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1. Introduction

1.1 Scope of Document

The document describes the specific requirement for the diagnostic of the TPMS.

1.2 Abbreviations and Terminology

ASC	ASCII Encoded.
VSIE	Vehicle Software Integration Engineer
BCD	Binary Coded Decimal (Numeric Signal)
BLN	Boolean
DRE	Design Release Engineer
DTC	Diagnostic Trouble Code

2. Applicable documents

2.1 Referenced Documents

Referenced parts of the documents listed herein form an integral part of the requirements imposed on the component by this specification.

2.1.1 Government Documents

Not applicable.

2.1.2 JAC Documents

[1] JAC Diagnostic DID specification_Version 2.pdf

[2] JAC Diagnostic SA specification_Version 2.pdf

2.1.3 Industry Documents

[1] ISO/DIS 14229-1.2 (rev. 2005-05-08) Road Vehicles-Diagnostic services-Part 1: Specification and requirements

[2] ISO 15765-3, first edition 2004-10-15 Road vehicles- Diagnostics on Controller Area Network (CAN) – Part 3: Implementation of diagnostic services

[3] ISO/DIS 15031-5.4, 2004-12-10 Road vehicles-Communication between vehicle and external equipment for emissions-related diagnostics-Part5: Emission-related diagnostic services

[4] ISO 15765-4, first edition 2004-10-15 Road vehicles- Diagnostics on Controller Area Network (CAN) – Part 4: Requirements for emission-related systems

[5] ISO 11898-1, first edition 2003-12-01 Road vehicles — Controller area network (CAN) — Part 1: Data link layer and physical signalling

2.1.4 Supplier Documents

Not applicable.

2.1.5 Other Documents

Not applicable.

2.2 Related Documents

This paragraph identifies related documents that may assist the reader in comprehension and understanding of the specification content or subject. Documents listed herein do not form a part of the requirements in this specification.

Not *applicable*.

3. REQUIREMENTS

3.1 Diagnostic Protocol

3.1.1 Physical Layer

物理层使用江淮标准：CAN 物理层规范.pdf（版本 2.1）

The Baud rate shall be 100kbps. The baud rate or bit rate is the number of bits per time during transmission regardless of bit representation.

3.1.2 Data Link Layer

数据链路层使用江淮标准：数据链路层与信号交互层规范.pdf（版本 2.0）

The ECU shall comply with [5] ISO 11898-1. The supplier shall provide documents to prove compliance to this requirement. This is also known as CAN v 2.0B, standard frame format.

3.1.2.1 Addressing Format

Both physical and Functional addressing shall supported by ECU, Only 11-bit CAN identifier shall be used and the N_AI field shall have values according to following table.

Addressing Method	Direction	CAN Identifier
Physical	Request	0x761
Physical	Response	0x769
Functional	Request	0x7DF
Functional	Response	0x769

3.1.2.2 Message Format

The message data length of all diagnostic requests and responses shall always be eight(8). The ECU can ignore any diagnostic requests that do not comply with this.

In the case of a diagnostic message that does not occupy all 8 data bytes of the CAN frame, the remaining data bytes will be padded with bytes of 0x00.

3.1.3 Network Layer

3.1.3.1 Timing Parameter for Network Layer

The ECU uses ISO TP according to ISO15765-2 as the network transport layer with the following settings:

Parameter	Description	Value
BS	Block Size	0
STmin	Minimum Separation Time	2ms
N_As	Time for transmission of the CAN frame (any N_PDU) on the sender side	100ms
N_Bs	Time until reception of the next FlowControl N_PDU.	1000ms
N-Cs	Time until transmission of the next ConsecutiveFrame N_PDU	2ms
N_Ar	Time for transmission of the CAN frame (any N_PDU) on the receiver side	100ms
N_Br	Time until transmission of the next FlowControl N_PDU	0
N-Cr	Time until reception of the next ConsecutiveFrame N_PDU	1000ms

3.1.4 Application Layer

3.1.4.1 Application Layer Timing Parameter

Parameter	Description	Type	Min	Max
P2CAN 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 (N_USDataFF.ind for a multi-frame message or N_USData.ind for a Single Frame message). Name of Parameter in ISO 15765-3: P2CAN_Client	Timer reload value	*	*
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 (N_USDataFF.ind for a multi-frame message or N_USData.ind for a Single Frame message). Name of Parameter in ISO 15765-3: P2*CAN_Client	Timer reload value	*	*
P2CAN ECU	Performance requirement for the ECU to start with the response message after the reception of a request message (indicated via N_USData.ind). Name of Parameter in ISO 15765-3: P2CAN_Server	Performance requirement	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). Name of Parameter in ISO 15765-3: P2*CAN_Server	Performance requirement	0ms	5000 ms
P3CAN 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 Name of Parameter in ISO 15765-3: P3CAN_Client_Phys	Timer reload value	*	*
P3CAN 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. Name of Parameter in ISO 15765-3: P3CAN_Client_Func	Timer reload value	*	*

Session Layer Timing Parameter

Parameter	Description	Type	Value (ms)
S3Tester	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). Name of Parameter in ISO 15765-3: S3Client	Timer reload value	2000
S3ECU	Time for the ECU to keep a diagnostic session other than the Default Session active while not receiving any diagnostic request message. Name of Parameter in ISO 15765-3: S3Server	Timer reload value	5000

3.2 Diagnostic Fault Detection and DTC Setting

3.2.1 Fault Definition

Any recognized faults shall generate a DTC. Recognized faults may include but are not limited to the following (as determined by FMEA):

- Open or shorted condition on an I/O Circuit outside of normal operation of that circuit.
- Erratic signal of a circuit, outside of normal operation, which can be readily and repeatedly recognized as erratic.
- A condition, outside of normal operation, which causes a customer perception of a performance problem.
- A condition (whether h/w or data link error) which causes a device to operate in a default or failsoft mode.
- A condition which changes or limits system performance such that customer safety may be compromised.
- Criteria determined by legislation.

3.2.2 DTC Information Storage

The DTC Numbers, DTC Failure Type, DTC Status Information and Failure Records shall be stored in non volatile memory (defined here as memory which is not lost during ignition off or battery disconnect conditions). The ECU shall have the capability to report DTCs with DTC Failure Type, Status Information, and if applicable, failure record.

3.2.3 DTC Status Information

Status information shall be assigned to the individual bits of the DTC Status byte.

Bit	Description	Emission	Non-emission	Impl. *
0	testFailed	M	M	YES
1	testFailedThisOperationCycle	M	N/A	YES
2	pendingDTC	M	N/A	YES
3	confirmedDTC	M	M	YES
4	testNotCompletedSinceLastClear	M	M	YES
5	testFailedSinceLastClear	M	M	YES
6	testNotCompletedThisOperationCycle	M	M	YES
7	warningIndicationRequested	M	N/A	NO

* Implemented: YES indicates that this status information shall be implemented.
NO indicates that this status information shall **NOT** be implemented.

4. Supported diagnostic services

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. The primitive of diagnostics are service requests and service responses. This chapter describes the general service message format for UDS. The following Diagnostic Services are supported by the ECU on default session, program session, or extended session under physical or functional addressing. By the way only a single transport protocol message is supported in functional addressing mode.

The Negative Response Trouble Code is listed for each service, and it is important to inform that the listed NRC is mandatory for development. For other NRC which supplier has to implement should comply with ISO 14229.

Services shall be implemented according to ISO/DIS 14229-1.2 and ISO 15765-3. Additional details are specified in this section.

4.1 Diagnostic services in Bootloader Software

4.2 Diagnostic services in Application Software

4.2.1 Addressing Restrictions

The ECU shall support physical and functional addressing.

The following table points out which services support which addressing. ✓

×

SID(hex)	Service name	Physical addressing	Functional addressing
10	Diagnostic Session Control	✓	✓ 1)
11	ECU Reset	✓	✓
14	Clear Diagnostic Information	✓	✓
19	Read DTC Information	✓	✓
22	Read Data by Identifier	✓	✓
27	Security Access	✓	×
28	Communication Control	✓	✓
2E	Write Data by Identifier	✓	×
31	Routine Control	✓	×
3E	Tester Present	✓	✓
85	Control DTC Setting	✓	✓
	用于 Bootloader :		
34	RequestDownload	✓	×
36	TransferData	✓	×
37	RequestTransferExit	✓	×

Explanation

✓ = Addressing mode is supported by this service.

1) Depending on the session parameter. For default and extended session the support of functional addressing is mandatory.

4.2.2 Session Restrictions

A diagnostic session enables a specific set of diagnostic services and/or functionality in the server. Consequently, all other services are not enabled and shall not be executed within this diagnostic session.

We can support the diagnostic sessions “default”, “extended”, and “programming”.

Service name	Service ID [Hex]	Default Session	Extended Session	Programming Session
Diagnostic Session Control	10	✓	✓	✓
ECU Reset	11	✓	✓	✓
Clear Diagnostic Information	14	✓	✓	
Read DTC Information	19	✓	✓	
Read Data by Identifier	22	✓	✓	✓
Security Access	27		✓	✓
Communication Control	28		✓	
Write Data by Identifier	2E		✓	✓
Routine Control	31		✓	✓
Tester Present	3E	✓	✓	✓
Control DTC Setting	85		✓	
用于 Bootloader:				
RequestDownload	34			✓
TransferData	36			✓
RequestTransferExit	37			✓

Explanation

✓ = Service may be executed in active session

1) Secured dataidentifiers requires a SecurityAccess service and therefore a non-default diagnostic session.

2) Secured routines require a SecurityAccess service and therefore a non-default diagnostic session. A routine that requires to be stopped actively by the client also requires a non-defaultl seseion.

Please note that that a service will only be executed if the current session and the current security level allow the execution.

4.3 DiagnosticSessionControl (\$10) Service (supported)

4.3.1 Request Message Definition

Data Byte	Parameter Name		Cvt	Hex Value
#1	DiagnosticSessionControl Service Id		M	10
#2	Bit 7	suppressPosRespMsgIndicationBit	M	0 or 1
	Bit 6~0	sub-function = [DefaultSession ProgrammingSession ExtendedSession]		01 02 03

4.3.1.1 Request Message Sub-Function Parameter Definition

Hex	Definition
01	DefaultSession
	This diagnostic session enables the default diagnostic session in the server(s) and does not support any diagnostic application timeout handling provisions(e.g. no TesterPresent service is necessary to keep the session active)
02	ProgrammingSession
	This diagnosticSession enables all diagnostic services required to support the memory programming of a server.
03	ExtendedSession
	This diagnostic session can e.g. be used to enable all diagnostic services required to support the adjustment of functions in the server's memory. It can also be used to enable diagnostic services, which are not specifically tied to the adjustment of functions.

4.3.2 Positive Response Message Definition

[In the case of sub-function = DefaultSession]

Data Byte	Parameter Name	Cvt	Hex Value
#1	DiagnosticSessionControl Positive Response Service Id	M	50
#2	DefaultSession	M	01

[In the case of sub-function = ProgrammingSession]

Data Byte	Parameter Name	Cvt	Hex Value
#1	DiagnosticSessionControl Positive Response Service Id	M	50
#2	ProgrammingSession	M	02

[In the case of sub-function = ExtendedSession]

Data Byte	Parameter Name	Cvt	Hex Value
#1	DiagnosticSessionControl Positive Response Service Id	M	50
#2	ExtendedSession	M	03

4.3.2.1 Positive Response Message Data Parameter Definition

Definition	
P2ServerMax	
Default P2ServerMax timing supported by the server for the activated diagnostic session	
P2*ServerMax	
Enhanced P2ServerMax supported by the server for the activated diagnostic session	

4.3.3 Supported Negative Response Codes (RC_)

The following negative response codes shall be implemented for this service.

Hex	Description	Cvt
12	subFunctionNotSupported	M
13	incorrectMessageLengthOrInvalidFormat	M
22	ConditionsNotCorrect	M

4.3.4 Service Example

[Request Example]

Data Byte	Parameter Name	Cvt	Hex Value
#1	DiagnosticSessionControl Request Service Id	M	10
#2	Subfunction	M	03

[Positive Response Example]

Data Byte	Parameter Name	Cvt	Hex Value
#1	DiagnosticSessionControl Request Service Id	M	50
#2	Subfunction	M	03

[Negative Response Example]

Data Byte	Parameter Name	Cvt	Hex Value
#1	Negative Response	M	7F
#2	Service ID	M	10
#3	NRC – “incorrectMessageLengthOrInvalidFormat”	M	13

4.3.5 Implementation Rules

4.4 ECUReset (\$11) Service (supported)

4.4.1 Request Message Definition

以上内容仅为本文档的试下载部分，为可阅读页数的一半内容。如要下载或阅读全文，请访问：<https://d.book118.com/248130134114006062>