

8.22 SID A0 – ECU Passive Mode ECU 的被动模式

This Service disables/enables transmission of certain diagnostic an inter ECU messages similar to service Communication Control with additional functionality with regards to sleep mode.

此服务是使类似睡眠模式相关的额外的服务通讯控制 ECU 某些诊断报文的发送失效或使能。

8.22.1 Passive Mode Type Description 被动模式类型描述

Enable Passive Mode: Transmission of messages shall be disabled.

使能被动模式：报文发送将失效。

Disable Passive Mode: Transmission of messages shall be enabled.

非被动模式：报文发送有效

8.22.2 Behavior 操作

This service is only allowed in default or extended diagnostic session. When the request

to enable passive mode is received the ECU shall completely switch of the CAN controller's transmit channel while the rest of the ECU (also the receive channel) remains active. Before enabling this Mode, the ECU shall switch to default session if it was not before. During active Passive Mode any Diagnostic Session Control request shall be ignored. All application CAN messages shall not be sent but the transmit status shall be responded to the application as if the message was sent onto the bus (The application shall not notice that the ECU is in passive mode and the transmit channel is disabled).

此服务只允许默认或者扩展诊断会话。当接收到使能被动模式的请求，ECU 将完全地转换 CAN 控制器的 ECU 的睡眠发送通道为保持激活。在激活被动模式之前，如果 ECU 不处在默认会话则将转换为默认会话。在激活被动模式期间，任何诊断会话控制请求将被忽视。所有应用程序的 CAN 报文都不能被发送，但是发送状态可以相应给应用程序好像报文被发送到总线上一样（应用程不通知 ECU 在被动模式而且发送通道无效）。

There are only four ways to disable ECU Passive Mode again：

a) By sending the ECU Passive Mode request message with parameter Disable Passive Mode.

b) An ECU Reset diagnostic message request with Sub-Function parameter set to Hard Reset.

c) Battery disconnect

d) A safety critical situation arises.

这里只有四种方法使 ECU 的被动模式再次失效：

通过发送带有 ECU 被动模式失效参数的被动模式请求报文。

带有设置硬件复位的子功能参数的 ECU 服务诊断报文请求。

电池不连接。

出现安全评估情况。

This service is only for development issues and must be removed before series production.

此服务只用于开发开发问题，且必须在产品量产前结束此服务。

8.22.3 Service Request 服务请求

This service supports a Sub-Function parameter.

此服务支持子功能参数。

The Request format shall match the following description:

请求格式要求符合表 91 的描述：

表 91

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	ECU Passive Mode Request Service Id ECU 被动模式请求服务 ID	M	A0
2	sub-function = [Control Type]子功能=【控制类型】	M	00-FF
	Enable Passive Mode - Positive Response Required 使能被动模式—肯定响应要求		01

Disable Passive Mode - Positive Response Required 使被动模式失效—肯定响应要求		02
Enable Passive Mode - No Positive Response Required 使能是被动模式—无肯定响应要求		81
Disable Passive Mode - No Positive Response Required 使被动模式失效—无肯定响应要求		82

8.22.4 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应格式要求符合表 92 的描述：

表 92

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	ECU Passive Mode Positive Response Service ID ECU 被动模式肯定响应服务 ID	M	E0
2	Control Type 控制类型		00-FF

The transmitted Control Type in the response message shall be identical to the one transmitted in the request message.

在响应报文中发送的控制类型将识别请求报文中的一个发送类型。

8.22.5 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合表 93 的描述：

表 93

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	ECU Passive Mode ECU 的被动模式	M	A0
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Subfunction not supported 不支持子功能		12
	Incorrect Message Length Or Invalid Format 报文长度不正确或者格式无效		13
	Conditions Not Correct 条件不正确		22
	Request out of Range 请求超出范围		31
	Service not supported in active session 在现行会话中不支持此服务		7F

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持设置的最少否定响应故障代码。

9 OBD Diagnostic Services OBD 诊断服务

This section defines the used OBD relevant diagnostic services and shall be additional valid to the OBD ISO specifications whereby at any differences the ISO specification shall be the valid one.

这部分定义了 ODB 相关诊断服务和附加说明任何与 ISO 规范不同的诊断部分。

Address definition is made in the *.dbc file of the according project and is not defined in this document.

诊断 ID 不在本文档中定义，以实际项目的 DBC 文件定义为准。

9.1 SID 01 - Request Current Powertrain Diagnostic Data   SID 01 请求当前动力总成诊断数据

This mode allows the off board tester access to current emissions related data values, including analogue inputs and outputs, digital inputs and outputs and system status information. The response shall contain the last determined value. All data values returned for sensor readings shall be the actually reading, not a default or substitute value used when a fault with the sensor is detected.

本模式允许非在线诊断仪访问当前产生的相关数据值，包括模拟的输入和输出，逻辑输入和输出和系统状态信息。响应数据应该包含最后的测定值。当检测到一个关于传感器故障时，所有响应数据值必须是实际检测传感器得来，不能是默认值或使用的替代值。

A positive response shall only be issued if the ECU supports the requested Data Identifier.

如果一个 ECU 支持请求数据 ID，只能发出一个肯定响应回复。

Not all OBD Data Identifier are applicable and/or supported by all systems. OBD Data Identifier 00 is an encoded bit that denotes which OBD Data Identifier are supported.

不是所有 SID 被所有的系统所应用和/或支持。SID 的 00 是一个编码位指示哪些 SID 被支持。

9.1.1 Request and Response Type Description 请求和响应类型描述

The Request Type is an Identifier which is used to code different functionality that can be requested by this service.

请求类型是一个标识符，它用于标识本服务中能被请求的不同功能类

The OBD Data Record shall be responded by the ECU to the Test tool and shall contain the requested Data. The format of this Data Record depends on the requested data.

OBD 数据记录必须通过 ECU 响应给测试工具和必须包含请求数据。数据记录的格式依据请求的数据。

9.1.2 Service Request 服务请求

The Request format shall match the following description:

请求格式必须符合表 94 的描述：

表 94

Byte No. 字节序号	Parameter Name 参数名称	Message Usage 报文使用	Data Value 数据值
1	Request Current Powertrain Diagnostic Data Request Service ID 请求当前动力总成诊断数据请求服务 ID	M	01
2	OBD Data Identifier no.1 车载诊断系统数据标识 1	M	00-FF
3	OBD Data Identifier no.2 车载诊断系统数据标识 2	C	00-FF
4	OBD Data Identifier no.3 车载诊断系统数据标识 3	C	00-FF
5	OBD Data Identifier no.4 车载诊断系统数据标识 4	C	00-FF
6	OBD Data Identifier no.5 车载诊断系统数据标识 5	C	00-FF
7	OBD Data Identifier no.6 车载诊断系统数据标识 6	C	00-FF

注：C: If more than one Parameter Identifier in one request are supported than the request may contain
up to 6 Parameter Identifier

C:是否在一个请求中支持的参数标识符多过 6 个

9.1.3 Positive Response 肯定响应

The Positive Response format shall match the following description:
肯定响应格式必须符合表 95 的要求：

表 95

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Current Powertrain Diagnostic Data Response Service ID 请求当前动力总成诊断数据响应服务 ID	M	41
2	OBD Data Identifier no.1 车载诊断系统标识符编号 1	M	00-FF

3
:
(k-1)+3
	OBD Data Record no.1 [] = 车载诊断系统数据记录编号 1
	[data no. 1 数据编号 1
	      :
	    data no. K 数据编号 k
		M
		:
		M
			00-FF
			:
			00-FF

:	:	:	:
n-r	Parameter identifier no.m 参数标识符编号 M	O/C1	00-FF

n-(r-1)
:
n
	OBD Data Record no.m [] = 车载诊断系统数据记录编号 m
	[data no. 1 数据编号 1
	      :
	    data no. r 数据编号 r
		O/C1
		:
		O/C1
			00-FF
			:
			00-FF

注：O/C1: If multiple OBD Data Records are requested by multiple requested OBD Data Identifier, these
blocks are needed to be responded.

O/C1：如果通过多个请求车载诊断系统数据标识符请求多个车载诊断系统数据记录，这些模块需要响应。

For ISO 14230‑4 implementations this service can only support a single Identifier request.

国际标准 14230-4 执行关于这部分的服务只支持一个标识符请求。

For ISO 15765‑4 implementations this service can support up to 6 Data Identifier requests but they must either be information Data Identifier or supported Data Identifier and not a combination of both. The response shall contain all Identifier requested and supported by the ECU, but the order of the Identifier information does not have to reflect the Identifier order of the request. If more than 6 Identifier are required then multiple requests must be issued.

国际标准 15765‑4 执行关于这部分的服务能支持高达 6 个数据标识符请求，但是这些请求必须既不能是信息数据标识符或支持数据标识符，也不能是这两种的组合. 响应应该包括 ECU 的所有标识符请求和支持，但是标识符的信息不一定按照请求的顺序响应。如果多余 6 个标识符被请求则说明存在问题。

9.1.4 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式必须符合表 96 描述:

表 96

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Request Current Powertrain Diagnostic Data Request Service ID 请求当前动力总成诊断数据请求服务 ID	M	01
3	sub-function = [Negative Response Trouble Code]子功能=【否定响应故障代码】	M	00-FF
	Subfunction not supported 不支持子功能		12
	Incorrect Message Length Or Invalid Format 报文长度不对或格式无效		13
	Busy Repeat Request 因总线帮而重复请求		21
	Conditions Not Correct 条件不正确		22
	Request Correctly Received Response Pending 请求被正确接收但没有响应		78

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述列表中，是一个 ECU 根据诊断服务必须设定和支持的最少否定响应故障代码

9.2 SID 02 — Request Powertrain Freeze Frame Data 请求动力总成冻结帧数据

This mode allows the off board tester access to emissions related data values, which were stored during the freeze frame required by OBD regulations. The mode allows expansion to meet manufacturer specific requirements not necessarily related to the freeze frame and

not necessarily containing the same data as the required freeze frame. The request for information includes a OBD Data Identifier that uniquely denotes the information required. The response shall contain the last determined value. All data values returned for sensor readings shall be the actually reading, not a default or substitute value used when a fault with the sensor is detected. A response shall only be issued if the ECU supports the requested Data Identifier.

Only one freeze frame in mandated, denoted by frame number 00. Manufacturers can defined additional freeze frames and use this service to obtain the information by specifying the associated frame number in the request. If used the manufacture shall defined the number of frames, storage conditions and data requirements and shall be detailed in the ECU specific document. If a freeze frame has not been stored (indicated when Identifier 02 – the stored DTC is 0000) then the validity of any

data reported data may be questionable.

此模式允许离线测试设备访问相由 OBD 标准定义冻结帧中数据值。此模式允许扩展应对主机厂规范要求，没有必要与冻结帧相关，也没必要像冻结帧要求那样包含相同的数据。请求的信息包括一个唯一指示数据需求的 OBD 数据标识符。响应将包括最后终止的值。为了读传感器返回的所有数据值实际上被读取，不是出现探测到传感器错误时使用的一个默认值或者替代值。如果 ECU 支持请求数据标识符响应只能是错误。在命令中一个冻结帧只能通过编号 00 表示。主机厂可以定义额外冻结帧，及使用此服务可以通过请求中规定的联合帧编号获取信息。如果使用主机厂定义的，需要定义帧的编号，存储条件和数据要求，并且要在详细的规定在 ECU 的规范文档中。如果一个冻结帧没有存储（指示当标识符为 02 —存储的 DTC 是 0000），则任何有效数据报告都有可疑性。

Not all Data Identifier are applicable and/or supported by all systems. Data Identifier 00 is an encoded bit that denotes which Identifier are supported.

不是所有数据标识被所以系统应用和/或被支持的。数据标识符 00 是一个编码比特，指示标识符被支持。

9.2.1 Service Request 服务请求

The Request format shall match the following description:
请求格式必须符合表 97 的描述

表 97

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Powertrain Freeze Frame Data Request Service ID 请求动力总成冻结帧数据请求服务 ID	M	02
2	OBD Data Identifier no.1 车载诊断系统标识符编号 1	M	00-FF
3	Frame Number no.1 帧序号编号 1	M	00-FF
4	OBD Data Identifier no.2 车载诊断系统标识符编号 2	C	00-FF
5	Frame Number no.2 帧序号编号 2	C	00-FF
6	OBD Data Identifier no.3 车载诊断系统标识符编号 3	C	00-FF

| 7 | Frame Number no.3 帧序号编号 3 | C | 00-FF |

注：C: If more than one Parameter Identifier in one request are supported than the request may contain up to 3 Data Identifier and FrameNumbers.

C:是否在一个请求中有参数标识符有多过 3 个数据参数标识符和帧序号

9.2.2 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应的格式要求符合表 98 的描述：

表 98

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Powertrain Freeze Frame Data Response Service ID 请求动力总成帧数据响应服务 ID	M	42
2	OBD Data Identifier no.1 车载诊断系统数据表示编号 1	M	00-FF
3	Frame Number no.1 帧序号编号 1	M	00-FF

4
:
(k-1)+4
	Freeze Frame Record no.1 [] = 冻结帧记录编号 1
	[data no. 1 数据编号 1
	        :
	    data no. K 数据编号 k
		M
		:
		M
			00-FF
			:
			00-FF

:	:	:	:
n-(r+1)	OBD Data Identifier no.m	O/C1	00-FF
n-r	Frame Number no.m	O/C1	00-FF

n-(r-1)
:
n
	Freeze Frame Record no.m [] = 冻结帧记录编号 m
	[data no. 1 数据编号 1
	        :
	    data no. r 数据编号 r
		O/C1
		:
		O/C1
			00-FF
			:
			00-FF

注：O/C1: If multiple Freeze Frame Records are requested by multiple requested OBD Data Identifier, these blocks are needed to be responded.

O/C1：如果通过多个请求车载诊断系统数据标识符请求多个冻结帧记录，这些模块需要响应。

For ISO 14230–4 implementations this service can only support a single Identifier request.

国际标准 14230–4 执行关于这部分的服务只支持一个标识符请求

For ISO 15765–4 implementations this service can support up to 3 Identifier requests but they must either be information Data Identifier or supported Data Identifier and not a combination of both. The response shall contain all Data Identifier requested and supported by the ECU, but the order of the Identifier information does not have to reflect the Data Identifier order of the request. If more than 3 Data Identifier are required then multiple requests must be issued.

国际标准 15765–4 执行关于这部分的服务能支持高达 3 个数据标识符请求，但是这些请求必须既不能是信息数据标识符或支持数据标识符，也不能是这两种的组合. 响应应该包括 ECU 的所有标识符请求和支持，但是标

识符的信息不一定按照请求的顺序响应。如果多余 3 个标识符被请求则说明存在问题。

9.2.3 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式必须符合表 99 的描述：

<center>表 99</center>

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Request Powertrain Freeze Frame Data Request Service ID 请求动力总成冻结帧请求服务 ID	M	02
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Subfunction not supported 子功能不支持		12
	Incorrect Message Length Or Invalid Format 帧长度不正确或格式无效		13
	Request out of Range 请求超出范围		31
	Busy Repeat Request 因为总线忙而重复请求		21
	Conditions Not Correct 条件不正确		22
	Request Correctly Received Response Pending 请求被正确接收但没有响应		78

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述表格为一个 ECU 支持诊断服务必须支持的最少数量的否定响应故障代码。

9.3 SID 03 - Request Emission Related Powertrain DTC 请求相关动力排放的诊断故障代码

This mode allows the off board tester to obtain stored or "confirmed" emission related trouble codes. If a DTC can be associated with more than one failure, only one instance of the DTC shall be reported. There is no requirement on the order the DTCs should be reported, only that the MSB shall be transmitted first.
A response shall only be issued if the ECU supports the mode.

此模式允许离线测试设备获取和确认排放相关的故障代码。如果一个诊断故障代码可以表示多个故障，那么只报告一个故障代码的情况。不要求报故障代码的顺序，只要求首先发送 MSB 部分。

9.3.1 Service Request 服务请求

The Request format shall match the following description:

服务请求的格式要求符合表 100 的描述：

表 100

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Emission Related Powertrain DTCs Request Service ID 请求动力排放相关的诊断故障码的请求服务 ID	M	03

9.3.2 Positive Response 肯定响应

The Positive Response format shall match the following description:

肯定响应格式要求符合表 101 的描述：

表 101

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Emission Related Powertrain DTCs Response Service ID。请求动力排放相关的诊断故障码的响应服务 ID	M	43
2	Number of Stored Emission Related DTCs 存储排放相关的诊断故障码数量	M	00-FF
3	Data Record[] = 数据记录	C1	00-FF
4	[DTC no.1 high Byte 诊断故障码编号 1 高字节	C1	00-FF
5	DTC no.1 low Byte 诊断故障码编号 1 低字节	C2	00-FF
6	DTC no.2 high Byte 诊断故障码编号 2 高字节	C2	00-FF
:	DTC no.2 low Byte 诊断故障码编号 2 低字节	:	:
n-1	DTC no.m high Byte 诊断故障码编号 m 高字节	C2	00-FF
n	DTC no.m low Byte 诊断故障码编号 m 低字节	C2	00-FF

注：C1: This parameter is only present if solely one DTC information is available to be reported.

C1:此参数只单独出现一个诊断故障码的有效报告信息

C2: This parameter is only present if more than one DTC information is available to be reported.

C2：此参数只单独出现多于一个诊断故障码的有效报告信息

For ISO 14230‐4 implementations this service can support a fixed response contain 3 DTCs. If no DTCsare stored a positive response padded out with 00 shall be issued. If less than three DTCs are storedthen the message shall be padded out with 00. If more than three DTCs are stored then multiple responses shall be issued, each containing 3 DTC codes until all DTCs have been transmitted i.e. 4 DTCs shall be transmitted using two responses one contain 3 DTC codes and one containing a single DTC padded out with 00. A maximum of127 DTCs can be supported.

根据执行的国际标准 14230‐4 本服务支持包含三个 DTC 的固定响应。如果一个肯定响应没有诊断故障码存储，填充 00 处理。如果一个肯定响应包含 DTC 少于三个，则填充 00。如果多于三个 DTC 应该存储在多个响应中处理，每个代码包含 3 个 DTC，直到所有 DTC 传送完。 4 个 DTC 应该使用两个响应来发送，一个包含 3 个 DTC，另一个包含一个 DTC 和填充 00. 最多能支持 127 个 DTC.

Prior to issuing this request the off board tester should send a Mode 01 PID 01 request to determine

the number of DTCs that have been stored. If additional DTCs have been stored between the two commands being issued then the process shall be repeated until the number of DTCs received agrees with the numberstored. (No Table diagram for this Implementation)

优先处理请求为诊断设备发送一个模式为 01 PID 为 01 的请求检测已经存储 DTC 数量。如果另外的 DTC 在两个命令执行之间产生，此过程不断重复直到接收到 DTC 的数量与存储 DTC 的数量一致。（此部分没有附加表格）

For ISO 15765–4 implementations this service can support a variable response depending on the number of DTCs stored. If no DTCs are stored a positive response containing just the Number of Emissions Related DTCs stored (set to 00) shall be issued. If 1 or more DTCs are stored then the response shall be as long as required to transmit all the DTCs indicated by the Number of Emissions Related DTCS stored in byte 2 of the response. A maximum of 255 DTCs can be supported.

根据执行的国际标准 15765–4 本服务支持一个依据存储 DTC 数量变化的响应。如果一个肯定响应没有存储排放相关的 DTC，则填充 00 处理。如果存储了一个或多个 DTC，发送所有 DTC 响应的长度要与响应字节 2 中指示排放相关 DTC 数量一致。最多能支持 255 个 DTC。

9.3.3 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合表 102 描述：

表 102

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Request Emission Related Powertrain DTCs Request Service ID 请求动力排放相关 DTC 请求服务	M	03
3	sub-function = ［Negative Response Trouble Code］子功能=【否定响应故障代码】	M	00-FF
	Busy Repeat Request 重复请求因为总线忙		21
	Incorrect Message Length Or Invalid Format 报文长度有误或格式无效		13
	Conditions Not Correct 条件不对		22
	Request Correctly Received Response Pending 请求正确接收但未响应		78

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务，列出了 ECU 支持的最少的否定响应故障代码。

9.4 SID 04 – Clear/Reset Emission Related Powertrain Diagnostic Information 清除或复位排放相关的诊断信息

This mode allows the off board tester to command all on–board modules to clear ALL

emissions‐related diagnostic information.

此模式允许离线测试设备命名所有在线木块去清除所有排放相关诊断信息。

9.4.1 Behavior 操作

The Clearance of all emission – related diagnostic information shall include also the following:

所有排放相关信息的清除必须包含下面：

a) Clear the number of DTCs and extinguish the MIL (Mode 01 PID 01)

b) Reset all status information of all supported System Monitoring tests (Mode 01 PIDs 01, 41)

c) Reset all MIL related counters i.e. distance travelled and time since illumination (Mode 01, PIDs 21, 4D)

d) Reset all iteration related counters i.e. number of warm up, distance travelled and time since previous clear / reset command issued (Mode 01, PIDs 30, 31, 4E)

e) Clear all Freeze Frame related data (Mode 02 all PIDs)

f) Clear all stored or "confirmed" DTCs (Mode 03)

g) Clear all Oxygen Sensor Test data (Mode 05)

h) Clear all On‐Board Monitoring test results and corresponding flags (Mode 06)

i) Clear all pending DTCs (Mode 07)

d) 清除DTCs的数量和熄灭排放故障灯（模式01 PID 01）

e) 复位所有支持系统监控测试的所有状态信息

f) 复位所有排放故障灯相关计数器，也就是里程和时间量

g) 复位所有重复相关的计数器，优先处理加热数量，里程和时间量优先清除/复位（模式01 PIDs 30, 31, 4E）'

h) 清除所有冻结帧相关的数据（模式2 所有PIDs）

i) 清除所有存储或固定DTCs（模式3）

j) 清除所有氧传感器测试数据（模式5）

k) 清除所有在线监控测试数据结果和通讯标志位（模式6）

l) 清除所有没有响应的DCTs（模式6）

In response to this service request, other manufacturer specific clearing/resetting action may occur.

在服务请求的响应中，其他制造商特定的清除或复位操作可能发生

A positive response shall only be issued if the ECU supports the mode. For safety and/or technical reasons, some ECUs may not response to this service positively under all conditions. All ECUs shall respond to this service request with the ignition ON and the engine not running. ECUs that cannot perform this operation under conditions, such as with the engine running, shall respond with a negative response code.

在ECU支持该模式下，ECU只能处理一个肯定响应。出于安全而且/或技术方面的考虑，在不满足所有的条件下某些ECU可能不响应该种肯定服务。在点火钥匙在ON而且发动机不运行时，所有ECU应

该响应这种请求服务。条件不满足时，ECU 不能执行这种操作，例如发动机在运行，ECU 应该发出否定响应代码。

9.4.2 Service Request 服务请求

The Request format shall match the following description:

请求格式要求符合表 103 描述：

表 103

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Clear/Reset Emission Related Diagnostic Information Request Service Id 清除或复位排放相关诊断信息请求服务标识符	M	04

9.4.3 Positive Response

The Positive Response format shall match the following description:

肯定响应格式要求符合表 104 的描述：

表 104

Byte No.	Parameter Name	Message Usage	Data Value
1	Request Emission Related Powertrain Diagnostic Information Response Service ID 请求动力排放相关诊断信息响应服务标识服	M	44

注：For ISO 14230-4 implementations this service supports the clearing of Oxygen Sensor Test Data if the function is supported by the ECU.

根据执行的国际标准 14230-4 如果 ECU 支持此功能，这个服务支持氧气传感器测试数据被清除

For ISO 15765-4 implementations this service does not support the clearing of Oxygen Sensor Test Data.

根据执行的国际标准 15765-4 这个服务不支持氧气传感器测试数据被清除

9.4.4 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合表 105 描述：

表 105

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Clear/Reset Emission Related Diagnostic Information Request Service Id 清除或复位排放相关诊断信息请求服务	M	04

	标识符		
3	sub-function = ［Negative Response Trouble Code］子功能=【否定响应故障代码】	M	00-FF
	Busy Repeat Request 重复请求因总线忙		21
	Incorrect Message Length Or Invalid Format 报文长度有误或格式无效		13
	Conditions Not Correct 条件不对		22
	Request Correctly Received Response Pending 请求正确接收但未响应		78

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持的最少否定响应故障代码。

9.5 SID 05 – Request Oxygen Sensor Monitoring Test Results 请求氧气传感器检测测试结果

This mode allows the off board tester to access the on board oxygen sensor monitoring test results. Alternatively this information can be accessed using Service 06 hex.

此模式允许离线测试设备访问在线氧气传感器监控测试结果。推荐使用服务 06hes 访问该类信息

9.5.1 Request and Response Type Description 请求和响应类型描述

Test Identifier – The Test Identifier (TID) uniquely denotes the information required.

测试标识符—唯一指示信息的要求。

Sensor Identifier – The Sensor Identifier shall indicate the position for the sensor and shall be defined by either Service [01/13] or Service [01/1D]

传感器标识符—传感器标识符应指示传感器的位置，定义服务【01/03】或服务【01/1D】

TID support Record – Four Bytes are used to convey which TIDs are supported e.g. TID 00 covers TIDs 01-20, TID 20 covers TIDs 21-40 and so forth

测试标识符支持记录—4 个字节用于传输支持的测试标识符。例如测试标识为 00 传输测试标识符 01-20，20 传输测试标识符 21-40 和更多

9.5.2 Behavior 操作

The response shall contain the last determined value. These results shall be retained over multiple ignition cycles until replace by more recent results or until the diagnostic information is cleared/ reset (Service 04). The values returned are positive unsigned values. No limit information is provided for TEST VALUES that are constants.

此响应该包含最后监控值。（服务 04）.反馈值要无符号正值。响应包含测试值是不限定提供的。

A positive response shall only be issued if the ECU supports the requested TID.Not all TIDs are applicable and/or supported by all systems. TID 00 is an encoded bit that denotes which TIDs are supported.

一个肯定响应值处理 ECU 支持测试标识符的请求。不是所有的测试标识符都可使用而且/或者所有系

统都支持。测试标识符 00 是一个编码位，用于指示哪些测试标识符是被支持的。

9.5.3 Service Request 服务请求

The Request format shall match the following description:

请求服务格式要求符合表 106 的描述：

表 106

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Oxygen Sensor Monitoring Test Results Request Service ID 请求氧气传感器监控测试结果请求服务 ID	M	05
2	Test Identifier (TID)测试标识符	M	00-FF
3	Sensor Identifier 传感器标识符	M	00-FF

9.5.4 Positive Response 肯定响应

The Positive Response format when Test Identifier are supported shall match the following description:

当测试标识符被支持时，肯定响应格式要求符合表 107 描述：

表 107

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Oxygen Sensor Monitoring Test Results Response Service ID 请求氧气传感器监控测试结果响应服务 ID	M	45
2	Test Identifier (TID)测试标识符（TID）	M	00-FF
3	Sensor Identifier 传感器标识符	M	00-FF
4 : 7	TID Support Record [] = [　Byte no.1测试标识符支持记录[]=字节编号 1 　　： 　　Byte no.4 字节编号 4]	M : M	00-FF : 00-FF

The Test Identifier and the Sensor Identifier in the response message shall match the Test Identifier and Sensor Identifier transmitted in the corresponding request message.

响应报文中的测试标识符和传感器标识要求符合发送的通讯请求报文的测试标识符和传感器标识符。

The Positive Response format if no Test Identifier are supported shall match the following description:

当测试标识符不被支持时，肯定响应格式要求符合下面表 108 的描述：

表 108

Byte No.	Parameter Name 参数名称	Message Usage	Data Value

	Request Oxygen Sensor Monitoring Test Results Response Service ID 请求氧气传感器监控测试结果响应服务 ID	M	45
1			
2	Test Identifier (TID)测试标识符（TID）	M	00-FF
3	Sensor Identifier 传感器标识符	M	00-FF
4	Test Value 测试值	M	00-FF
5	Minimum Test Limit 最小测试阀值	M	00-FF
6	Maximum Test Limit 最大测试阀值	M	00-FF

注：For ISO 14230–4 implementations this service may be supported as described above.

根据执行的国际标准 14230–4 上表描述的服务可能被支持

For ISO 15765–4 implementations this service shall not be supported.

根据执行的国际标准 15765–4 上表描述的服务不被支持

9.5.5 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式应该符合下表描述：

表 109

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Request Oxygen Sensor Monitoring Test Results Response Service ID 请求氧气传感器监控测试结果响应服务 ID	M	05
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Subfunction not supported 子功能不支持		12
	Incorrect Message Length Or Invalid Format 报文长度或格式不正确		13
	Request out of Range 请求超出范围		31
	Busy Repeat Request 因总线忙重复请求		21
	Conditions Not Correct 条件不正确		22
	Request Correctly Received Response Pending 请求正确接收但是未响应		78

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持的最少否定响应故障代码。

9.6 SID 06 — Request On-Board Monitoring TestResults for Specific Monitored Systems 请求在线监控测试结果为了规范监控系统

This mode allows the off board tester access to the results (test values and associated limits) for the on-board diagnostic monitoring tests of specific components/systems that are monitored.

此模式允许离线测试设备访问在线诊断监控特定零件或系统的测试的结果（测试值和联合限制）。

9.6.1 Request and Response Type Description 请求和响应类型描述

OBD Monitor ID - The On Board Diagnostic Monitor Identifier uniquely denotes the information required.

OBD 监控 ID—在线诊断监控标识符唯一地指示需要的信息

OBD Support Record – The size of this Data Record is fixed to four Bytes and is used to convey which OBD Mirror IDs are supported e.g. OBD Mirror ID 00 covers OBD Mirror IDs 01-20, OBD Mirror ID 20 cove3rs OBD Mirror IDs 21-40 and so forth.

OBD 支持记录—数据记录的尺寸固定为 4 个字节和用于传送支持 OBD 分配 ID。举例：OBD 分配 ID 00 传送 OBD 分配监控 ID 01-02,OBD 分配 ID20 传送分配 ID 21-40 等等

9.6.2 Behavior 操作

The vehicle manufacturer is responsible for assigning the identifiers of different systems and components whether they are Test Identifiers (TIDs) and Component Identifiers or On Board Diagnostic Monitor Identifiers (OBDMIDs).

整车厂有责任分配给不同系统和零件的标识符,无论是测试标识符还是零件标识符或者在线诊断监控标识符(OBDMIDs)。

A positive response shall only be issued if the ECU supports the requested TID or OBDMID. The results shall be retained over multiple ignition cycles until replaced by more recent results or until the diagnostic Information is cleared/ reset (Service 04 hex). The values returned are positive unsigned values.

如果 ECU 支持测试标识符或在线诊断监控标识符的请求，只能处理一个肯定响应。结果应保持超过多个点火循环直到被更接近结果替代或者直到诊断信息被清除/复位（服务 ID 为十六进制 04）。该值返回肯定无符号值。

注:Service[01/01] can be used to check the test status prior to executing the service to confirm the validity of the Test Values reported by a response to this service.

服务【01/01】用于检查测试状态，针对此服务的响应，优先执行确认测试报告有效的服务

9.6.3 Service Request 服务请求

a) OBD Monitor IDs Supported 支持 OBD 监控的 ID

The Request format shall match the following description when OBD Monitor IDs are supported:

当 OBD 监控的 ID 被支持，请求格式应该符合表 110 的描述

表 110

Byte No.	Parameter Name 参数名称	Message Usage	Data Value

	Request On-Board Monitoring Test Results for Specific Monitored Systems Request Service ID 请求在线监控测试结果因为特定监控系统请求服务 ID	M	06
1			
2	OBD Monitor ID no.1 OBD 监控 ID 编号 1	M	00-FF
3	OBD Monitor ID no.2 OBD 监控 ID 编号 2	C	00-FF
4	OBD Monitor ID no.3 OBD 监控 ID 编号 3	C	00-FF
5	OBD Monitor ID no.4 OBD 监控 ID 编号 4	C	00-FF
6	OBD Monitor ID no.5 OBD 监控 ID 编号 5	C	00-FF
7	OBD Monitor ID no.6 OBD 监控 ID 编号 6	C	00-FF

b) No OBD Monitor IDs supported 不支持 OBD 监控的 ID

The Request format shall match the following description when no OBD Monitor IDs are supported:

当 OBD 监控的 ID 不被支持，请求格式应该符合表 111 的描述：

表 111

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request On-Board Monitoring Test Results for Non-Continuously Monitored Systems Request Service ID 请求在线监控测试结果因为不联系监控系统请求服务 ID	M	06
2	OBD Monitor ID OBD 监控 ID	M	00-FF

9.6.4 Positive Response 肯定响应

a) OBD Monitor IDs Supported 支持的 OBD 监控 ID

The Positive Response format shall match the following description when OBD Monitor IDs are supported:

当 OBD 监控的 ID 被支持,肯定响应格式要求符合下表描述

表 112

Byte No.	Parameter Name	Message Usage	Data Value
1	Request On-Board Monitoring Test Results for Specific Monitored Systems Response Service ID 请求在线监控测试结果针对特定监控系统响应服务 ID	M	46
2	OBD Monitor ID no.1 OBD 监控 ID 编号 1	M	00-FF

3	OBD Support Record no.1 [] = OBD 支持记录编号 1 [　　Byte no.1　字节编号 1	M	00-FF
:	:	:	:
6	Byte no.4　字节编号 4]	M	00-FF
:	:	:	:
n-4	OBD Monitor ID no. n OBD 监控 ID 编号 n	C	00-FF
n-3	OBD Support Record no.n [] = OBD 支持记录编号 n [　　Byte no.1 字节编号 1	C	00-FF
:	:	:	:
n	: 　　　　Byte no.4　字节编号 4]	C	00-FF

注：C: If multiple OBD Support Records are supported these blocks are present.

　　C:如果多个 OBD 支持记录被支持，此部分体现

b）No OBD Monitor IDs supported 不支持的 OBD 监控 ID

The Positive Response format shall match the following description when no OBD Monitor IDs are supported:

当 OBD 监控的 ID 不被支持,肯定响应格式要求符合表 113 描述：

表 113

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request On-Board Monitoring Test Results for Non-Continuously Monitored Systems　Response Service ID 请求在线监控测试结果针对不联系监控系统响应服务 ID	M	46
2	OBD Monitor ID no.1 OBD 监控 ID 编号 1	M	00-FF
3	Test Identifier no.1 测试标识符编号 1	M	00-FF
4	Unit and Scaling Id no.1 单位和缩放比例标识符编号 1	M	00-FF
5	Test Value High Byte no.1 测试值高字节编号 1	M	00-FF
6	Test Value Low Byte no.1 测试值低字节编号 1	M	00-FF
7	Minimum Test Limit High Byte no.1 最小测试限定高字节编号 1	M	00-FF
8	Minimum Test Limit Low Byte no.1 最小测试限定低字节编号 1	M	00-FF
9	Maximum Test Limit High Byte no.1 最大测试限定高字节编号 1	M	00-FF

10	Maximum Test Limit Low Byte no.1 最大测试限定低字节编号 1	M	00-FF
:	:	:	:
n-8	OBD Monitor ID no.m OBD 监控 ID 编号 m	C	00-FF
n-7	Test Identifier no.m 测试标识符编号 m	C	00-FF
n-6	Unit and Scaling Id no.m 单位和缩放比例标识符编号 m	C	00-FF
n-5	Test Value High Byte no.m 测试值高字节编号 m	C	00-FF
n-4	Test Value Low Byte no.m 测试值低字节编号 m	C	00-FF
n-3	Minimum Test Limit High Byte no.m 最小测试限定高字节编号 m	C	00-FF
n-2	Minimum Test Limit Low Byte no.m 最小测试限定低字节编号 m	C	00-FF
n-1	Maximum Test Limit High Byte no.m 最大测试限定高字节编号 m	C	00-FF
n	Maximum Test Limit Low Byte no.m 最大测试限定低字节编号 m	C	00-FF

For ISO 14230-4 (no table of protocol requirements in this document) implementations this service only supports a single TID request and accesses the results for non-continuously monitored (e.g. catalyst monitoring) components/systems. The results are requested by TID. Only one test limit is included in a response message, but that limit could be either a maximum or minimum limit. If both a maximum and a minimum test limit are to be reported then two response messages shall be transmitted in any order. The parameter TEST LIMIT TYPE AND COMPONENT ID is used to convey this information; bit 7 indicates the TEST LIMIT 0 denotes a maximum value (test failed if the TEST VALUE is greater than the limit) and 1 denotes a minimum value (test failed if the TEST VALUE is less than the limit); bits 6-0 are available for the manufacturer to identify which component or system the results relate to when a vehicle has more than one component or system. Not all TIDs are applicable and/or supported by all systems. TID 00 is an encoded bit that denotes which TIDS are supported. This service can be used as an alternative to Mode 05 to report Oxygen Sensor test results.

根据执行的国际标准 14230-4（在此文档中没有协议要求的表格），此服务只支持一个单独测试标识符请求和访问没有连续监控零件/系统的结果（例如：提高监控）。结果通过测试标识符来请求。在一个肯定响应报文中只能包含一个测试限定，但是此限定可以是最大值或者是最小值。如果最大和最小测试限定两个都要被传送，那么两个响应报文应该按照一定的顺序发送。测试限定参数类型和零件 ID 用于传送这些信息。比特 7 标志测试限定 0 表示一个最大值（如果测试值大于限定值，测试失败），并且 1 表示最小值（如果测试值小于限定值，测试失败）。当一个汽车有多于一个零件或系统式，比特 6-0 用于制作厂商去识别是哪个零件或系统关联的结果。不是所有的测试标识符都可以被所以的系统应用或支持。测试标识符 00 是一个编码比特位，用于指示哪些测试标识符是被支持的。这些服务可以作为一个模式 5 的选择去报告氧气传感器测试结果

For ISO 15765-4 implementations this service can support up to 6 OBDMID supported requests

but only a single request for the results of an ODB Monitor and accesses the results for either continuously (e.g. misfire monitoring) or non‐continuously (e.g. catalyst monitoring) monitored components/systems.

The maximum and minimum test limits are reported with each test value.

A test is considered to have failed if the TEST VALUE is outside of the range defined by MAXIMUM TEST LIMIT and MINIMUM TEST LIMIT. The response shall contain all OBDMID information requested and supported by the ECU, but the order of the OBDMID information does not have to reflect the OBDMID order of the request. If an OBDMID has not been completed since the diagnostic information is cleared/ reset (Mode 04) or the battery was disconnected then the TEST VALUE, MAXIMUM TEST LIMIT and MINIMUM TEST LIMIT shall be returned as 00. Not all OBDMIDs are applicable and/or supported by all systems. OBDMID 00 is an encoded bit that denotes which OBDMIDs are supported.

根据国际标准 15765‐4 执行这个服务能支持高达 6 个 OBDMIDs，这 OBDMIDs 只支持一个单独 OBD 监控结果和访问针对既是连续地（例如：在非点火状态的监控）或者非连续（例如：启动时监控）监控零件或系统结果的请求。最大和最小的测试限定汇报在每个测试值中。如果测试值超出了定义最大和最小限定的范围则被认为一个测试失败。响应应该包含所有 ECU 请求和支持的 OBDMID 信息，但是另外的 OBDMID 信息不一定影响 OBDMID 请求的顺序。如果一个 OBDMID 不完全，一旦诊断信息清零或复位（模式 04）或没有上电，那么测试值、最大测试限定和最小测试限定应该返回 00. 不是所有的 OBDMID 被所有的系统应用和支持的。OBDMID 00 是一个编码比特位指示哪些 OBDMID 被支持。

9.6.5 Negative Response 否定响应

a) OBD Monitor IDs Supported 支持的 OBD 监控 ID

The Negative Response format shall match the following description when OBD Monitor IDs are supported:

当 OBD 监控 ID 被支持时，否定响应格式要求符合表 114 的描述：

表 114

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Request On-Board Monitoring Test Results for Specific Monitored Systems Request Service ID。请求在线监控测试结果针对特定监控系统请求服务 ID	M	06
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Subfunction not supported 不支持子功能		12
	Incorrect Message Length Or Invalid Format 报文长度和报文格式不正确		13
	Busy Repeat Request 因总线忙而重复请求		21

	Conditions Not Correct 条件不正确		22
	Request Correctly Received Response Pending 请求正确被接收但是未响应		78

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持的最少否定响应故障代码。

b) No OBD Monitor IDs supported 不支持的 OBD 监控 ID

The Negative Response format shall match the following description when no OBD Monitor IDs are supported:

当 OBD 监控 ID 不被支持时，否定响应格式要求符合表 115 的描述：

<center>表 115</center>

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Request On-Board Monitoring Test Results for Non-Continuously Monitored Systems Request Service ID 请求在线监控测试结果针对不连续监控系统请求服务 ID	M	06
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Subfunction not supported 不支持子功能		12
	Incorrect Message Length Or Invalid Format 报文长度和报文格式不正确		13
	Busy Repeat Request 因总线忙而重复请求		21
	Conditions Not Correct 条件不正确		22
	Request Correctly Received Response Pending 请求正确被接收但是未响应		78

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持的最少否定响应故障代码。

9.7 SID 07 – Request Emission Related DTCs Detected During Current/Last Completed Drive Cycle 请求排放相关 DTCs 探测当前/最新完成驱动循环

This mode allows the off board tester to obtain "pending" DTCs detected during the current or last completed drive cycle for emission related components or systems that are tested or continually monitored during normal driving.

此模式允许离线测试设备获取关于未响应的 DTC,这 些 DTC 是在当前或者最近完整的驾驶循环间探测到的，该循环针对在正常驾驶期间测试或连续监控得到的驱动排放相关零件或系统

The intended use of this data is to assist the service technician after a vehicle repair, and after clearing the diagnostic information, by reporting test results after a single driving cycle. If the test failed during the drive cycle, the DTC associated with the test shall be reported.

这些数据打算用于帮助服务工程师后面的整车维护，并且清除诊断信息，在一个单独的驾驶循环后报告测试结果。如果在驾驶期间测试失败，那么要求报告关联测试 DTC。

9.7.1 Behavior 操作

This service is required for all DTCs and is independent of Service [03/xx]. Test results reported by this mode do not necessarily indicate a faulty component/system. If the test results indicate a failure after additional driving, then the MIL shall be illuminated and a DTC shall be set and reported when service Mode 03 is requested, indicating a faulty component/system. This mode can always be used to request the results of the latest test independent of the setting of the DTC.

这个服务需求用于所有 DTC 和独立于服务【03/xx】。

通过此模式报告的测试结果不需要只是一个故障的零件/系统。如果在另外驾驶后测试结果指示失败，那么，当请求服务模式为 03 时，应该说明排放故障和设置及报告 DTC，指示一个故障零件/系统。此模式允许用于请求最近测试独立设置的 DTC.

A response shall only be issued if the ECU supports the mode Test results for these components/systems are reported in the same format as Service [03/xx] and the same response message criteria applied.

如果 ECU 支持的模式为测试结果是以下的零件/系统，即以相同的格式如服务[03/xx]和相同标准应用响应报文为报告的零件/系统，那么只能有一个响应被处理。

9.7.2 Service Request 服务请求

The Request format shall match the following description:
请求格式要求符合表 116 描述:

<center>表 116</center>

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Emission Related DTCs Detected During Current/Last Completed Drive Cycle Request Service ID 请求在当前/最近完整驾驶循环期间探测到的排放相关 DTCs 的请求服务 ID	M	07

9.7.3 Positive Response 肯定响应

The Positive Response format shall match the following description:
肯定响应格式要求符合表 117 描述:

<center>表 117</center>

Byte No.	Parameter Name 参数格式	Message Usage	Data Value
1	Request Emission Related DTCs Detected During Current/Last Completed Drive Cycle Response Service ID 请求在当前/最近完整驾驶循环期间探测到的排放相关 DTCs 的响应服务 ID	M	47
2	Number of Stored Emission Related DTCs 存储排放相关 DTCs 的数量	M	00-FF

3
4
5
6
:
n-1
n
	Data Record[] = 数据记录
	[DTC no.1 high Byte DTC 编号 1 高字节
	    DTC no.1 low Byte DTC 编号 1 低字节
	    DTC no.2 high Byte DTC 编号 2 低字节
	    DTC no.3 low Byte DTC 编号 2 低字节
	    :
	    DTC no.m high Byte DTC 编号 mg 高字节
	    DTC no.m low Byte DTC 编号 m 低字节
		C1
		C1
		C2
		C2
		:
		C2
		C2
			00-FF
			00-FF
			00-FF
			00-FF
			:
			00-FF
			00-FF

注：C1: This parameter is only present if solely one DTC information is available to be reported.

C1:如果报告中有单独地一个 DTC 信息被应用，这些参数才能出现

C2: This parameter is only present if more than one DTC information is available to be reported.

C2:如果报告中有多过一个 DTC 信息被应用，这些参数才能出现

9.7.4 Negative Response 否定响应

The Negative Response format shall match the following description:

否定响应格式要求符合表 118 描述：

表 118

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Request Emission Related DTCs Detected During Current/Last Completed Drive Cycle Request Service ID 请求在当前/最近完整驾驶循环期间探测到的排放相关 DTCs 的响应服务 ID	M	07
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】		00-FF
	Incorrect Message Length Or Invalid Format 报文长度或格式不正确	M	13
	Busy Repeat Request 因总线忙而重复请求		21
	Conditions Not Correct 条件不正确		22

Request Correctly Received Response Pending 请求被正确接收但未响应		78

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持的最少否定响应故障代码。

9.8 SID 08 - Request Control of On-Board System, Test or Componen 请求在线系统、测试或者控制

This mode allows the off board test device access to control the operation of an on-board system, test or component.

此模式允许测试设备访问去控制一个在线系统、测试、零件的运行

Possible uses for these data bytes in a request message are:

a) Turn on-board system / test / component ON

b) Turn on-board system / test / component OFF

c) Cycle on-board system / test / component for n seconds

在一个请求报文中可能用到的数据字节是:

a) 触发在线系统/测试/零件

b) 关闭在线系统/测试/零件

c) 循环在线系统/测试/零件 n 秒

Possible uses for the data bytes in the response message are:

a) Report system status

b) Report test results

在一个响应报文中可能用到的数据字节是:

a) 报告系统状态

b) 报告测试结果

The request for information includes a Test Identifier (TID) that uniquely denotes the information required.

这些信息请求包含一个单独指示信息要求的测试标识符,

Not all TIDs are applicable and/or supported by all systems. TID 00 is an encoded bit that denotes which TIDs are supported.

不是所有测试标识符被所有的系统应用和/或支持。测试标识符是一个编码比特位指示哪些测试标识被支持。

9.8.1 Behaviour 操作

A positive response shall only be issued if the ECU supports the requested TID.

如果 ECU 支持请求测试标识符,那么一个肯定响应才能被处理。

9.8.2 Service Request 服务请求

a) TID Supported 支持测试标识符

The Request format shall match the following description:

请求格式要求符合表 119 描述

表 119

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Control of On-Board System, Test or Component Request Service ID 请求在线系统、测试或零件请求服务 ID	M	08
2	Test Identifier no.1 测试标识编号 1	M	00-FF
3	Test Identifier no.2 测试标识编号 2	C	00-FF
4	Test Identifier no.3 测试标识编号 3	C	00-FF
5	Test Identifier no.4 测试标识编号 4	C	00-FF
6	Test Identifier no.5 测试标识编号 5	C	00-FF
7	Test Identifier no.6 测试标识编号 6	C	00-FF

b) TID Not Supported 不支持测试标识符

The Request format shall match the following description:

请求测试要求符合表 120 描述:

表 120

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Control of On-Board System, Test or Component Request Service ID 请求在线系统、测试或零件请求服务 ID	M	08
2	Test Identifier no.1 测试标识编号 1	M	00-FF
3 : 7	Data Record [] = 数据记录 [Data Byte no.1 数据字节编号 1 : Data Byte no.m 数据字节编号 m]	O : O	00-FF : 00-FF

9.8.3 Positive Response 肯定响应

a) TID Supported 支持测试标识符

The Positive Response format shall match the following description:

肯定响应格式要求符合表 121 描述:

表 121

Byte No.	Parameter Name 参数名称	Message Usage	Data Value

1	Request Control of On-Board System, Test or Component Response Service ID 请求在线系统，测试或零件响应服务ID	M	48
2	Test Identifier no.1 测试标识符	M	00-FF

4
:
7
	TID Support Record no.1 [] = 测试标识符支持记录编号1
	[Byte no.1 字节编号1
	     :
	    Byte no.4 字节编号4]
		M
		:
		M
			00-FF
			:
			00-FF

:	:	:	:
n-5	Test Identifier no.m 测试标识符编号m	C	00-FF

n-4
:
n
	TID Support Record no.m [] =测试标识符支持记录编号m
	[Byte no.1 字节编号1
	     :
	    Byte no.4 字节编号4]
		C
		:
		C
			00-FF
			:
			00-FF

注：C: If more than one TID Support Record is requested and also supported, the ECU shall response with additional response blocks.

    C:如果多过一个测试标识符支持记录被请求和被支持，那么ECU的响应应该携带额外响应模块

b) TID Not Supported 不支持测试标识符

The Positive Response format shall match the following description:

肯定响应格式要求符合表122描述：

表 122

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Control of On-Board System, Test or Component Response Service ID 请求在线系统、测试或零件响应服务ID	M	48
2	Test Identifier no.1 测试标识符编号1	M	00-FF

3
:
7
	Data Record [] = 数据记录【】
	[Data Byte no.1 数据字节编号1
	    :
	    Data Byte no.m 数据字节编号m
	]
		0
		:
		0
			00-FF
			:
			00-FF

The following Table defines:

根据表123定义：

表 123

Test Identifier 测试标识符	Description 描述
00	TIDs Supported 01-20 测试标识符支持 01-02 This TID provides details of which TIDS between 01 and 20, if any, are supported by the ECU. 这测试标识符提供 ECU 支持在 01 与 02 期间的任意测试标识符的细节
01	Evaporative System Leak Status - a single byte is returned 蒸汽系统泄漏状态 00 Active 00 激活 01 Already Active 01 准备激活 02 Cannot Activate 02 没有激活

For ISO 14230-4 implementations this service can only support a fixed single TID request. Any unused data bytes are padded out with 00 to maintain a fixed message length for both the request and response. In the case of TID Supported requests byte 03 acts as a filler byte and is set to 00.

根据国际标准 14230-4 执行的这个服务只能支持一个固定的单独标识标识符请求。不管请求还是响应，任意没有使用数据字节要填充为 00 用于维持一个固定报文长度。在支持请求字节 03 的情况了，当成一个过滤字节和设置为 00

For ISO 15765-4 implementations this service can support up to 6 TID supported requests but only a single request for control of a TID. Up to 5 data bytes can be passes and/or returned for each TID requested. The response shall contain all TID requested and supported by the ECU, but the order of the TID information does not have to reflect the TID order of the request. A negative response can be issued, if the conditions were not appropriate to perform the specified test. If more than 6 TIDs are required then multiple requests must be issued.

根据国际标准 15765-4 执行这个服务能支持高达 6 个测试标识符的支持请求，但是这些请求只能是针对一个测试标识控制的单独请求。

9.8.4 Negative Response 否定响应

a) TID Supported 支持的测试标识符

The Negative Response format shall match the following description:

否定响应要求符合表 124 的描述：

表 124

Byte No.	Parameter Name	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Request Control of On-Board System, Test or Component Request Service ID 请求控制在线系统，测试或组成请求的服务 ID	M	08
3	sub-function = [Negative Response Trouble Code] 子	M	00-FF

	功能=【否定响应故障代码】		
	Subfunction not supported 不支持的子功能		12
	Incorrect Message Length Or Invalid Format 报文长度错误或格式无效		13
	Busy Repeat Request 因总线忙而重复请求		21
	Conditions Not Correct 条件错误		22
	Request Correctly Received Response Pending 请求被正确接收但未响应		78

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持的最少否定响应故障代码。

b) TID Not Supported 不支持的测试标识符

The Negative Response format shall match the following description:

否定响应格式要求符合表 125 的描述：

表 125

Byte No.	Parameter Name	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Request Control of On-Board System, Test or Component Request Service ID 请求控制在线系统，测试或组成请求的服务 ID	M	08
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Subfunction not supported 不支持子功能		12
	Incorrect Message Length Or Invalid Format 报文长度错误或格式无效		13
	Request out of Range 请求超出范围		31
	Busy Repeat Request 条件错误		21
	Conditions Not Correct 条件错误		22
	Request Correctly Received Response Pending 请求被正确接收但未响应		78

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持的最少否定响应故障代码。

9.9 SID 09 — Request Vehicle Information 请求车速信息

This mode allows the off board test device to request vehicle specific information i.e.

Vehicle Identification Number (VIN) and Calibration Identification. Some of this information may be required by the regulations and some may be desirable to be reported in a standard format. The request for information includes an Information Type identifier (INFOTYPE) that uniquely denotes the information required.

此模式允许离线诊断设备请求车辆特定信息也就是车辆识别码（VIN 码）和标定识别。其中某些信息经过特定的规则可能被请求，有些信息被报告因标准格式可能无效。为了获取信息的访问包含了一个信息类型标识符（INFOTYPE），用于指示信息被请求。

A response shall only be issued if the ECU supports the requested INFOTYPE. Not all INFOTYPEs are applicable and/or supported by all systems. INFOTYPE 00 is an encoded bit that denotes which INFOTYPEs are supported.

如果一个 ECU 支持 INFOTYPE，那么只能有一个响应被执行。不是所有的 INFOTYPEs 都被所有的系统适用或/和支持的。NFOTYPE 00 是一个被所有 NFOTYPEs 支持的指示编码比特位。

9.9.1 Request and Response Type Description 请求和响应类型描述

Information Type Support Record – Consists of four Bytes and is used to convey which Information Types are supported e.g. Info Type 00 covers Info Types 1-20, Info Type 20 covers Info Types 21-40 and so forth.

信息类型支持记录——由 4 个字节组成和被用于被支持传递信息类型。例如，信息类型 00 传递信息类型 1 至 20；信息类型 20 传递信息类型 21 至 24，以此类推。

Information Data Record – Contains one through four data bytes.
信息数据记录——包含一个由 4 个数据字节的模块

9.9.2 Service Request 服务请求

a) Information Type Supported 支持的信息类型

The Request format shall match the following description:请求格式必须符合下表的描述

表 126

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Vehicle Information Request Service ID 请求车辆信息的请求服务 ID	M	09
2	Information Type no.1 信息类型编号 1	M	00-FF
3	Information Type no.2 信息类型编号 2	O	00-FF
4	Information Type no.3 信息类型编号 3	O	00-FF
5	Information Type no.4 信息类型编号 4	O	00-FF
6	Information Type no.5 信息类型编号 5	O	00-FF
7	Information Type no.6 信息类型编号 6	O	00-FF

b) Information Type Not Supported 不支持的信息类型

The Request format shall match the following description:

请求格式必须符合表 127 描述：

表 127

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Vehicle Information Request Service ID 请求车辆信息的请求服务 ID	M	09
2	Information Type 信息类型	M	00-FF

9.9.3 Positive Response 肯定响应

a) Information Type Supported 支持的信息类型

The Positive Response format shall match the following description:

肯定响应格式必须符合表 128 的描述：

表 128

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Request Vehicle Information Response Service ID 请求车辆信息的响应服务 ID	M	49
2	Information Type no.1 信息类型编号 1	M	00-FF
3	Number of Data Items 数据的数量	M	00-FF

	Information Type Support Record no.1 [] = [		
4	Byte no.1 : Byte no.4]	M	00-FF
:		:	:
7	信息类型支持的记录编号 1=【字节编号 1 .. 字节编号 4】	M	00-FF
:	:	:	:
n-6	Information Type no.m 信息类型编号 m	C	00-FF
n-5	Number of Data Items 数据数量	C	00-FF
n-4 : n	Information Type Support Record no.m [] = [Byte no.1 : Byte no.4] 信息类型支持记录编号 m【】=【字节编号 1 .. 字节编号 4】	C : C	00-FF : 00-FF

注：C: The presence of these blocks depend on the request if multiple Information Types are requested and shall only be present if supported.

C:这些模块的存在依赖请求，如果几个信息类型被请求并且被支持，这些模块只能存在。

b) Information Type Not Supported 不支持的信息类型

The Positive Response format shall match the following description:

肯定响应格式要求符合 129 表的描述：

表 129

Byte No.	Parameter Name	Message Usage	Data Value
1	Request Vehicle Information Response Service ID 请求车辆信息的响应服务 ID	M	49
2	Information Type 信息类型	M	00-FF
3	Number of Data Items 数据数量	M	00-FF
4 : 7	Information Data Record [] = [Byte no.1 : Byte no.4] 信息数据记录【】=【字节编号 1 .. 字节编号 4】	M : M	00-FF : 00-FF

注: C: The presence of these blocks depend on the request if multiple Information Types are requested and shall only be present if supported.

C:这些模块的存在依赖请求，如果几个信息类型被请求并且被支持，这些模块只能存在。

For ISO 14230-4 implementations this service can only support a single INFOTYPE request.

ISO 14230-4 执行的是：这个服务只能支持一个单独的 INFOTYPE 请求。

For ISO 15765-4 implementations this service can support up to 6 INFOTYPE supported requests but only a single request for INFOTYPE data. The INFOTYPEs purely cover the number of messages required to return the requested information (i.e. odd numbers) are not supported since the response already contains an indication of the NUMBER OF DATA ITEMS involved.

ISO 15765-4 执行的是：这个服务能支持高达 6 个 INFOTYPE 被支持请求，但是只支持一个单独的 INFOTYPE 数据请求。INFOTYPEs 完全地传递报文要求的数量用于返回不被支持的请求信息（也就是 odd 数量），因为响应完全包含指示相关的数据数量

9.9.4 Negative Response 否定响应

a) Information Type Supported 支持的信息类型

The Negative Response format shall match the following description:

否定响应必须符合表 130 的描述：

表 130

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Request Vehicle Information Request Service ID 请求车辆信息的请求服务 ID	M	09
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Subfunction not supported 不支持子功能		12
	Incorrect Message Length Or Invalid Format 报文长度错误或 格式无效		13
	Busy Repeat Request 因总线忙而重复请求		21
	Conditions Not Correct 条件错误		22
	Request Correctly Received Response Pending 请求被正确接收但未响应		78

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持的最少否定响应故障代码。

b) Information Type Not Supported 不支持的信息类型

The Negative Response format shall match the following description:

否定响应格式要求符合表 131 的描述：

表 131

Byte No.	Parameter Name 参数名称	Message Usage	Data Value
1	Negative Response 否定响应	M	7F
2	Request Vehicle Information Request Service ID 请求车辆信息的请求服务 ID	M	09
3	sub-function = [Negative Response Trouble Code] 子功能=【否定响应故障代码】	M	00-FF
	Subfunction not supported 不支持子功能		12
	Incorrect Message Length Or Invalid Format 报文长度错误或格式无效		13
	Busy Repeat Request 因总线忙而重复请求		21
	Conditions Not Correct 条件错误		22
	Request Correctly Received Response Pending 正确接收请求但是未响应		78

The above listed Negative Response Trouble Codes are a minimum set to be supported by an ECU supporting the according Diagnostic Service.

上述根据诊断服务列出了 ECU 支持的最少否定响应故障代码。

附录 A

（资料性附录）
Negative Response Codes 否定响应代码

The following section defines all possible negative response codes used within this standard. The negative response codes described in the section Diagnostic Services, are a minimum set of negative responses to be used. The ECU may also use additional negative response code specified in this section.

下面部分定义了本标准中所有可能出现的否定响应代码。此部分诊断服务描述的是否定响应代码，使用否定响应的最小设置。在此部分中，ECU 也可能使用另外的否定响应代码规范。

表 132

Hex Value（16 进制值）	Negative Response Code Description 否定响应代码描述
0-10	ISO SAE reserved 国际标准 SAE 预留
11	Service Not Supported 不支持本服务 This response code indicates that the requested action will not be taken because the ECU does not support the requested service. The ECU shall send this response code in case the diagnostic tool has sent a request message with a service identifier, which is either unknown or not supported by the ECU. Therefore this negative response code is not shown in the list of negative response codes to be supported for a diagnostic service, because this negative response code is not applicable for supported services. 此响应代码指示该请求部分不会被执行，因为此 ECU 不支持该请求服务。当诊断设备发送一个 ECU 不能识别或不支持的服务标识请求报文给 ECU,ECU 应该发送此响应代码回应诊断设备，因此这个否定响应代码没有在支持诊断服务的否定响应代码的列表中列出，因为此否定代码不应用于诊断服务
12	Sub Function Not Supported 不支持子功能 This response code indicates that the requested action will not be taken because the ECU does not support the service specific parameters of the request message. The ECU shall send this response code in case the diagnostic tool has sent a request message with a known and supported service identifier but with "sub parameters " which are either unknown or not supported 此响应代码指示请求部分不会被执行，因为此 ECU 不支持请求报文的服务特定参数。当诊断设备发送一个 ECU 可识别或支持的服务标识符但不能识别或支持的子参数的请求报文给 ECU,ECU 应该发送此响应代码回应诊断设备。
13	Incorrect Message Length Or Invalid Format 错误报文长度或无效格式 This response code indicates that the requested action will not be taken because the length of the received request message does not match the prescribed length for the specified service or the format of the parameters do not match the prescribed format for the specified service. 此响应代码指示请求部分不会被执行，因为接收到请求报文的长不符合特定服务的指定长度或参数格式不符合特定服务的指定格式。

14-20	ISO SAE reserved 国际标准 SAE 预留
21	Busy Repeat Request 占线，重复请求 This response code indicates that the ECU is temporarily too busy to perform the requested operation. In this circumstance the diagnostic tool shall perform repetition of the "identical request message" or "another request message". The repetition of the request shall be delayed by a defined amount of time. If the ECU is able to perform the response but needs additional time to finish the task and prepare the response, the NRC $78 shall be used instead of NRC $21. This response code is in general supported by each diagnostic service. 此响应代码指示 ECU 目前忙碌以至于不能执行响应请求的操作。这种情况下，诊断设备将要执行重复的同一个请求报文或重复其他请求报文。但是请求的重复要求延迟定义好的时间量。如果 ECU 能执行响应但是需要另外的时间来完成任务和准备响应，否定响应代码由$21 替换为$78。 Example: In a multi-diagnostic tool environment the diagnostic request of one diagnostic tool might be blocked temporarily by a NRC $21 while a different diagnostic tool finishes a diagnostic task. 例如：在多个诊断设备同时发出诊断请求时，某个设备可能得不到及时响应因为另外的诊断设备正在完成最后的诊断任务。
22	Conditions not Correct 条件不对 This response code indicates that the requested action will not be taken because the ECU prerequisite conditions are not met. 此响应代码指示请求部分不会被执行，因为 ECU 必备的条件没有满足
23	ISO SAE reserved 国际标准 SAE 预留
24	Request Sequence Error 请求顺序有误 This response code indicates that the requested action will not be taken because the ECU expects a different sequence of request messages or message as send by the diagnostic tool. This may occur when sequence sensitive requests are issued in the wrong order. Example: A successful Security Access service specifies a sequence of Request Seed and Send Key as sub-functions in the request messages. If the sequence is sent different by the diagnostic tool the ECU shall send a negative response message with the negative response code 24 hex - Request Sequence Error. 此响应代码指示指示请求部分不会被执行，ECU 认为诊断设备发送了有误顺序的请求报文或响应报文。顺序有误可能发生在执行请求严格顺序时。 例如：一个成功的安全访问服务会指定在请求报文中作为请求种子和发送密钥的顺序。如果诊断设备发送的顺序有误，ECU 会发生一个否定响应报文，报文会携带否定响应代码 24-表示请求顺序有误
25-30	ISO SAE reserved 国际标准 SAE 预留
31	Request Out Of Range 超出请求范围 This response code indicates that the requested action will not be taken because the ECU has detected that the request message contains a parameter which attempts to substitute a value beyond its range authority (e.g. attempting to substitute a data byte of 111 when the data is only defined to 100). This response code shall be implemented for all services, which allow the diagnostic tool to read data, write

	data or adjust functions by data in the ECU. 此响应代码指示请求部分不会被执行，因为 ECU 检测到请求报文中包含的参数值超出了设定的范围(例如：定义参数值最大为 100 字节，实际响应为 111 字节)。所有允许诊断设备对 ECU 读数据、写数据或调整功能数据的服务，应支持此响应代码执行。
32	ISO SAE reserved 国际标准 SAE 预留
33	Security Access Denied 安全访问不通过 This response code indicates that the requested action will not be taken because the ECU's security strategy has not been satisfied by the diagnostic tool. The ECU shall send this response code if one of the following cases occur: – the test conditions of the ECU are not met, – the diagnostic tool has sent a request message which requires an unlocked ECU. Beside the use of this negative response code as specified in the applicable services within this standard, this negative response code can also be used for any case where security is required and is not yet granted to perform the required service. 此响应代码指示请求部分不会被执行，因为诊断设备访问 ECU 的安全策略没有通过。ECU 应该发送此响应代码当下面条件满足时： –ECU 的测试条件还没有设定 –诊断设备发送了一个请求报文要求 ECU 解锁 在此标准的应用服务中此否定响应代码指定强制使用，此否定响应也可以被用于任意情况，即支持或不支持安全访问服务的情况。
34	ISO SAE reserved 国际标准 SAE 预留
35	Invalid Key 密钥无效 This response code indicates that the ECU has not given security access because the key sent by the diagnostic test tool did not match with the key in the ECU's memory. This counts as an attempt to gain security. The ECU shall remain locked and increments its internal Security Access failed counter. This response code shall only be implemented for Security Access service. 此响应代码指示 ECU 不接受的安全访问因为诊断设备发生的密钥跟 ECU 存储的密钥不匹配。这个计算企图获得安全认证。ECU 应该保持上锁和内部安全访问失败计数器值增加。此响应代码值用于安全访问服务。
36	Exceed Number of Attempts 超出尝试次数 This response code indicates that there have been too many unsuccessful Security Access attempts as allowed and therefore the requested action will not be proceeded. This response code shall only be implemented for Security Access service. 此响应代码指示 ECU 已经接受多次不成功的安全访问尝试，超出运行的次数，因此该请求部分不被执行。此响应代码值用于安全访问服务。
37	Required Time Delay not Expired This response code indicates that the requested action will not be taken because the diagnostic tool's latest attempt to gain security access was initiated before the ECU's required timeout period had elapsed. This response code shall only implemented for the Security Access Service – SID 27 hex. 此响应代码指示请求部分不会被执行，因为在诊断设备开始最近尝试去进行安全访问之前，ECU 的要求超时时间已经用完。此响应代码值用于安全访问服务- SID 27 hex

38-4F	Reserved by Extended Data Link Security Document 为扩展数据链接安全文档预算
50-6F	ISO SAE reserved 国际标准 SAE 预留
70	Upload Download not accepted 不接受上传和下载 This response code indicates that an attempt to upload/download data could not be performed due to some fault conditions. This response shall only be implemented for services which handle upload/download functionality. 此响应代码指示一个上传和下载数据的尝试不被执行，由于一些错误的条件。此响应只在处理上传/下载的功能性服务中才执行。
71	Transfer Data Suspended 发送数据暂停 This response code indicates that a data transfer operation was halted due to some fault. 此响应代码指示由于某些错误数据传递运行中断
72	General Programming Failure 常规程序擦写失败 This response code indicates that the ECU detected an error when erasing or programming a memory location in the permanent memory device (e.g. Flash Memory). This response code shall only be implemented for the Transfer Data service – SID 36 hex. 此响应代码指示 ECU 在永久存储芯片（例如：闪存）寄存器中擦除或写入程序时检测到一个错误。此响应代码只在传递数据服务- SID 36 hex 才执行。
73	Wrong Block Sequence Counter 错误块序列计数器 This response code indicates that the ECU detected an error in the sequence of Block Sequence Counter values. The repetition of with a Block Sequence Counter equal to the one included in the previous Transfer Data request message shall be accepted by the ECU This response code shall only be implemented for the Transfer Data service – SID 36 hex 此响应代码指示 ECU 在块序列计数器值的序列中检测到一个错误，一个携带块序列计数器值的传输数据请求报文的重复等于前期，ECU 应该接受传输数据请求报文。此响应代码只在传递数据服务-. SID 36 hex 才执行。
74-77	ISO SAE reserved 国际标准 SAE 预留
78	Request Correctly Received Response Pending 正确接收请求未响应 This response code indicates that the request message was received correctly, and that all parameters in the request message were valid, but the action to be performed is not yet ready to receive another request. As soon as the requested service has been completed, the ECU shall send a positive response message or negative response message with a negative response code different from this. The negative response message with this response code may be repeated by the ECU until the requested service is completed and the final response message is sent. This response code might impact the application layer timing parameter values. This response code shall only be used in a negative response message if the ECU will not be able to receive further request messages from the diagnostic tool while completing the requested diagnostic service. This response code insin general supported by each diagnostic service, therefore it is not listed in the list of applicable response codes of the diagnostic services. 此响应代码指示请求报文接收正确。而且在请求报文中所有的参数是有效的，但是因为在正执行某个请求服务中而不准备接收另一个请求服务。一旦请求服务执行完成，ECU 应该发送一个肯定响应报文或者发送一个携带与此否定响应代码不同的否定响应报文。ECU 可能重复的发

	送携带与此否定响应代码的否定响应报文,直到此请求服务被执行而且最终的响应报文被发送。这个响应代码可能影响应用层时序参数值。这个响应代码只能用于特定的否定响应报文,此类报文为 ECU 正在执行诊断服务以至于不能接收诊断设备发出的其他请求报文。每个诊断服务通常都支持这个响应代码,因此没有在诊断服务的应用响应代码列表中列出。
79-7D	ISO SAE reserved 国际标准 SAE 预留
7E	Sub Function Not Supported In Active Session 在会话活动中不支持的子功能 This response code indicates that the requested action will not be taken because the ECU does not support the requested Sub-Function in the session currently active. This response code is in general supported by each diagnostic service with a sub-function parameter, therefore it is not listed in the list of applicable response codes of the diagnostic services. 此响应代码指示该请求部分不会被执行,因为在当前会话活动中 ECU 不支持该请求服务。每个带有子功能参数诊断服务基本都支持这个响应代码,因此没有在诊断服务的应用响应代码列表中列出。
7F	Service Not Supported In Active Session 在会话活动中不支持的服务 This response code indicates that the requested action will not be taken because the ECU does not support the requested service in the session currently active. This response code is in general supported by each diagnostic service, therefore it is not listed in the list of applicable response codes of the diagnostic services. 此响应代码指示该请求部分不会被执行,因为在当前会话活动中 ECU 不支持该请求服务。每个诊断服务基本都支持这个响应代码,因此没有在诊断服务的应用响应代码列表中列出。
80	ISO SAE reserved 国际标准 SAE 预留
81	RPM Too High RPM 过高 This response code indicates that the requested action will not be taken because the ECU prerequisite condition for RPM is not met (current RPM is above a pre-programmed maximum threshold). 此响应代码指示该请求部分不会被执行,ECU 的 RPM 首要条件没有满足(即当前 RPM 高于原程序设定的最大阀值)
82	RPM Too Low RPM 过高 This response code indicates that the requested action will not be taken because the ECU prerequisite condition for RPM is not met (current RPM is below a pre-programmed minimum threshold). 此响应代码指示该请求部分不会被执行,ECU 的 RPM 首要条件没有满足(即当前 RPM 低于原程序设定的最大阀值)
83	Engine is Running 发动机正在运行 This response code is required for those actuator tests, which cannot be actuated unless the Engine is running. This is different from RPM too low negative response, and needs to be allowed. 此响应代码是要求那些激励测试,该测试不能执行除非发动机正在运行。这与 RPM 不同,太慢的否定响应和需要被允许。
84	Engine Is Not Running 发动机不运行 This response code is required for those actuator test, which cannot be actuated unless the Engine is running. This is different from RPM too low negative response, and needs to be allowed. 此响应代码是因发动机不运行而不能进行激励测试是用于响应的。不同于 RPM 过低的否定响

	应，此响应代码需要被运行
85	**Engine Run Time Too Low 发动机运行时间太短** This response code indicates that the requested action will not be taken because the ECU prerequisite condition for engine run time is not met (current engine run time is below a pre-programmed limit.) 此响应代码指示该请求部分不会被执行，因为 ECU 的发动机运行时间的要求不满足（当前发动的运行时间低于源程序设定的阀值）。
86	**Temperature Too High 温度过高** This response code indicates that the requested action will not be taken because the ECU prerequisite condition for temperature is not met (current temperature is above a pre-programmed maximum threshold). 此响应代码指示该请求部分不会被执行，因为 ECU 对温度要求没有得到满足（当前温度高于源程序设定的最大阀值）。
87	**Temperature Too Low 温度过低** This response code indicates that the requested action will not be taken because the ECU prerequisite condition for temperature is not met (current temperature is below a pre-programmed maximum threshold). 此响应代码指示该请求部分不会被执行，因为 ECU 对温度要求没有得到满足（当前温度低于源程序设定的最小阀值）。
88	**Vehicle Speed Too High 车速过高** This response code indicates that the requested action will not be taken because the ECU prerequisite condition for vehicle speed is not met (current vehicle speed is above a pre-programmed maximum threshold). 此响应代码指示该请求部分不会被执行，因为 ECU 对车速要求没有得到满足（当前车速高于源程序设定的最大阀值）。
89	**Vehicle Speed Too Low 车速过低** This response code indicates that the requested action will not be taken because the ECU prerequisite condition for vehicle speed is not met (current vehicle speed is below a pre-programmed maximum threshold). 此响应代码指示该请求部分不会被执行，因为 ECU 对车速要求没有得到满足（当前车速低于源程序设定的最小阀值）。
8A	**Throttle/ Pedal Too High 刹车/踏板位置过高** This response code indicates that the requested action will not be taken because the ECU prerequisite condition for throttle/ pedal position not met (current position is above a pre-programmed maximum threshold). 此响应代码指示该请求部分不会被执行，因为ECU对刹车/踏板位置要求没有得到满足（当前刹车/踏板位置高于源程序设定的最大阀值）。
8B	**Throttle/ Pedal Too Low 刹车/踏板位置过低** This response code indicates that the requested action will not be taken because the ECU prerequisite condition for throttle/ pedal position not met (current position is below a pre-programmed maximum threshold). 此响应代码指示该请求部分不会被执行，因为 ECU 对刹车/踏板位置要求没有得到满足（当前刹车/踏板位置低于原程序设定的最小限值）

8C	**Transmission Range Not In Neutral 传输不在空挡范围** This response code indicates that the requested action will not be taken because the ECU prerequisite condition for being in neutral is not met (current transmission range is not in neutral). 此响应代码指示该请求部分不会被执行，因为 ECU 对处在空挡的要求没有得到满足（当前传输范围不在空挡上）。
8D	**Transmission Range Not In Gear 传输不在正常齿轮范围** This response code indicates that the requested action will not be taken because the ECU prerequisite condition for being in gear is not met (current transmission range is not in gear). 此响应代码指示该请求部分不会被执行，因为 ECU 对齿轮的要求没有得到满足（当前传输不在正常齿轮范围）。
8E	ISO SAE reserved 国际标准 SAE 预留
8F	**Brake Switch(es) Not Closed (Brake Pedal not pressed or not applied)制动开关没有闭合（刹车踏板踩下或没有使用）** For safety reasons, this is required for certain tests before it begins , and must be maintained for the entire duration of the test. 出于安全考虑，在启动前可靠性测试的要求，而且必须维持整个测试时持续的。
90	**Shift Lever not In Park 挂挡柄不在驻车档上** For safety reasons, this is required for certain tests before it begins, and must be maintained for the entire duration of the test. 出于安全考虑，出于安全考虑，在启动前可靠性测试的要求，而且必须维持整个测试时持续的。
91	**Torque Converter Clutch Locked 扭矩转换离合上锁** This response code indicates that the requested action will not be taken because the ECU prerequisite condition for torque converter clutch is not met (current TCC status above a pre-programmed limit or locked). 此响应代码指示该请求部分不会被执行，因为 ECU 对扭矩转换离合要求没有得到满足（当前扭矩转换离合状态与原程序设定的阀值不符或上锁）。
92	**Voltage Too High 电压过高** This response code indicates that the requested action will not be taken because the ECU prerequisite condition for voltage at the primary pin of the ECU (ECU) is not met (current voltage is above a preprogrammed maximum threshold). 此响应代码指示该请求部分不会被执行，ECU 对 ECU 的主要 PIN 脚电压要求没有得到满足（当前电压高于源程序的最大阀值）。
93	**Voltage Too Low 电压过低** This response code indicates that the requested action will not be taken because the ECU prerequisite condition for voltage at the primary pin of the ECU (ECU) is not met (current voltage is below a preprogrammed maximum threshold). 此响应代码指示该请求部分不会被执行，ECU 对 ECU 的主要 PIN 脚电压要求没有得到满足（当前电压低于源程序的最小阀值）。
94-FE	ISO SAE reserved 国际标准 SAE 预留
FF	ISO SAE reserved 国际标准 SAE 预留

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