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1 Scope of the Document

This document specifies system requirements of AUTOSAR Diagnostic. It is meant to be independent of any particular implementation and it contains foundation requirements, common to AUTOSAR Classic and Adaptive Platform, as well as requirements specific to Classic Platform and Adaptive Platform.

In the Classic Platform chapter the handling of the legislated OBD and enhanced Diagnostics shall be achieved. As far as possible the set of diagnostic basic software elements should consist of already existing elements of modules of automotive software. Only in case of good reasons valid elements of basic software should be part of the set. If such the definition of these valid elements is not part of this work package. Nevertheless the information about basic software elements additionally required shall be given to related work groups.

In the Adaptive Platform chapter, some constraints should be notify related to the Adaptive environment: - only support for Ethernet as physical communication infrastructure will be provided, and no other typical bus communication is planned for release 1.0; on these grounds, all classical SRS Diagnostics requirements referring to standards (i.e. J1939) considering other bus protocols (i.e. FlexRay, CAN ..) were not considered in this specification
- due to insufficient information about the car domains where the AUTOSAR Adaptive Platform will apply, OBD protocol (standardized as ISO 15031) is also not subject of this specification
- Release 1.0 of AUTOSAR Adaptive Platform is planned to be a learning environment for future development as a consequence its interfaces are described with ICC1 (Interface Conformance Class) granularity level, meaning that no internal DM interfaces are to be specified

2 Acronyms and Abbreviations

Abbreviation / Acronym:	Description:
CAN	Controller Area Network (communication bus)
DEM	Diagnostic Event Manager
DID	Diagnostic Identifier
DM	Diagnostic Management
DoIP	Diagnostic over IP - transport protocol for diagnostic services standardized as ISO 13400
DTC	Diagnostic Trouble Code
ECU	Electronic Control Unit
IDL	Interface Description Language
OBD	On-board Diagnostic (standardized as ISO 15031)
RTE	Runtime Environment
SA	Source Address (diagnostics address of the tester)
SID	Service Identifier (hexa number to uniquely identify UDS services) 0x22 for Read Data by Identifier service 0x2E for Write to Non-Volatile memory service
SWC	Software Component (could refer either to Classic Platform SW-C or to Adaptive Platform SW-C)
TA	Target Address (diagnostic address of the ECU)
UDS	Unified Diagnostic Specification standardized as ISO 14229

Table 2.1: Acronyms and Abbreviations

3 Conventions to be used

In requirements, the following specific semantics are used :

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as follows.

Note that the requirement level of the document in which they are used modifies the force of these words.

- MUST: This word, or the adjective “LEGALLY REQUIRED”, means that the definition is an absolute requirement of the specification due to legal issues.
- MUST NOT: This phrase, or the phrase “MUST NOT”, means that the definition is an absolute prohibition of the specification due to legal issues.
- SHALL: This phrase, or the adjective “REQUIRED”, means that the definition is an absolute requirement of the specification.
- SHALL NOT: This phrase means that the definition is an absolute prohibition of the specification.
- SHOULD: This word, or the adjective “RECOMMENDED”, means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
- SHOULD NOT: This phrase, or the phrase “NOT RECOMMENDED”, means that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
- MAY: This word, or the adjective “OPTIONAL”, means that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item.

An implementation, which does not include a particular option, SHALL be prepared to interoperate with another implementation, which does include the option, though perhaps with reduced functionality. In the same vein an implementation, which does include a particular option, SHALL be prepared to interoperate with another implementation, which does not include the option (except, of course, for the feature the option provides).

4 Requirements Specification

4.1 Common Diagnostic requirements for Classic and Adaptive Platform

[RS_Diag_04200] Support event combination ⌈

Description:	The diagnostic in AUTOSAR shall allow combining several individual events to trigger a single DTC.
Rationale:	Advanced fault analysis
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	Improved clustering and judging of events/faults. Several internal hardware faults of an electronic control unit can be mapped onto a single "ECU internal" failure to reduce the number of Diagnostic Trouble Codes shown to the technician in the service workshop.

⌋

[RS_Diag_04150] Support the primary fault memory defined by ISO 14229-1 ⌈

Description:	The diagnostic in AUTOSAR shall support the primary fault memory defined by ISO 14229-1.
Rationale:	Storage of fault information for workshops.
AppliesTo:	CP, AP
Dependencies:	Production line, garage after reparation,...
Use Case:	The primary fault memory is used to store fault information that is related to defects in the vehicle and helps the workshops to identify the fault and repair it.
Supporting Material:	–

⌋

[RS_Diag_04214] Support the user defined fault memories defined by ISO 14229-1 ⌈

Description:	The diagnostic in AUTOSAR shall support the user defined fault memories defined by ISO 14229-1.
Rationale:	Independent storage of fault information.
Use Case:	User defined fault memories are used by OEM and Tier1 during development or for storing warranty relevant information inside. This information is also available for workshops or repairing the vehicle if the information stored in the user defined memory it is helpful for this task (e.g. to distinguish defective maintenance such as miss calibration from obvious malfunctions).
AppliesTo:	CP, AP
Dependencies:	–

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Supporting Material:	ISO 14229-1 v.2013

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[RS_Diag_04068] The diagnostic in AUTOSAR shall support event specific debounce counters to improve signal quality internally (According to ISO 14229-1 Appendix D) ⌈

Description:	The following types of debounce mechanisms shall be supported: The diagnostic in AUTOSAR module shall provide the ability to configure the jump behavior including jump up and jump down threshold value of the debounce counter in case of pre-passed or pre-failed event reporting. If failure detection jitters (e.g. sporadically reported pre-passed events), failure detection must not be delayed or prevented. The provision of jumping behavior of the debounce counter shall ensure the failure detection time because debouncing always starts from a defined starting point.This type of counters can be managed either internally or externally.
Rationale:	Advanced fault analysis
Use Case:	All applications and system modules can report events. The diagnostic module processes all these events and is able to provide a central de-bounce behavior for event classification and status management.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04225] The diagnostic in AUTOSAR shall support event specific time base debounce counters ⌈

Description:	The diagnostic in AUTOSAR shall support event specific time base debounce counters. The time based debouncing use a configurable time instead of counter threshold. The time is reloaded and running after the last monitor result/event status is different to the previous. After the time is exceeded the event has qualified.This type of counters can be managed either internally or externally.
Rationale:	Advanced fault analysis
Use Case:	All applications and system modules can report events. The diagnostic module processes all these events and is able to provide a central de-bounce behavior for event classification and status management.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04115] The optional parameter DTCSettingControlOptionRecord as part of UDS service ControlDTCSetting shall be limited to GroupOfDTC ⌈

Description:	ISO14229-1 does not specify how the parameter DTCSettingControlOptionRecord needs to be used. Therefore, the usage of the parameter shall be limited to GroupOfDTC.
Rationale:	Currently, no other use case for parameter DTCSettingControlOptionRecord is known than the usage for GroupOfDTC.
Use Case:	Fault storage is activated and deactivated for one specific DTC or for all DTCs.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	ISO14229-1 v.2013

⌋

[RS_Diag_04064] Provide configurable buffer sizes for storage of the events, status information and environmental data ⌈

Description:	Diagnostic in AUTOSAR shall provide configurable buffer sizes to store events, status information and environmental data. Due to resource limitation, only a few of the possible event related data is stored in the ECU. The system designer shall be able to dedicate an amount of non-volatile memory to be used for fault memory storage.
Rationale:	Storage of all event related data is not feasible due to the amount of required memory. This configurable buffer sizes allow to dedicate memory independent from the number of events or event related data size.
Use Case:	In case of large systems with many events a selection of events shall take place to fulfill NVRAM / RAM constraints of smaller processors.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	

⌋

[RS_Diag_04172] Inform external service processors about outcome of the final response ⌈

Description:	For each UDS service which diagnostic in AUTOSAR delegates to a application for processing, it shall inform the application, whether a response has been successfully sent out or not.
Rationale:	For long running service processing, which delegate the processing to separate threads, the asynchronous callback model is more efficient, while for simple service processors the strict synchronous model is easier to implement.
AppliesTo:	CP, AP
Dependencies:	[RS_Diag_04169]
Use Case:	Flexibility for service processor implementations.

⌋

[RS_Diag_04127] Configurable record numbers and trigger options for DTCSnapshotRecords and DTCExtendedDataRecords ⌈

Description:	The diagnostic in AUTOSAR module shall provide the capability to configure record numbers and trigger options for the storage of DTCSnapshotRecords and DTCExtendedDataRecords.
Rationale:	Advanced fault analysis
Use Case:	Flexible handling of DTCSnapshotRecords and DTCExtendedDataRecords
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04177] Custom diagnostic services ⌈

Description:	The diagnostic in AUTOSAR shall support the configuration of custom diagnostic services.
Rationale:	In some cases diagnostic services beyond the set of services standardized in ISO 14229-1 are needed.
AppliesTo:	CP, AP
Dependencies:	ISO14229-1
Use Case:	Most of the services that are in ISO 14229-1 and are also specified by AUTOSAR. Modifying the existing services behavior or adding customized behavior to existing services (e.g. not having session P2 timing values in the positive response to diagnostic session control or adding specific services such as "data log" services).

⌋

[RS_Diag_04033] Support the upload/download services for reading/writing data in an ECU in an extended and manufacturer specific diagnostic session ⌈

Description:	The diagnostic in AUTOSAR shall support the UDS services RequestDownload, RequestUpload, TransferData, RequestTransferExit (0x34-0x37) according to ISO 14229-1:2013. Note that in the Classic Platform these services are usually also implemented inside the bootloader which is out of scope of this requirement.
Rationale:	Provide means to upload and download data blocks.
Use Case:	Downloading configuration or application data during end of line or development. Another use case is uploading data blocks from the ECU for evaluation or verification purposes.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	ISO14229-1 v.2013

⌋

[RS_Diag_04020] Suppress responses to diagnostic tool requests ⌈

Description:	The diagnostic in AUTOSAR shall support the suppressPosRspMsgIndicationBit and the defined behavior according to ISO 14229-1:2013.
Rationale:	The tester is not interested in the positive response in certain situations. It prevents bus burst as result of a functional request.
Use Case:	In most cases, the positive responses are not relevant for functional requests to set the vehicle in a certain state. This can be a sequence of service 0x85, 0x28 and functional 0x3E during reprogramming to keep the vehicle in a 'silent' state without normal bus communication and DTC setting switched off.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	ISO14229-1 v.2013

⌋

[RS_Diag_04119] Handle the execution of diagnostic services according to the assigned diagnostic session ⌈

Description:	If a diagnostic session transition occurs (initiated by UDS Service 0x10), the diagnostic in AUTOSAR shall only maintain active diagnostic functionality if supported in the new session and if not prohibited by security access.
Rationale:	No interruption of diagnostic functionality
Use Case:	Deactivation of fault management and normal communication during ECU reprogramming
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	ISO14229-1 v.2013

⌋

[RS_Diag_04016] Support "Busy handling" by sending a negative response 0x78 ⌈

Description:	The diagnostic in AUTOSAR shall provide the sending of the negative response 0x78 in order get more time to build up the final positive or negative response.
Rationale:	Ensure a steady and save communication link and guarantee specified timing conditions.
Use Case:	When an application cannot provide the response in the protocol specific time
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	ISO14229-1 v.2013

⌋

[RS_Diag_04006] Manage session handling ⌈

Description:	The diagnostic in AUTOSAR shall support the transition from a default session to any other session, also back to the default session. (A diagnostic session enables a specific set of diagnostic services and/or functionality).
Rationale:	Some diagnostic services are not available in the default session. Therefore it is necessary to have information about the current session and no service which is connected to a non default session will be processed in the default session.
Use Case:	Special services need a different session than the default session, e.g. Reduction of communication traffic on the network in order to get more performance for the flash programming.
AppliesTo:	CP, AP
Dependencies:	[RS_Diag_04005] SecurityAccess level handling
Supporting Material:	–

⌋

[RS_Diag_04005] Manage Security Access level handling ⌈

Description:	The diagnostic in AUTOSAR shall manage the handling of the UDS-service 0x27 (SecurityAccess) and also the Security level handling. The accessibility of the services (service identifier) in the actual security level shall be checked.
Rationale:	Some diagnostic services are in dependence to a security access level. Therefore it is necessary to have information about the current level and no service which is restricted by security will be processed without authorization.
Use Case:	Not all diagnostic services are allowed in each security level.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04135] Support UDS service $38 (RequestFileTransfer) ⌈

Description:	The diagnostic in AUTOSAR shall support UDS service 0x38 ("RequestFileTransfer").
Rationale:	The requestFileTransfer service is used by the client to initiate a file data transfer from either the client to the server or from the server to the client (download or upload). Additionally, this service has capabilities to retrieve information about the file system
Use Case:	Upload of files (e.g. data files, graphics, navigation data...)
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	ISO 14229-1 v.2013

⌋

[RS_Diag_04159] Control of DTC storage ⌈

Description:	The diagnostic in AUTOSAR shall support control of DTC storage via UDS service 0x85.
Rationale:	Avoiding unwanted storage of DTCs.
Use Case:	No DTCs storage when functional communication is deactivated during ECU reprogramming.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04157] Reporting of DTCs and related data ⌈

Description:	The diagnostic in AUTOSAR shall provide the reporting of DTCs and related data.
Rationale:	Report failure memory data to the requester.
Use Case:	All services reporting fault memory data.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04131] Consistent event management mechanisms ⌈

Description:	All memory locations shall use the same event management mechanisms.
Rationale:	Ensure identical event management behavior.
Use Case:	–
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04117] Configurable behavior for DTC deletion ⌈

Description:	Usually, only ClearAllDTCs is used for the deletion of DTCs. Therefore, a configurable behavior which optionally limits the deletion of DTCs to ClearAllDTCs.
Rationale:	OEM specific behavior
Use Case:	Allow only ClearAllDTCs and therefore optimization of ClearDTC behavior.
AppliesTo:	CP, AP
Dependencies:	–

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Supporting Material:	–

⌋

[RS_Diag_04105] Event memory management ⌈

Description:	The diagnostic in AUTOSAR shall be able to handle valid events, update existing event memory entries or replace events in case of a full event memory. The processing is triggered externally (e.g. by the reported event status) or depends on internal information (e.g. value of debounce counter \timer,occurrence counter, ...)
Rationale:	Support of fault storage and analysis
Use Case:	Support of fault storage and analysis
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	ISO 14229-1 v.2013

⌋

[RS_Diag_04091] Application access to snapshot record data ⌈

Description:	he diagnostic in AUTOSAR shall provide access to snapshot record data to applications. If this functionality is configured for an event, diagnostics shall notify the application every time the data in the snapshot record changes.
Rationale:	Data provided in a snapshot record (like time stamp) can be of special interest for applications and is used for further vehicle functionalities.
Use Case:	Realizing a central error state handler within a vehicle. But there can be other use cases like providing data synchronizing within the vehicle or cloud.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04151] Event status handling ⌈

Description:	Diagnostics shall support event status handling.
Rationale:	Support OEM specific event status handling
Use Case:	Evaluation of monitor results and deriving corresponding actions from them
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04071] Process events according to their defined importance like priority and/or severity ⌈

Description:	The events shall be sorted or assigned to a specific priority (e.g. Severity Mask - ISO14229-1 v.2013,Annex D3) representing their importance like: • Healed events can be overwritten; • Privileged storing in case of Event Buffer filled up with less privileged events.
Rationale:	ISO14229-1 v.2013
Use Case:	Improved clustering and judging of events.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	ISO14229-1 v.2013

⌋

[RS_Diag_04125] Event debounce counter shall be configurable ⌈

Description:	It shall be configurable if the debounce counter shall be frozen or reset, when at least one enable condition for the event is set to ”not fulfilled” or when ControlDTCSetting is set to ”disabled”. In case of switching the enable conditions to ”fulfilled” the monitor needs to be informed to restart the event detection. In case of switching ControlDTCSetting to ”re-enabled” the monitor needs to be informed to restart the event detection.
Rationale:	Flexible usage of internal debouncing
Use Case:	–
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04136] Configurable ”confirmed” threshold ⌈

Description:	The diagnostic in AUTOSAR shall support a postbuild configurable ”confirmed” threshold.
Rationale:	Flexible usage of local legislated requirements.
Use Case:	Support different legislated requirements in different markets (US/EURO). For the US market the MIL and the ConfirmedDTC is activated after 2 DCY (Driving Cycles). For the EUR market the MIL and the ConfirmedDTC is activated after 3 DCY (Driving Cycles).
AppliesTo:	CP, AP
Dependencies:	–

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Supporting Material:	–

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[RS_Diag_04140] Aging for UDS status bits ”confirmedDTC” and ”testFailedSinceLastClear” ⌈

Description:	The diagnostic in AUTOSAR shall provide the capability to age both the confirmedDTC bit and the testFailedSinceLastClear bit after a configurable number of aging cycles has been reached. The value at which each bit is aged may be different between the two.
Rationale:	–
Use Case:	–
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04232] Access rights in client certificates ⌈

Description:	The client certificate extensions shall contain well-defined data with diagnostic access rights. The following access rights types shall be available: • Role based access rights • Dynamic access rights For role based access rights, the ECU maintains information about diagnostic services allowed to be executed if the tester has gained authentication in that role. The valid client certificate sets the tester into that role. Certificates can contain multiple roles to be active at the same point in time. For dynamic access rights, the certificate contains a whitelist of allowed diagnostic services to be executed. The white list access shall allow wildcards on PDU level. Both access right types can be active at any point in time and a logical ’Or’ operation shall be applied. The structured data layout of the certificate’s access rights content shall be specified by AUTOSAR.
Rationale:	Only well-defined client certificate shall be accepted by diagnostics in AUTOSAR that allows a standardized handling and evaluation of certificates and content.
Use Case:	The OEM PKI issues a certificate for a repair shop with role based or individual access rights for diagnostic services.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	Concept 636 "Security Extensions"

⌋

[RS_Diag_04233] Access granularity of diagnostic services ⌈

Description:	Certificates provide role based and individual access rights definition. Diagnostics in AUTOSAR shall provide a diagnostic service access right by evaluation properties of services to be executed in the following order: • service ID (SID) • service Id and sub-function (SF) • data identifier (DID) • routine identifier (RID). A service can be executed, if any of the above properties is part of the role or current dynamic access rights (white list).
Rationale:	A definition is required how, the diagnostic service is identified to be executed. Especially the level of granularity is important to reduce the resource consumption to a minimum. The SID check is very coarse but efficient, for services with sub-function the sub-function can be taken into account. Further services with DIDs and RIDs are identified by this identifier only.
Use Case:	An authentication state allows to execute any ECU reset service, is restricted to extended session, allows 5 DIDs and one RID to be executed.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	Concept 636 "Security Extensions"

⌋

[RS_Diag_04234] Binary compatibility of white list for individual access ⌈

Description:	Diagnostics in AUTOSAR shall specify the white list binary layout. This layout shall be compatible for all ECUs independent from the endianness in place.
Rationale:	A definition is required how a white list shall look like so it can be downloaded into any ECU software independent from the used implementation.
Use Case:	A certain binary layout for a white list shall define a well-defined set of diagnostic services that are allowed to be executed.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	Concept 636 "Security Extensions"

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[RS_Diag_04239] Diagnostic services in deauthenticated state ⌈

Description:	Diagnostics in AUTOSAR shall have a configuration to allow execution of dedicated diagnostic services in deauthenticated state.
Rationale:	At least the services to authenticate the tester, shall be available in all authentication states.
Use Case:	Sending a service 0x29 in deauthenticated state to reach an authentication state.

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AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	Concept 636 "Security Extensions"

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[RS_Diag_04240] Application based authentication ⌈

Description:	Diagnostics in AUTOSAR shall provide means to applications to change the authentication state of unauthenticated connections.
Rationale:	An individual authentication with each ECU in the vehicle might be take too much time some for some applications.
Use Case:	An application based centralized authentication broadcast is required to gain access to a set of diagnostic services.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	Concept 636 "Security Extensions"

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[RS_Diag_04133] Aging for event memory entries ⌈

Description:	The diagnostic in AUTOSAR shall support aging for event memory entries to remove entries from the event memory which have not failed for a specific number of operating cycles.
Rationale:	Remove information from fault memory that is not relevant for a repair action.
Use Case:	Network timeout fault that has been detected, but is not in active state any more.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

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[RS_Diag_04063] Process a dedicated event identifier for each monitoring path to support an autonomous handling of different events/faults ⌈

Description:	For the internal administration the diagnostic in AUTOSAR needs a unique identification of each monitoring path. This identification shall be handled via an event ID value (Integer).
Rationale:	A monitoring path shall be uniquely identified by its unique event ID value.
Use Case:	Unique fault identification which can be used for enhanced debugging.
AppliesTo:	CP, AP
Dependencies:	–

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Supporting Material:	–

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[RS_Diag_04148] Provide capabilities to inform applications about diagnostic data changes ⌈

Description:	The diagnostic in AUTOSAR modules shall provide capabilities to inform applications about diagnostic data changes. The capabilities shall cover the provision of corresponding interfaces and configuration options for data elements and associated triggers.
Rationale:	Applications requires information about data changes.
Use Case:	Applications needs to be informed about a status change of a DTC to be able to react on this DTC status.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

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[RS_Diag_04097] Decentralized and modular diagnostic configuration in applications ⌈

Description:	Applications can provide diagnostic information. The diagnostic in AUTOSAR module shall be able to generate ports to be connected to these applications in order access this diagnostic data.
Rationale:	Because of decentralized configuration and interface requirements each application shall provide and implement diagnostic interfaces to allow code generation and port connection
Use Case:	Use-case example: • As of today functions and associated diagnostics are developed by several parties. Thus for each function and its monitoring application (e.g. torque management in an engine controller)the diagnostic capabilities are defined separately and will not necessarily be coordinated during development. • System integration and combination of diagnostics for accessibility through diagnostic in AUTOSAR requires that the individual functions and diagnostic features are connected to be compiled as a complete diagnostic system (which is in case of OBD2 certification relevant). Use-case summary: 1. develop decentralized modular software and its diagnostics without permanent interaction with other application developers. 2. Combine modules and extract module-specific diagnostic data. 3. link diagnostic data from applications to the diagnostic in AUTOSAR.
AppliesTo:	CP, AP

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Dependencies:	–
Supporting Material:	ISO 14229-1 v.2013

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[RS_Diag_04067] Provide the diagnostic status information according to ISO 14229-1 ⌈

Description:	The diagnostic in AUTOSAR shall provide the diagnostic status information according to the DTCStatusMask, ISO 14229-1 v.2013 (refer to DTC status mask), Annex D5
Rationale:	Advanced fault analysis
Use Case:	Improved fault and event tracking and analysis
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	ISO 14229-1 v.2013

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[RS_Diag_04179] Provide interfaces for monitoring application. ⌈

Description:	AUTOSAR Diagnostics shall provide an interface to monitoring application for reporting and processing monitor results.
Rationale:	Test results reported by monitoring applications are handled diagnostic in AUTOSAR internally. The interaction between diagnostic in AUTOSAR and the application is realized using a dedicated interface.
Dependencies:	–
AppliesTo:	CP, AP
Use Case:	Monitoring applications report test results as soon as valid results are available by using the provided interface.
Supporting Material:	–

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[RS_Diag_04178] Support operation cycles according to ISO 14229-1 ⌈

Description:	The diagnostic in AUTOSAR shall provide a configurable set of system cycles that may qualify the event in an additional manner.
Rationale:	Operation cycles are essential for event status management.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	Starting of an operation cycle triggers many types of system reactions.
Supporting Material:	ISO 14229-1 v.2013 and ISO 15031-5

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[RS_Diag_04201] Support a configuration to assign specific events to a customer specific DTC ⌈

Description:	Assignment of events to customer specific or standardized DTCs.
Rationale:	Events are used diagnostic in AUTOSAR internally only. An external scan tool requests a DTC number which was assigned to one or multiple events/monitors.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	Internal monitor results (e.g. driver can be experienced) are observable via a scan tool enabling external fault analysis.

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[RS_Diag_04180] Process all UDS Services related to diagnostic fault memory of ISO 14229-1 internally ⌈

Description:	Service implementation of all UDS services, which are related to fault memory shall be implemented internally within diagnostic in AUTOSAR without delegating the processing/part of the processing to external modules.
Rationale:	Since diagnostic in AUTOSAR is also responsible for fault memory management, all fault memory related UDS services have to be processed internally.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	Fault memory handling like 0x85, 0x14, 0x19 have to be processed internally.
Supporting Material:	ISO 14229-1

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[RS_Diag_04182] Provide an application interface to change operation cycles states ⌈

Description:	Operation cycles handled by the diagnostic in AUTOSAR can be restarted by application.
Rationale:	Operation cycle state transitions are trigger conditions for event status management according to ISO 14229-1.
AppliesTo:	CP, AP
Dependencies:	[RS_Diag_04178]
Use Case:	Monitoring application restarts an operation cycle. This triggers some status changes for the relevant events.

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[RS_Diag_04183] Notify interested parties about event status changes ⌈

Description:	Event status change report shall be available for application subscribing for the notification.
Rationale:	Event specific status information is handled diagnostic in AUTOSAR internally, the change of the status might be relevant for monitoring or other applications.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	The application gets informed about relevant event status change.

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[RS_Diag_04185] Notify applications about the clearing of an event ⌈

Description:	Interested monitoring application shall be notified about the clearing of event status information and event related data.
Rationale:	Monitor reinitialization can be triggered by the clear notification.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	After the event status is cleared diagnostic in AUTOSAR informs the relevant monitoring application which can be reinitialized.

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[RS_Diag_04186] Notify applications about the start or restart of an operation cycle ⌈

Description:	Interested monitoring application shall be informed about the start or restart of operation cycles.
Rationale:	Monitor reinitialization can be triggered by the start of an operation cycle.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	A monitor application gets initialized after diagnostic in AUTOSAR informs it about the start of a relevant operation cycle.

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[RS_Diag_04204] Provide the current status of each warning indicator. ⌈

Description:	The diagnostic in AUTOSAR shall derive the current warning indicator status from the assigned events according to ISO 14229-1. The warningIndicatorRequested bit shall be set according to ISO 14229-1.
Rationale:	The warning indicator status is used to activate or deactivate indicators like lamps, text message or a beep. The state is calculated in diagnostic in AUTOSAR wherefore the information needs to be distribution to the application.
AppliesTo:	CP, AP
Dependencies:	–

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Use Case:	Indications of certain malfunctions to the driver (e.g. Malfunction Indicator Lamp (MIL)).

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[RS_Diag_04205] Support of SnapshotRecords ⌈

Description:	The diagnostic in AUTOSAR shall support SnapshotRecords according to ISO 14229-1. Each DTC can optionally have one or more SnapshotDataRecords. The supported record numbers shall be configurable. Only a atomic update of the whole record shall be supported. The storage trigger shall be configurable per snapshot record number. The configurable trigger is based on the following DTC status bit transitions: • TestFailed 0 -> 1 • ConfirmedDTC 0 -> 1 • PendingDTC 0 -> 1 • FaultDetectionCounterThreshold reached a configured threshold" The environmental data shall be captured from external applications.
Rationale:	Advanced fault analysis.
AppliesTo:	CP, AP
Dependencies:	[RS_Diag_04189]
Use Case:	Improved clustering and judging of events/faults.
Supporting Material:	ISO 14229-1

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[RS_Diag_04206] Support of ExtendedDataRecords ⌈

Description:	The diagnostic in AUTOSAR shall support ExtendedDataRecords according to ISO 14229-1. Each DTC can optionally have one or more ExtendedDataRecords. The record numbers shall be configurable. Only a atomic update of the whole record shall be supported. The storage trigger shall be configurable per Extended data number. The configurable trigger is based on the following DTC status bit transitions: • TestFailed 0 -> 1 • ConfirmedDTC 0 -> 1 • PendingDTC 0 -> 1 • FaultDetectionCounterThreshold reached a configured threshold"
Rationale:	Advanced fault analysis.
AppliesTo:	CP, AP
Dependencies:	[RS_Diag_04189]

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Use Case:	Improved clustering and judging of events/faults.
Supporting Material:	ISO 14229-1

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[RS_Diag_04189] Support a fine grained configuration for SnapshotRecords and ExtendedDataRecords ⌈

Description:	The diagnostic in AUTOSAR shall be able to handle fine grained layout configurations for event related data. Data elements might be collected from different applications and merged to different DIDs or ExtendedDataRecords.
Rationale:	Advanced fault analysis.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	diagnostic in AUTOSAR collects SnapshotRecord data from different application and merges diagnostic information into one DID.

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[RS_Diag_04190] Usage of internal data elements in SnapshotRecords and ExtendedDataRecords ⌈

Description:	It shall be possible to assign the diagnostic in AUTOSAR internal data elements like Operation Cycle Counter, Fault Detection Counter (FDC) and Occurrence Counter to Snapshot- and ExtendedDataRecords. While reading the Snapshot- or ExtendedDataRecord the current value of the diagnostic in AUTOSAR internal data element shall be reported.
Rationale:	Some data objects that are internally generated by the diagnostic in AUTOSAR can be retrieved by UDS service 0x19 ReadDTCInformation.
AppliesTo:	CP, AP
Dependencies:	[RS_Diag_04205]
Use Case:	Reading Operation Cycle Counter, Fault Detection Counter and Occurrence Counter.

⌋

[RS_Diag_04192] Provide the ability to handle event specific enable conditions ⌈

Description:	The diagnostic in AUTOSAR shall support enable conditions per event. If an event specific enable condition is not fulfilled, the reported event status is not processed.
Rationale:	Support mechanisms to avoid large amounts of event memory entries in case of specific ECU conditions.
AppliesTo:	CP, AP
Dependencies:	–

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Use Case:	In certain vehicle conditions, such as engine cranking, it shall be avoided to evaluate the result of a monitoring application for a certain time.

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[RS_Diag_04194] ClearDTC shall be accessible for applications ⌈

Description:	The service ClearDTC provided by the diagnostic in AUTOSAR supports the functionality of clearing the DTCs of a specified memory origin. This service shall be available not only inside the diagnostic in AUTOSAR, but also for the application.
Rationale:	The UDS job 0x14 ClearDiagnosticInformation supports only the clearing of primary memory. Clearing of user defined memory origins is usually handled by the application, that is why the ClearDTC service shall be provided.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	A routine control UDS job activates application, which clears the DTCs of a user defined memory using the ClearDTC service in diagnostic in AUTOSAR.

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[RS_Diag_04195] Chronological reporting order of the DTCs located in the configured event memory ⌈

Description:	The diagnostic in AUTOSAR shall be able to handle the order of event occurrences (e.g. represented by a time stamp or odometer value).
Rationale:	Advanced fault analysis.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	When processing 0x19 UDS job, DTCs are returned in the chronological order.

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[RS_Diag_04211] Persistent storage of DTC status and environmental data ⌈

Description:	The diagnostic in AUTOSAR shall support the non-volatile storage for event status and environmental data parameters required by ISO 14229-1.
Rationale:	According to the ISO 14229-1 UDS specification a set of status information and environmental data shall be stored non-volatile.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	Status information is stored non-volatile over power cycles.
Supporting Material:	ISO 14229-1 Appendix D

⌋

[RS_Diag_04196] UDS Service handling for all diagnostic services defined in ISO 14229-2 ⌈

Description:	The diagnostic in AUTOSAR shall implement the protocol handling for all UDS services defined in ISO 14229-2.
Rationale:	The diagnostic in AUTOSAR shall be the central service handler for UDS diagnostics.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	Interaction with UDS compliant tester on Ethernet.
Supporting Material:	ISO 14229

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[RS_Diag_04203] Common checks on all supported UDS Services Requests ⌈

Description:	For UDS services the support for the requested SID shall be checked by the diagnostic module. If the service ID is valid and depending on the service ID, the potential sub-function identifier shall be checked for support by the diagnostic module.
Rationale:	The diagnostic in AUTOSAR shall be UDS compliant and shall do general checks, which can be done on UDS protocol level centrally, independently whether the service is processed internally or externally by a applications as service processor.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	It must verified if the services requested is supported or not (i.g. ClearDTC,...)
Supporting Material:	ISO 14229

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[RS_Diag_04226] Diagnostic session check ⌈

Description:	For UDS services the support for Diagnostic session shall be checked by the diagnostic module.
Rationale:	The diagnostic in AUTOSAR shall be UDS compliant and shall do general checks, which can be done on UDS protocol level centrally, independently whether the service is processed internally or externally by applications as service processor.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	Session change should allow only specified changes.
Supporting Material:	ISO 14229

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[RS_Diag_04227] Common check for Security Access ⌈

Description:	For UDS services the support for Diagnostic security level shall be checked by the diagnostic module.
Rationale:	The diagnostic in AUTOSAR shall be UDS compliant and shall do general checks, which can be done on UDS protocol level centrally, independently whether the service is processed internally or externally by applications as service processor.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	To protect services from being accessed by non-authorized users.
Supporting Material:	ISO 14229

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[RS_Diag_04228] Common check for Message lengths ⌈

Description:	For UDS services the support for Message length shall be checked by the diagnostic module.
Rationale:	The diagnostic in AUTOSAR shall be UDS compliant and shall do general checks, which can be done on UDS protocol level centrally, independently whether the service is processed internally or externally by applications as service processor.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	The message length must be checked and if it does not respect a predefined range , the requested service will be rejected.
Supporting Material:	ISO 14229

⌋

[RS_Diag_04197] Clearing the user defined fault memory ⌈

Description:	The clearance of user defined fault memory shall be possible according to the ISO 14229 draft document: “02_ISO_14229-1_Comments-Summary_2016-09-13.docx” via diagnostic requests.
Rationale:	Provide a standardized way to clear user defined fault memory.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	OEM and TIER1 using the user defined fault memory need to clear the user defined memory. A standardized way make OEM or TIER1 specific solutions obsolete, which were incompatible to each.
Supporting Material:	ISO 14229-1

⌋

[RS_Diag_04198] Process all UDS Services related to session and security management of ISO 14229 internally ⌈

Description:	Service implementation of all UDS services, which are related to session and security management (DiagnosticSessionControl, SecurityAccess and TesterPresent from 'Diagnostic and Communication Management functional unit'), shall be implemented internally within diagnostic in AUTOSAR without delegating the processing/part of the processing to external modules. This does NOT exclude, that diagnostic in AUTOSAR does callout to external application for instance to get/check certain security keys. But the state machine/protocol is handled internally by diagnostic in AUTOSAR.
Rationale:	Session and security management is an integral part of general UDS service handling and has therefore to be implemented internally.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	General diagnostic protocol processing.
Supporting Material:	ISO 14229

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[RS_Diag_04199] UDS service request validation ⌈

Description:	Diagnostics in AUTOSAR shall provide a functionality to an external application to validate each UDS request according to ISO 14229-1. A validation can result in allowing to process the received request or in rejecting the request by discarding silently or returning an error code.
Rationale:	Restricting the execution of UDS requests via static configuration properties is not always sufficient and more dynamic checks are needed to achieve a further level of execution management.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	Allow ECU projects or manufacturers to realize specific verifications that go beyond of what is available by standard AUTOSAR mechanism such as authentication or environmental conditions. An external application has access to the received request and implements own filter, firewall, etc on individual conditions.

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[RS_Diag_04208] Inform the application about diagnostic session and diagnostic security level changes on each tester connection. ⌈

Description:	In case the currently active UDS session or security level change on a tester conversation, the diagnostic in AUTOSAR shall provide a notification mechanism for the application, to inform the applications about the new session or security level and the affected tester connection.
Rationale:	Session changes happen asynchronously to service processor implementations. But there exists functionality that needs to react on session changes.

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AppliesTo:	CP, AP
Dependencies:	[RS_Diag_04169]
Use Case:	Flexibility for service processor implementations.

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[RS_Diag_04218] Support of UDS service 0x2F InputOutputControlByIDentifier ⌈

Description:	The Diagnostic Management shall support the ISO 14229-1 service 0x2F InputOutputControlByIDentifier
Rationale:	Allow to simulate input values and to control output values
AppliesTo:	CP, AP
Use Case:	In workshop or production checks with the input and output channels of the ECU is needed.
Supporting Material:	ISO 14229-1

⌋

[RS_Diag_04224] Support the UDS service 0x31 (RoutineControl) according to ISO 14229-1 ⌈

Description:	The diagnostic in AUTOSAR shall support the ISO 14229-1 service 0x31 RoutineControl with all sub-functions
Rationale:	RoutineControl is an integral part of ISO 14229-1 and used in most ECUs for customer specific actions triggered by diagnostic services.
AppliesTo:	CP, AP
Use Case:	Diagnostic tester starts a routine in the server.
Supporting Material:	ISO 14229-1

⌋

[RS_Diag_04242] The DoIP module shall support Vehicle Internal Testers. ⌈

Description:	In addition to external tester, The DoIP module shall support Vehicle Internal Testers and shall reference the ISO standards 13400-2 for this purpose.
Rationale:	Support in vehicle DoIP communication.
Use Case:	DoIP testers not just resides outside vehicle network but also possible to reside inside vehicle network. Support in vehicle DoIP communication.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	ISO 13400-2, Road vehicles – Diagnostic communication over Internet Protocol (DoIP) – Part 2: Transport protocol and network layer services ISO 13400-2 extension with Internal tester concept.

⌋

[RS_Diag_04147] Communication with the transport layers to receive and send diagnostic data ⌈

Description:	The diagnostic in AUTOSAR shall communicate with the transport layer modules to receive and send diagnostic data.
Rationale:	Ensure diagnostic communication.
Use Case:	Support of various transport protocols (ISO-15765-2, ...).
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04244] Support sub-function 0x04 of UDS service 0x19. ⌈

Description:	The diagnostic in AUTOSAR shall support sub-function 0x04 of UDS service 0x19 to retrieve snapshot records stored for DTCs.
Rationale:	Provide means to retrieve snapshot records.
Use Case:	capture data at various points in time when faults occur in the system.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	ISO 14229-1

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[RS_Diag_04245] Support sub-function 0x06 of UDS service 0x19. ⌈

Description:	The diagnostic in AUTOSAR shall support sub-function 0x06 of UDS service 0x19 to retrieve extended data records stored for DTCs.
Rationale:	Provide means to retrieve statistical data.
Use Case:	Provide system internal statistical information assigned to a certain DTC.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	ISO 14229-1

⌋

[RS_Diag_04058] Ability to access different event memories ⌈

Description:	The diagnostic in AUTOSAR shall support diagnostic services to read or remove event entries from the configured event memory seperatly.
Rationale:	Advanced fault analysis

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Use Case:	The development departments of the OEMs and Suppliers need as much as possible deeper fault/event analysis although the mechanics may have deleted the faults or may not need to know if there are more detailed root causes for an event or fault.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04160] ResponseOnEvent according to ISO 14229-1 ⌈

Description:	Diagnostics shall support ResponseOnEvent according to ISO 14229-1.
Rationale:	Needed for failure analysis and fault memory tracking.
Use Case:	Inform diagnostic tooling about certain runtime conditions.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04109] Provide an interface to retrieve the number of event memory entries ⌈

Description:	The diagnostic in AUTOSAR shall provide an interface to retrieve the number of event memory entries currently stored in Primary and user defined memories to the application. Additionally, the corresponding Client Server Interface shall be provided.
Rationale:	The interface is required from application, to check if event memory entries exist that influence the ECU behavior.
Use Case:	There is an application message where a status bit must be set as soon as events are stored in the event memory. Therefore, the application needs to know how many event memory entries exist.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04246] Support of UDS service DynamicallyDefineDataIdentifier (0x2C) with subfunction 0x01 (defineByIdentifier) ⌈

Description:	The diagnostic in AUTOSAR shall support UDS service DynamicallyDefineDataIdentifier (0x2C) with subfunction 0x01 (defineByIdentifier) according to ISO 14229-1.

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Rationale:	UDS defines this service to allow the client to dynamically define a data identifier at a later point in time.
Use Case:	Read operations for tailored data identifier that are build out of a collection of parts or full content of existing data identifiers with UDS service 0x22/0x2A.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04215] Support of UDS service ReadDataByPeriodicIdentifier (0x2A) ⌈

Description:	The diagnostic in AUTOSAR shall support UDS service ReadDataByPeriodicIdentifier (0x2A) with all supported sub-functions according to ISO 14229-1.
Rationale:	Periodic transmission of measurements/data by the diagnostic server (ECU), instead of frequent polling by re-requesting the same data via ReadDataByIdentifier. Further it is possible to reach higher update rates of measurements (e.g. 2ms).
Use Case:	Monitor measurement values over time by diagnostics.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

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[RS_Diag_04248] Support of session control service ⌈

Description:	The diagnostic in AUTOSAR shall support the UDS service 0x10 (SessionControl) with all its mandatory sub-functions and allow to define the vehicle manufacturer specific and system supplier specific sub-functions.
Rationale:	Sessions are a key aspect to control that an active tester connection is given and restrict certain services to be executed only in certain sessions.
Use Case:	Execute certain diagnostic services only in timing secured sessions, fall back into default session will stop all started diagnostic activity in that session.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04249] Support of session layer service ⌈

Description:	The diagnostic in AUTOSAR shall support the session layer services defined by ISO-14229-2.
Rationale:	OSI compliant network adaption.
Use Case:	Organizing the diagnostic communication within heterogeneous network systems (e.g.keep alive logic).
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

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[RS_Diag_04093] Memory overflow indication ⌈

Description:	For each Event Memory it shall be indicated if the related event memory (e.g. primary and user defined memories) is full and the next event occurs to be stored in this event memory.
Rationale:	The information that an event memory overflow occurred is very important for fault analysis.
Use Case:	• Triggering further internal behavior (e.g displacement strategies) • Linking this information to a dedicated Extended Data Record • Vendor specific UDS-Service
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

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[RS_Diag_04118] Optionally support event displacement ⌈

Description:	The diagnostic in AUTOSAR shall optionally support event displacement. The following sequence of different displacement criteria shall be possible: 1. Priority; 2. Active/passive status (optional); 3. Occurrence.
Rationale:	Limited hardware (memory resources) in ECU.
Use Case:	Error memory is full and Valid event is reported to diagnostic in AUTOSAR.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04120] Support a predefined AddressAndLengthFormatIdentifier ⌈

Description:	The diagnostic in AUTOSAR shall support a predefined AddressAndLengthFormatIdentifier for UDS service 0x23 (ReadMemoryByAddress), UDS service 0x2C (DynamicallyDefineDataIdentifier (only CP) with subservice DefineByMemoryAddress), UDS service 0x3D (WriteMemoryByAddress), UDS service 0x34 (RequestDownload) and UDS service 0x35 (RequestUpload).
Rationale:	AddressAndLengthFormatIdentifier is defined once and afterwards used in corresponding UDS services.
Use Case:	Static configuration of AddressAndLengthFormatIdentifier
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	ISO14229-1 v.2013

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[RS_Diag_04270] Notify applications about the changes of enable conditions ⌈

Description:	Interested monitoring application shall be notified when the state of an event assigned enable condition has changed.
Rationale:	Allow applications to know if the current read event status is a current value and event reports are not blocked by disabled event processing.
Use Case:	Safety concepts on application level depend on current event states (pass/fail) of certain monitors. The information on the current assigned enabled conditions is essential to evaluate if the current event status processing is disabled and the read event status might not reflect the state that is reported by the monitor.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04271] Support of Transmit Certificate ⌈

Description:	Diagnostics in AUTOSAR shall support the ISO 14229-1:2020 service 0x29 "Authentication" with the sub-function "TransmitCertificate" allows a client to write certificates for different use cases into the server. Some of the use cases can be directly internally handled inside the AUTOSAR modules while others require an implementation in scope of an application.
Rationale:	Possibility to upload a certificate into the server.
Use Case:	Security related applications rely on the use of certificates. Among the use cases are: • secure variant coding • secure time update
AppliesTo:	CP, AP

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Dependencies:	–
Supporting Material:	–

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[RS_Diag_04272] Support of secure data coding ⌈

Description:	Diagnostics in AUTOSAR shall support secure coding of authenticated data. A manufacturer signed certificate containing a public key followed by one or more write data requests is ensures the integrity of the data. Only data that matches the signature inside the certificate is accepted.
Rationale:	Secure coding data is already used in almost all ECUs and a standardized mechanism to secure and authenticate data writing shall be provided by AUTOSAR.
Use Case:	Storing of authenticated variant coding or other parameters via diagnostics.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	Concept 646 “Security Extensions Harmonized” – ISO 14229-1 – Authentication Service 0x29

⌋

[RS_Diag_04209] Pseudo parallel client interaction according to ISO ⌈

Description:	The diagnostic in AUTOSAR shall support the parallelism defined by the ISO as pseudo parallel concept, which is defined in ISO 14229-1 under Figure J.2.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	Support of scenarios, where testers in parallel is only allowed, when in default session.
Supporting Material:	ISO 14229-1

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[RS_Diag_04019] Provide confirmation after transmit diagnostic responses to the application ⌈

Description:	Diagnostic in AUTOSAR shall notify applications about successful or failed transmission of diagnostic responses.
Rationale:	Provide application a mean to get notified on transmission results. Some operations shall only be started after the transmission. Without this notification an application will have no knowledge when to start an operation depending on a previous transmission. Service response confirmation is defined by ISO 14229-1 v.2013.
Use Case:	E.g.reset function. The ECU shall only be reset if the positive response was sent on the bus.

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AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	ISO14229-1 v.2013

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[RS_Diag_04274] Variant handling at runtime ⌈

Description:	The diagnostic in AUTOSAR shall provide API functions to allow applications to switch off configured diagnostic functionality for variant handling. Examples are diagnostic event or diagnostic test results (DTR).
Rationale:	Different market or regions require different sets of diagnostic functionality. Instead of a single software for each variant, a superset variant is created and the application can disable certain set of not desired functions.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	Support of a single software as superset of all needed diagnostics and disable at runtime the functionality that is not needed in a certain variant. The variant is mostly depending on the country or market the vehicle is homologated.

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[RS_Diag_04275] Support of UDS service 0x22 ReadDataByIdentifier ⌈

Description:	The Diagnostic Management shall support the ISO 14229-1 service 0x22 ReadDataByIdentifier.
Rationale:	Allow the external test equipment to read data such as measurement values, configuration, coding values or logistical data from the diagnostic server.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	Reading data and values from the server.
Supporting Material:	ISO 14229-1

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[RS_Diag_04276] General validation of UDS requests according to ISO 14229-1 ⌈

Description:	The diagnostic in AUTOSAR shall support the validation steps and order of the UDS requests according to figure 5 (General server response behaviour) and 6 (General server response behaviour for request messages with SubFunction parameter) of ISO 14229-1 including SID, Subfunction, minimum UDS request length, session permission and security checks.
Rationale:	–
AppliesTo:	CP, AP
Dependencies:	–

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Use Case:	–
Supporting Material:	ISO 14229-1

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[RS_Diag_04277] UDS Response types ⌈

Description:	The diagnostic in AUTOSAR shall return a positive response, a negative response or suppress the response in accordance with ISO 14229-1.
Rationale:	–
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	–
Supporting Material:	ISO 14229-1

⌋

[RS_Diag_04278] UDS service CommunicationControl (SID 0x28) ⌈

Description:	The diagnostic in AUTOSAR shall support the UDS service CommunicationControl according to ISO 14229-1 in forwarding the requested control data to application.
Rationale:	–
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	–
Supporting Material:	ISO 14229-1

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[RS_Diag_04279] UDS service EcuReset (SID 0x11) ⌈

Description:	The diagnostic in AUTOSAR shall support the UDS service EcuReset according to ISO 14229-1.
Rationale:	–
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	–
Supporting Material:	ISO 14229-1

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[RS_Diag_04280] UDS service WriteDataByIdentifier (SID 0x2E) ⌈

Description:	The diagnostic in AUTOSAR shall support the UDS service WriteDataByIdentifier according to ISO 14229-1.
Rationale:	–
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	–
Supporting Material:	ISO 14229-1

⌋

[RS_Diag_04165] Triggering of multiple events upon a master event is reported ⌈

Description:	The diagnostic in AUTOSAR shall provide the capability to trigger multiple events upon an event is reported.
Rationale:	From one unique fault source, multiple events shall be derived and each derived event can trigger an own DTC and event memory entry.
Use Case:	Storing DTCs from one unique source into different event memories without changing and recompiling the reporting software. A given software can report event status information and depending on configuration multiple DTCs and event related data in different fault memories can be stored.
AppliesTo:	CP, AP
Dependencies:	–
Supporting Material:	–

⌋

4.1.1 Diagnostics over Internet Protocol (DoIP)

[RS_Diag_04281] Support of DoIP ⌈

Description:	The diagnostic in AUTOSAR shall support DoIP as defined in ISO 13400-2.
Rationale:	Ethernet is a common network technology used in the automotive industry and DoIP based on the ISO 13400 series is a standardized way for diagnostic communciation of external testers with the vehicle.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	Allow diagnostic communication over ethernet between diagnostic client and server.
Supporting Material:	ISO 13400-2

⌋

[RS_Diag_04282] Support of DoIP TCP General Inactivity Timer ⌈

Description:	The diagnostic in AUTOSAR shall support TCP General Inactivity Timer as defined in ISO 13400-2.
Rationale:	Allows the detection of an no longer used TCP connection and releases no longer needed resources for further use.
AppliesTo:	CP, AP
Dependencies:	–
Use Case:	In case a diagnostic client is gone and the TCP connection is still alive, this mechanism gives the DoIP server a mean to supervise active connections and close the connection if it is inactive for a certain time.
Supporting Material:	ISO 13400-2

⌋

4.2 Diagnostic requirements for the Classic Platform

4.2.1 Functional Requirements

[RS_Diag_04112] The DEM module shall support DTCs according to SAE J1939 ⌈

Description:	The DEM module shall support DTCs according to SAE J1939-73.
Rationale:	Support of SAE J1939-73
Use Case:	Diagnostics in HDV, HD-OBD
AppliesTo:	CP
Dependencies:	DEM, J1939DCM
Supporting Material:	–

⌋

[RS_Diag_04139] Support subfunction 0x42 of UDS service 0x19 ⌈

Description:	The diagnostic in AUTOSAR shall support subfunction 0x42 of UDS service 0x19 to retrieve WWH-OBD-specific DTCs matching the requested DTC status mask and severity mask record.
Rationale:	Support of WWH-OBD
Use Case:	Improved fault and event tracking and analysis
AppliesTo:	CP
Dependencies:	–
Supporting Material:	Support of WWH-OBD

⌋

[RS_Diag_04129] Provide OBD-specific configuration capabilities ⌈

Description:	The diagnostic in AUTOSAR shall provide the following configuration capabilities: • OBD- ECU kind 1: ECU acts as OBD Master ECU (Master or Primary ECU) • OBD- ECU kind 2: ECU acts as OBD Slave ECU (Dependent / Secondary ECU) • OBD- ECU kind 3: ECU acts as non-OBD ECU The diagnostic in AUTOSAR shall both provide corresponding configuration parameters to switch on/switch off module-specific OBD functionality. Depending on the configured use case, the associated application interfaces shall be provided to connect different OBD-ECU kinds on application level (via bus communication).
Rationale:	UseCase-specific module configuration.
Use Case:	Optimization of RAM/ROM consumption.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04163] Parallel OBD and UDS processing ⌈

Description:	Diagnostics shall support the parallel processing of OBD and UDS protocols.
Rationale:	Vehicles can be equipped with On-board testers which send diagnostic requests at any arbitrary point in time. Legislative OBD requests need to be processed independently from a UDS requests from On-board testers.
Use Case:	Parallel reception of diagnostic requests from multiple testers.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04161] Provide support for the ASMIP algorithm ⌈

Description:	The diagnostic in AUTOSARs shall consider the ASMIP algorithm (Alternative Statistical MIL Illumination Protocol) according to the Californian Code of Regulation 13 CCR section 1968.2.
Rationale:	Supporting OBD use cases.
Use Case:	Dynamical threshold modification.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04230] Support of UDS service 0x29 (Authentication) ⌈

Description:	Diagnostics in AUTOSAR shall support the ISO 14229-1:2020 service 0x29 Authentication with sub-functions for "Authentication with PKI Certificate Exchange (APCE)" to grant access to diagnostic services. The service shall be implemented as internal service (in the BSW) without interaction with applications over middleware.
Rationale:	The authentication service provides a standardized way in authenticating a tester and ECU and grant access to diagnostic services depending on the certificate content.
Use Case:	A repair shop diagnostic tester authenticates with an ECU to gain access to diagnostic services that are explicitly allowed to be executed for a repair shop.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	Concept 636 "Security Extensions" - C5, ISO14229-1:2020 Authentication Service 0x29

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4.2.2 Fault Memory Management

[RS_Diag_04002] The Diagnostic event (fault) management shall be established as Basic SW Module ⌈

Description:	The Diagnostic event (error) management shall be a Basic SW Module described in the Diagnostic WP. Diagnostic event (error) management is out of scope for Mode Management.
Rationale:	SW Architecture
Use Case:	Improved fault and event tracking and analysis for Service, assembly line, OBD-SCAN-Tool
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04057] Classification of events for series production, OBD and expert usage ⌈

Description:	The diagnostic in AUTOSAR shall support a classification of events for the following types of events: • Events that are defined for error analysis in the service station shall be stored in the primary event memory. • Events that are defined for detailed error analysis by experts in the after sale department are stored in the secondary error memory. Errors that occur during the development process shall be reported to the debugging modules. Therefore, debugging module APIs shall be used which (are not provided by the diagnostic in AUTOSAR).
Rationale:	After sales analysis
Use Case:	Distinction between service station relevant and after sales relevant events.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04123] Harmonized Driving//WarmUp cycles ⌈

Description:	The diagnostic in AUTOSAR shall support harmonized Driving-/WarmUp cycles. The calculation of Driving-/WarmUp cycles is based on legal requirements.
Rationale:	OBD certification requires vehicle consistent calculations based on a harmonized Driving-/WarmUp cycle in the centralized OBD Master ECU.
Use Case:	Qualification of OBD-relevant DTCs
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04126] Configurable suppression of events ⌈

Description:	The diagnostic in AUTOSAR shall provide a postbuild/loadable boolean configuration option per event. If this configuration is set to true the event behaves the same as if it is suppressed by API call. An event suppressed by configuration can not be activated via API call.
Rationale:	Use case-specific configuration of fault memory, only required events are visible and usable in ECU.
Use Case:	Variant coding
AppliesTo:	CP
Dependencies:	–

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Supporting Material:	–

⌋

[RS_Diag_04110] SAE J1939 lamp status ⌈

Description:	The composite and DTC-specific lamp status of the following lamps shall be supported: Malfunction Indicator Lamp, Red Stop Lamp, Amber Warning Lamp and Protect Lamp.
Rationale:	Support of SAE J1939-73
Use Case:	Diagnostics in HDV, HDOBD
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04111] SAE J1939 Expanded-FreezeFrame ⌈

Description:	The composite and DTC-specific lamp status of the following lamps shall be supported: Malfunction Indicator Lamp, Red Stop Lamp, Amber Warning Lamp and Protect Lamp.
Rationale:	Support of SAE J1939-73
Use Case:	Diagnostics in HDV, HDOBD
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04113] Support a set of SAE J1939 DM-messages ⌈

Description:	The following DM-messages shall be supported: **Name Description** **DM01** Active Diagnostic Trouble Codes **DM02** Previously Active Diagnostic Trouble Codes **DM03** Diagnostic Data Clear/Reset for Previously Active DTCs **DM04** Freeze Frame Parameters **DM05** Diagnostic Readiness 1 **DM06** Emission Related Pending DTCs **DM11** Diagnostic Data Clear/Reset for Active DTCs **DM12** Emissions Related Active DTCs

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	△ **DM13** Stop Start Broadcast **DM19** Calibration Information **DM20** Monitor Performance Ratio SAE J1939-73 Revised SEP2006 **DM21** Diagnostic Readiness 2 **DM22** Individual Clear/Reset of Active and Previously Active DTC **DM23** Previously Active Emission Related Faults **DM24** SPN Support **DM25** Expanded Freeze Frame **DM26** Diagnostic Readiness 3 **DM28** Permanent DTCs **DM29** Regulated DTC Counts (Pending, Permanent, MIL-On, PMIL-On) **DM31** DTC to Lamp Association **DM35** Immediate Fault Status **DM41** DTCs - A, Pending **DM42** DTCs - A, Confirmed and Active **DM43** DTCs - A, Previously Active **DM44** DTCs - B1, Pending **DM45** DTCs - B1, Confirmed and Active **DM46** DTCs - B1, Previously Active **DM47** DTCs - B2, Pending **DM48** DTCs - B2, Confirmed and Active **DM49** DTCs - B2, Previously Active **DM50** DTCs - C, Pending **DM51** DTCs - C, Confirmed and Active **DM52** DTCs - C, Previously Active **DM53** Active Service Only DTCs **DM54** Previously Active Service Only DTCs **DM55** Diagnostic Data Clear/Reset for All Service Only DTCs **DM58** Rationality Fault SP Data **DM59** Diagnostic Readiness 4 **DM60** Extended DTC Information
Rationale:	Support of SAE J1939-73
Use Case:	Diagnostics in HDV, HD-OBD
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04241] Support for unsupported SAE J1939 DM-messages ⌈

Description:	All DM-messages that are not listed in [RS_Diag_04113] shall be supported by a generic service.
Rationale:	An application shall be capable of handling DM-messages that are not directly handled by the implementation of the diagnostics module.
Use Case:	Handling of memory access or routine control.
AppliesTo:	CP
Dependencies:	[RS_Diag_04113]
Supporting Material:	SAE J1939-73+

⌋

[RS_Diag_04137] Definition of replacement failure ⌈

Description:	Upon filtering the storage of failure reports by central conditions (Storage Condition), it shall be possible to define and store a replacement failure info which then can be stored to the event memory. This replacement failure will represent the actual failure reason.
Rationale:	Improvement of failure analysis.
Use Case:	–
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04155] Notify applications and BSW modules about updates of event related data ⌈

Description:	The diagnostic in AUTOSAR shall notify other applications / BSW modules about updates of the event-related data in the event memory.
Rationale:	Changes to the event related data are done internally while evaluating event information passed from the monitoring application. Third parties interested in the change of event related data need to get notified.
Use Case:	Allow OEM specific reaction on updates of the event related data.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04217] Adding the Lamp status pertinent to a specific Fault Event/DTC available as DemInternalDataClass shall be codified in the same format of DM31 ⌈

Description:	when a Fault Event memory entry is coming, the related FreezeFrame includes the pertinent DTC lamp status with the SPN number for each kind of lamp. In fact, the format of this data shall also be compliant to the content of the DM31 with the same codification/format and SPNs identification. In other word this solution would ensure that the user is able to retrieve the pertinent lamp status as it becomes a memory entry even if the DM31 request is not done in the same moment.
Rationale:	After sales analysis.
Use Case:	Provide lamp status per DTC to diagnostic testers.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04031] Notify the Function Inhibition Manager (FIM) upon changes of the event status in order to process them according to the SW components dependencies ⌈

Description:	Control (enable/disable) of functionalities of SW components based on the following inhibit condition: - faults
Rationale:	Event status information for function inhibition
Use Case:	Usage of event status information for function inhibition
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04221] In-Use-Monitor Performance Ratio indicates how often the OBD system monitors particular components, compared to the amount of the vehicle operation ⌈

Description:	The diagnostic in AUTOSARs shall provide a means to indicates how often the OBD system monitors particular components, compared to the amount of the vehicle operation.This is done through In-Use-Monitor Performance Ratio (IUMPR). It is defined as the number of times a fault could have been found (=numerator), divided by the number of times the vehicle operation conditions have been fulfilled (=denominator) as defined in the respective OBD regulations.
Rationale:	Supporting OBD use cases
Use Case:	Calculation of IUMPR for legal regulation

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AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04223] Support Snapshot Records data pre-storage ⌈

Description:	The diagnostic in AUTOSAR shall provide means to applications to immediately trigger capturing snapshot record data.This captured data shall be stored in the snapshot record if the trigger condition is fulfilled in a later point in time.
Rationale:	Snapshot record data would always have the data value at a point in time when a trigger occurs which might be too late as the environmental data already has changed since the first fault occurrence.
Use Case:	Capture snapshot record data at the first time the fault occurs.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04250] Support subfunction 0x1A and 0x56 of UDS service 0x19 ⌈

Description:	The diagnostic in AUTOSAR shall support subfunction 0x1A and 0x56 of UDS service 0x19 to retrieve information for emission related DTCs and supported ECU data.
Rationale:	Required to fulfill SAE J1979-2 and enhanced diagnostics.
Use Case:	Support of legislated diagnostic requirements and enhanced diagnostic support.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04252] Support of SAE J1979-2 ⌈

Description:	AUTOSAR shall support OBD services according to SAE J1979-2
Rationale:	Legislation requires vehicle manufacturer to report emission related information via diagnostics.
Use Case:	Develop emission-related ECUs with AUTOSAR.
AppliesTo:	CP
Dependencies:	–

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Supporting Material:	–

⌋

[RS_Diag_04253] Support separated DTCs for UDS and OBD based on J1979-2 ⌈

Description:	SAE J1979-2 based UDS communication shall report a different 3 byte DTC number than for none J1979-2 UDS communication.
Rationale:	A further set of 3 Byte DTCs is required to avoid conflicts with UDS enhanced diagnostics.
Use Case:	Some manufacturers don't want to fully change to SAE J1979-2 support with UDS and will only support the J1979-2 functionality on the limited UDS subset defined by J1979-2.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04254] Independent CP Software Cluster development ⌈

Description:	The diagnostic in AUTOSAR shall support the flexible implementation of diagnostic capabilities in Application Software Clusters. Hence, widely used interfaces applicable for Application Software Clusters shall avoid precompile-time configurability. Configuration parameters adopting to application dependent behavior shall be post-build configurable. Widely used interfaces are related to • UDS Services – 0x22 ReadDataByIdentifier – 0x24 ReadScalingDataByIdentifier – 0x2E WriteDataByIdentifier – 0x2F InputOutputControlByIdentifier – 0x31 RoutineControl Supported • OBD Services – $01 Request Current Powertrain Diagnostic Data – $09 Request Vehicle Information • Diagnostic Monitors
Rationale:	-
Use Case:	Change diagnostic related functionality in an Application Software Clusters without rebuild of the Host Software Clusters
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04255] Support of nested data elements for the DID ⌈

Description:	The Dcm shall support the usage of nested data elements for the DID sender/receiver and RID routine interaction between the Dcm and application software.
Rationale:	Nested data types are a commonly used case in AUTOSAR application software. Consequently, the AUTOSAR diagnostic stack shall support this case for the interaction between the Dcm and application software.
Use Case:	The user wants to access a nested data type in a PortPrototype of the application to be used in the description of diagnostic content (e.g. the definition of a Diagnostic Data Identifier).
AppliesTo:	CP
Dependencies:	–
Supporting Material:	ISO14229-1

⌋

[RS_Diag_04235] Client certificate validity ⌈

Description:	Diagnostics in AUTOSAR shall evaluate the client certificates validity period and refuse expired our not yet valid certificates.
Rationale:	Control the certificate lifetime and limit the potential of outdated certificates.
Use Case:	The OEM PKI issues a certificate (e.g. for a repair shop) for a defined period.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	Concept 636 "Security Extensions"

⌋

[RS_Diag_04236] Client certificate target identification ⌈

Description:	Diagnostics in AUTOSAR shall provide standardized means for target identification. A target can be identified by OEM defined criteria such as VIN, vehicle line or ECU type.
Rationale:	Control the certificates validity on defined targets only.
Use Case:	The OEM PKI issues a certificate for a vehicle with a certain VIN or an only for one type of ECU.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	Concept 636 "Security Extensions"

⌋

[RS_Diag_04237] Client certificate evaluation ⌈

Description:	Diagnostics in AUTOSAR shall use the diagnostic policy manager to evaluate client certificates from service 0x29 requests. The result of a certificate evaluation is the decision if the certificate is valid and which diagnostic services are allowed for execution. Based on the active certificate it grants access for received diagnostic requests.
Rationale:	AUTOSAR shall define the semantics for the certificate payload. This allows to have a standardized check for certificate validities and evaluation of contained access rights.
Use Case:	A repair shop diagnostic tester initiates an authentication by sending its certificate. A set of diagnostic services is available to the diagnostic tester after authentication.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	Concept 636 "Security Extensions"

⌋

[RS_Diag_04238] Logging certificate evaluation ⌈

Description:	The diagnostic policy manager shall report a security event every time a certificate is passed for evaluation. The event data shall contain at least the result of the certificate evaluation.
Rationale:	Forensic analysis and interested parties require information which kind of access was requested and granted to diagnostic testers.
Use Case:	A certificated with extended access rights is provided by the diagnostic tester. A security event provides information about that specific certificate was provided to the ECU.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	Concept 636 "Security Extensions"

⌋

[RS_Diag_04219] Provide the ability to handle event specific storage conditions ⌈

Description:	The diagnostic in AUTOSAR shall support storage conditions per event. A storage condition is used to block the process of storing event related data (e.g. snapshot records) because that data would in that situation of no interest and it is not necessary to spent non-volatile memory for this event related data. If an event specific storage condition is not fulfilled and a trigger to store event related data occurs, no event related data is captured and UDS status bits 2 (pendingDTC) and 3 (confirmedDTC) are not set to 1.
Rationale:	Support mechanisms to avoid event memory entries in situations where the event related data is of no interest.
AppliesTo:	CP

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Dependencies:	–
Use Case:	For certain events only safety related information (e.g. via Fim) are derived but the further processing can be skipped as another root cause is active and only event related data for that root cause is stored.

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[RS_Diag_04124] Store the current debounce counter value nonvolatile to over a powerdown cycle ⌈

Description:	The diagnostic in AUTOSAR shall be able to store the current debounce counter value non-volatile to over a power-down cycle.
Rationale:	Support of DTC de-bouncing within several power cycles.
Use Case:	While the typical DTC operation cycle for a DTC is to start at power up and end at power down, there are different situations, when a particular DTC must define its operation cycle to span multiple ECU power up/down cycles. In this case, the FDC would need to be stored in NVM as it may never make it to 127 during a single power up.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04220] Support DTCs suppression ⌈

Description:	The diagnostic in AUTOSAR shall provide the possibility to suppress DTCs to be visible in diagnostic services. Suppressed DTCs shall be available internally and processed as any other DTCs
Rationale:	DTCs need to be hidden in certain conditions (e.g. dedicated markets)
Use Case:	Hide DTCs in certain markets
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

4.2.2.1 DTC and event-related data

[RS_Diag_04162] Parallel fault memory access ⌈

Description:	The diagnostic in AUTOSAR shall provide parallel access to the fault memory to various clients. Each client shall be able to access the fault memory independent from other clients. Conflicts occurring during parallel access to shared resources shall be resolved.
Rationale:	OEMs require parallel access to diagnostics.
Use Case:	• Support of OBD and UDS in parallel • Software interacting with secondary ECUs in OBD • Software components accessing event memory data
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04164] Independent event memories for multiple diagnostic server instances (virtual ECUs) ⌈

Description:	The diagnostic in AUTOSAR shall provide multiple sets of independent event memories that can store information independently from each other.
Rationale:	Individual assignment of fault memories to dedicated diagnostic servers.
Use Case:	ECUs with multiple independent diagnostic servers. Common faults of the host ECU shall be stored in each of the virtual ECU which is affected by such a fault. Common faults need to be stored in each virtual ECU to ensure that storing and clearing of fault entries has no or little side-effects with the information stored in other virtual ECUs. This use-case assumes that the cost to store a common fault in multiple event memory entries is accepted because sharing of a single event memory entry may have unintended side-effects.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

4.2.3 Diagnostic Communication

[RS_Diag_04021] Handling of different diagnostic sessions in parallel ⌈

Description:	Handle an established diagnostic communication and a parallel diagnostic access request in parallel. This is necessary to open a diagnostic access with high priority and the controlled shutdown of the established diagnostic access with low priority.
Rationale:	To prioritize handling of different diagnostic protocols e.g. OBD and normal diagnostic communication as UDS.
Use Case:	An internal vehicle diagnostic tester communication is interrupted by OBD diagnostic access request.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04032] Different diagnostic addresses shall be supported by multiple (physical) channels ⌈

Description:	Modern ECUs contain more than one functionality (e.g. board computer, instrument cluster). Each functionality shall be addressable by a diagnostic tool with a different diagnostic address. This does not imply that those multiple requests are allowed in parallel.
Rationale:	High flexibility and granularity for addressing of applications
Use Case:	At the service (garage) a fault symptom is based on functionality. The service only wants to address this functionality.
AppliesTo:	CP
Dependencies:	[RS_Diag_04021] Switch diagnostic communication access
Supporting Material:	–

⌋

[RS_Diag_04024] Access and handle specific data elements and data element groups if requested by an external scan tool ⌈

Description:	The diagnostic in AUTOSAR shall provide interfaces for applications to access diagnostic data and to process diagnostic services. The size of a diagnostic data element is derived by the interface or provided as an attribute of the API call itself.
Rationale:	Optimized usage of resources
Use Case:	Transfer environmental / FreezeFrame data of the diagnostic in AUTOSAR.
AppliesTo:	CP
Dependencies:	–

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Supporting Material:	–

⌋

[RS_Diag_04121] Provide the handling of service DynamicallyDefineDataIdentifier according to ISO 14229-1 ⌈

Description:	The diagnostic in AUTOSAR shall provide the handling of service DynamicallyDefineDataIdentifier according to ISO 14229-1 v.2013.
Rationale:	Standardized ISO 14229-1 v.2013 behavior
Use Case:	–
AppliesTo:	CP
Dependencies:	–
Supporting Material:	ISO14229-1 v.2013

⌋

[RS_Diag_04153] Support generic connections ⌈

Description:	Diagnostics shall support generic connections. Addressed information is then using MetaData.
Rationale:	Channel and connection configuration optimization through the layers.
Use Case:	Limit the request execution due to vehicle- or ECU states/-conditions.
AppliesTo:	CP
Dependencies:	Generic connections are supported for CAN diagnostics using normal fixed or mixed 29 bit addressing formats according to ISO15765-2. Depending on the actual layout of the CAN IDs, generic connections could also be used for extended or normal and mixed 11 bit addressing formats.
Supporting Material:	–

⌋

[RS_Diag_04011] Provide diagnostic state information to applications ⌈

Description:	Applications need to know about the actual session and security state, because it is not predictable if the information's lead to a different functional diagnostic behavior.
Rationale:	Functional requirement
Use Case:	With the diagnostic session which the garage is using, it is allowed to switch between different sets of parameters. With an enhanced diagnostic session which could be used in development and a corresponding security level, it is allowed to change the data within the set of parameters.
AppliesTo:	CP
Dependencies:	–

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Supporting Material:	–

⌋

[RS_Diag_04003] Network independent design ⌈

Description:	All network (CAN, LIN, FlexRay, MOST, Ethernet) dependent parts shall be done outside the diagnostic in AUTOSAR. That means that all interfaces to the transport protocol modules shall be network independent.
Rationale:	The diagnostic in AUTOSAR describes only the services for communication and the behavior of network is out of scope. Highest granularity and best option to adapt upcoming networks.
Use Case:	The diagnostic in AUTOSAR has to be network independent. The interface to the transport protocol shall be network independent.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04243] Update of constant parameters through diagnostics ⌈

Description:	Almost constant parameters shall be updatable via diagnostics. Reading and writing those parameters shall avoid a RAM copy of the data.
Rationale:	The size of coding parameter is increasing dramatically. The current FEE concepts require conceptually a RAM copy of the data. This RAM copy shall be avoided.
Use Case:	Coding parameter
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04247] Support of UDS service DynamicallyDefineDataIdentifier (0x2C) with subfunction 0x02 (defineByMemoryAddress) ⌈

Description:	The diagnostic in AUTOSAR shall support UDS service DynamicallyDefineDataIdentifier (0x2C) with subfunction 0x02 (defineByMemoryAddress) according to ISO 14229-1.
Rationale:	UDS defines this service to allow the client to dynamically define a data identifier based on known and individual memory addresses at a later point in time.
Use Case:	Read operations for tailored data identifier that are build out of a collection of parts or full content of existing data identifiers with UDS service 0x22/0x2A.

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AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04015] Timing handling according to ISO14229-2 ⌈

Description:	In ISO14229-2 timing handling for physical and functional communication and error reaction is described. The diagnostic in AUTOSAR shall work according this specification. Timing parameters shall be configurable (see dependencies).
Rationale:	Ensure a steady and save communication link and guarantee specified timing conditions.
Use Case:	Optimizing of timing for high performance during reprogramming.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	ISO14229-2

⌋

[RS_Diag_04098] Interact with standard bootloader ⌈

Description:	Integration of a standard bootloader into the AUTOSAR architecture. • If the diagnostic in AUTOSAR is requested to change into the programming session ($1002), it shall either send the final response and then activate the bootloader or it shall not send the final response and activate the bootloader where the activate the bootloader and the final response shall be sent by the bootloader (according HIS [FL-504]). • The diagnostic in AUTOSAR shall be able to check environmental conditions (e.g. engine speed) before activating the bootloader. • The diagnostic in AUTOSAR shall provide a configurable NRC 0x78 (RCRRP, retrigger the timeout supervision of the diagnostic client) response during transition to the bootloader.
Rationale:	Bootloader concept has to be standardized within AUTOSAR.
Use Case:	Usage of ”off-the-shelf” bootloader
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04156] Support DTCFunctionalUnit ⌈

Description:	The diagnostic in AUTOSAR shall support DTCFunctionalUnit according to ISO 14229-1.
Rationale:	Compliance to ISO 14229-1.
Use Case:	OEM-specific use of DTCs.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04077] Uses standard mechanisms provided by persistency modules ⌈

Description:	–
Rationale:	Non volatile data storage
Use Case:	Triggered data storage during normal ECU operation to avoid loss of volatile data / event information.
AppliesTo:	CP
Dependencies:	–
Supporting Material:	–

⌋

[RS_Diag_04107] Provide defensive behavior ⌈

Description:	For safety-related applications, the diagnostic in AUTOSAR shall ensure data integrity of fault information stored in non-volatile memory.
Rationale:	Error protection of fault memory is needed for safety-related applications
Use Case:	Fault memory could have been corrupted
AppliesTo:	CP
Dependencies:	–
Supporting Material:	Use the optional CRC and redundancy capabilities provided by the AUTOSAR persistency modules for stored fault memory blocks. Only blocks assigned to error events of high severity can be protected. These blocks can be stored in non-volatile memory when the error event is confirmed (before shutdown of the ECU)

⌋

4.2.4 Function Inhibition Manager (FIM)

The specification of Software requirements of the function inhibition manager is not a part of this specification. For details, please refer to the AUTOSAR_FIM_SRS.

4.3 Diagnostic requirements for the Adaptive Platform

[RS_Diag_04166] Several tester conversations in parallel with assigned priorities ⌈

Description:	The diagnostic in AUTOSAR shall generally support a configurable amount of tester conversations/connections in parallel. Per tester connection, a priority shall be configurable. The priority is assigned to the tester address (SA of the UDS request), which identifies the connection.
Rationale:	ECUs in the Adaptive Platform generally have enough resources to handle multiple tester conversations in parallel.
AppliesTo:	AP
Dependencies:	–
Use Case:	Support for vehicle internal and external testers in parallel, which can not be easily synchronized.
Supporting Material:	ISO 14229-1

⌋

[RS_Diag_04167] Conversation preemption/abortion ⌈

Description:	The diagnostic in AUTOSAR shall generally support the preemption of a tester conversation in case all configured tester connections are currently active and a new connection of a tester with higher priority than an existing one takes place, it shall abort the lowest priority conversation and accept the new connection/conversation.
Rationale:	A ECU will have limited resources for parallel processing of diagnostic requests and different requests will have different priorities therefore the need for abortion.
AppliesTo:	AP
Dependencies:	–
Use Case:	Support for vehicle internal and external testers in parallel, which can not be easily synchronized.
Supporting Material:	ISO 14229-1

⌋

[RS_Diag_04168] Adding of user-defined transport layers ⌈

Description:	The diagnostic in AUTOSAR shall support adding of user-defined transport layers.
Rationale:	Although the Adaptive Platform starts out with Ethernet support, later extension to other networks (CAN, FlexRay) should already be prepared. Additionally there is at least one OEM, which has its own DoIP implementation, which differs from ISO 13400. It should be possible to integrate this DoIP implementation with manageable effort/costs.
AppliesTo:	AP

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Dependencies:	–
Use Case:	Plugability of UDS transport layers, to support different networks.

⌋

[RS_Diag_04169] Provide an interface for external UDS service processors. ⌈

Description:	For all UDS services, which are NOT processed/implemented internally by diagnostic in AUTOSAR (either by configuration or generally not supported internally), but by external service processors, the diagnostic in AUTOSAR has to delegate the processing to the external application.
Rationale:	The majority of diagnostic services is implemented by the application, where the diagnostic in AUTOSAR has to delegate the service processing to.
AppliesTo:	AP
Dependencies:	[RS_Diag_04097]
Use Case:	Service processing by software components.
Supporting Material:	ISO 14229-1

⌋

[RS_Diag_04170] Provide connection specific meta information to external service processors ⌈

Description:	The diagnostic in AUTOSAR shall provide connection specific meta-information to the external service processor, which is processing the UDS service request. At least DoIP shall be supported and the meta-information shall contain Src-IP-Adr/Port and Target-IP-Adr/Port of the request. The meta-information should be designed, that it can later easily extended to also cover connection information of other network technologies (like CAN, Flexray).
Rationale:	Sometimes the reaction of service processor implementations on a UDS request depend on the connection properties of the tester.
Use Case:	Flexibility for service processor implementations.
AppliesTo:	AP
Dependencies:	[RS_Diag_04169]

⌋

[RS_Diag_04171] Synchronous and asynchronous interaction with external service processors ⌈

Description:	The diagnostic in AUTOSAR shall support both types of interaction: • Calling a service processor synchronously, which means a blocking call until the service processor returns the final result (pos./neg. response, optional out parameters). • Calling a service processor asynchronously, which means a call to the service processor, where the service processor returns, that the job is not yet finished and later reports back to diagnostic in AUTOSAR via a separate callback, that the service processing has finished.
Rationale:	For long running service processing, which delegate the processing to own worker threads, the asynchronous callback model is more efficient, while for simple service processors the strict synchronous model is easier to implement.
AppliesTo:	AP
Dependencies:	[RS_Diag_04169]
Use Case:	Flexibility for service processor implementations.

⌋

[RS_Diag_04173] Different signature types, when delegating processing of UDS service to the application ⌈

Description:	The diagnostic in AUTOSAR shall support the following signatures, when delegating processing of UDS service to the application: • Untyped interface, where the entire payload including SID and sub-service is given as a byte array to service processors • Typed interface per SID, sub-service and data element, where a mapping from the UDS parameters/data stream to datatypes is described in the configuration.
Rationale:	Depending on the use case/complexity of the UDS service and its parameters, it is much more efficient to do the parsing/interpretation in the implementation of the service processor. On the other hand, there are use cases, where the description of mapping from UDS data stream to interface type has the benefit, that the service processor implementation may stay unchanged, where the mapping description may be adapted to an altered on the wire representation.
AppliesTo:	AP
Dependencies:	[RS_Diag_04169]
Use Case:	Flexibility for service processor implementations.

⌋

[RS_Diag_04174] Provide SA and TA to external service processors ⌈

Description:	The diagnostic in AUTOSAR shall provide source and target address to the external service processor, which is processing the UDS service request.
Rationale:	Sometimes the reaction of service processor implementations on a UDS request depend on the tester (SA) or on the target.

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AppliesTo:	AP
Dependencies:	[RS_Diag_04169]
Use Case:	Flexibility for service processor implementations.

⌋

[RS_Diag_04216] Support for multiple Diagnostic Server Instances ⌈

Description:	The Diagnostics in AUTOSAR shall be able to handle multiple Diagnostic Server Instances. Each Diagnostic Server Instance shall be addressable by its own set of target address and they shall be almost independent of each other. Exceptions like EcuReset needs to be coordinated between the server instances.
Rationale:	Software on AP is grouped in so called SoftwareClusters, and each cluster shall be diagnosed on its own.
AppliesTo:	AP
Dependencies:	–
Use Case:	Multiple SoftwareClusters deployed on single AP and each SoftwareCluster is diagnosed separately.

⌋

[RS_Diag_04251] Support of UDS service 0x29 (Authentication) ⌈

Description:	Diagnostics in AUTOSAR shall support the ISO 14229-1:2020 service 0x29 Authentication with sub-functions for "Authentication with PKI Certificate Exchange (APCE)" to grant access to diagnostic services.
Rationale:	The authentication service provides a standardized way in authenticating a tester and ECU and grant access to diagnostic services depending on the certificate content.
AppliesTo:	AP
Dependencies:	–
Use Case:	A repair shop diagnostic tester authenticates with an ECU to gain access to diagnostic services that are explicitly allowed to be executed for a repair shop.

⌋

[RS_Diag_04256] Support of SOVD ⌈

Description:	Diagnostics within AUTOSAR shall support an SOVD endpoint according the ASAM specification "'SOVD - Service Oriented Vehicle Diagnostics V1.0.0"'.
Rationale:	Provide vehicle access for backends
AppliesTo:	AP
Dependencies:	ISO14229-1
Use Case:	Modernized diagnostic approach in the automotive industry

⌋

[RS_Diag_04257] Capability Description ⌈

Description:	Diagnostics in AUTOSAR shall support the "'API Methods for Access to Capability Description Content"'.
Rationale:	Essential part of the SOVD protocol
AppliesTo:	AP
Dependencies:	–
Use Case:	SOVD is a self-describing protocol

⌋

[RS_Diag_04258] Discovering of Entities and Resources ⌈

Description:	Diagnostics in AUTOSAR shall support the "'API Methods for Discovering of Entities and Resources"'.
Rationale:	Essential part of the SOVD protocol
AppliesTo:	AP
Dependencies:	–
Use Case:	A client to traverse the topology to find out, which methods can be used for which resources.

⌋

[RS_Diag_04259] Fault Memory Access ⌈

Description:	Diagnostics in AUTOSAR shall support the "'API Methods for Fault Handling"'.
Rationale:	Essential part of the SOVD protocol
AppliesTo:	AP
Dependencies:	–
Use Case:	Providing fault memory data

⌋

[RS_Diag_04260] Read / Write Access ⌈

Description:	Diagnostics in AUTOSAR shall support the "'API methods for data ressource read / write access"'.
Rationale:	Essential part of the SOVD protocol
AppliesTo:	AP
Dependencies:	–
Use Case:	Reading and writing various kinds of data

⌋

[RS_Diag_04261] Configuration Access ⌈

Description:	Diagnostics in AUTOSAR shall support the "'API Methods for Configuration"'.
Rationale:	Essential part of the SOVD protocol
AppliesTo:	AP
Dependencies:	–
Use Case:	Components and Apps need to be configured to a specific environment, e.g., vehicle equipment, country, customer demand, variant coding, etc.

⌋

[RS_Diag_04262] Control of Operations ⌈

Description:	Diagnostics in AUTOSAR shall support the "'API Methods for Control of Operations"'. The following limitations in Operation capabilities related to SOVD methods: I/O control adjustments are not supported for the SOVD server in Adaptive Platforms, as the UDS service for I/O control is also not supported, yet.
Rationale:	Essential part of the SOVD protocol
AppliesTo:	AP
Dependencies:	–
Use Case:	Remote procedure calls and adjustment of values

⌋

[RS_Diag_04263] Support of Target Modes ⌈

Description:	Diagnostics in AUTOSAR shall support the "'API Methods for Support of Target Modes"'.
Rationale:	Essential part of the SOVD protocol
AppliesTo:	AP
Dependencies:	–
Use Case:	Controlling and preparing states/modes of target entities

⌋

[RS_Diag_04264] SOVD specific Locking/Semaphore mechanism ⌈

Description:	Diagnostics in AUTOSAR shall support the "'API Methods for Locking"'.
Rationale:	Essential part of the SOVD protocol
AppliesTo:	AP
Dependencies:	–
Use Case:	Gain exclusive access to a single client for specific resources

⌋

[RS_Diag_04265] Software Update ⌈

Description:	Diagnostics in AUTOSAR shall support the "'API Methods for Software Update"'.
Rationale:	Optional part of the SOVD protocol
AppliesTo:	AP
Dependencies:	–
Use Case:	SOVD approach to update software

⌋

[RS_Diag_04266] Bulk data ⌈

Description:	Diagnostics in AUTOSAR shall support the "'API Methods for Handling of bulk-data"'.
Rationale:	Optional part of the SOVD protocol
AppliesTo:	AP
Dependencies:	–
Use Case:	Handling of larger bulk data like kernel-dump files

⌋

[RS_Diag_04267] Logging ⌈

Description:	Diagnostics in AUTOSAR shall support the "'API Methods for Logging"'.
Rationale:	Essential part of the SOVD protocol
AppliesTo:	AP
Dependencies:	–
Use Case:	Aggregation of logging information

⌋

[RS_Diag_04268] Authentication ⌈

Description:	Diagnostics in AUTOSAR shall support the "'Authentication of SOVD clients"' AUTOSAR shall mandate a security solution based on OAuth as defined in the chapter 6.15 Authentication of SOVD clients. SOVD does not mandate compared to AUTOSAR this solution as this chapter is only informative.
Rationale:	Essential part of the SOVD protocol
AppliesTo:	AP
Dependencies:	–
Use Case:	Enabling authorization and validation process to protect the resources of any accessible entity in a car against misuse.

⌋

[RS_Diag_04269] SOVD 2 UDS Adapter ⌈

Description:	Diagnostics in AUTOSAR shall support the "'Classic Diagnostic Adapter"'.
Rationale:	Optional part of SOVD protocol
AppliesTo:	AP
Dependencies:	–
Use Case:	Adapter to access UDS-based ECUs via SOVD

⌋

[RS_Diag_04273] SOVD service request validation ⌈

Description:	The diagnostic in AUTOSAR shall provide a functionality to an external application to validate each SOVD request. A validation can result in allowing to process the received request or in rejecting the request by discarding silently or returning an error code.
Rationale:	Restricting the execution of SOVD requests via static configuration properties is not always sufficient and more dynamic checks are needed to achieve a further level of execution management.
AppliesTo:	AP
Dependencies:	–
Use Case:	Allow ECU projects or manufacturers to realize specific verifications that go beyond of what is available by standard AUTOSAR mechanism such as authentication or environmental conditions. An external application has access to the received request and implements own filter, firewall, etc on individual conditions.

⌋

[RS_Diag_00047] DoIP shall be able to access the DHCP host name option. ⌈

Description:	The value used in the DHCP host name option shall be accessible and changeable by DoIP.
Rationale:	–
Use Case:	–
AppliesTo:	AP
Dependencies:	–
Supporting Material:	[1] ISO13400-2

⌋

[RS_Diag_00024] DoIP messages shall be bi-directionally routed ⌈

Description:	DoIP shall implement a mechanism to bi-directionally route DoIP messages between the vehicle networks and TCP sockets.
Rationale:	This is necessary to allow DoIP communication
Use Case:	–
AppliesTo:	AP

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Dependencies:	–
Supporting Material:	[1] ISO13400-2

⌋

[RS_Diag_00025] Valid DoIP messages shall be recognized ⌈

Description:	DoIP shall provide a mechanism to recognize valid DoIP Messages
Rationale:	This is necessary to ensure correct DoIP communication
Use Case:	–
AppliesTo:	AP
Dependencies:	–
Supporting Material:	[1] ISO13400-2

⌋

[RS_Diag_00026] DoIP Vehicle Identification shall be provided ⌈

Description:	DoIP shall provide a mechanism to identify a vehicle respective its DoIP entity in a network
Rationale:	This is necessary to determine the IP addresses of the DoIP entity
Use Case:	–
AppliesTo:	AP
Dependencies:	–
Supporting Material:	[1] ISO13400-2

⌋

[RS_Diag_00027] DoIP diagnostic message shall have a format ⌈

Description:	DoIP shall implement a message format to allow the routing of diagnostic messages
Rationale:	This is necessary to allow DoIP
Use Case:	–
AppliesTo:	AP
Dependencies:	–
Supporting Material:	[1] ISO13400-2

⌋

[RS_Diag_00028] Multiple DoIP sockets shall be allowed on a single port ⌈

Description:	DoIP shall implement a mechanism to allow the use and assignment of multiple sockets on a single port, while ensuring that no active communication is disturbed
Rationale:	This is necessary for the efficient use of socket communication
Use Case:	–
AppliesTo:	AP
Dependencies:	–
Supporting Material:	[1] ISO13400-2

⌋

[RS_Diag_00080] DoIP shall implement a mechanism to retrieve diagnostic power mode ⌈

Description:	DoIP shall implement a mechanism to retrieve the diagnostic power mode of a DoIP Entity via a diagnostic power mode request as described in ISO 13400-2. The service is needed to provide the tester with the diagnostic capability information.
Rationale:	This is necessary to allow DoIP
Use Case:	–
AppliesTo:	AP
Dependencies:	–
Supporting Material:	[1] ISO13400-2

⌋

[RS_Diag_00081] DoIP shall be able to dynamically maintain connection to different testers ⌈

Description:	DoIP shall be able to dynamically maintain the connection to different testers as described in ISO 13400-2
Rationale:	This is necessary to allow DoIP
Use Case:	–
AppliesTo:	AP
Dependencies:	–
Supporting Material:	[1] ISO13400-2

⌋

[RS_Diag_00082] DoIP shall implement a mechanism to retrieve Entity Status ⌈

Description:	DoIP shall implement a mechanism to retrieve the entity status information of a DoIP Entity via an Entity status request as described in ISO13400-2. The service is needed to provide the tester with the diagnostic capability information.

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Rationale:	This is necessary to allow DoIP
Use Case:	–
AppliesTo:	AP
Dependencies:	–
Supporting Material:	[1] ISO13400-2

⌋

[RS_Diag_00083] DoIP shall implement a mechanism to check if diagnostic testers are alive ⌈

Description:	DoIP shall implement a mechanism to check if the connected testers are still available to allow an efficient management of connections for diagnostics from the DoIP entity point of view. The alive check mechanism shall be according to 13400-2.
Rationale:	This is necessary to allow DoIP
Use Case:	–
AppliesTo:	AP
Dependencies:	–
Supporting Material:	[1] ISO13400-2

⌋

[RS_Diag_00084] DoIP shall implement routing activation mechanism ⌈

Description:	DoIP shall implement a mechanism to allow the selective activation of diagnostics on all supported socket connections with the Routing activation mechanisms described in ISO 13400-2
Rationale:	This is necessary to allow DoIP
Use Case:	–
AppliesTo:	AP
Dependencies:	–
Supporting Material:	[1] ISO13400-2

⌋

[RS_Diag_00104] DoIP shall support USDT and UUDT messages according to ISO 14229-5 ⌈

Description:	DoIP module shall support both the interface-API (for UUDT) and the transport layer API towards the PduR for USDT.
Rationale:	DoIP shall be able to route both USDT (Unacknowledged segmented data transfer) and UUDT (Unacknowledged unsegmented data transfer) messages.
Use Case:	Routing of USDT and UUDT messages

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AppliesTo:	AP
Dependencies:	–
Supporting Material:	[2] ISO 14229-5

⌋

[RS_Diag_00140] TLS for diagnostic communication (DoIP) shall support at least one ciphersuite as defined in ISO13400-2. ⌈

Description:	The DoIP specification ISO13400-2 defines a list of ciphersuites. If a TLS connection is used for diagnostic communication over TLS, at least one of the defined ciphersuites shall be supported.
Rationale:	Support ISO 13400-2
Use Case:	–
AppliesTo:	AP
Dependencies:	–
Supporting Material:	–

⌋

5 References

[1] ISO 13400-2:2019 – Road vehicles – Diagnostic communication over Internet Protocol (DoIP) – Part 2: Network and transport layer requirements and services (Edition 2, Release 2019-12)
https://www.iso.org/standard/74785.html

[2] ISO 14229-5(2013) – Road vehicles – Unified diagnostic services (UDS) – Part 5: Unified diagnostic services on Internet Protocol implementation (UDSonIP)
https://www.iso.org

5.1 Deliverables of AUTOSAR

1. General Requirements of Basic Software Modules:
AUTOSAR_SRS_BSWGeneral.pdf
2. Specification of the Virtual Functional Bus : *AUTOSAR_EXP_VFB.pdf*
3. Software Standardization Template : *AUTOSAR_TPS_StandardizationTemplate.pdf*

5.2 Related standards and norms

5.2.1 ITEA-EAST

- D1.5-General Architecture; ITEA/EAST-EEA, Version 1.0; chapter 3, page 72 et seq.
- D2.1-Embedded Basic Software Structure Requirements; ITEA/EAST-EEA, Version 1.0 or higher
- D2.2-Description of existing solutions; ITEA/EAST-EEA, Version 1.0 or higher.

5.2.2 ISO

1. ISO 14229-1 Unified diagnostic services (UDS) Part 1: Specification and Requirements (v.2013)
2. ISO 15031-5 Communication between vehicle and external equipment for emissions related diagnostics Part 5: Emissions related diagnostic services (2005-01-13)
3. ISO 15765-3 Diagnostics on controller area network (CAN) Part 3: Implementation of unified diagnostic services (UDS on CAN) (2004-10-06)
4. ISO 15765-4 Diagnostics on controller area network (CAN) Part 4: Requirements for emissions-related systems (2005-01-04)

A Change history of AUTOSAR traceable items

Please note that the lists in this chapter also include traceable items that have been removed from the specification in a later version. These items do not appear as hyperlinks in the document.

A.1 Traceable item history of this document according to AUTOSAR Release R26-11

A.1.1 Added Requirements in R26-11

Number	Heading
[RS_Diag_04281]	Support of DoIP
[RS_Diag_04282]	Support of DoIP TCP General Inactivity Timer

Table A.1: Added Requirements in R26-11

A.1.2 Changed Requirements in R26-11

Number	Heading
[RS_Diag_04113]	Support a set of SAE J1939 DM-messages
[RS_Diag_04205]	Support of SnapshotRecords
[RS_Diag_04206]	Support of ExtendedDataRecords

Table A.2: Changed Requirements in R26-11

A.1.3 Deleted Requirements in R26-11

none

A.2 Traceable item history of this document according to AUTOSAR Release R25-11

A.2.1 Added Requirements in R25-11

Number	Heading
[RS_Diag_04275]	Support of UDS service 0x22 ReadDataByIdentifier
[RS_Diag_04276]	General validation of UDS requests according to ISO 14229-1
[RS_Diag_04277]	UDS Response types
[RS_Diag_04278]	UDS service CommunicationControl (SID 0x28)
[RS_Diag_04279]	UDS service EcuReset (SID 0x11)
[RS_Diag_04280]	UDS service WriteDataByIdentifier (SID 0x2E)

Table A.3: Added Requirements in R25-11

A.2.2 Changed Requirements in R25-11

Number	Heading
[RS_Diag_04113]	Support a set of SAE J1939 DM-messages

Table A.4: Changed Requirements in R25-11

A.2.3 Deleted Requirements in R25-11

none

A.3 Traceable item history of this document according to AUTOSAR Release R24-11

A.3.1 Added Requirements in R24-11

Number	Heading
[RS_Diag_00024]	DoIP messages shall be bi-directionally routed
[RS_Diag_00025]	Valid DoIP messages shall be recognized
[RS_Diag_00026]	DoIP Vehicle Identification shall be provided
[RS_Diag_00027]	DoIP diagnostic message shall have a format
[RS_Diag_00028]	Multiple DoIP sockets shall be allowed on a single port
[RS_Diag_00047]	DoIP shall be able to access the DHCP host name option.

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Number	Heading
[RS_Diag_00080]	DoIP shall implement a mechanism to retrieve diagnostic power mode
[RS_Diag_00081]	DoIP shall be able to dynamically maintain connection to different testers
[RS_Diag_00082]	DoIP shall implement a mechanism to retrieve Entity Status
[RS_Diag_00083]	DoIP shall implement a mechanism to check if diagnostic testers are alive
[RS_Diag_00084]	DoIP shall implement routing activation mechanism
[RS_Diag_00104]	DoIP shall support USDT and UUDT messages according to ISO 14229-5
[RS_Diag_00140]	TLS for diagnostic communication (DoIP) shall support at least one ciphersuite as defined in ISO13400-2.
[RS_Diag_04273]	SOVD service request validation
[RS_Diag_04274]	Variant handling at runtime

Table A.5: Added Requirements in R24-11

A.3.2 Changed Requirements in R24-11

Number	Heading
[RS_Diag_04019]	Provide confirmation after transmit diagnostic responses to the application
[RS_Diag_04077]	Uses standard mechanisms provided by persistency modules
[RS_Diag_04091]	Application access to snapshot record data
[RS_Diag_04098]	Interact with standard bootloader
[RS_Diag_04107]	Provide defensive behavior
[RS_Diag_04124]	Store the current debounce counter value nonvolatile to over a powerdown cycle
[RS_Diag_04156]	Support DTCFunctionalUnit
[RS_Diag_04179]	Provide interfaces for monitoring application.
[RS_Diag_04199]	UDS service request validation
[RS_Diag_04219]	Provide the ability to handle event specific storage conditions
[RS_Diag_04220]	Support DTCs suppression
[RS_Diag_04235]	Client certificate validity
[RS_Diag_04236]	Client certificate target identification
[RS_Diag_04237]	Client certificate evaluation
[RS_Diag_04238]	Logging certificate evaluation

Table A.6: Changed Requirements in R24-11

A.3.3 Deleted Requirements in R24-11

Number	Heading
[RS_Diag_04059]	Configuration of timing parameters
[RS_Diag_04222]	Independence of clearing DTC status and system degradation

Table A.7: Deleted Requirements in R24-11

A.4 Traceable item history of this document according to AUTOSAR Release R23-11

A.4.1 Added Requirements in R23-11

Number	Heading
[RS_Diag_04270]	Notify applications about the changes of enable conditions
[RS_Diag_04271]	Support of Transmit Certificate
[RS_Diag_04272]	Support of secure data coding

Table A.8: Added Requirements in R23-11

A.4.2 Changed Requirements in R23-11

none

A.4.3 Deleted Requirements in R23-11

none