Q_LAH80124

Implementation Matrix

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1. Implementation Matrix

Id:	Q-LAH_80124-165
Version:	2.7
Description:	The objective of this Performance Specification is to completely describe the UDS and on- board diagnostics (OBD) diagnostic communication protocols for Volkswagen AG.

Id:	Q-LAH_80124-7566
Version:	2.7
Description:	Additional requirements are defined for a specific Volkswagen AG implementation deviating from or in addition to documents /1/ and /8/.

Id:	Q-LAH_80124-9588
Version:	2.7
Description:	Documents /8/ and /11/ leave room for interpretation at many points. This document describes the actual implementations that apply to Volkswagen AG electronic control units (ECUs)/servers for the OBD requirements with respect to communications with clients. Requirements with respect to event memory management are described in document /2/.

Id:	Q-LAH_80124-9589
Version:	2.7
Description:	Deviations from the DESIRED version of this document must be disclosed by the supplier and agreed upon with Volkswagen AG.

Id:	Q-LAH_80124-9935
Version:	2.7
Description:	Interpretations and expansions that go beyond the scope of this document and the referenced documents must be clarified with the Diagnostics department.

Id:	Q-LAH_80124-10022
Version:	2.7
Description:	General Project-Independent Performance Specifications (Q-LAH) for diagnostics are published as a package of individual Diagnostics Q-LAHs in versions that are compatible with each other. The version number of the Q-LAH package is published in the Baseline attribute on the title page.

Id:	Q-LAH_80124-10023
Version:	2.7
Description:	Only Diagnostics Q-LAHs that have the same version number may be used for the development of a system. Deviations must be agreed upon with the Diagnostics department and documented in the Component Performance Specification (BT-LAH).

Id:	Q-LAH_80124-7567
Version:	2.7
Description:	Diagnostic services that are not required for Volkswagen AG in accordance with documents /1/ and /8/ are not described in this Performance Specification.

Id:	Q-LAH_80124-166
Version:	2.7
Description:	In accordance with the OSI reference model, these specifications will contain a description of application layer 7 and session layer 5, together with the associated implementation rules General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-203
Version:	2.7
Description:	Table 1-1: OSI reference model OSI layer Protocol WWH-OBD ISO 14229-1, ISO 14229-3 UDSonCAN,

Id:	Q-LAH_80124-204
Version:	2.7
Description:	To transmit the services, additional protocols are used (e.g., CAN, FlexRay, LIN, ISO 15765-2).

Id:	Q-LAH_80124-205
Version:	2.7
Description:	The latest versions of the relevant Performance Specifications and standards must be General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-7417
Version:	2.7
Description:	See document /18/.

Id:	Q-LAH_80124-6786
Version:	2.7
Description:	Table 2-1 Abbreviations and terms Abbreviation Designation Meaning Q-LAH_-80124-xxxxx - Requirement number Server req. - Requirement number for server Client req. - Requirement number for client Gen. req. - Generally valid requirement number Cvt. Conventional Implementation rules and conventions that apply to the parameters of a service M Mandatory Cvt. = M: Must be implemented or must always be transmitted for the application software C Conditional Cvt. = C: Must be transmitted/implemented as a function of specific conditions U User optional Cvt. = U: Must be implemented specific to the system NoImp No Cvt. = NoImp: Must not be implemented for servers ordered by implementation Volkswagen AG xx Data Any data

Id:	Q-LAH_80124-7568
Version:	2.7
Description:	The values of the service identifiers are named in this document (except for the examples) with the suffix 'hex', e.g., Service DiagnosticSessionControl (10hex).

Id:	Q-LAH_80124-9289
Version:	2.7
Description:	The NRC sequences described for the services can be found in document /1/ and are expanded by Volkswagen AG requirements. The descriptions of the figures have been explicitly left in English as per document /1/.

Id:	Q-LAH_80124-9854
Version:	2.7
Description:	In this document, the following terms mean the same thing: positive response = positive answer negative response = negative answer

Id:	Q-LAH_80124-9860
Version:	2.7
Description:	The considerations of the protocols apply to CAN. For other network address information (N_AI) definitions, the pendants of the N_AIs apply to the corresponding buses (e.g., FlexRay, TCP/IP).

Id:	Q-LAH_80124-10109
Version:	2.7
Description:	Among other things, this document describes the requirements for OBDECUs. Legally compliant OBDECU development is referred to as FullOBD in this doc-

	ument. The preparation of a legally compliant OBDECU is referred to as OBDReady in this document. To differentiate and delimit OBDReady from FullOBD implementations, the requirements for an OBDReady implementation are specified in the "OBDReadyECU" sections and those for FullOBD in the "FullOBDECU" sections. General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-286
Version:	2.7
Description:	A message is structured as follows and is made up of (at least) one or more messages (frames):

Id:	Q-LAH_80124-295
Version:	2.7
Description:	Figure 3-1: Message structure SID Parameter Data

Id:	Q-LAH_80124-9906
Version:	2.7
Description:	The diagnostic communication with the server (reception, processing, and response to a UDS request) must be possible within 500 ms after Power-on/ Wake-up.

Id:	Q-LAH_80124-298
Version:	2.7
Description:	The request/response process as per documents /1/ and /8/ is used. Only one client (e.g., diagnostic scan tool (on-board or off-board), testing system, generic scan tool, etc.) is authorized to send request messages (requirements). The servers participating in the communication are only permitted to send response messages.

Id:	Q-LAH_80124-301
Version:	2.7
Description:	The ServiceIdentifier (SID) identifies the service and indicates whether it is a request or a response message. The service identifier of a response must be 0x40 larger than the service identifier of the request.

Id:	Q-LAH_80124-302
Version:	2.7

Description:	The final (concluding) response message of a system must be either only positive or only negative.

Id:	Q-LAH_80124-7569
Version:	2.7
Description:	A positive response message must be sent by the server if the diagnostic service requested by the client has been successfully executed as a function in the server. (Exceptions are described in the respective services.)

Id:	Q-LAH_80124-7570
Version:	2.7
Description:	A negative response message must be sent by the server if the diagnostic service requested by the client is incorrect or could not be performed within the specified time (see Timing section).

Id:	Q-LAH_80124-10188
Version:	2.7
Description:	A requested diagnostic service must only trigger the functions defined in its scope. A diagnostic service must not be used as a trigger for further operations in the ECU that were not defined in the ECU's scope. Example: Customer-perceivable responses when running service 22hex.

Id:	Q-LAH_80124-303
Version:	2.7
Description:	Within the P2Client timer period, a server response must reach the client (1st frame of the General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-304
Version:	2.7
Description:	Each message (request or response) must comply with the format stipulated in these specifications. Other formats are not permitted, nor is adding or leaving out information.

Id:	Q-LAH_80124-306
Version:	2.7
Description:	All the services indicated here can be requested by a client in any sequence.

Id:	Q-LAH_80124-9443

Version:	2.7
Description:	In the server, only service sequences may be mapped that are described in this document or are mapped in the client via job sequences (e.g., update programming as per document /9/ or data set download as per /19/).

Id:	Q-LAH_80124-307
Version:	2.7
Description:	Each service described here can be queried in polling mode (e.g., for measured value/diagnostic trouble code (DTC) monitoring). Cyclical transmission of positive responses without polling (e.g., as a free-running protocol) is not permitted.

Id:	Q-LAH_80124-308
Version:	2.7
Description:	The service parameters identify the transmitted data. The parameters can contain, e.g., sub- functions, DataIdentifiers, additional data, to respond to the addressed diagnostic object.

Id:	Q-LAH_80124-309
Version:	2.7
Description:	The data length of a UDS message must not exceed a maximum of 4 095 Bytes. The stipulations in document /5/ must also be complied with. For pure diagnostic communication over Internet Protocol (DoIP) transfer paths from the client to the server, the max. data length of 4 GB must not be exceeded.

Id:	Q-LAH_80124-9651
Version:	2.7
Description:	The effective chain or transmission path of all transport protocols in interaction with all TP gateways must be considered for the data length.

Id:	Q-LAH_80124-310
Version:	2.7
Description:	The byte order is HighByte/MSByte first (= Motorola format).

Id:	Q-LAH_80124-311
Version:	2.7
Description:	For services with a sub-function, the MSBit (bit 7) in the request is used to indicate whether a positive response is required or not (SuppressPositiveResponseBit). Evaluation/implementation is carried out on a service-specific basis.

Id:	Q-LAH_80124-9292
Version:	2.7
Description:	The OBD services as per document /8/ do not contain sub-functions.

Id:	Q-LAH_80124-9293
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-312
Version:	2.7
Description:	Negative responses are always related only to the service itself and not to the content- related results of an already executed service. Only if the service itself cannot be executed can a corresponding negative response be sent to the client. However, the positive response can contain negative results, such as an incorrect EEPROM checksum or incorrect software authentication.

Id:	Q-LAH_80124-7572
Version:	2.7
Description:	The service identifier specified in the response always has the value 0x7F.

Id:	Q-LAH_80124-7573
Version:	2.7
Description:	The following values are specified as additional parameters for the negative response: Service ID of the request message Actual NegativeResponseCode (NRC)

Id:	Q-LAH_80124-9306
Version:	2.7
Description:	The NegativeResponseCode (NRC) in the Negative Response Message is used to indicate why the requested service failed or could not be completed in time.

Id:	Q-LAH_80124-9719
Version:	2.7
Description:	The NegativeResponseCode is a 1-byte value (see appendix A - Codes and service parameters).

Id:	Q-LAH_80124-9307
Version:	2.7

Description:	A client must evaluate the service ID of the Negative Response Message to be able to establish the correspondence to the service ID of the request.

Id:	Q-LAH_80124-7574
Version:	2.7
Description:	Table 3-1: Layout of a negative response message Data Parameter name, response Bit- Cvt. Hex length #1 NegativeResponse ServiceID 8 M 7F #2 Request ServiceID 8 M xx #3 NegativeResponseCode 8 M xx

Id:	Q-LAH_80124-7603
Version:	2.7
Description:	If a service request that is not supported is placed by the client, NRC 0x11 must be sent by the server. This also applies if a response SID is used for a request.

Id:	Q-LAH_80124-314
Version:	2.7
Description:	The size of the send and receive buffer (RAM) for calibrating a system is defined as a function of the diagnostic protocol and the physical bus characteristics: LIN (DK0/1/2/2F): 128 to 512 bytes Default values DK1/DK2: 128 bytes DK2F: 256 bytes CAN/CAN FD/Flexray/MOST and others: 512 to 4 096 bytes, applies for all diagnostic General Project-Independent Performance Specification LAH.-DUM.909.G DoIP: 1 024 to 4 096 bytes For DoIP-only transfer paths between the client and the server, the system's send and receive buffer can be up to 1 Mbyte. This must be agreed upon with the Diagnostics and Networking departments and must be documented in the BT-LAH. Default values Volkswagen AG diagnostic protocol: 1 024 OBDC diagnostic protocol: 1 024

Id:	Q-LAH_80124-9834
Version:	2.7
Description:	The buffer size for an appropriately used protocol must be designed with respect to the use case according to which the size of the request/response buffer is calculated.

Id:	Q-LAH_80124-9835
Version:	2.7
Description:	These use cases are, for example: Maximum response length for ReadDiagnosticInformation (19hex) with reference to the sub-functions implemented in the server. Note: DTCs for which no diagnostic results have been delivered [TestNotCompletedSinceLastClear = 1, TestNotCompletedThisOperationCycle =

	1] must not be considered for the sizing. Maximum response length for ReadDataByIdentifier (22hex) for multiple DataIdentifier query for all DataIdentifiers implemented in the server. Maximum response length for ReadDataByIdentifier (22hex) for multiple DataIdentifier query of DK1/2/2F systems as per document /15/. Maximum request length for TransferData (36hex) for update programming. Maximum request length for WriteDataByIdentifier (2Ehex) for configuration.

Id:	Q-LAH_80124-9836
Version:	2.7
Description:	For implementation of diagnostics over IP (DoIP), the buffer size as per document /12/ must be considered.

Id:	Q-LAH_80124-7605
Version:	2.7
Description:	DataIdentifiers must always be available in every session.

Id:	Q-LAH_80124-7606
Version:	2.7
Description:	DataIdentifiers, InputOutputIdentifiers, and RoutineIdentifiers protected by the SecurityAccess service (27hex) require a NonDefaultSession.

Id:	Q-LAH_80124-7607
Version:	2.7
Description:	A DataIdentifier, InputOutputIdentifier, and RoutineIdentifier must not be associated with a session if this is not explicitly required.

Id:	Q-LAH_80124-7608
Version:	2.7
Description:	Exceptions must be agreed upon with the Volkswagen AG Diagnostics and Diagnostic General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-7602
Version:	2.7
Description:	Note for all NRC sequences: Depending on the implementation, a certain NRC cannot be guaranteed for all possible test scenarios.

Id:	Q-LAH_80124-9621

Version:	2.7
Description:	The handling at the TP level is not considered here.

Id:	Q-LAH_80124-710
Version:	2.7
Description:	The service processing in the server sequence diagram shown below must be implemented for all services:

Id:	Q-LAH_80124-6545
Version:	2.7
Description:	Figure 3-2: General server response behavior mandatory optional VOLKSWAGEN AG-specific 1) Server is busy*? Yes No SID supported? No NRC 0x11 Yes SID supported in No NRC 0x7F active session? Yes SID security check o.k.? No NRC 0x33 Yes Service with 2) Subfunction, but not SID 31hex? Yes No 1 1) Diagnostic request can not be accepted because another diagnostic task requested before or by different client is already inprogress. Refer to Multiple-Client-Chapter General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-7577
Version:	2.7
Description:	The service processing in the server sequence diagram shown below must be implemented for all services with sub-function parameters.

Id:	Q-LAH_80124-7578
Version:	2.7
Description:	Figure 3-3: General server response behavior with sub-function parameters mandatory optional VOLKSWAGEN AG-specific 1 1) Minimum No NRC 0x13 length check ok? YES Subfunction supported ever No NRC 0x12 for the SID? Yes Subfunction supported in No NRC 0x7E active session Subfunction for the SID? security check o.k.? No NRC 0x33 Yes Request sequence respected for the Subfunction? No NRC 0x24 Yes Condition check o.k.? 2) No NRC 0x22, 0x81-0x93 Yes Specific SID checks 1) at least 2 (SID+SubFunction-Parameter) General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-5288
Version:	2.7
Description:	The most significant bit (MSBit) in the sub-function byte of certain client requests is used to activate and deactivate the positive server response. This bit is desig-

	nated the SuppressPositiveResponseBit (SPR) and does not belong to the subfunction. Therefore it is not contained in the positive response of a server.

Id:	Q-LAH_80124-7257
Version:	2.7
Description:	The SuppressPositiveResponseBit is evaluated and considered only when the server has concluded the service processing.

Id:	Q-LAH_80124-7516
Version:	2.7
Description:	The client must accept a positive response for a request with SuppressPositiveResponseBit == 1 and subsequent NRC 0x78.

Id:	Q-LAH_80124-5341
Version:	2.7
Description:	Table 3-2: Services with SuppressPositiveResponseBit Service Request ServiceIdentifier (SID) DiagnosticSessionControl 10hex ECUReset 11hex ReadDTCInformation 19hex CommunicationControl 28hex SecurityAccess 27hex RoutineControl 31hex TesterPresent 3Ehex ControlDTCSetting 85hex ResponseOnEvent 86hex LinkControl 87hex

Id:	Q-LAH_80124-9532
Version:	2.7
Description:	The following table describes the services for which the use of SuppressPositiveResponseBit == 1 is meaningful:

Id:	Q-LAH_80124-9533
Version:	2.7
Description:	Table 3-3: Meaningful use of services with SuppressPositiveResponseBit == 1 Service Request ServiceIdentifier (SID) DiagnosticSessionControl 10hex ECUReset 11hex CommunicationControl 28hex RoutineControl 31hex TesterPresent 3Ehex ControlDTCSetting 85hex General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-305
Version:	2.7
Description:	Each service can be transmitted to one (=physical), to several (=functional), or to all systems in a bus system. A service to all systems is called a broadcast service (functional request).

Id:	Q-LAH_80124-9444
Version:	2.7
Description:	The server must not make any distinction in performing the physically or functionally addressed diagnostic requests.

Id:	Q-LAH_80124-9530
Version:	2.7
Description:	Exceptions are described explicitly in the "Boundary conditions for services" section.

Id:	Q-LAH_80124-9840
Version:	2.7
Description:	The server-response behavior applies for valid preconditions/boundary conditions (e.g., valid session, speed OK).

Id:	Q-LAH_80124-5290
Version:	2.7
Description:	The following stipulations apply to the SuppressPositiveResponseBit in the event of physical addressing:

Id:	Q-LAH_80124-5304
Version:	2.7
Description:	Table 3-4: Physical addressing - SuppressPositiveResponse Bin Description - SuppressPositiveResponseBit Cvt.

Id:	Q-LAH_80124-1746
Version:	2.7
Description:	For physical addressing with a SuppressPositiveResponseBit == 1, the client must send a General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-7583
Version:	2.7
Description:	The following table with descriptions must be implemented in the server:

Id:	Q-LAH_80124-7584
Version:	2.7

Description:	Table 3-5: Description of the server response behavior for physical addressing with sub-function parameters Request message Server support Response Message Scenario Suppress Description Addressing Positive SID Subfunction Parameter Message NRC Response supported supported supported (hex) Bit a At least PosResp - PositiveResponse one b yes yes At least XX Evaluation of parameters one contains errors c None 31 RequestOutOfRange d 0 no - - 11 ServiceNotSupported NegResp 12 SubfunctionNotSupported e yes no - 7E SubfunctionNotSupported InActiveDiagnostic Physical Session f At least No - No response one response g yes yes At least XX Evaluation of parameters one contains errors h None 31 RequestOutOfRange i 1 no - - 11 ServiceNotSupported NegResp 12 SubfunctionNotSupported j yes no - 7E SubfunctionNotSupported InActiveDiagnostic Session

Id:	Q-LAH_80124-9247
Version:	2.7
Description:	a) The server sends a positive response that the service and sub-function are supported.

Id:	Q-LAH_80124-9249
Version:	2.7
Description:	b) The server sends a negative response (e.g., NRC 0x13 IncorrectMessageLengthOrIncorrectFormat) because the service and the sub-function are supported by the server, but, e.g., a format/length error was detected with respect to the service or sub-function.

Id:	Q-LAH_80124-9248
Version:	2.7
Description:	c) The server sends a negative response with NRC 0x31 because the service and the sub- function are supported, but none of the parameters are supported.

Id:	Q-LAH_80124-9250
Version:	2.7
Description:	d) The server sends a negative response with NRC 0x11 because the service is not supported.

Id:	Q-LAH_80124-9251
Version:	2.7
Description:	e) The server sends a negative response with NRC 0x12 or NRC 0x7E because the service is supported, but the sub-function is not supported.

Id:	Q-LAH_80124-9252
Version:	2.7
Description:	f) The server sends no response, because the service and the sub-function are supported General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-9253
Version:	2.7
Description:	g) As in b): The server sends a negative response, the value of the Suppress-PositiveReponseBit is ignored for physical addressing and required negative re-sponse.

Id:	Q-LAH_80124-9254
Version:	2.7
Description:	h) As in c): The server sends a negative response, the value of the Suppress-PositiveReponseBit is ignored for physical addressing and required negative re-sponse.

Id:	Q-LAH_80124-9255
Version:	2.7
Description:	i) As in d): The server sends a negative response, the value of the Suppress-PositiveReponseBit is ignored for physical addressing and required negative re-sponse.

Id:	Q-LAH_80124-9256
Version:	2.7
Description:	j) As in e): The server sends a negative response, the value of the Suppress-PositiveReponseBit is ignored for physical addressing and required negative re-sponse.

Id:	Q-LAH_80124-7587
Version:	2.7
Description:	The following table with descriptions must be implemented in the server:

Id:	Q-LAH_80124-7588
Version:	2.7
Description:	Table 3-6: Description of the server response behavior for physical addressing without sub-function parameters Request message Server support Response

	Scenario Message Description Addressing SID Parameter Message NRC supported supported (hex) a All - PositiveResponse b At least one PosResp - Evaluation of parameters yes contains errors c At least one XX NegativeResponse d Physical None 31 RequestOutOfRange NegResp 11 ServiceNotSupported e no - ServiceNotSupported 7F InActiveDiagnosticSession

Id:	Q-LAH_80124-9242
Version:	2.7
Description:	a) The server sends a positive response that the service and the parameters are supported.

Id:	Q-LAH_80124-9243
Version:	2.7
Description:	a) The server sends a positive response that the service and at least one of the parameters are supported.

Id:	Q-LAH_80124-9244
Version:	2.7
Description:	c) The server sends a negative response (e.g., NRC 0x13), because the service and the parameters are supported, but a format/length error was detected when evaluating the parameters.

Id:	Q-LAH_80124-9245
Version:	2.7
Description:	d) The server sends a negative response with NRC 0x31 because the service is supported, General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-9246
Version:	2.7
Description:	e) The server sends a negative response with NRC 0x11 or NRC 0x7F because the service is not supported.

Id:	Q-LAH_80124-5343
Version:	2.7
Description:	For functional addressing, the following applies to all systems: If a negative response is generated, this may only be sent to the client if the NRC is not equal to 0x11, 0x12, 0x31, 0x7E, and 0x7F (note: different behavior if NRC 0x78 is used).

Id:	Q-LAH_80124-5306
Version:	2.7
Description:	The following stipulations apply to the SuppressPositiveResponseBit in the event of functional addressing:

Id:	Q-LAH_80124-5320
Version:	2.7
Description:	Table 3-7: Functional addressing - SuppressPositiveResponseBit Bin Description - SuppressPositiveResponseBit Cvt.

Id:	Q-LAH_80124-5321
Version:	2.7
Description:	For functional addressing of services, the client can set the SuppressPositiveResponseBit to 1 (ONE) if the service includes a sub-function.

Id:	Q-LAH_80124-9534
Version:	2.7
Description:	The following table describes the services for which the use of functional addressing is meaningful:

Id:	Q-LAH_80124-9535
Version:	2.7
Description:	Table 3-8: Meaningful use of functional addressing Service Request ServiceIdentifier (SID) DiagnosticSessionControl 10hex ECUReset 11hex ClearDiagnosticInformation 14hex ReadDTCInformation 19hex ReadDataByIdentifier 22hex CommunicationControl 28hex InputOutputByIdentifier 2Fhex RoutineControl 31hex WriteDataByIdentifier 2Ehex TesterPresent 3Ehex ControlDTCSetting 85hex ResponseOnEvent 86hex LinkControl 87hex General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7590
Version:	2.7
Description:	The following table must be implemented in the server:

Id:	Q-LAH_80124-7591
Version:	2.7
Description:	Table 3-9: Description of the server response behavior for functional addressing with sub-function parameters Request message Server support Response Sce-

	nario message Description Addressing SuppressPositive SID Subfunction Parameter Message NRC ResponseBit supported supported supported (hex) a At least PosResp - Positive one response Evaluation of b yes yes At least NegResp XX parameters

Id:	Q-LAH_80124-9227
Version:	2.7
Description:	a) The server sends a positive response that the service and sub-function are supported.

Id:	Q-LAH_80124-9228
Version:	2.7
Description:	b) The server sends a negative response (e.g., NRC 0x13 IncorrectMessageLengthOrIncorrectFormat) because the service and the sub-function are supported by the server, but a format/length error was detected with respect to the service or sub-function.

Id:	Q-LAH_80124-9229
Version:	2.7
Description:	c) The server sends no response because the service and sub-functions are supported, but the parameter is not supported. The NRC 0x31 is suppressed for functional addressing. The information in the SuppressPositiveResponseBit has no meaning in this case.

Id:	Q-LAH_80124-9230
Version:	2.7
Description:	d) The server sends no response to an unsupported service or an unsupported service in the active DiagnosticSession. The NRC 0x11 and NRC 0x7F are suppressed for functional addressing. The information in the SuppressPositiveResponseBit has no meaning in this case.

Id:	Q-LAH_80124-9231
Version:	2.7
Description:	e) The server sends no response to a supported service and unsupported subfunction. The NRC 0x12 and NRC 0x7E are suppressed for functional addressing. The information in the SuppressPositiveResponseBit has no meaning in this case.

Id:	Q-LAH_80124-9232

Version:	2.7
Description:	f) The server sends no response because the service, sub-function, and parameters are General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-9233
Version:	2.7
Description:	g) As in b): The server sends a negative response (e.g., NRC 0x13 IncorrectMessageLengthOrIncorrectFormat) because the service and the sub-function are supported by the server, but a format/length error was detected with respect to the service or sub-function. The information in the SuppressPositiveResponseBit has no meaning in this case.

Id:	Q-LAH_80124-9234
Version:	2.7
Description:	h) As in c): The server sends no response because the service and sub-functions are supported, but the parameter is not supported. The NRC 0x31 is suppressed for functional addressing. The information in the SuppressPositiveResponseBit has no meaning in this case.

Id:	Q-LAH_80124-9235
Version:	2.7
Description:	i) As in d): The server sends no response to an unsupported service or an unsupported service in the active DiagnosticSession. The NRC 0x11 and NRC 0x7F are suppressed for functional addressing. The information in the SuppressPositiveResponseBit has no meaning in this case.

Id:	Q-LAH_80124-9236
Version:	2.7
Description:	j) As in e): The server sends no response to a supported service and unsupported sub-function. The NRC 0x7E and NRC 0x12 are suppressed for functional addressing. The information in the SuppressPositiveResponseBit has no meaning in this case.

Id:	Q-LAH_80124-7593
Version:	2.7
Description:	The following table with descriptions must be implemented in the server:

Id:	Q-LAH_80124-7594

Version:	2.7
Description:	Table 3-10: Description of the server response behavior for functional addressing without sub-function parameters Request message Server support Response message Scenario Addressing SID supported Parameter Message NRC Description supported (hex) a All PosResp - PositiveResponse b yes At least one - PositiveResponse c Functional At least one NegResp XX NegativeResponse d None NoResp - No response e no - - No response

Id:	Q-LAH_80124-9237
Version:	2.7
Description:	a) The server sends a positive response that the service and the parameters are supported.

Id:	Q-LAH_80124-9238
Version:	2.7
Description:	a) The server sends a positive response that the service and at least one of the parameters are supported.

Id:	Q-LAH_80124-9239
Version:	2.7
Description:	c) The server sends a negative response with NRC 0x13, because the service and the parameters are supported, but a format/length error was detected when evaluating the General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-9240
Version:	2.7
Description:	d) The server sends no response with NRC 0x31, because the service is supported, but the parameter or parameters are not supported. An NRC 0x31 is suppressed for functional addressing.

Id:	Q-LAH_80124-9241
Version:	2.7
Description:	e) The server sends no response, because the service is not supported. An NRC 0x11 is suppressed for functional addressing.

Id:	Q-LAH_80124-9660
Version:	2.7

Description:	If there are errors, it might happen that the processing of a service request cannot be completed.

Id:	Q-LAH_80124-9661
Version:	2.7
Description:	The use of an NRC 0x78 as per the description from the Timing section or appendix A is possible specific to the protocol, but not "indefinitely" desired.

Id:	Q-LAH_80124-9662
Version:	2.7
Description:	A client breaks the connection to the server as per the "Timing" section after the time P ,NRC0x78_CompletionTimeout in this case the server can still be in this possible "Dead-Lock" and the service might not be able to finish. Under some circumstances, the server can be freed from Dead-Lock only by a restart (e.g., restart by voltage interruption).

Id:	Q-LAH_80124-9664
Version:	2.7
Description:	This Dead-Lock might cause a permanent NRC 0x78 and the service might not be able to be completed by the server with a positive or negative response.

Id:	Q-LAH_80124-9663
Version:	2.7
Description:	Therefore, mechanisms for self-monitoring can be implemented in the server if a service is requested longer than a system-specific time in the worst-case scenario.

Id:	Q-LAH_80124-9665
Version:	2.7
Description:	If a request cannot be completed and thus an "endless use" of the NRC 0x78 is caused, the server must send NRC 0x10 after a time defined specific to the system and set the General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-7049
Version:	2.7
Description:	A multiple-client environment is a vehicle in which more than one client can send service requests at the same time. This can lead to a server receiving an additional request from client B while it is processing a request from client A.

	Since parallel processing of both requests is not possible (the first service request blocks the second service request until the subsequent positive or negative response [exception NRC 0x78]) for resource reasons (there is generally only one UDS application in the ECU), a processing strategy must be developed for the server. This strategy is defined in the following sub-section.

Id:	Q-LAH_80124-8903
Version:	2.7
Description:	The multiple client environment for the Diagnostic over Internet protocol (DoIP) is defined in document /12/.

Id:	Q-LAH_80124-7044
Version:	2.7
Description:	Every client - both on-board and off-board - must use a separate diagnostic protocol.

Id:	Q-LAH_80124-9833
Version:	2.7
Description:	If a client can access a server via multiple physical media or transport protocols, then these also represent different diagnostic protocols.

Id:	Q-LAH_80124-9799
Version:	2.7
Description:	A diagnostic protocol is a collection of different parameters that define a communications path between the nodes. These are, for example: Network address information (N_AI) Diagnostic protocol buffer and its size Associated timings (see "Timings" section) Supported UDS services SecurityLevel Session

Id:	Q-LAH_80124-9800
Version:	2.7
Description:	Every defined diagnostic protocol must have a unique physical and 0-n functional addressing relationships (corresponds to the network address information N_-AI).

Id:	Q-LAH_80124-10208
Version:	2.7
Description:	For services that perform a reset (e.g., HardReset 11hex 0x01, 10hex 0x02), the diagnostic protocol must be persisted beyond the reset so that a response to the request can be correctly addressed.

Id:	Q-LAH_80124-9809
Version:	2.7
Description:	If a session change is required for a client, a functional N_AI must be allocated to the appropriate diagnostic protocol being used based on the necessary keep-alive logic for a General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-9802
Version:	2.7
Description:	In the case of an individual diagnostic protocol resource within a server, at any time there is only one DiagnosticSession and one SecurityLevel accordingly within a server, even if the server supports multiple diagnostic protocols.

Id:	Q-LAH_80124-10003
Version:	2.7
Description:	The N_AI values specified in this Q-LAH on the diagnostics access can also be mapped to different N_AI values for different bus types within the vehicle. The requirements of Q-LAH 80124 also apply to these N_AI values used within the vehicle. The requirements of the data definition apply to the mapping of N_AI values.

Id:	Q-LAH_80124-9808
Version:	2.7
Description:	The following allocations apply:

Id:	Q-LAH_80124-8894
Version:	2.7
Description:	A PrimaryOBDECU must respond to functional requests in the OBD diagnostic protocol (CAN identifier 0x7DF or 0x18DB33F1) with the physical response in the OBD diagnostic protocol.

Id:	Q-LAH_80124-8895
Version:	2.7
Description:	The server must respond to functional requests in the Volkswagen AG diagnostic protocol (CAN identifier 0x700 to 0x709) with the assigned physical response in the Volkswagen AG diagnostic protocol.

Id:	Q-LAH_80124-10069

Version:	2.7
Description:	Client requests via different bus types (e.g., CAN and Ethernet) represent diagnostic protocols of equal priority for the server.

Id:	Q-LAH_80124-7597
Version:	2.7
Description:	A server may have multiple diagnostic protocol resources.

Id:	Q-LAH_80124-9810
Version:	2.7
Description:	Figure 4-1: General diagnostic protocol relationship Client Server Diagnoseprotokoll Functional Request N_AI Physical Request N_AI Physical Response N_AI - Puffer - Timings - Services - SecurityLevels General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9811
Version:	2.7
Description:	Figure 4-2: Diagnostic protocol relationship using an example ECM (engine control module) Client ECM Appli- B oot - kation loader OBD-Diagnose - GST: Prio 1 Functional Request N _AI 0x7DF Physical Request N_AI 0x7E0 Physical Response N_AI 0x7E8 Eigenschaften , z.B. - Puffer - 50ms GST-Timing, etc. - Services 01hex..0Fhex VWAG-Diagnose: Prio 2 Functional Request N _-AI 0x700, 0x703 Physical Request N_AI 0x17FC0076 Physical Response N_-AI 0x17FE0076 Eigenschaften , z.B. - Puffer - UDS-Timings - UDS-Services - Services 01hex..0Fhex OnBoardClient: Prio 10 Functional Request N _AI 0x17FD0200 Physical Request N_AI 0x017FC0276 Physical Response N_-AI 0x017FE0276 Eigenschaften , z.B. - Puffer - UDS-Timings - UDS-Services - Services 01hex..0Fhex Applikation Application Bootloader Boot loader OBD-Diagnose -GST: Prio 1 OBD diagnostics - generic scan tool: Priority 1 Eigenschaften, z.B. Properties, e.g., - Puffer - Buffer - 50ms GST-Timing, etc. - 50 ms generic scan tool timing, etc. - Services 01hex..0Fhex - Services 01hex - 0Fhex VWAG-Diagnose: Prio 2 Volkswagen AG diagnostics: Priority 2 Eigenschaften, z.B. Properties, e.g., - Puffer - Buffer General Project-Independent Performance Specification LAH.DUM.909.G - UDS-Services - UDS services - Services 01hex..0Fhex - Services 01hex - 0Fhex

Id:	Q-LAH_80124-9813
Version:	2.7
Description:	Figure 4-3: Diagnostic protocol relationship using an example BCM_1 (body control module) Client BCM_1 Appli- Boot- VWAG-Diagnose: Prio 2 kation

	loader Functional Request N_AI 0x700 Physical Request N_AI 0x70E Physical Response N_AI 0x778 Eigenschaften, z.B. - Puffer - UDS-Timings - UDS-Services OnBoardClient: Prio 10 Functional Request N_AI 0x17FD0200 Physical Request N_AI 0x17FC020E Physical Response N_AI 0x17FE020E Eigenschaften, z.B. - Puffer - UDS-Timings - UDS-Services VWAG-Diagnose: Prio 2 Volkswagen AG diagnostics: Priority 2 Eigenschaften, z.B. Properties, e.g., - Puffer - Buffer - UDS-Timings - UDS timings General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9804
Version:	2.7
Description:	A diagnostic protocol can either be allocated exclusively to one diagnostic protocol resource or multiple diagnostic protocols share this diagnostic protocol resource of the server.

Id:	Q-LAH_80124-9805
Version:	2.7
Description:	A generic scan tool for communication as per document /8/ must either have the highest priority in the server or must obtain an exclusive diagnostic protocol resource in the server, in order to fulfill the legislated OBD communications.

Id:	Q-LAH_80124-9914
Version:	2.7
Description:	A diagnostic protocol resource can process only one request at a time. The rule is that every received message - regardless of the addressing method - occupies the resource until the request has been completed with a final positive or negative response. Exceptions from this requirement apply for: Keep-alive logic, bypass (see service 3Ehex) Priority handling of different protocols

Id:	Q-LAH_80124-7058
Version:	2.7
Description:	Multiple client handling in the server is performed for the following scenarios: Receipt of requests of the same diagnostic protocol Receipt of requests of a different diagnostic protocol Receipt of requests of a diagnostic protocol with the same priority Receipt of requests of a diagnostic protocol with a different priority Receipt of requests of a diagnostic protocol while a previously received request of a different or the same diagnostic protocol is already running

Id:	Q-LAH_80124-9298
Version:	2.7

Description:	If a server receives a valid higher-priority request of a different diagnostic protocol, the server must return to the DefaultSession.

Id:	Q-LAH_80124-9725
Version:	2.7
Description:	If a server receives a valid equal-priority or lower-priority request of a different diagnostic protocol, this must have no effect on the current session.

Id:	Q-LAH_80124-9859
Version:	2.7
Description:	If a TesterPresent (3Ehex) with SuppressPositiveResponseBit == 1 is received on a different diagnostic protocol, it is not processed. The S3 timer is not reset. Note: This occurs independently of the priority of the diagnostic protocol.

Id:	Q-LAH_80124-8884
Version:	2.7
Description:	The following figure describes the basic behavior for handling within a multiple-client General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-8885
Version:	2.7
Description:	Figure 4-4: Multiple-client handling Neuer Request Message komplett empfangen Request Ist ein anderes Optionale Umsetzung, Nein Protokoll angefragt als das falls angewendet, gelten diese aktuell in Bearbeitung Abfragen/Aktionen verpflichtend befindliche? Ja Diagnose-Request Zusätzliche Diagnose- Nein in Bearbeitung? Nein Protokoll-Ressource für parallele Abarbeitung vorhanden? Ja Kein NRC 0x21 Handling innerhalb Applikation Ja Empfangener NRC 0x21 Handling Request Nein unterstützt? Ja höherprior? Ja Nein Service-Bearbeitung abbrechen Zusätzliche Ressource Neuen NRC 0x21 (CancelReceive/Cancel-Transmit) dem neuen Request zuweisen Request neg. ignorieren response Nein Ist der Server in einer NonDefaultSession ? Ja Empfangener Request Nein höherprior? Ja Rückfall in DefaultSession Zugriff auf die Ressource nur für Paralleler Service- hochprio-Requests. Zugriff von Zugriff auf die gleiche Ja low-Prio-Request beenden und Ressource? low-Prio-Ausführung/Response abbrechen Nein

Id:	Q-LAH_80124-9915
Version:	2.7

Description:	Description of keys: 1) Behavior as per document /5/ - Handling of equal-priority requests of the same diagnostic protocol if the resource is already in use. The resource must not be interrupted in this case and must process the first request received. The second request is discarded, and there is no NRC to the second request,

Id:	Q-LAH_80124-8886
Version:	2.7
Description:	With respect to the multiple client requirements, a server acts as in the following figures. The internal behavior of the software can be implemented differently depending on the General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-7234
Version:	2.7
Description:	All servers must implement a prioritization for various clients.

Id:	Q-LAH_80124-9856
Version:	2.7
Description:	The prioritization is used to decide in the server if a service request must be processed with priority or ignored in the event of a conflict.

Id:	Q-LAH_80124-8891
Version:	2.7
Description:	Use of NRC 0x21 is forbidden for PrimaryOBDECUs.

Id:	Q-LAH_80124-8892
Version:	2.7
Description:	The following prioritization must be implemented for a server:

Id:	Q-LAH_80124-7235
Version:	2.7
Description:	Table 4-1: Priority definition in the server Client Priority Protocol consisting of GenericScanTool - Physical OBD diagnostic protocol requests N_AI (e.g., classical CAN: 0x7E0 to 0x7E7), and (valid for 1 - Functional OBD diagnostic protocol requests N_AI (e.g., classical CAN: 0x7DF) PrimaryOBDECUs) - Physical Volkswagen AG diagnostic protocol N_AI, and - Functional Volkswagen AG diagnostic protocol N_AI Off-board client 2 (e.g., for DoIP: N_SA:0x0E80,

	N_TA:0xE400; for classical CAN: 0x700, 0x703; for CAN FD: 0x1C410000) - Physical OnBoardClient diagnostic protocol request N_AI, and - Functional OnBoardClient diagnostic protocol request N_AI On-board client 10 (e.g., for DoIP N_SA:0x0F02, N_TA:0xE400; for classical CAN: 0x17FD0200; for CAN FD: 0x1C410200)

Id:	Q-LAH_80124-7258
Version:	2.7
Description:	If in the event of a conflict a second service request with a diagnostic protocol of higher priority is received, the service processing of the first service request with lower priority must be immediately terminated. The timing must be reinitialized in the UDS protocol stack. Additional measures must be implemented, if necessary (e.g., non-volatile memory (NVM) handler activities, state machine inits).

Id:	Q-LAH_80124-7268
Version:	2.7
Description:	In the event that a service processing must be terminated, the server must not reset and an undefined system state must not arise.

Id:	Q-LAH_80124-9220
Version:	2.7
Description:	For each higher-priority request received by the server, the DefaultSession is always assumed by the server and then the request of the higher-priority diagnostic protocol is processed.

Id:	Q-LAH_80124-9726
Version:	2.7
Description:	If the server is in a NonDefaultSession and receives a lower-priority or equal-priority request of a different diagnostic protocol, this new request must be ignored by the server and the General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8888
Version:	2.7
Description:	These sequence diagrams apply to all systems.

Id:	Q-LAH_80124-7438
Version:	2.7

Description:	Figure 4-5: Parallel requests with different diagnostic protocol and prioritization A) Client 1 Client 2 hochprior niederprior Server (Protokoll A) (Protokoll B) Während Abarbeitung einer Request Message 1 Anfrage wird auf unterschiedlichem Diagnoseprotokoll erneut angefragt. Diagnoseprotokolle mit unterschiedlicher Priorität. Request Message 2 Bearbeitung von Request Message 1 wird abgebrochen Response Message Client 1 hochprior Client 1 high priority (Protokoll A) (Protocol A) Client 2 niederprior Client 2 low priority (Protokoll B) (Protocol B) Während Abarbeitung einer Anfrage wird auf While processing one request, a repeat request is received unterschiedlichem Diagnoseprotokoll erneut angefragt. on a different diagnostic protocol. Diagnostic protocols Diagnoseprotokolle mit unterschiedlicher Priorität. with a different priority. Bearbeitung von Request Message 1 wird abgebrochen Processing of request message 1 is terminated

Id:	Q-LAH_80124-7439
Version:	2.7
Description:	Figure 4-6: Parallel requests with different diagnostic protocol and prioritization B) Client 1 Client 2 hochprior niederprior Server (Protokoll A) (Protokoll B) Während Abarbeitung einer Request Message 1 Anfrage wird auf unterschiedlichem Diagnoseprotokoll erneut angefragt. Diagnoseprotokolle Request Message 2 Bearbeitung von mit unterschiedlicher Priorität. Request Message 2 wird verworfen Response Message Client 1 hochprior Client 1 high priority (Protokoll A) (Protocol A) Client 2 niederprior Client 2 low priority (Protokoll B) (Protocol B) Während Abarbeitung einer Anfrage wird auf While processing one request, a new request is received unterschiedlichem Diagnoseprotokoll erneut angefragt. on a different diagnostic protocol. Diagnostic protocols Diagnoseprotokolle mit unterschiedlicher Priorität. with a different priority. General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9221
Version:	2.7
Description:	In the boot loader, no priority plan is implemented.

Id:	Q-LAH_80124-9224
Version:	2.7
Description:	In the boot loader, only Volkswagen AG diagnostic protocols and the on-board client diagnostic protocol must be supported.

Id:	Q-LAH_80124-9225
Version:	2.7

Description:	The OBD services 01hex to 0Fhex must not be supported in the boot loader.

Id:	Q-LAH_80124-300
Version:	2.7
Description:	If the server is in a NonDefaultSession and receives a request of a different diagnostic protocol, this must be rejected by the server with a negative response NRC 0x21 and the current DiagnosticSession must be maintained.

Id:	Q-LAH_80124-10271
Version:	2.7
Description:	Exception for TesterPresent (3Ehex): There is no need to send a NRC 0x21.

Id:	Q-LAH_80124-10272
Version:	2.7
Description:	If a TesterPresent (3Ehex) is received on a different diagnostic protocol, it is not processed. The S3 timer is not reset.

Id:	Q-LAH_80124-299
Version:	2.7
Description:	During the processing of a request, every other request via the same diagnostic protocol is ignored until the request has been completely processed.

Id:	Q-LAH_80124-7431
Version:	2.7
Description:	Figure 4-7: Parallel requests with the same diagnostic protocol Client 1 Client 2 Anfrage1 Anfrage2 Server (Protokoll A) (Protokoll A) Während Abarbeitung einer Request Message 1 Anfrage wird auf gleichem Request Message 1 Diagnoseproprotokoll erneut vollständig angefragt. Diagnoseprotokolle mit empfangen gleicher Priorität. Request Message 2 Request Message 2 wird ignoriert Response Message Client 1 Anfrage1 Client 1 request 1 (Protokoll A) (Protocol A) Client 2 Anfrage2 Client 2 request 2 (Protokoll A) (Protocol A) Während Abarbeitung einer Anfrage wird auf gleichem While processing one request, a new request is received Diagnoseproprotokoll erneut angefragt. on the same diagnostic protocol. Diagnostic protocols Diagnoseprotokolle mit gleicher Priorität. with the same priority. Request Message 1 vollständig empfangen Request message 1 completely received. General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7446

Version:	2.7
Description:	Figure 4-8: Parallel requests with different diagnostic protocols Client 1 Client 2 Anfrage1 Anfrage2 Server (Protokoll A) (Protokoll B) Während Abarbeitung einer Request Message 1 Anfrage wird auf unterschiedlichem Diagnoseprotokoll erneut Request Message 2 NRC 0x21, angefragt. Diagnoseprotokolle mit gleicher Priorität. nachdem Request Message 2 vollständig Response Message empfangen wurde Client 1 Anfrage1 Client 1 request 1 (Protokoll A) (Protocol A) Client 2 Anfrage2 Client 2 request 2 (Protokoll A) (Protocol A) Während Abarbeitung einer Anfrage wird auf While processing one request, a new request is received unterschiedlichem Diagnoseprotokoll erneut angefragt. on a different diagnostic protocol. Diagnostic protocols Diagnoseprotokolle mit gleicher Priorität. with the same priority. NRC 0x21, nachdem Request Message 2 vollständig NRC 0x21, after request message 2 was received empfangen wurde completely

Id:	Q-LAH_80124-9823
Version:	2.7
Description:	An on-board client designates a client that is hosted on a server (e.g., ECU) and may send its own requests.

Id:	Q-LAH_80124-9822
Version:	2.7
Description:	Only one single on-board client must exist in a vehicle.

Id:	Q-LAH_80124-7045
Version:	2.7
Description:	An on-board client must not use the OBD diagnostic protocol.

Id:	Q-LAH_80124-8899
Version:	2.7
Description:	For the UDS protocol - also with respect to NRC 0x21 - additional timers must be implemented in the application layer of the on-board client:

Id:	Q-LAH_80124-8900
Version:	2.7
Description:	These timers are: P3Client PNRC0x21_Repetition_Time PNRC0x21_CompletionTimeout PNRC0x78_CompletionTimeout

Id:	Q-LAH_80124-9645

Version:	2.7
Description:	A data logger must use the ReadDataByIdentifier service (22hex).

Id:	Q-LAH_80124-9646
Version:	2.7
Description:	A data logger must use the ReadDTCInformation service (19hex). General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9647
Version:	2.7
Description:	A data logger must use the ResponseOnEvent service (86hex).

Id:	Q-LAH_80124-9648
Version:	2.7
Description:	A data logger must use the ClearDiagnosticInformation service (14hex) or ClearEmissionRelatedDiagnosticInformation service (04hex) only with interaction with a user.

Id:	Q-LAH_80124-9649
Version:	2.7
Description:	All other services from this document are forbidden for data loggers and must not be used by General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9839
Version:	2.7
Description:	The color coding of the tables is only for legibility.

Id:	Q-LAH_80124-10033
Version:	2.7
Description:	The following table shows the diagnostic protocols to be implemented for Volkswagen AG subject to the server classification as per document /15/.

Id:	Q-LAH_80124-10034
Version:	2.7
Description:	Table 5-1: Diagnostic protocols to be implemented Server classification SecondaryOBDECU/ Diagnostic protocol NonOBDECU PrimaryOBDECU Secondary OBDComponent Application Boot loader Application Boot loader Ap-

	plication Boot loader OBD diagnostic protocol NoImp (Not NoImp M NoImp C1 NoImp important) Volkswagen AG diagnostic M C2 M C2 M C2 protocols OnboardClient diagnostic protocol M C2 M C2 M C2

Id:	Q-LAH_80124-10035
Version:	2.7
Description:	C1 - The OBD diagnostic protocol must be implemented under the condition that service ClearResetEmissionRelatedDiagnosticInformation (04hex) must be implemented. See section "Behavior of SecondaryOBDECUs."

Id:	Q-LAH_80124-10036
Version:	2.7
Description:	C2 - The Volkswagen AG diagnostic protocols and the OnBoardClient diagnostic protocol must be implemented in the boot loader if programming as per document /9/ is required.

Id:	Q-LAH_80124-10037
Version:	2.7
Description:	Note: Due to the different bus types (e.g., CAN, CAN-FD (flexible data rate), Ethernet, FlexRay) in one vehicle, a server must support multiple Volkswagen AG diagnostic protocols, if applicable. See data definition.

Id:	Q-LAH_80124-10038
Version:	2.7
Description:	Note: The N_AIs are assigned to the diagnostic protocols using the data definition in the General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-10040
Version:	2.7
Description:	The following table shows the services to be implemented for Volkswagen AG subject to the server classification as per document /15/.

Id:	Q-LAH_80124-10041
Version:	2.7
Description:	Table 5-2: Services to be implemented Server classification Secondary Service Service NonOBDECU Primary OBDECU/ ID OBDECU Secondary OBD-Component 01hex RequestCurrentPowertrain NoImp M NoImp DiagnosticData 02hex RequestPowertrain NoImp M NoImp FreezeFrameData 03hex Re-

	questEmissionRelated NoImp M NoImp DiagnosticInformation 04hex Clear-ResetEmissionRelated NoImp M C1 DiagnosticInformation 06hex RequestOn-BoardMonitoringTest NoImp C3 NoImp ResultsforSpecificMonitoredSystems RequestEmissionRelatedDiagnostic 07hex TroubleCodesDetectedDuringCur-rentOrLast NoImp M NoImp CompletedDrivingCycle 08hex RequestControlO-fOnBoardSystem NoImp C3 NoImp TestOrComponent 09hex RequestVehicleIn-formation NoImp M NoImp RequestEmissionRelated 0Ahex DiagnosticTrou-bleCodesWith NoImp C2 NoImp PermanentStatus 10hex DiagnosticSession-Control M M M 11hex ECUReset M M M 14hex ClearDiagnosticInformation M NoImp C1 19hex ReadDTCInformation M M M 22hex ReadDataByIdentifier M M M 23hex ReadMemoryByAddress U U U 27hex SecurityAccess C C C 28hex CommunicationControl M M M 2Ehex WriteDataByIdentifier M M M 2Fhex In-putOutputControlByIdentifier C5 C5 C5 31hex RoutineControl C, U C, U C, U 34hex RequestDownload C C C 35hex RequestUpload C C C 36hex Transfer-Data C C C 37hex RequestTransferExit C C C 38hex RequestFileTransfer U U U 3Dhex WriteMemoryByAddress U U U 3Ehex TesterPresent M M M 85hex ControlDTCSetting M M M 86hex ResponseOnEvent U U U 87hex LinkControl C4 C4 C4 BAhex- SystemSupplierSpecific SID U U U BEhex All other NoImp (Not important) NoImp NoImp NoImp services

Id:	Q-LAH_80124-10042
Version:	2.7
Description:	C1 - SecondaryOBDECUs and SecondaryOBDComponents can implement the ClearDiagnosticInformation (14hex) service if the boundary conditions in section "Behavior of General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-10043
Version:	2.7
Description:	C2 - Only in the USOBD variant

Id:	Q-LAH_80124-10044
Version:	2.7
Description:	C3 - Only to be implemented for PrimaryOBDECU_MILMaster

Id:	Q-LAH_80124-10045
Version:	2.7
Description:	C4 - Only to be implemented in the ECU with central diagnostic access

Id:	Q-LAH_80124-10120

Version:	2.7
Description:	C5 - This service should not be used any more for new developments. Use is only possible in consultation with the Diagnostics department.

Id:	Q-LAH_80124-10110
Version:	2.7
Description:	C, U - To be implemented as a function of specific conditions (e.g., flashing). If this functionality is not required, then a system-specific implementation is possible.

Id:	Q-LAH_80124-10047
Version:	2.7
Description:	The following table shows the diagnostic sessions to be implemented for Volkswagen AG subject to the server classification as per document /15/.

Id:	Q-LAH_80124-10048
Version:	2.7
Description:	Table 5-3: Diagnostic sessions to be implemented Server classification Secondary Diagnostic Session NonOBDECU Primary OBDECU/ SessionType OBDECU Secondary OBDComponent 0x01 DefaultSession M M M NonDefaultSession 0x02 ECUProgrammingSession C1 C1 C1 0x03 ExtendedDiagnosticSession M M M

Id:	Q-LAH_80124-10049
Version:	2.7
Description:	C1 - To be implemented for ECUs that are reprogrammable as per document /9/.

Id:	Q-LAH_80124-10051
Version:	2.7
Description:	The following table shows the availability of services to be implemented for Volkswagen AG in the diagnostic sessions.

Id:	Q-LAH_80124-10052
Version:	2.7
Description:	The following applies to the designation "available" in this table: If the service is required, then the service must be available in the appropriate General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-10053
Version:	2.7
Description:	Table 5-4: Availability of services in the diagnostic sessions DiagnosticSession Default NonDefaultSession session ECUProgrammingSession ExtendedDiagnosticSession Service Service 0x01 0x02 0x03 ID 01hex RequestCurrentPowertrain Available notAvailable Available DiagnosticData no response 02hex RequestPowertrain Available notAvailable Available FreezeFrameData no response 03hex RequestEmissionRelated Available notAvailable Available DiagnosticInformation no response 04hex ClearResetEmissionRelated Available notAvailable Available DiagnosticInformation no response 06hex RequestOnBoardMonitoringTest Available notAvailable Available ResultsforSpecificMonitoredSystems no response RequestEmissionRelatedDiagnostic notAvailable 07hex TroubleCodesDetectedDuringCurrentOrLast Available no response Available CompletedDrivingCycle 08hex RequestControlOfOnBoardSystem Available notAvailable Available TestOrComponent no response 09hex RequestVehicleInformation Available notAvailable Available no response RequestEmissionRelated notAvailable 0Ahex DiagnosticTroubleCodesWith Available no response Available PermanentStatus 10hex DiagnosticSessionControl Available Available Available 11hex ECUReset Available Available Available 14hex ClearDiagnosticInformation Available NotAvailable Available 19hex ReadDTCInformation Available NotAvailable Available 22hex ReadDataByIdentifier Available Available Available 23hex ReadMemoryByAddress NotAvailable NotAvailable Available 27hex SecurityAccess NotAvailable Available Available 28hex CommunicationControl NotAvailable Available Available 2Ehex WriteDataByIdentifier NotAvailable Available Available 2Fhex InputOutputControlByIdentifier NotAvailable NotAvailable Available 31hex RoutineControl U1 Available Available 34hex RequestDownload NotAvailable Available NotAvailable 35hex RequestUpload NotAvailable C C 36hex TransferData NotAvailable Available C 37hex RequestTransferExit NotAvailable Available C 38hex RequestFileTransfer NotAvailable U U 3Dhex WriteMemoryByAddress NotAvailable NotAvailable Available 3Ehex TesterPresent Available Available Available 85hex ControlDTCSetting NotAvailable Available Available 86hex ResponseOnEvent Available NotAvailable U 87hex LinkControl NotAvailable U C BAhex- SystemSupplierSpecific SID U U U BEhex

Id:	Q-LAH_80124-10055
Version:	2.7
Description:	U1 - Use must be agreed upon with the Diagnostics and Diagnostic Specifications departments and documented in the BT-LAH: Whether a routine is permitted to continue running after return to DefaultSession General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-10057
Version:	2.7
Description:	The following table shows the availability of services to be implemented for Volkswagen AG in the diagnostic protocols.

Id:	Q-LAH_80124-10070
Version:	2.7
Description:	The following applies to the designation "available" in this table: If the service is required, then the service must be available in the appropriate diagnostic protocols.

Id:	Q-LAH_80124-10058
Version:	2.7
Description:	Table 5-5: Availability of services in the diagnostic protocols Diagnostic protocols OBD diagnostic protocol Volkswagen AG OnboardClient diagnostic protocols diagnostic protocol Service Service T.15 OFF T.15 ON T.15 OFF T.15 ON T.15 OFF T.15 ON ID 01hex RequestCurrentPowertrain notAvailable Available notAvailable Available Available Available DiagnosticData noresponse noresponse 02hex RequestPowertrain notAvailable Available notAvailable Available Available Available FreezeFrameData noresponse noresponse 03hex RequestEmissionRelated notAvailable Available notAvailable Available Available Available DiagnosticInformation noresponse noresponse 04hex ClearResetEmissionRelated notAvailable Available notAvailable Available Available Available DiagnosticInformation noresponse noresponse 06hex RequestOnBoardMonitoringTest notAvailable Available notAvailable Available Available Available ResultsforSpecificMonitoredSystems noresponse noresponse RequestEmissionRelatedDiagnostic notAvailable notAvailable 07hex TroubleCodesDetectedDuringCurrentOrLast noresponse Available noresponse Available Available Available CompletedDrivingCycle 08hex RequestControlOfOnBoardSystem notAvailable Available notAvailable Available Available Available TestOrComponent noresponse noresponse 09hex RequestVehicleInformation notAvailable Available notAvailable Available Available Available noresponse noresponse RequestEmissionRelated notAvailable notAvailable 0Ahex DiagnosticTroubleCodesWith noresponse Available noresponse Available Available Available PermanentStatus 10hex DiagnosticSessionControl NotAvailable NotAvailable Available Available Available Available 11hex ECUReset NotAvailable NotAvailable Available Available Available Available 14hex ClearDiagnosticInformation NotAvailable NotAvailable Available Available Available Available 19hex ReadDTCInformation NotAvailable NotAvailable Available Available Available Available 22hex ReadDataByIdentifier NotAvailable NotAvailable Available Available Available Available 23hex ReadMemoryByAddress NotAvailable NotAvailable Available Avail-

	able Available Available 27hex SecurityAccess NotAvailable NotAvailable Available Available Available Available 28hex CommunicationControl NotAvailable NotAvailable Available Available Available Available 2Ehex WriteDataByIdentifier NotAvailable NotAvailable Available Available Available Available 2Fhex InputOutputControlByIdentifier NotAvailable NotAvailable Available Available Available Available 31hex RoutineControl NotAvailable NotAvailable Available Available Available Available 34hex RequestDownload NotAvailable NotAvailable Available Available Available Available 35hex RequestUpload NotAvailable NotAvailable Available Available Available Available 36hex TransferData NotAvailable NotAvailable Available Available Available Available 37hex RequestTransferExit NotAvailable NotAvailable Available Available Available Available 38hex RequestFileTransfer NotAvailable NotAvailable Available Available Available Available 3Dhex WriteMemoryByAddress NotAvailable NotAvailable Available Available Available Available 3Ehex TesterPresent NotAvailable NotAvailable Available Available Available Available 85hex ControlDTCSetting NotAvailable NotAvailable Available Available Available Available 86hex ResponseOnEvent NotAvailable NotAvailable Available Available Available Available 87hex LinkControl NotAvailable NotAvailable Available Available Available Available BAhex- SystemSupplierSpecific SID NotAvailable NotAvailable Available Available Available Available General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9858
Version:	2.7
Description:	NonOBDECUs must not support the OBD diagnostic protocol.

Id:	Q-LAH_80124-10061
Version:	2.7
Description:	The response behavior of NonOBDECUs must be implemented for all diagnostic protocols as per the section "Addressing types."

Id:	Q-LAH_80124-10062
Version:	2.7
Description:	With terminal 15 OFF, servers powered by terminal 30 must respond to unavailable services with NRC 0x22.

Id:	Q-LAH_80124-7300
Version:	2.7
Description:	Diagnostic communication via Volkswagen AG diagnostic protocols must also function in the pre-run and post-run modes (terminal 15 OFF).

Id:	Q-LAH_80124-7304
Version:	2.7
Description:	When the ignition is switched off (terminal 15 OFF), a request that is being processed must be completed and, if necessary, answered.

Id:	Q-LAH_80124-9003
Version:	2.7
Description:	The response behavior of PrimaryOBDECUs for the OBD diagnostic protocol is defined in ISO 15031-5 and SAE J1979.

Id:	Q-LAH_80124-10065
Version:	2.7
Description:	The response behavior of PrimaryOBDECUs must be implemented for Volkswagen AG diagnostic protocols as per the section "Addressing types."

Id:	Q-LAH_80124-10066
Version:	2.7
Description:	The response behavior of PrimaryOBDECUs must be implemented for the OnBoardClient diagnostic protocol as per the section "Addressing types."

Id:	Q-LAH_80124-9005
Version:	2.7
Description:	Functional Volkswagen AG requests via 0x700 or 0x703 must be answered with the physical Volkswagen AG response ID.

Id:	Q-LAH_80124-10067
Version:	2.7
Description:	The response behavior of SecondaryOBDECU/SecondaryOBDComponent must be implemented for all diagnostic protocols as per the section "Addressing types."

Id:	Q-LAH_80124-10068
Version:	2.7
Description:	SecondaryOBDECU/SecondaryOBDComponent that have service 04hex implemented must General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-9593

Version:	2.7
Description:	A PrimaryOBDECU must have different behaviors based on market-specific variants:

Id:	Q-LAH_80124-9591
Version:	2.7
Description:	PrimaryOBDECUs in the NoOBD variant must support the response behavior for the USOBD/EOBD variant. However, they must not respond to or execute a functional OBD request in the OBD diagnostic protocol.

Id:	Q-LAH_80124-9905
Version:	2.7
Description:	Following consultation with Volkswagen AG, OBDECUs that are OBD-mandatory in EOBD vehicles must also communicate with generic scan tools via the OBD diagnostic protocol in NoOBD vehicles.

Id:	Q-LAH_80124-9592
Version:	2.7
Description:	PrimaryOBDECUs in the EOBD variant must support the response behavior for the USOBD variant, but must not support service General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-717
Version:	2.7
Description:	The diagnostic and communication management system within the vehicle diagnostics system comprises the following services to be implemented in the server.

Id:	Q-LAH_80124-751
Version:	2.7
Description:	Table 6-1 Services for diagnostic and communication management Service SID Document DiagnosticSessionControl 10hex /1/ ECUReset 11hex /1/ SecurityAccess 27hex /1/ TesterPresent 3Ehex /1/ ControlDTCSetting 85hex /1/ LinkControl 87hex /1/

Id:	Q-LAH_80124-753
Version:	2.7
Description:	This service is used to switch between the different DiagnosticSessions.

Id:	Q-LAH_80124-7648
Version:	2.7
Description:	Entry into DiagnosticSessions must not be protected by a SecurityLevel.

Id:	Q-LAH_80124-7609
Version:	2.7
Description:	Different sessions available have different services and diagnostic functions and contents.

Id:	Q-LAH_80124-9300
Version:	2.7
Description:	A session change must not start functions (e.g., reference run, diagnostic or monitoring initialization, functional limitations, or the like). An exception is an EventTrigger started by ResponseOnEvent (86hex) (see the "ResponseOn-Event (86 hex) - Session behavior" section).

Id:	Q-LAH_80124-7610
Version:	2.7
Description:	Furthermore, different timings are activated in the data link layer when there is a session change. The timing values are reported to the client in the response when there is a session change.

Id:	Q-LAH_80124-7614
Version:	2.7
Description:	The timings of the new session become active after the positive response to the session change has been sent.

Id:	Q-LAH_80124-692
Version:	2.7
Description:	Only one DiagnosticSession may be activated at one time in a server during runtime.

Id:	Q-LAH_80124-7612
Version:	2.7
Description:	The server remains in the DefaultSession until a different session is requested by a client.

Id:	Q-LAH_80124-7613

Version:	2.7
Description:	A session change requested by a client must be performed immediately by the server. Exceptions are described in the "Boundary conditions for services" section

Id:	Q-LAH_80124-652
Version:	2.7
Description:	DiagnosticSessions with boundary conditions can only be activated and maintained if the General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-9727
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response behavior from the "Service processing in the server" and "Addressing types" sections.

Id:	Q-LAH_80124-7620
Version:	2.7
Description:	Figure 6-1: Basic session sequence 2 3 1 DefaultSession NonDefaultSession 4

Id:	Q-LAH_80124-7622
Version:	2.7

Id:	Q-LAH_80124-7623
Version:	2.7

Id:	Q-LAH_80124-7624
Version:	2.7

Id:	Q-LAH_80124-7625
Version:	2.7

Id:	Q-LAH_80124-7644
Version:	2.7
Description:	If routines must be preserved in the return to the DefaultSession, this must be agreed upon with the purchaser's Diagnostics and Diagnostic Specifications departments and documented in the BT-LAH.

Id:	Q-LAH_80124-651
Version:	2.7
Description:	With the exception of the DefaultSession 0x01, all DiagnosticSessions are kept active by means of the services sent by a client. This is the sole function of the cyclic TesterPresent (3Ehex) service, which informs the server that a client is present but is inactive. If a (any) client request/TesterPresent request is not made during the time S3Server, the previously activated session is ended and the DefaultSession is assumed.

Id:	Q-LAH_80124-656
Version:	2.7
Description:	The state change diagram of the DiagnosticSessions is shown in the follow-ing figure. All the client requests, server responses, and results which cause a change of status or a change of session in the server are shown.

Id:	Q-LAH_80124-6616
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G 1 Startup 2 Bootmanager 18 19 20 Programmier- anforderung

Id:	Q-LAH_80124-660
Version:	2.7
Description:	Description of the individual transitions:

Id:	Q-LAH_80124-661
Version:	2.7

Id:	Q-LAH_80124-662
Version:	2.7

Id:	Q-LAH_80124-663
Version:	2.7

Id:	Q-LAH_80124-664
Version:	2.7

Id:	Q-LAH_80124-665
Version:	2.7

Id:	Q-LAH_80124-666
Version:	2.7

Id:	Q-LAH_80124-667
Version:	2.7

Id:	Q-LAH_80124-7626
Version:	2.7

Id:	Q-LAH_80124-669
Version:	2.7

Id:	Q-LAH_80124-670
Version:	2.7

Id:	Q-LAH_80124-671
Version:	2.7

Id:	Q-LAH_80124-672
Version:	2.7

Id:	Q-LAH_80124-673
Version:	2.7

Id:	Q-LAH_80124-9749
Version:	2.7
Description:	The change to the ProgrammingSession (0x02) can be made from any NonDefaultSession. Document /9/ defines the explicit sequence for update programming.

Id:	Q-LAH_80124-674
Version:	2.7

Id:	Q-LAH_80124-675
Version:	2.7

Id:	Q-LAH_80124-676

Version:	2.7

Id:	Q-LAH_80124-677
Version:	2.7

Id:	Q-LAH_80124-678
Version:	2.7

Id:	Q-LAH_80124-679
Version:	2.7

Id:	Q-LAH_80124-680
Version:	2.7

Id:	Q-LAH_80124-681
Version:	2.7
Description:	21. If the client requests a change to the DefaultSession in the DefaultSession in the boot loader, the server must send a negative response with NRC 0x78 and the reset must be performed. The positive response occurs in the boot loader in state transition 41.

Id:	Q-LAH_80124-682
Version:	2.7
Description:	22. If the client requests an ECUReset (11hex) with the sub-function HardReset (0x01) in the DefaultSession in the boot loader, the server must send a negative response with NRC 0x78 and the reset must be performed. The positive response occurs in the boot loader in state transition 41.

Id:	Q-LAH_80124-683
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-684
Version:	2.7

Id:	Q-LAH_80124-685
Version:	2.7

Id:	Q-LAH_80124-686

Version:	2.7

Id:	Q-LAH_80124-687
Version:	2.7

Id:	Q-LAH_80124-688
Version:	2.7

Id:	Q-LAH_80124-689
Version:	2.7

Id:	Q-LAH_80124-690
Version:	2.7

Id:	Q-LAH_80124-6706
Version:	2.7

Id:	Q-LAH_80124-6759
Version:	2.7
Description:	32. Applies to servers powered by terminal 15 or terminal 30 that require a restart in this service: If the client requests an ECUReset with the sub-function KeyOffOnReset (0x02) in a NonDefaultSession in the application software, then the server must send a negative response with NRC 0x78 and the reset must be performed. The positive response takes place in the application in the state transition 34.

Id:	Q-LAH_80124-6785
Version:	2.7
Description:	33. Applies to servers powered by terminal 15 or terminal 30 that require a restart in this service: If the client requests an ECUReset with the sub-function KeyOffOnReset (0x02) in the DefaultSession in the application software, then the server must send a negative response with NRC 0x78, if necessary, and the reset must be performed. The positive response takes place in the application in the state transition 34.

Id:	Q-LAH_80124-7627
Version:	2.7

Id:	Q-LAH_80124-9438

Version:	2.7

Id:	Q-LAH_80124-9439
Version:	2.7
Description:	36. If a server exchanges diagnostic messages with the client within the Default-Session in the terminal 15 ON state, the server must maintain communication with the client if there is a change to terminal 15 OFF and remain in the Default-Session

Id:	Q-LAH_80124-9440
Version:	2.7
Description:	37. Applies to servers powered by terminal 30 that do not require a restart in this service: If the client requests an ECUReset with the sub-function KeyOffOnReset (0x02) in a NonDefaultSession in the application software, then the server must first perform a KeyOffOnReset. Then the server must execute a switch to the DefaultSession. Finally, the server must send a positive response to the request.

Id:	Q-LAH_80124-9441
Version:	2.7
Description:	38. Applies to servers powered by terminal 30 that do not require a restart in this service: If the client requests an ECUReset with the sub-function KeyOffOnReset (0x02) in a DefaultSession in the application software, then the server must first perform a KeyOffOnReset. Then the server must respond positively to the request. The server remains in the DefaultSession.

Id:	Q-LAH_80124-9584
Version:	2.7

Id:	Q-LAH_80124-9583
Version:	2.7

Id:	Q-LAH_80124-9841
Version:	2.7

Id:	Q-LAH_80124-9908
Version:	2.7

Id:	Q-LAH_80124-10133

Version:	2.7

Id:	Q-LAH_80124-10134
Version:	2.7

Id:	Q-LAH_80124-10135
Version:	2.7

Id:	Q-LAH_80124-10136
Version:	2.7

Id:	Q-LAH_80124-695
Version:	2.7
Description:	This session is always active after the power has been switched on (terminal 15 ON, wake- up indication); it is used for on-board diagnostic requests, on-board diagnostics, and for session changes to a NonDefaultSession.

Id:	Q-LAH_80124-696
Version:	2.7
Description:	It is not possible to protect the services, sub-functions, or service parameters requested in this DiagnosticSession with a SecurityAccess type.

Id:	Q-LAH_80124-7649
Version:	2.7
Description:	This session makes all diagnostic services available that are required for the programming (e.g., flash update) of servers.

Id:	Q-LAH_80124-698
Version:	2.7
Description:	The programming sequence compulsory for Volkswagen AG can be found in document /9/.

Id:	Q-LAH_80124-700
Version:	2.7
Description:	This session is used for services that affect the system behavior and therefore are no longer permitted in the DefaultSession. In this session, the services required for initial setup can be General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-756
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-770
Version:	2.7
Description:	Table 6-2: Request message definition Data Parameter name, request Bit- Cvt. Hex length #1 DiagnosticSessionControl Request Service Id 8 M 10 #2 SuppressPos.Response 1 M 0-1 DiagnosticSessionType 7 00 - 7F

Id:	Q-LAH_80124-7630
Version:	2.7
Description:	No other parameters are defined for this service.

Id:	Q-LAH_80124-7632
Version:	2.7
Description:	The DiagnosticSessionType sub-function is used to set special properties of the server via the requested session.

Id:	Q-LAH_80124-771
Version:	2.7
Description:	The following sub-function parameters are defined for this service:

Id:	Q-LAH_80124-821
Version:	2.7
Description:	Table 6-3: Request message sub-function definition Hex Description, DiagnosticSessionType Cvt. (bit 6-0)

Id:	Q-LAH_80124-7633
Version:	2.7
Description:	C1 - Must be supported if the server can be programmed as per document /9/.

Id:	Q-LAH_80124-7634
Version:	2.7
Description:	The following response message must be implemented:

Id:	Q-LAH_80124-7635
Version:	2.7

Description:	Table 6-4: Positive response message definition Data Parameter name, response Bit- Cvt. Hex length #1 DiagnosticSessionControl Response Service Id 8 M 50 #2 DiagnosticSessionType 8 M 00 - 7F #3 8 M xx : SessionParameterRecord : : : General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-9916
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-824
Version:	2.7
Description:	Table 6-5: Positive response message parameter definition Definition DiagnosticSessionType This parameter is used in the server response as an echo of the sub-function (without SuppressPositiveResponseBit) in the client request. SessionParameterRecord This parameter includes the specific parameter for the server in the requested session.

Id:	Q-LAH_80124-826
Version:	2.7
Description:	The following parameters are defined and must be adopted by the client in the started session:

Id:	Q-LAH_80124-843
Version:	2.7
Description:	Table 6-6: SessionParameterRecord Parameter Description, SessionParameterRecord Bytes Resolution P2Server_Max This value identifies the server's standard P2 timing in the active 2 1 ms session. This value identifies the server's extended P2 timing which is P2*Server_Max started after an NRC 0x78 (RequestCorrectlyReceived- 2 10 ms ResponsePending).

Id:	Q-LAH_80124-7647
Version:	2.7
Description:	Table 6-7: Sequence of SessionParameterRecord Response Parameter Parameters: byte position #3 - 4 1 P2Server_Max #5 - 6 2 P2*Server_Max

Id:	Q-LAH_80124-7637
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-7638
Version:	2.7
Description:	Table 6-8: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-7641
Version:	2.7
Description:	The following example shows the change to the ExtendedDiagnosticSession. For the change to the ExtendedDiagnosticSession, the server returns the following parameters: P2Server_Max = 0x0032 = 50 ms P2*Server_Max = 0x01F4 = 5 000 ms

Id:	Q-LAH_80124-7642
Version:	2.7
Description:	Table 6-9: Example request Data Parameter name, request Bit- Hex length #1 DiagnosticSessionControl Request Service Id 8 10 #2 DiagnosticSessionType 8 03

Id:	Q-LAH_80124-7643
Version:	2.7
Description:	Table 6-10: Example response Data Parameter name, response Bit- Hex length #1 DiagnosticSessionControl Response Service Id 8 50 #2 DiagnosticSession-Type 8 03 #3 sessionParameterRecord 8 00 [P2Server_Max (high byte)] #4 sessionParameterRecord 8 32 [P2Server_Max (low byte)] #5 sessionParameterRecord 8 01 [P2*Server_Max (high byte)] #6 sessionParameterRecord 8 F4 [P2*Server_Max (low byte)]

Id:	Q-LAH_80124-943
Version:	2.7
Description:	A software reset is requested using this service. The way in which the software reset is to be carried out is defined in more detail by the ResetType parameter.

Id:	Q-LAH_80124-7036
Version:	2.7
Description:	The request-response behavior for the ECUReset service sub-function HardReset (0x01) is further described in document /9/ and in the section for the DiagnosticSessionControl service.

Id:	Q-LAH_80124-6677

Version:	2.7
Description:	After execution of the service ECUReset 0x11, DefaultSession 0x01 is always activated. For flash programming, document /9/ must be observed.

Id:	Q-LAH_80124-944
Version:	2.7
Description:	Each server must ensure that the ECUReset service can be reliably executed, without unintentional, permanent changes to the system characteristics.

Id:	Q-LAH_80124-7275
Version:	2.7
Description:	When a reset requested using this service is executed, the bus initialization time of the General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7385
Version:	2.7
Description:	Servers that are connected to the CAN or FlexRay bus must restart the timer TDiagStart as per document /14/ and /13/ after startup in the application.

Id:	Q-LAH_80124-9257
Version:	2.7
Description:	Important: This document does not define the behavior of performing the actual reset.

Id:	Q-LAH_80124-9728
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response behavior from the "Service processing in the server" and "Addressing types" sections.

Id:	Q-LAH_80124-9262
Version:	2.7
Description:	The boundary conditions for this service are described in the "Boundary conditions for services" section and must be implemented.

Id:	Q-LAH_80124-946
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-960
Version:	2.7
Description:	Table 6-11: Request message definition Data Parameter name, request Bit- Cvt. Hex length #1 ECUReset Request Service Id 8 M 11 #2 SuppressPositiveResponseBit 1 M 0-1 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7651
Version:	2.7
Description:	The ResetType parameter defines how the server must perform the reset.

Id:	Q-LAH_80124-961
Version:	2.7
Description:	The following sub-function parameters are defined for this service:

Id:	Q-LAH_80124-1007
Version:	2.7
Description:	Table 6-12: Request message sub-function definition Hex Description, ResetType Cvt. (bit 6-0)

Id:	Q-LAH_80124-7656
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-1009
Version:	2.7
Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-1023
Version:	2.7
Description:	Table 6-13: Positive response message definition Data Parameter name, response Bit- Cvt. Hex length #1 ECUReset Response Service Id 8 M 51 #2 ResetType 8 M 00 - 7F

Id:	Q-LAH_80124-1025
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-7655
Version:	2.7
Description:	Table 6-14: Positive response message parameter definition Definition Reset-Type This parameter is used in the server response as an echo of the sub-function (without SuppressPositiveResponseBit) in the client request.

Id:	Q-LAH_80124-7658
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-7659
Version:	2.7
Description:	Table 6-15: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-7661
Version:	2.7
Description:	All conditions for performing an ECUReset in the server are fulfilled in this example.

Id:	Q-LAH_80124-7662
Version:	2.7
Description:	Table 6-16: Example request Data Parameter name, request Bit- Hex length #1 ECUReset Request Service Id 8 11 #2 SuppressPos.Response 1 02 ResetType = KeyOffOnReset 7

Id:	Q-LAH_80124-7663
Version:	2.7
Description:	Table 6-17: Example response Data Parameter name, response Bit- Hex length #1 ECUReset Response Service Id 8 51 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-10156
Version:	2.7
Description:	Figure 6-3: Reset behavior of servers powered by terminal 15 or terminal 30, which require a restart in the event of a KeyOffOnReset Client Server ECU-Reset Server-spezifisch

Id:	Q-LAH_80124-10157

Version:	2.7
Description:	Figure 6-4: Reset behavior of servers powered by terminal 30, which do not require a restart in the event of a KeyOffOnReset Client Server ECU-Reset Server-spezifisch

Id:	Q-LAH_80124-10267
Version:	2.7
Description:	The SecurityAccess (27hex) service must be implemented as per document /9/ and with the required parameters.

Id:	Q-LAH_80124-1161
Version:	2.7
Description:	This service cannot be executed in the DefaultSession (0x01). To be able to execute this service, a session change to a NonDefaultSession must be performed.

Id:	Q-LAH_80124-7216
Version:	2.7
Description:	The following services must be protected against unauthorized execution using a SecurityLevel: ReadMemoryByAddress (23hex) WriteMemoryByAddress (3Dhex) RequestDownload (34hex) RequestUpload (35hex) TransferData (36hex) RequestTransferExit (37hex)

Id:	Q-LAH_80124-7217
Version:	2.7
Description:	The following service and addressing parameters can be protected against unauthorized execution or read-out using a SecurityLevel: RoutineIdentifier within the RoutineControl (31hex) service DataIdentifier within the ReadDataByIdentifier (22hex) and WriteDataByIdentifier (2Ehex) services

Id:	Q-LAH_80124-7218
Version:	2.7
Description:	The following service and addressing parameters can be protected against unauthorized execution or read-out using a SecurityLevel only as an exception and after approval by Volkswagen AG: InputOutputIdentifier within the InputOutputControl service (2Fhex)

Id:	Q-LAH_80124-8551
Version:	2.7

Description:	Only one SecurityLevel must be active.

Id:	Q-LAH_80124-9721
Version:	2.7
Description:	Every SecurityLevel that is active in the server deactivates a previously active SecurityLevel and the associated enabled functions.

Id:	Q-LAH_80124-8552
Version:	2.7
Description:	The SecurityLevels are connected to the corresponding AccessType tuple.

Id:	Q-LAH_80124-8992
Version:	2.7
Description:	If a SecurityLevel is required, all packages that are used for initial setup must be protected by a shared SecurityLevel.

Id:	Q-LAH_80124-8553
Version:	2.7
Description:	The allocation of the SecurityLevel to the enabled functions or diagnostic objects must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-10029
Version:	2.7
Description:	A SecurityLevel is achieved via an AccessType. Here, a login is allocated to one General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8555
Version:	2.7
Description:	Figure 6-5: Example allocation of the SecurityLevel and enabled functions 1 SA-Level : 5 4 3 2 1 Freigeschaltete Funktion SA-Level SA level Freigeschaltete Funktion Enabled function

Id:	Q-LAH_80124-8556
Version:	2.7
Description:	Figure 6-6: Example allocation of the SecurityLevel and enabled functions 2 SA-Level : 5 4 3 2 1 Freigeschaltete Funktion SA-Level SA level Freigeschaltete Funktion Enabled function

Id:	Q-LAH_80124-9729

Version:	2.7
Description:	The server and the client must implement the requirements for the request/response General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9641
Version:	2.7
Description:	The following apply below: KeyCtr: Key counter KeyCtr_Limit: Maximum value of the KeyCounter

Id:	Q-LAH_80124-1163
Version:	2.7
Description:	The method used consists of a fixed sequence of services (= SecurityAccess (SA) job) with an AccessType for the seed (random number) and for the key.

Id:	Q-LAH_80124-1164
Version:	2.7
Description:	The following sequence is mandatory for unlocking locked services, parameters, and data.

Id:	Q-LAH_80124-1169
Version:	2.7
Description:	In the event of any session change, all the previously unlocked services, parameters, and data will be locked again and will have to be unlocked once more via a SecurityAccess service, depending on the definition of the new session.

Id:	Q-LAH_80124-9642
Version:	2.7
Description:	The value of the parameter KeyCtr_Limit is defined with the value '2' for Volkswagen AG.

Id:	Q-LAH_80124-8579
Version:	2.7
Description:	The sub-function parameter SecurityAccessType defines the progress of the seed&key sequence, the SecurityLevel, and the format of the request/response message.

Id:	Q-LAH_80124-1171

Version:	2.7
Description:	The client requests a seed from the server and uses it to calculate the key using a defined formula.

Id:	Q-LAH_80124-10112
Version:	2.7
Description:	In the generation of the seed, there must be no dependencies on bus signals or signals read via the local periphery (e.g., sensor values).

Id:	Q-LAH_80124-8561
Version:	2.7
Description:	In parallel to this, the server also calculates the key using the same seed and the same formula.

Id:	Q-LAH_80124-8562
Version:	2.7
Description:	The client then sends the key it has calculated to the server, which then compares the two keys.

Id:	Q-LAH_80124-8563
Version:	2.7
Description:	If the calculated keys are the same, the server grants access authorization (SecurityLevel reached).

Id:	Q-LAH_80124-8564
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8565
Version:	2.7
Description:	The Seed&Key process must then be repeated by the client using a new seed request (RequestSeed).

Id:	Q-LAH_80124-8599
Version:	2.7
Description:	For each seed request, the server returns a newly generated random number as the seed to the client.

Id:	Q-LAH_80124-8558
Version:	2.7
Description:	The value of the seed requested and delivered by the server is valid for the current session, as long as no other RequestSeed or SendKey is requested by the client.

Id:	Q-LAH_80124-8559
Version:	2.7
Description:	A multiple seed request (without a key in between) is also possible. The server must send a positive response to this.

Id:	Q-LAH_80124-1172
Version:	2.7
Description:	The following specification applies to all AccessTypes: After a number of KeyCtr_Limit unsuccessful access attempts by the client for a SecurityLevel, the SecurityAccess (27hex) service is blocked for the time Ps.

Id:	Q-LAH_80124-8570
Version:	2.7
Description:	A separate KeyCtr must be used for each SecurityLevel.

Id:	Q-LAH_80124-8994
Version:	2.7
Description:	A single blocking time timers must be used for all SecurityLevels.

Id:	Q-LAH_80124-6708
Version:	2.7
Description:	For each SecurityLevel, a blocking time Ps of 10 min must always be used.

Id:	Q-LAH_80124-8598
Version:	2.7
Description:	The blocking time Ps must be identical for the application and boot loader.

Id:	Q-LAH_80124-7179
Version:	2.7
Description:	If the application is exited before the block time has elapsed, the corresponding block time must be restarted after startup in the application.

Id:	Q-LAH_80124-9830
Version:	2.7
Description:	If the boot loader is exited before the blocking time has elapsed, the corresponding blocking time must be restarted after startup in the boot loader or in the application.

Id:	Q-LAH_80124-8566
Version:	2.7
Description:	In the event of a reset or a power down-power on cycle, the blocking time begins again, i.e., the block must be stored in a non-volatile memory.

Id:	Q-LAH_80124-8567
Version:	2.7
Description:	All other diagnostic and system functions which are available without SecurityAccess must not be affected by a blocking time.

Id:	Q-LAH_80124-8568
Version:	2.7
Description:	The blocking time is only related to the SecurityAccess service (27hex).

Id:	Q-LAH_80124-9311
Version:	2.7
Description:	After a blocking time has elapsed, the KeyCtrs of all SecurityLevels must be reset to the value 0.

Id:	Q-LAH_80124-8571
Version:	2.7
Description:	After a negative response with NRC 0x35 InvalidKey, the SecurityAccess sequence must General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-6707
Version:	2.7
Description:	The blocking time must be independent of the activated DiagnosticSession. A restart or a deactivation of the blocking time when there is a session change within a software instance (application or boot loader) is not permissible.

Id:	Q-LAH_80124-1180

Version:	2.7
Description:	If an additional seed is requested for an already unlocked SecurityLevel, the server must respond with the seed = 0dec (zero). A negative response is not permitted. If a SecurityLevel is not enabled, the value 0dec (zero) must not be generated by the server in the event of a seed request.

Id:	Q-LAH_80124-6728
Version:	2.7
Description:	The execution of the SecurityAccess service (27hex), including negative responses, must not change the session.

Id:	Q-LAH_80124-8573
Version:	2.7
Description:	If restoring the non-volatile memory (for the information on whether SecurityAccess was blocked in the previous OperationCycle) fails after power up (startup), the block must not be activated.

Id:	Q-LAH_80124-8574
Version:	2.7
Description:	There is always a fixed tuple of RequestSeed and SendKey sub-functions. The value for SendKey (even number of the SecurityAccessType) is always 1 higher than the value for RequestSeed (odd number of the SecurityAccessType).

Id:	Q-LAH_80124-1394
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-1184
Version:	2.7
Description:	This status transition diagram must be implemented for each AccessType (SecurityLevel) or login to be unlocked.

Id:	Q-LAH_80124-1185
Version:	2.7
Description:	Figure 6-7: State transition diagram - SecurityAccess 1 AllSecLevel_locked 2 AllSecLevel_locked NoSeed SeedSent_Wait4Key 4 A B 5 9

Id:	Q-LAH_80124-9722

Version:	2.7
Description:	The following apply to the table below for the description of the transitions: xx: Corresponds to the last requestSeed SA type received by the server General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8983
Version:	2.7
Description:	Table 6-18: Description of transitions No. Operation Condition Action Server-Reset (Startup, ECUReset, Server- - KeyCtr Init (0) AND Wake-up, PowerOn, etc.) - KeyCtr = KeyCtr_NVM

Id:	Q-LAH_80124-8984
Version:	2.7
Description:	SecurityAccess request message received - Generate seed with random number (SA-Type == RequestSeed) - - Send PositiveResponse with seed for requested

Id:	Q-LAH_80124-8985
Version:	2.7
Description:	SecurityAccess request message received (SA-Type == SendKey) - Set KeyCtr = 0 and store it in non-volatile memory for sendKey (even number) with incrementing requested AccessType.

Id:	Q-LAH_80124-8986
Version:	2.7
Description:	SecurityAccess request message received AND (SA-Type == RequestSeed) NRC 0x13 Request-Message length not OK SecurityAccess message received (SA- NRC 0x24 Type == SendKey) SecurityAccess message received (SA- AND Type == RequestSeed) NRC 0x37

Id:	Q-LAH_80124-8987
Version:	2.7
Description:	SecurityAccess request message received - Generate seed with random number 5 (SA-Type == RequestSeed) - Send PositiveResponse with seed to client. - xx = cache SA type

Id:	Q-LAH_80124-8988
Version:	2.7

Description:	DiagnosticSessionControl (10hex) - Assume requested SecurityLevel.

Id:	Q-LAH_80124-8989
Version:	2.7
Description:	SecurityAccess request message received AND (SA-Type == RequestSeed) NRC 0x13 Request-Message length not OK SecurityAccess request message received NRC 0x24 (SA-Type == SendKey) SecurityAccess request message received Transmit positive response message with seed = 0x00 for all AND (SA-Type == RequestSeed) bytes of defined seed/key length. Requested SecurityLevel unlocked

Id:	Q-LAH_80124-9301
Version:	2.7
Description:	SecurityAccess request message received - Generate seed and store it for the currently requested (SA-Type == RequestSeed) AccessType (if not already generated and stored during the

Id:	Q-LAH_80124-8990
Version:	2.7
Description:	SecurityAccess request message received (SA-Type == SendKey) sendKey (SA type) with increment of - Increment counter state KeyCtr and store it in non-volatile AND previously requested SA type memory. (yy == xx + 1) - NRC 0x35 Request-Message length OK Key not OK ++KeyCtr < KeyCtr_Limit SecurityAccess request message received (SA-Type == SendKey) sendKey (SA type even number) with - Store counter state KeyCtr in non-volatile memory. AND increment of previously requested SA type - Start blocking time (store information for starting blocking (yy == xx + 1) time in non-volatile memory) Request-Message length OK - NRC 0x36 Key not OK

Id:	Q-LAH_80124-8991
Version:	2.7
Description:	SecurityAccess request message received Transmit positive response message with seed = 0x00 for all AND (SA-Type == RequestSeed) bytes of defined seed/key length. Requested SecurityLevel already unlocked SecurityAccess request message received (SA-Type == SendKey) sendKey (SA type) with increment of - KeyCtr = 0 and non-volatile storage of counter status AND previously requested SA type - Drop current SecurityLevel (block) (yy == xx + 1) - Release newly requested SecurityLevel Request-Message length OK Key OK SecurityAccess request message received (SA-Type == SendKey) sendKey (SA type) with increment of - Store ++KeyCtr (as number of failed attempts) in non- AND

	previously requested SA type volatile memory (yy == xx + 1) - NRC 0x35 Request-Message length OK Key NOK ++KeyCtr < KeyCtr_Limit SecurityAccess request message received (SA-Type == SendKey)

Id:	Q-LAH_80124-1196
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-1214
Version:	2.7
Description:	Table 6-19: Request message definition - RequestSeed Data Parameter name, request Bit- Cvt. Hex length #1 SecurityAccess Request Service Id 8 M 27 SuppressPositiveResponseBit 1 0 #2 Sub-function = [M 01 AccessType = RequestSeed 7 11] :

Id:	Q-LAH_80124-8576
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8575
Version:	2.7
Description:	Table 6-20: Request message definition - SendKey Data Parameter name, request Bit- Cvt. Hex length #1 SecurityAccess Response Service Id 8 M 27 SuppressPositiveResponseBit 1 0-1 #2 Sub-function = [M 02 AccessType = SendKey 7 12] : SecurityKey = [#3 Key#1 (high byte) 8 M xx #4 Key#2 8 M xx #5 Key#3 8 M xx #6 Key#4 (low byte) 8 M xx]

Id:	Q-LAH_80124-1215
Version:	2.7
Description:	The following sub-function parameters are defined for this service:

Id:	Q-LAH_80124-1277
Version:	2.7
Description:	Table 6-21: Request message sub-function definition Hex Description, AccessType Cvt. (bit 6-0)

Id:	Q-LAH_80124-6699
Version:	2.7

Description:	C1 - Observe document /9/ for the implementation. C2 - Special unlocking EventDataRecorder - EDR General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-1281
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-1295
Version:	2.7
Description:	Table 6-22: Request message parameter definition Definition SecurityKey This parameter is the value that is determined by the calculation algorithm. The basis for the calculation is the previously transmitted seed value.

Id:	Q-LAH_80124-1298
Version:	2.7
Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-6531
Version:	2.7
Description:	Table 6-23: Positive response message definition Data Parameter name, response Bit- Cvt. Hex length #1 SecurityAccess Response Service Id 8 M 67 #2 AccessType 8 M 00 - 7F SecuritiySeed = [#3 Seed#1 8 C1 xx #4 Seed#2 8 C1 xx #5 Seed#3 8 C1 xx #6 Seed#4 8 C1 xx]

Id:	Q-LAH_80124-1389
Version:	2.7
Description:	C1 - This response must be sent only if a request with a RequestSeed sub-function has been received.

Id:	Q-LAH_80124-8582
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-8583
Version:	2.7
Description:	Table 6-24: Request message parameter definition Definition AccessType This parameter is used in the server response as an echo of the sub-function (with-

	out SuppressPositiveResponseBit) in the client request. SecuritySeed This parameter represents the server data and is used by the client for calculating the key. The parameter is present General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8586
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-8585
Version:	2.7
Description:	Table 6-25: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-8589
Version:	2.7
Description:	The following example shows the SeedKey request with the following values: Client requests seed (Request 0x03) Server sends seed (Positive Response 0x03) with the random number (4 bytes) 0x12345678 Client sends key (e.g., KEY = LOGIN + SEED) after login 1101dec/0x44D with the value 0x12345AC5 (Request SendKey 0x04) Server internally back-calculates the key and accepts the key (PositiveResponse SendKey 0x04) - Server is unlocked for this SecurityLevel

Id:	Q-LAH_80124-8590
Version:	2.7
Description:	Table 6-26: Request message Data Parameter name, request Bit- Hex length #1 SecurityAccess Request Service Id 8 27 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8591
Version:	2.7
Description:	Table 6-27: Response message Data Parameter name, response Bit- Hex length #1 SecurityAccess Response Service Id 8 67 #2 AccessType 8 03 SecuritiySeed = [#3 Seed#1 8 12 #4 Seed#2 8 34 #5 Seed#3 8 56 #6 Seed#4 8 78]

Id:	Q-LAH_80124-8592
Version:	2.7
Description:	Table 6-28: Request message Data Parameter name, request Bit- Hex length #1 SecurityAccess Request Service Id 8 27 #2 AccessType = SendKey 8 04 Secu-

	rityKey = [#3 Key#1 (high byte) 8 12 #4 Key#2 8 34 #5 Key#3 8 5A #6 Key#4 (low byte) 8 C5]

Id:	Q-LAH_80124-8593
Version:	2.7
Description:	Table 6-29: Response message Data Parameter name, response Bit- Hex length #1 SecurityAccess Response Service Id 8 67 #2 AccessType 8 04

Id:	Q-LAH_80124-8595
Version:	2.7
Description:	The server is already unlocked for the SecurityAccessType (0x03/0x04).

Id:	Q-LAH_80124-8596
Version:	2.7
Description:	Table 6-30: Request message Data Parameter name, request Bit- Hex length #1 SecurityAccess Request Service Id 8 27 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8597
Version:	2.7
Description:	Table 6-31: Response message Data Parameter name, response Bit- Hex length #1 SecurityAccess Response Service Id 8 67 #2 AccessType 8 03 SecuritySeed = [#3 Seed#1 8 00 #4 Seed#2 8 00 #5 Seed#3 8 00 #6 Seed#4 8 00]

Id:	Q-LAH_80124-1485
Version:	2.7
Description:	This service is used to switch on and off the sending and/or receiving of certain messages of a system in order to increase the bandwidth of the respective bus system (via the bus application).

Id:	Q-LAH_80124-7274
Version:	2.7
Description:	When the bus communication is reactivated through this service or a session change occurs (ControlType=0x00, EnableRxAndTx), the bus initialization time of the respective bus system as per the valid Bus Performance Specification must be adhered to.

Id:	Q-LAH_80124-7937
Version:	2.7

Description:	If the transmission/reception behavior set by the CommunicationControl service (28hex) is activated in the server, this refers only to the transmission and reception messages of the server. A routing engine in the server for 1:1 message routing from source bus to destination bus is not affected.

Id:	Q-LAH_80124-9748
Version:	2.7
Description:	The server must send a positive response if the service is supported in the active session and if the ControlType [0x00 - 0x03, 0x40] requested in the request is already active.

Id:	Q-LAH_80124-9922
Version:	2.7
Description:	The server must send a positive response if the service is supported in the active session and if the ControlType 0x40 and SubSystemNodeAddress requested in the request are already active.

Id:	Q-LAH_80124-9923
Version:	2.7
Description:	For sub-system routing by means of ControlType 0x04, the following applies: For LIN: In the event of routing activation for different SubSystemNodeAddress values, the request can receive a positive response only if the SubSystemNodeAddress is linked to different LIN bus segments. for Sub-CAN: In the event of routing activation for different SubSystemNodeAddress values, the request must always receive a positive response. Deviations must be agreed upon with the Diagnostics department.

Id:	Q-LAH_80124-9730
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-7933
Version:	2.7
Description:	The boundary conditions for this service are described in the "Boundary conditions for services" section and must be implemented.

Id:	Q-LAH_80124-9043

Version:	2.7
Description:	If the specified boundary conditions/preconditions are violated during active CommunicationControl (28hex) (e.g., EnableRxDisableTx), then the server that sends the speed signal (e.g., brake system control module) must reject the activated CommunicationControl and resend its messages (EnableRxAndTx activation). The server must also remain in the current DiagnosticSession.

Id:	Q-LAH_80124-1502
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-1520
Version:	2.7
Description:	Table 6-32: Request message definition Data Parameter name, request Bit-Cvt. Hex length #1 CommunicationControl Request Service Id 8 M 28 #2 SuppressPositiveResponseBit 1 M 0-1 Sub-function = ControlType 7 00 - 7F #3 Communication&NetworkType 8 M xx #4 NodeIdentificationNumber#1[High] 8 C1 xx #5 NodeIdentificationNumber#2[Low] 8 C1 xx

Id:	Q-LAH_80124-7941
Version:	2.7
Description:	C1 - The parameter is available only if the sub-function ControlType has the value 0x04 or General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-7943
Version:	2.7
Description:	The sub-function parameter ControlType contains information on to what extent the server must influence the communications as a function of the value.

Id:	Q-LAH_80124-1521
Version:	2.7
Description:	The following sub-function parameters are defined for this service:

Id:	Q-LAH_80124-1563
Version:	2.7
Description:	Table 6-33: Request message sub-function definition Hex Description, ControlType Cvt. (bit 6-0) EnableRxAndTx

Id:	Q-LAH_80124-7127
Version:	2.7
Description:	C1 - This value must be implemented for the update programming of DK2F ECUs as per document /15/ via sub-buses of DK4 ECUs (e.g., LIN-Master). In the event of a request for this sub-function, the parameter CommunicationAnd-NetworkType must not be evaluated.

Id:	Q-LAH_80124-7944
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7957
Version:	2.7
Description:	The following parameters are defined for this service:

Id:	Q-LAH_80124-7947
Version:	2.7
Description:	Table 6-34: Request message parameter definition Definition Communicatio-nAndNetworkType This parameter influences the type and method of commu-nications influence. Communications components are activated or deactivated here in a bitwise manner. NodeIdentificationNumber This parameter is used for addressing the SubSystemNodeAddress uniform in the Volkswagen Group for DK1/2/2F systems as per document /15/.

Id:	Q-LAH_80124-7949
Version:	2.7
Description:	Table 6-35: CommunicationAndNetworkType Communicatio n Hex Description, CommunicationAndNetworkType Cvt. AndNet workType AllNetworks This value identifies all the network segments (incl. subnets) connected to the addressed server(s). That is, the 28hex service has an impact on all network

Id:	Q-LAH_80124-7951
Version:	2.7
Description:	C1 - Only relevant for subbus masters (DK4-high/low)

Id:	Q-LAH_80124-7137
Version:	2.7
Description:	The NodeIdentificationNumber parameter is used to uniquely indicate an inde-pendent sub- system on a subbus master in the vehicle. The sub-system cannot

	be addressed using another addressing method (e.g., CAN identifier, extended/mixed addressing). This parameter is available only if the sub-function ControlType has the value 0x04 or 0x05.

Id:	Q-LAH_80124-7138
Version:	2.7
Description:	Table 6-36: NodeIdentificationNumber Hex NodeIdentificationNumber Cvt.

Id:	Q-LAH_80124-7157
Version:	2.7
Description:	C1 - The parameter NodeIdentificationNumber is sent only if the ControlType has the value 0x04 or 0x05.

Id:	Q-LAH_80124-1613
Version:	2.7
Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-1623
Version:	2.7
Description:	Table 6-37: CommunicationControl response parameters Data Parameter name, response Bit- Cvt. Hex length #1 CommunicationControl Response Service Id 8 M 68 #2 ControlType 8 M 00 - 7F

Id:	Q-LAH_80124-7955
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-7959
Version:	2.7
Description:	Table 6-38: Positive response message parameter definition Definition ControlType This parameter is used in the server response as an echo of the sub-function (without SuppressPositiveResponseBit) in General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7961
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-7962

Version:	2.7
Description:	Table 6-39: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-7968
Version:	2.7
Description:	In this example, a functional CommunicationControl (28hex) is sent with the parameters: SuppressPositiveResponseBit = 1 ControlType = EnableRxAndDisableTx CommunicationAndNetworkType#1 = NormalCommunicationMessages CommunicationAndNetworkType#2 = AllNetworks

Id:	Q-LAH_80124-7966
Version:	2.7
Description:	Table 6-40: Example request Data Parameter name, request Bit- Hex length #1 CommunicationControl Request Service Id 8 28 #2 ControlType = EnableRxAndDisableTx 8 81 #3 Communication&NetworkType 8 01 #4 NodeIdentificationNumber#1[High] 8 xx General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7978
Version:	2.7
Description:	The TesterPresent service (3Ehex) is used to indicate to one or more servers that a client is connected to the vehicle or server(s) and certain previously activated diagnostic functions must continue to be maintained.

Id:	Q-LAH_80124-1725
Version:	2.7
Description:	The Keep Alive logic by TesterPresent (3Ehex) must be used by the client to maintain a previously activated NonDefaultSession in one or more servers.

Id:	Q-LAH_80124-1729
Version:	2.7
Description:	The keep-alive logic must be ensured by the client as a functionally addressed, valid TesterPresent (3Ehex) request with SuppressPositiveResponseBit == 1 and must be processed by the server in the bypass process.

Id:	Q-LAH_80124-9795
Version:	2.7
Description:	Bypass process means that the request is not handled in the UDS service and does not generate a positive or negative response. The timer S3Server as per

	the "Timing" section is retriggered. In this case, a MultipleClient handling does not apply.

Id:	Q-LAH_80124-1726
Version:	2.7
Description:	Receiving the client request prevents the server from automatically returning to the DefaultSession 0x01. Returning to this session may take place only in the event of an S3Server timeout (i.e., a defined time after the last service/TesterP-resent service correctly received by the server).

Id:	Q-LAH_80124-1728
Version:	2.7
Description:	To maintain a NonDefaultSession in one or more servers, a functional TesterP-resent 3Ehex must be used with SuppressPositiveResponseBit == 1.

Id:	Q-LAH_80124-9723
Version:	2.7
Description:	The functionally addressed TesterPresent (3Ehex) with SuppressPositiveRe-sponseBit == 1 must be sent by the client periodically with the cycle time S3Client to the server(s).

Id:	Q-LAH_80124-9724
Version:	2.7
Description:	Even if several servers must be maintained in a NonDefaultSession, a single functionally addressed TesterPresent 3Ehex with SuppressPositiveResponseBit == 1 with the cycle time S3Client is sufficient for all servers.

Id:	Q-LAH_80124-9731
Version:	2.7
Description:	The server and the client must implement the requirements for the request/re-sponse behavior from the "Service processing in the server" and "Addressing types" sections.

Id:	Q-LAH_80124-1731
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-1745

Version:	2.7
Description:	Table 6-41: TesterPresent request parameters Data Parameter name, request Bit- Cvt. Hex length #1 TesterPresent Request Service Id 8 M 3E #2 Suppress-PositiveResponseBit 1 M 0-1 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-1762
Version:	2.7
Description:	The following sub-function parameters are defined for this service:

Id:	Q-LAH_80124-1776
Version:	2.7
Description:	Table 6-42: Request message sub-function definition Hex Description, ZeroSub-Function Cvt. (bit 6-0)

Id:	Q-LAH_80124-1778
Version:	2.7
Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-1788
Version:	2.7
Description:	Table 6-43: Positive response message definition Definition ZeroSubFunction This parameter is used in the server response as an echo of the client request and has the same meaning.

Id:	Q-LAH_80124-7971
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-7972
Version:	2.7
Description:	Table 6-44: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-7974
Version:	2.7
Description:	The TesterPresent service 3Ehex is sent with SuppressPositiveResponseBit == 1 by the client. No response is generated by the server.

Id:	Q-LAH_80124-7975
Version:	2.7
Description:	Table 6-45: Example request Data Parameter name, request Bit- Hex length #1 TesterPresent Request Service Id 8 3E General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-1868
Version:	2.7
Description:	This service is used to deactivate and reactivate the updating of the StatusOfDTC bits of events and notices in the event memory of a server in a NonDefaultSession.

Id:	Q-LAH_80124-8104
Version:	2.7
Description:	If the ControlDTCSetting service and sub-function Off (0x02) are accepted by the server, the StatusOfDTC is no longer updated or the StatusOfDTC is frozen until the time at which the functionality (updating of the StatusOfDTC) is reactivated.

Id:	Q-LAH_80124-1870
Version:	2.7
Description:	All the errors or notes stored before the service ControlDTCSetting (85hex) was executed will be retained.

Id:	Q-LAH_80124-8105
Version:	2.7
Description:	The behavior of the ControlDTCSetting function with respect to a change in session is described in the DiagnosticSessionControl (10hex) section.

Id:	Q-LAH_80124-1871
Version:	2.7
Description:	This service is allowed only in NonDefaultSessions (i.e., this service is prohibited in session 0x01).

Id:	Q-LAH_80124-1929
Version:	2.7
Description:	After the initialization phase, an executed ECUReset reactivates the saving of DTCs (events and notices).

Id:	Q-LAH_80124-8106
Version:	2.7
Description:	The server must send a positive response if the service is supported in the active session and if the DTCSettingType ("On" or "Off") requested in the request is already active.

Id:	Q-LAH_80124-8107
Version:	2.7
Description:	If a request with ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex) is sent by the client during an active ControlDTCSetting == Off in the server, all StatusOfDTC bits must be reset to reflect with their logic. The ControlDTCSetting function is not affected.

Id:	Q-LAH_80124-8108
Version:	2.7
Description:	ControlDTCSetting deactivates only the updating of the StatusOfDTC bits. The service is not used to deactivate substitute functions.

Id:	Q-LAH_80124-8995
Version:	2.7
Description:	If event memory entries must be made (e.g., for legal reasons or if substitute functions and their documentation as DTC are required), the freezing of the StatusOfDTC must be deactivated. The previously activated ControlDTCSetting (85hex) service with sub-function DTCSettingType == Off is thus rejected and event memory entries in the server are again possible. The behavior must be agreed upon specific to the system with the Safety and Diagnostics departments and then documented in the BT-LAH.

Id:	Q-LAH_80124-9291
Version:	2.7
Description:	The handling of events that occur during a ControlDTCSetting==Off are described in document /2/.

Id:	Q-LAH_80124-9732
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-9260
Version:	2.7
Description:	The boundary conditions for this service are described in the "Boundary conditions for services" section and must be implemented.

Id:	Q-LAH_80124-1874
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-1892
Version:	2.7
Description:	Table 6-46: Request message definition Data Parameter name, request Bit- Cvt. Hex length #1 ControlDTCSetting Request Service Id 8 M 85 #2 SuppressPositiveResponseBit 1 M 0-1 DTCSettingType 7 00 - 7F DTCSettingControlOptionRecord [#3 Parameter#1 8 M xx #4 Parameter#2 8 M xx #5 Parameter#3 8 M xx]

Id:	Q-LAH_80124-1928
Version:	2.7
Description:	The sub-function DTCSettingType parameter is used to indicate in the request whether the updating of StatusOfDTC bits must be activated or deactivated.

Id:	Q-LAH_80124-1893
Version:	2.7
Description:	The following sub-function parameters are defined for this service:

Id:	Q-LAH_80124-1927
Version:	2.7
Description:	Table 6-47: Request message sub-function definition Hex Description, DTCSettingType Cvt. (bit 6-0)

Id:	Q-LAH_80124-1930
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-1944
Version:	2.7

Description:	Table 6-48: Request message parameter definition Definition DTCSettingControlOptionRecord This parameter is used to report to the server which DTCs are affected.

Id:	Q-LAH_80124-8119
Version:	2.7
Description:	Table 6-49: DTCSettingControlOptionRecord Hex: Description, DTCSettingControlOptionRecord: Cvt. 000000 - FFFFFE VWAGReserved NoImp AllSupportedDTCs FFFFFF This value deactivates or activates all the detectable DTCs (events and M notices) in the system.

Id:	Q-LAH_80124-1946
Version:	2.7
Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-1960
Version:	2.7
Description:	Table 6-50: ControlDTCSetting response parameters Data Parameter name, request Bit- Cvt. Hex length #1 ControlDTCSetting Response Service Id 8 M C5 #2 DTCSettingType 8 M 00 - 7F

Id:	Q-LAH_80124-1961
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-8122
Version:	2.7
Description:	Table 6-51: Positive response message parameter definition Definition DTCSettingType This parameter is used in the server response as an echo of the sub-function (without SuppressPositiveResponseBit) in General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8123
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-8124
Version:	2.7

Description:	Table 6-52: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-8127
Version:	2.7
Description:	The following example shows the deactivation of the updating of the StatusOfDTC of all event paths in the server.

Id:	Q-LAH_80124-8128
Version:	2.7
Description:	Table 6-53: Example request Data Parameter name, request Bit- Hex length #1 ControlDTCSetting Request Service Id 8 85 #2 DTCSettingType 8 02 #3 8 FF #4 DTCSettingControlOptionRecord 8 FF #5 8 FF

Id:	Q-LAH_80124-8129
Version:	2.7
Description:	Table 6-54: Example response Data Parameter name, response Bit- Hex length #1 ControlDTCSetting Response Service Id 8 C5 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-2038
Version:	2.7
Description:	This service is used to increase the bandwidth for diagnostic communication (e.g., FlexRay schedule or CAN baud rate). The service has access to the server instances/layers that cause a reconfiguration of the communication parameters, i.e., the physical bus behavior is changed.

Id:	Q-LAH_80124-2039
Version:	2.7
Description:	This service is permissible only in the DiagnosticSessions that must remain active via the TesterPresent service 3Ehex, i.e., only in NonDefaultSessions.

Id:	Q-LAH_80124-2040
Version:	2.7
Description:	The following sequence must be adhered to for changing the baud rate:

Id:	Q-LAH_80124-2041
Version:	2.7
Description:	Step#1: First it is checked whether the baud rate requested by the client is supported by the server. In order to do this, the client first sends the service 87hex

	with the sub-function 01hex VerifyBaudrateTransitionWithFixedBaudrate to the server. The LinkControlModeIdentifier parameter contains the relevant baud rate (e.g., 12hex for CAN 500 kbaud).

Id:	Q-LAH_80124-8850
Version:	2.7
Description:	Important: The SuppressPositiveResponseBit must be set to 0 (zero). The baud rate is not yet changed. The positive response only informs the client that the requested baud rate is supported by the server and that a change would currently be possible.

Id:	Q-LAH_80124-2042
Version:	2.7
Description:	Step#2: Step#2 is possible only if, immediately prior to this, Step#1 was carried out and the server has sent a positive response to the desired baud rate.

Id:	Q-LAH_80124-8851
Version:	2.7
Description:	The client then requests the change using service 87hex and sub-function TransitionMode (0x03) and set SuppressPositiveResponseBit=1.

Id:	Q-LAH_80124-8852
Version:	2.7
Description:	The LinkControlModeIdentifier parameter must no longer be used for the TransitionMode (0x03).

Id:	Q-LAH_80124-8853
Version:	2.7
Description:	The switch is performed immediately after receiving the request message to the new value. The maximum switchover time must be P2Server-Functional (50 ms). The client switches the baud rate only after the time P2Client-Functional (150 ms) has elapsed.

Id:	Q-LAH_80124-2043
Version:	2.7
Description:	The default setting can be set in the server in a variety of different ways:

Id:	Q-LAH_80124-8854

Version:	2.7
Description:	The switchover can take place as follows:

Id:	Q-LAH_80124-8855
Version:	2.7
Description:	SuppressPositiveResponseBit == 1: After receipt of the client's request message

Id:	Q-LAH_80124-8857
Version:	2.7
Description:	SuppressPositiveResponseBit == 0: After sending the server's positive response message

Id:	Q-LAH_80124-9844
Version:	2.7
Description:	The server must send a positive response if the service is supported in the active session and if the TransitionMode requested in the request is already active.

Id:	Q-LAH_80124-9733
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response behavior from the "Service processing in the server" and "Addressing types" sections.

Id:	Q-LAH_80124-8858
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-8859
Version:	2.7
Description:	Table 6-55: Request message definition Data Parameter name, request Bit-Cvt. Hex length #1 LinkControl Request Service Id 8 M 87 #2 SuppressPositiveResponseBit 1 M 0-1 Sub-function = LinkControlType 7 00 - 7F #3 LinkControlModeIdentifier 8 C1 xx

Id:	Q-LAH_80124-6711
Version:	2.7

Description:	C1 - This parameter is available if the sub-function LinkControlType has the value VerifyModeTransitionWithFixedParameter (0x01).

Id:	Q-LAH_80124-8860
Version:	2.7
Description:	Important information: In previous versions, the handling of the LinkControlModeIdentifier parameter was not clearly defined and could also be sent for sub-function=ModeTransition (0x03).

Id:	Q-LAH_80124-9815
Version:	2.7
Description:	If the parameter LinkControlParameter is sent within the request in Step#2, the server must General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8862
Version:	2.7
Description:	The LinkControlType is used to indicate the switchover to be performed.

Id:	Q-LAH_80124-2096
Version:	2.7
Description:	The following sub-function parameters are defined for this service:

Id:	Q-LAH_80124-2095
Version:	2.7
Description:	Table 6-56: LinkControlType Hex Description, LinkControlType Cvt. (bit 6-0)

Id:	Q-LAH_80124-2050
Version:	2.7
Description:	The following values must be implemented for this service:

Id:	Q-LAH_80124-8863
Version:	2.7
Description:	Table 6-57: Request message parameter definition Definition LinkControlModeIdentifier General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-2118

Version:	2.7
Description:	Table 6-58: LinkControlModeIdentifier Hex Description, LinkControlModeIdentifier Cvt. 00 - 11 Volkswagen AG-Reserved NoImp

Id:	Q-LAH_80124-7167
Version:	2.7
Description:	C1 - The baud rate change must be implemented only by networking gateways at the diagnostic access.

Id:	Q-LAH_80124-8865
Version:	2.7
Description:	C2 - Must be implemented for all FlexRay servers if separate FlexRay schedules are defined in valid data definition. If other mechanisms for fast data transfer are defined in valid FlexRay data definition, the implementation for the appropriate servers must be documented in the BT-LAH.

Id:	Q-LAH_80124-8866
Version:	2.7
Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-8867
Version:	2.7
Description:	Table 6-59: Positive response message definition Data Parameter name, request Bit- Cvt. Hex length #1 LinkControl Response Service Id 8 M C7 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-2120
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-2130
Version:	2.7
Description:	Table 6-60: LinkControl response parameters Definition LinkControlType This parameter is used in the server response as an echo of the client request and has the same meaning.

Id:	Q-LAH_80124-8870
Version:	2.7

Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-8871
Version:	2.7
Description:	Table 6-61: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-8874
Version:	2.7
Description:	The requirement for the following figure is that only supported sub-functions are sent by the General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-8875
Version:	2.7
Description:	Figure 6-8: State diagram Werte für LinkControlModeIdentifier xx := Unterstützter Wert yy := Wert ist ungleich dem Wert bei ,,Verify" zz := Default-Wert bei Nennverhalten Req 87 ... / Resp. 7F 87 7F Req 10 01 / Resp 50 01 LinkControl-NotPossible [DefaultSession] / Default -Values Req 10 01 / Resp 50 01 Req 10 NonDefaultSession S3-Timeout / Resp 50 NonDefaultSession Req 11 xx / Resp 51 xx LinkControlPossible [NonDefaultSession] Req for not Req 87 01 !xx supported or / Resp 7F 87 31 mismatching Req 87 83 LinkControlMode- / Resp 7F 87 24 Identifier Wait4Verify Req 87 01 !xx / Resp 7F 87 31 Req 87 83 / Resp - TransitionMode Req 87 01 xx || zz / Resp C7 01 Req 87 01 zz / Resp C7 01 Req 87 01 xx || zz / Resp C7 01 Req 87 83 Req 87 01 xx Wait4Transition / Resp - / Resp C7 01 Mode Req for not supported or mismatching

Id:	Q-LAH_80124-8877
Version:	2.7
Description:	The following example shows the change to the 1 000 kbaud mode for ISO-CAN. The switchover takes place within the NonDefaultSession.

Id:	Q-LAH_80124-8879
Version:	2.7
Description:	Table 6-62: Example request Data Parameter name, request Bit- Hex length #1 LinkControl Request Service Id 8 87 #2 LinkControlType = VerifyModeTransitionWithFixedParameter 8 01 #3 LinkControlModeIdentifier = CAN1000000Baud 8 13

Id:	Q-LAH_80124-8880

Version:	2.7
Description:	Table 6-63: Example response Data Parameter name, request Bit- Hex length #1 LinkControl Request Service Id 8 C7 #2 LinkControlType = VerifyModeTransitionWithFixedParameter 8 01

Id:	Q-LAH_80124-8883
Version:	2.7
Description:	Table 6-64: Example request Data Parameter name, request Bit- Hex length #1 LinkControl Request Service Id 8 87 #2 LinkControlType = TransitionMode, SPR bit = 1 (True) 8 83

Id:	Q-LAH_80124-8878
Version:	2.7
Description:	No response is generated because the SuppressPositiveReponseBit in the request has the General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-2213
Version:	2.7
Description:	A system's data management includes the following services:

Id:	Q-LAH_80124-2235
Version:	2.7
Description:	Table 7-1: Services for data management Service SID Document ReadDataByIdentifier 22hex /1/ ReadMemoryByAddress 23hex /1/ WriteDataByIdentifier 2Ehex /1/ WriteMemoryByAddress 3Dhex /1/

Id:	Q-LAH_80124-9988
Version:	2.7
Description:	In the context of ODX calibration, both terms can be used for the 22hex/2Ehex services: DataIdentifier or RecordDataIdentifier, General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-2237
Version:	2.7
Description:	This service is used to read out data from the system. The data involved is described in more detail in the client request and within the system response by means of the DataIdentifier parameter. The client's request can contain either one or more DataIdentifier parameters (each 2 bytes).

Id:	Q-LAH_80124-2238
Version:	2.7
Description:	The data to be issued by the system includes digital/analog input and output signals (measured values), system status information, identification data, as well as other internal system data.

Id:	Q-LAH_80124-10228
Version:	2.7
Description:	A DataIdentifier can be write-protected by an access protection method (e.g., PVD protection of vehicle diagnostics).

Id:	Q-LAH_80124-10227
Version:	2.7
Description:	The security level of a DataIdentifier must be documented in the data tables of the BT-LAH.

Id:	Q-LAH_80124-7908
Version:	2.7
Description:	At the receipt of the request, the current data of the addressed DataIdentifier must be transferred immediately (by NRC 0x78).

Id:	Q-LAH_80124-9643
Version:	2.7
Description:	If data for DataIdentifiers is currently not available, the response can be delayed with NRC 0x78. This must be agreed upon with the appropriate departments and documented in the Component Performance Specification.

Id:	Q-LAH_80124-9942
Version:	2.7
Description:	For the following DataIdentifiers (ECU identification data), the delaying of the response with NRC 0x78 is not permissible: 0x0600-VW Coding Value (coding) 0xF187-VW Spare Part Number (Volkswagen/Audi part number) 0xF189 -VW Software Version Number (software version) 0xF191-VW Hardware Number (hardware part number) 0xF197-VW System Name Or Engine Type (system designation) 0xF19E-ASAM ODX File Identifier (ASAM/ODX file designation) 0xF1A2-ASAM ODX File Version (ASAM/ODX file version) 0xF1A3-VW ECU Hardware Version Number (hardware version) 0xF1AA-VW Workshop System Name (system code)

Id:	Q-LAH_80124-2385
Version:	2.7
Description:	If one or more DataIdentifiers are included in a client request several times, the relevant DataIdentifiers must also be sent several times to the client in the positive response from the system.

Id:	Q-LAH_80124-7909
Version:	2.7
Description:	Through the sequential processing, in this case the response to the same DataIdentifier might contain different values of the DataRecord due to possible value changes.

Id:	Q-LAH_80124-9213
Version:	2.7
Description:	The sequence of the DataIdentifier specified in the request specifies the sequence of the General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9299
Version:	2.7
Description:	DataIdentifiers of the EndOfPDU data type must be used only once in a request with ReadDataByIdentifier with multiple DataIdentifiers and must be requested only as the last DataIdentifier in the sequence.

Id:	Q-LAH_80124-2251
Version:	2.7
Description:	A positive response also must be sent even if the server does not support all the DataIdentifiers contained in the client request. The DataIdentifiers that are not supported are left out of the positive server response.

Id:	Q-LAH_80124-10114
Version:	2.7
Description:	For physical addressing, the client must request between m = 1 and m = 8 DataIdentifiers per request.

Id:	Q-LAH_80124-2252
Version:	2.7
Description:	For physical addressing, the server must respond with the number of DataIdentifiers specified by the client. This number is between m = 1 and m = 8.

Id:	Q-LAH_80124-7910
Version:	2.7
Description:	For functional addressing, the client must request between m = 1 and m = 3 DataIdentifiers per request (single frame for classical CAN).

Id:	Q-LAH_80124-10115
Version:	2.7
Description:	For functional addressing, the server must respond with the number of DataIdentifiers specified by the client. This number is between m = 1 and m = 3.

Id:	Q-LAH_80124-7911
Version:	2.7
Description:	The requirements from the "Availability of DataIdentifiers" section apply.

Id:	Q-LAH_80124-9734
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response behavior from the "Service processing in the server" and "Addressing types" sections.

Id:	Q-LAH_80124-2240
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-2250
Version:	2.7
Description:	Table 7-2: ReadDataByIdentifier parameters Data Parameter name, request Bit-Cvt. Hex length #1 ReadDataByIdentifier Request Service Id 8 M 22 #2 DataIdentifier#1 (high byte) 8 M xx #3 DataIdentifier#1 (low byte) 8 M xx : : : : : #n - 1 DataIdentifier#m (high byte) 8 U xx #n DataIdentifier#m (low byte) 8 U xx

Id:	Q-LAH_80124-7913
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7915
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-7916
Version:	2.7
Description:	Table 7-3: Request message parameter definition Definition DataIdentifier (#1 - #m) This parameter identifies an object in the server. The ranges are specified in appendix E1.

Id:	Q-LAH_80124-7918
Version:	2.7
Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-7919
Version:	2.7
Description:	Table 7-4: Positive response message definition Data Parameter name, re-sponse Bit- Cvt. Hex length #1 ReadDataByIdentifier Response Service Id 8 M 62 #2 DataIdentifier#1 (high byte) 8 M xx #3 DataIdentifier#1 (low byte) 8 M xx #4 DataRecord Data#1 #1 8 M xx : : : : #(k - 1) + 4 #k 8 U xx : : : : : #n - (o - 1) - 2 DataIdentifier#m (high byte) 8 C1 xx #n - (o - 1) - 1 DataIdentifier#m (low byte) 8 C1 : #n - (o - 1) DataRecord Data#m #1 8 C1 xx : : : : : #n #o 8 U xx

Id:	Q-LAH_80124-9943
Version:	2.7
Description:	C1: The number of DataIdentifiers is specified by the client: For physical ad-dressing, a maximum of m = 8 For functional addressing, a maximum of m = 3

Id:	Q-LAH_80124-7921
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-7922
Version:	2.7
Description:	Table 7-5: Positive response message parameter definition Definition DataIden-tifier The parameter is used in the server response as an echo of the sub-func-tion (without SuppressPositiveResponseBit) in the client request. DataRecord (#1 - #m) The DataRecord parameter is used to provide the positive response requested by the client via the DataIdentifier. The General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7924
Version:	2.7

Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-7925
Version:	2.7
Description:	Table 7-6: NegativeResponseCodes NRC Description (hex) IncorrectMessage-LengthOrInvalidFormat

Id:	Q-LAH_80124-7926
Version:	2.7
Description:	Figure 7-1: NRC behavior mandatory optional VOLKSWAGEN AG-specific Service with SID 0x22 1) Min. length check + modulo 2 division NO NRC 0x13 ok? 2) YES Max. length NO NRC 0x13 check ok? YES n=0 Loop (multiple DIDs) Same check for n++ each DID DID#n support NO service 0x22 in active session? YES Security check NO NRC 0x33 o.k.? DID#n condition YES check o.-k.? NO NRC 0x22 3) YES YES further DID available? 3) NO - at least one DID is supported in NO NRC 0x31 active session? - DID-config-check ok? YES Total response length exceeded NO NRC 0x14 (available in the Server)? YES With all Positive supported DIDs Response in this active session 1) minimum length is 3 byte (SI + DID) 2) maximum length is 1 byte (SI) + 2*n bytes (DID(s)) General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7928
Version:	2.7
Description:	Table 7-7: Example request Data Parameter name, request Bit- Hex length #1 ReadDataByIdentifier ReqSId 8 22 #2 DataIdentifier#1 (high byte) 8 F1 #3 DataIdentifier#1 (low byte) 8 A3

Id:	Q-LAH_80124-7929
Version:	2.7
Description:	Table 7-8: Example response Data Parameter name, response Bit- Hex length #1 ReadDataByIdentifier ReqSId 8 62 #2 DataIdentifier#1 (high byte) 8 F1 #3 DataIdentifier#1 (low byte) 8 A3 #4 DataRecord Data#1 #1 8 35 #5 DataRecord Data#1 #2 8 30 General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-2527
Version:	2.7
Description:	The ReadMemoryByAddress service (23hex) is used to read contiguous data from the memory location of a server.

Id:	Q-LAH_80124-8906
Version:	2.7
Description:	The maximum number of transmitted bytes is defined accordingly by the transport protocol layer being used.

Id:	Q-LAH_80124-2528
Version:	2.7
Description:	This service must be implemented only for development purposes within the ExtendedDiagnosticSession (0x03).

Id:	Q-LAH_80124-8955
Version:	2.7
Description:	The memory locations must be protected by a SecurityLevel and documented in the Component Performance Specification.

Id:	Q-LAH_80124-8828
Version:	2.7
Description:	The memory location is defined by the MemoryAddress and MemorySize parameters.

Id:	Q-LAH_80124-8829
Version:	2.7
Description:	The number of bytes for the MemoryAddress and MemorySize parameters are defined by the AddressAndLengthFormatIdentifier parameter.

Id:	Q-LAH_80124-8830
Version:	2.7
Description:	The AddressAndLengthFormatIdentifier parameter can be defined as a fixed size. The value 0x00 must be written into bytes not used for the MemoryAddress and MemorySize parameters.

Id:	Q-LAH_80124-8831
Version:	2.7
Description:	The data transmitted by the server in the DataRecord parameter must be transmitted uncompressed.

Id:	Q-LAH_80124-9735
Version:	2.7

Description:	The server and the client must implement the requirements for the request/response General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-8833
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-8834
Version:	2.7
Description:	Table 7-9: Request message definition Data Parameter name, request Bit- Cvt. Hex length #1 ReadMemoryByAddress Request Service Id 8 M 23 #2 AddressAndLengthFormatIdentifier 8 M xx MemoryAddress = [#3 Byte#1 (MSB) 8 M xx : : : : : #(m - 1) + 3 Byte#m 8 C1 xx] MemorySize = [#n - (k - 1) Byte#1 (MSB) 8 M xx : : : : : #n Byte#k 8 C2 xx]

Id:	Q-LAH_80124-2652
Version:	2.7
Description:	C1 - The parameter is present, depending on the address length information from the AddressAndLengthFormatIdentifier parameter.

Id:	Q-LAH_80124-2653
Version:	2.7
Description:	C2 - The parameter is present, depending on the size information from the AddressAndLengthFormatIdentifier parameter.

Id:	Q-LAH_80124-8838
Version:	2.7
Description:	The service does not support any sub-functions.

Id:	Q-LAH_80124-2530
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-2548
Version:	2.7
Description:	Table 7-10: Request message parameter definition Definition AddressAndLengthFormatIdentifier This parameter is a one-byte value where the nib-

	bles have the following meanings: - High nibble (bit 7-4): number of bytes of the MemorySize parameter - Low nibble (bit 3-0): number of bytes of the MemoryAddress parameter MemoryAddress (MA) The values for the MemoryAddress (byte) parameter correspond to the start address of the memory area to be read. Byte#m is always the least significant byte of the address, representing the specified address in the server. MemorySize (MS) General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-2570
Version:	2.7
Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-8839
Version:	2.7
Description:	Table 7-11: Positive response message definition Data Parameter name, response Bit- Cvt. Hex length #1 ReadMemoryByAddress Response Service Id 8 M 63 DataRecord = [#2 Data#1 8 M xx : : : : : #n Data#m 8 U xx]

Id:	Q-LAH_80124-8841
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-8842
Version:	2.7
Description:	Table 7-12: Positive response message parameter definition Definition DataRecord This parameter includes the uncompressed data that the client reads from the memory of the server.

Id:	Q-LAH_80124-8844
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-8845
Version:	2.7
Description:	Table 7-13: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-8847
Version:	2.7

Description:	Figure 7-2: NRC behavior mandatory optional VOLKSWAGEN AG-specific Service with SID 0x23 1) Min. length check NO NRC 0x13 ok? YES AddressAndLengt hFormatIdentifier NO NRC 0x31 is applicable? 2) YES total length check NRC 0x13 ok? NO YES memoryAddress and memorySize are correct NRC 0x31 AND NO Supported in the current session? YES Security check ok for requested memory NO NRC 0x33 intervall? YES Positive Response 1) at least 4 (SI + addressAndLengthFormatIdentifier+min memoryAddress+min memorySize) 2) at 1 byte SI + 1 byte addressAndLengthFormatIdentifier + n byte memoryAddress parameter General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8835
Version:	2.7
Description:	The client requests a 4-byte data length from a server starting at address 0xFFFF1837.

Id:	Q-LAH_80124-8836
Version:	2.7
Description:	Table 7-14: Example request Data Parameter name, request Bit- Cvt. Hex length #1 ReadMemoryByAddress Request Service Id 8 M 23 #2 AddressAndLengthFormatIdentifier 8 M 14 #3 MemoryAddress#1 8 M FF #4 MemoryAddress#2 8 M FF #5 MemoryAddress#3 8 M 18 #6 MemoryAddress#4 8 M 37 #7 MemorySize 8 M 4

Id:	Q-LAH_80124-8849
Version:	2.7
Description:	Table 7-15: Example response Data Parameter name, response Bit- Cvt. Hex length #1 ReadMemoryByAddress Response Service Id 8 M 63 #2 DataRecord#1 8 M 12 #3 DataRecord#2 8 M 34 #4 DataRecord#3 8 M 56 #5 DataRecord#4 8 M 78

Id:	Q-LAH_80124-2657
Version:	2.7
Description:	Any data can be written in the server using this service. The data type is described in more detail in the client request and within the system response by means of the DataIdentifier parameter (2 bytes each); it contains process, parameter, identification, or coding values of the system, for example. The definition is described in document /10/.

Id:	Q-LAH_80124-7979

Version:	2.7
Description:	The data stream and its length transmitted to the server are defined by the DataIdentifier parameter.

Id:	Q-LAH_80124-7980
Version:	2.7
Description:	A DataIdentifier can be write-protected by an access protection method (e.g., PVD protection of vehicle diagnostics).

Id:	Q-LAH_80124-7981
Version:	2.7
Description:	The security level of a DataIdentifier must be documented in the data tables of the BT-LAH.

Id:	Q-LAH_80124-7982
Version:	2.7
Description:	Boundary conditions that must be adhered to for performing the service must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-7983
Version:	2.7
Description:	DataIdentifiers and their data must be defined so that the data is copied into a unique memory area of the server. Assigning or defining memory areas multiple times of and by General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-7984
Version:	2.7
Description:	Expanding the DataIdentifier by additional parameters (e.g., for controlling address information) is not permitted.

Id:	Q-LAH_80124-9302
Version:	2.7
Description:	A positive response to the WriteDataByIdentifier (2Ehex) request indicates to the client that all parameters have been successfully written into the memory area(s) defined for the DataIdentifier.

Id:	Q-LAH_80124-9303

Version:	2.7
Description:	In the Component Performance Specification it must be documented whether the parameters of a DataIdentifier have been stored in volatile or non-volatile memory by means of the WriteDataByIdentifier service (2Ehex).

Id:	Q-LAH_80124-9304
Version:	2.7
Description:	In implementations that transmit the parameters to the non-volatile memory via a RAM mirror, the memory destination is the non-volatile memory and thus a positive response must be sent after successful storage in the non-volatile memory.

Id:	Q-LAH_80124-7985
Version:	2.7
Description:	The WriteDataByIdentifier service (2Ehex) is used exclusively for configuration purposes. A triggering of internal functions must be performed via the RoutineControl service 31hex.

Id:	Q-LAH_80124-7986
Version:	2.7
Description:	For this service, under some circumstances, a longer time than P2Server_Max or P2*Server_Max is required (e.g., NVM action). In this case, a negative response must be sent with NRC 0x78 within P2Server_Max or P2*Server_Max from the server to the client.

Id:	Q-LAH_80124-7987
Version:	2.7
Description:	The behavior must be agreed upon with the purchaser's Diagnostics and Diagnostic Specifications departments and documented in the Component Performance Specification.

Id:	Q-LAH_80124-7988
Version:	2.7
Description:	It must be possible to query every parameter that is written via the WriteDataByIdentifier (2Ehex) service in every session via the ReadDataByIdentifier (22hex) service.

Id:	Q-LAH_80124-9736
Version:	2.7

Description:	The server and the client must implement the requirements for the request/response behavior from the "Service processing in the server" and "Addressing types" sections.

Id:	Q-LAH_80124-2661
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-2671
Version:	2.7
Description:	Table 7-16: Request message definition Data Parameter name, request Bit-Cvt. Hex length #1 WriteDataByIdentifier Request Service Id 8 M 2E #2 DataIdentifier (high byte) 8 M xx #3 DataIdentifier (low byte) 8 M xx #4 8 M xx : DataRecord : : : General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-2672
Version:	2.7
Description:	The values of the DataRecord for the supported DataIdentifiers must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-7990
Version:	2.7
Description:	The service does not support any sub-functions.

Id:	Q-LAH_80124-7992
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-7993
Version:	2.7
Description:	Table 7-17: Request message parameter definition Definition DataIdentifier This parameter identifies the addressed data object in the server that obtains the data of the DataRecord from the request. DataRecord (#1 - #m) This parameter includes the data to be written.

Id:	Q-LAH_80124-7995
Version:	2.7

Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-7996
Version:	2.7
Description:	Table 7-18: Positive response message definition Data Parameter name, response Bit- Cvt. Hex length #1 WriteDataByIdentifier Response Service Id 8 M 6E #2 DataIdentifier (high byte) 8 M xx #3 DataIdentifier (low byte) 8 M xx

Id:	Q-LAH_80124-7998
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-7999
Version:	2.7
Description:	Table 7-19: Positive response message parameter definition Definition DataIdentifier General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-8001
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-8002
Version:	2.7
Description:	Table 7-20: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-8004
Version:	2.7
Description:	Figure 7-3: NRC behavior mandatory optional VOLKSWAGEN AG-specific Service with SID 0x2E 1) Min. length NO NRC 0x13 check ok? - DID supports YES service 0x2E in active session? NO NRC 0x31 - ReadOnly - DID-config-check (Coding, Parameter) YES 2) total length check NRC 0x13 ok? NO YES DID security NRC 0x33 check ok? NO DID condition check o.k.? YES NO NRC 0x22 YES Data record NO NRC 0x31 is valid? YES Was correctly altered into NO NRC 0x72 server's memory? YES Positive Response 1) minimum length is 4 byte (SI + DID + DREC) General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8008

Version:	2.7
Description:	It is assumed that the requirements for writing by means of WriteDataByIdentifier are fulfilled.

Id:	Q-LAH_80124-8006
Version:	2.7
Description:	Table 7-21: Example request Data Parameter name, request Bit- Hex length #1 WriteDataByIdentifier ReqSId 8 2E #2 DataIdentifier (high byte) 8 F1 #3 DataIdentifier (low byte) 8 98 #4 DataRecord#1 8 11 #5 DataRecord#2 8 22 #6 DataRecord#3 8 33 #7 DataRecord#4 8 44 #8 DataRecord#5 8 55 #9 DataRecord#6 8 66

Id:	Q-LAH_80124-8007
Version:	2.7
Description:	Table 7-22: Example response Data Parameter name, response Bit- Hex length #1 WriteDataByIdentifier RespSId 8 6E #2 DataIdentifier (high byte) 8 F1 #3 DataIdentifier (low byte) 8 98

Id:	Q-LAH_80124-8015
Version:	2.7
Description:	The sequence implies a previously performed session change to a NonDefault-Session.

Id:	Q-LAH_80124-8016
Version:	2.7
Description:	If data for a DataIdentifier is written, this must be readable after transfer into the final memory location and positive response via the DataIdentifier used for the data input.

Id:	Q-LAH_80124-8018
Version:	2.7
Description:	The server must provided consistent delivery of data used in the application with the ReadDataByIdentifier service (22hex).

Id:	Q-LAH_80124-8019
Version:	2.7
Description:	If the WriteDataByIdentifier (2Ehex) service is used, it may be necessary to transfer the data to the application via the optional ECUReset-KeyOffOnReset (11hex 02). This must be agreed upon with the Production and Diagnostics de-

	partments; it must be General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-2781
Version:	2.7
Description:	The WriteMemoryByAddress service (3Dhex) is used to write data quantities in coherent memory areas of a system.

Id:	Q-LAH_80124-8905
Version:	2.7
Description:	The maximum number of transmitted bytes is defined accordingly by the transport protocol layer being used.

Id:	Q-LAH_80124-8802
Version:	2.7
Description:	The flash programming must not be realized with the WriteMemoryByAddress service (3Dhex).

Id:	Q-LAH_80124-2782
Version:	2.7
Description:	This service must be implemented only for development purposes within the ExtendedDiagnosticSession (0x03).

Id:	Q-LAH_80124-8956
Version:	2.7
Description:	The memory locations must be protected by a SecurityLevel and documented in the Component Performance Specification.

Id:	Q-LAH_80124-8803
Version:	2.7
Description:	The request message requests the server to write data transmitted via the DataRecord parameter to the addresses defined by the MemoryAddress and MemorySize parameters.

Id:	Q-LAH_80124-8804
Version:	2.7
Description:	The data transmitted by the client in the DataRecord parameter must be transmitted uncompressed.

Id:	Q-LAH_80124-8805
Version:	2.7
Description:	The AddressAndLengthFormatIdentifier parameter can be defined as a fixed size.

Id:	Q-LAH_80124-8806
Version:	2.7
Description:	Use cases can include the following, among other examples: Erasing a non-volatile memory area Changing parameters

Id:	Q-LAH_80124-8807
Version:	2.7
Description:	The WriteMemoryByAddress service (3Dhex) must not be used for deleting the event memory.

Id:	Q-LAH_80124-9737
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8813
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-6571
Version:	2.7
Description:	Table 7-23: Request message definition Data Parameter name, request Bit-Cvt. Hex length #1 WriteMemoryByAddress Request Service Id 8 M 3D #2 AddressAndLengthFormatIdentifier 8 M xx MemoryAddress = [#3 Byte#1 (MSB) 8 M xx : : : : : #m+2 Byte#m 8 C1 xx] MemorySize = [#n - r - 2 - (k - 8 M xx 1) Byte#1 (MSB) : : : : : #n - r - 2 Byte#k 8 C2 xx] DataRecord = [#n - (r - 1) Data#1 8 M xx : : : : : #n Data#r 8 U xx]

Id:	Q-LAH_80124-8808
Version:	2.7
Description:	C1 - The parameter is present, depending on the address length information from the AddressAndLengthFormatIdentifier parameter.

Id:	Q-LAH_80124-8810
Version:	2.7
Description:	C2 - The parameter is present, depending on the size information from the AddressAndLengthFormatIdentifier parameter.

Id:	Q-LAH_80124-8812
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-2784
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-2806
Version:	2.7
Description:	Table 7-24: Request message parameter definition Definition AddressAndLengthFormatIdentifier This parameter is a one-byte value where the nibbles have the following meanings: - High nibble (bit 7-4): number of bytes of the MemorySize parameter - Low nibble (bit 3-0): number of bytes of the MemoryAddress parameter MemoryAddress (MA) The values for the MemoryAddress (mByte) parameter correspond to the start address of the memory area to be programmed. Byte#m is always the least significant byte of the address, representing the specified address in the server. MemorySize (MS) The MemorySize parameter (byte) indicates the amount of actual, i.e., uncompressed, data to be transmitted in bytes. DataRecord This parameter describes the data that the client writes to the memory of the server. Range: [MA, (MA + MS - 0x01)]

Id:	Q-LAH_80124-8815
Version:	2.7
Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-8816
Version:	2.7
Description:	Table 7-25: Positive response message definition Data Parameter name, request Bit- Cvt. Hex length #1 WriteMemoryByAddress Response Service Id 8 M 7D #2 AddressAndLengthFormatIdentifier 8 M xx MemoryAddress = [#3 Byte#1 (MSB) 8 M xx : : : : : #(m - 1) + 3 Byte#m 8 C1 xx] MemorySize = [#n - (k - 1) Byte#1 (MSB) 8 M xx : : : : : #n Byte#k 8 C2 xx]

Id:	Q-LAH_80124-2931
Version:	2.7
Description:	C1 - The parameter is present, depending on the address length information from the AddressAndLengthFormatIdentifier parameter.

Id:	Q-LAH_80124-2932
Version:	2.7
Description:	C2 - The parameter is present, depending on the size information from the General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8818
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-8819
Version:	2.7
Description:	Table 7-26: Request message parameter definition Definition AddressAndLengthFormatIdentifier This parameter is the echo of the request message. MemoryAddress (MA) This parameter is the echo of the request message. MemorySize (MS) This parameter is the echo of the request message.

Id:	Q-LAH_80124-8821
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-8822
Version:	2.7
Description:	Table 7-27: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-8823
Version:	2.7
Description:	Figure 7-4: NRC behavior mandatory optional VOLKSWAGEN AG-specific Service with SID 0x3D 1) Min. length check NO NRC 0x13 ok? YES addressAndLength FormatIdentifier is NO NRC 0x31 applicable? 2) YES total length check NRC 0x13 ok? NO YES memoryAddress and memorySize are correct NRC 0x31 AND NO Supported in the current session? YES Security check ok for requested memory NO NRC 0x33 intervall? Condition check o.k.? YES NO NRC 0x22 YES No error when writing to a NO NRC 0x72 memory location? YES

	Positive Response 1) at least 5 (SI+addressAndLengthFormatIdentifier + min memoryAddress+min memorySize + min dataRecord) 2) 1 byte SI + 1 byte addressAndLengthFormatIdentifier + n byte memoryAddress parameter length + n byte General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8825
Version:	2.7
Description:	The client writes data to the address 0xFFFF1837. The length of the data (0x12, 0x34, 0x56, 0x78) is 4 bytes.

Id:	Q-LAH_80124-8826
Version:	2.7
Description:	Table 7-28: Example request Data Parameter name, request Bit- Cvt. Hex length #1 WriteMemoryByAddress Request Service Id 8 M 3D #2 AddressAndLengthFormatIdentifier 8 M 14 #3 MemoryAddress#1 8 M FF #4 MemoryAddress#2 8 M FF #5 MemoryAddress#3 8 M 18 #6 MemoryAddress#4 8 M 37 #7 MemorySize 8 M 04 #8 DataRecord#1 8 M 12 #9 DataRecord#2 8 M 34 #10 DataRecord#3 8 M 56 #11 DataRecord#4 8 M 78

Id:	Q-LAH_80124-8827
Version:	2.7
Description:	Table 7-29: Example response Data Parameter name, response Bit- Cvt. Hex length #1 WriteMemoryByAddress Response Service Id 8 M 7D #2 AddressAndLengthFormatIdentifier 8 M 14 #3 MemoryAddress#1 8 M FF #4 MemoryAddress#2 8 M FF #5 MemoryAddress#3 8 M 18 #6 MemoryAddress#4 8 M 37 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-2937
Version:	2.7
Description:	The system's event and error management function includes the following services:

Id:	Q-LAH_80124-2951
Version:	2.7
Description:	Table 8-1: Services for the event and error management Service SID Document ClearDiagnosticInformation 14hex /1/ ReadDTCInformation 19hex /1/ ResponseOnEvent 86hex /1/

Id:	Q-LAH_80124-6679

Version:	2.7
Description:	This service is used to erase the entire contents of the event memory or particular stored events from a system. Additional information such as ambient data is also erased using this service. The clearing process must be carried out independently of the event/notice status (StatusOfDTC), i.e., active events and notices are also cleared.

Id:	Q-LAH_80124-2953
Version:	2.7
Description:	The ClearDiagnosticInformation (14hex) service or, for OBDECUs or OBDReadyECUs, the ClearEmissionRelatedDiagnosticInformation (04hex) service must not be used to execute a self-test (Quickstart for OBD) or an ECU reset.

Id:	Q-LAH_80124-2954
Version:	2.7
Description:	The StatusOfDTC of all DTCs is affected by the ClearDiagnosticInformation service (14hex) or ClearEmissionRelatedDiagnosticInformation service (04hex).

Id:	Q-LAH_80124-7098
Version:	2.7
Description:	If this service is executed, the confirmation and interruption times of all DTCs are restarted as per document /2/.

Id:	Q-LAH_80124-7675
Version:	2.7
Description:	The ClearDiagnosticInformation (14hex) service erases or resets the following information: StatusOfDTC Detected DTCSnapshotData data Detected DTCExtendedData data All flags, counter states, timers, etc., related to DTC or event memory management

Id:	Q-LAH_80124-7766
Version:	2.7
Description:	The system-specific memory area must not be erased with ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex).

Id:	Q-LAH_80124-6714
Version:	2.7
Description:	In this context, it is not considered whether the old contents could be restored by a power down/up reset, e.g., in the case of incomplete post-run.

Id:	Q-LAH_80124-9738
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7676
Version:	2.7
Description:	The server must send a positive response after the structure allocated for the event memory output has been completely erased by the ClearDiagnosticInformation service (14hex).

Id:	Q-LAH_80124-7678
Version:	2.7
Description:	If the server supports mirrored storage of the event memory (RAM and NVM), the content of the structure used for an event memory query via the ReadDTCInformation service (19hex) must be erased.

Id:	Q-LAH_80124-6713
Version:	2.7
Description:	During standard operating conditions, it must be ensured by the system that the associated NVM contents are also consistent on the next power down/up reset of the system.

Id:	Q-LAH_80124-7679
Version:	2.7
Description:	At the latest in the post-run phase of the server, it must be ensured that the NVM mirror is updated with the content of the structure used for an event memory query via the ReadDTCInformation service (19hex).

Id:	Q-LAH_80124-7677
Version:	2.7
Description:	The server must send a positive response even if no events are stored at the time of the event memory clearing.

Id:	Q-LAH_80124-7681
Version:	2.7

Description:	Note: If the guarantee of the data consistency is affected (e.g., voltage interrupt during NVM update from RAM mirror), this can lead to corrupt data after start-up/power on of the server.

Id:	Q-LAH_80124-2955
Version:	2.7
Description:	PrimaryOBDECUs, even if they have been developed as OBDReadyECUs, must not implement the Service ClearDiagnosticInformation (14hex) service and must send no response, or a negative response, depending on the addressing (see section "Addressing method and response behavior"). Clearing the event memory must be realized in these servers by means of the ClearEmissionRelated-DiagnosticInformation (04hex) OBD service.

Id:	Q-LAH_80124-9445
Version:	2.7
Description:	This is necessary to keep the OBD information of these systems (e.g., Readiness bits) in a vehicle consistent.

Id:	Q-LAH_80124-9454
Version:	2.7
Description:	A monitoring/diagnostics event that is transmitted from a SecondaryOBDECU to a PrimaryOBDECU must be evaluated only if the corresponding "TestNotCompletedThisOperationCycle" information indicates a detected monitoring/diagnostics event (TestNotCompletedThisOperationCycle == 0).

Id:	Q-LAH_80124-9455
Version:	2.7
Description:	This also applies if the transmitted TestNotCompletedThisOperationCycle changes from 0bin to 1bin within the current driving cycle (DCY). (In the case of a 14hex service request, a new General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9446
Version:	2.7
Description:	SecondaryOBDECUs can implement the ClearDiagnosticInformation (14hex) service under the following boundary conditions:

Id:	Q-LAH_80124-9447
Version:	2.7

Description:	All emission-relevant diagnostic monitoring detect and report the last pass/fail event to the PrimaryOBDECU on a continuous or cyclical basis. This also applies to the case of transmitted unprocessed values.

Id:	Q-LAH_80124-10116
Version:	2.7
Description:	If the 14hex service is implemented, the 04hex service must not be supported.

Id:	Q-LAH_80124-2957
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-7682
Version:	2.7
Description:	Table 8-2: Request message definition Data Parameter name, request Bit-Cvt. Hex length #1 ClearDiagnosticInformation Request Service Id 8 M 14 GroupOfDTC = [#2 GroupOfDTCHighByte 8 M xx #3 GroupOfDTCMiddleByte 8 M xx #4 GroupOfDTCLowByte] 8 M xx

Id:	Q-LAH_80124-7684
Version:	2.7
Description:	The service does not support any sub-functions.

Id:	Q-LAH_80124-7686
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-2967
Version:	2.7
Description:	Table 8-3: Request message parameter definition Definition GroupOfDTC This 3-byte parameter addresses DTC groups.

Id:	Q-LAH_80124-2968
Version:	2.7
Description:	In the request from the client, the GroupOfDTC parameter identifies a certain group of DTCs which are to be deleted. This makes it possible to select one, several, or all DTCs for erasing General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-2969
Version:	2.7
Description:	The following values have been defined for the GroupOfDTC parameter:

Id:	Q-LAH_80124-2983
Version:	2.7
Description:	Table 8-4: GroupOfDTC Hex: Description, GroupOfDTC Cvt. 000000 - FFFFFE Reserved NoImp FFFFFF AllGroups (all DTCs) M

Id:	Q-LAH_80124-7688
Version:	2.7
Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-7689
Version:	2.7
Description:	Table 8-5: Positive response message definition Data Parameter name, re- sponse Bit- Cvt. Hex length #1 ClearDiagnosticInformation Response Service Id 8 M 54

Id:	Q-LAH_80124-7691
Version:	2.7
Description:	No parameters are defined for the positive response message.

Id:	Q-LAH_80124-7693
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-7694
Version:	2.7
Description:	Table 8-6: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-7696
Version:	2.7
Description:	Figure 8-1: NRC behavior mandatory optional VOLKSWAGEN AG-specific Ser- vice with SID 0x14 Length check NO NRC 0x13 == 4 Byte? YES GroupOfDTC NO NRC 0x31 supported? YES Condition check ok? NO NRC 0x22 YES Stor- age ok? NO NRC 0x72 YES Positive Response

Id:	Q-LAH_80124-7698
Version:	2.7
Description:	The client sends the ClearDiagnosticInformation request to a server. The GroupOfDTC parameter contains the value (0xFFFFFF) AllGroups (all DTCs).

Id:	Q-LAH_80124-7699
Version:	2.7
Description:	Table 8-7: Example request Data Parameter name, request Bit- Cvt. Hex length #1 ClearDiagnosticInformation Request Service Id 8 M 14 GroupOfDTC = [#2 GroupOfDTCHighByte 8 M FF #3 GroupOfDTCMiddleByte 8 M FF General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7700
Version:	2.7
Description:	Table 8-8: Example response Data Parameter name, response Bit- Cvt. Hex length #1 ClearDiagnosticInformation Response Service Id 8 M 54

Id:	Q-LAH_80124-3094
Version:	2.7
Description:	The ReadDTCInformation service 19hex is used to read events or notices that have occurred or been detected, as well as the related additional information such as ambient data from a server.

Id:	Q-LAH_80124-7702
Version:	2.7
Description:	A client has the ability to obtain from the server the following, via sub-functions or additional parameters: The number of DTCs that match a defined status mask - ReportNumberOfDTCByStatusMask (0x01) A list of all DTCs that match a defined status mask - ReportDTCByStatusMask (0x02) A list of snapshot data for a DTC - ReportDTCSnapshotIdentification (0x03), ReportDTCSnapshotRecordByDTCNumber (0x04) To keep ambient data added to the actual event memory entry - ReportDTCExtendedDataRecordByDTCNumber (0x06) Standard ambient data as per /2/ Extended ambient data Fixed system ambient data valid for each DTC Dynamic system ambient data that is different for each DTC The DTCs that are currently in "prefailed" status and have not yet been validated ("confirmed" or "pending") - ReportDTCFaultDetectionCounter (0x14) The number of DTCs from a system-specific memory area that match a defined status mask (developer event memory) - ReportUserDefMemoryDTCByStatusMask (0x17) To keep a list of snapshot data for a DTC from a system-specific server memory - ReportUserDefMemoryDTCSnapshotRecordByDTCNumber (0x18)

	Ambient data from a system-specific memory area, which was recorded for the actual event memory entry - ReportUserDefMemoryDTCExtDataRecordByDTC-Number (0x19) Standard ambient data as per /2/ Extended ambient data Fixed system ambient data valid for each DTC General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7703
Version:	2.7
Description:	As per document /1/, additional options that can be used by the client must not be supported for Volkswagen AG in the server.

Id:	Q-LAH_80124-7704
Version:	2.7
Description:	What information is read out via the ReadDTCInformation service (19hex) is defined by means of the sub-function.

Id:	Q-LAH_80124-7705
Version:	2.7
Description:	A DTC must be listed only once in the positive response (exception is the reading of DTCSnapshotRecords, because several snapshots can be recorded for one DTC).

Id:	Q-LAH_80124-7706
Version:	2.7
Description:	DTCs deactivated by coding or configuration must not be contained in the DTC list in the response. Exceptions for the response/output are DTCs with relevant StatusMask and available ambient data. For more information, see appendix F.

Id:	Q-LAH_80124-9739
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response behavior from the "Service processing in the server" and "Addressing types" sections.

Id:	Q-LAH_80124-7711
Version:	2.7
Description:	A client queries the number of DTCs that relates to a defined status pattern by sending a request with the service 19hex and the sub-function ReportNumberOfDTCByStatusMask (0x01).

Id:	Q-LAH_80124-7712
Version:	2.7
Description:	The response of the server contains the DTCStatusAvailabilityMask that indicates which bits of the StatusOfDTC are supported by the server.

Id:	Q-LAH_80124-7713
Version:	2.7
Description:	In accordance with the DTCStatusAvailabilityMask, the response contains the DTCFormatIdentifier and the information on DTC formatting and coding.

Id:	Q-LAH_80124-7714
Version:	2.7
Description:	In accordance with the DTCFormatIdentifier, the DTCCount (2-bytes unsigned) that contains the number of DTCs recorded in the event memory relates to the status pattern requested by General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7716
Version:	2.7
Description:	The client queries a list of DTCs that relates to a defined status pattern by sending a request with the service 19hex with the sub-function ReportDTCByStatusMask (0x02).

Id:	Q-LAH_80124-7718
Version:	2.7
Description:	The DTCStatusAvailabilityMask must be output in addition to the output DTCs.

Id:	Q-LAH_80124-7889
Version:	2.7
Description:	All DTCs are output whose StatusOfDTC is bitwise ANDed with DTCStatusMask not equal to zero , [(StatusOfDTC & DTCStatusMask) !=0].

Id:	Q-LAH_80124-10238
Version:	2.7
Description:	Table 8-9: Example of DTC output DTC 1 DTC 2 StatusOfDTC 00001100bin 00000000bin DTCStatusMask 00010100bin 00010100bin (StatusOfDTC & DTCStatusMask) 00000100bin 00000000bin DTC output yes no

Id:	Q-LAH_80124-7719

Version:	2.7
Description:	If the client requests a status mask that the server does not support, the server must apply the calculation to the bits that are supported by it.

Id:	Q-LAH_80124-7720
Version:	2.7
Description:	If no DTC in the server matches the status mask requested by the client, no data is transmitted in the positive response in accordance with the DTCStatusAvailabilityMask.

Id:	Q-LAH_80124-9212
Version:	2.7
Description:	All DTCExtendedDataRecord data must be reset for a ClearDiagnosticInformation (14hex) service or ClearResetEmissionRelatedDiagnosticInformation (04hex) service receiving a positive response.

Id:	Q-LAH_80124-7724
Version:	2.7
Description:	The snapshot data is recorded only for validated DTCs (TestFailed == 1).

Id:	Q-LAH_80124-7726
Version:	2.7
Description:	A server can record several DTCSnapshotRecords for a single DTC, in order to trace the current conditions for each occurrence of the DTC.

Id:	Q-LAH_80124-10111
Version:	2.7
Description:	The number of DTCSnapshotRecords can be specified individually for each DTC.

Id:	Q-LAH_80124-7738
Version:	2.7
Description:	If only one DTCSnapshot is recorded, only the first occurrence in the DTCSnapshotRecord must be saved. Additional DTCSnapshotRecord data must not overwrite the first entry.

Id:	Q-LAH_80124-7727
Version:	2.7

Description:	If more than one DTCSnapshotRecord is possible for a DTC and the maximum number of DTCSnapshots has been recorded, in the event of another occurrence, only the last DTCSnapshotRecord must be updated.

Id:	Q-LAH_80124-7728
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7739
Version:	2.7
Description:	If multiple DTCSnapshots are recorded, all other DTCSnapshotRecord data is stored with the increasing DTCSnapshotRecordNumber.

Id:	Q-LAH_80124-8982
Version:	2.7
Description:	If the maximum number of DTCSnapshotsRecordNumber is reached, this must not be incremented anymore. Nevertheless, additional snapshots are recorded. The value range of the DTCSnapshotsRecordNumber goes from 1 to 254.

Id:	Q-LAH_80124-7741
Version:	2.7
Description:	The DataIdentifiers listed in the snapshot must be DataIdentifiers present in the server.

Id:	Q-LAH_80124-7742
Version:	2.7
Description:	Different DataIdentifiers in the server can be recorded for the DTCSnapshot.

Id:	Q-LAH_80124-7746
Version:	2.7
Description:	All DTCSnapshots data must be reset for a ClearDiagnosticInformation service (14hex) or ClearResetEmissionRelatedDiagnosticInformation service (04hex) receiving a positive response.

Id:	Q-LAH_80124-7892
Version:	2.7
Description:	The following figure shows the difference between a SnapshotRecord and an ExtendedDataRecord:

Id:	Q-LAH_80124-7893
Version:	2.7
Description:	Figure 8-2: Difference between a SnapshotRecord and an ExtendedDataRecord DTC#1 ExtendedDataRecord (max 1 Record) Event (1) wird gespeichert 1 (PendingDTC oder Confirmed DTC) DTC#1 Pos SnapshotRecord (max. 3 Records) 1 #1 2 #2 5 #3 1 TestFailed DTC#1 0

Id:	Q-LAH_80124-7722
Version:	2.7
Description:	A client queries DTCSnapshotRecord identification for all detected DTCSnapshotRecords by sending a request with the service 19hex with the sub-function ReportDTCSnapshotIdentification (0x03).

Id:	Q-LAH_80124-7725
Version:	2.7
Description:	Every element of the response of a DTCSnapshot includes a DTCRecord with the contents: DTC (high, middle, low byte) DTCSnapshotRecord number

Id:	Q-LAH_80124-7723
Version:	2.7
Description:	If several DTCSnapshotRecords are saved for a single DTC, the server must generate an entry for each occurrence in the response by using different DTCSnapshotRecord numbers for each occurrence (feature for reading out at a later time).

Id:	Q-LAH_80124-8981
Version:	2.7
Description:	The sequence of DTCSnapshotRecord numbers of the DTCs must mirror the sequence of DTCSnapshotRecords.

Id:	Q-LAH_80124-7729
Version:	2.7
Description:	The ReportDTCSnapshotIdentification sub-function (0x03) must be implemented if the ReportDTCSnapshotRecordByDTCNumber service (0x04) is implemented.

Id:	Q-LAH_80124-7732
Version:	2.7

Description:	A client queries recorded DTCSnapshotRecord data with a defined DTC-MaskRecord in connection with a DTCSnapshotRecord number by sending a request with the service 19hex with the ReportDTCSnapshotRecordByDTC-Number sub-function (0x04).

Id:	Q-LAH_80124-7734
Version:	2.7
Description:	The server searches within the supported DTCs for the matching DTC-MaskRecord with the contents: DTC (high, middle, low byte)

Id:	Q-LAH_80124-7735
Version:	2.7
Description:	The DTCSnapshotRecordNumber parameter within the request must query from the server the appropriate occurrence of the DTC and the recorded DTCSnap-shotRecord data.

Id:	Q-LAH_80124-7737
Version:	2.7
Description:	If the server has saved multiple DTCSnapshots for a single DTC, a client must implement the following sequence of queries:

Id:	Q-LAH_80124-7740
Version:	2.7
Description:	A DTCSnapshot contains: DTC (high, middle, low byte) StatusOfDTC DTCS-napshotRecordNumber Number of following DataIdentifiers DTCSnap-shotRecordData (One or more DataIdentifiers, including appending the General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7743
Version:	2.7
Description:	The server must respond to the corresponding DTCSnapshotRecord with a single positive response for each supported DTCSnapshotRecordNumber. This does not apply if the client has set the DTCSnapshotRecordNumber in the request to the value 0xFF. In this case, the server must respond with all saved DTCSnapshotRecords for this DTC in a response message in numerically increasing sequence.

Id:	Q-LAH_80124-7744
Version:	2.7

Description:	The server must respond with a negative response if the DTCSnapshotRecord-Number of DTCMaskRecord in the request message is invalid or not supported.

Id:	Q-LAH_80124-7745
Version:	2.7
Description:	The server must respond with a positive response only with DTC (high, middle, low byte) StatusOfDTC if the DTCMaskRecord or DTCSnapshotRecordNumber is supported, but no DTCSnapshot data has been recorded for this DTC.

Id:	Q-LAH_80124-7748
Version:	2.7
Description:	A client queries extended data (ambient data) for a defined DTC in connection with a DTCExtendedDataRecord number by sending a request with the service 19hex with the ReportDTCExtendedDataRecordByDTCNumber sub-function (0x06).

Id:	Q-LAH_80124-7749
Version:	2.7
Description:	The server searches within the supported DTCs for the matching DTC-MaskRecord with the contents: DTC (high, middle, low byte)

Id:	Q-LAH_80124-7750
Version:	2.7
Description:	The DTCExtendedDataRecordNumber parameter defines a certain data point from the DTCExtendedData.

Id:	Q-LAH_80124-7751
Version:	2.7
Description:	Will be reset by the server: DTC (high, middle, low byte) StatusOfDTC DTCEx-tendedData

Id:	Q-LAH_80124-6668
Version:	2.7
Description:	DTCExtendedData is left out if no DTCExtendedDataRecord data has been recorded for this DTC.

Id:	Q-LAH_80124-7752
Version:	2.7

Description:	The server must respond to the DTCExtendedDataRecord with a single response message as a function of the DTCExtendedDataRecordNumber parameter.

Id:	Q-LAH_80124-7754
Version:	2.7
Description:	All DTCExtendedDataRecord data must be reset for a ClearDiagnosticInformation (14hex) service or ClearResetEmissionRelatedDiagnosticInformation (04hex) service receiving a General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9995
Version:	2.7
Description:	The implementation must be agreed upon between the contractor and the purchaser.

Id:	Q-LAH_80124-9957
Version:	2.7
Description:	The client queries a list of all DTCs that are in the "prefailed" status or are not yet in the "confirmed" or "pending" status, in that it sends a request with the service 19hex with sub- function ReportDTCFaultDetectionCounter (0x14).

Id:	Q-LAH_80124-9958
Version:	2.7
Description:	The sub-function is used to read out events that have not yet been completely validated (e.g., with long validation time).

Id:	Q-LAH_80124-9959
Version:	2.7
Description:	The server generates a list of prefailed DTCs with the respective DTCFaultDetectionCounter that are identified at the time of the request.

Id:	Q-LAH_80124-9962
Version:	2.7
Description:	The DTCFaultDetectionCounter (1 byte) is output with a scaling in the range [1; +126]. The scaling must be adapted in accordance with the maximum debounce period or debounce threshold and documented in the BT-LAH.

Id:	Q-LAH_80124-9963

Version:	2.7
Description:	The following applies to time debouncing: FaultDetectionCounter = telapsed · 127 tvalidation where tvalidation: Debounce period of the symptom as per BT-LAH telapsed: The time already elapsed for the debouncing

Id:	Q-LAH_80124-9964
Version:	2.7
Description:	The following applies to event debouncing: FaultDetectionCounter = ndetected · 127 nmax where nmax: Debounce threshold of the system as per BT-LAH ndetected: The events that already occurred for the debouncing

Id:	Q-LAH_80124-9965
Version:	2.7
Description:	A DTCFaultDetectionCounter with the value +127 must be treated in the sense of the debouncing/validation as a "failed" DTC and must not be reported via this sub-function. For prefailed DTCs, only values between 1 and +126 are reported.

Id:	Q-LAH_80124-9966
Version:	2.7
Description:	The behavior of the DTCFaultDetectionCounter is described in appendix F.

Id:	Q-LAH_80124-9967
Version:	2.7
Description:	The parameter FaultDetectionCounter must be reset to the value 0 after a power-down/up.

Id:	Q-LAH_80124-9968
Version:	2.7
Description:	The parameter FaultDetectionCounter must be set with ClearDiagnosticInformation (14hex) General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-7760
Version:	2.7
Description:	The client queries a list of DTCs that relates to a defined status pattern by sending a request with the service 19hex with the sub-function ReportUserDefMemoryDTCByStatusMask (0x17).

Id:	Q-LAH_80124-7761

Version:	2.7
Description:	The sub-function is used to obtain all DTCs that have set one of the bits requested in the status mask in the StatusOfDTC.

Id:	Q-LAH_80124-7762
Version:	2.7
Description:	The server must create a bit-wise logical AND link between the client status pattern and the current StatusOfDTC of each DTC.

Id:	Q-LAH_80124-7763
Version:	2.7
Description:	In addition to the DTCStatusAvailabilityMask, the server must return all DTCs in which the result of the AND logic operation is not equal to 0 [(StatusOfDTC & DTCStatusMask) != 0].

Id:	Q-LAH_80124-7764
Version:	2.7
Description:	If the client requests a status mask that the server does not support, the server must apply the calculation to the bits that are supported by it.

Id:	Q-LAH_80124-7765
Version:	2.7
Description:	If the client requests a status mask within which the server supports none of the bits, no DTC or additional status information as per the DTCStatusAvailabilityMask must be contained in the positive response.

Id:	Q-LAH_80124-10194
Version:	2.7
Description:	A client queries recorded DTCSnapshotRecord data with a defined DTCMaskRecord in conjunction with a DTCSnapshotRecordNumber from a system-specific memory area by sending a request with the service 19hex with the ReportUserDefMemoryDTCSnapshotRecordByDTCNumber sub-function (0x18).

Id:	Q-LAH_80124-10195
Version:	2.7
Description:	The server searches within the supported DTCs for the matching DTCMaskRecord with the contents: DTC (high, middle, low byte)

Id:	Q-LAH_80124-10196
Version:	2.7
Description:	The DTCSnapshotRecordNumber parameter within the request must query from the server the appropriate occurrence of the DTC and the recorded DTCSnapshotRecord data.

Id:	Q-LAH_80124-10197
Version:	2.7
Description:	If the server saves only one DTCSnapshot for a single DTC, the Component Performance Specification must define whether the DTCSnapshotsRecord is stored for the first or last General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-10198
Version:	2.7
Description:	A DTCSnapshot for a system-specific memory area contains: MemorySelection DTC (high, middle, low byte) StatusOfDTC DTCSnapshotRecordNumber Number of following DataIdentifiers DTCSnapshotRecordData (One or more DataIdentifiers, including appending the appropriate data with the value/values the data had at the time of the data capture.)

Id:	Q-LAH_80124-10199
Version:	2.7
Description:	The server must respond to the corresponding DTCSnapshotRecord with a single positive response for each supported DTCSnapshotRecordNumber.

Id:	Q-LAH_80124-10200
Version:	2.7
Description:	This does not apply if the client has set the DTCSnapshotRecordNumber in the request to the value 0xFF. In this case, the server must respond with all saved DTCSnapshotRecords for this DTC in a response message in numerically ascending order.

Id:	Q-LAH_80124-10201
Version:	2.7
Description:	The server must respond with a negative response if the DTCSnapshotRecordNumber of DTCMaskRecord in the request message is invalid or not supported.

Id:	Q-LAH_80124-10202

Version:	2.7
Description:	The server must respond with a positive response only with MemorySelection DTC (high, middle, low byte) StatusOfDTC if the DTCMaskRecord or DTCSnapshotRecordNumber is supported, but no DTCSnapshot data has been recorded for this DTC.

Id:	Q-LAH_80124-7770
Version:	2.7
Description:	A client queries extended data (ambient data) for a defined DTC in connection with a DTCExtendedDataRecord number from a system-specific memory area (developer event memory) by sending a request with the service 19hex with the ReportUserDefMemoryDTCExtDataRecordByDTCNumber (0x19).

Id:	Q-LAH_80124-7771
Version:	2.7
Description:	The server searches within the supported DTCs for the matching DTCMaskRecord with the contents: DTC (high, middle, low byte)

Id:	Q-LAH_80124-7772
Version:	2.7
Description:	The DTCExtendedDataRecordNumber parameter defines a certain data point from the DTCExtendedData.

Id:	Q-LAH_80124-7773
Version:	2.7
Description:	Will be reset by the server: DTC (high, middle, low byte) StatusOfDTC General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7769
Version:	2.7
Description:	DTCExtendedData is left out if no DTCExtendedDataRecord data has been recorded for this DTC.

Id:	Q-LAH_80124-7774
Version:	2.7
Description:	The server must respond to a DTCExtendedDataRecord with a single response message. An exception is if the client sets the parameter DTCExtendedDataRecordNumber to 0xFF. In this case, the server must respond with all saved DTCExtendedDataRecords for this DTC in a response message.

Id:	Q-LAH_80124-7775
Version:	2.7
Description:	The server must respond with a negative response if the requested DTC-MaskRecord or the requested DTCExtendedDataRecordNumber is invalid or not supported by the server.

Id:	Q-LAH_80124-7776
Version:	2.7
Description:	The system-specific memory area must not be erased with ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex).

Id:	Q-LAH_80124-7777
Version:	2.7
Description:	The system-specific memory area that is read out with ReportUserDefMemoryDTCByStatusMask (0x17) ReportUserDefMemoryDTCSnapshotRecordBy-DTCNumber (0x18) ReportUserDefMemoryDTCExtDataRecordByDTCNumber (0x19) must be able to be cleared with service RoutineControl (31hex) and RoutineIdentifier "0x045A-Clear_user_defined_DTC_information."

Id:	Q-LAH_80124-7890
Version:	2.7
Description:	A client must always send the SuppressPositiveResponseBIt with the value '0' in the request with ReadDTCInformation service (19hex).

Id:	Q-LAH_80124-3115
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-7779
Version:	2.7
Description:	Table 8-10: Request message definition - ReportNumberOfDTCByStatusMask, ReportDTCByStatusMask Sub-function = ReportNumberOfDTCByStatusMask (x01) ReportDTCByStatusMask (0x02) Data Parameter name, request Bit- Cvt. Hex length #1 ReadDTCInformation Request Service Id 8 M 19 SuppressPositiveResponseBit 1 0 DTCInformationType = [#2 ReportNumberOfDTCByStatus-Mask 7 M 01 ReportDTCByStatusMask 02] General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7781

Version:	2.7
Description:	Table 8-11: Request message definition - ReportDTCSnapshotIdentification, ReportDTCSnapshotRecordByDTCNumber Sub-function = ReportDTCSnapshotIdentification (0x03) ReportDTCSnapshotRecordByDTCNumber (0x04) Data Parameter name, request Bit- Cvt. Hex length #1 ReadDTCInformation Request Service Id 8 M 19 SuppressPositiveResponseBit 1 0 DTCInformationType = [#2 ReportDTCSnapshotIdentification 7 M 03 ReportDTCSnapshotRecordByDTC-Number 04] DTCMaskRecord = [#3 DTCHighByte 8 C1 xx #4 DTCMiddleByte 8 C1 xx #5 DTCLowByte 8 C1 xx] #6 DTCSnapshotRecordNumber 8 C1 xx

Id:	Q-LAH_80124-7782
Version:	2.7
Description:	C1 - The DTCMaskRecord and DTCSnapshotRecordNumber parameters are present only if the sub-function has the value ReportDTCSnapshotRecordBy-DTCNumber (0x04).

Id:	Q-LAH_80124-7783
Version:	2.7
Description:	Table 8-12: Request message definition - ReportDTCExtendedDataRecordBy-DTCNumber Sub-function = ReportDTCExtendedDataRecordByDTCNumber (0x06) Data Parameter name, request Bit- Cvt. Hex length #1 ReadDTCInformation Request Service Id 8 M 19 SuppressPositiveResponseBit 1 0 #2 DTCInformationType = [M ReportDTCExtendedDataRecordByDTCNumber 7 06] DTCMaskRecord = [#3 DTCHighByte 8 M xx #4 DTCMiddleByte 8 M xx #5 DT-CLowByte 8 M xx] General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9960
Version:	2.7
Description:	Table 8-13: Request message definition - ReportDTCFaultDetectionCounter Sub-function = ReportDTCFaultDetectionCounter (0x14) Data Parameter name, request Bit- Cvt. Hex length #1 ReadDTCInformation Request Service Id 8 M 19 SuppressPositiveResponseBit 1 0 #2 DTCInformationType = [M ReportDTC-FaultDetectionCounter 7 14]

Id:	Q-LAH_80124-7785
Version:	2.7
Description:	Table 8-14: Request message definition - ReportUserDefMemoryDTCByStatus-Mask Sub-function = ReportUserDefMemoryDTCByStatusMask (0x17) Data Parameter name, request Bit- Cvt. Hex length #1 ReadDTCInformation Request

	Service Id 8 M 19 SuppressPositiveResponseBit 1 0 #2 DTCInformationType = [M ReportUserDefMemoryDTCByStatusMask 7 17] #3 DTCStatusMask 8 M xx #4 MemorySelection 8 M xx

Id:	Q-LAH_80124-10207
Version:	2.7
Description:	Table 8-15 Request message definition ReportUserDefMemoryDTCSnapshotRecordByDTCNumber Sub-function = ReportUserDefMemoryDTCSnapshotRecordByDTCNumber (0x18) Data Parameter name, request Bit- Cvt. Hex length #1 ReadDTCInformation Request Service Id 8 M 19 SuppressPositiveResponseBit 1 0 DTCInformationType = [#2 ReportUserDefMemoryDTCSnapshotRecord 7 M 18 ByDTCNumber] DTCMaskRecord = [#3 DTCHighByte 8 M xx #4 DTCMiddleByte 8 M xx #5 DTCLowByte 8 M xx] #6 DTCSnapshotRecordNumber 8 M xx General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7786
Version:	2.7
Description:	Table 8-16: Request message definition - ReportUserDefMemoryDTCExtDataRecordByDTCNumber Sub-function = ReportUserDefMemoryDTCExtDataRecordByDTCNumber (0x19) Data Parameter name, request Bit- Cvt. Hex length #1 ReadDTCInformation Request Service Id 8 M 19 SuppressPositiveResponseBit 1 0 DTCInformationType = [#2 ReportUserDefMemoryDTCExtDataRecord 7 M 19 ByDTCNumber] DTCMaskRecord = [#3 DTCHighByte 8 M xx #4 DTCMiddleByte 8 M xx #5 DTCLowByte 8 M xx] #6 DTCExtendedDataRecordNumber 8 M xx General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7788
Version:	2.7
Description:	The sub-function parameter is used to define the DTCInformation type for the server.

Id:	Q-LAH_80124-7790
Version:	2.7
Description:	The following sub-function parameters are defined for this service:

Id:	Q-LAH_80124-3165
Version:	2.7

Description:	Table 8-17: Request message sub-function definition Hex Description, DTCInformationType Cvt. (bit 6-0)

Id:	Q-LAH_80124-6772
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7801
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-7802
Version:	2.7
Description:	Table 8-18: Request message parameter definition Definition DTCStatusMask This parameter contains eight DTC status bits. The definition corresponds to that of the StatusOfDTC. A StatusOfDTC matches the DTCStatusMask if one of the bits in the StatusOfDTC also has the value 1. A server must evaluate only the bits of the DTCStatusMask that the server supports. The DTCStatusMask parameter enables particular status-related DTCs to be selected in the client request. In order to do this, a logical AND operation combining the DTCStatusMask (client request) and StatusOfDTC (status in the server) must be implemented. If this logical AND operation results in a value not equal to zero (i.e., > 0) for a DTC, the DTC must be output to the client (also applies to multiple DTCs). A positive response must still be sent even if not all the bits are supported in the DTCStatusMask request parameter. DTCMaskRecord (High-, middle-, low-Byte) (DTC-DFCC) The DTC diagnostic failure check code (DTC-DFCC) number for events and notices must be implemented specific to the system and defined in the BT-LAH. Range: 0x000000 - 0xFFFFFF DTCSnapshotRecordNumber This parameter is a one-byte value that indicates what DTCSnapshot is requested via the ReportDTCSnapshotRecordByDTCNumber (0x04) subfunction. 0x00: reserved by OBD Freezeframes as per service 02hex, the current output in the diagnostic scan tool 0x01 - 0xFB: intended for system-specific applications 0xFC StandardFreezeFrame 0xFD StandardFreezeFrameDynamic 0xFE: requests the OBD Freezeframe from the PrimaryOBDECU as per service 02hex on the basic DFCC 0xFF: requests all DTCSnapshotDataRecords for a DTC from a server DTCExtendedDataRecordNumber This parameter is a one-byte value that indicates what DTCExtendedDataRecords of a DTC are requested. MemorySelection This parameter is used to define the system-specific memory area for reading out the DTC for the server. 0x00 - 0x0F: reserved by ISOSAE 0x10: first developer event memory area 0x11 - 0x2F: intended for system-specific applications 0x30 - 0xDF: reserved by Volkswagen AG 0xE0

	- 0xEF: intended for supplier-specific applications 0xF0 - 0xFE: reserved by Volkswagen AG General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-9938
Version:	2.7
Description:	The values of the MemorySelection parameter must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-3192
Version:	2.7
Description:	The values of the DTCExtendedDataRecord parameter (e.g., format, length, conversion method) are defined in appendix B of this document. System-specific values must be described in the BT-LAH. The following values and value ranges have been specified:

Id:	Q-LAH_80124-10118
Version:	2.7
Description:	For DTCSnapshotRecord 0x00 and 0xFE in service ReportDTCSnapshotRecordByDTCNumber (19 04), the same requirements apply as for RequestPowertrainFreezeFrameData (02hex).

Id:	Q-LAH_80124-10119
Version:	2.7
Description:	The PowertrainFreezeFrameData available for each validated OBD-relevant error must be output via 19 04 FE.

Id:	Q-LAH_80124-3246
Version:	2.7
Description:	Table 8-19: DTCExtendedDataRecordNumber Hex Description, DTCExtended-DataRecordNumber Cvt. (bit 6-0)

Id:	Q-LAH_80124-3248
Version:	2.7
Description:	The following response message must be implemented for this service as a function of the sub-function:

Id:	Q-LAH_80124-3274
Version:	2.7

Description:	Table 8-20: Positive response message definition - ReportNumberOfDTCByStatusMask Sub-function = ReportNumberOfDTCByStatusMask (0x01) Data Parameter name, response Bit- Cvt. Hex length #1 ReadDTCInformation Response Service Id 8 M 59 ReportType = [#2 ReportNumberOfDTCByStatusMask 8 M 01] #3 DTCStatusAvailabilityMask 8 M xx DTCFormatIdentifier = [#4 ISO_-14229-1-DTCFormat 8 M 01] DTCCount = [#5 DTCCountHigByte 8 M xx #6 DTCCountLowByte 8 M xx]

Id:	Q-LAH_80124-7803
Version:	2.7
Description:	Table 8-21: Positive response message definition - ReportDTCByStatusMask Sub-function = ReportDTCByStatusMask (0x02) Data Parameter name, response Bit- Cvt. Hex length #1 ReadDTCInformation Response Service Id 8 M 59 ReportType = [#2 ReportDTCByStatusMask 8 M 02] #3 DTCStatusAvailabilityMask 8 M xx DTCAndStatusRecord = [#4 DTCHighByte #1 8 C1 xx #5 DTCMiddleByte #1 8 C1 xx #6 DTCLowByte #1 8 C1 xx #7 StatusOfDTC #1 8 C1 xx : : : : : #n - 3 DTCHighByte #m 8 C2 xx #n - 2 DTCMiddleByte #m 8 C2 xx #n - 1 DTCLowByte #m 8 C2 xx #n StatusOfDTC #m 8 C2 xx]

Id:	Q-LAH_80124-7804
Version:	2.7
Description:	C1 - The parameter is only present if DTC information is available.

Id:	Q-LAH_80124-7805
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7806
Version:	2.7
Description:	Table 8-22: Positive response message definition - ReportDTCSnapshotIdentification Sub-function = ReportDTCSnapshotIdentification (0x03) Data Parameter name, response Bit- Cvt. Hex length #1 ReadDTCInformation Response Service Id 8 M 59 ReportType = [#2 ReportDTCSnapshotIdentification 8 M 03] DTCRecord#1 = [#3 DTCHighByte #1 8 C1 xx #4 DTCMiddleByte #1 8 C1 xx #5 DTCLowByte #1 8 C1 xx] #6 DTCSnapshotRecordNumber#1 8 C1 xx : : : : : DTCRecord#n = [#n - 3 DTCHighByte #n 8 C2 xx #n - 2 DTCMiddleByte #n 8 C2 xx #n - 1 DTCLowByte #n 8 C2 xx] #n DTCSnapshotRecordNumber#n 8 C2 xx

Id:	Q-LAH_80124-9989

Version:	2.7
Description:	C1 - The parameters DTCRecord and DTCSnapshotRecordNumber are only present if at least one DTCSnapshotRecord has been recorded and is available.

Id:	Q-LAH_80124-9990
Version:	2.7
Description:	C2 - The parameters DTCRecord and DTCSnapshotRecordNumber are only present if more General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-7809
Version:	2.7
Description:	Table 8-23: Positive response message definition - ReportDTCSnapshotRecord-ByDTCNumber Sub-function = ReportDTCSnapshotRecordByDTCNumber (0x04) Data Parameter name, response Bit- Cvt. Hex length #1 ReadDTCIn-formation Response Service Id 8 M 59 ReportType = [#2 ReportDTCSnap-shotRecordByDTCNumber 8 M 04] DTCAndStatusRecord = [#3 DTCHighByte 8 M xx #4 DTCMiddleByte 8 M xx #5 DTCLowByte 8 M xx #6 StatusOfDTC 8 M xx] #7 DTCSnapshotRecordNumber #1 8 C1 xx #8 DTCSnapshotRecord-NumberOfIdentifiers #1 8 C1 xx DTCSnapshotRecord#1 = [#9 DataIdentifi-er#1 (high byte) 8 C1 xx #10 DataIdentifier#1 (low byte) 8 C1 xx #11 Snap-shotData #1 8 C1 xx : : : : : #11 + (p - 1) SnapshotData #p 8 C1 xx #r - (m - 1) - 2 DataIdentifier#w (high byte) 8 C2 xx #r - (m - 1) - 1 DataIdentifier#w (low byte) 8 C2 xx #r - (m - 1) SnapshotData #2 8 C2 xx : : : : : #r SnapshotData #m 8 C2 xx] : : : : : #t DTCSnapshotRecordNumber #x 8 C3 xx #t + 1 DTCSnap-shotRecordNumberOfIdentifiers #x 8 C3 xx DTCSnapshotRecord#1 = [#t + 2 DataIdentifier#1 (high byte) 8 C3 xx #t + 3 DataIdentifier#1 (low byte) 8 C3 xx #t + 4 SnapshotData #1 8 C3 xx : : : : : #t + 4 + (p - 1) SnapshotData #p 8 C3 xx #n - (u - 1) - 2 DataIdentifier#w (high byte) 8 C4 xx #n - (u - 1) - 1 DataIdentifier#w (low byte) 8 C4 xx #n - (u - 1) SnapshotData #2 8 C4 xx : : : : : #n SnapshotData #u 8 C4 xx]

Id:	Q-LAH_80124-7810
Version:	2.7
Description:	C1 - The parameter and the first tuple of DataIdentifier and SnapshotData is present only if at least one DTCSnapshotRecord has been recorded and is available.

Id:	Q-LAH_80124-7811
Version:	2.7

Description:	C2/C4 - Multiple DataIdentifiers with their SnapshotData are permitted in a DTCSnapshotRecord.

Id:	Q-LAH_80124-7812
Version:	2.7
Description:	C3 - The parameter and the first tuple of DataIdentifier and SnapshotData is available only if all records have been requested (the DTCSnapshotRecord-Number has the value 0xFF in General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7813
Version:	2.7
Description:	Table 8-24: Positive response message definition - ReportDTCExtended-DataRecordByDTCNumber Sub-function = ReportDTCExtendedDataRecord-ByDTCNumber (0x06) Data Parameter name, response Bit- Cvt. Hex length #1 ReadDTCInformation Response Service Id 8 M 59 ReportType = [#2 Re-portDTCExtDataRecordByDTCNumber 8 M 06] DTCAndStatusRecord = [#3 DTCHighByte 8 M xx #4 DTCMiddleByte 8 M xx #5 DTCLowByte 8 M xx #6 Sta-tusOfDTC 8 M xx] #7 DTCExtendedDataRecordNumber #1 8 C1 xx DTCEx-tendedDataRecord#1 = [#8 ExtendedData#1 Byte#1 8 C1 xx : : 8 C1 xx #8 + (p - 1) ExtendedData#1 Byte#p 8 C1 xx] : : : : : #t DTCExtendedDataRecordNum-ber #n 8 C2 xx DTCExtendedDataRecord#n = [#t + 1 ExtendedData#n Byte#1 8 C2 xx : : 8 C2 xx #t + 1 + (q - 1) ExtendedData#n Byte#q 8 C2 xx]

Id:	Q-LAH_80124-7807
Version:	2.7
Description:	C1 - The parameter is only present if at least one DTCExtendedDataRecord has been recorded and is available.

Id:	Q-LAH_80124-7808
Version:	2.7
Description:	C2 - The parameter is only present if more than one DTCExtendedDataRecord has been General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-9969
Version:	2.7
Description:	Table 8-25: Response message definition - ReportDTCFaultDetectionCounter Sub-function = ReportDTCFaultDetectionCounter (0x14) Data Parameter name,

	response Bit- Cvt. Hex length #1 ReadDTCInformation Response Service Id 8 M 59 ReportType = [#2 ReportDTCFaultDetectionCounter 8 M 14] DTCFaultDetectionCounterRecord[] = [#3 DTCHighByte #1 8 C1 xx #4 DTCMiddleByte #1 8 C1 xx #5 DTCLowByte #1 8 C1 xx #6 DTCFaultDetectionCounter #1 8 C1 01 - 7E #7 DTCHighByte #2 8 C2 xx #8 DTCMiddleByte #2 8 C2 xx #9 DTCLowByte #2 8 C2 xx #10 DTCFaultDetectionCounter #2 8 C2 01 - 7E : : : : : #n - 3 DTCHighByte #m 8 C2 xx #n - 2 DTCMiddleByte #m 8 C2 xx #n - 1 DTCLowByte #m 8 C2 xx #n DTCFaultDetectionCounter #m 8 C2 01 - 7E]

Id:	Q-LAH_80124-9970
Version:	2.7
Description:	C1 - The parameter is present only if at least one DTC has a DTCFaultDetectionCounter with a value from 1 to 126.

Id:	Q-LAH_80124-9971
Version:	2.7
Description:	C2 - The parameter is present only if more than one DTC has a DTCFaultDetectionCounter General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-7817
Version:	2.7
Description:	Table 8-26: Positive response message definition - ReportUserDefMemoryDTCByStatusMask Sub-function = ReportUserDefMemoryDTCByStatusMask (0x17) Data Parameter name, response Bit- Cvt. Hex length #1 ReadDTCInformation Response Service Id 8 M 59 ReportType = [#2 ReportUserDefMemoryDTCByStatusMask 8 M 17] #3 MemorySelection 8 M xx #4 DTCStatusAvailabilityMask 8 M xx DTCAndStatusRecord = [#5 DTCHighByte #1 8 C1 xx #6 DTCMiddleByte #1 8 C1 xx #7 DTCLowByte #1 8 C1 xx #8 StatusOfDTC #1 8 C1 xx : : : : : #n - 3 DTCHighByte #m 8 C2 xx #n - 2 DTCMiddleByte #m 8 C2 xx #n - 1 DTCLowByte #m 8 C2 xx #n StatusOfDTC #m 8 C2 xx]

Id:	Q-LAH_80124-7818
Version:	2.7
Description:	C1 - The parameter is only present if DTC information is available from a system-specific memory area.

Id:	Q-LAH_80124-7819
Version:	2.7

Description:	C2 - The parameter is only present if more than one set of DTC information is available from General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-10203
Version:	2.7
Description:	Table 8-27: Positive response message definition - reportUserDefMemoryDTCSnapshotRecordByDTCNumber Sub-function = ReportUserDefMemoryDTCSnapshotRecordByDTCNumber (0x18) Data Parameter name, response Bit-Cvt. Hex length #1 ReadDTCInformation Response Service Id 8 M 59 ReportType = [#2 ReportUserDefMemoryDTCSnapshotRecord 8 M 18 ByDTCNumber] #3 MemorySelection 8 M xx DTCAndStatusRecord = [#4 DTCHighByte 8 M xx #5 DTCMiddleByte 8 M xx #6 DTCLowByte 8 M xx #7 StatusOfDTC 8 M xx] #8 DTCSnapshotRecordNumber #1 8 C1 xx #9 DTCSnapshotRecordNumberOfIdentifiers #1 8 C1 xx DTCSnapshotRecord#1 = [#10 DataIdentifier#1 (high byte) 8 C1 xx #11 DataIdentifier#1 (low byte) 8 C1 xx #12 SnapshotData #1 8 C1 xx : : : : : #12 + (p - 1) SnapshotData #p 8 C1 xx #r - (m - 1) - 2 DataIdentifier#w (high byte) 8 C2 xx #r - (m - 1) - 1 DataIdentifier#w (low byte) 8 C2 xx #r - (m - 1) SnapshotData #2 8 C2 xx : : : : : #r SnapshotData #m 8 C2 xx] : : : : : #t DTCSnapshotRecordNumber #x 8 C3 xx #t + 1 DTCSnapshotRecordNumberOfIdentifiers #x 8 C3 xx DTCSnapshotRecord#1 = [#t + 2 DataIdentifier#1 (high byte) 8 C3 xx #t + 3 DataIdentifier#1 (low byte) 8 C3 xx #t + 4 SnapshotData #1 8 C3 xx : : : : : #t + 4 + (p - 1) SnapshotData #p 8 C3 xx #n - (u - 1) - 2 DataIdentifier#w (high byte) 8 C4 xx #n - (u - 1) - 1 DataIdentifier#w (low byte) 8 C4 xx #n - (u - 1) SnapshotData #2 8 C4 xx : : : : : #n SnapshotData #u 8 C4 xx]

Id:	Q-LAH_80124-10204
Version:	2.7
Description:	C1 - The parameter and the first tuple of DataIdentifier and SnapshotData is present only if at least one DTCSnapshotRecord has been recorded and is available.

Id:	Q-LAH_80124-10205
Version:	2.7
Description:	C2/4 - Multiple DataIdentifiers with their SnapshotData are permitted in a DTCSnapshotRecord.

Id:	Q-LAH_80124-10206
Version:	2.7

Description:	C3 - The parameter and the first tuple of DataIdentifier and SnapshotData is available only if all records have been requested (the DTCSnapshotRecord-Number has the value 0xFF in General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7820
Version:	2.7
Description:	Table 8-28: Positive response message definition - ReportUserDefMemory-DTCByStatusMask Sub-function = ReportUserDefMemoryDTCExtDataRecord-ByDTCNumber (0x19) Data Parameter name, response Bit- Cvt. Hex length #1 ReadDTCInformation Response Service Id 8 M 59 ReportType = [#2 ReportUserDefMemoryDTCExtDataRecord 8 M 19 ByDTCNumber] #3 MemorySelection 8 M xx DTCAndStatusRecord = [#4 DTCHighByte 8 M xx #5 DTCMiddleByte 8 M xx #6 DTCLowByte 8 M xx #7 StatusOfDTC 8 M xx] #8 DTCExtendedDataRecordNumber #1 8 C1 xx DTCExtendedDataRecord#1 = [#9 ExtendedData#1 Byte#1 8 C1 xx : : : : : #9 + (p - 1) ExtendedData#1 Byte#p 8 C1 xx] : : : : : #t DTCExtendedDataRecordNumber #n 8 C2 xx DTCExtendedDataRecord#n = [#t + 1 ExtendedData#n Byte#1 8 C2 xx : : : : : #t + 1 + (q - 1) ExtendedData#n Byte#q 8 C2 xx]

Id:	Q-LAH_80124-7821
Version:	2.7
Description:	C1 - The parameter is only present if at least one DTCExtendedDataRecord has been recorded and is available in the system-specific memory area.

Id:	Q-LAH_80124-7822
Version:	2.7
Description:	C2 - The parameter is only present if more than one DTCExtendedDataRecord has been General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-3275
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-7824
Version:	2.7
Description:	Table 8-29: Positive response message parameter definition Definition Report-Type This parameter is used in the server response as an echo of the sub-func-

	tion (without SuppressPositiveResponseBit) in the client request. DTCAndStatusRecord This parameter in the server response must contain a number (any number between #0 and #m) of notice and error locations (DTCs) in 3-byte format as well as the associated StatusOfDTC parameter in 1-byte format. DTCRecord This parameter contains one or more groupings of DTCs (high byte, middle byte, low byte). The format is defined by means of the DTCFormatIdentifier parameter. StatusOfDTC The definition of bits is described in the StatusOfDTC appendix. Unsupported bits must be output with the value 0bin. This parameter indicates the status that the output DTC (notice/error location) currently has in the server (e.g., ECU). Every erasing operation in the event memory or the erasing of individual errors or notices resets all the bits in the StatusOfDTC byte in accordance with the relevant logic. DTCStatusAvailabilityMask This parameter defines the bits within the StatusOfDTC that are supported by the server. Unsupported bits must be set to the value 0. Each bit that is indicated by the value 1 must be supported in the StatusOfDTC for each DTC. The relevance (not the contents) of bits 0 - 7 in the DTCStatusAvailabilityMask corresponds to the DTCStatusMask and StatusOfDTC parameters. DTCFormatIdentifier This parameter defines the format for interpreting the 3-byte DTC. DTCCount This parameter (2 bytes) contains the number of DTCs that match the DTCStatusMask. DTCSnapshotRecordNumber This parameter contains the number of the DTCSnapshots as an echo. DTCSnapshotRecordNumberOfIdentifiers This parameter contains the number of DataIdentifiers contained in the DTCSnapshotRecord. The value 0 is prohibited. DTCSnapshotRecord This parameter contains data that was recorded at the time of the DTC occurrence. DTCExtendedDataRecordNumber This parameter contains as an echo the type of data that was recorded at the time of the DTC occurrence. All DTCExtendedDataRecordNumbers that are supported for a DTC must be output in the server response in ascending numerical order. It must be possible to read this parameter out for all events with ConfirmedBit == 1 or PendingBit == 1 in the StatusOfDTC. This results in a limitation of the number of errors and notices with ConfirmedBit == 1 or PendingBit == 1 to the number of events that can be stored with ambient data. DTCExtendedDataRecord This parameter defines the system-specific additional ambient data. These values must be specified on a system- specific basis and included in the BT-LAH. MemorySelection General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7826
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-7827
Version:	2.7

Description:	Table 8-30: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-3412
Version:	2.7
Description:	With this service, the client can request the number of event memory entries with corresponding status pattern of a server.

Id:	Q-LAH_80124-7831
Version:	2.7
Description:	The example reads out the number 1 from the server; the DTCStatusAvailabilityMask has the value 0x19. The event is confirmed; the DTCStatusMask (0x08) applies to the recorded events.

Id:	Q-LAH_80124-6576
Version:	2.7
Description:	Table 8-31: Example request 19 01 Data Parameter name, request Bit- Hex length #1 ReadDTCInformation Request Service Id 8 19 #2 ReportNumberOfDTCByStatusMask 8 01 #3 DTCStatusMask 8 08

Id:	Q-LAH_80124-7837
Version:	2.7
Description:	Table 8-32: Example response 59 01 Data Parameter name, response Bit-Hex length #1 ReadDTCInformation Response Service Id 8 59 #2 ReportNumberOfDTCByStatusMask 8 01 #3 DTCStatusAvailabilityMask 8 19 #4 DTCFormatIdentifier = ISO_14229-1-DTCFormat 8 01 DTCCount = [#5 DTCCountHigByte 8 00 #6 DTCCountLowByte 8 01 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7834
Version:	2.7
Description:	The example reads two DTCs from the server; the DTCStatusAvailabilityMask has the value 0x19. Both events are confirmed; DTCStatusMask (0x18) applies to both events.

Id:	Q-LAH_80124-7838
Version:	2.7
Description:	Table 8-33: Example request 19 02 Data Parameter name, request Bit- Hex length #1 ReadDTCInformation Request Service Id 8 19 #2 ReportDTCByStatusMask 8 02 #3 DTCStatusMask 8 18

Id:	Q-LAH_80124-7836
Version:	2.7
Description:	Table 8-34: Example response 59 02 Data Parameter name, response Bit- Hex length #1 ReadDTCInformation Response Service Id 8 59 #2 ReportDTCByStatusMask 8 02 #3 DTCStatusAvailabilityMask 8 19 #4 DTCHighByte #1 8 11 #5 DTCMiddleByte #1 8 12 #6 DTCLowByte #1 8 13 #7 StatusOfDTC #1 8 08 #8 DTCHighByte #2 8 AA #9 DTCMiddleByte #2 8 BB #10 DTCLowByte #2 8 CC #11 StatusOfDTC #2 8 08

Id:	Q-LAH_80124-7840
Version:	2.7
Description:	The example reads no DTCs from the server; the DTCStatusAvailabilityMask has the value 0x99. The DTCStatusMask (0x04) applies to no StatusOfDTC of the DTCs.

Id:	Q-LAH_80124-7841
Version:	2.7
Description:	Table 8-35: Example request 19 02 Data Parameter name, request Bit- Hex length #1 ReadDTCInformation Request Service Id 8 19 #2 ReportDTCByStatusMask 8 02 #3 DTCStatusMask 8 04

Id:	Q-LAH_80124-7842
Version:	2.7
Description:	Table 8-36: Example response 59 02 Data Parameter name, response Bit- Hex length #1 ReadDTCInformation Response Service Id 8 59 #2 ReportDTCByStatusMask 8 02 General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-7845
Version:	2.7
Description:	The example shows the use of the sub-function ReportDTCSnapshotIdentification (0x03): The server supports two DTCSnapshotRecords for one DTC 0x123456. The server indicates that two DTCSnapshotRecords are stored for the DTC 0x123456. The event for recording the DTCSnapshot occurred four times; the first DTCSnapshotRecord is kept and the last is overwritten. The server shows one DTCSnapshot for a second DTC 0x789ABC. The DTCSnapshots are stored in the sequence of their occurrence and are output in this sequence.

Id:	Q-LAH_80124-7846

Version:	2.7
Description:	Table 8-37: Example request 19 03 Data Parameter name, request Bit- Hex length #1 ReadDTCInformation Request Service Id 8 19 #2 DTCInformation-Type = ReportDTCSnapshotIdentification 8 03

Id:	Q-LAH_80124-7847
Version:	2.7
Description:	Table 8-38: Example response 59 03 Data Parameter name, response Bit- Hex length #1 ReadDTCInformation Response Service Id 8 59 #2 ReportType = ReportDTCSnapshotIdentification 8 03 #3 DTCHighByte #1 8 12 #4 DTCMiddleByte #1 8 34 #5 DTCLowByte #1 8 56 #6 DTCSnapshotRecordNumber#1 8 01 #7 DTCHighByte #2 8 12 #8 DTCMiddleByte #2 8 34 #9 DTCLowByte #2 8 56 #10 DTCSnapshotRecordNumber#2 8 02 #11 DTCHighByte #3 8 78 #12 DTCMiddleByte #3 8 9A #13 DTCLowByte #3 8 BC #14 DTCSnapshotRecordNumber#3 8 03

Id:	Q-LAH_80124-7849
Version:	2.7
Description:	The example shows the use of the sub-function ReportDTCSnapshotRecordByDTCNumber (0x04). The client requests the second DTCSnapshotRecord of DTC 0x123456 from the server from the example ReportDTCSnapshotIdentification (0x03): The DTC 0x123456 has the StatusOfDTC 0x0C. DTCSnapshotRecordNumberOfIdentifiers are used to indicate two DataIdentifiers. In accordance with their parameter definitions, the DataIdentifiers 0x15FF and 0x3456 General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-7850
Version:	2.7
Description:	Table 8-39: Example request 19 04 Data Parameter name, request Bit- Hex length #1 ReadDTCInformation Request Service Id 8 19 #2 DTCInformation-Type = 8 04 ReportDTCSnapshotRecordByDTCNumber SnapshotIdentification #3 DTCHighByte 8 12 #4 DTCMiddleByte 8 34 #5 DTCLowByte 8 56 #6 DTCSnapshotRecordNumber#2 8 02

Id:	Q-LAH_80124-7851
Version:	2.7
Description:	Table 8-40: Example response 59 04 Data Parameter name, response Bit-Hex length #1 ReadDTCInformation Response Service Id 8 59 #2 ReportType

	= ReportDTCSnapshotRecordByDTCNumber 8 04 #3 DTCHighByte 8 12 #4 DTCMiddleByte 8 34 #5 DTCLowByte 8 56 #6 StatusOfDTC 8 0C #7 DTCSnapshotRecordNumber 8 02 #8 DTCSnapshotRecordNumberOfIdentifiers 8 02 #9 DataIdentifier#1 (high byte) 8 15 #10 DataIdentifier#1 (low byte) 8 FF #11 DTCSnapshotRecord [0] 8 02 #12 DTCSnapshotRecord [1] 8 06 #13 DTCSnapshotRecord [2] 8 FF #14 DataIdentifier#2 (high byte) 8 34 #15 DataIdentifier#2 (low byte) 8 56 General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-7854
Version:	2.7
Description:	The example shows the use of the sub-function ReportDTCExtended-DataRecordByDTCNumber (0x06) with DTCExtendedDataRecordNumber 0x01. The client requests the DTCExtendedDataRecordNumber 0x01 (Standard-DTCInformation) for DTC 0x123456: The DTC 0x123456 has the StatusOfDTC 0x0C. The DTC 0x123456 has the priority 4. The DTC 0x123456 has the occurrence counter (OCC) 5.

Id:	Q-LAH_80124-7855
Version:	2.7
Description:	Table 8-41: Example request 19 06

Id:	Q-LAH_80124-7856
Version:	2.7
Description:	Table 8-42: Example response 59 06

Id:	Q-LAH_80124-7858
Version:	2.7
Description:	The example shows the use of the sub-function ReportDTCExtended-DataRecordByDTCNumber (0x06) with DTCExtendedDataRecordNumber 0x02. The client requests the DTCExtendedDataRecordNumber 0x02 (Standard-FreezeFrame#1) for DTC 0x123456: The DTC 0x123456 has the StatusOfDTC 0x0C. The DTC 0x123456 has the aging counter value 9. The DTC 0x123456 has the mileage 0x0001FF (511dec). The TimeIndication information must always be set to 0x00 by the server. The date and time are taken from the Diagnose_01 message: 0x002B20F246 (16.12.2010, 15:09:06)

Id:	Q-LAH_80124-7859
Version:	2.7

Description:	Table 8-43: Example request 19 06 Data Parameter name, request Bit- Hex length #1 ReadDTCInformation Request Service Id 8 19 #2 DTCInformation-Type = 8 06 ReportDTCExtendedDataRecordByDTCNumber #3 DTCHighByte 8 12 #4 DTCMiddleByte 8 34 #5 DTCLowByte 8 56 #6 DTCExtendedDataRecord-Number 8 02

Id:	Q-LAH_80124-7860
Version:	2.7
Description:	Table 8-44: Example response 59 06 Data Parameter name, response Bit- Hex length #1 ReadDTCInformation Response Service Id 8 59 #2 ReportType = Re-portDTCExtendedDataRecordByDTCNumber 8 06 #3 DTCHighByte 8 12 #4 DTCMiddleByte 8 34 #5 DTCLowByte 8 56 #6 StatusOfDTC 8 0C #7 DTCEx-tendedDataRecordNumber 8 02 #8 Aging counter 8 09 #9 Km-Mileage #1 8 00 #10 Km-Mileage #2 8 01 #11 Km-Mileage #3 8 FF #12 TimeIndication 8 00 #13 Timestamp#1 8 00 #14 Timestamp#2 8 2B #15 Timestamp#3 8 20 #16 Time-stamp#4 8 F2 General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-7866
Version:	2.7
Description:	The example shows the use of the sub-function ReportDTCExtended-DataRecordByDTCNumber (0x06) with a DTCExtendedDataRecordNumber 0x55. The client requests the DTCExtendedDataRecordNumber 0x55 for DTC 0x123456 from the example ReportDTCSnapshotIdentification (0x03): The DTC 0x123456 has the StatusOfDTC 0x0C. For the ExtendedDataRecordNumber 0x55, a data stream of 6 bytes (0x112233445566) is returned.

Id:	Q-LAH_80124-7867
Version:	2.7
Description:	Table 8-45: Example request 19 06 Data Parameter name, request Bit- Hex length #1 ReadDTCInformation Request Service Id 8 19 #2 DTCInformation-Type = 8 06 ReportDTCExtendedDataRecordByDTCNumber #3 DTCHighByte 8 12 #4 DTCMiddleByte 8 34 #5 DTCLowByte 8 56 #6 DTCExtendedDataRecord-Number 8 55

Id:	Q-LAH_80124-7868
Version:	2.7
Description:	Table 8-46: Example response 59 06 Data Parameter name, response Bit- Hex length #1 ReadDTCInformation Response Service Id 8 59 #2 ReportType = Re-portDTCExtendedDataRecordByDTCNumber 8 06 #3 DTCHighByte 8 12 #4

	DTCMiddleByte 8 34 #5 DTCLowByte 8 56 #6 StatusOfDTC 8 0C #7 DTCExtendedDataRecordNumber 8 55 #8 StaticExtendedData#1 8 11 #9 StaticExtendedData#2 8 22 #10 StaticExtendedData#3 8 33 #11 StaticExtendedData#4 8 44 #12 StaticExtendedData#5 8 55 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7874
Version:	2.7
Description:	The example shows the use of the sub-function ReportDTCExtendedDataRecordByDTCNumber (0x06) with AllDTCExtendedDataRecordNumbers 0xFF. With DTCExtendedDataRecordNumbers 0xFF, the client requests all ambient data for DTC 0x123456: The DTC 0x123456 has the StatusOfDTC 0x0C. DTCExtendedDataRecordNumber 0x55 is supported.

Id:	Q-LAH_80124-7875
Version:	2.7
Description:	Table 8-47: Example request 19 06 Data Parameter name, request Bit- Hex length #1 ReadDTCInformation Request Service Id 8 19 #2 DTCInformationType = 8 06 ReportDTCExtendedDataRecordByDTCNumber #3 DTCHighByte 8 12 #4 DTCMiddleByte 8 34 #5 DTCLowByte 8 56 #6 DTCExtendedDataRecordNumber = 8 FF AllDTCExtendedDataRecordNumbers

Id:	Q-LAH_80124-7876
Version:	2.7
Description:	Table 8-48: Example response 59 06 Data Parameter name, response Bit- Hex length #1 ReadDTCInformation Response Service Id 8 59 #2 ReportType = ReportDTCExtendedDataRecordByDTCNumber 8 06 #3 DTCHighByte 8 12 #4 DTCMiddleByte 8 34 #5 DTCLowByte 8 56 #6 StatusOfDTC 8 0C #7 DTCExtendedDataRecordNumber 8 01 #8 DTC priority 8 04 #9 OCC 8 05 #10 DTCExtendedDataRecordNumber 8 02 #11 Aging counter 8 04 #12 Km-Mileage #1 8 00 #13 Km-Mileage #2 8 01 #14 Km-Mileage #3 8 FF #15 TimeIndication 8 00 #16 Timestamp#1 8 00 #17 Timestamp#2 8 2B #18 Timestamp#3 8 20 #19 Timestamp#4 8 F2 #20 Timestamp#5 8 46 #21 DTCExtendedDataRecordNumber 8 55 #22 StaticExtendedData#1 8 11 #23 StaticExtendedData#2 8 22 #24 StaticExtendedData#3 8 33 #25 StaticExtendedData#4 8 44 #26 StaticExtendedData#5 8 55 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7882
Version:	2.7

Description:	The example shows the use of the sub-function ReportDTCExtended-DataRecordByDTCNumber (0x06) with AllDTCExtendedDataRecordNumbers 0xFF. With DTCExtendedDataRecordNumbers 0xFF, the client requests all ambient data for DTC 0x123456: The DTC 0x123456 has the StatusOfDTC 0x00. No DTCExtendedDataRecords are recorded.

Id:	Q-LAH_80124-7883
Version:	2.7
Description:	Table 8-49: Example request 19 06 Data Parameter name, request Bit- Hex length #1 ReadDTCInformation Request Service Id 8 19 #2 DTCInformation-Type = 8 06 ReportDTCExtendedDataRecordByDTCNumber #3 DTCHighByte 8 12 #4 DTCMiddleByte 8 34 #5 DTCLowByte 8 56 #6 DTCExtendedDataRecord-Number 8 FF

Id:	Q-LAH_80124-7884
Version:	2.7
Description:	Table 8-50: Example response 59 06 Data Parameter name, response Bit- Hex length #1 ReadDTCInformation Response Service Id 8 59 #2 ReportType = ReportDTCExtendedDataRecordByDTCNumber 8 06 #3 DTCHighByte 8 12 #4 DTCMiddleByte 8 34 #5 DTCLowByte 8 56 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9973
Version:	2.7
Description:	The example shows the use of the sub-function ReportDTCFaultDetection-Counter (0x14). The client requests the list of DTCs undergoing debouncing: The DTC 0x123456 has the debouncing status (before TestFailed == 1). The FaultDetectionCounter has the value 0x50 (80dec). For a debounce period of 1 000 ms until TestFailed == 1, this corresponds to a currently elapsed debounce period of 630 ms. FaultDetectionCounter = 630 ms · 127 = 80

Id:	Q-LAH_80124-9974
Version:	2.7
Description:	Table 8-51: Example request 19 14 Data Parameter name, request Bit- Hex length #1 ReadDTCInformation Request Service Id 8 19 #2 DTCInformation-Type = ReportDTCFaultDetectionCounter 8 14

Id:	Q-LAH_80124-9975
Version:	2.7

Description:	Table 8-52: Example response 59 14 Data Parameter name, response Bit- Hex length #1 ReadDTCInformation Response Service Id 8 59 #2 DTCInformationType = ReportDTCFaultDetectionCounter 8 14 #3 DTCHighByte 8 12 #4 DTCMiddleByte 8 34 #5 DTCLowByte 8 56 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8603
Version:	2.7
Description:	For the ResponseOnEvent service (86hex), additional requirements and behavior from the "Diagnostics on xx" section must be adhered to (xx = bus system connected to the server for diagnostics access).

Id:	Q-LAH_80124-5693
Version:	2.7
Description:	This service is used to switch the server to a special monitoring mode that provides the opportunity of automatically sending a UDS message on the CAN bus via the diagnostics interface if an event occurs. The purpose of this is to provide a client immediately via the UDS interface with the related information if a certain event occurs (DTC or error stored for the first time, temperature increase, etc.).

Id:	Q-LAH_80124-9578
Version:	2.7
Description:	EventTrigger is monitoring initialized via the 'EventType' parameter (e.g., OnDTCStatusChange 0x01). Example: The ResponseOnEvent (86hex) service is initialized with the EventTrigger 'OnDTCStatusChange' for the monitoring of the TestFailed bits.

Id:	Q-LAH_80124-8137
Version:	2.7
Description:	In the ResponseOnEvent request message, the client defines the event (including optional parameters) and the service to be performed by the server (ServiceToRespondTo including service parameters), if the event occurs.

Id:	Q-LAH_80124-7342
Version:	2.7
Description:	A detected event must not cause a bus wake-up.

Id:	Q-LAH_80124-8187

Version:	2.7
Description:	If a ServiceToRespondTo is initialized and started, a corresponding NRC is first generated in the response for the executed ServiceToRespondTo if the Service-ToRespondTo in the current session is invalid or is not supported by the server.

Id:	Q-LAH_80124-8188
Version:	2.7
Description:	Executing the ServiceToRespondTo (also the final, closed/expired EventWindow) has no effect on P2Server (start, stop, resume), because no request appears.

Id:	Q-LAH_80124-7344
Version:	2.7
Description:	The service ResponseOnEvent has no effect on the network management, i.e., beginning with the status ReadyToSleep, no more event messages may be sent until the server is participating in normal bus operation again (sending/receiving).

Id:	Q-LAH_80124-8139
Version:	2.7
Description:	The ResponseOnEvent service is not rejected if a jump into the flash boot loader takes place without reprogramming. This must be considered as a function of the initialized EventWindow and StorageState.

Id:	Q-LAH_80124-8140
Version:	2.7
Description:	The server must perform the service with the positive response that was requested in the serviceToRespondToRecord and the event takes place within the defined General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8190
Version:	2.7
Description:	The SuppressPositiveResponseBit with the value '1' must be used in the request only for the following eventTypes (sub-function types == control): stopResponseOnEvent startResponseOnEvent clearResponseOnEvent

Id:	Q-LAH_80124-8141
Version:	2.7

Description:	If the specified event has occurred, the ServiceToRespondTo must always deliver a response for a ResponseOnEvent request regardless of the value of the SuppressPositiveResponseBit.

Id:	Q-LAH_80124-9305
Version:	2.7
Description:	The ResponseOnEvent service (86hex) must not be used via the N_AI for legislated OBD communication.

Id:	Q-LAH_80124-9341
Version:	2.7
Description:	Only one EventTrigger is provided for a single ServiceToRespondTo.

Id:	Q-LAH_80124-9342
Version:	2.7
Description:	Only one EventTrigger can be initialized.

Id:	Q-LAH_80124-9824
Version:	2.7
Description:	There is, however, the ability to instantiate multiple parallel EventTriggers if additional ServiceToRespondTo messages are specified in this document. This must be documented in the BT-LAH.

Id:	Q-LAH_80124-9334
Version:	2.7
Description:	If multiple EventTriggers are initialized, all initialized EventTriggers must be started and stopped simultaneously.

Id:	Q-LAH_80124-9338
Version:	2.7
Description:	Events that occur during a not-started EventTrigger (ROE_cleared, ROE_initialized) must be discarded in the server; a ServiceToRespondTo must not be generated.

Id:	Q-LAH_80124-9740
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-9320
Version:	2.7
Description:	If multiple clients access a server with the ResponseOnEvent service, the following rules apply:

Id:	Q-LAH_80124-9321
Version:	2.7
Description:	If an EventTrigger has been initialized in a server, each client can, e.g., start this EventTrigger.

Id:	Q-LAH_80124-9322
Version:	2.7
Description:	Each client can reinitialize or update the EventTrigger.

Id:	Q-LAH_80124-9323
Version:	2.7
Description:	If the EventTrigger reaches the status "ROE_started" (e.g., through sub-function "StartResponseOnEvent" or automatic reactivation), each additional request with ResponseOnEvent service (86hex) to different SourceAddress (N_SA) must be rejected with NRC 0x22. Exceptions are the sub-functions "StopResponseOnEvent" and "ClearResponseOnEvent." Notice: This exception allows an exclusive allocation of ResponseOnEvent to a client.

Id:	Q-LAH_80124-9324
Version:	2.7
Description:	In the server there must always be the ability to influence the EventTrigger through "StopResponseOnEvent" and "ClearResponseOnEvent." Note: This prevents a permanent block of the EventTrigger or ResponseOnEvent, especially for the use of the StorageState == StoreEvent parameter.

Id:	Q-LAH_80124-9315
Version:	2.7
Description:	If the EventTrigger reaches the status "ROE_started" (e.g., through sub-function "StartResponseOnEvent" or automatic reactivation), the following rules apply:

Id:	Q-LAH_80124-8142
Version:	2.7
Description:	The server must send the ServiceToRespondTo to each client that has started the EventTrigger until the EventWindow has expired.

Id:	Q-LAH_80124-9317
Version:	2.7
Description:	The server must send the ServiceToRespondTo to the client that has started the EventTrigger until the EventTrigger is explicitly stopped by the sub-function General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8191
Version:	2.7
Description:	The DiagnosticSessionControl request (10hex) in the direction of any NonDefaultSession stops the ResponseOnEvent (86hex) (including applied EventTrigger). This must also be performed if, within an already active NonDefaultSession, a different or the same NonDefaultSession is requested.

Id:	Q-LAH_80124-8192
Version:	2.7
Description:	For a return to the DefaultSession, all of the EventTriggers activated previously in the DefaultSession by ResponseOnEvent (86hex) must be automatically restarted or reactivated by the server.

Id:	Q-LAH_80124-8148
Version:	2.7
Description:	For the initialization of ResponseOnEvent with a setup request, only services as ServiceToRespondTo that are permitted in the respective diagnostic session may be requested.

Id:	Q-LAH_80124-8149
Version:	2.7
Description:	The ResponseOnEvent service can be initialized and activated in every session. A TesterPresent (3Ehex) is not required to maintain the ResponseOnEvent.

Id:	Q-LAH_80124-7340
Version:	2.7
Description:	The settings of an event must not be lost as a result of a session change in the server.

Id:	Q-LAH_80124-8186
Version:	2.7
Description:	If events occur during a diagnostic service that is already in progress and a response cannot be sent by the server due to the occupied resources, The Ser-

	viceToRespondTo must be shifted until the running diagnostic service has ended with a positive or negative response (exception NRC 0x78).

Id:	Q-LAH_80124-8189
Version:	2.7
Description:	Notice: Under certain circumstances, it can happen due to the shifting of the ServiceToRespondTo that the data sent via ResponseOnEvent does not correspond to the data the event has created.

Id:	Q-LAH_80124-7356
Version:	2.7
Description:	Starting the event trigger (StartResponseOnEvent) sets the measured value "Response_On_Event" 0x02B3 to the value "active" in the server.

Id:	Q-LAH_80124-6778
Version:	2.7
Description:	When the ResponseOnEvent (ClearResponseOnEvent) is deactivated, the measurement value "Response_On_Event" 0x02B3 must be set to the value "not initialized."

Id:	Q-LAH_80124-7368
Version:	2.7
Description:	Stopping the event trigger (StopResponseOnEvent) sets the measured value General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9336
Version:	2.7
Description:	The control sub-functions of the ResponseOnEvent with exclusive client access are described below.

Id:	Q-LAH_80124-7348
Version:	2.7
Description:	For initializing an EventTrigger (setup), the StorageState bit must be evaluated.

Id:	Q-LAH_80124-9340
Version:	2.7
Description:	1, 17: If, for initializing an EventTrigger, the StorageState bit has the value DoNotStoreEvent (0), the initialization applies only to the current OperationCycle.

Id:	Q-LAH_80124-9515
Version:	2.7
Description:	2: If, for initializing an EventTrigger, the StorageState bit has the value StoreEvent (1), this initialization must be stored in non-volatile memory. (Adherence to the note for storage in the EventWindowTime parameter description is mandatory.)

Id:	Q-LAH_80124-7349
Version:	2.7
Description:	14, 15, 19, 20: A new, initialized EventTrigger replaces the old EventTrigger in the server.

Id:	Q-LAH_80124-7350
Version:	2.7
Description:	14, 15: A reinitialization is also possible for a started EventTrigger. The EventTrigger is stopped in the process.

Id:	Q-LAH_80124-9976
Version:	2.7
Description:	Table 8-53: Combinations of StorageState and EventWindowTime for the initialization StorageState EventWindow Applies to Response OperationCycle

Id:	Q-LAH_80124-7354
Version:	2.7
Description:	Starting the EventTrigger causes all initialized EventTriggers in the server to be started.

Id:	Q-LAH_80124-7355
Version:	2.7
Description:	4: Starting the EventTrigger without prior initialization must be rejected by the server with NRC 0x24.

Id:	Q-LAH_80124-9977
Version:	2.7
Description:	The starting must be stored in persistent memory as a function of the StorageState.

Id:	Q-LAH_80124-9339

Version:	2.7
Description:	A started EventTrigger must be restarted as "started" after power up as a function of the StorageState and the initialized EventWindow.

Id:	Q-LAH_80124-9978
Version:	2.7
Description:	Table 8-54: Permissible combinations of StorageState and EventWindowTime for starting StorageState EventWindow (initialization) Applies to OperationCycle

Id:	Q-LAH_80124-7364
Version:	2.7
Description:	23, 24: Stopping the EventTrigger causes all initialized EventTriggers in the server to be stopped. Events subsequently detected must not lead to a ServiceToRespondTo being sent.

Id:	Q-LAH_80124-7365
Version:	2.7
Description:	8: A started EventTrigger is automatically stopped in the server and not restarted if the EventType ClearResponseOnEvent is executed.

Id:	Q-LAH_80124-7367
Version:	2.7
Description:	9: Stopping an EventTrigger without prior initialization of the EventTrigger must be rejected by the server with NRC 0x24.

Id:	Q-LAH_80124-9337
Version:	2.7
Description:	Stopping an initialized EventTrigger must receive a positive response from the server.

Id:	Q-LAH_80124-7369
Version:	2.7
Description:	Stopping the EventTrigger must not clear the EventTrigger.

Id:	Q-LAH_80124-9516
Version:	2.7
Description:	Stopping the EventTrigger must always be possible.

Id:	Q-LAH_80124-9979

Version:	2.7
Description:	The stopping must be stored in persistent memory as a function of the StorageState.

Id:	Q-LAH_80124-9980
Version:	2.7
Description:	Table 8-55: Permissible combinations of StorageState and EventWindowTime for stopping StorageState EventWindow (initialization) Applies to OperationCycle

Id:	Q-LAH_80124-7371
Version:	2.7
Description:	8, 13: Clearing the EventTrigger causes an initialized EventTrigger in the server to be permanently cleared (in a non-volatile manner).

Id:	Q-LAH_80124-7372
Version:	2.7
Description:	8, 13: Clearing the EventTrigger causes started EventTriggers in the server to be immediately cleared. All detected events are discarded.

Id:	Q-LAH_80124-7373
Version:	2.7
Description:	8, 13, 16: It must always be possible to clear an EventTrigger regardless of the StorageState bit and a positive response must be sent.

Id:	Q-LAH_80124-6342
Version:	2.7
Description:	Figure 8-3: State transition diagram - Diagnostic monitoring/EventTrigger Precondition: Format check of the request OK Boundary conditions for execution of the service OK Requests are received by a client. Parameter StorageState is not considered. 4: [XX, 9: [XX, 3: [doNotstoreEvent , 25: [storeEvent, 16: [XX, star t R esponseOnEv en t, stop R esponseOnEv en t, onDTCStatusChange , onDTCStatusChange , clear R esponseOnEv en t, XX] XX] infiniteTimeToRespons] !infiniteTimeToResponse] XX] /NRC 0x24 /NRC 0x24 /NRC 0x31 /NRC 0x31 /pos. Resp. RoE_Idle 17: New OCY 1: [doNotStoreEvent , onDTCStatusChange , ! infiniteTimeToR esponse] 13: [XX, /pos. Resp. 8: [XX, 18: [doNotStoreEvent , clearResponseOnEvent clearResponseOnEvent star tR esponseO nEv ent , XX] 2: [storeEvent, XX] XX] /pos .Resp. onDTCStatusChange , /pos .Resp. /pos . Resp infiniteTimeToResponse]

	24: [doNotStoreEvent , /pos. Resp 5: New OCY stop R esponseO nEv ent , XX] 7: [storeEvent, /pos . Resp star tR esponseO nEv ent , XX] RoE_Active 10: [doNotStoreEvent , RoE_InActive /NRC 0x22 stopResponseOnEvent , XX] 27:New OCY /pos. Resp Start_Stored Start_NotStored Setup_Stored Set-up_NotStored 12: [storeEvent, Setup_NotStored Stop_NotStored stop R espon-seOnEv ent , XX] /NRC 0x22 26: New OCY 21: [StoreEvent, 23: [XX, stop Re-sponseOnEvent, Setup_Stored stop R esponseO nEv ent , Stop_Stored Infinite-TimeToResponse] 20: [storeEvent, XX] /pos .Resp. onDTCStatusChange , / pos . Resp infiniteTimeToResponse] /pos . Resp 22: [doNotStoreEvent , star t R esponseOnEv ent , 19: [doNotStoreEvent , XX] onDTCStatusChange , 11: [StoreEvent, /pos . Resp !infiniteTimeToResponse] 6: [storeEvent, stopRespon-seOnEvent , /pos . Resp. star t R esponseO nEv ent , infiniteTimeToResponse] XX] /pos .Resp. /pos . Resp 14: [storeEvent, 15: [doNotStoreEvent , onDTCSta-tusChange , onDTCStatusChange , infiniteTimeToResponse] !infiniteTimeToRe-sponse] General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-5695
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-5721
Version:	2.7
Description:	Table 8-56: Request message definition Data Parameter name, request Bit- Cvt. Hex length #1 ResponseOnEvent Request Service Id 8 M 86 SuppressPosi-tiveResponseBit 1 0-1 #2 EventType StorageState 1 M 00 - 7F eventType 6 #3 EventWindowTime 8 M 00 - FF #4 EventTypeRecord 8 C1 xx #5 ServiceToRe-spondToRecord#1 8 C2 xx : : : : xx #(m - 1) + 5 ServiceToRespondToRecord#m 8 C2 xx

Id:	Q-LAH_80124-8158
Version:	2.7
Description:	C1 - The parameter is present if multiple parameters are required for defining the EventTrigger. In the Volkswagen AG use case, the DTCStatusMask = 1 byte.

Id:	Q-LAH_80124-8159
Version:	2.7
Description:	C2 - Mandatory parameter if the sub-function (EventType) has the value OnDTCStatusChange (0x01).

Id:	Q-LAH_80124-5722
Version:	2.7
Description:	The EventType parameter is used to initialize (set up) the trigger event and to start and stop the sending of the message when the event has occurred.

Id:	Q-LAH_80124-8161
Version:	2.7
Description:	The following sub-function parameters are defined for this service:

Id:	Q-LAH_80124-8162
Version:	2.7
Description:	Table 8-57: Request message sub-function definition - StorageState Hex: Description, StorageState Cvt. (bit 6) DoNotStoreEvent

Id:	Q-LAH_80124-9313
Version:	2.7
Description:	The values of the EventTypes within the sub-function are classified into the following types: setup control

Id:	Q-LAH_80124-5748
Version:	2.7
Description:	Table 8-58: Request message sub-function definition – EventType

Id:	Q-LAH_80124-8164
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-8165
Version:	2.7
Description:	Table 8-59: Request message parameter definition Definition EventWindowTime This parameter is used to pull up a window for the activated event logic. The parameter must not be evaluated in the server if the sub-function is one of the following ResponseOnEvent control sub-functions: - StopResponseOnEvent - StartResponseOnEvent - ClearResponseOnEvent A combination of a finite EventWindow and StorageState == StoreEvent must not be used. Note: See NRC table for ResponseOnEvent. EventTypeRecord This EventTypeRecord parameter indicates additional boundary conditions for the initialization of the UDS service ResponseOnEvent with the EventType OnDTCStatusChange. The length of the parameter is defined as n = 1 byte. ServiceToRespondToRecord

	This parameter includes the service and its parameter that must be executed if an event occurs that was defined by the General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-5771
Version:	2.7
Description:	Table 8-60: ResponseOnEvent parameter - EventWindowTime Hex: Description, EventWindowTime Cvt. 00 - 01 ISOSAE-Reserved NoImp InfiniteTimeToResponse This value means that the EventTrigger is active for an infinitely long time until being cleared.

Id:	Q-LAH_80124-8166
Version:	2.7
Description:	Table 8-61: ResponseOnEvent parameter - EventTypeRecord for EventType OnDTCStatusChange Bit Description, EventType Cvt. 7-4 Optional U2 ConfirmedDTC

Id:	Q-LAH_80124-8167
Version:	2.7
Description:	U1 - Can be set optionally by the client to detect a new setting or resetting for DTCs that already have a Confirmed status (change of StatusOfDTC.TestFailed from value '0' to '1' or '1' to '0').

Id:	Q-LAH_80124-9832
Version:	2.7
Description:	U2 - Optional

Id:	Q-LAH_80124-5811
Version:	2.7
Description:	Table 8-62: ResponseOnEvent parameter - ServiceToRespondToRecord Data Hex: Description, EventType Cvt. #1 19 ReadDTCInformation-reportMostRecentConfirmedDTC M #2 0E When the event has been fulfilled, the response from the UDS service M 19, 0E, i.e., 59, 0E, XX - XX is sent to the client once.

Id:	Q-LAH_80124-5813
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-5831

Version:	2.7
Description:	Table 8-63: Positive response message definition Data Parameter name, response Bit- Cvt. Hex length #1 ResponseOnEvent Response Service Id 8 M C6 #2 EventType 8 M 00 - 7F #3 NumberOfIdentifiedEvents 8 M xx #4 EventWindowTime 8 M xx

Id:	Q-LAH_80124-8175
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-8176
Version:	2.7
Description:	Table 8-64: Positive response message parameter definition Definition EventType This parameter is used in the server response as an echo of the sub-function (without SuppressPositiveResponseBit) in the client request. NumberOfIdentifiedEvents This parameter is not used and always has the value 0x00. EventWindowTime This parameter corresponds to the parameter in the request.

Id:	Q-LAH_80124-8169
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-8170
Version:	2.7
Description:	Table 8-65: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-5963
Version:	2.7
Description:	Use case: Diagnostic monitoring by means of event triggering with ResponseOnEvent in connection with ServiceToRespondTo ReadDTCInformation (19hex).

Id:	Q-LAH_80124-5964
Version:	2.7

Id:	Q-LAH_80124-9518
Version:	2.7
Description:	StorageState is evaluated, because the request contains a setup sub-function. In this example, the initialization is retained in non-volatile memory.

Id:	Q-LAH_80124-6601
Version:	2.7
Description:	Table 8-66: Example request 86 Data Parameter name, request Bit- Hex length #1 ResponseOnEvent Request Service Id 8 86 SuppressPositiveResponseBit 1 #2 StorageState = 1 1 41 EventType eventType = 01 6 OnDTCStatusChange #3 EventWindowTime = CurrentCycle 8 04 #4 EventTypeRecordDTCStatusMask 8 08 [ConfirmedDTC] #5 ServiceToRespondToRecord#1 = 8 19 ReadDTCInfor-mation #6 ServiceToRespondToRecord#2 = 8 0E reportMostRecentConfirmed-DTC

Id:	Q-LAH_80124-6604
Version:	2.7
Description:	Table 8-67: Example response C6 Data Parameter name, response Bit- Hex length #1 ResponseOnEvent Response Service Id 8 C6 #2 EventType 8 41 #3 NumberOfIdentifiedEvents 8 00 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-6069
Version:	2.7

Id:	Q-LAH_80124-9517
Version:	2.7
Description:	The 'EventWindowTime' parameter is not evaluated; the value defined for the initialization applies.

Id:	Q-LAH_80124-8179
Version:	2.7
Description:	Table 8-68: Example request 86 Data Parameter name, request Bit- Hex length #1 ResponseOnEvent Request Service Id 8 86 SuppressPositiveResponseBit 1 StorageState x #2 EventType eventType = 05 05 StartResponseOnEve 6 nt #3 EventWindowTime = don't care 8 XX

Id:	Q-LAH_80124-8180
Version:	2.7
Description:	Table 8-69: Example response C6 Data Parameter name, response Bit- Hex length #1 ResponseOnEvent Response Service Id 8 C6 #2 EventType 8 05 #3 NumberOfIdentifiedEvents 8 00 #4 EventWindowTime = don't care 8 XX

Id:	Q-LAH_80124-6174

Version:	2.7

Id:	Q-LAH_80124-6605
Version:	2.7
Description:	Table 8-70: Example ResponseOnEvent Data Parameter name, response Bit-Hex length #1 ReadDTCInformation Response Service Id 8 59 ReportType = [#2 ReportDTCByStatusMask 8 0E] #3 DTCStatusAvailabilityMask 8 xx DT-CAndStatusRecord = [#4 DTCHighByte #1 8 xx #5 DTCMiddleByte #1 8 xx #6 DTCLowByte #1 8 xx #7 StatusOfDTC #1 8 xx General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-6236
Version:	2.7

Id:	Q-LAH_80124-6237
Version:	2.7
Description:	This service can be sent at any time and is independent of a specified sequence.

Id:	Q-LAH_80124-9519
Version:	2.7
Description:	The 'EventWindowTime' parameter is not evaluated; the value defined for the initialization applies.

Id:	Q-LAH_80124-6606
Version:	2.7
Description:	Table 8-71: Example request 86 Data Parameter name, request Bit- Hex length #1 ResponseOnEvent Request Service Id 8 86 SuppressPositiveResponseBit 0 #2 StorageState x 00 EventType eventType = 00 6 StopResponseOnEvent #3 EventWindowTime = don't care 8 XX

Id:	Q-LAH_80124-8181
Version:	2.7
Description:	Table 8-72: Example response C6 Data Parameter name, response Bit- Hex length #1 ResponseOnEvent Response Service Id 8 C6 #2 EventType 8 00 #3 NumberOfIdentifiedEvents 8 00 #4 EventWindowTime = don't care 8 XX

Id:	Q-LAH_80124-8182

Version:	2.7

Id:	Q-LAH_80124-9520
Version:	2.7
Description:	The value of the StorageState bit and the EventWindowTime parameter is not taken into account for the clearing.

Id:	Q-LAH_80124-8184
Version:	2.7
Description:	Table 8-73: Example request 86 Data Parameter name, request Bit- Hex length #1 ResponseOnEvent Request Service Id 8 86 SuppressPositiveResponseBit 0 #2 StorageState x 06 EventType eventType = 06 6 ClearResponseOnEvent #3 EventWindowTime = don't care 8 XX

Id:	Q-LAH_80124-8185
Version:	2.7
Description:	Table 8-74: Example response C6 Data Parameter name, response Bit- Hex length #1 ResponseOnEvent Response Service Id 8 C6 #2 EventType 8 06 #3 NumberOfIdentifiedEvents 8 00 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-3625
Version:	2.7
Description:	A system's interactive diagnostics management includes the following services:

Id:	Q-LAH_80124-3639
Version:	2.7
Description:	Table 9-1: Services for the interactive diagnostics management Service SID Document InputOutputControlByIdentifier 2Fhex /1/ RoutineControl 31hex /1/

Id:	Q-LAH_80124-10122
Version:	2.7
Description:	This service must not be used for the new development. The corresponding functions must be mapped by service RoutineControl (31hex). Use of service 2Fhex is only possible in consultation with the Diagnostics department.

Id:	Q-LAH_80124-3641
Version:	2.7

Description:	This service is used to transmit a certain desired value to a system input or to one or more internal system functions, in order to form and evaluate the reactions acoustically, visually, or tactilely.

Id:	Q-LAH_80124-3984
Version:	2.7
Description:	This service is used to start a sub-program or a routine in the server. The program can either be ended automatically (e.g., timed, event-triggered) or by means of an appropriate sub- function. A results query is also possible.

Id:	Q-LAH_80124-6752
Version:	2.7
Description:	The desired values given over to the service at the start of the InputOutputControl (InputOutputControlParameter = ShortTermAdjustment 0x03) must be rejected at the end/abort of the InputOutputControl and must cause no permanent changes in the server (e.g., execution of a normalization run and optional subsequent automatic parameter adjustments or the like).

Id:	Q-LAH_80124-8197
Version:	2.7
Description:	The following procedure must be implemented to support the InputOutputControl:

Id:	Q-LAH_80124-8193
Version:	2.7
Description:	The InputOutputControlByIdentifier service must decouple the object addressed via the InputOutputIdentifier from all input signals that load this object with values in one way or another.

Id:	Q-LAH_80124-8194
Version:	2.7
Description:	The desired value of the internal value must be replaced by the corresponding ControlState parameter of the request.

Id:	Q-LAH_80124-6774
Version:	2.7
Description:	If InputOutputControls are required by a client, those that cause critical or implausible General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-8279
Version:	2.7
Description:	It must be clarified with the purchaser's Diagnostic Specifications department to what extent a clustering or combination of hardware outputs is useful by means of one InputOutputControl. This must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-7386
Version:	2.7
Description:	If an InputOutputControl is started by means of this service and influences a function that influences a bus signal (e.g., CAN, LIN), then the bus signal value must be output on this InputOutputControl accordingly.

Id:	Q-LAH_80124-8195
Version:	2.7
Description:	The server must send a positive response after the request for the InputOutputControl has been successfully started or has reached the necessary status.

Id:	Q-LAH_80124-8196
Version:	2.7
Description:	The server must send a positive response to a request with InputOutputControlParameter ReturnControlToEcu (0x00), also if the requested InputOutputIdentifier is not currently requested/controlled by a client via InputOutputControlByIdentifier (2Fhex).

Id:	Q-LAH_80124-8198
Version:	2.7
Description:	Functional dependencies must not affect this default value of the ControlState#1-#n up to the end of the InputOutputControl.

Id:	Q-LAH_80124-8957
Version:	2.7
Description:	In the event of terminal 15 OFF, an already started InputOutputControl must be stopped and the server must then be in a safe state.

Id:	Q-LAH_80124-8958
Version:	2.7
Description:	After aborting an InputOutputControl due to terminal 15 OFF, the state of the InputOutputControl is defined as an abort by the server.

Id:	Q-LAH_80124-8959
Version:	2.7
Description:	There is the option to start again with InputOutputControl started through a request with InputOutputControlParameter ShortTermAdjustment (0x03) and the same or different, valid ControlState#1 - #n. This behavior is also called a "restart."

Id:	Q-LAH_80124-10030
Version:	2.7
Description:	If a restart is not possible (e.g., as a protective mechanism), the restart must be rejected with NRC 0x24.

Id:	Q-LAH_80124-10031
Version:	2.7
Description:	The restart capability for the InputOutputIdentifier must be documented in the BT-LAH.

Id:	Q-LAH_80124-8960
Version:	2.7
Description:	An InputOutputControl start of an already running InputOutputControl with invalid ControlOptionRecord must be rejected by the server with NRC 0x31, regardless of whether the ECU supports the restarting.

Id:	Q-LAH_80124-8961
Version:	2.7
Description:	It must be possible to stop an InputOutputControl at any time. InputOutputControls that cannot be ended by means of ReturnControlToEcu (0x00) must be agreed upon with the purchaser's Diagnostics and Diagnostic Specifications departments and documented in the Component Performance Specification.

Id:	Q-LAH_80124-3748
Version:	2.7
Description:	The generic DataIdentifier 0x0100 (ReadDataByIdentifier 22hex) must be implemented for General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-6761
Version:	2.7

Description:	For parallel InputOutputControls, the following applies: The DataIdentifier 0x0100 (ReadDataByIdentifier 22hex) includes the status of all running InputOutputControls (OR logic operation).

Id:	Q-LAH_80124-6874
Version:	2.7
Description:	Figure 9-1: Value of the generic DataIdentifier 0x0100 Start eines InputOutputControls InputOutputControl Re-Start 0x00 0xC0 InputOutputControls wird in irgendeiner Art und Weise beendet Start eines InputOutputControls Start of an InputOutputControl InputOutputControls wird in irgendeiner Art und Weise InputOutputControl can be ended in any way. beendet InputOutputControl Re-Start InputOutputControl restart

Id:	Q-LAH_80124-9741
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response behavior from the "Service processing in the server" and "Addressing types" sections.

Id:	Q-LAH_80124-3643
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-3657
Version:	2.7
Description:	Table 9-2: Request message definition Data Parameter name, request Bit- Cvt. Hex length #1 InputOutputControlByIdentifier Request Service Id 8 M 2F #2 InputOutputIdentifier#1 (high byte) 8 M xx #3 InputOutputIdentifier#1 (low byte) 8 M xx ControlOptionRecord[] = [#4 InputOutputControlParameter 8 M xx #5 ControlState#1 (ControlTimer) 8 C1 xx #6 ControlState#2 8 C2 xx : : : : : #6 + (n - 1) ControlState#n 8 C2 xx]

Id:	Q-LAH_80124-3843
Version:	2.7
Description:	C1 - The ControlState#1 parameter must be present if the InputOutputControlParameter has the value ShortTermAdjustment (0x03).

Id:	Q-LAH_80124-9757
Version:	2.7

Description:	C2 - The ControlState#2 to ControlState#n parameters are optionally present if the General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8200
Version:	2.7
Description:	The service does not support any sub-functions.

Id:	Q-LAH_80124-8202
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-8203
Version:	2.7
Description:	Table 9-3: Request message parameter definition Definition InputOutputIdentifier This parameter identifies a procedure in the server. InputOutputIdentifiers are implemented as per the description in the BT-LAH. The ranges are specified in appendix E3. ControlOptionRecord This parameter is used to transmit additional parameters. Among others, it contains the following parameters: - InputOutputControlParameter: This parameter is used to transmit the start or stop request to the server. - ControlState#1: Timing specification for control - ControlState#2-n: Optionally, other default values

Id:	Q-LAH_80124-3658
Version:	2.7
Description:	The InputOutputIdentifier parameter identifies the input signal to be monitored, the internal system function to be controlled, or the output signal (actuator) to be activated. It is also possible to combine multiple input and output signals of a system and influence or control them via one InputOutputIdentifier.

Id:	Q-LAH_80124-3684
Version:	2.7
Description:	The InputOutputControl parameter must be contained in the request and response message and must have the same value.

Id:	Q-LAH_80124-3685
Version:	2.7
Description:	The InputOutputControl parameter specifies how the requested signal must be triggered in the server.

Id:	Q-LAH_80124-3715
Version:	2.7
Description:	Table 9-4: InputOutputControlParameter Hex Description, InputOutputControl-Parameter Cvt. (bit 7-0) ReturnControlToECU This value means that the signal requested and selected by the

Id:	Q-LAH_80124-8207
Version:	2.7
Description:	C1 - Applies to InputOutputIdentifiers that do not end automatically.

Id:	Q-LAH_80124-3716
Version:	2.7
Description:	The following values must be implemented for ControlState#1:

Id:	Q-LAH_80124-3734
Version:	2.7
Description:	Table 9-5: ControlState#1 Hex Description, ControlOption#1 (ControlTimer) Cvt. (bit 7-0)

Id:	Q-LAH_80124-8209
Version:	2.7
Description:	C1 - These values are optional (without time control) and must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-3745
Version:	2.7
Description:	Table 9-6: ControlState#2 - #n Hex: Description, ControlState#2 - #n Cvt. 00 - FF ControlState#2 C1 00 - FF ControlState#n C1

Id:	Q-LAH_80124-8214
Version:	2.7
Description:	C1 - The value range, the number #n, and the assignment with parameters must be General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8217
Version:	2.7
Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-8218
Version:	2.7
Description:	Table 9-7: Positive response message definition Data Parameter name, response Bit- Cvt. Hex length #1 InputOutputControlByIdentifier Response Service Id 8 M 6F #2 InputOutputIdentifier#1 (high byte) 8 M xx #3 InputOutputIdentifier#1 (low byte) 8 M xx ControlStatusRecord[Byte #1] = [#4 InputOutputControlParameter 8 M xx] ControlStatusRecord[Byte #2 - n] = [#5 ControlState#1 (ControlTimer) 8 C1 xx #6 ControlState#2 (InputOutputIdentifierInfo) 8 C1 xx #7 ControlState#3 8 C2 xx : : : : : #7 + (n - 1) ControlState#n 8 C2 xx]

Id:	Q-LAH_80124-3844
Version:	2.7
Description:	C1 - The parameter must be present if the InputOutputControlParameter has the value 0x03.

Id:	Q-LAH_80124-9758
Version:	2.7
Description:	C2 - The parameter is present if the InputOutputControlParameter has the value 0x03 and if, in addition to the InputOutputIdentifierInfo, additional information on the behavior of the InputOutputIdentifier is transmitted. This must be documented in the BT-LAH.

Id:	Q-LAH_80124-8220
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-8221
Version:	2.7
Description:	Table 9-8: Positive response message parameter definition Definition InputOutputIdentifier This parameter is the echo of the InputOutputIdentifier of the request. InputOutputControlParameter This parameter is the echo of the InputOutputControlParameter of the request. ControlStatusRecord General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-6704
Version:	2.7
Description:	In the ControlStatusRecord, in the response with InputOutputControlParameter == 0x03 (ShortTermAdjustment), the current value (state) can always be includ-

	ed before transmitting the respective signal or object. The ControlState can also contain, for example, additional feedback data.

Id:	Q-LAH_80124-9761
Version:	2.7
Description:	The ControlState#1 (ControlTimer) must indicate the current value of the timer counted down from the transmitted starting value (=ControlState#1 of the Request Message).

Id:	Q-LAH_80124-9762
Version:	2.7
Description:	If the ControlState#1 (ControlTimer) transmits the value Infinite (0xFF) at the startup of the InputOutputControl with ShortTermAdjustment (0x03), this parameter must also be returned as an echo with InfiniteTiming (0xFF).

Id:	Q-LAH_80124-9763
Version:	2.7
Description:	If the InputOutputControlByIdentifier is in the Diag_IoEcuControl state, the ControlState#1 (ControlTimer) must indicate in the Response Message the value 0x00 (e.g., DataIdentifier allocated in the request via ReadDataByIdentifier (22hex) and the InputOutputIdentifier).

Id:	Q-LAH_80124-9764
Version:	2.7
Description:	The value range of the response parameter ControlState#1 (ControlTimer) must be identical to the value range of the request parameter ControlState#1 (ControlTimer).

Id:	Q-LAH_80124-8964
Version:	2.7
Description:	The InputOutputIdentifierInfo parameter is divided into the following sub-parameters:

Id:	Q-LAH_80124-8965
Version:	2.7
Description:	Table 9-9: InputOutputIdentifierInfo Definition, InputOutputIdentifierInfo IoReachedStatus This parameter is used to represent the current state of the InputOutputControl. The following rule applies for the value of this parameter: - After Startup/Init/Reset of the server, the value ReachedStatus = IOControlIn-

	active must be assumed. - After a request where InputOutputControlParameter == ShortTermAdjustment and functional adoption of the default parameters, at least the value ReachedStatus = IOControlActive must be assumed. - Each state transition of the InputOutputControl is indicated with a change of the ReachedStatus value. The value of the ReachedStatus parameter assumed in the Diag_IoEcuControl state is maintained until the startup/init/reset of the General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8239
Version:	2.7
Description:	The following values must be implemented for the parameter when using an InputOutputIdentifierInfo:

Id:	Q-LAH_80124-8240
Version:	2.7
Description:	Table 9-10: InputOutputIdentifierInfo structure Parameter Bit Hex: Description, InputOutputIdentifierInfo Cvt. pos. NoImp 7-4 0 Volkswagen AG-Reserved NoImp

Id:	Q-LAH_80124-8241
Version:	2.7
Description:	All values of InputOutputIdentifierInfo (e.g., also partially for individual InputOutputIdentifiers) must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-9297
Version:	2.7
Description:	The contents of the ControlState#3-#n must be documented in the Component Performance General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8224
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-8225
Version:	2.7
Description:	Table 9-11: NegativeResponseCodes NRC Description (hex) IncorrectMessageLengthOrInvalidFormat

Id:	Q-LAH_80124-8226
Version:	2.7
Description:	Figure 9-2: NRC behavior mandatory optional VOLKSWAGEN AG-specific Service with SID 0x2F 1) Min. length check NO NRC 0x13 ok? ID supports service 0x2F in acitive session YES AND IO-ControlParameter is supported AND controlState is supported (if applicable) NO NRC 0x31 AND controlMask is supported if applicable)? - ID-config-check (Coding,Parameter) ok? YES 2) total length check NRC 0x13 ok? NO YES Security check ok for requested IO- NO NRC 0x33 Identifier? Sequence ok? YES NO NRC 0x24 YES Condition check ok? NO NRC 0x22 NRC 0x81-93 YES Positive Response 1) at least 4 (SI+DID +IOCP) 2) If IOCP = shortTermAdjustment,

Id:	Q-LAH_80124-8602
Version:	2.7
Description:	IOTimer := TimerParameter yy for service 2Fhex HH := For this value, it must be taken into account whether other InputOutputControls are active at the same time.

Id:	Q-LAH_80124-8227
Version:	2.7
Description:	Figure 9-3: State diagram Precondition: Format check of the request OK Boundary conditions for execution of the service OK Req 2F 8xxx 00 / IoReachedStatus = Req 22 8xxx / Resp 6F xxxx 00 IoControlInactive / Resp 62 8xxx ... Req 2F 8xxx 01..02 / Resp 7F 2F 31 Diag_IoEcuControl IOTimer yy elapsed (Funktionales Nennverhalten) / IoReachedStatus = Req 2F 8xxx 04..FF Req 22 0100 IoControlFinishedCorrectly / Resp 7F 2F 31 / Resp 62 0100 HH Req 2F 8xxx 00 Req 2F 8xxx 03 yy zz Req 11 xx / (Resp 51 xx, / (Resp 6F 8xxx 00, / (Resp 6F xxxx 03 yy zz, IoReachedStatus = IoReachedStatus = IoReachedStatus = Io-ControlInactive) IoControlReturnedToEcuControl) IoC ontrolR eturnedActive , Start IOTimer yy) Req 10 01 / (Resp 50 01, S3_Timeout Abbruch durch Server IoReachedStatus = / IoReachedStatus = / IoReachedStatus = IoC ontrolInactive) IoControlInactive IoControlAborted Diag_IoShortTermAdj Req 2F 8xxx 03 aa ... (Verhalten gemäß InputOutpuContro)l / Resp 7F 2F 31 Gleichzeitiger Start eines laufenden Req 22 0100 IOControls mit gleichem IOIdentifier und / Resp 62 0100 C0 ungültigen ControlStates IOTimer yy running Req 2F 8xxx 04..FF / Resp 7F 2F 31 Req 2F 8xxx 03 yy zz / Resp 6F xxxx 03 yy zz Req 22 8xxx IO-Control - oder / Resp 62 8xxx ... Req 2F 8xxx 01..02 spezifisch / Resp 7F 2F 24 / Resp 7F 2F 31 Gleichzeitiger Start eines laufenden IOControls mit Server erkennt , dass IOControl gleichem IOIdentifier und gleichen oder nicht beendet werden kann unterschiedlichen gültigen ControlStates / IoReachedStatus = Pos. Response falls das SG das Restarten IoControlExecutionStuck unterstützt oder

	Neg. Response falls das SG das Restarten nicht unterstützt Diag_IoEcuControl Diag_IoEcuControl (Funktionales Nennverhalten) (Functional nominal behavior) Abbruch durch Server / IoReachedStatus = Abort by server/IoReachedStatus = IoControlAborted IoControlAborted spezifischServer erkennt, dass IOControl nicht beendet A specific server detects that IOControl cannot be werden kann / IoReachedStatus= IoControlExecutionStuck ended/IoReachedStatus = IoControlExecutionStuck. Diag_IoShortTermAdj Diag_IoShortTermAdj (Verhalten gemäß InputOutpuControl) (Behavior as per InputOutputControl) Gleichzeitiger Start eines laufenden IOControls mit Simultaneous start of a running IOControl with the same gleichem IOIdentifier und ungültigenControlStates IOIdentifier and invalid ControlStates General Project-Independent Performance Specification LAH.DUM.909.G oder or Gleichzeitiger Start eines laufenden IOControls mit Simultaneous start of a running IOControl with same gleichem IOIdentifier und gleichen oder unterschiedlichen IOIdentifier and the same or different, valid ControlStates gültigen ControlStates Pos. response if the ECU supports the restart Pos. Response falls das SG das Restarten unterstützt or oder Neg. response if the ECU does not support the restart Neg. Response falls das SG das Restarten nicht unterstützt Server erkennt, dass IOcontrol nicht beendet werden kann Server detects that IOControl cannot be ended

Id:	Q-LAH_80124-8228
Version:	2.7
Description:	The transition as per Diag_IoEcuControl must be enabled with "ReturnControlToEcu" (0x00) in the server.

Id:	Q-LAH_80124-8229
Version:	2.7
Description:	If system-specific InputOutputIdentifiers require automatic termination, this must be agreed upon with the purchaser's Diagnostic and Diagnostic Specifications departments. For these InputOutputIdentifier, the sub-function "ReturnControlToEcu" for these InputOutputIdentifiers does not have to be described in the BT-LAH.

Id:	Q-LAH_80124-8231
Version:	2.7
Description:	For each InputOutputIdentifier defined for the server, the status must be returned via DataIdentifier. The value of the InputOutputIdentifier and the associated DataIdentifier (StatusOfIOControls) must be identical.

Id:	Q-LAH_80124-8232
Version:	2.7

Description:	The DataIdentifiers allocated to each InputOutputIdentifier must be defined in agreement with the Diagnostic Specifications department and documented in the Component Performance Specification for each InputOutputIdentifier.

Id:	Q-LAH_80124-8233
Version:	2.7
Description:	The DataIdentifier allocated to the respective InputOutputIdentifier must contain, as parameters, at least the ControlState#1 (ControlTimer) and ControlState#2 (InputOutputIdentifierInfo) of the InputOutputIdentifier.

Id:	Q-LAH_80124-10028
Version:	2.7
Description:	The parameter ControlState#1 (ControlTimer) must indicate the remaining run-time of the respective InputOutputIdentifier with a maximum resolution of 1 second. If the parameter ControlState#1 (ControlTimer) was transmitted with the value 0xFF (InfiniteTiming) via an InputOutputIdentifier, then the parameter ControlState#1 (ControlTimer) of the allocated DataIdentifier must likewise show the value 0xFF (InfiniteTiming).

Id:	Q-LAH_80124-8234
Version:	2.7
Description:	The DataIdentifier allocated to the respective InputOutputIdentifier can also contain other General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-8235
Version:	2.7
Description:	The InputOutputIdentifier DataIdentifier has the following parameters:

Id:	Q-LAH_80124-8237
Version:	2.7
Description:	Table 9-12: Measurement value for InputOutputIdentifier Data Parameter name, response Bit- Cvt. Hex length #1 ReadDataByIdentifier Response Service Id 8 M 62 #2 DataIdentifier#1 (high byte) 8 M 8x #3 DataIdentifier#1 (low byte) 8 M 00 - FF ControlStatusRecord[Byte #2 - n] = [#4 ControlState#1 (ControlTimer) 8 M xx #5 ControlState#2 (InputOutputIdentifierInfo) 8 M xx #6 ControlState#3 8 C1 xx : : : : : #6 + (n - 1) ControlState#n 8 C1 xx]

Id:	Q-LAH_80124-8236

Version:	2.7
Description:	C1 - The parameter is present if additional information on the behavior of the InputOutputIdentifier is transmitted. This must be documented in the BT-LAH.

Id:	Q-LAH_80124-8259
Version:	2.7
Description:	The ControlStatusRecord [Byte #2 - n] has the identical setup or structure of the response with InputOutputControlParameter ShortTermAdjustment (0x03).

Id:	Q-LAH_80124-3873
Version:	2.7
Description:	The client requests an increase in the idle speed through the server (ShortTermAdjustment with InputOutputControl identifier 0x8123). The value by which the idle speed is requested to be increased/decreased is contained in the ControlState#2 (IdleSpeedDifference) request parameter. The ControlTimer parameter is set to 0Ahex (10 seconds actuation time). In this case, the idle speed can be changed by a value of 50 [rpm]. The response to the start contains the current value of the idle speed in the ControlState#2 - #3. The status of the InputOutputControl is queried via the same DataIdentifier through the ReadDataByIdentifier service (22hex).

Id:	Q-LAH_80124-6580
Version:	2.7
Description:	Table 9-13: Request message Data Parameter name, request Bit- Hex length #1 InputOutputControlByIdentifier Request Service Id 8 2F #2 InputOutputIdentifier#1 (high byte) 8 81 #3 InputOutputIdentifier#1 (low byte) 8 23 #4 InputOutputControlParameter = ShortTermAdjustment 8 03 #5 ControlState#1 (ControlTimer = 10 s) 8 0A #6 ControlState#2 (IdleSpeedDifference Delta U = +50 [rpm]) 8 32 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8277
Version:	2.7
Description:	Table 9-14: Response message Data Parameter name, response Bit- Hex length #1 InputOutputControlByIdentifier Response Service Id 8 6F #2 InputOutputIdentifier#1 (high byte) 8 81 #3 InputOutputIdentifier#1 (low byte) 8 23 #4 InputOutputControlParameter = ShortTermAdjustment 8 03 #5 ControlState#1 (ControlTimer = 10 s) 8 0A #6 ControlState#2 (InputOutputIdentifierInfo) 8 02 (IoControlActive) #7 ControlState#2 (high byte) 8 03 (current IdleSpeed U = 1 050 [rpm]) #8 ControlState#3 (low byte) 8 E8 (current IdleSpeed U = 1 050 [rpm])

Id:	Q-LAH_80124-3936
Version:	2.7
Description:	Querying the status of the InputOutputControl after, e.g., two seconds (2 s) by ReadDataByIdentifier service (22hex) during running InputOutputControl. In the response, the current value is returned (here rpm = 1 050 [rpm]). The server indicates eight seconds (0x08) for the ControlState#1 = ControlTimer, the idle speed is returned with the current value in the ControlStates#2 - #3.

Id:	Q-LAH_80124-6584
Version:	2.7
Description:	Table 9-15: Request message Data Parameter name, request Bit- Hex length #1 ReadDataByIdentifier Request Service Id 8 22 #2 DataIdentifier#1 (high byte) 8 81 #3 DataIdentifier#1 (low byte) 8 23

Id:	Q-LAH_80124-8278
Version:	2.7
Description:	Table 9-16: Response message Data Parameter name, response Bit- Hex length #1 ReadDataByIdentifier Response Service Id 8 62 #2 DataIdentifier#1 (high byte) 8 81 #3 DataIdentifier#1 (low byte) 8 23 #4 ControlState#1 (ControlTimer) 8 08 #5 ControlState#2 (InputOutputIdentifierInfo) 8 01 (IoControlActive) #6 ControlState#3 (high byte) 8 04 (current IdleSpeed U = 1 050 [rpm]) #7 ControlState#4 (low byte) 8 1A (current IdleSpeed U = 1 050 [rpm])

Id:	Q-LAH_80124-8966
Version:	2.7
Description:	The client returns control of the system function (idle speed control) to the server General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8967
Version:	2.7
Description:	Table 9-17: Request message Data Parameter name, request Bit- Hex length #1 InputOutputControlByIdentifier Request Service Id 8 2F #2 InputOutputIdentifier#1 (high byte) 8 81 #3 InputOutputIdentifier#1 (low byte) 8 23 #4 InputOutputControlParameter = ReturnControlToECU 8 00

Id:	Q-LAH_80124-8968
Version:	2.7
Description:	Table 9-18: Response message Data Parameter name, response Bit- Hex length #1 InputOutputControlByIdentifier Response Service Id 8 6F #2 InputOut-

	putIdentifier#1 (high byte) 8 81 #3 InputOutputIdentifier#1 (low byte) 8 23 #4 InputOutputControlParameter = ReturnControlToECU 8 00

Id:	Q-LAH_80124-9767
Version:	2.7
Description:	Querying the status of the InputOutputControl through the ReadDataByIdentifier service (22hex) after explicit termination by the client. In the response, the current value is returned (here rpm = 1 000 [rpm]), after which the client has actively terminated the InputOutputControl. After termination, the ControlTimer indicates the value 0x00. The InputOutputIdentifierInfo indicates that the InputOutputControl was terminated by the client (IoControlReturnedToEcuControl and can be restarted). InputOutputControlParameter and ControlTimer (ControlState#1) correspond to respective values in the Diag_IoEcuControl state.

Id:	Q-LAH_80124-9768
Version:	2.7
Description:	Table 9-19: Request message Data Parameter name, request Bit- Hex length #1 ReadDataByIdentifier Request Service Id 8 22 #2 DataIdentifier#1 (high byte) 8 81 #3 DataIdentifier#1 (low byte) 8 23

Id:	Q-LAH_80124-9769
Version:	2.7
Description:	Table 9-20: Response message Data Parameter name, response Bit- Hex length #1 ReadDataByIdentifier Response Service Id 8 62 #2 DataIdentifier#1 (high byte) 8 81 #3 DataIdentifier#1 (low byte) 8 23 #4 ControlState#1 (ControlTimer) 8 08 #5 ControlState#2 (InputOutputIdentifierInfo) 8 05 (IoControlReturnedToEcuControl) #6 ControlState#3 (high byte) 8 03 (current IdleSpeed U = 1 000 [rpm]) #7 ControlState#4 (low byte) 8 E8 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-6751
Version:	2.7
Description:	The RoutineControl service (31hex) must be used to trigger internal learning functions without specifying values that can be determined externally. Furthermore, this service also starts internal triggering functions in the server, such as the deletion of all learned values and the resetting of adaption channels, and all other asynchronous server functions with separate results query.

Id:	Q-LAH_80124-8280
Version:	2.7

Description:	Typical use cases are, among other things: Clearing a memory area Resetting learned data or adaptation data Self-tests Influencing the normal procedures within a server Activating calibration routines or reference runs Basic configuration Transfer of desired values to a system input/internal system function (actuator test)

Id:	Q-LAH_80124-8281
Version:	2.7
Description:	Clearing an event memory implicitly (except UserDefinedMemory of the event memory) by means of routines is prohibited!

Id:	Q-LAH_80124-8969
Version:	2.7
Description:	In the event of terminal 15 OFF, an already started routine must be stopped and the server must then be in a safe state. Routines that continue to run after terminal 15 OFF must be agreed upon with the purchaser and documented in the Initial Setup and Testing Specification (IPB).

Id:	Q-LAH_80124-8970
Version:	2.7
Description:	After aborting a routine due to terminal 15 OFF, the state of the routine is defined as an abort by the server.

Id:	Q-LAH_80124-4238
Version:	2.7
Description:	The generic DataIdentifier 0x0102 (for ReadDataByIdentifier 22hex) must be implemented (see appendix C1).

Id:	Q-LAH_80124-8282
Version:	2.7
Description:	For simultaneously triggered routines, the content in the DataIdentifier 0x0102 is an OR logic operation of all started routines.

Id:	Q-LAH_80124-6875
Version:	2.7
Description:	Figure 9-4: Handling of the generic DataIdentifier 0x0102 Start einer Routine RoutineRestart 0x00 0xC0 Routine wird in irgendeiner Art und Weise beendet Start einer Routine Start of a routine Routine wird in irgendeiner Art und Weise beendet Routine can be ended in any way

Id:	Q-LAH_80124-9742
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response behavior from the "Service processing in the server" and "Addressing types" sections.

Id:	Q-LAH_80124-8285
Version:	2.7
Description:	The RoutineControl service is used by the client to: Start a routine (StartRoutine) Stop a routine (StopRoutine) Query additional information for a routine (RequestRoutineResults)

Id:	Q-LAH_80124-9623
Version:	2.7
Description:	For general project-independent functions, e.g., update programming or protection of vehicle diagnostics (SFD), the request/response behavior defined in the respective Q-LAH applies.

Id:	Q-LAH_80124-9624
Version:	2.7
Description:	If the server can be reprogrammed, the RoutineIdentifier(s), RoutineControlType(s), and the appropriate request/response behavior required in the application software must be implemented as per document /9/.

Id:	Q-LAH_80124-8287
Version:	2.7
Description:	A routine must be started in the server after a request with the sub-function "StartRoutine" (0x01) is received and before the response has been sent, in order to indicate that the request was received and the routine has started.

Id:	Q-LAH_80124-8288
Version:	2.7
Description:	A RoutineStart of a running routine must be possible at all times with the same or different valid ControlOptions.

Id:	Q-LAH_80124-8289
Version:	2.7
Description:	If a RoutineStart of an already running routine (restart of the same RoutineIdentifier) with the same or different, valid ControlOptions is not possible, this must

	be rejected by the server with NRC 0x24. This behavior must be documented in the BT-LAH.

Id:	Q-LAH_80124-8291
Version:	2.7
Description:	The RoutineStart of an already running routine (restart of the same RoutineIdentifier) with different and invalid ControlOptions must be rejected by the server with NRC 0x31, General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-8292
Version:	2.7
Description:	The routine must be stopped in the server after a request with the sub-function "StopRoutine" (0x02) has occurred and before the response has been sent, in order to indicate that the request was received and processed.

Id:	Q-LAH_80124-8293
Version:	2.7
Description:	It must be possible to stop a routine at any time. Routines that cannot be ended by means of the sub-function "StopRoutine" (0x02) must be agreed upon with the purchaser's Diagnostics and Diagnostic Specifications departments and documented in the BT-LAH.

Id:	Q-LAH_80124-9982
Version:	2.7
Description:	For quick-running routines that are already completed before a response to the starting of the routine has come, a request with sub-function "StopRoutine" (0x02) must also be answered with a positive response if the routine is already in this state.

Id:	Q-LAH_80124-9983
Version:	2.7
Description:	A running routine that is, due to the application, in a state in which it cannot or must not be stopped by means of the sub-function "StopRoutine" (0x02) must be rejected with NRC 0x22.

Id:	Q-LAH_80124-8296
Version:	2.7

Description:	This sub-function is used by the client to query additional RoutineStatusRecord parameters for a RoutineIdentifier.

Id:	Q-LAH_80124-8299
Version:	2.7
Description:	If a routine is aborted by the server after the RoutineStart due to system-specific boundary conditions or remains in a state that is not automatically terminated, this must be indicated via the status.

Id:	Q-LAH_80124-8300
Version:	2.7
Description:	The values for RoutineStatusRecord are maintained after terminating the routine within the current OperationCycle or up to the next RoutineStart.

Id:	Q-LAH_80124-9325
Version:	2.7
Description:	If a routine has never before run within the current startup/init/reset cycle, the RoutineControl (31hex) request with sub-function RequestRoutineResults (0x03) must be answered with the General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-3986
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-4008
Version:	2.7
Description:	Table 9-21: Request message definition Data Parameter name, request Bit-Cvt. Hex length #1 RoutineControl Request Service Id 8 M 31 #2 SuppressPositiveResponseBit 1 M 0-1 Subfunction = RoutineControlType 7 00 - 7F #3 RoutineIdentifier (HighByte) 8 M xx #4 RoutineIdentifier (LowByte) 8 M xx #5 RoutineControlOption#1 8 C1 xx : : : : #n RoutineControlOption#m 8 C1 xx

Id:	Q-LAH_80124-8301
Version:	2.7
Description:	C1 - This parameter is optionally available if the sub-function RoutineControlType has the value 0x01 or 0x02.

Id:	Q-LAH_80124-4010

Version:	2.7
Description:	The RoutineControlType parameter is used to start and stop a routine in the server and to request additional information.

Id:	Q-LAH_80124-8303
Version:	2.7
Description:	The following values must be implemented for the RoutineControlType sub-function:

Id:	Q-LAH_80124-4036
Version:	2.7
Description:	Table 9-22: Request message sub-function definition Hex Description, RoutineControlType Cvt. Cvt. (bit 6-0) APP FBL

Id:	Q-LAH_80124-8306
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-8307
Version:	2.7
Description:	Table 9-23: Request message parameter definition Definition RoutineIdentifier This parameter identifies a procedure in the server. RoutineIdentifiers are implemented as per the description in the BT- LAH. The ranges are specified in appendix E2. RoutineControlOption This parameter is used to optionally transmit the start conditions or stop conditions to the server. The value range, the number #m, and the assignment with parameters must be documented in the BT-LAH for each RoutineIdentifier.

Id:	Q-LAH_80124-8309
Version:	2.7
Description:	For the functional addressing of RoutineIdentifiers, the number #m = 3 applies for the RoutineControlOption #1 - #m parameters.

Id:	Q-LAH_80124-9545
Version:	2.7
Description:	Globally valid RoutineIdentifiers and parameters are described in appendix C2.

Id:	Q-LAH_80124-10159

Version:	2.7
Description:	If RoutineControl is used for InputOutputControls, then the RoutineControlOption#1 parameter contains the time specification for activating specific signal states (ControlTimer).

Id:	Q-LAH_80124-10182
Version:	2.7
Description:	The following values must be implemented for RoutineControlOption#1 (ControlTimer):

Id:	Q-LAH_80124-10183
Version:	2.7
Description:	Table 9-24: RoutineControlOption#1 (ControlTimer) Hex Description, RoutineControlOption#1 (ControlTimer) Cvt. (bit 7-0) Time This value stipulates a timer for activating certain signal states. Resolution is in 00 - FA seconds/bit (s), i.e., a requested state can therefore be maintained for a C1 maximum of 250 s. Note: A value of 0x00 is only allowed in the response of sub-function 0x03- RequestRoutineResult. FB - FE Volkswagen AG-Reserved NoImp InfiniteTiming FF NoTimingDefined - This value stands for an infinite period/no time period M (permanent activation).

Id:	Q-LAH_80124-10184
Version:	2.7
Description:	C1 - These values are optional (without time control) and must be documented in General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-4167
Version:	2.7
Description:	The following response message must be implemented:

Id:	Q-LAH_80124-4185
Version:	2.7
Description:	Table 9-25: Positive response message definition Data Parameter name, response Bit- Cvt. Hex length #1 RoutineControl Response Service Id 8 M 71 #2 RoutineControlType 8 M 00 - 7F #3 RoutineIdentifier (HighByte) 8 M xx #4 RoutineIdentifier (LowByte) 8 M xx #5 RoutineInfo 8 M xx #6 RoutineStatusRecord#1 8 U xx : : : : #m RoutineStatusRecord#n 8 U xx

Id:	Q-LAH_80124-9258

Version:	2.7
Description:	U - RoutineStatusRecord#1 - #n are present if the routine delivers additional RoutineStatusRecord parameters for the RequestRoutineResults sub-function (0x03). This can be defined on a function-dependent basis for each RoutineIdentifier.

Id:	Q-LAH_80124-10266
Version:	2.7
Description:	The values for RoutineInfo and RoutineStatusRecord are kept after terminating the routine within the current OperationCycle or up to the next RoutineStart.

Id:	Q-LAH_80124-10095
Version:	2.7
Description:	Note: Deviations may occur for generic routines defined in General Project-Independent Performance Specifications by the Diagnostics departments.

Id:	Q-LAH_80124-8325
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-8326
Version:	2.7
Description:	Table 9-26: Positive response message parameter definition Definition RoutineControlType This parameter is used in the server response as an echo of the sub-function (without SuppressPositiveResponseBit) in the client request. RoutineIdentifier This parameter is used in the server response as an echo of the client request and has the same meaning. RoutineInfo This parameter identifies the current status of a routine, a sub-program, or a function at the time of a results query. RoutineStatusRecord General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8972
Version:	2.7
Description:	The RoutineInfo parameter is divided into the following sub-parameters:

Id:	Q-LAH_80124-8971
Version:	2.7
Description:	Table 9-27: RoutineInfo definition RoutineInfo definition RoutineStatus This parameter is used to represent the current state of the routine. The following rule

	applies for the value of this parameter: - The value Status = RoutineInactive must be assumed after a startup/init/reset of the server, . - After a request with StartRoutine sub-function (0x01) and functional transfer of the specification parameters, at least the value RoutineStatus = RoutineActive must be assumed. - Each state transition of the routine is indicated with a change of the RoutineStatus value. The value of the RoutineStatus parameter assumed in the Diag_RoutineInit state is maintained until the startup/init/reset of the server or the restart of the routine via RoutineControlType == StartRoutine. RoutineResult This parameter is used to indicate whether a routine has determined the required results.

Id:	Q-LAH_80124-4188
Version:	2.7
Description:	The RoutineInfo parameter has the following structure:

Id:	Q-LAH_80124-4236
Version:	2.7
Description:	Table 9-28: RoutineInfo structure Parameter Bit Hex: Description, RoutineInfo Cvt. pos.

Id:	Q-LAH_80124-8332
Version:	2.7
Description:	The length or number of RoutineStatusRecords can be expanded specifically for the system and must be documented in this case in the BT-LAH.

Id:	Q-LAH_80124-8335
Version:	2.7
Description:	The RoutineStatusRecord#1 - n parameter is present for the RequestRoutineResults sub- function (0x03) for each value of RoutineStatus with the number n defined specifically for the system.

Id:	Q-LAH_80124-8333
Version:	2.7
Description:	The assignment of the RoutineStatusRecord#1 - #n must be documented in the BT-LAH.

Id:	Q-LAH_80124-8330
Version:	2.7
Description:	Table 9-29: RoutineStatusRecord#1 - #n Hex: Description, RoutineResult#1 - #n Cvt. 00 - FF RoutineResultInformation C1

Id:	Q-LAH_80124-8338
Version:	2.7
Description:	C1 - These values must be indicated specific to the system in the case of RoutineStatusRecord#1 and must be documented in the BT-LAH.

Id:	Q-LAH_80124-10164
Version:	2.7
Description:	If RoutineControl is used for InputOutputControls, then the RoutineStatus-Record#1 parameter contains the time specification for activating specific signal states (ControlTimer).

Id:	Q-LAH_80124-10161
Version:	2.7
Description:	The RoutineStatusRecord#1 (ControlTimer) must indicate the current value of the timer counted down from the transmitted starting value (=RoutineStatus-Record#1 of the request message).

Id:	Q-LAH_80124-10162
Version:	2.7
Description:	If the RoutineStatusRecord#1 (ControlTimer) transmits the value Infinite (0xFF) at the startup of the RoutineControl, this parameter must also be returned as an echo with InfiniteTiming (0xFF).

Id:	Q-LAH_80124-10163
Version:	2.7
Description:	If the RoutineIdentifier is in the Diag_RoutineInit state, the RoutineStatus-Record#1 General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-8346
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-8347
Version:	2.7
Description:	Table 9-30: NegativeResponseCodes NRC Description (hex) SubFunction-NotSupported

Id:	Q-LAH_80124-8349

Version:	2.7
Description:	Figure 9-5: NRC behavior mandatory optional VOLKSWAGEN AG-specific Service with SID 0x31 1) Min. length check NO NRC 0x13 ok? YES - RID supported in active session? NO NRC 0x31 - RID-config-check ok (Coding, Parameter)? YES RID security NRC 0x33 check ok? NO YES Subfunction NRC 0x12 supported for RID? NO YES 2) Total length check NRC 0x13 ok? NO YES routineControlOption Record contains NRC 0x31 valid data for the NO requested RID? Requested sequence respected for the RID ok? YES NO NRC 0x24 YES Condition check ok? NO NRC 0x22 YES Further Parameter checks 1) at least 4 (SI+Subfunction+RID Parameter) General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9853
Version:	2.7
Description:	HH := For this value, it must be taken into account whether other routines are active at the same time.

Id:	Q-LAH_80124-8353
Version:	2.7
Description:	Description of keys:

Id:	Q-LAH_80124-8350
Version:	2.7
Description:	Figure 9-6: State diagram Precondition: Format check of the request OK Boundary conditions for execution of the service OK / RoutineStatus = RoutineInactive Req 31 00 || 31 04-7F Req 31 03 xxxx / Resp 7F 31 12 / Resp 7F 31 24

Id:	Q-LAH_80124-4348
Version:	2.7
Description:	This routine is started and then stopped.

Id:	Q-LAH_80124-6587
Version:	2.7
Description:	Table 9-31: Example request Data Parameter name, request Bit- Hex length #1 RoutineControl Request Service Id 8 31 #2 RoutineControlType = StartRoutine 8 01 #3 RoutineIdentifier (HighByte) 8 12 #4 RoutineIdentifier (LowByte) 8 34 #5 8 xx #6 RoutineControlOption 8 xx #7 8 xx

Id:	Q-LAH_80124-8355

Version:	2.7
Description:	Table 9-32: Example response Data Parameter name, response Bit- Hex length #1 RoutineControl Response Service Id 8 71 #2 RoutineControlType = StartRoutine 8 01 #3 RoutineInfo = RoutineActive, NoResultsAvailable 8 01 #4 RoutineIdentifier (HighByte) 8 12 #5 RoutineIdentifier (LowByte) 8 34

Id:	Q-LAH_80124-6590
Version:	2.7
Description:	Table 9-33: Example request Data Parameter name, request Bit- Hex length #1 RoutineControl Request Service Id 8 31 #2 RoutineControlType = StopRoutine 8 02 #3 RoutineIdentifier (HighByte) 8 12 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8356
Version:	2.7
Description:	Table 9-34: Example response Data Parameter name, response Bit- Hex length #1 RoutineControl Response Service Id 8 71 #2 RoutineControlType = StopRoutine 8 02 #3 RoutineInfo = RoutineReturnedToEcuControl, NoResultsAvailable 8 05 #4 RoutineIdentifier (HighByte) 8 12 #5 RoutineIdentifier (LowByte) 8 34

Id:	Q-LAH_80124-9999
Version:	2.7
Description:	The example specified below shows one possible behavior of an already running routine whose status is queried with RequestRoutineResults. The response delivers a result with a running calibration and a voltage raw value of 0x8C.

Id:	Q-LAH_80124-8361
Version:	2.7
Description:	Table 9-35: Example request Data Parameter name, request Bit- Hex length #1 RoutineControl Request Service Id 8 31 #2 RoutineControlType = RequestRoutineResults 8 03 #3 RoutineInfo = RoutineActive, NoResultsAvailable 8 01 #4 RoutineIdentifier (HighByte) 8 12 #5 RoutineIdentifier (LowByte) 8 34

Id:	Q-LAH_80124-8362
Version:	2.7
Description:	Table 9-36: Example response Data Parameter name, response Bit- Hex length #1 RoutineControl Response Service Id 8 71 #2 RoutineControlType = RequestRoutineResults 8 03 #3 RoutineIdentifier (HighByte) 8 12 #4 RoutineIdentifi-

	er (LowByte) 8 34 #5 RoutineInfo = RoutineActive, NoResultsAvailable 8 01 #6 RoutineStatusRecord#1 8 00 #7 RoutineStatusRecord#2 8 01 - calibration running General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-10000
Version:	2.7
Description:	The example below shows one possible behavior of a routine aborted by the server whose status is queried with RequestRoutineResults. The response delivers a result with an invalid terminal status and a voltage raw value of 0x7C.

Id:	Q-LAH_80124-8370
Version:	2.7
Description:	Table 9-37: Example request Data Parameter name, request Bit- Hex length #1 RoutineControl Request Service Id 8 31 #2 RoutineControlType = RequestRoutineResults 8 03 #3 RoutineIdentifier (HighByte) 8 12 #4 RoutineIdentifier (LowByte) 8 34

Id:	Q-LAH_80124-8371
Version:	2.7
Description:	Table 9-38: Example response Data Parameter name, response Bit- Hex length #1 RoutineControl Response Service Id 8 71 #2 RoutineControlType = RequestRoutineResults 8 03 #3 RoutineIdentifier (HighByte) 8 12 #4 RoutineIdentifier (LowByte) 8 34 #5 RoutineInfo = RoutineAborted, NoResultsAvailable 8 02 #6 RoutineStatusRecord#1 (terminal status invalid) 8 20 #7 RoutineStatusRecord#2 8 00 #8 RoutineStatusRecord#3 (voltage [0.1 V/inc]) 8 7C

Id:	Q-LAH_80124-10001
Version:	2.7
Description:	The example specified below shows one possible behavior of a correctly executed and completed routine whose status is queried with RequestRoutineResults. The response delivers a result with a valid status and a voltage raw value of 0x8E.

Id:	Q-LAH_80124-8974
Version:	2.7
Description:	Table 9-39: Example request Data Parameter name, request Bit- Hex length #1 RoutineControl Request Service Id 8 31 #2 RoutineControlType = RequestRoutineResults 8 03 #3 RoutineIdentifier (HighByte) 8 12 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8975
Version:	2.7
Description:	Table 9-40: Example response Data Parameter name, response Bit- Hex length #1 RoutineControl Response Service Id 8 71 #2 RoutineControlType = RequestRoutineResults 8 03 #3 RoutineIdentifier (HighByte) 8 12 #4 RoutineIdentifier (LowByte) 8 34 #5 RoutineInfo = RoutineFinishedCorrectly, CorrectResults 8 24 #6 RoutineStatusRecord#1 8 00 #7 RoutineStatusRecord#2 8 00 #8 RoutineStatusRecord#3 (voltage [0.1 V/inc]) 8 8E

Id:	Q-LAH_80124-8341
Version:	2.7
Description:	Table 9-41: RoutineStatusRecord#1 Bit position Description of bit coding #1 Bit 0 0: Supply voltage valid 1: Supply voltage invalid RoutineStatusRecord#1 Bit 1 0: Speed valid 1: Speed invalid Bit 2 0: Engine speed valid 1: Engine speed invalid Bit 3 0: Engine temperature valid 1: Engine temperature invalid Bit 4 0: Ambient temperature valid 1: Ambient temperature invalid Bit 5 0: Terminal status valid 1: Terminal status invalid Bit 6 0: Event memory entry valid 1: Event memory entry invalid Bit 7 0: Bus communication valid 1: Bus communication invalid

Id:	Q-LAH_80124-9521
Version:	2.7
Description:	Table 9-42: RoutineStatusRecord#2 RoutineStatusRecord#2 Bit position Description of bit coding #2 Bit 0 0: Calibration not running 1: Calibration running Bit 1 Reserved Bit 2 Reserved Bit 3 Reserved Bit 4 Reserved Bit 5 Reserved Bit 6 Reserved General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-9791
Version:	2.7
Description:	Table 9-43: RoutineStatusRecord#3 (voltage value) Hex Description of RoutineResult#3 xx Voltage [0.1 V/inc]

Id:	Q-LAH_80124-10167
Version:	2.7
Description:	The client requests an increase in the idle speed through the server (sub-function 0x01- StartRoutine with RoutineControl identifier 0x8123). The value by which the idle speed is requested to be increased/decreased is contained in the RoutineStatusRecord#2 (IdleSpeedDifference) request parameter. The Rou-

	tineStatusRecord#1 (ControlTimer) parameter is set to 0Ahex (10 seconds actuation time). In this case, the idle speed can be changed by a value of 50 [rpm].

Id:	Q-LAH_80124-10168
Version:	2.7
Description:	Table 9-44: Request message Data Parameter name, request Bit- Hex length #1 RoutineControl Request Service Id 8 31 #2 RoutineControlType = StartRoutine 8 01 #3 RoutineIdentifier#1 (high byte) 8 81 #4 RoutineIdentifier#1 (low byte) 8 23 #5 RoutineControlOption#1 8 0A (ControlTimer = 10 s) #6 RoutineControlOption#2 8 32 (IdleSpeedDifference Delta U = +50 [rpm])

Id:	Q-LAH_80124-10169
Version:	2.7
Description:	Table 9-45: Response message Data Parameter name, response Bit- Hex length #1 RoutineControl Response Service Id 8 71 #2 RoutineControlParameter = StartRoutine 8 01 #3 RoutineInfo = RoutineActive, NoResultsAvailable 8 01 #4 InputOutputIdentifier#1 (high byte) 8 81 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-10181
Version:	2.7
Description:	The status of the RoutineControl is requested using sub-function 0x03- RequestRoutineResult.

Id:	Q-LAH_80124-10179
Version:	2.7
Description:	Table 9-46: Request message Data Parameter name, request Bit- Hex length #1 RoutineControl Request Service Id 8 31 #2 RoutineControlType = RequestRoutineResult 8 03 #3 RoutineIdentifier#1 (high byte) 8 81 #4 RoutineIdentifier#1 (low byte) 8 23

Id:	Q-LAH_80124-10180
Version:	2.7
Description:	Table 9-47: Response message Data Parameter name, response Bit- Hex length #1 RoutineControl Response Service Id 8 71 #2 RoutineControlType = RequestRoutineResult 8 03 #3 RoutineIdentifier#1 (high byte) 8 81 #4 RoutineIdentifier#1 (low byte) 8 23 #5 RoutineInfo = NoResultsAvailable, RoutineActive 8 01 #6 RoutineStatusRecord#1 (ControlTimer) 8 0A #7 RoutineStatusRecord#2 (high byte) 8 03 (Current IdleSpeed U = 1 000 [rpm]) #8 RoutineStatusRecord#3 (low byte) 8 E8 (Current IdleSpeed U = 1 000 [rpm])

Id:	Q-LAH_80124-10170
Version:	2.7
Description:	The status of the RoutineIdentifier is requested by the sub-function (03hex) after two seconds (2 s) while RoutineControl is running. In the response, the current value is returned (here rpm = 1 050 [rpm]). The server indicates eight seconds (0x08) for the RoutineStatusRecord#1 (ControlTimer); the idle speed is returned with the current value in the RoutineStatusRecords#2 - #3.

Id:	Q-LAH_80124-10171
Version:	2.7
Description:	Table 9-48: Request message Data Parameter name, request Bit- Hex length #1 RoutineControl Request Service Id 8 31 #2 RoutineControlType = RequestRoutineResult 8 03 #3 RoutineIdentifier#1 (high byte) 8 81 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-10172
Version:	2.7
Description:	Table 9-49: Response message Data Parameter name, response Bit- Hex length #1 RoutineControl Response Service Id 8 71 #2 RoutineControlType = RequestRoutineResult 8 03 #3 RoutineIdentifier#1 (high byte) 8 81 #4 RoutineIdentifier#1 (low byte) 8 23 #5 RoutineInfo = NoResultsAvailable, RoutineActive 8 01 #6 RoutineStatusRecord#1 (ControlTimer) 8 08 #8 RoutineStatusRecord#2 (high byte) 8 04 (Current IdleSpeed U = 1 050 [rpm]) #9 RoutineStatusRecord#3 (low byte) 8 1A (Current IdleSpeed U = 1 050 [rpm])

Id:	Q-LAH_80124-10173
Version:	2.7
Description:	The client returns control of the system function (idle speed control) to the server (RoutineReturnToEcuControl).

Id:	Q-LAH_80124-10174
Version:	2.7
Description:	Table 9-50: Request message Data Parameter name, request Bit- Hex length #1 RoutineControl Request Service Id 8 31 #2 RoutineControlType = StopRoutine 8 02 #3 RoutineIdentifier#1 (high byte) 8 81 #4 RoutineIdentifier#1 (low byte) 8 23

Id:	Q-LAH_80124-10175
Version:	2.7

Description:	Table 9-51: Response message Data Parameter name, request Bit- Hex length #1 RoutineControl Response Service Id 8 71 #2 RoutineControlType = StopRoutine 8 02 #3 RoutineInfo = RoutineReturnedToEcuControl, NoResultsAvailable 8 05 #4 RoutineIdentifier#1 (high byte) 8 81 #5 RoutineIdentifier#1 (low byte) 8 23

Id:	Q-LAH_80124-10176
Version:	2.7
Description:	The status of the RoutineControl is requested after explicit termination by the client. In the response, the current value is returned (here rpm = 1 000 [rpm]), after the client has actively terminated the RoutineControl. After termination, the ControlTimer indicates the value of 0x00. The RoutineInfo indicates that the RoutineControl was terminated by the client (RoutineReturnedToEcuControl) and can be restarted. Sub-function and ControlTimer (RoutineStatusRecord#1) correspond to respective values in General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-10177
Version:	2.7
Description:	Table 9-52: Request message Data Parameter name, request Bit- Hex length #1 RoutineControl Request Service Id 8 31 #2 RoutineControlType = RequestRoutineResult 8 03 #3 RoutineIdentifier#1 (high byte) 8 81 #4 RoutineIdentifier#1 (low byte) 8 23

Id:	Q-LAH_80124-10178
Version:	2.7
Description:	Table 9-53: Response message Data Parameter name, response Bit- Hex length #1 RoutineControl Response Service Id 8 71 #2 RoutineControlType = RequestRoutineResult 8 03 #3 RoutineIdentifier#1 (high byte) 8 81 #4 RoutineIdentifier#1 (low byte) 8 23 #5 RoutineInfo = RoutineReturnedToEcuControl, NoResultsAvailable 8 05 #6 RoutineStatusRecord#1 (ControlTimer) 8 00 #8 RoutineStatusRecord#2 (high byte) 8 03 (Current IdleSpeed U = 1 000 [rpm]) #9 RoutineStatusRecord#3 (low byte) 8 E8 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-4658
Version:	2.7
Description:	A system's upload and download management includes the following services:

Id:	Q-LAH_80124-4680

Version:	2.7
Description:	Table 10-1: Services for upload and download management Service SID Document RequestDownload 34hex /1/ RequestUpload 35hex /1/ TransferData 36hex /1/ RequestTransferExit 37hex /1/ RequestFileTransfer 38hex /1/

Id:	Q-LAH_80124-4681
Version:	2.7
Description:	Note: The latest version of document /9/ must be adhered to for implementing the update programming.

Id:	Q-LAH_80124-4683
Version:	2.7
Description:	This service is used to initialize the transfer of EEPROM or flash EEPROM data from the client to a server.

Id:	Q-LAH_80124-4684
Version:	2.7
Description:	A positive response may be sent only when all the requirements (e.g., Security-Access) needed for receiving data and storing it in non-volatile memory have been met.

Id:	Q-LAH_80124-9743
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response behavior from the "Service processing in the server" and "Addressing types" sections.

Id:	Q-LAH_80124-4686
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-4708
Version:	2.7
Description:	Table 10-2: Request message definition Data Parameter name, request Bit- Cvt. Hex length #1 RequestDownload Request Service Id 8 M 34 #2 DataFormatIdentifier 8 M xx #3 AddressAndLengthFormatIdentifier 8 M xx MemoryAddress = [#4 Byte#1 (MSB) 8 M xx : : : : : #(m - 1) + 4 Byte#m 8 C1 xx] MemorySize = [#n - (k - 1) Byte#1 (MSB) 8 M xx : : : : : #n Byte#k 8 C2 xx General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8021
Version:	2.7
Description:	C1 - This parameter is present as a function of the AddressAndLengthFormatIdentifier

Id:	Q-LAH_80124-8022
Version:	2.7
Description:	C2 - This parameter is present as a function of the MemorySize of the AddressAndLengthFormatIdentifier

Id:	Q-LAH_80124-8024
Version:	2.7
Description:	No sub-function has been defined for this service.

Id:	Q-LAH_80124-8026
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-4739
Version:	2.7
Description:	Table 10-3: Request message parameter definition Definition DataFormatIdentifier This parameter is a one-byte value where the nibbles have the following meanings: High nibble (bits 7 - 4): Compression method 0x0: No compression 0x1 - 0x9: Reserved for contractor 0xA: Purchaser's standard compression method LZSS 0xB - 0xF: Reserved by Volkswagen AG Low nibble (bits 3 - 0): Encryption method 0x0: No encryption. 0x1 - 0x9: Reserved for contractor 0xA: AES 128-bit CBC mode 0xB - 0xF: Reserved by Volkswagen AG AddressAndLengthFormatIdentifier This parameter is a one-byte value where the nibbles have the following meanings: - High nibble (bit 7 - 4): Number of bytes of the MemorySize parameter - Low nibble (bit 3 - 0): Number of bytes of the MemoryAddress parameter MemoryAddress The values for the MemoryAddress parameter correspond to the start address of the (flash) EEPROM memory area to be programmed. Byte#m is always the least significant byte of the address, representing the specified address in the server. MemorySize The MemorySize parameter indicates the quantity of actual, i.e., uncompressed, data to be transmitted in bytes. The number of bytes transferred can deviate from this due to compression or encryption.

Id:	Q-LAH_80124-8039

Version:	2.7
Description:	If encryption or compression is used, this must be documented in the Component General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-4761
Version:	2.7
Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-4775
Version:	2.7
Description:	Table 10-4: Positive response message definition Data Parameter name, response Bit- Cvt. Hex length #1 RequestDownload Response Service Id 8 M 74 #2 LengthFormatIdentifier 8 M x0 MaxNumberOfBlockLength = [#3 Byte#1 (MSB) 8 M xx : : : : : #n Byte#m 8 8 xx]

Id:	Q-LAH_80124-4776
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-4793
Version:	2.7
Description:	Table 10-5: LengthFormatIdentifier Definition LengthFormatIdentifier This parameter is a one-byte value where the nibbles have the following meanings: - High nibble (bit 7 - 4): Number of bytes of the MaxNumberOfBlockLength parameter - Low nibble (bit 3 - 0): No parameters, value always 0 MaxNumberOfBlockLength The server uses the MaxNumberOfBlockLength response parameter to indicate the maximum data size in bytes, including the ServiceIdentifier and BlockSequenceNumber (BSN), contained in every TransferData message. Using this, the client can configure the system's receive buffer. Because this size is a determining factor with respect to the flashing performance, ECUs that are programmed by means of DoIP or ISO-TP[2015] must specify a block size that is significantly higher than 4 kB, e.g. 32 kB or more.

Id:	Q-LAH_80124-8030
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-8031
Version:	2.7

Description:	Table 10-6: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-8033
Version:	2.7
Description:	Figure 10-1: NRC behavior mandatory optional VOLKSWAGEN AG-specific Service with SID 0x34 1) Min. length check NO NRC 0x13 ok? YES dataFormatIdentifier is valid AND NO NRC 0x31 adressAndLenthFormat Identifier is valid? 2) YES Full length check NRC 0x13 ok? NO YES memoryAdress/ NRC 0x31 memorySize valid? NO YES Security check ok for requested memory NO NRC 0x33 intervall? YES Condition check ok? NO NRC 0x22 YES Download fault condition check ok? NO NRC 0x70 YES Positive Response 1) at least 5 (SI + DFI_ + ALFID + minimum MA_ + minimum MS_-) General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8035
Version:	2.7
Description:	Programming request with logical address 0x0201 (block index 02, segment index 01) and block size 0x0FA000. The data is transmitted in a compressed (method LZSS) and unencrypted form.

Id:	Q-LAH_80124-8036
Version:	2.7
Description:	The response provides for the data transfer the maximum data quantity of 996 bytes (SID +

Id:	Q-LAH_80124-8037
Version:	2.7
Description:	Table 10-7: Example request Data Parameter name, request Bit- Hex length #1 RequestDownload Request Service Id 8 34 #2 DataFormatIdentifier 8 A0 #3 AddressAndLengthFormatIdentifier 8 32 MemoryAddress = [#4 Byte#1 (MSB) 8 02 #5 Byte#2 8 01] MemorySize = [#6 Byte#1 (MSB) 8 0F #7 Byte#2 8 A0 #8 Byte#3 8 00]

Id:	Q-LAH_80124-8038
Version:	2.7
Description:	Table 10-8: Example response Data Parameter name, response Bit- Hex length #1 RequestDownload Response Service Id 8 74 #2 LengthFormatIdentifier 8 20 MaxNumberOfBlockLength = [#3 Byte#1 (MSB) 8 03 #4 Byte#2 8 E4]

Id:	Q-LAH_80124-4896

Version:	2.7
Description:	This service is used to initialize the transfer of EEPROM or flash EEPROM data from a server to a client.

Id:	Q-LAH_80124-4897
Version:	2.7
Description:	A positive response may be sent only when all the boundary conditions or preconditions (e.g., SecurityAccess) needed for transferring data (to the client) have been met.

Id:	Q-LAH_80124-9744
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-4899
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-4921
Version:	2.7
Description:	Table 10-9: Request message definition Data Parameter name, request Bit- Cvt. Hex length #1 RequestUpload Request Service Id 8 M 35 #2 DataFormatIdentifier 8 M xx #3 AddressAndLengthFormatIdentifier 8 M xx MemoryAddress = [#4 Byte#1 (MSB) 8 M xx : : : : : #(m - 1) + 4 Byte#m 8 C1 xx] MemorySize = [#n - (k - 1) Byte#1 (MSB) 8 M xx : : : : : #n Byte#k 8 C2 xx]

Id:	Q-LAH_80124-8040
Version:	2.7
Description:	C1 - This parameter is present as a function of the AddressAndLengthFormatIdentifier

Id:	Q-LAH_80124-8041
Version:	2.7
Description:	C2 - This parameter is present as a function of the MemorySize of the AddressAndLengthFormatIdentifier

Id:	Q-LAH_80124-8043

Version:	2.7
Description:	The service does not support any sub-functions.

Id:	Q-LAH_80124-4922
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-4952
Version:	2.7
Description:	Table 10-10: Request message parameter definition Definition DataFormatIdentifier This parameter is a one-byte value where the nibbles have the following meanings: High nibble (bits 7 - 4): Compression method 0x0: No compression 0x1 - 0x9: Reserved for contractor 0xA: Purchaser's standard compression method LZSS 0xB - 0xF: Reserved by Volkswagen AG Low nibble (bits 3 - 0): Encryption method 0x0: No encryption. 0x1 - 0x9: Reserved for contractor 0xA: AES 128-bit CBC mode 0xB - 0xF: Reserved by Volkswagen AG AddressAndLengthFormatIdentifier This parameter is a one-byte value where the nibbles have the following meanings: - High nibble (bit 7 - 4): Number of bytes of the MemorySize parameter - Low nibble (bit 3 - 0): Number of bytes of the MemoryAddress parameter MemoryAddress The values for the MemoryAddress parameter correspond to the start address of the (flash) EEPROM memory area to be programmed. Byte#m is always the least significant byte of the address, representing the specified address in the server. MemorySize The MemorySize parameter indicates the quantity of actual, i.e., uncompressed, data to be transmitted in bytes.

Id:	Q-LAH_80124-8061
Version:	2.7
Description:	If encryption or compression is used, this must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-4974
Version:	2.7
Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-4988
Version:	2.7
Description:	Table 10-11: Positive response message definition Data Parameter name, response Bit- Cvt. Hex length #1 RequestUpload Response Service Id 8 M 75 #2

	LengthFormatIdentifier 8 M x0 MaxNumberOfBlockLength = [#3 Byte#1 (MSB) 8 M xx : : : : : #n Byte#m 8 M xx General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8049
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-8050
Version:	2.7
Description:	Table 10-12: LengthFormatIdentifier Definition LengthFormatIdentifier This parameter is a one-byte value where the nibbles have the following meanings: - High nibble (bit 7 - 4): Number of bytes of the MaxNumberOfBlockLength parameter - Low nibble (bit 3 - 0): No parameters, value always 0 MaxNumberOfBlockLength The server uses the MaxNumberOfBlockLength response parameter to indicate the maximum data size in bytes, including the ServiceIdentifier and BlockSequenceNumber (BSN), contained in every positive response to a TransferData request. The client can use this to configure the server's send buffer. Note: The last response to a TransferData request can be smaller than stated in the MaxNumberOfBlockLength.

Id:	Q-LAH_80124-8053
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-8052
Version:	2.7
Description:	Table 10-13: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-8055
Version:	2.7
Description:	Figure 10-2: NRC behavior mandatory optional VOLKSWAGEN AG-specific Service with SID 0x35 1) Min. length check NO NRC 0x13 ok? YES dataFormatIdentifier is valid AND NO NRC 0x31 adressAndLenthFormat Identifier is valid? 2) YES Full length check NRC 0x13 ok? NO YES memoryAdress/ NRC 0x31 memorySize valid? NO YES Security check ok for requested memory NO NRC 0x33 intervall? YES Condition check ok? NO NRC 0x22 YES Upload fault condition check ok? NO NRC 0x70 YES Positive Response 1) at least 5 (SI + DFI_ + ALFID + minimum MA_ + minimum MS_-) General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8057
Version:	2.7
Description:	Upload request with logical address 0x0201 (block index 02, segment index 01) and block size 0x0FA000. The data is requested in a compressed (method LZSS) and unencrypted form.

Id:	Q-LAH_80124-8058
Version:	2.7
Description:	The response provides for the data transfer the number of bytes (2) for the block length 996 bytes (SID + 994 byte flash data).

Id:	Q-LAH_80124-8059
Version:	2.7
Description:	Table 10-14: Example request Data Parameter name, request Bit- Hex length #1 RequestUpload Request Service Id 8 35 #2 DataFormatIdentifier 8 A0 #3 AddressAndLengthFormatIdentifier 8 32 MemoryAddress = [#4 Byte#1 (MSB) 8 02 #5 Byte #2 8 01] MemorySize = [#6 Byte#1 (MSB) 8 0F #7 Byte#2 8 A0 #8 Byte#3 8 00]

Id:	Q-LAH_80124-8060
Version:	2.7
Description:	Table 10-15: Example response Data Parameter name, response Bit- Hex length #1 RequestDownload Response Service Id 8 75 #2 LengthFormatIdentifier 8 20 MaxNumberOfBlockLength = [8 #3 Byte#1 (MSB) 03 #4 Byte#2 E4 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-5107
Version:	2.7
Description:	This service is used to execute the previously initialized data transfer to the server (RequestDownload) or to the client (RequestUpload) or in both directions (RequestFileTransfer).

Id:	Q-LAH_80124-8062
Version:	2.7
Description:	The direction is defined by the previously performed service RequestDownload (34hex) or RequestUpload (35hex) or RequestFileTransfer (38hex).

Id:	Q-LAH_80124-8063
Version:	2.7

Description:	If a RequestDownload (34hex) was initialized, the data is included as a parameter of the request of the TransferData service (36hex).

Id:	Q-LAH_80124-8064
Version:	2.7
Description:	If a RequestUpload (35hex) was initialized, the data is included as a parameter of the response of the TransferData service (36hex).

Id:	Q-LAH_80124-9523
Version:	2.7
Description:	The parameters are included as a function of the RequestFileTransfer (38hex) either in the response or request of the (36hex) service.

Id:	Q-LAH_80124-8065
Version:	2.7
Description:	The TransferData service (36hex) contains the BlockSequenceNumber parameter (BSN) to be able to guarantee a correct sequence of the blocks in the receiver of the data packet during the transfer.

Id:	Q-LAH_80124-8066
Version:	2.7
Description:	A TransferData (36hex) always starts with the value one (1) for the BlockSequenceNumber parameter.

Id:	Q-LAH_80124-8067
Version:	2.7
Description:	The value of the BlockSequenceNumber parameter is incremented for each block.

Id:	Q-LAH_80124-9524
Version:	2.7
Description:	In addition, a RequestFileTransfer with corresponding value of the ModeOfOperation parameter corresponds to an upload and download.

Id:	Q-LAH_80124-9745
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-5109
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-5123
Version:	2.7
Description:	Table 10-16: Request message definition Data Parameter name, request Bit-Cvt. Hex length #1 TransferData Request Service Id 8 M 36 #2 BlockSequenceNumber 8 M xx TransferRequestParameterRecord = [#3 Byte#1 (MSB) 8 C1 xx : : : : : #n Byte#m 8 U xx]

Id:	Q-LAH_80124-8068
Version:	2.7
Description:	C1 - The parameter is mandatory if a download is performed.

Id:	Q-LAH_80124-8070
Version:	2.7
Description:	The service does not support any sub-functions.

Id:	Q-LAH_80124-8083
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-8084
Version:	2.7
Description:	Table 10-17: Request message parameter definition Definition BlockSequenceNumber(BSN)-RecoverySequence The BlockSequenceNumber (BSN) is used to number all the TransferData messages sequentially and must be implemented as a 1-byte wrap-around counter. The start value after a download/upload request is always 01hex (range: 0 - 255dec, FFhex => 00hex). The client compares the BSN in the server response with the BSN currently stored in the client and increments the BlockSequenceNumber (BSN) by 1 (ONE) for every successful transfer (for downloads and uploads). There are two different use cases:

Id:	Q-LAH_80124-8072
Version:	2.7
Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-8073
Version:	2.7
Description:	Table 10-18: Positive response message definition Data Parameter name, response Bit- Cvt. Hex length #1 RequestDownload Response Service Id 8 M 76 #2 BlockSequenceCounter 8 M xx TransferRequestParameterRecord = [#3 Byte#1 (MSB) 8 C1 xx : : : : : #n Byte#m 8 U xx]

Id:	Q-LAH_80124-8085
Version:	2.7
Description:	C1 - The parameter is mandatory if an upload is performed.

Id:	Q-LAH_80124-8075
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-8076
Version:	2.7
Description:	Table 10-19: Positive response message parameter definition Definition BlockSequenceCounter This parameter is the echo of the request message parameter. TransferRequestParameterRecord General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8078
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-8079
Version:	2.7
Description:	Table 10-20: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-8081
Version:	2.7
Description:	Figure 10-3: NRC behavior mandatory optional VOLKSWAGEN AG-specific Service with SID 0x36 1) Min. length check NO NRC 0x13 ok? YES Sequence ist NO NRC 0x24 respected for SID? YES Data transfer can continue AND NO NRC 0x71 memorySize is respected? YES Block sequence- NRC 0x73 counter is ok? NO TransferRequestParameterRecord YES is valid AND NRC 0x31 Expected number of NO transferRequestParameters are included (if applicable)? YES Data is correctly altered? NO NRC 0x72 YES Voltage condition are ok? NO

	NRC 0x92 or NRC 0x93 YES Condition check ok NO NRC 0x81-91 YES Positive Response 1) must be 2 if a RequestUpload is in progress (SI + BSC) General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8087
Version:	2.7
Description:	Pre-sequence with example from RequestDownload (34hex). Then, the data for the fist block (BlockSequenceCounter == 1) is transmitted to the server with TransferData (36hex).

Id:	Q-LAH_80124-8089
Version:	2.7
Description:	Table 10-21: Example request Data Parameter name, request Bit- Hex length #1 TransferData Request Service Id 8 36 #2 BlockSequenceCounter 8 01 #3 TransferRequestParameterRecord [Byte#1] 8 xx #4 TransferRequestParameter-Record [Byte#2] 8 xx : : : :

Id:	Q-LAH_80124-8090
Version:	2.7
Description:	Table 10-22: Example response Data Parameter name, response Bit- Hex length #1 TransferData Response Service Id 8 76 #2 BlockSequenceCounter 8 01

Id:	Q-LAH_80124-5226
Version:	2.7
Description:	This service is used by the client to stop a download or an upload.

Id:	Q-LAH_80124-5227
Version:	2.7
Description:	All the settings needed for a download or an upload (e.g., timings) must be reset to the default values by the server.

Id:	Q-LAH_80124-9746
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response behavior from the "Service processing in the server" and "Addressing types" sections.

Id:	Q-LAH_80124-8091

Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-8092
Version:	2.7
Description:	Table 10-23: Request message definition Data Parameter name, request Bit- Cvt. Hex length General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-8094
Version:	2.7
Description:	The service does not support any sub-functions.

Id:	Q-LAH_80124-5229
Version:	2.7
Description:	This service does not contain any parameters.

Id:	Q-LAH_80124-5231
Version:	2.7
Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-6594
Version:	2.7
Description:	Table 10-24: Positive response message definition Data Parameter name, re-sponse Bit- Cvt. Hex length #1 RequestTransferExit Response Service Id 8 M 77

Id:	Q-LAH_80124-8097
Version:	2.7
Description:	No response parameters are defined.

Id:	Q-LAH_80124-8100
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-8101
Version:	2.7
Description:	Table 10-25: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-8103
Version:	2.7
Description:	Figure 10-4: NRC behavior mandatory optional VOLKSWAGEN AG-specific Service with SID 0x37 Sequence ist NO NRC 0x24 respected for SID? YES Total length check NO NRC 0x13 ok? YES check ok? NO NRC 0x72 YES Positive General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9468
Version:	2.7
Description:	This service is used by a client to trigger a transmission of data files.

Id:	Q-LAH_80124-9474
Version:	2.7
Description:	The transmission direction can be defined from the client to the server (FileDownload) or from the server to the client (FileUpload).

Id:	Q-LAH_80124-9475
Version:	2.7
Description:	The RequestFileTransfer service (38hex) offers the ability to query information via the file system.

Id:	Q-LAH_80124-9476
Version:	2.7
Description:	The service must be used as a replacement to RequestDownload (34hex) and RequestUpload (35hex) if the server has integrated a file system.

Id:	Q-LAH_80124-9478
Version:	2.7
Description:	The file data transfer must take place via the TransferData service (36hex).

Id:	Q-LAH_80124-9477
Version:	2.7
Description:	Completing the data transfer of the file must take place via the TransferExit service (37hex).

Id:	Q-LAH_80124-9479
Version:	2.7

Description:	With the RequestFileTransfer (38hex) service, it must be possible to use certain operations (ModeOfOperation table) on files or folders of the FileSystem within the server.

Id:	Q-LAH_80124-9480
Version:	2.7
Description:	The positive response must be sent only if all actions requested in the request have been performed.

Id:	Q-LAH_80124-9747
Version:	2.7
Description:	The server and the client must implement the requirements for the request/response General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-9489
Version:	2.7
Description:	The following request message must be implemented for this service:

Id:	Q-LAH_80124-9490
Version:	2.7
Description:	Table 10-26: Request message definition Data Parameter name, request Bit-Cvt. Hex length #1 RequestFileTransfer Request Service Id 8 M 38 #2 ModeOfOperation 8 M 01 - 05 FilePathAndNameLength = [#3 Byte#1 (MSB) 8 M 00 - FF #4 Byte#2 (LSB) 8 M 00 - FF] FilePathAndName = [#5 Byte#1 (MSB) 8 M 00-FF : : : : : #5 + n - 1 Byte#n 8 C1 00 - FF] #5 + n DataFormatIdentifier 8 C2 00 - FF #5 + n + 1 FileSizeParameterLength 8 C2 00 - FF FileSizeUncompressed = [#5 + n + 2 Byte#1 (MSB) 8 C2 00 - FF : : : : : #5 + n + 2 + k - Byte#k 8 C2,3 00 - FF 1] FileSizeCompressed = [#5 + n + 2 + k Byte#1 (MSB) 8 C2,3 00 - FF : : : : : #5 + n + 2 + 2k Byte#k 8 C2,3 00 - FF]

Id:	Q-LAH_80124-9491
Version:	2.7
Description:	C1 - The length (number of bytes) for the FilePathAndNameLength parameter.

Id:	Q-LAH_80124-9492
Version:	2.7
Description:	C2 - The parameter is present as a function of the value of the ModeOfOperation parameter.

Id:	Q-LAH_80124-9493
Version:	2.7
Description:	C3 - The length (number of bytes) for the parameter is defined with the FileSizeParameterLength parameter.

Id:	Q-LAH_80124-9487
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9495
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-9494
Version:	2.7
Description:	Table 10-27: Request message parameter definition Definition ModeOfOperation This parameter defines the type of RequestFileTransfer (38hex) service for the folder/files addressed in the FilePathAndName parameter. FilePathAndNameLength This parameter defines the length in bytes for the FilePathAndName parameter. FilePathAndName This parameter defines the location in the server's file system where the file is to be: - added - deleted - replaced - read. The parameter also includes the file name. Each byte of this parameter must be in ASCII format. DataFormatIdentifier This parameter is a one-byte value where the nibbles have the following meanings: High nibble (bits 7 - 4): Compression method 0x0: No compression 0x1 - 0x9: Reserved for contractor 0xA: Purchaser's standard compression method LZSS 0xB - 0xF: Reserved by Volkswagen AG Low nibble (bits 3 - 0): Encryption method 0x0: No encryption 0x1 - 0x9: Reserved for contractor 0xA: AES 128-bit CBC mode 0xB - 0xF: Reserved by Volkswagen AG If the ModeOfOperation parameter has a value of 'DeleteFile' (0x02), then the Request message must not contain the DataFormatIdentifier parameter. FileSizeParameterLength This parameter defines the length in bytes for both: - FileSizeCompressed, and - FileSizeUncompressed If the ModeOfOperation parameter has a value of 'DeleteFile' (0x02), 'ReadFile' (0x04), or 'ReadDir' (0x05), then the Request message must not contain the FilesizeParameterLength parameter. FileSizeUncompressed This parameter defines the size of the uncompressed file in bytes. If the ModeOfOperation parameter has the value 'DeleteFile' (0x02), 'ReadFile' (0x04), or 'ReadDir' (0x05), the FilesizeParameterLength parameter must not be listed in the request message. FileSizeCompressed This parameter defines the size of the compressed file in bytes. If an uncompressed file is transmitted, all bytes of

	this parameter must be populated with the size information from the FileSize-Uncompressed parameter. If the ModeOfOperation parameter has the value 'DeleteFile' (0x02), 'ReadFile' (0x04), or 'ReadDir' (0x05), the General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9525
Version:	2.7
Description:	Table 10-28: ModeOfOperation Value Description, ModeOfOperation: Cvt. (hex)

Id:	Q-LAH_80124-9720
Version:	2.7
Description:	Depending on the use case, at least one ModeOfOperation must be implemented. The General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-9499
Version:	2.7
Description:	The following response message must be implemented for this service:

Id:	Q-LAH_80124-9500
Version:	2.7
Description:	Table 10-29: Positive response message definition Data Parameter name, response Bit- Cvt. Hex length #1 RequestFileTransfer Response Service Id 8 M 78 #2 ModeOfOperation 8 M 01 - 05 #3 LengthFormatIdentifier 8 C1 01 - 05 MaxNumberOfBlockLength = [#4 Byte#1 (MSB) 8 C1/2 xx : : : : : #4 + (m - 1) Byte#m 8 C1/2 xx] #4 + m DataFormatIdentifier 8 C1 01 - 05 FileSizeOrDirInfoParameterLength = [#4 + m + 1 Byte#1 (MSB) 8 C1 xx #4 + m + 2 Byte#2 (LSB) 8 C1 xx] FileSizeUncompressedOrDirInfoLength = [#4 + m + 3 Byte#1 (MSB) 8 C1/3 xx : : : : : #4 + m + 3 + (k Byte#k 8 C1/3 xx - 1)] FileSizeCompressed = [#4 + m + 3 + k Byte#1 (MSB) 8 C1/3 xx : : : : : #4 + m + 3 + 2k Byte#k 8 C1/3 xx +1]

Id:	Q-LAH_80124-9512
Version:	2.7
Description:	C1 - The parameter is present as a function of the value of the ModeOfOperation parameter.

Id:	Q-LAH_80124-9513
Version:	2.7

Description:	C2 - The length (number of bytes) for the parameter is defined with the Length-FormatIdentifier parameter.

Id:	Q-LAH_80124-9514
Version:	2.7
Description:	C3 - The length (number of bytes) for the parameter is defined with the General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9501
Version:	2.7
Description:	The following parameters must be implemented for this service:

Id:	Q-LAH_80124-9502
Version:	2.7
Description:	Table 10-30: LengthFormatIdentifier Definition ModeOfOperation This parameter is the echo of the request message parameter. LengthFormatIdentifier This parameter defines the length in bytes of the MaxNumberOfBlockLength parameter. If the ModeOfOperation parameter has the value 'DeleteFile' (0x02), the parameter must not be listed in the response message. MaxNumberOfBlock-Length This parameter is used to report to the client how many bytes (MaxNumberOfBlockLength) must be transmitted in the TransferData (36hex) service, either in the server or client direction. The length includes the complete message length (service identifier and parameter in the TransferData request/response message). The parameter is used to adapt the buffer size in the client for data upload or in the server for data download. A server must accept the data length or data transfer via TransferData (36hex) that was announced via this MaxNumberOfBlockLength parameter in the positive response. A server can also accept less data for TransferData (36hex) than announced for MaxNumberOfBlock-Length. If the ModeOfOperation parameter has the value 'DeleteFile' (0x02), the parameter must not be listed in the response message. DataFomatidentifier This parameter is the echo of the request message parameter. If the ModeOfOperation parameter has the value 'DeleteFile' (0x02), the parameter must not be listed in the response message. If the ModeOfOperation parameter has the value 'ReadDir' (0x05), the parameter must have the value 0x00 in the response message. FileSizeOfDirInfoParameterLength This parameter defines the length in bytes for both: - FileSizeUncompressedOrDirInfoLength, and - FileSizeUncompressed If the ModeOfOperation parameter has a value of 'AddFile' (0x01), 'DeleteFile' (0x02) or 'ReplaceFile' (0x03), then the response message must not contain the parameter. FileSizeUncompressedOrDirInfoLenth This parameter defines: - the size of the file to upload, or - the length in bytes of the directory to be read. If the ModeOfOperation parameter has the value 'AddFile' (0x01),

	'DeleteFile' (0x02), or 'ReplaceFile' (0x03), the parameter must not be listed in the response message. FileSizeCompressed This parameter defines the size in bytes of the compressed file. If the ModeOfOperation parameter has the value 'AddFile' (0x01), 'DeleteFile' (0x02), or 'ReplaceFile' (0x03), the parameter General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9497
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-9498
Version:	2.7
Description:	Table 10-31: NegativeResponseCodes NRC Description (hex)

Id:	Q-LAH_80124-9504
Version:	2.7
Description:	Figure 10-5: NRC behavior mandatory optional VOLKSWAGEN AG-specific Service with SID 0x38 1) Min. length check NO NRC 0x13 ok? YES 2) NO NRC 0x31 3) YES Full length check NRC 0x13 ok? NO YES FileSizeUncompressed valid AND FileSizeCompressed valid NO NRC 0x31 AND FilePathAndName valid ? YES Security check ok for NRC 0x33 FilePathAndFileName? NO YES Condition check ok? NO NRC 0x22 YES Downloade fault condition check ok? NO NRC 0x70 YES Positive Response 1) at least 5 Byte 2) validity check of message parameters depends on the ModeOfOperation Parameter General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9505
Version:	2.7
Description:	The RequestFileTransfer sequence (38hex) is identical to that for Request-Download (34hex) or RequestUpload (35hex) in connection with TransferData (36hex) and TransferExit (37hex).

Id:	Q-LAH_80124-9510
Version:	2.7
Description:	The following information is available:

Id:	Q-LAH_80124-9509
Version:	2.7
Description:	Table 10-32: Assumptions for RequestFileTransfer (38hex) example Parameter Value Description ModeOfOperation 0x01 AddFile FilePathAndNameLength

	0x0015 Length of FilePathAndName parameter FilePathAndNameLength "D:\maps\eur\germ1.map" Path including file name DataFormatIdentifier 0x11 CompressionMethod = 0x1X EncryptingMethod = 0xX1 FileSizeParameterLength 0x02 Length of FilePathAndName parameter FileSizeUncompressed 0xC350 50 kB General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9507
Version:	2.7
Description:	Table 10-33: Example request Data Parameter name, request Bit- Hex length #1 RequestFileTransfer Request Service Id 8 38 #2 ModeOfOperation 8 01 filePathAndNameLength = [#3 Byte#1 (MSB) 8 00 #4 Byte#2 8 15] FilePathAndName = [#5 Byte#1 (MSB) 8 44 #6 Byte#2 8 3A #7 Byte#3 8 5C #8 Byte#4 8 6D #9 Byte#5 8 61 #10 Byte#6 8 70 #11 Byte#7 8 73 #12 Byte#8 8 5C #13 Byte#9 8 65 #14 Byte#10 8 75 #15 Byte#11 8 5C #16 Byte#12 8 73 #17 Byte#13 8 65 #18 Byte#14 8 72 #19 Byte#15 8 6D #20 Byte#16 8 31 #21 Byte#17 8 2E #22 Byte#18 8 6D #23 Byte#19 8 61 #24 Byte#20 8 70] #25 DataFormatIdentifier 8 11 #26 FileSizeParameterLength 8 11 FileSizeUncompressed = [#27 Byte#1 (MSB) 8 C3 #28 Byte#2 8 50] FileSizeCompressed = [#29 Byte#1 (MSB) 8 75 #30 Byte#2 8 30]

Id:	Q-LAH_80124-9508
Version:	2.7
Description:	Table 10-34: Example response Data Parameter name, response Bit- Hex length #1 RequestFileTransfer Response Service Id 8 78 #2 ModeOfOperation 8 01 #3 LengthFomatIdentifier 8 02 MaxNumberOfBlockLength = [#4 Byte#1 (MSB) 8 C3 #5 Byte#2 8 50] General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-6597
Version:	2.7
Description:	Figure 10-6: State transition diagram - Download Download Download not Download active active Req 36 xx dd dd /Resp 76 xx Invalid data: NRC: Req 34 aa aa aa 00 ss ss Transfer Data Req 34 aa .. aa nn ss .. ss / Resp 74 20 0 F FF /Resp 7F 34 NRC Req 36 xx /Resp 7F 36 NRC Req 34 aa aa aa 00 ss ss Req 37 /Resp 7F 34 22 /Resp 7F 37 24 All Data transmitted End Transfer Data Req 37 Req 36 && BSN != 0 /Resp 7F 37 24 Req 37 /Resp 7F 36 24 / Resp 77

Id:	Q-LAH_80124-5278
Version:	2.7
Description:	Figure 10-7: State transition diagram - Upload Upload Upload not Upload active active Invalid data : NRC: Req 35 aa aa aa 00 ss ss Transfer Data Req 35

	aa .. aa nn ss .. ss / Resp 75 20 0 F FF Req 36 /Resp 7F 35 NRC /Resp 76 dd dd ... Req 35 aa aa aa 00 ss ss Req 37 /Resp 7F 35 22 /Resp 7F 37 24 All Data transmitted End Transfer Data Req 37 Req 36 && BSN != 0 /Resp 7F 37 24 Req 37 /Resp 7F 36 24 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9511
Version:	2.7
Description:	Figure 10-8: State transition diagram - File transfer FileTransfer FileTransfer FileTransfer active not active Invalid data : NRC: Req 38 ... Transfer Data Req 38 ... / Resp 78 ... Req 36 /Resp 7F 35 NRC /Resp 76 dd dd ... Req 38 ... Req 37 /Resp 7F 38 22 /Resp 7F 37 24 All Data transmitted End Transfer Data Req 37 Req 36 && BSN != 0 /Resp 7F 37 24 Req 37 /Resp 7F 36 24 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9869
Version:	2.7
Description:	PrimaryOBDECUs must fulfill at least the scope of functions required for PrimaryOBDECUnoMILMasters (e.g., event memory management and OBD scan tool functions).

Id:	Q-LAH_80124-9344
Version:	2.7
Description:	The generic scan tool functions must be realized in all OBDECUs with direct communication with a generic scan tool as per document /11/ or document /8/.

Id:	Q-LAH_80124-9345
Version:	2.7
Description:	The communications are performed via CAN through the diagnostic protocol, document /7/.

Id:	Q-LAH_80124-9528
Version:	2.7
Description:	Table 11-1: Services for generic scan tool functions Service SID Document RequestCurrentPowertrainDiagnosticData 01hex /11/ RequestPowertrainFreezeFrameData 02hex /11/ RequestEmissionRelatedDiagnosticInformation 03hex /11/ ClearResetEmissionRelatedDiagnosticInformation 04hex /11/ RequestOxygenSensorMonitoringTestResults 05hex /11/ RequestOnBoardMonitoringTestResultsforSpecificMonitoredSystems 06hex /11/ RequestEmission-

	RelatedDiagnosticTroubleCodesDetected 07hex /11/ DuringCurrentOrLast-CompletedDrivingCycle RequestControlOfOnBoardSystemTestOrComponent 08hex /11/ RequestVehicleInformation 09hex /11/ RequestEmissionRelatedDi-agnosticTroubleCodesWithPermanentStatus 0Ahex /11/

Id:	Q-LAH_80124-9347
Version:	2.7
Description:	The RequestCurrentPowertrainDiagnosticData (01hex) service enables access to the current measurement values/diagnostic data of the PrimaryOBDECUs.

Id:	Q-LAH_80124-9348
Version:	2.7
Description:	Only original measurement values/raw sensor values (no substitute values), input and output data, and system status information from the PrimaryOBDECUs must be output.

Id:	Q-LAH_80124-9349
Version:	2.7
Description:	The raw values transmitted via the bus interface must be output; internal substitute values are not permissible either in the transmitter or in the receivers.

Id:	Q-LAH_80124-9350
Version:	2.7
Description:	In the event of a vehicle bus error (missing message, bus off, etc.) or if no sensor data is transmitted over the bus interface for a sensor (i.e., init value, error values), the value must be output that corresponds to the least likeliest value under normal operating conditions as per document /8/. This is the minimum or maximum value of the value range.

Id:	Q-LAH_80124-9351
Version:	2.7
Description:	The least likeliest value under normal operating conditions as per document /8/ must be agreed upon with Volkswagen AG.

Id:	Q-LAH_80124-9353
Version:	2.7
Description:	The vehicle must output all measured values required by document /11/ and document /8/ General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-9354
Version:	2.7
Description:	System-specific requests and contents must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-9355
Version:	2.7
Description:	The following PIDs must be supported at a minimum as per document /8/:

Id:	Q-LAH_80124-9356
Version:	2.7
Description:	Table 11-2: Minimum implementation of PIDs for service 01hex PID Description (hex)

Id:	Q-LAH_80124-9628
Version:	2.7
Description:	PID 0x1F must be only be output in the RequestCurrentPowertrainDiagnostic-Data (01hex) service by the PrimaryOBDECU_MILMaster.

Id:	Q-LAH_80124-9902
Version:	2.7
Description:	It must be clarified for each PrimaryOBDECU what PIDs must be output to GSTs for each system in compliance with current OBD legislation.

Id:	Q-LAH_80124-9357
Version:	2.7
Description:	Document /3/ includes further description of the PIDs.

Id:	Q-LAH_80124-9359
Version:	2.7
Description:	The RequestPowertrainFreezeFrameData service (02hex) enables the access to the Service-02hex-FreezeFrame-Daten concerning a ConfirmedDTC in the service 03hex.

Id:	Q-LAH_80124-9360
Version:	2.7
Description:	Each PrimaryOBDECU outputs Service-02hex-FreezeFrame-Data via the Re-questPowertrainFreezeFrameData (02hex) service only for an error.

Id:	Q-LAH_80124-9361
Version:	2.7
Description:	If there is a FreezeFrame entry, the PIDs are output in accordance with the following table General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-9362
Version:	2.7
Description:	Table 11-3: Output of PIDs for service 02hex PID Description (hex)

Id:	Q-LAH_80124-9363
Version:	2.7
Description:	The listed PIDs must be stored as per document /8/ at least in the Service-0x02-FreezeFrame.

Id:	Q-LAH_80124-9903
Version:	2.7
Description:	It must be clarified for each PrimaryOBDECU what PIDs must be output to GSTs for each system in compliance with current OBD legislation.

Id:	Q-LAH_80124-9364
Version:	2.7
Description:	System-specific requests and contents must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-9365
Version:	2.7
Description:	If there is no Service-02hex-FreezeFrame in the server, all PIDs supported in the RequestPowertrainFreezeFrameData service (02hex) are indicated in the query with the PIDs 0x00, 0x20, 0x40, and the following.

Id:	Q-LAH_80124-9366
Version:	2.7
Description:	If there is no Service-02hex-FreezeFrame in the server, the value 0x0000 must be returned in the RequestPowertrainFreezeFrameData service (02hex) for the PID$02.

Id:	Q-LAH_80124-9367

Version:	2.7
Description:	If there is no Service-02hex-FreezeFrame in the server, other supported PIDs must not be output for a RequestPowertrainFreezeFrameData request (02hex). (See document /11/.)

Id:	Q-LAH_80124-9368
Version:	2.7
Description:	In contrast to the requirements for the output with the RequestCurrentPowertrainDiagnosticData (01hex) request service, PID 0x1F must be stored and output in the Service-02hex-FreezeFrame by all PrimaryOBDECUs.

Id:	Q-LAH_80124-9370
Version:	2.7
Description:	The RequestEmissionRelatedDiagnosticInformation (03hex) service enables querying of DTCs with ConfirmedDTC == 1 for legislated OBD errors.

Id:	Q-LAH_80124-9371
Version:	2.7
Description:	The RequestEmissionRelatedDiagnosticInformation service (03hex) must be implemented General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-10005
Version:	2.7
Description:	The boundary conditions for this service are described in the "Boundary conditions for services" section and must be implemented.

Id:	Q-LAH_80124-9373
Version:	2.7
Description:	The ClearResetEmissionRelatedDiagnosticInformation (04hex) service enables clearing of the entire event memory and resetting of all diagnostic data.

Id:	Q-LAH_80124-9376
Version:	2.7
Description:	Document /2/ includes a description of the actions to be performed within a PrimaryOBDECU.

Id:	Q-LAH_80124-9378
Version:	2.7

Description:	Document /2/ includes detailed descriptions of the actions to be performed within a SecondaryOBDECU.

Id:	Q-LAH_80124-9750
Version:	2.7
Description:	The ClearResetEmissionRelatedDiagnosticInformation (04hex) service must be supported by SecondaryOBDECUs/SecondaryOBDComponents as per section "Addressing method and response behavior for OBDECUs."

Id:	Q-LAH_80124-9375
Version:	2.7
Description:	If the server is connected to other bus systems (e.g., FlexRay), the identifiers defined for the bus system and routed by the diagnostic CAN apply as per the valid data specifications.

Id:	Q-LAH_80124-9377
Version:	2.7
Description:	If it is not permissible to erase the event memory in specific operating conditions due to legal or safety-relevant requirements, service ClearResetEmissionRelatedDiagnosticInformation (04hex) must be responded to with NRC 0x22.

Id:	Q-LAH_80124-9381
Version:	2.7
Description:	Physically addressed requests with ClearResetEmissionRelatedDiagnosticInformation (04hex) must receive negative responses from the PrimaryOBDECUs (see section "Addressing method and response behavior for OBDECUs").

Id:	Q-LAH_80124-9531
Version:	2.7
Description:	Exceptions for physical event memory clearing with ClearResetEmissionRelatedDiagnosticInformation (04hex) are described by means of special requirements for the initial setup in production (P-Mode as per document /16/).

Id:	Q-LAH_80124-9838
Version:	2.7
Description:	The behavior for the clearing process and the corresponding response must be implemented identical to the description from the "Behavior with respect to storage medium" section for General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9374
Version:	2.7
Description:	The ClearResetEmissionRelatedDiagnosticInformation (04hex) service must be supported by PrimaryOBDECUs only via functional requests.

Id:	Q-LAH_80124-9382
Version:	2.7
Description:	PrimaryOBDECUs must support clearing the event memory only by means of the ClearResetEmissionRelatedDiagnosticInformation (04hex) service.

Id:	Q-LAH_80124-10078
Version:	2.7
Description:	The ClearResetEmissionRelatedDiagnosticInformation (04hex) service must be supported in the production software of PrimaryOBDECUs only via functional requests in the Volkswagen AG and OnboardClient diagnostic protocol.

Id:	Q-LAH_80124-10074
Version:	2.7
Description:	The following NegativeResponseCodes must be supported for this service:

Id:	Q-LAH_80124-10075
Version:	2.7
Description:	Table 11-4: NegativeResponseCodes NRC Description Cvt. (hex) ServiceNotSupported

Id:	Q-LAH_80124-10094
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9384
Version:	2.7
Description:	The RequestOxygenSensorMonitoringTestResults service (05hex) is not supported by ECMs with ISO-CAN.

Id:	Q-LAH_80124-9387
Version:	2.7
Description:	The RequestOxygenSensorMonitoringTestResults (05hex) service is not supported by the PrimaryOBDECU_noMILMaster.

Id:	Q-LAH_80124-9390
Version:	2.7
Description:	The RequestOnBoardMonitoringTestResultsforSpecificMonitoredSystems (06hex) service enables the querying of test results of special components and systems that are monitored continuously or intermittently.

Id:	Q-LAH_80124-9391
Version:	2.7
Description:	The RequestOnBoardMonitoringTestResultsforSpecificMonitoredSystems service (06hex) is available only for ECMs.

Id:	Q-LAH_80124-9393
Version:	2.7
Description:	The RequestOnBoardMonitoringTestResultsforSpecificMonitoredSystems (06hex) service is currently not supported by the PrimaryOBDECU_noMILMaster.

Id:	Q-LAH_80124-9395
Version:	2.7
Description:	The RequestEmissionRelatedDiagnosticTroubleCodesDetectedDuringCurrentOrLast CompletedDrivingCycle (07hex) service enables the querying of DTCs with PendingDTCs == 1 for legislated OBD errors that have occurred during the current or last General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9398
Version:	2.7
Description:	With the RequestControlOfOnBoardSystemTestOrComponent service (08hex), defined functions and tests as per document /8/ can be triggered.

Id:	Q-LAH_80124-9400
Version:	2.7
Description:	The RequestControlOfOnBoardSystemTestOrComponent (08hex) service is not supported by the PrimaryOBDECU_noMILMaster.

Id:	Q-LAH_80124-9402
Version:	2.7
Description:	The RequestVehicleInformation (09hex) service enables access to vehicle-specific information from the PrimaryOBDECUs.

Id:	Q-LAH_80124-9403
Version:	2.7
Description:	With the RequestVehicleInformation service (09hex), at least the following information must be output:

Id:	Q-LAH_80124-9404
Version:	2.7
Description:	Table 11-5: Minimum implementation of InfoTypes for service 09hex InfoType Description (hex)

Id:	Q-LAH_80124-9405
Version:	2.7
Description:	The InfoTypes are described in greater detail in document /3/.

Id:	Q-LAH_80124-9406
Version:	2.7
Description:	System-specific requests and contents must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-10080
Version:	2.7
Description:	A PrimaryOBDECU must support the 09hex service, but here it only outputs the initial values General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-9408
Version:	2.7
Description:	Additional requirements for PrimaryOBDECU_MILMasters (e.g., ECM, ASG) for the RequestVehicleInformation (09hex) service:

Id:	Q-LAH_80124-9409
Version:	2.7
Description:	Table 11-6: Additional InfoTypes for PrimaryOBDECU_MILMasters InfoType Description (hex)

Id:	Q-LAH_80124-9411
Version:	2.7

Description:	The vehicle identification number (VIN) InfoType 0x02 must be output for Volkswagen AG only once by the PrimaryOBDECU_MILMaster within the vehicle OBD network.

Id:	Q-LAH_80124-9412
Version:	2.7
Description:	After successful reprogramming of the VIN, the PrimaryOBDECU_MILMaster must trigger internal clearing of the event memory.

Id:	Q-LAH_80124-9413
Version:	2.7
Description:	For the internal clearing of the event memory after successful reprogramming of the VIN, all diagnostic information must be reset in the same way as when executing a request with ClearResetEmissionRelatedDiagnosticInformation (04hex).

Id:	Q-LAH_80124-9414
Version:	2.7
Description:	The VIN is reprogrammed in Volkswagen AG vehicles exclusively through immobilizer learning (successful download).

Id:	Q-LAH_80124-9434
Version:	2.7
Description:	In-Use Performance Tracking Counter (In-Use Monitor Performance Ratio) must be output via service 09hex INFOTYPE 0x08/INFOTYPE 0x0B for Volkswagen AG only by the General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-9416
Version:	2.7
Description:	A Software Calibration Identification (CALID) must be output for each DECECU.

Id:	Q-LAH_80124-9419
Version:	2.7
Description:	The CALID is the combination of the Volkswagen AG part number (DataIdentifier 0xF187), software version (DataIdentifier 0xF189), and any project-specific OBD-relevant criteria.

Id:	Q-LAH_80124-9861

Version:	2.7
Description:	The CALID calibration identification consists of 16 byte ASCII characters.

Id:	Q-LAH_80124-9865
Version:	2.7
Description:	All 16 ASCII characters of the CALID must always be output.

Id:	Q-LAH_80124-9867
Version:	2.7
Description:	Unused characters/bytes of the Volkswagen AG part number in the CALID must be populated with 0x20 (plus signs).

Id:	Q-LAH_80124-9868
Version:	2.7
Description:	Unused characters/bytes of the project-specific emission-relevant criteria in the CALID must be filled with 0x30.

Id:	Q-LAH_80124-10124
Version:	2.7
Description:	Use of 0x20 (spaces) is not permissible in the CALID.

Id:	Q-LAH_80124-10125
Version:	2.7
Description:	Apart from the special characters defined in this section, CALID characters must be restricted to the following ranges: 0x30 (0) ... 0x39 (9) 0x61 (a) ... 0x7A (z) 0x41 (A) ... 0x5A (Z) Deviations from this requirement must be documented in the BT-LAH.

Id:	Q-LAH_80124-9862
Version:	2.7
Description:	The project-specific emission-relevant criteria of the CALID must be agreed upon with Volkswagen AG.

Id:	Q-LAH_80124-9863
Version:	2.7
Description:	The following partitioning of the 16 ASCII characters of the CALID is recommended: The ASCII characters 1 to 3 of the CALID contain the digits 1 to 3 of the Volkswagen AG part number or the identification of the relevant Secondary-

	OBDECUs. The ASCII characters 4 to 8 of the CALID contain the digits 7 to 11 of the Volkswagen AG part number. The ASCII characters 9 to 12 of the CALID contain the Volkswagen AG software version. The ASCII characters 13 to 16 of the CALID contain the project-specific OBD-relevant General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9420
Version:	2.7
Description:	Table 11-7: Structure of the CALID

Id:	Q-LAH_80124-9907
Version:	2.7
Description:	The first three ASCII characters or the project-specific part of the CALID can be used for identifying the relevant SecondaryOBDECUs. With respect to the following SecondaryOBDECUs, the three ASCII characters of the CALID have already been defined:

Id:	Q-LAH_80124-9864
Version:	2.7
Description:	Table 11-8: Abbreviations for SecondaryOBDECU identification Abbreviation Description SCR Selective catalytic reduction ECU NOX Nitrogen oxides sensor PMS Soot sensor DEF Diesel exhaust fluid/urea quality sensor OBC On-board charger EGS Electric shift actuator

Id:	Q-LAH_80124-10081
Version:	2.7
Description:	Each DECECU must output a Software Calibration Identification (CALID).

Id:	Q-LAH_80124-10082
Version:	2.7
Description:	For each OBD-relevant calibration option of an ECU, a unique CALID must be provided in the software structure and in the memory.

Id:	Q-LAH_80124-10083
Version:	2.7
Description:	DECECUs that do not implement variant control must at least output the initial value for the CALID ASCII string "????????????????" (i.e., 16x ASCII 0x3F).

Id:	Q-LAH_80124-10084

Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9911
Version:	2.7
Description:	The storage of the CVN in non-volatile memory when the CVN is changed is sufficient.

Id:	Q-LAH_80124-9912
Version:	2.7
Description:	The storage of the CVN in non-volatile memory in the ECU post-run phase is permissible.

Id:	Q-LAH_80124-9425
Version:	2.7
Description:	The result must be output immediately on request to a generic scan tool as per document /8/.

Id:	Q-LAH_80124-9426
Version:	2.7
Description:	If the request occurs before the calculation is finished, the result of the previous DCY must be output.

Id:	Q-LAH_80124-9427
Version:	2.7
Description:	For each CALID, a separate, individual CVN must be formed and output. Only one CVN per CALID must be output.

Id:	Q-LAH_80124-9428
Version:	2.7
Description:	The stored CVN must not be cleared by a clear event memory process.

Id:	Q-LAH_80124-9429
Version:	2.7
Description:	The CVN must be calculated with an algorithm approved by Volkswagen AG.

Id:	Q-LAH_80124-9430
Version:	2.7

Description:	The CVN calculation must cover the entire memory area that contains the emissions- relevant program and calibration data. The boot block and production data (e.g., serial number) are excepted from this. For different CALIDs (OBD-relevant variants) within a server, the CVN must be calculated only by means of CALID-relevant areas.

Id:	Q-LAH_80124-9431
Version:	2.7
Description:	Each OBD-relevant software or calibration change requires a new CALID. Changing the software results in a new CVN. The CALID and CVN must be uniquely matched.

Id:	Q-LAH_80124-9432
Version:	2.7
Description:	For a DECECU, the CVN is cleared and set to the initial value: After reprogramming of the server After OBD-relevant data set changes (e.g., due to automatic switchover as per documents /2/ and /19/) After unforeseeable loss of the memory contents of the server (e.g., disconnection of the battery for ECUs with battery-buffered RAM). Thereafter calculation of the CVN may take up to 30 s. During this time, if there is a request with RequestVehicleInformation (09hex), the server must respond with NRC 0x78 (see documents /8/, /11/, and /4/).

Id:	Q-LAH_80124-9904
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9422
Version:	2.7
Description:	The CVN must be calculated once per DCY in the background and stored in non-volatile memory until a new calculation result is present.

Id:	Q-LAH_80124-9424
Version:	2.7
Description:	Each new calculation result overrides the previously stored result.

Id:	Q-LAH_80124-9423
Version:	2.7
Description:	The calculation begins with terminal 15 ON or wake-up, independently of a request with RequestVehicleInformation (09hex).

Id:	Q-LAH_80124-10085
Version:	2.7
Description:	The CVN must not be calculated by an OBDReadyECU.

Id:	Q-LAH_80124-10086
Version:	2.7
Description:	An OBDReadyECU must at least output the initial value for the CVN value 0x00000000 (4 bytes 0x00).

Id:	Q-LAH_80124-10087
Version:	2.7
Description:	The software of an OBDReadyECU must be structured in such a way that a CVN can be mapped by the OBD-relevant part of the software in a FullOBD implementation.

Id:	Q-LAH_80124-10088
Version:	2.7
Description:	An OBDReadyECU must be prepared in such a way that calculation of the CVN begins with terminal 15 ON or wake-up, independently of a request with RequestVehicleInformation (09hex).

Id:	Q-LAH_80124-10089
Version:	2.7
Description:	In the case of a later FullOBD implementation, the CVN must be calculated with an algorithm approved by Volkswagen AG. The complexity of the calculation must at least correspond to a CRC32.

Id:	Q-LAH_80124-9436
Version:	2.7
Description:	The RequestEmissionRelatedDiagnosticTroubleCodesWithPermanentStatus service (0Ahex) enables the querying of all legislated OBD errors with the PermanentDTC status.

Id:	Q-LAH_80124-9437
Version:	2.7
Description:	The RequestEmissionRelatedDiagnosticTroubleCodesWithPermanentStatus (0Ahex) service must not be supported for servers in the sense of a PrimaryOBDECU for EOBD, General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-5286
Version:	2.7
Description:	The following requirements apply to implementations of the services via CAN, FlexRay, MOST, and LIN buses, unless explicit deviations for these bus systems are specified in this section or other sections.

Id:	Q-LAH_80124-9991
Version:	2.7
Description:	In the case of a request in the CAN-FD protocol format, the response must also be sent in the CAN-FD protocol format by the server.

Id:	Q-LAH_80124-9992
Version:	2.7
Description:	In the case of a request in the CAN 2.0 protocol format, the response must also be sent in the CAN 2.0 protocol format by the server.

Id:	Q-LAH_80124-8908
Version:	2.7
Description:	While a ResponseOnEvent service is active, the server must be able to process different request and response messages. This must be enabled by different CAN identifiers or FlexRay source addresses.

Id:	Q-LAH_80124-8909
Version:	2.7
Description:	If the same CAN identifiers or FlexRay source and target addresses are used as for normal diagnostic communication, the following restrictions apply:

Id:	Q-LAH_80124-8911
Version:	2.7
Description:	If a different client sends a request for other CAN identifiers or FlexRay PDUs during a ServiceToRespondTo, the server can reject the request.

Id:	Q-LAH_80124-8912
Version:	2.7
Description:	The client must check each response for a possible ServiceToRespondTo:

Id:	Q-LAH_80124-8913
Version:	2.7

Description:	If there is a valid ServiceToRespondTo, the client must repeat the request after the ServiceToRespondTo response has been received completely.

Id:	Q-LAH_80124-8914
Version:	2.7
Description:	If the response is not clear (response to the actual request or to an event for the ServiceToRespondTo), the client must indicate the response both as a response to the request and also as a ServiceToRespondTo response. The client must not repeat General Project-Independent Performance Specification LAH.DUM.909.-G

Id:	Q-LAH_80124-8915
Version:	2.7
Description:	Figure 12-1: Conflict case for the occurrence of an event Client Server Request Start Response FirstFrame Event Server ignoriert Request Start FlowControl Start Response ConsecutiveFrame Start Response ConsecutiveFrame == Last-Frame Request Response Server ignoriert Request Server ignores the request

Id:	Q-LAH_80124-8916
Version:	2.7
Description:	For FlexRay, in this figure the following applies: It is assumed that the First-Frame is transmitted within the same FlexRay cycle as the diagnostics request.

Id:	Q-LAH_80124-8917
Version:	2.7
Description:	If an event occurs, the server must immediately respond with the appropriate ServiceToRespondTo response.

Id:	Q-LAH_80124-8918
Version:	2.7
Description:	If a request has already received a response, the ServiceToRespondTo must be delayed until the current transmission is finished.

Id:	Q-LAH_80124-8919
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G Client Server Request Start Response FirstFrame Event Start FlowControl Start Response Verzögerung ConsecutiveFrame Start Response Consecutive-

	Frame == LastFrame Start ServiceToRespondTo Response Start FlowControl Verzögerung Delay

Id:	Q-LAH_80124-5346
Version:	2.7
Description:	The following timers must be implemented in the application layer in the client and the server General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-5368
Version:	2.7
Description:	Table 12-1: Message timing parameters Parameter Description: Type: The parameter is defined as the worst-case latency time within the network for the transmission (influencing factors include gateways, bus load, arbitration, etc.) The value is partitioned into the time for the transmission of the request to the server P2 (P2Request) and the time for the transmission of the response (P2Response) to the Performance client. request The value of P2 is dependent on whether the server supports a StartOfMessage.Indication (e.g., Diagnostic Communication over Controller Area Network (DoCAN) as per document /5/, /6/, and /7/). The parameter is defined as the worst-case latency time within the network for the transmission (influencing factors include gateways, bus load, arbitration, etc.) The value is partitioned into the time for the transmission of the request to the server P6 (P6Request) and the time for the transmission of the complete response (P6Response) Performance to the client. request The value of P6 is independent of whether the server supports a StartOfMessage.Indication or not (e.g., DoCAN as per document /5/, /6/, and /7/ or DoIP as per document /12/). Performance request to the server to start with the response message after receiving Performance P2Server the request. request Important: This is the actual time measured on the server connection. P2Client Client timeout, i.e., the time a client waits for a server response after sending a UDS TimerReload message (SingleFrame or FirstFrame). value Client timeout, i.e. the time a client waits for a complete server response after P6Client sending a UDS message. TimerReload If the transport/network layer does not support StartOfMessage.Indication, P6Client value must be used instead of P2Client. P2*Server Performance request to the server to start the response message after a negative Performance response with NRC 0x78 (Enhanced Response Timing). request P2*Client Extended client timeout to wait for a response message after receipt of an NRC 0x78 TimerReload from the server (SingleFrame or First-Frame). value Extended client timeout to wait for the complete response message after receipt of P6*Client an NRC 0x78 from the server. TimerReload If the transport/network layer does not support StartOfMessage.Indication, P6*Client

	value must be used instead of P2*Client. P3Client_Phys Minimum client wait time for sending another physical or functional request after a TimerReload physically addressed request, if no response of the server is expected or required. value P3Client_Func Minimum client wait time for sending another physical or functional request after a TimerReload functionally addressed request, if no response of the server is expected or required. value Time after which a service request must be repeated by the client if a negative PNRC0x21_Repetition_Time response with NRC 0x21 was received. Timeout value The number of repetitions is limited to the parameter P .NRC0x21_CompletionTimeout PNRC0x21_CompletionTimeout Maximum time the client waits for multiple negative responses with NRC 0x21. The Timeout value request is repeated within this time. PNRC0x78_CompletionTimeout Maximum time the client waits for multiple negative responses with NRC 0x78. Timeout value P4Server This is the time between the reception of the request and the beginning of the Performance General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8922
Version:	2.7
Description:	Each server must be able to process a new request immediately after the successful sending of the response message to a request. Exceptions must be agreed upon with the Diagnostics department. The accepted case is the sequence for the ECUReset service (11hex).

Id:	Q-LAH_80124-5391
Version:	2.7
Description:	Table 12-2: Message timing parameter values PrimaryOBDECU Volkswagen AG and Parameter Minimum Maximum as per /1/ (Values apply to all OnboardClient diagnostic protocols) diagnostic protocol P2 0 ms P2Request + P2Response e) 150 ms I.) P6 0 ms P6Request + P6Response f) 2 450 ms II.) P2Server 0 ms 50 ms 25 ms 50 ms P2Client P2Server_Max + P2Max a) 100 ms P2Server + P2 = 200ms P6Client P2Server_Max + P6Max a) f) 2 500 ms P2*Server b) 5 000 ms 4 850 ms 5 000 ms P2*Client P2*Server_Max + P2Response c) P2*Server + P2 P2*Server + P2 = 5 000 ms = 5 150 ms P6*Client P2*Server_Max + P6Response c) f) 7 450 ms P3Client_Phys P2Server_Max + P2Max d) 100 ms P2Server + 350 ms = 400 ms P3Client_Func P2Server_Max + P2Max d) 100 ms P2Server + 350 ms = 400 ms PNRC0x21_Repetition_Time - 200 ms (ISO 22900) 200 ms 200 ms PNRC0x21_CompletionTimeout - 1 300 ms (ISO 22900) 60 000 ms 60 000 ms PNRC0x78_CompletionTimeout - 100 000 ms 100 000 ms 100 000 ms dev. (ISO 22900) P4Server - - - g)

Id:	Q-LAH_80124-8923

Version:	2.7
Description:	a. The maximum time that a client waits for a response message is left to the discretion of the client. This value is defined for clients developed for Volkswagen AG. b. During extended response timing, a minimum value of 0.3 P2*Server_Max must be maintained in order not to generate an unnecessarily large number of NRCs 0x78 by servers. c. The maximum time that a client waits for a response message is left to the discretion of the client. This value is defined for clients developed for Volkswagen AG. d. The maximum time that a client waits for a response until it sends the next request message is left to the discretion of the client. This value is defined for clients developed for Volkswagen AG. e. For OBDECUs, it must be ensured that a value approaching 0 ms is the goal for P2 due to network latency and architectures. f. This data must not be implemented for PrimaryOBDECUs, because these times must not be considered for the diagnostic protocol implementation as per document /8/. g. This timer must only be used in special cases upon agreement with the appropriate department. The value of the timer and which services are to be affected must be defined General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-8932
Version:	2.7
Description:	I. Important: It must be possible to configure P2 for a client for the appropriate server variant in the ODX data. The described default value applies. Changes must be agreed upon with the Diagnostics department. II. Important: It must be possible to configure P6 for vehicle access via DoIP for a vehicle project in the ODX data. The described default value applies. Changes must be agreed upon with the Diagnostics department.

Id:	Q-LAH_80124-9650
Version:	2.7
Description:	If the server is required with substantiation longer than 2x P2*Server for a positive or negative response with the use of NRC 0x78, this must be agreed upon in advance with the appropriate departments and documented in the Component Performance Specification.

Id:	Q-LAH_80124-9843
Version:	2.7
Description:	The same UDS timing applies for the UDS server for each diagnostic protocol. An implementation of different UDS timing for different diagnostic protocols is forbidden.

Id:	Q-LAH_80124-7180
Version:	2.7
Description:	The time P3Client_Physical is omitted or has the value 0 ms if the client expects a positive response by the server and has already completely received this response. After the positive response has been completely received, the next service request can immediately be sent to the same server.

Id:	Q-LAH_80124-8924
Version:	2.7
Description:	The parameter P2/P6 takes into account the dependencies of the network architecture. Influencing factors are: Number of gateways Baud rate Bus type Bus driver mode (polling or interrupt) and processing time in the server

Id:	Q-LAH_80124-8925
Version:	2.7
Description:	P2/P6 is defined as the time for the request and the response: P2 = P2Request + P2Response P6 = P6Request + P6Response

Id:	Q-LAH_80124-8926
Version:	2.7
Description:	Figure 12-3: Partitioning of the times for request response Client Gateway Gateway Server #1 #2 T_Data.req Request T_Data.con Request P2Request P6Request Request T_Data.ind P2/6Client P2Server Response T_Data.req T_-Data.con P2Response Response P6Response Response General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-5411
Version:	2.7
Description:	The following timers must be implemented in the session layer in the client and the server for the UDS protocol:

Id:	Q-LAH_80124-5428
Version:	2.7
Description:	Table 12-3: Timer in the session layer of client and server for a NonDefaultSession Parameter Description Timer type Volkswagen AG default value Time between two consecutive TesterPresent services (3Ehex) (functionally addressed with SuppressPositiveResponseBit == 1) S3Client in order to obtain a diagnostic session in the server (except for Timer reload value 2 000 ms session 0x01), or the maximum client dead time between the last server response and any new

	client UDS message. Monitoring time for maintaining an active diagnostic session in the S3Server server (except for DefaultSession 0x01) without communication Timer reload value 5 000 ms with a client (exchanging UDS messages) in the meantime.

Id:	Q-LAH_80124-8927
Version:	2.7
Description:	Each new unsupported UDS request in the same diagnostic protocol also starts the S3Server timer.

Id:	Q-LAH_80124-10113
Version:	2.7
Description:	UDS requests from a diagnostic protocol other than that currently being processed do not restart the S3Server timer.

Id:	Q-LAH_80124-8930
Version:	2.7
Description:	During a NonDefaultSession, the following start and stop conditions for S3 must be General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8931
Version:	2.7
Description:	Table 12-4: S3 handling Physical and functional communication, Physical communication with periodic Parameter Action periodic functionally addressed physically addressed TesterPresent request TesterPresent request T_Data.con, which indicates the complete T_Data.con, which indicates the complete reception reception of the request message of the request message DiagnosticSessionControl Initial start DiagnosticSessionControl (10hex) with Sub- (10hex) if no response is required. function = SessionType of a T_Data.ind, which indicates a reception of the NonDefaultSession. request message DiagnosticSessionControl (10hex) if a response is required. T_Data.con, which indicates the complete reception S3Client of each request message if no response is required. T_Data.con, which indicates the complete T_Data.con, which indicates an error in the event of reception of a functionally addressed request the transmission of single-frame/multi-frame request Restart message TesterPresent (3Ehex). This messages. TesterPresent (3Ehex) is generated each time T_Data.con, which indicates the reception of each after S3Client timeout response message if a response is required. T_Data.ind, which indicates an error during the reception of a multi-frame response message. T_Data.con, which indicates the complete transmission of a positive response message on Initial start DiagnosticSession-

	Control (10hex). The server changes to the requested NonDefaultSession. Successful execution of the requested session change on DiagnosticSessionControl (10hex) for the change from the DefaultSession to a NonDefaultSession. - T_-DataSOM.ind, which indicates the start of a multi-frame request message. T_-Data.con, which indicates the reception of each response message S3Server Stop Note: - The S3Server timer is inactive in the DefaultSession. - Stopping the S3 timer does not cause a fall back into the DefaultSession. T_Data.con, which indicates the complete transmission of each response message, if a positive or negative response message is required/allowed. Restart The NRC 0x78 does not restart the timer S3Server. Completion of the action requested by means of a diagnostic request. T_Data.ind, which indicates an error during the reception of a Multi-Frame-Request-Message.

Id:	Q-LAH_80124-8933
Version:	2.7
Description:	The following abbreviations apply: Client: T_Data.con Transport/network layer informs the diagnostic application about the complete transmission of a request message. T_Data.ind Transport/network layer informs the diagnostic application about the complete reception of a response message. T_DataSOM.ind Transport/network layer informs the diagnostic application about the reception of a StartOfMessage PDU. P2Client is stopped. Server: T_Data.con Transport/network layer informs the diagnostic application about the completion of the General Project-Independent Performance Specification LAH.DUM.909.G T_Data.ind Transport/network layer informs the diagnostic application about the complete reception of a request message. P2Server is restarted. T_DataSOM.ind Transport/network layer informs the diagnostic application about the reception of a StartOfMessage PDU.

Id:	Q-LAH_80124-5430
Version:	2.7
Description:	The UDS protocol requires error handling in the application and session layer, regardless of the addressing method. The requirement for this is the implementation of the timers described in the Timing section.

Id:	Q-LAH_80124-5436
Version:	2.7
Description:	Table 12-6: Client-error handling Communication Client error Client handling phase type Physical Functional communication communication The last UDS request is repeated T_Data.con of immediately. Transmission of a the network The last UDS request is repeated after UDS message layer with The timer S3Client is reset (restarted), P3Client_Physical. (request) negative result. be-

	cause a TesterPresent should not be sent and the new UDS request stops the S3Client timer. Timeout as a normal event: The client's The last UDS request is repeated reception window is closed. No more immediately. server responses are expected. The client does not repeat the UDS request P2Client/P6Client Timeout and analyzes the server responses received. Timer S3Client is restarted if a physical and Timeout as an error: The client's periodic TesterPresent (3Ehex) is reception window is closed. If no server transmitted. responses have been received, the UDS request is repeated immediately. The last UDS request is repeated The last UDS request is repeated Reception of a T_Data.ind of immediately. immediately. All the responses received UDS message the network up to this point are rejected, because (response) layer with Timer S3Client is restarted if a physical and an error has occurred in the network negative result. periodic TesterPresent (3Ehex) is layer. transmitted.

Id:	Q-LAH_80124-5437
Version:	2.7
Description:	The client may repeat a UDS request a maximum of two times. Therefore, a UDS message General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-5459
Version:	2.7
Description:	Table 12-7: Server error handling Communication Server event/error type Server handling phase Reception of a UDS The timer S3server is restarted. An error has message (request) T_Data.ind of the network layer with negative result. occurred in the network layer, the UDS message received must be rejected. The timer S3server is restarted. An error has Transmission of a UDS T_Data.con of the network layer with negative result. occurred in the network layer, the UDS message (response) message to be sent (response) is not repeated!!

Id:	Q-LAH_80124-5461
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7391
Version:	2.7
Description:	This section deals only with the deviations from the "Diagnostics on CAN" section and additional bus-system-specific requirements. Any requirements for implementation not considered here must be implemented in accordance with the "Diagnostics on CAN" section.

Id:	Q-LAH_80124-7502
Version:	2.7
Description:	If the VBV component list contains 0x2A2D-Gateway_component_list_data-bus_identification as per document /15/ for more than one system as bus type "LIN" and simultaneously the same bus number, the client must not start parallel requests for this bus segment.

Id:	Q-LAH_80124-8935
Version:	2.7
Description:	All LIN servers must support the following timing:

Id:	Q-LAH_80124-7339
Version:	2.7
Description:	P2Server = 50 ms

Id:	Q-LAH_80124-8934
Version:	2.7
Description:	Possible deviations can be implemented depending on the schedule; deviating values must be agreed upon with the Diagnostics department.

Id:	Q-LAH_80124-8937
Version:	2.7
Description:	The parameter P2 to be output by the DK2F system when there is a change into a NonDefaultSession is calculated as follows: (UDS block size/6 bytes * DiagResponse) + 40% Note: The formula for calculating P2 applies to a LIN baud rate of 19.2 kbps. Other baud rates specified by means of the LIN data specifications must be included for calculating P2.

Id:	Q-LAH_80124-9755
Version:	2.7
Description:	UDSBlocksize: Corresponds to the parameter that the server sends in the positive response to the RequestDownload service. Notice: UDSBlocksize = MaximumBlockSize corresponds to the number of maximum bytes to be transmitted.

Id:	Q-LAH_80124-8938
Version:	2.7
Description:	The parameter DiagResponse is defined as follows:

Id:	Q-LAH_80124-8939

Version:	2.7
Description:	For a switchover to a separate LIN flash schedule, the following applies: DiagResponse = 10ms

Id:	Q-LAH_80124-8940
Version:	2.7
Description:	For an application schedule, the following applies: DiagResponse = Time difference between 2 successive DiagnoseResponse FrameIdentifiers as per the valid data definition for this LIN segment.

Id:	Q-LAH_80124-10187
Version:	2.7
Description:	The MaximumBlockSize parameter in the positive response to the RequestDownload (34hex) service must not exceed a maximum value of 508 bytes. It must not drop below a General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7408
Version:	2.7
Description:	DK3 servers on the LIN bus as per document /15/ must implement the CommunicationControl service 0x28 without function and must not send a negative response to the client.

Id:	Q-LAH_80124-7405
Version:	2.7
Description:	For the service ResponseOnEvent (86hex), it must be ensured in the LIN data specification of the Volkswagen AG networking that at least one SlaveResponseSlot is provided for in the application schedule.

Id:	Q-LAH_80124-8936
Version:	2.7
Description:	For a DK3 server on the LIN bus as per document /15/, the ROE response is allocated to only one request response tuple for multiple-client support. This is usually the standard Volkswagen AG diagnostics request/response tuple.

Id:	Q-LAH_80124-7410
Version:	2.7
Description:	DK3 servers on the LIN bus as per document /15/ must not implement the LinkControl 0x87 service and must send the negative response ServiceNotSup-

	ported NRC 0x11 depending General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7392
Version:	2.7
Description:	This section deals only with the deviations from the "Diagnostics on CAN" section and additional bus-system-specific requirements. Any requirements for implementation not considered here must be implemented in accordance with the "Diagnostics on CAN" section.

Id:	Q-LAH_80124-7381
Version:	2.7
Description:	The timing from the "Diagnostics on CAN" section applies.

Id:	Q-LAH_80124-8941
Version:	2.7
Description:	The support of the CommunicationControl (28hex) service is dependent on the networking definition or the data definition valid for the vehicle.

Id:	Q-LAH_80124-7389
Version:	2.7
Description:	DK3 or DK4 servers on MOST as per document /15/ must implement the CommunicationControl service (0x28) without function and must always send a positive response to the client.

Id:	Q-LAH_80124-8942
Version:	2.7
Description:	If messages of a DK3 or DK4 server on the MOST as per document /15/ are routed 1:1 from the MOST ring onto the CAN, the CommunicationControl (28hex) must be implemented as per the appropriate definition.

Id:	Q-LAH_80124-7412
Version:	2.7
Description:	DK3 servers on MOST as per document /15/ must not implement the LinkControl 0x87 service and must send the negative response ServiceNotSupported NRC 0x11 depending on the addressing method.

Id:	Q-LAH_80124-8943

Version:	2.7
Description:	A DK4 server as per document /15/ can implement the LinkControl service 0x87. The General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8945
Version:	2.7
Description:	This section deals only with the deviations from the "Diagnostics on CAN" section and additional bus-system-specific requirements. Any requirements for implementation not considered here must be implemented in accordance with the "Diagnostics on CAN" section.

Id:	Q-LAH_80124-8947
Version:	2.7
Description:	The timing from the "Diagnostics on CAN" section applies.

Id:	Q-LAH_80124-10239
Version:	2.7
Description:	To be able to adhere to the P2Server timing, PrimaryOBDECUs on Flexray may need to implement a bus-synchronized integration of the diagnostic task.

Id:	Q-LAH_80124-8949
Version:	2.7
Description:	If the server's diagnostic interface is connected to FlexRay, these requirements apply in addition to those in the section for the generic CommunicationControl (28hex) description.

Id:	Q-LAH_80124-8954
Version:	2.7
Description:	If the CommunicationControl functionality is activated, the FlexRay synchronization must not be affected.

Id:	Q-LAH_80124-8950
Version:	2.7
Description:	Table 15-1: Request message sub-function definition Hex Description, ControlType Cvt. (bit 6-0) EnableRxAndTx 00 - Enables FlexRay communication in the static segment M - Enables FlexRay communication in the dynamic segment EnableRxAndDisableTx 01 - Enables Rx communication in the static and dynamic segment M - Disables Tx communication in the static and dynamic segment DisableRxAndEnableTx 02 - Disables Rx communication in the static and

	dynamic segment M - Enables Tx communication in the static and dynamic segment

Id:	Q-LAH_80124-8951
Version:	2.7
Description:	Requirements for message updates (PDU update bits) must be implemented as per document /13/.

Id:	Q-LAH_80124-8953
Version:	2.7
Description:	The descriptions from the "Diagnostics on CAN" section apply. The specific characteristics General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-9327
Version:	2.7
Description:	This section deals only with the deviations from the "Diagnostics on CAN" section and additional bus-system-specific requirements. Any requirements for implementation not considered here must be implemented in accordance with the "Diagnostics on CAN" section.

Id:	Q-LAH_80124-9329
Version:	2.7
Description:	The TCP connection must not be interrupted by a Session change of the DoIP node.

Id:	Q-LAH_80124-9330
Version:	2.7
Description:	Sole exception: A new routing activation message for DoIP must be performed for DiagnosticSessionControl (10hex) with ProgrammingSession (10hex) subfunction.

Id:	Q-LAH_80124-9332
Version:	2.7
Description:	With the execution of the ECUReset service (11hex) in the DoIP node, the Routing General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7935
Version:	2.7

Description:	This section describes boundary conditions that are valid for the individual services. The behavior of the server is further defined in the following cases: Request of the service a function activated by a service

Id:	Q-LAH_80124-9632
Version:	2.7
Description:	For a return to the nominal behavior or resumption of the nominal behavior from a function activated by a service, no boundary conditions must be tested for service requests.

Id:	Q-LAH_80124-9633
Version:	2.7
Description:	Return to the nominal behavior or resumption of the nominal behavior can be performed, for example: Return to default session Service request with which the nominal function is invoked, for example: Request CommunicationControl (28hex), EnableRxTx (0x00) Request DiagnosticSessionControl (10hex), DefaultSession (0x01) Request RoutineControl (31hex), StopRoutine (0x02) Request InputOutputControlByIdentifier (2Fhex), ReturnControlToEcu (0x00) Request ControlDTCSetting (85hex), On (0x01)

Id:	Q-LAH_80124-10189
Version:	2.7
Description:	If one of the services listed above calls a safety-relevant application function, the function must additionally be implemented with suitable measures in line with the required ASIL classification, and in consultation with Function Safety, the Diagnostics department, Production, After-Sales Service, and the appropriate department.

Id:	Q-LAH_80124-10268
Version:	2.7
Description:	If the application function cannot be called, a suitable NRC must be returned (see appendix A1).

Id:	Q-LAH_80124-10190
Version:	2.7
Description:	The ASIL-relevance of the data as per the safety analysis (e.g., DSDL) is not authoritative for implementing the diagnostics.

Id:	Q-LAH_80124-10270

Version:	2.7
Description:	The calling function must ensure that the data to be written are protected with suitable measures in line with the required ASIL classification, and in consultation with Function Safety, the Diagnostics department, Production, After-Sales Service, and the appropriate department.

Id:	Q-LAH_80124-10191
Version:	2.7
Description:	The part layout in Production, After-Sales Service, and Development must be taken into account in the measures to be implemented.

Id:	Q-LAH_80124-10192
Version:	2.7
Description:	The measures to be implemented for each function and calibration must be in the basic General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-9022
Version:	2.7
Description:	The following table shows the overview of the boundary conditions to be tested for the services.

Id:	Q-LAH_80124-9897
Version:	2.7
Description:	Description of the keys for the following table: a. System-specific evaluation of the boundary conditions for the requested memory area. b. System-dependent whether a parameter change is possible without testing the boundary General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9023
Version:	2.7
Description:	Table 17-1: Overview of testing for boundary conditions Service Service Cvt. Check for service request While service function is active Action/description ID Positive Response for 04hex ClearResetEmissionRelatedDiagnosticInformation M x OBD_ClearMem_Inhibit from the message OBD_01 = 0 (clearing possible) 10hex DiagnosticSessionControl M x To be implemented only for a change to the ProgrammingSession as per document /9/. 11hex ECUReset (only ResetType 0x02: KeyOffOnReset) M x Rejection of the request 14hex ClearDiagnosticInformation NoImp 19hex ReadDTCInformation NoImp 22hex ReadDataByI-

	dentifier NoImp 23hex ReadMemoryByAddress U a) Rejection of the request 27hex SecurityAccess NoImp Rejection of the service request or 28hex CommunicationControl M x x discontinuation if the function has already been activated. Rejection of the service request 2Ehex WriteDataByIdentifier U b) The boundary conditions to be tested must be agreed upon and documented in the component safety strategy. Rejection of the service request or discontinuation if the function has already 2Fhex InputOutputControlByIdentifier U x x been activated. The boundary conditions to be tested must be agreed upon and documented in the component safety strategy. Rejection of the service request or discontinuation if the function has already 31hex RoutineControl U x x been activated. The boundary conditions to be tested must be agreed upon and documented in the component safety strategy. 34hex RequestDownload NoImp See document /9/. 35hex RequestUpload NoImp See document /9/. 36hex TransferData NoImp See document /9/. 37hex RequestTransferExit NoImp See document /9/. 38hex RequestFileTransfer U a) Rejection of the service request 3Dhex WriteMemoryByAddress U a) Rejection of the service request 3Ehex TesterPresent NoImp Rejection of the service request or 85hex ControlDTCSetting M x x discontinuation if the function has already been activated. 86hex ResponseOnEvent NoImp Rejection of the service request or discontinuation if the function has already 87hex LinkControl U x x been activated. The boundary conditions to be tested must be agreed upon and documented in the component safety strategy.

Id:	Q-LAH_80124-9263
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9285
Version:	2.7
Description:	Explanation of keys:

Id:	Q-LAH_80124-9284
Version:	2.7
Description:	Figure 17-1: State diagram for testing boundary conditions and the validated signal value The following applies: t_SigDebounce:= Debounce period for the applied signal PowerUp / OBD_Driving_Cycle_InitiallySet = FALSE, NVMRestore OBD_Driving _Cycle_notSet NVMRestored_ OBD_Driving_Cycle_InitiallySet == FALSE (Keine Überprüfung von Randbedingunge)n Information OBD_Driving_Cycle == 1 NVMRestored_ / (OBD_Driving_Cycle_InitiallySet = TRUE, OBD_Driving_Cycle_InitiallySet == TRUE Store OBD_Driving_Cycle_InitiallySet to NVM)

Id:	Q-LAH_80124-9034
Version:	2.7
Description:	The data specifications currently valid for the servers must be used.

Id:	Q-LAH_80124-9567
Version:	2.7
Description:	For testing boundary conditions, the defined signals must be used exactly:

Id:	Q-LAH_80124-9569
Version:	2.7
Description:	The signal that is sent by the brake system control module must be used for the speed signal.

Id:	Q-LAH_80124-9570
Version:	2.7
Description:	The following signal must be used for the status [Propulsion_system_active (PSA)] for vehicle projects before E^3-1.2 : for electrified drive layouts: [MO_-Hyb_Fahrbereitschaft] for conventional drive layouts : [MO_Fahrbereitschaft] The respective signal is sent by the PrimaryOBDECU_MILMaster.

Id:	Q-LAH_80124-10260
Version:	2.7
Description:	The following signal must be used for the status [Propulsion_system_active (PSA)] for vehicle projects as of E^3-1.2 : for all drive layouts: [MM_PropulsionSystemActive] The signal is sent by the PrimaryOBDECU_MILMaster.

Id:	Q-LAH_80124-9571
Version:	2.7
Description:	The following specification applies for the [OBD_Driving_Cycle] information: If the [OBD_Driving_Cycle] signal is received by the server, the server must use the message with the signal as the information source. If the [OBD_Driving_Cycle] signal is not received by the server, the server must use information from the Diagnose_01 message as per document /2/ as the information source.

Id:	Q-LAH_80124-9020
Version:	2.7
Description:	The [Standstill flag] signal as per the valid data definition must not be evaluated as a boundary condition for diagnostic services.

Id:	Q-LAH_80124-9579
Version:	2.7
Description:	If a server does not receive the required signals as per the valid data specifications, this must be agreed upon with the Functional Safety and Diagnostics departments for whether boundary conditions can be omitted in the required signals.

Id:	Q-LAH_80124-9634
Version:	2.7
Description:	A general dependency with respect to the terminal 15 status applies. This is described in the service table in the "Allocation of services and DiagnosticSessions" section.

Id:	Q-LAH_80124-9496
Version:	2.7
Description:	Important: The "OBD_Driving_Cycle_notSet" status must be used only for diagnostics-relevant purposes (e.g., Diagnostic Services). A use of this status General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9566
Version:	2.7
Description:	It must be possible to read out the state of receiving the OBD_Driving_Cycle information with the ReadDataByIdentifier (22hex) and DataIdentifier 0x0261 services.

Id:	Q-LAH_80124-9910
Version:	2.7
Description:	If internal states (e.g., steering intervention, regulation) must be evaluated as boundary conditions, this must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-558
Version:	2.7
Description:	Each service request must be checked by the server to see if it is permissible/executable.

Id:	Q-LAH_80124-9273
Version:	2.7

Description:	The [OBD_Driving_Cycle] information must be received and evaluated by each server except the transmitter.

Id:	Q-LAH_80124-9274
Version:	2.7
Description:	The [OBD_Driving_Cycle] signal must be sent as an initial value with a value of 0 - even when transmitted for the first-time by the signal generator.

Id:	Q-LAH_80124-9275
Version:	2.7
Description:	In the as-received condition, the [OBD_Driving_Cycle == 1] information must have never been received previously; it must be initialized with a value of 0 in the server.

Id:	Q-LAH_80124-9276
Version:	2.7
Description:	If the [OBD_Driving_Cycle] information with a value of 1 has never before been received by the server, all boundary conditions (e.g., evaluation of the speed signal for services) are considered fulfilled (status "OBD_Driving_Cycle_notSet").

Id:	Q-LAH_80124-9277
Version:	2.7
Description:	If the [OBD_Driving_Cycle] information is detected by the server for the first time with a leading edge (value 0 --> value 1), this information must be stored in non-volatile memory and must not be changed (Transition (1)).

Id:	Q-LAH_80124-9278
Version:	2.7
Description:	After the [OBD_Driving_Cycle information] with the value 1 has been received by the server, boundary conditions for services (e.g., evaluation of the speed signal) must be evaluated in accordance with the definition (Transition (2), status "OBD_Driving_Cycle_setOnce").

Id:	Q-LAH_80124-9007
Version:	2.7
Description:	After the [OBD_Driving_Cycle] with the value 1 is received for the first time, a signal marked as "not received" applies as a not-satisfied boundary condition (timeout).

Id:	Q-LAH_80124-9008
Version:	2.7
Description:	After the [OBD_Driving_Cycle] with the value 1 is received for the first time, a received initial value for a signal to be tested applies as a not-satisfied boundary condition.

Id:	Q-LAH_80124-9009
Version:	2.7
Description:	After the [OBD_Driving_Cycle] with the value 1 is received for the first time, a received error General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-9279
Version:	2.7
Description:	For update programming of a previously initially set up diagnostic server to be possible, the boundary conditions for the Volkswagen AG diagnostic protocol are only deemed met if: [OBD_Driving_Cycle == 1] (status "OBD_Driving_Cycle_setOnce") has already been received for the first time, and all signals pertinent to update programming are marked as "not received."

Id:	Q-LAH_80124-9280
Version:	2.7
Description:	Table 17-2: Not-received signals as valid boundary conditions for PrimaryOBDECUs Signal Cvt. Speed signal M Propulsion system active M

Id:	Q-LAH_80124-9281
Version:	2.7
Description:	Table 17-3: Not-received signals as valid boundary conditions for NonOBDECUs Signal Cvt. Speed signal M Propulsion system active U

Id:	Q-LAH_80124-9283
Version:	2.7
Description:	A Q-bit for a signal to be tested must not be evaluated as a boundary condition.

Id:	Q-LAH_80124-9010
Version:	2.7
Description:	The signals must be taken from the currently valid data specifications or Fibex.

Id:	Q-LAH_80124-9012
Version:	2.7
Description:	The speed signal as per the current data specifications must be filtered as a boundary condition and access or continuous testing for diagnostic services.

Id:	Q-LAH_80124-9013
Version:	2.7
Description:	The speed signal debounced for diagnostic purposes is designated vDiagService.

Id:	Q-LAH_80124-9014
Version:	2.7
Description:	Each server must determine when the speed threshold is exceeded (the debounced speed signal applies).

Id:	Q-LAH_80124-9016
Version:	2.7
Description:	The boundary conditions are considered fulfilled if the received speed signal has a value <= speed threshold (vDiagService_Threshold).

Id:	Q-LAH_80124-9017
Version:	2.7
Description:	The boundary conditions are considered not fulfilled if the received speed signal is applied with a value > speed threshold for longer than two seconds (2 s).

Id:	Q-LAH_80124-9018
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9286
Version:	2.7
Description:	Thresholds and debounce periods for other signals that are used as boundary conditions for services must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-9265
Version:	2.7

Description:	No other boundary conditions may be evaluated. If additional boundary conditions are required for reasons of component or vehicle safety, this must be agreed upon with the Diagnostics department and documented in the BT-LAH.

Id:	Q-LAH_80124-9266
Version:	2.7
Description:	If the boundary conditions are not fulfilled, a request with the CommunicationControl service (28hex) must be rejected with a corresponding negative response.

Id:	Q-LAH_80124-9309
Version:	2.7
Description:	If the specified boundary conditions/preconditions are adversely affected for an active CommunicationControl (28hex) service with sub-function in the range 0x01 - 0x7E, the server must end the state (return to EnableRxAndTx state) and resume the transmission of application messages. In this case, the current DiagnosticSession must be preserved.

Id:	Q-LAH_80124-10002
Version:	2.7
Description:	If the monitoring of certain boundary conditions is not possible due to the active state CommunicationControl(0x28), these must be ignored or considered to be fulfilled in the active state CommunicationControl(0x28). In the case of [Signal_DiagService_invalid], the boundary conditions must be considered to be fulfilled.

Id:	Q-LAH_80124-1500
Version:	2.7
Description:	Safety-relevant servers activate a limited limp-home-mode if the transmitting/receiving behavior set by the CommunicationControl service (28hex) is active.

Id:	Q-LAH_80124-7037
Version:	2.7
Description:	Possible limp-home features or strategies based on active CommunicationControl (28hex) must be documented in the component safety strategy.

Id:	Q-LAH_80124-9715
Version:	2.7

Description:	With the setting of the CommunicationControl state (28hex) with sub-function EnableRxDisableTx (0x01), a starting of the engine (internal combustion engine and electric motor) is prevented for the entire ignition cycle.

Id:	Q-LAH_80124-9716
Version:	2.7
Description:	For restoring the starting capability of the motor, a change in ignition status (terminal 15 General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-10265
Version:	2.7
Description:	PrimaryOBDECUs are only permitted to run the CommunicationControl (28hex) service with the subfunction parameters EnableRxAndTx (0x00), EnableRxAndDisableTx (0x01), DisableRxAndEnableTx (0x02), and DisableRxAndTx (0x03) if the service is received with functional addressing.

Id:	Q-LAH_80124-9037
Version:	2.7
Description:	The boundary conditions from the following table apply:

Id:	Q-LAH_80124-9268
Version:	2.7
Description:	Table 17-4: Boundary conditions for PrimaryOBDECUs Condition Description Operation Cvt. vDiagService <= vDiagService_Threshold Speed signal <= threshold M Propulsion system not active No driving readiness M The server is only permitted to run the service if it is received with functional addressing and the following subfunction parameters: AND Service is functionally addressed. - EnableRxAndTx (0x00) M - EnableRxAndDisableTx (0x01) - DisableRxAndEnableTx (0x02) - DisableRxAndTx (0x03)

Id:	Q-LAH_80124-7939
Version:	2.7
Description:	The boundary conditions from the following table apply:

Id:	Q-LAH_80124-9269
Version:	2.7
Description:	Table 17-5: Boundary conditions for NonOBDECUs or SecondaryOBDECUs Condition Description Operation Cvt. vDiagService <= vDiagService_Thresh-

	old Speed signal <= threshold AND M Propulsion system not active No driving readiness U

Id:	Q-LAH_80124-8111
Version:	2.7
Description:	In the Component Performance Specification it must be documented which of the input bus signals are used for the evaluation. The data specifications currently valid for the server must be used.

Id:	Q-LAH_80124-8110
Version:	2.7
Description:	It must be documented in the Component Performance Specification whether optional signals are also evaluated.

Id:	Q-LAH_80124-8112
Version:	2.7
Description:	If the boundary conditions are not fulfilled, a request with the ControlDTCSetting service (85hex) must be rejected with a corresponding negative response.

Id:	Q-LAH_80124-1872
Version:	2.7
Description:	Before and during the execution of the ControlDTCSetting service (85hex), the server must test the boundary conditions in consideration of system-relevant tolerances.

Id:	Q-LAH_80124-8130
Version:	2.7
Description:	If the boundary conditions are no longer fulfilled, the state or the functionality of the ControlDTCSetting must be discontinued. The current DiagnosticSession must be preserved.

Id:	Q-LAH_80124-9717
Version:	2.7
Description:	With the setting of the ControlDTCSetting state (85hex) with sub-function Off (0x02), a starting of the engine (internal combustion engine and electric motor) is prevented for the entire ignition cycle.

Id:	Q-LAH_80124-9718

Version:	2.7
Description:	An ignition cycle (terminal 15 off/on) must be performed to restore the engine's starting capability.

Id:	Q-LAH_80124-8132
Version:	2.7
Description:	PrimaryOBDECUs must execute the ControlDTCSetting (85hex) service only if this is received by the client with functional addressing.

Id:	Q-LAH_80124-8134
Version:	2.7
Description:	OBDECUs must execute the ControlDTCSetting (85hex) service only if the OBD_Driving_Cycle == 0 OBD status information is fulfilled as per the data definition currently in effect.

Id:	Q-LAH_80124-9032
Version:	2.7
Description:	The boundary conditions from the following table apply:

Id:	Q-LAH_80124-9270
Version:	2.7
Description:	Table 17-6: Boundary conditions for PrimaryOBDECUs Condition Description Operation Cvt. v < vDiagService DiagService_Threshold Speed signal < threshold M Propulsion system not active No driving readiness AND M Service is functionally addressed. Service must be executed by the server only if this M is received with functional addressing.

Id:	Q-LAH_80124-8136
Version:	2.7
Description:	Requirements with respect to OBD legislation (CARB, Technical Meeting May 2006) for active ControlDTCSetting (85hex), the vehicle must be at a standstill. Previously, this requirement was fulfilled by the boundary conditions in the ECM (motor start block) and in the transmission control module (friction locking block) Due to the increasing use of electrical components and OBDECUs, there is the necessity to implement the requirements above also for new OBDECUs that themselves cannot guarantee that the vehicle is at a standstill.

Id:	Q-LAH_80124-9271
Version:	2.7

Description:	The boundary conditions from the following table apply:

Id:	Q-LAH_80124-8109
Version:	2.7
Description:	Table 17-7: Boundary conditions for NonOBDECUs or SecondaryOBDECUs Condition Description Operation Cvt. v < vDiagService DiagService_Threshold Speed signal < threshold AND M General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9272
Version:	2.7
Description:	There are no general requirements for the boundary conditions.

Id:	Q-LAH_80124-9919
Version:	2.7
Description:	It may be necessary to define system-specific boundary conditions (e.g., v = 0) that must be checked by the server before executing the ECUReset service. If the service cannot be executed, a corresponding negative response must be sent to the client.

Id:	Q-LAH_80124-9920
Version:	2.7
Description:	If system-specific boundary conditions exist, these must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-8545
Version:	2.7
Description:	PrimaryOBDECUs are only permitted to run the ECUReset (11hex) service if the following boundary conditions are met:

Id:	Q-LAH_80124-9296
Version:	2.7
Description:	Table 17-8: Boundary conditions for PrimaryOBDECUs Condition Description Operation Cvt. v < vDiagService DiagService_Threshold Speed signal < threshold AND M PropulsionSystemNotActive No driving readiness M

Id:	Q-LAH_80124-9041
Version:	2.7

Description:	If system-specific boundary conditions exist, these must be documented in the BT-LAH.

Id:	Q-LAH_80124-10011
Version:	2.7
Description:	For the service 04hex, there must be no other boundary conditions except for those described in the "Boundary conditions for services" section.

Id:	Q-LAH_80124-10013
Version:	2.7
Description:	The clearing of the event memory via the service 04hex is permissible only if all of the following boundary conditions are fulfilled:

Id:	Q-LAH_80124-10072
Version:	2.7
Description:	Table 17-9: Boundary conditions for PrimaryOBDECU_MILMasters Condition Description Operation Cvt. v < vDiagService DiagService_Threshold Speed signal < threshold M Terminal 15 on OR Terminal 15 on AND [Terminal 15 off AND OR M [[ORU-Signal == RUNNING] OR Terminal 15 off with OnlineRemoteUpdate active General Project-Independent Performance Specification LAH.DUM.-909.G Propulsion system not active No driving readiness M

Id:	Q-LAH_80124-10015
Version:	2.7
Description:	If all boundary conditions from the table "Boundary conditions for PrimaryOBDECU_MILMasters" are met for the PrimaryOBDECU_MILMaster, the signal [OBD_ClearMem_Inhibit] is set to a value of "0."

Id:	Q-LAH_80124-10263
Version:	2.7
Description:	If at least one of the boundary conditions from the table "Boundary conditions for PrimaryOBDECU_MILMasters" is NOT met for the PrimaryOBDECU_MILMaster, the signal [OBD_ClearMem_Inhibit] is set to a value of "1."

Id:	Q-LAH_80124-10264
Version:	2.7
Description:	The clearing of the event memory must be processed by the PrimaryOBDECU_MILMaster via the service ClearResetEmissionRelatedDiagnosticInformation (04hex) only if the boundary conditions for the clearing are fulfilled. Sig-

	naling via the signal [OBD_ClearMem_Inhibit] (value 0 = clearing of the event memory possible).

Id:	Q-LAH_80124-10016
Version:	2.7
Description:	If signal(s) that are used as the initial value for the signal [OBD_ClearMem_Inhibit] are not present/invalid, they are considered to be fulfilled in order to enable clearing, e.g., in partial installation.

Id:	Q-LAH_80124-10017
Version:	2.7
Description:	To ensure backward compatibility, it must be possible to use calibration to deactivate setting of the [OBD_ClearMem_Inhibit] signal to the value = 1 by the PrimaryOBDECU_MILMaster.

Id:	Q-LAH_80124-10018
Version:	2.7
Description:	If setting of the signal [OBD_ClearMem_Inhibit] is deactivated in the PrimaryOBDECU_MILMaster via calibration, the PrimaryOBDECU_MILMaster also performs clearing under all circumstances.

Id:	Q-LAH_80124-10014
Version:	2.7
Description:	The [OBD_ClearMem_Inhibit] signal must be read by the DECECU via the bus.

Id:	Q-LAH_80124-10020
Version:	2.7
Description:	Clearing of the event memory for a DECECU via the service ClearResetEmissionRelatedDiagnosticInformation (04hex) is permissible only if the [OBD_-ClearMem_Inhibit] signal has a value of "0" (equivalent to clearing of event memory possible).

Id:	Q-LAH_80124-10021
Version:	2.7
Description:	If the [OBD_ClearMem_Inhibit] signal is not present or is invalid, then it must be possible for the DECECU to clear the event memory using the ClearResetEmissionRelatedDiagnosticInformation (04hex) service.

Id:	Q-LAH_80124-10071

Version:	2.7
Description:	Table 17-10: Boundary conditions for DECECUs Condition Description Operation Cvt. General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-9826
Version:	2.7
Description:	In addition to the component-specific specifications, diagnostic communication is also a necessary reason for maintaining diagnostic activity in state t.15 OFF and a DefaultSession OR a NonDefaultSession

Id:	Q-LAH_80124-9667
Version:	2.7
Description:	The display or status for exchanging diagnostic messages is designated by means of bit information in the network management message as per document /17/.

Id:	Q-LAH_80124-9668
Version:	2.7
Description:	This information is called "NM_DiagActive" below.

Id:	Q-LAH_80124-9669
Version:	2.7
Description:	The generally valid designation for "NM_DiagActive" must be taken from document /17/.

Id:	Q-LAH_80124-9692
Version:	2.7
Description:	To avoid operating diagnostics continuously, even during t.15 OFF, a server must limit the diagnostics mode for power-consumption reasons.

Id:	Q-LAH_80124-9693
Version:	2.7
Description:	A server must implement two timers: T_NM_DiagActive (used to indicate the reason for maintaining diagnostic activity within the DefaultSession) T_Diag_Enable (used to force the suppression of diagnostic communication in the case of no further internal server reasons for maintaining diagnostic activity)

Id:	Q-LAH_80124-9694

Version:	2.7
Description:	While a server is in a NonDefaultSession, the information NM_DiagActive must be set to the value 1.

Id:	Q-LAH_80124-9708
Version:	2.7
Description:	If the timer T_NM_DiagActive for diagnostic requests/responses within the DefaultSession is running, the NM_DiagActive information must be set to the value 1.

Id:	Q-LAH_80124-9709
Version:	2.7
Description:	After expiration of the T_NM_DiagActive timer within the DefaultSession, the information NM_DiagActive must be set to the value 0 (diagnostic communication as reason for maintaining diagnostic activity no longer present).

Id:	Q-LAH_80124-9671
Version:	2.7
Description:	A timer T_NM_DiagActive must be implemented.

Id:	Q-LAH_80124-9675
Version:	2.7
Description:	The timer T_NM_DiagActive must be started or re-triggered with the following exceptions for all requests and responses within the DefaultSession: Functionally addressed TesterPresent with SuppressPositiveResponseBit == 1 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9676
Version:	2.7
Description:	The T_NM_DiagActive timer must always be started or retriggered on joining the DefaultSession if the DefaultSession is joined due to a S3Server-Time-Out or through the DiagnosticSessionControl (10hex) service.

Id:	Q-LAH_80124-9702
Version:	2.7
Description:	The T_NM_DiagActive timer must be stopped when changing to a NonDefault-Session.

Id:	Q-LAH_80124-9672

Version:	2.7
Description:	The timer value for T_NM_DiagActive is 10 seconds

Id:	Q-LAH_80124-9696
Version:	2.7
Description:	A timer T_Diag_Enable must be implemented.

Id:	Q-LAH_80124-9829
Version:	2.7
Description:	The T_Diag_Enable timer must not be an internal server diagnostic activity maintenance/sleep condition.

Id:	Q-LAH_80124-9697
Version:	2.7
Description:	The T_Diag_Enable timer must be started under the following boundary conditions (logical OR operation): Transition from t.15 ON to t.15 OFF T.15 OFF and activation of the DefaultSession after start-up

Id:	Q-LAH_80124-9698
Version:	2.7
Description:	The T_Diag_Enable timer must be stopped when switching from the DefaultSession to a NonDefaultSession.

Id:	Q-LAH_80124-9706
Version:	2.7
Description:	The T_Diag_Enable timer must no longer be considered when the T_NM_DiagActive timer has elapsed.

Id:	Q-LAH_80124-9699
Version:	2.7
Description:	The timer value for T_Diag_Enable is defined as follows:

Id:	Q-LAH_80124-9700
Version:	2.7
Description:	T_Diag_Enable = 60 s

Id:	Q-LAH_80124-9701
Version:	2.7

Description:	T_Diag_Enable = 900 s (15 min) - on transition from t.15 ON to t.15 OFF

Id:	Q-LAH_80124-9704
Version:	2.7
Description:	After the T_Diag_Enable timer has elapsed, requests being processed must be processed and, if necessary, answered before the transition to "ReadyToSleep" may take place (elimination of wake-up reason "NM_DiagActive"), if no other reasons for maintaining diagnostic activity are active in the server.

Id:	Q-LAH_80124-9703
Version:	2.7
Description:	After the T_Diag_Enable timer has elapsed, only requests must be accepted and processed by the server if there is an additional reason for maintaining diagnostic activity in the server.

Id:	Q-LAH_80124-10241
Version:	2.7
Description:	After the T_Diag_Enable timer expires, the T_NM_DiagActive timer must not be restarted or retriggered within the current DefaultSession so that diagnostics are not a keep-awake General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9827
Version:	2.7
Description:	If a diagnostic server is awake, and bus communication is taking place, diagnostic communication must be possible. To allow this to happen, network management as per /17/ must keep the buses of the entire diagnostic communication path (diagnostic client <- > diagnostic server) active.

Id:	Q-LAH_80124-9681
Version:	2.7
Description:	The following descriptions for starting and stopping the timers apply:

Id:	Q-LAH_80124-9682
Version:	2.7
Description:	Figure 18-1: Description for starting and stopping the timers Start Start Restart Stop

Id:	Q-LAH_80124-10240

Version:	2.7
Description:	Multiple response arrows in succession in the following figures represent the transmission of a segmented response message. This representation must not be confused with NRC 0x78.

Id:	Q-LAH_80124-9679
Version:	2.7
Description:	Figure 18-2: Behavior within DefaultSessions for terminal 15 OFF

Id:	Q-LAH_80124-9842
Version:	2.7
Description:	Figure 18-3: Behavior within DefaultSessions for terminal 15 ON

Id:	Q-LAH_80124-9705
Version:	2.7
Description:	Figure 18-4: Behavior within DefaultSessions for terminal 15 OFF - T_Diag_Enable running

Id:	Q-LAH_80124-10123
Version:	2.7
Description:	Figure 18-5: Behavior within NonDefaultSessions for terminal 15 OFF – T_Diag_Enable stopped

Id:	Q-LAH_80124-9683
Version:	2.7
Description:	Figure 18-6: Behavior for S3 timeout and terminal 15 OFF Client Server Server Timer UDS_S3 Timer NM_ Timer Kl.15 NM_DiagActive Diagnose_ aktiv Diag_Enable Wakeup DefaultSession Request Session Wechsel NonDefaultSession 0 T_Diag_Enable T_NM_DiagActive Stop restarted Response NonDefaultSession 3E 80 Functional 3E 80 Functional Request Response Response 1 Response 0 DefaultSession T_NM_DiagActive elapsing T_Diag_Enable Wachhaltegrund Diagnose Stop wird zurückgenommen 0 Kl.15 Terminal 15 Request Session Wechsel NonDefaultSession Request Session change, NonDefaultSession General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9685
Version:	2.7
Description:	Figure 18-7: Behavior for S3 timeout, terminal 15 OFF, and additional diagnostic communication in DefaultSession Client Server Server Timer UDS_S3 Timer

	NM_ Timer Kl. 1 5 NM_DiagActive Diagnose _aktiv Diag_Enable Wakeup Defaul tSessi on 0 Request Session Wechsel NonDefaultSession T_Diag_Enable T_NM_DiagActive Stop restarted Response NonDefaul tSessi on 3 E 80 Functional

Id:	Q-LAH_80124-9689
Version:	2.7
Description:	Figure 18-8: Behavior for NonDefaultSession and terminal 15 leading edge See also Transition (35) from the "State transition diagram of DiagnosticSessions (server)" section. Client Server Server Timer UDS_S3 Timer NM_ Timer Kl.15 NM_DiagActive Diagnose _aktiv Diag _Enable Wakeup DefaultSess ion R e q u e st Se ssio n We ch se l N o n D e fa u ltSe ssio n 0 T_ Diag_ Enable T_NM_-DiagActive Stop restarted R e sp o n se NonDefaultSess ion 3E 8 0 Fu n ctio n a l 3E 8 0 Fu n ctio n a l R e q u e st 0 R e sp o n se R e sp o n se R e sp o n se Kl.15 steigende Flanke [Transition (35)] S3 not elapsing / Default Session DefaultSess ion T_NM_ DiagActive restarted R e q u e st R e sp o n se R e sp o n se R e sp o n se 1

Id:	Q-LAH_80124-5464
Version:	2.7
Description:	Only the NegativeResponseCodes (NRCs) indicated in this section are permitted for negative responses (Response SID = 7Fhex).

Id:	Q-LAH_80124-8376
Version:	2.7
Description:	The NRCs are divided into three ranges: 0x00: ISOSAE-Reserved 0x01 - 0x7F: NRCs that are used for the communications or the protocol 0x80 - 0xFF: NRCs that can be returned for special boundary conditions at the time of the request, if the generic NRC 0x22 is not unique

Id:	Q-LAH_80124-8377
Version:	2.7
Description:	For the NRC range 0x80 - 0xFF the following applies: If these NRCs are used, the processing for the appropriate service must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-8600
Version:	2.7
Description:	The generic NRCs (0x10, 0x11, 0x21, 0x78, 0x26, 0x25, 0x7E, 0x7F) are not described in the tables of the individual services and are generally applicable.

Id:	Q-LAH_80124-8601
Version:	2.7
Description:	The service-specific NRC behavior is described in the sections on services.

Id:	Q-LAH_80124-5676
Version:	2.7
Description:	Table 19-1: Description of all permissible NegativeResponseCodes (NRCs) NRC Description (hex)

Id:	Q-LAH_80124-9048
Version:	2.7
Description:	01 - 0F ISOSAE-Reserved

Id:	Q-LAH_80124-9049
Version:	2.7
Description:	GeneralReject

Id:	Q-LAH_80124-9050
Version:	2.7

Id:	Q-LAH_80124-9051
Version:	2.7

Id:	Q-LAH_80124-9638
Version:	2.7
Description:	IncorrectMessageLengthOrInvalidFormat

Id:	Q-LAH_80124-9052
Version:	2.7
Description:	ResponseTooLong

Id:	Q-LAH_80124-9053
Version:	2.7
Description:	15 - 20 ISOSAE-Reserved

Id:	Q-LAH_80124-9054
Version:	2.7

Description:	BusyRepeatRequest This NRC indicates that the receiver is busy or occupied at the same time as the request and thus the processing of the received service is not possible. The client must repeat the service request after PNRC21_Repetition_Time.

Id:	Q-LAH_80124-9055
Version:	2.7

Id:	Q-LAH_80124-9056
Version:	2.7

Id:	Q-LAH_80124-9057
Version:	2.7
Description:	RequestSequenceError

Id:	Q-LAH_80124-9058
Version:	2.7
Description:	NoResponseFromSubnetComponent This NRC indicates that the sub-system or slave system connected to the server has not responded within a certain

Id:	Q-LAH_80124-9059
Version:	2.7
Description:	FailurePreventsExecutionOfRequestedAction This NRC indicates that, in the server, an event has occurred (StatusOfDTC: TestFailed, Pending, Confirmed, or TestFailedSinceLastClear with the value 1), which prevents the correct execution of the requested UDS service. 26 A client must not use this NRC as a precondition for ReadDTCInformation (19hex). Furthermore, the NRC must not be used in services for reading the event memory (e.g., ReadDTCInformation).

Id:	Q-LAH_80124-9060
Version:	2.7
Description:	27 - 30 ISOSAE-Reserved

Id:	Q-LAH_80124-9061
Version:	2.7
Description:	RequestOutOfRange

Id:	Q-LAH_80124-9062

Version:	2.7

Id:	Q-LAH_80124-9063
Version:	2.7
Description:	SecurityAccessDenied This NRC shows that the diagnostic service requested by the client is not running because the access protection

Id:	Q-LAH_80124-9064
Version:	2.7

Id:	Q-LAH_80124-9065
Version:	2.7
Description:	InvalidKey

Id:	Q-LAH_80124-9066
Version:	2.7

Id:	Q-LAH_80124-9067
Version:	2.7

Id:	Q-LAH_80124-9068
Version:	2.7
Description:	38 - 6F ISOSAE-Reserved

Id:	Q-LAH_80124-9069
Version:	2.7

Id:	Q-LAH_80124-9070
Version:	2.7
Description:	TransferDataSuspended

Id:	Q-LAH_80124-9071
Version:	2.7
Description:	GeneralProgrammingFailure

Id:	Q-LAH_80124-9072
Version:	2.7

Description:	WrongBlockSequenceCounter

Id:	Q-LAH_80124-9073
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9074
Version:	2.7
Description:	RequestCorrectlyReceived-ResponsePending This NRC indicates that the service was correctly received and processed, but a positive response cannot yet be sent. The server cannot process or respond to any more requests for a certain period of time P2*Server_max. Within this time period P2*Server_max, the same response can be repeated by the server (many times if necessary). After executing the requested service with prior use of at least one NRC 0x78, a positive or negative response must be

Id:	Q-LAH_80124-9075
Version:	2.7
Description:	79 - 7D ISOSAE-Reserved

Id:	Q-LAH_80124-9076
Version:	2.7
Description:	SubFunctionNotSupportedInActiveDiagnosticSession This NRC indicates that the server does not support the requested sub-function parameter in the active session. Within the ProgrammingSession (0x02), the NRC 0x12 can be used instead of NRC 0x7E. 7E This NRC must only be used if the sub-function of the service is also supported in a different session. If not, the NRC 0x12 must be used. As a general requirement, the NRC must be supported by every service with a subfunction parameter. Note: Within the boot loader, there is no knowledge about subfunctions supported in the application.

Id:	Q-LAH_80124-9077
Version:	2.7
Description:	ServiceNotSupportedInActiveDiagnosticSession This NRC indicates that the requested service is not supported in the active session. This NRC must be used only if the service is supported in a different session than the current session. If not, the NRC 0x11 must be used. 7F This NRC must not be sent if the service received could simply be unlocked via a SecurityAccess. As a general requirement, the NRC must be supported by every service. Note: Within the boot loader, there is no knowledge about services supported in the application.

Id:	Q-LAH_80124-9078
Version:	2.7

Id:	Q-LAH_80124-9079
Version:	2.7
Description:	RpmTooHigh

Id:	Q-LAH_80124-9080
Version:	2.7
Description:	RpmTooLow

Id:	Q-LAH_80124-9081
Version:	2.7
Description:	EngineIsRunning

Id:	Q-LAH_80124-9082
Version:	2.7
Description:	EngineIsNotRunning

Id:	Q-LAH_80124-9083
Version:	2.7
Description:	EngineRunTimeTooLow

Id:	Q-LAH_80124-9084
Version:	2.7
Description:	TemperatureTooHigh

Id:	Q-LAH_80124-9085
Version:	2.7
Description:	TemperatureTooLow

Id:	Q-LAH_80124-9086
Version:	2.7
Description:	VehicleSpeedTooHigh

Id:	Q-LAH_80124-9087

Version:	2.7
Description:	VehicleSpeedTooLow

Id:	Q-LAH_80124-9088
Version:	2.7
Description:	ThrottlePedalTooHigh 8A This NRC indicates that the accelerator pedal position has exceeded a predefined value and therefore the requested service cannot be executed (e.g., during an actuator test).

Id:	Q-LAH_80124-9089
Version:	2.7
Description:	ThrottlePedalTooLow 8B This NRC indicates that the accelerator pedal position has fallen below a predefined value and therefore the requested service cannot be executed (e.g., during an actuator test).

Id:	Q-LAH_80124-9090
Version:	2.7
Description:	TransmissionRangeNotInNeutral 8C This NRC indicates that the selector lever is not in neutral and therefore the requested service cannot be executed (e.g., during an actuator test).

Id:	Q-LAH_80124-9091
Version:	2.7
Description:	TransmissionRangeNotInGear 8D This NRC indicates that the transmission is not engaged in a gear and therefore the requested service cannot be executed (e.g., during an actuator test).

Id:	Q-LAH_80124-9092
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9093
Version:	2.7
Description:	8F BrakeSwitch(es)NotClosed This NRC indicates that the brake pedal is not pressed.

Id:	Q-LAH_80124-9094
Version:	2.7

Description:	ShifterLeverNotInPark

Id:	Q-LAH_80124-9095
Version:	2.7
Description:	TorqueConverterClutchLocked

Id:	Q-LAH_80124-9096
Version:	2.7
Description:	VoltageTooHigh

Id:	Q-LAH_80124-9097
Version:	2.7
Description:	VoltageTooLow

Id:	Q-LAH_80124-9098
Version:	2.7
Description:	94 - EF ISOSAE-Reserved

Id:	Q-LAH_80124-9099
Version:	2.7
Description:	BasicSettingNotStarted The NRC indicates that it was not possible to execute the requested routine/basic setting due to a missing system F0 setting. This is the case if, e.g., the server still must learn the peripherals or the vehicle.

Id:	Q-LAH_80124-9100
Version:	2.7
Description:	NotConfigured F1 This NRC indicates that the requested function was not yet coded (activated) (e.g., for multiple installation). Can be applied to diagnostic object activation based on SW configuration (e.g., available DataIdentifiers)

Id:	Q-LAH_80124-9101
Version:	2.7
Description:	F2 - F9 Volkswagen AG-Reserved

Id:	Q-LAH_80124-9102
Version:	2.7
Description:	ECUSpecificConditionsNotCorrect FA - FE This NRC indicates that a sys-tem-specific boundary condition for the requested service is not fulfilled. Notice:

	The use cases must be specified and documented in the Component Performance Specification.

Id:	Q-LAH_80124-9103
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-5678
Version:	2.7
Description:	The identifiers defined for this specification must be implemented in accordance with Volkswagen AG specifications in a system-specific or generic manner as defined by Volkswagen AG. The current Volkswagen AG specifications for DataIdentifiers, RoutineIdentifiers, and InputOutputIdentifiers with length, format, text IDs, and resolution are defined by the Volkswagen AG Diagnostic Specifications department. These identifiers are defined in the BT-LAH specific to the system in agreement with the Volkswagen AG Diagnostic Specifications department.

Id:	Q-LAH_80124-5680
Version:	2.7
Description:	The DataIdentifiers must be implemented in accordance with the Component Performance Specification.

Id:	Q-LAH_80124-5682
Version:	2.7
Description:	The InputOutputIdentifiers must be implemented in accordance with the Component Performance Specification.

Id:	Q-LAH_80124-5684
Version:	2.7
Description:	The RoutineIdentifiers must be implemented in accordance with the Component Performance Specification.

Id:	Q-LAH_80124-7453
Version:	2.7
Description:	See appendix B.

Id:	Q-LAH_80124-5688
Version:	2.7

Description:	The error and notice codes must be implemented in accordance with the Component General Project-Independent Performance Specification LAH.DUM.909.-G

Id:	Q-LAH_80124-9594
Version:	2.7
Description:	The priority (DTC priority) of a DTC must be defined as per document /2/.

Id:	Q-LAH_80124-9595
Version:	2.7
Description:	The occurrence counter (OCC) must be defined as per document /2/.

Id:	Q-LAH_80124-9596
Version:	2.7
Description:	The aging counter must be defined as per document /2/.

Id:	Q-LAH_80124-9581
Version:	2.7
Description:	The time stamp for the event memory for output via ReadDTCInformation (19hex) is defined as follows:

Id:	Q-LAH_80124-7898
Version:	2.7
Description:	Table 20-1: Time stamp 5-byte layout Byte 0 Byte 1 Byte 2 Byte 3 Byte 4

Id:	Q-LAH_80124-5691
Version:	2.7
Description:	Table 20-2: Request StandardDTCInformation Data Parameter name, request Bit- Cvt. Hex length #1 ReadDTCInformation Request Service Id 8 M 19 #2 DTCInformationType = 8 M 06 ReportDTCExtendedDataRecordByDTCNumber #3 DTCHighByte 8 M xx #4 DTCMiddleByte 8 M xx #5 DTCLowByte 8 M xx #6 DTCExtendedDataRecordNumber 8 M 01

Id:	Q-LAH_80124-7895
Version:	2.7
Description:	Table 20-3: Response StandardDTCInformation Data Parameter name, response Bit- Cvt. Hex length #1 ReadDTCInformation Response Service Id 8 M 59 #2 ReportType = ReportDTCExtendedDataRecordByDTCNumber 8 M 06 #3

	DTCHighByte 8 M xx #4 DTCMiddleByte 8 M xx #5 DTCLowByte 8 M xx #6 StatusOfDTC 8 M xx #7 DTCExtendedDataRecordNumber 8 M 01 DTC priority Priority High nibble #8 0x0 (default) 8 M 0x Low nibble 0x0 = NotAvailable 0x1 - 0x6 0x7 - 0xF = reserved #9 OCC Occurrence counter

Id:	Q-LAH_80124-6783
Version:	2.7
Description:	Table 20-4: Request DTCExtendedDataRecordNumber 0x02 Data Parameter name, request Bit- Cvt. Hex length #1 ReadDTCInformation Request Service Id 8 M 19 #2 DTCInformationType = 8 M 06 ReportDTCExtendedDataRecordByDTCNumber #3 DTCHighByte 8 M xx #4 DTCMiddleByte 8 M xx #5 DTCLowByte 8 M xx #6 DTCExtendedDataRecordNumber 8 M 02

Id:	Q-LAH_80124-7897
Version:	2.7
Description:	Table 20-5: Response DTCExtendedDataRecordNumber 0x02 Data Parameter name, response Bit- Cvt. Hex length #1 ReadDTCInformation Response Service Id 8 M 59 #2 ReportType = ReportDTCExtendedDataRecordByDTCNumber 8 M 06 #3 DTCHighByte 8 M xx #4 DTCMiddleByte 8 M xx #5 DTCLowByte 8 M xx #6 StatusOfDTC 8 M xx #7 DTCExtendedDataRecordNumber 8 M 02 #8 Aging counter 8 M xx Km-Mileage #1 Km-Mileage #2 #9 Km-Mileage #3 8 M xx #10 Value 8 M xx #11 0x000000 - 0x0FFFFD 8 M xx 0x0FFFFE = Init 0x0FFFFF = Error 0xFFFFFF = NotAvailable #12 TimeIndication 8 M 00 #13 Timestamp#1 8 M xx #14 Timestamp#2 8 M xx #15 Timestamp#3 8 M xx #16 Timestamp#4 8 M xx General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7905
Version:	2.7
Description:	Table 20-6: Request SystemSpecificDTCExtendedDataRecordNumbers Data Parameter name, request Bit- Cvt. Hex length #1 ReadDTCInformation Request Service Id 8 M 19 #2 DTCInformationType = 8 M 06 ReportDTCExtendedDataRecordByDTCNumber #3 DTCHighByte 8 M xx #4 DTCMiddleByte 8 M xx #5 DTCLowByte 8 M xx #6 DTCExtendedDataRecordNumber 8 M 03 - 70

Id:	Q-LAH_80124-7906
Version:	2.7
Description:	Table 20-7: Response SystemSpecificDTCExtendedDataRecordNumbers Data Parameter name, response Bit- Cvt. Hex length #1 ReadDTCInformation Response Service Id 8 M 59 #2 ReportType = ReportDTCExtendedDataRecordByDTCNumber 8 M 06 #3 DTCHighByte 8 M xx #4 DTCMiddleByte 8 M xx #5 DT-

	CLowByte 8 M xx #6 StatusOfDTC 8 M xx #7 DTCExtendedDataRecordNumber 8 M 03 - 70 #8 DataRecord#1 #1 8 M xx #9 DataRecord#1 #2 8 C1 xx : : : : : #9 + n DataRecord#1 #n 8 C1 xx : : : : : #9 + n + 1 DataRecord#k #1 8 C1 xx #9 + n + 2 DataRecord#k #2 8 C1 xx : : : : : #9 + n + o DataRecord#k #o 8 C1 xx

Id:	Q-LAH_80124-7907
Version:	2.7
Description:	C1 - Only present if more than one static datum is defined for the ambient data for the DTC.

Id:	Q-LAH_80124-9900
Version:	2.7
Description:	The format of an ExtendedDataRecordNumber (number, structure, and sequence of General Project-Independent Performance Specification LAH.DUM.-909.G

Id:	Q-LAH_80124-9537
Version:	2.7
Description:	Within this document, the diagnostic objects described below must be implemented.

Id:	Q-LAH_80124-9936
Version:	2.7
Description:	The diagnostic objects must be available in sessions as per document /3/.

Id:	Q-LAH_80124-6414
Version:	2.7
Description:	If no routine, InputOutputControl, or SecurityAccess is started, the default value must always be output.

Id:	Q-LAH_80124-7384
Version:	2.7
Description:	Table 21-1: Generic DataIdentifiers DID Meaning Initial value Note (hex) DataIdentifier 0x0100 outputs the overall status (logical OR operation) of all InputOutputControls active in the server to the client Status of InputOutputControl

Id:	Q-LAH_80124-9538
Version:	2.7

Description:	The DataIdentifier 0x0102 outputs the overall status (logical OR operation) of all active RoutineControls to the client.

Id:	Q-LAH_80124-9565
Version:	2.7
Description:	Signal [OBD_Driving_Cycle] is 0x00: Not active

Id:	Q-LAH_80124-9540
Version:	2.7
Description:	Response_On_Event 0x00: Not active 02B3 Status EventTrigger 0x02 0x01: Active 0x02: Not initialized 0x03 - 0xFF: Reserved by Volkswagen AG

Id:	Q-LAH_80124-9539
Version:	2.7
Description:	Default value is dependent on the Definition: 8000 - 83FF Status of individual InputOutputControls state of the See section InputOutputControl (2Fhex) InputOutputContro General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-9548
Version:	2.7
Description:	As per the description of the ClearDiagnosticInformation (14hex) service, a developer event memory is cleared by RoutineControl (31hex).

Id:	Q-LAH_80124-10230
Version:	2.7
Description:	This RoutineIdentifier must be implemented as per the section "RoutineControl (31hex) and the parameters required here.

Id:	Q-LAH_80124-9549
Version:	2.7
Description:	The following RoutineIdentifier is defined for this purpose:

Id:	Q-LAH_80124-9542
Version:	2.7
Description:	Table 21-3: RoutineIdentifier definition Hex: Description, RoutineIdentifier Cvt. 045A Clear_user_defined_DTC_information C1

Id:	Q-LAH_80124-9557

Version:	2.7
Description:	C1 - The routine must be implemented only if user-defined DTC information is supported.

Id:	Q-LAH_80124-9556
Version:	2.7
Description:	With this parameter value, all user-defined DTC information is cleared.

Id:	Q-LAH_80124-9552
Version:	2.7
Description:	Table 21-4: RoutineOption #1 - #3 Data Description of RoutineControlOption#1 - #3 Cvt. Hex #5 RoutineControlOption#1 (MemorySelection) M FF #6 RoutineControlOption#2 (reserved) M FF #7 RoutineControlOption#3 (reserved) M FF

Id:	Q-LAH_80124-9559
Version:	2.7
Description:	With this parameter value, all user-defined DTC information (MemorySelection) in the range from 0x10 to 0xFE is cleared. MemorySelections in the range from 0x00 to 0x0F may not be cleared in this way.

Id:	Q-LAH_80124-9554
Version:	2.7
Description:	Table 21-5: RoutineOption #1 - #3 Data Description of RoutineControlOption#1 - #3 Cvt. Hex #5 RoutineControlOption#1 (MemorySelection) M 10 - FE #6 RoutineControlOption#2 (reserved) M FF General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8313
Version:	2.7
Description:	Special RoutineIdentifiers that require a defined request are defined for the after-sales service and production processes. The handling and mechanisms for these RoutineIdentifiers are defined in document /10/.

Id:	Q-LAH_80124-10233
Version:	2.7
Description:	This RoutineIdentifier must be implemented as per the section "RoutineControl (31hex) and the parameters required here.

Id:	Q-LAH_80124-8314
Version:	2.7
Description:	The following RoutineIdentifier is defined for this purpose:

Id:	Q-LAH_80124-8315
Version:	2.7
Description:	Table 21-6: RoutineIdentifier definition Hex: Description, RoutineIdentifier Cvt.

Id:	Q-LAH_80124-8316
Version:	2.7
Description:	C1 - If after-sales service and repair shop parameters are defined as per document /10/.

Id:	Q-LAH_80124-8317
Version:	2.7
Description:	The RoutineControlOption for these RoutineIdentifiers is defined with the following values in the request:

Id:	Q-LAH_80124-8318
Version:	2.7
Description:	Table 21-7: RoutineOption #1 - #3 Data Description of RoutineControlOption#1 - #3 Cvt. Hex #5 RoutineControlOption#1 M 00 #6 RoutineControlOption#2 M 00 #7 RoutineControlOption#3 M 00

Id:	Q-LAH_80124-8319
Version:	2.7
Description:	It is possible specific to the system to define additional values for the RoutineControlOption#1-#3 values. The effects of each value must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-8320
Version:	2.7
Description:	Table 21-8: RoutineOption #1 - #3 Data Description of RoutineControlOption#1 - #3 Cvt. Hex #5 RoutineControlOption#1 M 000001 #6 RoutineControlOption#2 M - General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9653
Version:	2.7

Description:	Special RoutineIdentifiers that require a defined request are defined for the after-sales service and production processes. The handling and mechanisms for these RoutineIdentifiers are defined in document /10/.

Id:	Q-LAH_80124-10232
Version:	2.7
Description:	This RoutineIdentifier must be implemented as per the section "RoutineControl (31hex) and the parameters required here.

Id:	Q-LAH_80124-9654
Version:	2.7
Description:	The following RoutineIdentifier is defined for this purpose:

Id:	Q-LAH_80124-9655
Version:	2.7
Description:	Table 21-9: RoutineIdentifier definition Hex: Description, RoutineIdentifier Cvt. 03E7 Reset_to_factory_setting C1

Id:	Q-LAH_80124-9656
Version:	2.7
Description:	C1 - If vehicle, customer, after-sales service, process parameters, initial calibration or learned values are defined as per document /10/.

Id:	Q-LAH_80124-9657
Version:	2.7
Description:	The RoutineControlOption for these RoutineIdentifiers is defined with the following values in the request:

Id:	Q-LAH_80124-9658
Version:	2.7
Description:	Table 21-10: RoutineOption #1 - #3 Data Description of RoutineControlOption#1 - #3 Cvt. Hex #5 RoutineControlOption#1 M 00 #6 RoutineControlOption#2 M 00 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-10210
Version:	2.7
Description:	Situations can exist for a diagnostic server in which a RoutineIdentifier or DataIdentifier is used for configuration, calibration or initial setup purposes, and can-

	not be executed due to preconditions not being met (e.g., engine running, undervoltage, immobilizer, etc.).

Id:	Q-LAH_80124-10214
Version:	2.7
Description:	To ensure that a diagnostic server is in a safe state prior to configuring, the client checks the conditions for the error-free configuration of the diagnostic server immediately prior to the calibration step.

Id:	Q-LAH_80124-10215
Version:	2.7
Description:	The applicable configuration preconditions must be agreed upon with the Diagnostic Specifications department and documented in the BT-LAH. The preconditions correspond to the programming preconditions from document /3/.

Id:	Q-LAH_80124-10213
Version:	2.7
Description:	RoutineIdentifier 0xC013-Check_calibration_pre_conditions is used to query the unfulfilled preconditions from the diagnostic server.

Id:	Q-LAH_80124-10231
Version:	2.7
Description:	This RoutineIdentifier must be implemented with the request/response behavior and parameters required here. It is impermissible for all the RoutineIdentifiers in this section to use the: StopRoutine (0x02) RequestRoutineResults (0x03) General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-10211
Version:	2.7
Description:	The following request message must be implemented:

Id:	Q-LAH_80124-10212
Version:	2.7
Description:	Table 21-11: RoutineIdentifier definition Data Description Cvt. Value (hex) #1 Request service ID RoutineControl M 31 #2 RoutineControlType StartRoutine M 01 #3 RoutineIdentifier [Byte#1] Check_calibration_pre_conditions [Byte#1] (MSB) M C0 #4 RoutineIdentifier [Byte#2] Check_calibration_pre_conditions [Byte#2] M 13 #5 RoutineControlOption#1 Configuration_Typ M 00 - FF #6 Rou-

	tineControlOption#2 Parameter_ID [Byte#1] (MSB) M 00 - FF #7 RoutineControlOption#3 Parameter_ID [Byte#2] M 00 - FF

Id:	Q-LAH_80124-10218
Version:	2.7
Description:	The following request message parameter definition must be implemented:

Id:	Q-LAH_80124-10219
Version:	2.7
Description:	Table 21-12: Request message parameter definition Definition Configuration_Typ This parameter states the configuration type used based on a UDS service. 0x01 = WriteDataByIdentifier (2Ehex) 0x02 = RoutineControl (31hex) Other values are reserved by Volkswagen AG. Parameter_ID This parameter states the diagnostic object used by the configuration (RoutineIdentifier or DataIdentifier). Example: 0x0301 = Bluetooth_Search_Devices (RID for service 31hex) General Project-Independent Performance Specification LAH.DUM.909.-G

Id:	Q-LAH_80124-10221
Version:	2.7
Description:	The following response message definition must be implemented:

Id:	Q-LAH_80124-10222
Version:	2.7
Description:	Table 21-13: Response message definition Data Description Cvt. Value (hex) #1 Response SID RoutineControl M 71 #2 RoutineControlType StartRoutine M 01 #3 RoutineIdentifier [Byte#1] Check_calibration_pre_conditions [Byte#1] (MSB) M C0 #4 RoutineIdentifier [Byte#2] Check_calibration_pre_conditions [Byte#2] M 13 #5 RoutineStatusRecord#1 Configuration_Typ M 00 - FF #6 RoutineStatusRecord#2 Parameter_ID [Byte#1] (MSB) M 00 - FF #7 RoutineStatusRecord#3 Parameter_ID [Byte#2] M 00 - FF #8 RoutineStatusRecord#4 Number_of_preconditions M 00 - FF #9 RoutineStatusRecord#5 Configuration_precondition_list [Byte#1] C1 00 - FF : : : : #m RoutineStatusRecord#n Configuration_precondition_list [Byte#n] C1 00 - FF

Id:	Q-LAH_80124-10225
Version:	2.7
Description:	C1 - Only exists if the server has configuration preconditions.

Id:	Q-LAH_80124-10236

Version:	2.7
Description:	The following response message parameter definition must be implemented:

Id:	Q-LAH_80124-10224
Version:	2.7
Description:	Table 6-8: Response message parameter definition Definition Configuration_Typ This parameter is used in the server response as an echo of the client request and has the same meaning. Parameter_ID This parameter is used in the server response as an echo of the client request and has the same meaning. Number_of_preconditions The value indicates the number of unfulfilled preconditions. Example: 0x00 = The configuration does not have any preconditions. 0x02 = Two preconditions are not met. Configuration_precondition_list This parameter outputs a list of the unfulfilled preconditions. Example: 01dec = Engine speed non-zero 09dec = Ignition (terminal 15) is switched off

Id:	Q-LAH_80124-10235
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-10093
Version:	2.7
Description:	An OBDReadyECU that already determines IUMPR data must output this data using the mechanism described in this section.

Id:	Q-LAH_80124-10144
Version:	2.7
Description:	The IUMPRs determined in the server must be output as IUMPR single ratios via ReadDataByIdentifier (22hex) service in order to simplify the analysis of field data.

Id:	Q-LAH_80124-10145
Version:	2.7
Description:	All IUMPR single ratios determined in the server must be output using DataIdentifier 0x018A- In_use_monitor_performance_ratio.

Id:	Q-LAH_80124-10229
Version:	2.7
Description:	The recommendation for SecondaryOBDECUs as of DK3 is to determine the IUMPR single ratios separately, and output them via the DataIdentifier 018A-

	In_use_monitor_performance_ratio. Note: Generic representation in the PrimaryOBDECUs is not possible as it is impossible to tell using this interface that IUMPR single ratios are required for the symptom in question.

Id:	Q-LAH_80124-10146
Version:	2.7
Description:	The DataIdentifier is defined as follows:

Id:	Q-LAH_80124-10148
Version:	2.7
Description:	Table 22-1: IUMPR DataIdentifiers DID Designation Identifier Description (hex) 018A In_use_monitor_performance_ratio IUMPR- Byte 0 Version DIDSINGLE Byte 1 Number of IUMPR Byte 2 single ratios Byte 3 Mileage Byte 4 Byte 5 Ignition Cycle Counter Byte 6 Byte 7 General Denominator Byte 8 Start iteration Byte n + 0 Byte n + 1 DFCC value Byte n + 2 Byte n + 3 Numerator Byte n + 4 Byte n + 5 Denominator Byte n + 6 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-10147
Version:	2.7
Description:	IUMPR DataIdentifier 0x018A consists of a constant part, in which the general IUMPR data of the server is output, and a repeating part (iteration) used to output all function-specific IUMPR single ratios in succession.

Id:	Q-LAH_80124-10149
Version:	2.7
Description:	The maximum number of IUMPR single ratios that can be output using DataIdentifier 0x018A is limited to 580. Note: This limit is a result of ISO-TP via Classical CAN.

Id:	Q-LAH_80124-10150
Version:	2.7
Description:	Parameter "Number of IUMPR single ratios" is used to specify the total number IUMPR single ratios that can be output in the iteration.

Id:	Q-LAH_80124-10154
Version:	2.7
Description:	The parameter version in byte 0 of DataIdentifier 0x018A must be output with a value of 0x01.

Id:	Q-LAH_80124-10245
Version:	2.7
Description:	An OBDReadyECU that already determines EI (Emission Increasing) (Auxiliary Emission Control Device) AECD data must output this data using the mechanism described in this section.

Id:	Q-LAH_80124-10246
Version:	2.7
Description:	This section only describes the UDS output method for EI-AECD records in order to facilitate the analysis of field data among other things.

Id:	Q-LAH_80124-10247
Version:	2.7
Description:	The classification of an AECD as an EI-AECD must be agreed upon with the OBD Certification department.

Id:	Q-LAH_80124-10248
Version:	2.7
Description:	The EI-AECD records determined in the server must be output using DataIdentifier 0x49D9- General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-10249
Version:	2.7
Description:	The DataIdentifier is defined as follows:

Id:	Q-LAH_80124-10250
Version:	2.7
Description:	Table 22-1 EI-AECD DataIdentifier DID Designation Identifier Description (hex) 49D9 EI_AECD_tracking EIAECD- Byte 0 Version DIDSINGLE Byte 1 Number_of_EI_AECD_records Byte 2 Byte 3 Byte 4 Total_time_with_propulsion_system_active Byte 5 Byte 6 Byte 7 Byte 8 Total_time_with_fueled_engine_operation Byte 9 Byte 10 Byte 11 Byte 12 Total_time_with_system_active Byte 13 Byte 14 Start iteration Byte n + 0 Byte n + 1 EI_AECD_ID Byte n + 2 Byte n + 3 Byte n + 4 EI_AECDx_TIME1 Byte n + 5 Byte n + 6 Byte n + 7 Byte n + 8 EI_AECDx_TIME2 Byte n + 9 Byte n + 10 end iteration

Id:	Q-LAH_80124-10261

Version:	2.7
Description:	DataIdentifier 0x49D9 consists of a constant part, in which the general EI-AECD data of the server is output, and a repeating part (iteration) used to consecutively output all EI-AECD records for the individual EI-AECDs.

Id:	Q-LAH_80124-10251
Version:	2.7
Description:	The maximum number of EI-AECD records that can be output using DataIdentifier 0x49D9 is limited to 360. Note: This limit is a result of ISO-TP via Classical CAN.

Id:	Q-LAH_80124-10252
Version:	2.7
Description:	The parameter [Number_of_EI-AECD_records] is used to specify the total number EI-AECD records that can be output via the iteration.

Id:	Q-LAH_80124-10253
Version:	2.7
Description:	The [Version] parameter in byte 0 of DataIdentifier 0x49D9 must be output with a value of 0x01.

Id:	Q-LAH_80124-10254
Version:	2.7
Description:	An EI-AECD record consists of an EI_AECD_ID that uniquely describes the EI-AECD assigned to the timers.

Id:	Q-LAH_80124-10255
Version:	2.7
Description:	The two timers required for EI-AECDs must be output via the parameters General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-10256
Version:	2.7
Description:	The parameter [Total_time_with_propulsion_system_active] must be used to output the time in seconds that the vehicle spends in state P.

Id:	Q-LAH_80124-10257
Version:	2.7

Description:	The parameter [Total Time with fueled engine operation] must be used to output the time in seconds that the vehicle spends in the ready to drive state, and where the internal combustion engine is additionally running.

Id:	Q-LAH_80124-10258
Version:	2.7
Description:	[Total Time with System active] must be used as an alternative for [Total Time with propulsion system active] and [Total Time with fueled engine operation]. [Total Time with System active] must be used to output the function-specific time in seconds in which the function or system is active. The timer then acts as a reference for the EI-AECD records. Example: During high-voltage charging, the active charging time must be output here as the EI-AECD only takes effect during charging. A comparison with the total charging time must also be made.

Id:	Q-LAH_80124-10259
Version:	2.7
Description:	The timer [Total Time with System active] must only be used if the function influenced by an General Project-Independent Performance Specification LAH.-DUM.909.G

Id:	Q-LAH_80124-7931
Version:	2.7
Description:	The ranges for DataIdentifier RoutineIdentifier InputOutputIdentifier described in the following tables.

Id:	Q-LAH_80124-8604
Version:	2.7
Description:	Identifiers that must be implemented for all servers are described in the document /3/.

Id:	Q-LAH_80124-8605
Version:	2.7
Description:	From document /3/, calibrations for all the systems are generated (e.g., BT-LAH or ODX calibrations).

Id:	Q-LAH_80124-2383
Version:	2.7
Description:	Table 23-1: DataIdentifiers Hex: Description of DataIdentifier Cvt. 0000 - 00FF ISOSAE-Reserved NoImp

Id:	Q-LAH_80124-9104
Version:	2.7
Description:	0100 - 0400 Reserved by Volkswagen AG C Assigned by the purchaser's Diagnostic Specifications department.

Id:	Q-LAH_80124-9108
Version:	2.7
Description:	0401 - 041F FlashAndDataCounter C

Id:	Q-LAH_80124-9109
Version:	2.7
Description:	0420 - 5FFF Reserved by Volkswagen AG C Assigned by the purchaser's Diagnostic Specifications department.

Id:	Q-LAH_80124-9128
Version:	2.7
Description:	6000 - 6FFF Volkswagen AG-Reserved C

Id:	Q-LAH_80124-9134
Version:	2.7
Description:	7000 - 70FF Reserved by Volkswagen AG C Assigned by the purchaser's Diagnostic Specifications department.

Id:	Q-LAH_80124-9135
Version:	2.7
Description:	7100 - 71FF VWDatasetIdentificationBLF C Data set designation (boot loader)

Id:	Q-LAH_80124-9136
Version:	2.7
Description:	7200 - 72FF VWDatasetIdentificationAPP C Data set designation (application)

Id:	Q-LAH_80124-9137
Version:	2.7
Description:	7300 - 7FFF Reserved by Volkswagen AG C General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9138

Version:	2.7
Description:	StatusOfIOControls 8000 - 83FF This value range is reserved for the output of the status of actuator tests (service C 2Fhex).

Id:	Q-LAH_80124-9141
Version:	2.7
Description:	8400 - A5FF Reserved by Volkswagen AG C Assigned by the purchaser's Diagnostic Specifications department.

Id:	Q-LAH_80124-9142
Version:	2.7
Description:	A600 - A7FF ISOSAE-Reserved NoImp

Id:	Q-LAH_80124-9143
Version:	2.7
Description:	A800 - ACFF Reserved by Volkswagen AG C Assigned by the purchaser's Diagnostic Specifications department.

Id:	Q-LAH_80124-9144
Version:	2.7
Description:	AD00 - AFFF ISOSAE-Reserved NoImp

Id:	Q-LAH_80124-9145
Version:	2.7
Description:	B000 - B1FF Reserved by Volkswagen AG C Assigned by the purchaser's Diagnostic Specifications department.

Id:	Q-LAH_80124-9146
Version:	2.7
Description:	B200 - BFFF ISOSAE-Reserved NoImp

Id:	Q-LAH_80124-9147
Version:	2.7
Description:	C000 - C2FF Volkswagen AG-Reserved NoImp

Id:	Q-LAH_80124-9148
Version:	2.7
Description:	C300 - CEFF ISOSAE-Reserved NoImp

Id:	Q-LAH_80124-9149
Version:	2.7
Description:	CF00 - EFCF Reserved by Volkswagen AG C Assigned by the purchaser's Diagnostic Specifications department.

Id:	Q-LAH_80124-9151
Version:	2.7
Description:	EFD0 - EFFF SupplierSpecificDataIdentifier C Manufacturer ECU-specific range

Id:	Q-LAH_80124-9152
Version:	2.7
Description:	F000 - F00F networkConfigurationDataForTractorTrailerApplicationDataIdentifier C

Id:	Q-LAH_80124-9153
Version:	2.7
Description:	F010 - F0FF Reserved by Volkswagen AG C Assigned by the purchaser's Diagnostic Specifications department.

Id:	Q-LAH_80124-9154
Version:	2.7
Description:	F100 - F17F GlobalIdentificationDataIdentifier C General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9155
Version:	2.7
Description:	F180 - F19F ISO-DataIdentifier C See document /3/

Id:	Q-LAH_80124-9156
Version:	2.7
Description:	F1A0 - F1EF GlobalIdentificationDataIdentifier C See document /3/

Id:	Q-LAH_80124-9157
Version:	2.7
Description:	SupplierSpecificDataIdentifier F1F0 - F1FF identificationOptionSystemSupplierSpecific U Manufacturer ECU-specific range

Id:	Q-LAH_80124-9158

Version:	2.7
Description:	PeriodicDataIdentifier F200 - F2FF This value range is reserved for data and measurement values that can be C transmitted to the client periodically (only for use with service 2Ahex)

Id:	Q-LAH_80124-9159
Version:	2.7
Description:	DynamicallyDefinedDataIdentifier F300 - F3FF This value range is reserved for data and measurement values that can be NoImp defined dynamically (for use with service 2Chex)

Id:	Q-LAH_80124-9160
Version:	2.7
Description:	OBDDataIdentifier This range is reserved for PrimaryOBDECUs. F400 - F4FF The mapping rule for the 1-byte ParameterIDs/MonitorIDs consists of the offsets C (+) F400hex Note: These DataIdentifiers must not be supported by NonOBDECUs.

Id:	Q-LAH_80124-9161
Version:	2.7
Description:	F500 - F5FF OBDDataIdentifier C

Id:	Q-LAH_80124-9162
Version:	2.7
Description:	F600 - F6FF OBDMonitorDataIdentifier C This range is reserved for OBD/EOBD monitoring results. The mapping rule for the 1-byte MonitorIDs consists of the offset (+) F600hex Note: These DataIdentifiers must not be supported by NonOBDECUs.

Id:	Q-LAH_80124-9163
Version:	2.7
Description:	F700 - F7FF OBDMonitorDataIdentifier C

Id:	Q-LAH_80124-9164
Version:	2.7
Description:	OBDInfoTypeDataIdentifier F800 - F8FF This range is reserved for OBD/EOBD InfoType values. C The mapping rule for the 1-byte InfoTypes consists of the offset (+) F800hex Note: These DataIdentifiers must not be supported by NonOBDECUs.

Id:	Q-LAH_80124-9165
Version:	2.7
Description:	F900 - F9FF TachographDataIdentifier C This range is reserved for safety-relevant DIDs.

Id:	Q-LAH_80124-9166
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-9167
Version:	2.7
Description:	FA10 - FA18 EventDataRecorderInformation C As per ISO 26021-2

Id:	Q-LAH_80124-9639
Version:	2.7
Description:	FA19 - FAFF SafetySystem-DataIdentifier C

Id:	Q-LAH_80124-9168
Version:	2.7
Description:	FB00 - FCFF LegislativeUse-Reserved C

Id:	Q-LAH_80124-9169
Version:	2.7
Description:	FD00 - FEFF SystemSupplierSpecific U Manufacturer ECU-specific range

Id:	Q-LAH_80124-9170
Version:	2.7
Description:	FF00 - FFFF ISOSAE-Reserved NoImp

Id:	Q-LAH_80124-8743
Version:	2.7
Description:	C - Identifiers from this range are implemented as per the description in the Component Performance Specification.

Id:	Q-LAH_80124-8631
Version:	2.7
Description:	U - Identifiers from this range may be implemented, but must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-7549
Version:	2.7
Description:	The use of the InputOutputIdentifiers must be agreed upon with the Volkswagen AG Diagnostic Specifications department. These ranges will be expanded or supplemented during development. It must be possible to configure an optional testing for these range General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-4104
Version:	2.7
Description:	Table 23-2: RoutineIdentifiers Hex: Description, RoutineIdentifier Cvt. 0000 - 00FF ISOSAE-Reserved NoImp

Id:	Q-LAH_80124-9171
Version:	2.7
Description:	0100 - 01FF TachographTestIds C1

Id:	Q-LAH_80124-9172
Version:	2.7
Description:	0200 - 0201 Volkswagen AG-Reserved NoImp

Id:	Q-LAH_80124-9173
Version:	2.7
Description:	0202 - 0203 See document /9/. C2

Id:	Q-LAH_80124-9179
Version:	2.7
Description:	0204 - DFFF Reserved by Volkswagen AG C Assigned by the purchaser's Diagnostic Specifications department.

Id:	Q-LAH_80124-9183
Version:	2.7
Description:	E000 - E1FF OBDTestIDs U Test results of OBD/EOBD test routines

Id:	Q-LAH_80124-9184
Version:	2.7
Description:	DeploymentLoopRoutineID E200 - EFFF This value shall be used to initiate the deployment of the previously selected C1 ignition loop.

Id:	Q-LAH_80124-9185
Version:	2.7
Description:	E201 - E2FF SafetySystemRoutineIDs - ISOSAEReserved NoImp

Id:	Q-LAH_80124-9187
Version:	2.7
Description:	E300 - EFFF ISOSAE-Reserved NoImp

Id:	Q-LAH_80124-9188
Version:	2.7
Description:	F000 - FEFF SystemSupplierSpecific U RoutineIdentifier range for contractor routines

Id:	Q-LAH_80124-9189
Version:	2.7
Description:	FF00 - FF01 See document /9/. C2

Id:	Q-LAH_80124-9190
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-6877
Version:	2.7
Description:	C1 - RoutineIdentifiers from this range are implemented as per the description in the BT- LAH.

Id:	Q-LAH_80124-8798
Version:	2.7
Description:	C2 - Only relevant for flash/update programming as per document /9/.

Id:	Q-LAH_80124-8801
Version:	2.7
Description:	U - RoutineIdentifiers from this range may be implemented, but must be documented in the BT-LAH.

Id:	Q-LAH_80124-7548
Version:	2.7

Description:	The use of the RoutineIdentifiers must be agreed upon with the Volkswagen AG Diagnostic Specifications department. These ranges will be expanded or supplemented during development. It must be possible to configure an optional testing for these range limits.

Id:	Q-LAH_80124-3681
Version:	2.7
Description:	Table 23-3: InputOutputIdentifiers Hex: Description, InputOutputIdentifier Cvt. 0000 - 00FF ISOSAE-Reserved NoImp

Id:	Q-LAH_80124-9191
Version:	2.7
Description:	0100 - 83FF Reserved by Volkswagen AG C Assigned by the purchaser's Diagnostic Specifications department.

Id:	Q-LAH_80124-9201
Version:	2.7
Description:	8400 - FFFF Volkswagen AG-Reserved NoImp

Id:	Q-LAH_80124-8211
Version:	2.7
Description:	C - InputOutputIdentifiers from this range are implemented as per the description General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8409
Version:	2.7
Description:	This section describes the StatusOfDTC status byte or the bits contained therein.

Id:	Q-LAH_80124-9459
Version:	2.7
Description:	Deviations with respect to specific behavior of the StatusOfDTC bits for PrimaryOBDECUs are described in document /2/.

Id:	Q-LAH_80124-8410
Version:	2.7
Description:	The information is required for the ReadDTCInformation (19hex) service and is used as documentation of the state of the diagnostic monitor, event, symptom, or diagnostic path.

Id:	Q-LAH_80124-3405
Version:	2.7
Description:	The value 0bin must be used for StatusOfDTC bits that are not supported.

Id:	Q-LAH_80124-3313
Version:	2.7
Description:	The current status of the validation time/validation timeout (or event counter) must be re- initialized with the initial values on ECU wake-up or ECU start-up.

Id:	Q-LAH_80124-7192
Version:	2.7
Description:	For all communication monitoring, the following applies: After the successful bus initialization (CAN, LIN, MOST, FlexRay), the TestNotCompletedSinceLastClear bit (bit 4) and the TestNotCompletedThisOperationCycle bit (bit 6) are set to 0bin for all instances of communication monitoring of the respective bus system.

Id:	Q-LAH_80124-8415
Version:	2.7
Description:	The operation cycle and driving cycle definitions for OBDECUs apply as per document /18/.

Id:	Q-LAH_80124-8996
Version:	2.7
Description:	If bits are set in the StatusAvailabilityMask, the bits must be supported in the StatusOfDTC for all DTCs.

Id:	Q-LAH_80124-9640
Version:	2.7
Description:	The time of the saving is described in document /2/.

Id:	Q-LAH_80124-8417
Version:	2.7
Description:	The information for the TestFailed bit must be stored in non-volatile memory.

Id:	Q-LAH_80124-8418
Version:	2.7
Description:	The information for the PendingDTC bit must be stored in non-volatile memory.

Id:	Q-LAH_80124-8419
Version:	2.7
Description:	The information for the ConfirmedDTC bit must be stored in non-volatile memory.

Id:	Q-LAH_80124-8420
Version:	2.7
Description:	The information for the TestFailedSinceLastClear bit must be stored in non-volatile memory.

Id:	Q-LAH_80124-8421
Version:	2.7
Description:	The information for the TestNotCompletedSinceLastClear bit must be stored in non-volatile memory.

Id:	Q-LAH_80124-8422
Version:	2.7
Description:	The information for the WarningIndicatorRequested bit must be stored in non-volatile General Project-Independent Performance Specification LAH.DUM.909.-G

Id:	Q-LAH_80124-9714
Version:	2.7
Description:	Notice: For PrimaryOBDECUs, the OperationCycle corresponds to one DrivingCycle. Therefore, one operation cycle can extend across several ignition cycles due to "non- validation" of the driving cycle (see also document /2/).

Id:	Q-LAH_80124-9994
Version:	2.7
Description:	A PrimaryOBDECU must support all bits of the StatusOfDTC.

Id:	Q-LAH_80124-9712
Version:	2.7
Description:	The information for the TestNotCompletedThisOperationCycle bit must be stored in non- volatile memory by a server in the sense of a PrimaryOBDECU.

Id:	Q-LAH_80124-9713
Version:	2.7

Description:	The information for the TestFailedThisOperationCycle bit must be stored in non-volatile memory by a server in the sense of a PrimaryOBDECU.

Id:	Q-LAH_80124-8424
Version:	2.7
Description:	The StatusOfDTC byte includes eight bits with the following information

Id:	Q-LAH_80124-8425
Version:	2.7
Description:	Table 24-1: StatusOfDTC Bit pos. Description Cvt. Cvt. Byte OBD NonOBD

Id:	Q-LAH_80124-8426
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8428
Version:	2.7
Description:	The TestFailed bit in the StatusOfDTC indicates whether or not the test results of the last test performed reported an error.

Id:	Q-LAH_80124-8429
Version:	2.7
Description:	As long as there is no new test result, the current information of the TestFailed bit is maintained.

Id:	Q-LAH_80124-8430
Version:	2.7
Description:	At the beginning of a new operation cycle, the value of the TestFailed bit must be initialized with the last determined value of the previous operation cycle until there is a new test result available.

Id:	Q-LAH_80124-8433
Version:	2.7
Description:	0: Value of the bit after successful ClearDiagnosticInformation (14hex) or Clear-ResetEmissionRelatedDiagnosticInformation (04hex)

Id:	Q-LAH_80124-8435
Version:	2.7

Description:	0: The last DTC test is debounced and reports no error.

Id:	Q-LAH_80124-8436
Version:	2.7
Description:	1: The last DTC test is debounced and reports an error.

Id:	Q-LAH_80124-8437
Version:	2.7
Description:	Figure 24-1: StatusOfDTC.TestFailed ClearDiagnosticInformation oder Clear-ResetEmissionRelatedDiagnosticInformation TestResult (Passed) Init /Test-Failed = 0 /TestFailed = 1 TestResult (Failed) ClearDiagnosticInformation oder ClearDiagnosticInformation or General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8439
Version:	2.7
Description:	The TestFailedThisOperationCycle bit in the StatusOfDTC indicates whether a TestFailed result was determined with the value 1 during the current operation cycle.

Id:	Q-LAH_80124-8442
Version:	2.7
Description:	0: Value of the bit after successful ClearDiagnosticInformation (14hex) or Clear-ResetEmissionRelatedDiagnosticInformation (04hex)

Id:	Q-LAH_80124-8444
Version:	2.7
Description:	0: In the current operation cycle, a test result with TestFailed == 1 has yet to be detected for the DTC.

Id:	Q-LAH_80124-8445
Version:	2.7
Description:	1: In the current operation cycle, a test result with TestFailed == 1 has been detected for the DTC.

Id:	Q-LAH_80124-8446
Version:	2.7
Description:	Figure 24-2: StatusOfDTC.TestFailedThisOperationCycle ClearResetEmissionRelatedDiagnosticInformation ClearDiagnosticInformation OperationCy-

	cleChange Init /TestFailed /TestFailed ThisOperationCycle = 0 ThisOperationCycle = 1 General Project-Independent Performance Specification LAH.DUM.909.-G

Id:	Q-LAH_80124-8448
Version:	2.7
Description:	The PendingDTC bit in the StatusOfDTC indicates whether a TestFailed result was determined with the value 1 during the current or the last operation cycle.

Id:	Q-LAH_80124-8524
Version:	2.7
Description:	If a PendingDTC in the StatusOfDTC has the value 1, this status is preserved at least up to the end of the error-free (pass, no fail) operation cycle.

Id:	Q-LAH_80124-8455
Version:	2.7
Description:	The PendingDTC bit is reset after all conditions are satisfied (error-free operation cycle with TestFailedThisOperationCycle == 0 && TestNotCompletedThisOperationCycle == 0) at the beginning of the new operation cycle or for ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex) immediately.

Id:	Q-LAH_80124-8414
Version:	2.7
Description:	For resetting the PendingDTC bit, the operation cycle or driving cycle must not be considered without the test results.

Id:	Q-LAH_80124-8450
Version:	2.7
Description:	0: Value of the bit after successful ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex)

Id:	Q-LAH_80124-8452
Version:	2.7
Description:	0: In the current or last operation cycle, a test result with TestFailed == 1 has yet to be detected for the DTC.

Id:	Q-LAH_80124-8457
Version:	2.7

Description:	1: In the current or last operation cycle, a test result with TestFailed == 1 has been detected for the DTC.

Id:	Q-LAH_80124-8454
Version:	2.7
Description:	Figure 24-3: StatusOfDTC.PendingDTC OperationCycleChange [test-FailedThisOperationCycle == 0 && testNotCompletedThisOperationCycle == 0] ClearResetEmissionRelatedDiagnosticInformation ClearDiagnosticInformation Init /PendingDTC = 0 /PendingDTC = 1 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8459
Version:	2.7
Description:	The ConfirmedDTC bit in the StatusOfDTC is set if the TripCounter reaches the "ConfirmationThreshold" threshold.

Id:	Q-LAH_80124-9460
Version:	2.7
Description:	The TripCounter must be implemented by the server for each event memory, because a ConfirmedDTC is detected only across multiple operation cycles (Trip).

Id:	Q-LAH_80124-9456
Version:	2.7
Description:	The TripCounter is incremented if TestFailed == 1 is detected for the first time in the current operation cycle.

Id:	Q-LAH_80124-9457
Version:	2.7
Description:	At the end of the current operation cycle, the TripCounter is set to the value 0 if, within the current operation cycle, a "passed" test result and no "failed" test result is detected.

Id:	Q-LAH_80124-9458
Version:	2.7
Description:	The TripCounter is set to the value 0 if the ConfirmedDTC bit is set to the value 1.

Id:	Q-LAH_80124-8468
Version:	2.7

Description:	A ConfirmedDTC does not indicate whether there is a malfunction at the time of the ReadDTCInformation request (19hex).

Id:	Q-LAH_80124-8461
Version:	2.7
Description:	The ConfirmedDTC bit is reset to the value 0 at the end of the operation cycle if the DTC is unlearned as per document /2/ (40 warm-up cycles).

Id:	Q-LAH_80124-8525
Version:	2.7
Description:	The ConfirmedDTC bit is reset immediately in the case of the following: Clear-DiagnosticInformation (14hex) ClearResetEmissionRelatedDiagnosticInformation (04hex).

Id:	Q-LAH_80124-8997
Version:	2.7
Description:	The TripCounter value must be handled for the servers as follows: ConfirmationThreshold = 2 (US-OBD/NoOBD/NonOBD) ConfirmationThreshold = 3 (EOBD/NoOBD)

Id:	Q-LAH_80124-9461
Version:	2.7
Description:	The process in which the ConfirmedDTC bit is reset over a certain number of warm-up cycles is called "unlearning."

Id:	Q-LAH_80124-9462
Version:	2.7
Description:	Operation cycles without diagnostic results (passed/failed) must also be considered in the unlearning state.

Id:	Q-LAH_80124-9473
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8463
Version:	2.7
Description:	0: Value of the bit after successful ClearDiagnosticInformation (14hex) or Clear-ResetEmissionRelatedDiagnosticInformation (04hex)

Id:	Q-LAH_80124-8465
Version:	2.7
Description:	0: The DTC was not confirmed or debounced, or the DTC was unlearned or deleted.

Id:	Q-LAH_80124-8466
Version:	2.7
Description:	1: The DTC was confirmed or debounced at least once as per the Confirmation-Threshold.

Id:	Q-LAH_80124-8467
Version:	2.7
Description:	Figure 24-5: StatusOfDTC.ConfirmedDTC ClearResetEmissionRelatedDiag-nosticInformation ClearDiagnosticInformation OperationCycleChange [Test-FailedThisOperationCycle == 1] OperationCycleChange [AgingCriteriaFulfilled] / TripCounter ++ Init / ConfirmedDTC = 0 / ConfirmedDTC = 1 OperationCy-cleChange [TestResult [Failed && TripCounter == ConfirmationThreshold] Test-FailedThisOperationCycle == 0 && / TripCounter = 0 TestNotCompletedThisOp-erationCycle == 0] General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8470
Version:	2.7
Description:	The TestNotCompletedSinceLastClear bit in the StatusOfDTC indicates whether a test result was detected since the last ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex).

Id:	Q-LAH_80124-8540
Version:	2.7
Description:	It is reset to the value 1 for ClearDiagnosticInformation (14hex) or ClearResetE-missionRelatedDiagnosticInformation (04hex).

Id:	Q-LAH_80124-8475
Version:	2.7
Description:	1: Value of the bit after successful ClearDiagnosticInformation (14hex) or Clear-ResetEmissionRelatedDiagnosticInformation (04hex)

Id:	Q-LAH_80124-8477
Version:	2.7

Description:	1: For the DTC, no test result was still detected (pass or fail).

Id:	Q-LAH_80124-8480
Version:	2.7
Description:	0: For the DTC, a test result was detected at least once after ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex).

Id:	Q-LAH_80124-8479
Version:	2.7
Description:	Figure 24-7: StatusOfDTC.TestNotCompletedSinceLastClear ClearResetEmissionRelatedDiagnosticInformation /init and restart DiagnosticMonitor ClearDiagnosticInformation /init and restart DiagnosticMonitor / TestNotCompleted / TestNotCompleted General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8530
Version:	2.7
Description:	The TestFailedSinceLastClear bit in the StatusOfDTC indicates whether a test result with a "fail" test result was detected since the last ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex).

Id:	Q-LAH_80124-8528
Version:	2.7
Description:	It is reset to the value 0 for ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex).

Id:	Q-LAH_80124-9466
Version:	2.7
Description:	The TestFailedSinceLastClear bit must not be reset with the ConfirmedDTC bit based on the unlearning.

Id:	Q-LAH_80124-8535
Version:	2.7
Description:	0: Value of the bit after successful ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex)

Id:	Q-LAH_80124-8537
Version:	2.7

Description:	0: A test result with TestFailed == 1 has yet to be determined for the DTC after ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex).

Id:	Q-LAH_80124-8538
Version:	2.7
Description:	1: A test result with TestFailed == 1 has been determined for the DTC after ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex).

Id:	Q-LAH_80124-8539
Version:	2.7
Description:	Figure 24-8: StatusOfDTC.TestFailedSinceLastClear ClearResetEmissionRelatedDiagnosticInformation ClearDiagnosticInformation Init / TestFailed / TestFailed SinceLastClear = 0 SinceLastClear = 1 General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8482
Version:	2.7
Description:	The TestNotCompletedThisOperationCycle bit in the StatusOfDTC indicates whether a test result was determined within the current operation cycle.

Id:	Q-LAH_80124-8541
Version:	2.7
Description:	It is reset to the value 1 at the start of a new operation cycle or ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex).

Id:	Q-LAH_80124-8484
Version:	2.7
Description:	1: Value of the bit after successful ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex)

Id:	Q-LAH_80124-8486
Version:	2.7
Description:	0: For the DTC, a test result was detected within the current operation cycle.

Id:	Q-LAH_80124-8487
Version:	2.7

Description:	1: For the DTC, a test result was still not detected within the current operation cycle.

Id:	Q-LAH_80124-8488
Version:	2.7
Description:	Figure 24-9: StatusOfDTC.TestNotCompletedThisOperationCycle ClearResetEmissionRelatedDiagnosticInformation ClearDiagnosticInformation OperationCycleChange Init / TestNotCompleted / TestNotCompleted ThisOperationCycle =1 SinceLastClear = 0 TestResult (Failed) OR General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8492
Version:	2.7
Description:	The WarningIndicatorRequested bit in the StatusOfDTC indicates whether an optical or acoustic alarm or a substitute function is triggered for a DTC.

Id:	Q-LAH_80124-8499
Version:	2.7
Description:	Alarms can be, among other things, malfunction indicator lights or warning messages.

Id:	Q-LAH_80124-8500
Version:	2.7
Description:	If there is no alarm or substitute function for the DTC, the value of the WarningIndicatorRequested bit must always be set to the value 0.

Id:	Q-LAH_80124-8542
Version:	2.7
Description:	It is reset to the value 0 for rejection of the substitute function or ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex).

Id:	Q-LAH_80124-8494
Version:	2.7
Description:	0: Value of the bit after successful ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex)

Id:	Q-LAH_80124-8501
Version:	2.7

Description:	Some servers must preserve the WarningIndicatorRequested bit in the event of alarm information or substitute functions, even after successful ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex), until the substitute function is canceled (e.g., with change to terminal 15 OFF).

Id:	Q-LAH_80124-8502
Version:	2.7
Description:	The expanded use of the WarningIndicatorRequested bit for DTCs that must be kept after ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex) must be taken from document /2/ and documented in the Component Performance General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8496
Version:	2.7
Description:	0: For the DTC, no alarm information is output or no substitute function is active or the DTC supports no alarm information or substitute function.

Id:	Q-LAH_80124-8497
Version:	2.7
Description:	1: For the DTC, alarm information is output or a substitute function is active.

Id:	Q-LAH_80124-8498
Version:	2.7
Description:	Figure 24-10: StatusOfDTC.WarningIndicatorRequested OperationCycleChange [legislativeRequirementsFulfilled] ClearResetEmissionRelatedDiagnosticInformation [latchedFailSafeNotActive] ClearDiagnosticInformation [latchedFailSafeNotActive] TestResult [Passed && latchedFailSafeNotActive] Init / WarningIndicator / WarningIndicator Requested = 0 Requested = 1 TestResult [Failed && WarningIndicator OnCriteriaFulfilled]

Id:	Q-LAH_80124-8543
Version:	2.7
Description:	Notice for latchedFailSafeNotActive: For DTCs that must maintain the substitute function as per document /2/ for ClearDiagnosticInformation (14hex) or ClearResetEmissionRelatedDiagnosticInformation (04hex).

Id:	Q-LAH_80124-9529

Version:	2.7
Description:	Note for WarningIndicatorOnCriteriaFulfilled: Warning indicator light/substitute function is defined for DTC. The conditions that apply to WarningIndicatorOnCriteriaFulfilled must be General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8504
Version:	2.7
Description:	Only the DTCs currently configured for the server through the configuration via the service ReadDTCInformation (19hex), RequestEmissionRelatedDiagnosticInformation (03hex), or RequestEmissionRelatedDiagnosticTroubleCodesDetectedDuringCurrentOrLastCompletedD rivingCycle (07hex) must be output. Exceptions for the response/output are DTCs with relevant StatusMask and available ambient data.

Id:	Q-LAH_80124-9629
Version:	2.7
Description:	DTCs that are dependent on the configuration and are recorded in the event memory and are deactivated by a configuration must continue to be output via the service ReadDTCInformation (19hex), RequestEmissionRelatedDiagnosticInformation (03hex), or RequestEmissionRelatedDiagnosticTroubleCodesDetectedDuringCurrentOrLastCompletedD rivingCycle (07hex) until unlearned or deleted as per document /1/.

Id:	Q-LAH_80124-8505
Version:	2.7
Description:	Configurations offer the ability to deactivate functions. If a DTC is dependent on a function that can be activated or deactivated via configurations, this must be documented in the Component Performance Specification.

Id:	Q-LAH_80124-8506
Version:	2.7
Description:	DTCs that are dependent on the configuration and are recorded in the event memory and are deactivated by a configuration must not be implicitly removed from the event memory by an internal server process for clearing the event memory.

Id:	Q-LAH_80124-8507
Version:	2.7

Description:	A diagnostic monitor deactivated by configuration must report the following states to the event manager: Diagnostic boundary conditions satisfied Test cycle considered as having been run from start to end Diagnostic result passive

Id:	Q-LAH_80124-9921
Version:	2.7
Description:	For PrimaryOBDECUs, this is used, among other things, as a condition for removing the PermanentFaultCodes in the 0Ahex service.

Id:	Q-LAH_80124-8508
Version:	2.7
Description:	The DTC is thus unlearned if it has already been entered in the event memory.

Id:	Q-LAH_80124-8509
Version:	2.7
Description:	Furthermore, for the bits in the StatusOfDTC, the following state must be assumed: StatusOfDTC.Bit4: TestNotCompletedSinceLastClear = 0 StatusOfDTC.Bit6: TestNotCompletedThisOperationCycle = 0

Id:	Q-LAH_80124-8510
Version:	2.7
Description:	If the StatusOfDTC.Bit5 bit (TestFailedSinceLastClear) has the value 1 before a function/DTC deactivation, this bit is maintained at the value 1 also after this function/DTC General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8512
Version:	2.7
Description:	DTCs that are dependent on the configuration and are recorded in the event memory and that are deactivated by a configuration must be included in the response until unlearned.

Id:	Q-LAH_80124-8514
Version:	2.7
Description:	DTCs that are dependent on the configuration and are recorded in the snapshot memory and are deactivated by a configuration must be included in the response. If there is associated ambient data, this must also be output.

Id:	Q-LAH_80124-9940

Version:	2.7
Description:	DTCs that are dependent on the configuration and are recorded in the event memory and that are deactivated by the configuration must be included in the response for a query with 19hex 0x06 until unlearned. If there is associated ambient data, this must also be output.

Id:	Q-LAH_80124-9939
Version:	2.7
Description:	Only one of the following variants must be implemented.

Id:	Q-LAH_80124-8516
Version:	2.7
Description:	Variant 1: No special handling for configuration-dependent DTCs.

Id:	Q-LAH_80124-9934
Version:	2.7
Description:	Variant 2: The configuration-dependent DTCs must be responded to with NRC 0x31 for a query with 19hex 0x06.

Id:	Q-LAH_80124-9941
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-8520
Version:	2.7
Description:	The examples give a rough overview of the behavior of the StatusOfDTC bits.

Id:	Q-LAH_80124-8521
Version:	2.7
Description:	The TestFailed bit is set in the examples, because sufficient test results have been detected (an appropriate debounce period has already elapsed).

Id:	Q-LAH_80124-3378
Version:	2.7
Description:	Figure 24-11: StatusOfDTC - Representation with StatusAvailabilityMask 0x99 OperationCycle Cycle 1 Cycle 2 Cycle 3 Cycle 4 Cycle 5 Cycle 6 Cycle 7x monitoring cyclewithout test failed detectionCycle 43 passed TestResult no result

	failed TestNotCompleteSinceLastClear (Bit4) ConfirmedDTC (Bit3) 1 TestFailed (Bit0)

Id:	Q-LAH_80124-9625
Version:	2.7
Description:	Explanation of keys:

Id:	Q-LAH_80124-9626
Version:	2.7

Id:	Q-LAH_80124-9469
Version:	2.7
Description:	Figure 24-12: StatusOfDTC - Representation with StatusAvailabilityMask 0xFF for NonOBDECUs Op e ra tio n C ycle Cycle 1 Cycle 2 Cycle 3 Cycle 4 Cycle 5 Cycle 6 Cycle 6x monitoring cyclewithout test failed detectionCycle 46 passed Te stR e su lt no result failed 1 1 TestNotComplete ThisOperationCycle (Bit6) TestFailedSinceLastClear (Bit5) TestN otC om pleteSinceLastC lear (Bit4) Con-firmedDTC (Bit3) 3 PendingDTC (Bit2) Te stFa ile d Th isOp e ra tio n C ycle (Bit1) TestFailed (Bit0)

Id:	Q-LAH_80124-9471
Version:	2.7
Description:	Explanation of keys:

Id:	Q-LAH_80124-9470
Version:	2.7

Id:	Q-LAH_80124-10027
Version:	2.7
Description:	The substitute function/warning and thus the WarningIndicatorRequested bit can be canceled, for example: At the end of the OCY At the end of an error-free OCY At the end of three successive error-free DCYs (MIL behavior as per doc-ument /8/ and /11/) General Project-Independent Performance Specification LAH.DUM.909.G

Id:	Q-LAH_80124-7061
Version:	2.7
Description:	Figure 24-13: StatusOfDTC - Representation with StatusAvailabilityMask 0xFF for PrimaryOBDECUs Op e ra tio n C ycle Cycle 1 Cycle 2 Cycle 3 Cycle 4 Cy-

	cle 5 Cycle 6 Cycle 6x monitoring cyclewithout test failed detectionCycle 46 passed Te stR e su lt no result failed WarningLamp (Bit7) Entspricht MIL==ON TestNotComplete ThisOperationCycle (Bit6) TestFailedSinceLastClear (Bit5) TestNotCompleteSinceLastClear(Bit 4) ConfirmedDTC (Bit3) 1 PendingDTC (Bit2) TestFailedThisOperationCycle (Bit1) TestFailed (Bit0)

Id:	Q-LAH_80124-9202
Version:	2.7
Description:	Explanation of keys:

Id:	Q-LAH_80124-9203
Version:	2.7

Id:	Q-LAH_80124-6476
Version:	2.7
Description:	If not explicitly specified otherwise, the references cited here must be used in the currently applicable version.

Id:	Q-LAH_80124-6477
Version:	2.7
Description:	/1/ ISO 14229, Unified Diagnostic Services UDS, part 1-5, part 7

Id:	Q-LAH_80124-9870
Version:	2.7
Description:	/2/ LAH.DUM.909.A/J - Q-LAH 80114 NonOBD/OBD - General Diagnostic Functions of Electronic Vehicle Systems - version matching the Q-LAH package version

Id:	Q-LAH_80124-9871
Version:	2.7
Description:	/3/ LAH.DUM.909.H - Q-LAH 80125 - Identification of Electronic Vehicle Systems - version matching the Q-LAH package version

Id:	Q-LAH_80124-9872
Version:	2.7
Description:	/4/ OBD II COMPLIANCE TEST CASES J1699-3

Id:	Q-LAH_80124-9873
Version:	2.7

Description:	/5/ ISO 15765-2, Diagnostics on Controller Area Networks (CAN); part 2: Network Layer Services

Id:	Q-LAH_80124-9874
Version:	2.7
Description:	/6/ ISO 15765-3, Diagnostics on Controller Area Networks (CAN); part 3: Implementation of Diagnostic Services

Id:	Q-LAH_80124-9875
Version:	2.7
Description:	/7/ ISO 15765-4, Diagnostics on Controller Area Networks (CAN), part 4: Requirements for Emission-Related Systems

Id:	Q-LAH_80124-9876
Version:	2.7
Description:	/8/ SAE J1979 and ISO 15031-5

Id:	Q-LAH_80124-9877
Version:	2.7
Description:	/9/ LAH.DUM.906.A - Q-LAH 80126 - UDS-Compliant Programming of Electronic Control Units

Id:	Q-LAH_80124-9878
Version:	2.7
Description:	/10/ LAH.DUM.907.BE Diagnostics Data Types

Id:	Q-LAH_80124-9879
Version:	2.7
Description:	/11/ CCR 1968.2, (CARB OBD law) - FINAL REGULATION ORDER, title 13, California Code Regulations, section 1968.2, Malfunction and Diagnostic System Requirements for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines (OBD II)

Id:	Q-LAH_80124-9880
Version:	2.7
Description:	/12/ ISO 13400, Diagnostic over Internet Protocol

Id:	Q-LAH_80124-9881

Version:	2.7
Description:	/13/ LAH.DUM.907.AJ - Group Performance Specification "FlexRay"

Id:	Q-LAH_80124-9882
Version:	2.7
Description:	/14/ LAH.DUM.857.AG - Group Performance Specification "CAN"

Id:	Q-LAH_80124-9883
Version:	2.7
Description:	/15/ LAH.DUM.909.B - Q-LAH 80127 - Diagnostics for Distributed Systems; Diagnostics Requirements for Bus Masters and Systems - version matching the Q-LAH package version

Id:	Q-LAH_80124-9884
Version:	2.7
Description:	General Project-Independent Performance Specification LAH.DUM.909.G /16/ LAH.DUM.907.AS - Q-LAH Production Mode

Id:	Q-LAH_80124-9885
Version:	2.7
Description:	/17/ LAH.DUM.857.AK - Network Management High Group Performance Specification

Id:	Q-LAH_80124-9901
Version:	2.7
Description:	/18/ LAH.DUM.909.D - Diagnostics Glossary

Id:	Q-LAH_80124-10132
Version:	2.7