AUTOSAR Dem User Manual

Document Change History				
Date (YYYY-MM-DD)	Ver.	Editor	Chap	Description (before change -> after revision)
2016-04-29	1.0.0	Yj Yun	All	• Initial creation
2016-05-30	1.0.1	Yj Yun	All	• Eliminated interface which is not used
2016-08-12	1.0.2	Yj Yun	All	• Modified the parameter category
2016-08-15	1.1.0	Yj Yun	6.2 6.3 6.3 6.4 10	• Setting: DemNvRamBlockAccessOptimizationSupport was added • Setting: DemEventStatusBitStorageTestFailed was added • Setting: DemEventStatusBitResetWarningIndicatorRequested was added • Setting: DemUdsStatusAvailabilityMask was added • Redundant mention in Appendix was deleted
2016-08-30	1.2.0	Yj Yun	6.2.17 6.3.5.2 6.4	• J1939 support • Setting: DemGeneral1939 was added • Setting: DemIndicatorBehaviour was added • Setting: DemJ1939DTCValue was added
2016-09-30	1.3.0	Yj Yun	6.2 10.4 5.2.3	• Setting: DemFimIntegrated was added • Cautions while using Operation were added • Limitations were added
2016-11-16	1.3.1	Yj Yun	5.2.2	• Change Log was updated
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2017-02-14	1.3.3	Yj Yun	10.5 5.2.4 7.2.20	• ClearDTC Operation was added
2017-03-21	1.3.4	Yj Yun	10.6 10.7	• Description of NvBlockLength validation feature was added • Recommendation for NvM Block was added
2017-04-05	1.3.5	Yj Yun	5.2.2	• Change Log was updated

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			10.7	• Recommendation related to NvM Block
2017-05-31	1.3.6	Ek Kim	5.2.2 6.4	• Change Log was updated • Setting: DemEventStatusBitResetWarningIndicatorRequested was changed
2017-06-22	1.3.7	Ek Kim	5.2.2	• Change Log was updated
2017-07-28	1.3.8	Ek Kim	5.2.2	• Change Log was updated
2017-08-31	1.3.9	Ek Kim	5.2.2	• Change Log was updated
2018-01-30	1.3.10	Ek Kim	5.2.2 6.3 10.7.2	• Change Log was updated • Description of the DemGeneralJ1939 setting was updated • Recommendation for the NvM ReadAll/WriteAll feature was added
2018-03-31	1.3.11	Ek Kim	5.2.2 6.2 10.8	• Change Log was updated • Setting: DemExtendedDataCapture, DemFreezeFrameCapture Value were changed • Caution related to NvM Block was added
2018-05-31	1.3.12	Ek Kim	5.2.2 8.2.1	• Change Log was updated • Generator Error Message was added
2018-11-16	1.3.13	Ek Kim	5.2.2	• Change Log was updated
2018-12-07	1.3.14	Ek Kim	5.2.2	• Change Log was updated
2018-12-31	1.4.0	Ek Kim	5.2.2 6.2 7.2	• Change Log was updated • Regarding J1939, the Configuration Guide was updated with the mention of IndicatorID added • Interface related to J1939 was added
2019-02-20	1.4.1	Ek Kim	5.2.2 10.8	• Change Log was updated • Caution related to NvM Block was added
2019-04-10	1.4.2	Ek Kim	5.2.2	• Change Log was updated
2019-07-31	1.4.3	Ek Kim	5.2.2 10.5	• Change Log was updated • How to use ClearDTC Operation(API) was added
2019-10-10	1.4.4	Ek Kim	5.2.2 6	• Change Log was updated • Configuration item properties were changed
2020-01-21	1.4.5	Ek Kim	5.2.2	• Change Log was updated
2020-09-07	1.4.6	Ek Kim	5.2.2	• Change Log was updated
2020-12-30	3.2.1.0	Ek Kim	5.2.2	• Change Log was updated
2021-01-13	3.2.2.0	Ek Kim	5.2.2	• Change Log was updated
2021-02-01	3.2.3.0	Ek Kim	5.2.2	• Change Log was updated

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2021-02-22	3.3.0.0	Ek Kim	5.2.2 6.2 6.3	• Change Log was updated • DemEventClearSupport was added to the settings • DemResetEventStatus was added to the settings
2021-03-31	3.3.1.0	Ek Kim	5.2.2	• Change Log was updated
2021-08-02	3.3.2.0	LanhLT	5.2.2 6.2	• Change Log was updated • Description of DemEventClearSupport was changed
2021-10-27	3.3.3.0	LanhLT	5.2.2	• Change Log was updated
2021-12-31	3.3.4.0	LanhLT	5.2.2	• Change Log was updated
2022-02-18	3.3.5.0	LanhLT	5.2.2 8.2.1 8.2.3	• Change Log was updated • Add new Error Message • Add new Information Message
2022-04-08	3.3.6.0	KH Kim	5.2.2	• ChangeLog was updated
2022-08-12	3.3.7.0	KT Kim	5.2.2	• ChangeLog was updated
2022-11-30	3.3.7.1	KT Kim	5.2.2	• ChangeLog was updated
2023-03-09	3.3.8.0	KT Kim	5.2.2	• ChangeLog was updated
2023-07-20	3.3.9.0	KT Kim	5.2.2	• ChangeLog was updated
2023-07-31	4.0.0.0	EK Kim	5.2.2 6.2.18 6.4 6.5 6.6 7.1.13 7.2.27	• ChangeLog was updated • Add DemSupportedObdUdsDtcSeparation • Add DemObdDTCValue3Byte • Add DemWWHOBDDTCClass • Add DemDtr • Add DemPidClass • Add Dem_DTRControlType • Add DTRCentralReport
2023-09-20	4.1.0.0	DanhTQ1	5.2.2	• ChangeLog was updated
2024-03-08	4.1.1.0	KT Kim	5.2.2	• ChangeLog was updated

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1 Overview

This document provides references and guidance for users on parameter configuration and system design when they use the AUTOSAR platform for Dem. It is created based on the AUTOSAR standard SRS/SWS. For more technical details, please see the reference documents below. See the user manuals related to memory such as NvM,Ea,and Fee for more information on non-volatile memory.

*Note: This document is based on the AUTOSAR diagnostic stack and HMC ES95486.

The following terms on configuration categories mean:

- Changeable (C): Items that can be configured by user
- Fixed (F): Items that cannot be changed by user
- NotSupported (N): Items that are not used

2 Reference

Sl. No.	Title	Version
1.	AUTOSAR BSW Service API Guide.doc	1.0.0 or later
2.	AUTOSAR_SWS_DiagnosticEventManager.pdf	4.2.0
3.	AUTOSAR_SWS_DevelopmentErrorTracer.pdf	2.2.0
4.	AUTOSAR_SWS_FunctionInhibitionManager.pdf	3.2.0
5.	AUTOSAR_SWS_DiagnosticCommunicationManager.pdf	4.2.0
6.		
7.		

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3 Acronyms and abbreviations

Acronym:	*Description:*
N_OK	Not OK
Freeze frame	Freeze frame is defined as a record of data (DIDs/PIDs). Freeze frames are the same as SnapShotRecords in ISO 14229-1.
Extended data record	An extended data record is a record to store specific information assigned to a fault.
Monitor	A diagnostic monitor is a routine entity determining the proper functionality of a component. Alternatively the term "diagnostic function" can be used.
Operating cycle	An 'Operating cycle' is the base of the event qualifying and also Dem scheduling (e.g. ignition key off-on cycles, driving cycles, etc.)
Aging	Unlearning/deleting of a no longer failed event/DTC after a defined number of operation cycles from event memory
Healing	Switching of the warning indicator including the handling of reported passed results over a period of time / several operation cycles
PossibleErrors	PossibleErrors means the ApplicationErrors as defined in meta model
Event debouncing	Debouncing is a specific mechanism (e.g. counter-based) to evaluate, if the diagnostic event gets qualified. This works on top of potential signal debouncing and can be done within the SW-C or inside the Dem.
Event qualification	A diagnostic event is qualified in case of a passed or a failed result is set (Dem-internal or reported from another BSW module or SW-C).
Event confirmation	A diagnostic event is confirmed in case of repeated detection of qualified events over cycles or time evaluated by means of fault confirmation counters. Therefore, also the UDS DTC Status bit 3 (ConfirmedDTC) is set.
Event memory overflow indication	The event memory overflow indication indicates, if this specific event memory is full and the next event occurs to be stored in this event memory.
Readiness	The readiness refers to the tested bits TestNotCompletedSinceLastClear (bit 4) and TestNotCompleteThisOperationCycle (bit 6) of the UDS DTC Status Byte.
Application Layer	The Application Layer is placed above the RTE. Within the Application Layer the AUTOSAR Software-Components are placed.
Channel	A link at which a data transfer can take place. If there is more than one Channel, there is normally some kind of ID assigned to the Channel.
Diagnostic Channel	A link at which a data transfer between a diagnostic tool and an ECU can take place. Example: An ECU is connected via CAN and the diagnostic channel has an assigned CAN-ID. Diagnostic channels connected to other bus-systems such as MOST, FlexRay, LIN, etc. are also possible.
External Diagnostic Tool	A device which is NOT permanently connected to the vehicle communication network. This External Diagnostic Tool can be connected to the vehicle for various purposes, as e.g. for: • development, • manufacturing, and • service (in a garage). Example External Diagnostic Tools are: • a diagnostic tester, • an OBD scan tool. The External Diagnostic Tool is to be connected by a mechanic to gather information from "inside" the car.
Freeze Frame	A set of the vehicle/system operation conditions at a specific time.
Functional Addressing	The diagnostic communication model where a group or all nodes of a specific communication network receive a message from one sending node (1-n communication). This model is also referred to as 'broadcast' or 'multicast'. OBD

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	communication will always be done in the Functional Addressing mode.
Internal Diagnostic Tool	A device/ECU which is connected to the vehicle communication network. The Internal Diagnostic Tool can be used for: advanced event tracking, advanced analysis, for service. The behavior of the Internal Diagnostic Tool can be the same as of an External Diagnostic Tool. The notion of "Internal Diagnostic Tool" does not imply that it is included in each ECU as an AUTOSAR Software-Component.
Physical Addressing	The diagnostic communication model where a node of a specific communication network receives a message from one sending node (1-1 communication). This model is also referred to as 'unicast'.
UDS Service	This refers to a UDS Service as defined in ISO14229-1
Callouts	Callouts are pieces of code that have to be added to the DCM during ECU integration. The content of most callouts is hand-written code, for some callouts the DCM configuration tool shall generate a default implementation that is manually edited by the integrator. Conceptually, these callouts belong to the ECU Firmware.
DDDID	Dynamically Defined Data IDentifier

Abbreviation:	*Description:*
API	Application Programming Interface
BSW	Basic Software
CRC	Cyclic Redundancy Check
Dcm	Diagnostic Communication Manager
Dem	Diagnostic Event Manager
Det	Development Error Tracer
DID	Data Identifier
Dlt	Diagnostic Log and Trace
DTC	Diagnostic Trouble Code
ECU	Electronic Control Unit
EcuM	Electronic Control Unit Manager
FDC	Fault Detection Counter
FiM	Function Inhibition Manager
HW	Hardware
ID	Identification/Identifier
ISO	International Standardization Organization
IUMPR	In Use Monitoring Performance Ratio
MIL	Malfunction Indication Light
NVRAM	Non volatile RAM
OBD	Onboard Diagnostics
OEM	Original Equipment Manufacturer (Automotive Manufacturer)
OS	Operating System
PID	Parameter Identification
PTO	Power Take Off
RAM	Random Access Memory
ROM	Read-only Memory
RTE	Runtime Environment
SSCP	synchronous server call point
SW	Software
SW-C	Software Component
UDS	Unified Diagnostic Services

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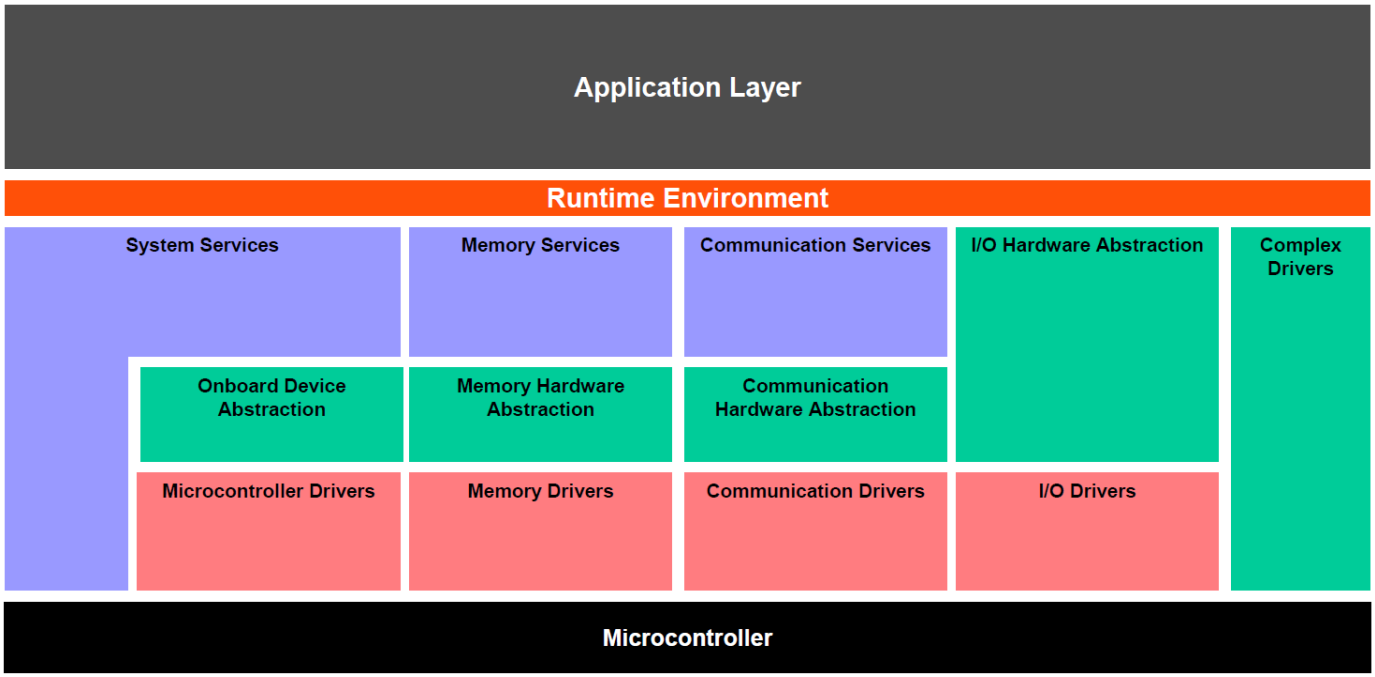
4 AUTOSAR System

4.1 Overview of Software Layers

The AUTOSAR platform is a layered architecture as illustrated below. The AUTOSAR platform is composed of Service Layer, ECU Abstraction Layer, Complex Device Drivers and Microcontroller Abstraction Layer.



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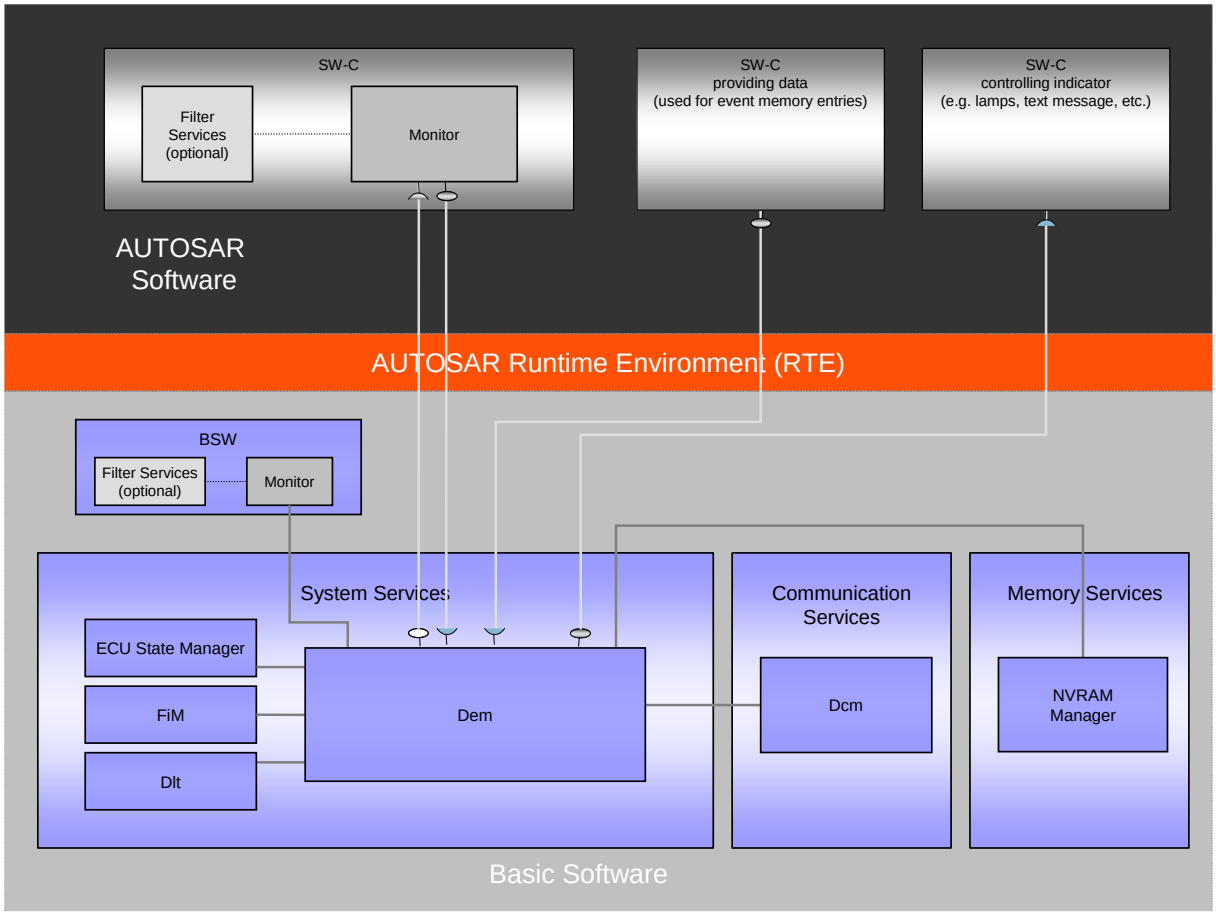
4.2 AUTOSAR Diagnostic Stack



4.2.1 Function Inhibition Manager

Depending on event status (Test Failed, etc.), permission status of SW-C functionality is changed.
SW-C monitors permission status of functionality and determines whether a function works or not.

4.2.2 Diagnostic Event Manager

It processes an event created in SW-C and the BSW module.

4.2.3 Diagnostic Communication Manager

It manages diagnostic data flow and diagnostic state while performing request for diagnosis.

4.2.4 Development Error Tracer

It manages errors generated during development (eliminate the module before SOP).

5 Product Release Notes

5.1 Overview

This chapter provides the release information of Hyundai AutoEver diagnostic products, describing the features

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and restrictions of different release versions of the diagnostic stack software.

5.2 Scope of the Release

Module	AUTOSAR version	SWS version	Module version
Dem	4.0.3	4.2.0	4.1.1

5.2.1 Module release notes

5.2.2 Change Log

- Version 4.1.1.0 (2024-03-08)
  - Bug
    - Change generator code to generate Compile error when invalid NvM block length related to Dem is set(3.3.9.0 Revisions Re-reflected)

Cause	NvM Length check logic not working due to generator code error
Operation Impact	None
Configuration Impact	None
ASW Action	None

- Version 4.1.0.0 (2023-09-20)
  - Feature
    - Change operation when the configuration NvMSetRamBlockStatusApi is set true

Rationale	Dem module should support event storage when NvM's configuration NvMSetRamBlockStatusApi is true, but Dem doesn't.
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

- Version 4.0.0.0 (2023-07-31)
  - Feature
    - J1979-2 specification development

Cause	Request for J1979-2 specification development
Operation Impact	None
Configuration Impact	/AUTRON/Dem/DemGeneral/DemGeneralOBD/DemSupportedObdUdsDtcSeparation (refer 6.2.18) /AUTRON/Dem/DemConfigSet/DemDTCClass/DemObdDTCValue3Byte(refer 6.4) /AUTRON/Dem/DemConfigSet/DemDTCClass/DemWWHOBDDTCClass(refer 6.4) /AUTRON/Dem/DemConfigSet/DemDtrs (refer 6.6)
ASW Action	None

    - J1979 specification development

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Cause	Request for J1979 specification development
Operation Impact	None
Configuration Impact	/AUTRON/Dem/DemConfigSet/DemPidClass(refer 6.5)
ASW Action	None

- Version 3.3.9.0 (2023-07-20)
  - Bug
    - Change generator code to generate Compile error when invalid NvM block length related to Dem is set

Cause	NvM Length check logic not working due to generator code error
Operation Impact	None
Configuration Impact	None
ASW Action	None

- Version 3.3.8.0 (2023-03-09)
  - Improvement
    - Improvements template of Swcd_Bsw_Dem.arxml in generator

Rationale	Need to change template of Swcd_Bsw_Dem.arxml
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

- Version 3.3.7.1 (2022-11-30)
  - Task
    - Update User Manual

Rationale	Change user manual to English/Korean version.
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

- Version 3.3.7.0 (2022-08-12)
  - Improvement
    - Improvement of coding convention for Cyber-Security

Rationale	Improved security of code to comply with the UNECE Cyber Security regulations
Impact on Behavior	None
Impact on Setting	None

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Required ASW Action	None

➢ Version 3.3.6.0 (2022-04-08)

- Bug
  - ■ Dem_Num_Of_IndicatorId should be const data type.

Cause	Dem_Num_Of_Inidicatorld has wrong data type.
Operation Impact	None
Configuration Impact	None
ASW Action	None

- Improvement
  - ■ Delete the DEM_NO_NVMBLOCK_LENGTH_VALIDATION compile option

Cause	To reduce the wrong configuration, make user need to use NVMBlock length validation option.
Operation Impact	None
Configuration Impact	None
ASW Action	None

- Improvement
  - ■ Improvement of coding convention for Cyber-Security

Cause	Improvement of coding convention for Cyber-Security
Operation Impact	None
Configuration Impact	None
ASW Action	None

- Improvement
  - ■ Improvement that the code order of the Generate file is different even when the same input file is used

Cause	Add sorting logic so that the code order of the generate file cannot be changed when the same input file is used
Operation Impact	None
Configuration Impact	None
ASW Action	None

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➢ Version 3.3.5.0 (2022-02-18)

- Improvement
  - In Generator, add error message when DemSecondaryEventMemoryNvBlockIdRef, DemPrimaryEventMemoryNvBlockIdRef and DemPermanentEventMemoryNvBlockIdRef reference to NvMBlockDescriptor in NvM and parameter NvMRamBlockDataAddress is not configuration.

Rationale	When NvMRamBlockDataAddress is not configured, 3 arrays Dem_PrimaryEventMemoryNvmBlockId, Dem_SecondaryEventMemoryNvmBlockId and Dem_PermanentEventMemoryNvmBlockId shall be generated with wrong value.
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

- Improvement
  - In generator, add sorting logic and warning message when user configure wrong index of DemPrimaryEventMemory, DemSecondaryEventMemory and DemPermanentEventMemory.

Rationale	When container DemPrimaryEventMemory, DemSecondaryEventMemory and DemPermanentEventMemory was not configured sequential and mismatched with configuration in NvM. The generated index value of related array shall be wrong.
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

➢ Version 3.3.4.0 (2021-12-31)

- Improvement
  - Improvement of coding convention for Cyber-Security

Rationale	Improved security of code to comply with the UNECE Cyber Security regulations
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

➢ Version 3.3.3.0 (2021-10-27)

- Improvement
  - Update generator to fix unnecessary warning

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Rationale	In previous version, unnecessary warning has been printed when generating the output.
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

- Improvement
  - ■ Update error of function declaration

Rationale	Correct function declaration
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

- Improvement
  - ■ Solving the Race Condition Problem

Rationale	If there are 2 testers with 2 different protocols, tester 1 send request Clear DTC. After that tester 2 send other request (tester 2 is higher priority protocol). So, when clear DTC is executing. Cancel clear DTC preempt. In some cases, Cancel clear DTC shall not work.
Impact on Behavior	Cancel clear DTC work normally when was requested
Impact on Setting	None
Required ASW Action	None

- Improvement
  - ■ Solving the Race Condition Problem

Rationale	When OBD feature is used, if the function set Pfc Qualified is preempted. Some case this function work as unexpected behavior.
Impact on Behavior	Pfc Qualified work normally when SWC-C call.
Impact on Setting	None
Required ASW Action	None

- Bug
  - ■ Solving missing exit protection in Dem_SetObdCycle()

Rationale	SchM_Exit_Dem_REQUEST_STATUS_PROTECTION() is missing in Dem_SetObdCycle(). When Dem_SetObdCycle() is called 65535 times with OperationCylceId which the parameter DemOperationCycleType configure DEM_OPCYC_IGNITION.
Impact on Behavior	Dem_SetObdCycle shall work normally when SWC-C call.
Impact on Setting	None

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Required ASW Action	None

➢ Version 3.3.2.0 (2021-08-02)

- Improvement

■ Update information of the configuration parameter DemEventClearSupport in User Manual

Rationale	In previous version, the information of configuration parameter DemEventClearSupport is wrong.
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

- Improvement

■ Improving Dem generator to generate the same generated File for the same Input File.

Rationale	Sorting function of generator should be improved.
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

- Bug

■ Solving the problem that CAN is not working after request Clear DTC

Rationale	SchM_Exit_Dem_REQUEST_STATUS_PROTECTION() is missing in the Clear DTC.
Impact on Behavior	CAN communication work normally after request the ClearDTC
Impact on Setting	None
Required ASW Action	None

- Bug

■ Solving the problem that CAN is not working after request J1939 Clear DTC

Rationale	SchM_Exit_Dem_REQUEST_STATUS_PROTECTION() is missing in the J1939 Clear DTC.
Impact on Behavior	CAN communication work normally after receiving the J1939 ClearDTC
Impact on Setting	None
Required ASW Action	None

➢ Version 3.3.1.0 (2021-03-31)

- Improvement

■ Corrected MISRA-C violations

Rationale	Corrected MISRA-C violations

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Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

➢ Version 3.3.0.0 (2021-02-23)

- New feature

■ A feature was added to clear events not connected to DTC upon ClearDTC request.

Rationale	Request for a feature that allows deletion of events not connected to DTC if ClearDTC service is received
Impact on Behavior	Event Parameter configuration was added to provide the feature
Impact on Setting	DemGeneral/DemEventClearSupport , DemEventParameter/DemResetEventStatus's setting were added (see 6.2 and 6.3)
Required ASW Action	None

- Improvement

■ Corrected the phenomenon that the Confirmed bit is deleted after reset when an event other than the representative event is confirmed in DTC of Combined Type1

Rationale	If a non-representative event is confirmed in DTC of Combined Type1, the confirmed bit of representative event is set. At the time the error occurs as the EventStatusByte in EventMemory of the representative event is not updated
Impact on Behavior	Modified to update the EventStatusByte in the EventMemory
Impact on Setting	None
Required ASW Action	None

■ When using J1939, Det works if Indicator is not set

Rationale	Even when Indicator was not set up, DEM_MIL_INDICATORID was set to be 0 by default, calling the Dem_GetIndicatorStatus function and leading to Det error
Impact on Behavior	If MIL Indicator is not set up, DEM_MIL_INDICATORID will not be created
Impact on Setting	None
Required ASW	None

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Action	

- Version 3.2.3.0 (2021-02-02)
  - Improvement
    - Modified MISRA C mandatory item

Rationale	Modified the item in breach of the MISRA C mandatory rule
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

- Version 3.2.2.0 (2021-01-14)
  - Improvement
    - MISRA C Verification

Rationale	Verification of MISRA-C
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

- Version 3.2.1.0 (2020-12-30)
  - Improvement
    - Modified the MISRA rule and performed verification

Rationale	Modified the code in breach of the MISRA rule
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

- Version 3.2.0.0 (2020-09-09)

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- Improvement
  - ■ Addressed the symptom that GetSpinLock is requested through Dem before StartOs

Rationale	If Dem_ReportErrorStatus is called before the start of Os, GetSpinLock is requested generating os error hook
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

  - ■ If more than 10 Freeze Frames are generated, FFClassPos is wrongfully generated in Dem_EventRelatedData

Rationale	If more than 10 Freeze Frames are generated, FFClassPos is wrongfully generated in Dem_EventRelatedData
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

➢ Version 3.1.3.0 (2020-01-17)

- Improvement
  - ■ Addressed Dem_EventMemoryCfg.c Compile Error which takes place if DTC Extended data is not used while using J1939

Rationale	When a function related to J1939 Freeze Frame is run, a logic is needed to ensure it is run only when J1939 Freeze Frame is set up
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

➢ Version 3.1.2.0 (2019-10-11)

- Improvement
  - ■ Changed configuration item properties to make code available

Rationale	Needed to change configuration item properties along with code publishing

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Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

➢ Version 3.1.2 (2019-07-31)

- Improvement

■ Fixed the display failure of DTC of 0x0A (report SupportedDTC) of ReadDTCInformation service

Rationale	When [02 19 0A] of ReadDTCInformation is requested, a positive response is received and DTC is not displayed. Changed to respond to all DTC supported as in specifications
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

➢ Version 3.1.1 (2019-04-30)

- Improvement

■ Improved the Permanent DTC Register logic

Rationale	When multiple indicators are set in one event, permanent event is registered when MIL is turned on. Use non-MRM to clear
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

■ Modified the NvM Block Lenghth Valication logic

Rationale	Modified DemPermanentEventMemory NvBlockLength from 2 to 3 If OBD Support == True, change the calculation of DemEventStatusNvRamBlock
Impact on Behavior	None
Impact on Setting	None

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Required ASW Action	None

➢ Version 3.1.0 (2019-02-26)

- Improvement

■ Resized the initialization buffer for variables related to Indicator

Rationale	In Dem 3.0.0, the initialization buffer for variables related to Indicator was wrongfully sized while changing the Indicator logic. The improvement was made to correct this
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

➢ Version 3.0.0 (2018-12-31)

- Improvement

■ Development of J1939 DM

Rationale	Development of J1939 DM was requested
Impact on Behavior	DM that has not been in service will be supported (DM2, DM3, DM4, DM5, DM6, DM11, DM12, DM20, DM21, DM23, DM24, DM25, DM26, DM28, DM29, DM31, and DM35)
Impact on Setting	Added DemGeneralJ1939, DemGeneralOBD, and DemRatioId to settings (see 6.2.17, 6.2.18 and 6.2.19)
Required ASW Action	None

■ Improvement of indicator logic

Rationale	Logic was improved to shorten the runtime of Dem_GetIndiacatorStatus when there are large numbers of Indicator and Event
Impact on Behavior	None
Impact on Setting	Indicator ID should increase starting from 0 in a sequential way without any gap (see 6.2.12)
Required ASW Action	None

➢ Version 2.7.8 (2018-12-07)

- Improvement

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■ J1939 DTC combined type was applied

Rationale	When multiple events are connected to one J1939 DTC because Combined Type is not applied to it, DTC was not displayed when an event other than the first one took place. This was corrected
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

➢ Version 2.7.7 (2018-11-16)

- Improvement

■ If ReadDTC was requested during DTC Aging, the DTC being deleted was displayed. Addressed this phenomenon

Rationale	Fixed a phenomenon in which the deleted DTC is displayed, showing initialized DTC Status when ReadDTC is requested during DTC Aging
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

■ Modified variables that can cause overflow

Rationale	Dem_Max_ListOfEnableConditionId, Dem_Max_ListOfStorageConditionId variables that have been declared as uint8 are changed to unit16 to prevent a possible overflow
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

➢ Version 2.7.6 (2018-5-31)

- Improvement

■ Generation Error occurs if only part of ReadAll setting is blocked for NvM Blocks related to Dem

Rationale	For Dem-related blocks, the initialization time becomes longer when the NvM ReadAll setting is applied to only some blocks. In this case, a generation error will occur to prevent a problem from happening

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Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

- Version 2.7.5 (2018-3-30)
  - Improvement
    - Save the state of operation cycle only when an event is saved

Rationale	Reduced the number of NvM Access by changing to save the state of the operation cycle only when the event is saved. Optimized to shorten initialization time when no event is not saved
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

- Version 2.7.4 (2018-1-31)
  - Improvement
    - J1939 DTC lamp status was added (DEM_INDICATOR_CONTINUOUS)

Rationale	If J1939 lamp status is DEM_INDICATOR_CONTINUOUS, it is not possible to set to lamp ON. According to the J1939 specifications, it is Unavailable/Do Not Flash if the lamp status is 11, but it was developed to work only when it is Unavailable. Added a behavior whose state is Do Not Flash with Lamp on
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

- Version 2.7.3 (2017-8-31)
  - Improvement
    - Developed support of ReadDTCInformation (SID19) service commercial vehicle diagnostic specification ES95486-50

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Rationale	In ReadDTCInformation (SID19) service, 0x04 of commercial vehicle diagnostic specification DTCFormat Identifier was added
Impact on Behavior	None
Impact on Setting	Add DEM_DTC_TRANSLATION_J2012DA_FORMAT_04 to the Type of DTC Supported setting
Required ASW Action	None

■ Corrected abnormal behavior of DTC Status Byte (Confirmed DTC bit)

Rationale	For an event that is not set to Nv Ram Block Access Optimization Support == true && Operation Cycle Status Storage == false && Status Bit Storage Test Failed == false && Indicator, ConfirmedDTC bit of DTCStatusByte was 0 after ECU Reset following Confirmed DTC. If Nv Ram Block Access Optimization Support == false, this takes place every time Ecu is reset
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

➢ Version 2.7.2 (2017-7-28)

- Improvement

■ Rte warning of Dem SWC (WRN0103) was improved

Rationale	SwcBswMapping was added to map events in Dem Swc Runnable to Dem_MainFunction so that Rte can recognize callpoint of Swc Events
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

➢ Version 2.7.1 (2017-6-22)

- Improvement

■ Improved compile warning

Rationale	Improved compile warning
Impact on	None

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Behavior	
Impact on Setting	None
Required ASW Action	None

- Version 2.7.0 (2017-5-31)
  - Improvement
    - Setting: DemEventStatusBitResetWarningIndicatorRequested was changed

Rationale	Customer request
Impact on Behavior	Before the change, WIR bit 7 was initialized when Operation cycle is start if DemEventStatusBitResetWarningIndicatorRequested is true. Option was added to allow users to choose when to reset WIR bit7 (Operationcycle is start or end)
Impact on Setting	Setting: DemEventStatusBitResetWarningIndicatorRequested was changed (select DEM_WIR_RESET_ON_OPERATIONCYCLE_END, DEM_WIR_RESET_ON_OPERATIONCYCLE_START) See Chapter 6.3
Required ASW Action	None

    - Corrected abnormal behavior of DTC Status Byte

Rationale	For an event whose EventFailureCycleCounterThreshold is 2 or above, Confirmed DTC bit of DTC Status Byte was set when the DTC state is pending
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

- Version 2.6.0 (2017-4-5)
  - Improvement
    - A saved EventId gets deleted if Displacement is in use

Rationale	If Displacement is true and the EventMemory is full, the ID of a new event is not saved when it occurs deleting the existing event and preempting EventMemory
Impact on Behavior	None
Impact on	None

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Setting	
Required ASW Action	None

■ The comments of the code generated from the same input (arxml) are changed

Rationale	The “Line Break” of comments of the code generated from the same input (arxml) and the input file list are changed
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

■ Wrong interpretation of the Fault Confirmation in the specifications

Rationale	If Combined Event type 1 is used, the time point when ConfirmedDTC is set is different from actual use case. Corrected the point of TripCounter increase to be consistent with the use case
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

➢ Version 2.6.0 (2017-3-21)

- New feature

■ NvM block length validation is supported

Rationale	Added a feature to prevent wrong setting while increasing user convenience
Impact on Behavior	None
Impact on Setting	See 10.6NvM block length validation support
Required ASW Action	See 10.6NvM block length validation support

➢ Version 2.5.0 (2017-2-16)

- New feature

■ ClearDTC Operation is available in CDD now.

Rationale	Change in customer requirements

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Impact on Behavior	Provided ClearDTC Operation that serves as same as ClearDiagnosticInformation diagnosis service. Yet it is available only in CDD
Impact on Setting	See 10.5 ClearDTC Operation(API) Support
Required ASW Action	See 10.5 ClearDTC Operation(API) Support

- Improvement
  - ■ Improved counter debouncing algorithm

Rationale	When Prefailed (or Prepassed) was reported after reporting of an event whose state is Passed (or Failed), the Fault Detection Counter does not move to the Jump Down Value (or Jump Up Value) configured.
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

  - ■ Improved RTE compile warning

Rationale	It doesn't affect any behavior but a number of warnings were created during RTE Generation due to Swcd_Bsw_Dem.arxml
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

➢ Version 2.4.1 (2016-12-30)

- New feature
  - ■ Setting: DemJ1939DM1ActiveConditionConfirmedDTC was changed

Rationale	Change in customer requirements
Impact on Behavior	Users can control filtering condition of DC which will be included in J1939 DM1 message through settings.
Impact on Setting	DemJ1939DM1ActiveConditionConfirmedDTC is added
Required ASW	DemJ1939DM1ActiveConditionConfirmedDTC setting is needed in

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Action	line with J1939 protocol specifications

- Improvement
  - ■ Sorting of Swcd_Bsw_Dem

Rationale	Customer requirements
Impact on Behavior	Modified Generator to sort and create items in a container when Swcd_Bsw_Dem.arxml is generated
Impact on Setting	None
Required ASW Action	None

  - ■ Change in DemStorageConditionSupport Category

Rationale	Customer requirements
Impact on Behavior	None
Impact on Setting	Change in DemStorageConditionSupport Category *Changed from "NOT SUPPORTED" to "From SRS"*
Required ASW Action	None

➢ Version 2.4.0 (2016-11-16)

- New feature
  - ■ N/A
- Improvement
  - ■ Change in Change Log Template

Rationale	Change in customer requirements
Impact on Behavior	Modified to clarify implications of changes to the system
Impact on Setting	None
Required ASW Action	None

  - ■ Sorting of Swcd_Bsw_Dem

Rationale	Customer requirements
Impact on Behavior	Modified Generator to sort and create items in a container when Swcd_Bsw_Dem.arxml is generated

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Impact on Setting	None
Required ASW Action	None

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■ Improved Fail Safety feature related to NvM Block

Rationale	Internal check
Impact on Behavior	Improved the logic that initializes Event Memory if NvM Read All fails
Impact on Setting	None
Required ASW Action	None

■ Support for DM1 message of J1939 protocol

Rationale	Change in customer requirements
Impact on Behavior	Changed the DTC reporting order in DM1 Among DTCs with high priority, the latest DTC is reported first
Impact on Setting	None
Required ASW Action	None

➢ Version 2.3.0 (2016-09-30)

- New feature

■ N/A

- Improvement

■ Initialization of FiM through Dem (applied to AUTOSAR 4.2.2 in advance)

Rationale	Det error takes place if FiM is initialized
Impact on Behavior	None
Impact on Setting	Set Dem/DemGeneral/DemFimIntegrated to be true while using FiM
Required ASW Action	None

■ Change in DTC priority of j1939 DM1 messages The latest DTC is sent first

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Rationale	Change in customer requirements
Impact on Behavior	Changed the DTC reporting order in DM1 The latest DTC is reported first
Impact on Setting	None
Required ASW Action	None

■ Modified NvM Access optimization

Rationale	Failure information is not saved if NvM Access Optimization Support is off
Impact on Behavior	None
Impact on Setting	None
Required ASW Action	None

➢ Version 2.2.0 (2016-08-30)

- New feature

■ Support for DM1 message of J1939 protocol

Rationale	New customer requirement
Impact on Behavior	Logic was implemented to support J1939 DM1
Impact on Setting	New parameters such as DemGeneralJ1939 and DemJ1939DTCValue were added for J1939
Required ASW Action	None

- Improvement

■ N/A

➢ Version 2.1.0 (2016-07-26)

- New feature

■ Optimization of NvM Access frequency

Rationale	Analyzed customer use case
Impact on Behavior	An optimization feature was added to minimize NvM Access time (Nvm_WriteBlock API) during an event

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Impact on Setting	DemNvRamBlockAccessOptimizationSupport was set to True
Required ASW Action	None

■ Setting: DemEventStatusBitStorageTestFailed was added

Rationale	Analyzed customer use case
Impact on Behavior	Initialization status of UDS TestFailed bit0 (failed at the moment) for each event
Impact on Setting	Setting of DemEventStatusBitStorageTestFailed in accordance with controller specifications
Required ASW Action	None

■ Setting: DemEventStatusBitResetWarningIndicatorRequested was added

Rationale	Analyzed customer use case
Impact on Behavior	Whether to initialize UDS WarningIndicatorRequested bit7 for each event
Impact on Setting	Setting of DemEventStatusBitResetWarningIndicatorRequested in accordance with controller specifications
Required ASW Action	None

■ Setting: DemUdsStatusAvailabilityMask was added

Rationale	Analyzed customer use case
Impact on Behavior	Set DTCStatusAvailabilityMask by DTC
Impact on Setting	Set DemUdsStatusAvailabilityMask in accordance with controller specifications
Required ASW Action	None

- Improvement
  - ■ N/A

➢ Version 2.0.5 (2016-06-13)

- Optimized aging logic

➢ Version 2.0.4 (2016-05-30)

- User Manual was updated

➢ Version 2.0.3 (2016-05-13)

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- Eliminated unnecessary Det error

➢ Version 2.0.2 (2016-04-29)

- User Manual was separated for each module

➢ Version 2.0.1 (2016-01-13)

- AUTRON_AUTOSAR_Dem_ECU_Configuration_PDF.arxml : Fixed parameter was added

➢ Version 2.0.0 (2016-01-07)

- Support Secondary EventMemory
- Support Combined Event Type1
- ClearDTC was optimized
- NvM use logic was optimized

➢ Version 1.0.33 (2015-10-20)

- Debugged AgingCounter Reset

➢ Version 1.0.31 (2015-07-28)

- TimeBased Debounce was optimized
- Debugged General Callback Interface

5.2.3 Limitations

➢ **Additional event memories (mirror and permanent) are not supported.**
'Event Memory' is defined as the place where a diagnosis event is saved.

➢ **Only Pre-Compile is supported.**

➢ **OBD protocol is not supported.**

➢ The platform should be released again if any configuration related to SRS is going to be changed. Unauthorized change might cause abnormal behavior.

➢ Pseudo code
The code provided as an example should be used for understanding the concept only.

➢ J1939 protocol
Provide features for DM1 and DM2 message in the J1939 protocol

➢ Cautions for Operation SetEventStatus
As Operation SetEventStatus is programmed in a synchronous way, it shouldn't be preempted during run.
Therefore, attention should be paid to prevent preempting if there are several tasks using Operation SetEventStatus.

➢ Cautions for Operation SetEventStatus
SetEventStatus does not guarantee Reentrancy.

5.2.4 Deviation

➢ **DemAgingCycle(DemGeneral) was eliminated.**
Event performs aging in accordance with Start/End of the set AgingCycle.
The AgingCycle that can be assigned to Events are Container DemOperationCycle and Container

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DemAgingCycle but only DemOperationCycle can be used because the duplicate setting DemAgingCycle has been deleted.
It has been deleted in AUTOSAR 4.2.1 and applied in advance.

- **DemCallbackInitMForF was eliminated**
  This callback is called when an event allocated to DTC was initialized.
  It was deleted as it overlaps Callback InitMonitorForEvent. It has been deleted in AUTOSAR 4.2.1 and applied in advance.

- **DemEventFailureCycleRef was eliminated**
  Among Event Status Bytes, an OperationCycle was deleted to set ConfirmedDTC bit. Use OperationCycle allocated through DemOperationCycleRef to control ConfirmedDTC bit.
  It has been deleted in AUTOSAR 4.2.1 and applied in advance.

- **DemIndicatorFailureCycleRef was eliminated**
  Among Event Status Bytes, an OperatingCycle was deleted to set WarningIndicatorRequest bit. Use OperatoinCycle allocated through DemOperationCycleRef to control WarningIndicatorRequest bit. It has been deleted in AUTOSAR 4.2.1 and applied in advance.

- **DemIndicatorHealingCycleRef was eliminated**
  Among Event Status Bytes, an OperatingCycle to clear WarningIndicatorRequest bit was deleted. Use OperatoinCycle allocated through DemOperationCycleRef to control WarningIndicatorRequest bit. It has been deleted in AUTOSAR 4.2.1 and applied in advance.

- **DemIndicatorFailureCycleSource was eliminated**
  Among Event Status Bytes, a feature to select OperatingCycle was deleted so as not to set WarningIndicatorRequest bit.
  - DEM_FAILURE_CYCLE_EVENT: Use OperationCycle allocated through DemOperationCycleRef
  - DEM_FAILURE_CYCLE_INDICATOR : Use DemIndicatorFailureCycleRef

  It has been deleted in AUTOSAR 4.2.1 and applied in advance.

- **Combination event type2 not supported**

- **DemDataElementClass : Sender Receiver Interface not supported.**
  The data allocated to FreezeFrame or ExtendedDataRecord is read from application through RTE.
  Only Client-Server interface is supported during this time.

- **External Aging not supported**
  It is not possible to control aging (auto-elimination of a faulty code) with SWC. There is no support plan as it will be deleted in the next version of AUTOSAR due to absence of use case.

- **J1939 protocol**
  Reporting order of DM1 and DM2 message: Among DTCs with high priority, the latest DTC is reported first

- **FiM_DemInit**
  Initialize permission status, etc. of FiM through the FiM_DemInit function.

- **CddIf Client-Server Interface supports ClearDTC Operation**
  The operation supported in AUTOSAR 4.2.2 was applied in advance.

6 Configuration Guide

(1) Parameters are basically based on AUTOSAR specifications unless mentioned otherwise.

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The parameters Hyundai AutoEver added are marked as AutoEver-specific.

(2) If there is a default value while not supported, the set values must not be changed.

6.1 General

6.2 DemGeneral

See the following configurations.

Parameter Name	Value	Category
DemOperationCycleStatusStorage(1)	User Defined	C
DemMaxNumberEventEntryPrimary(2)	User Defined	C
DemImmediateNvStorageLimit(12)	User Defined	C
DemBswErrorBufferSize(3)	1-255: User Defined	C
DemDtcStatusAvailabilityMask(9)	User Defined	C
DemHeaderFileInclusion	User Defined	C
DemMaxNumberEventEntrySecondary(23)	1-255: User Defined	C
DemMaxNumberPrestoredFF(24)	1-255: User Defined	C
DemAgingRequieresTestedCycle(AutoEver specific)(25)	User Defined	C
DemHealingRequieresTestedCycle(AutoEver specific)(26)	User Defined	C
DemNvRamBlockAccessOptimizationSupport(AutoEver specific)(27)	User Defined	C
DemClearDTCBehavior(4)	User Defined	C
DemDTCSuppressionSupport(5)	User Defined	C
DemDebounceCounterBasedSupport(6)	User Defined	C
DemDebounceTimeBasedSupport(7)	User Defined	C
DemDevErrorDetect(8)	User Defined	C
DemEnableConditionSupport(10)	User Defined	C
DemEventCombinationSupport	User Defined	C
DemEventDisplacementSupport(11)	User Defined	C
DemExtendedDataCapture	User Defined	C
DemFreezeFrameCapture	User Defined	C
DemStatusBitStorageTestFailed(16)	User Defined	C
DemStorageConditionSupport(17)	User Defined	C
DemTaskTime(18)	User Defined	C
DemTriggerFiMReports(19)	User Defined	C
DemTriggerMonitorInitBeforeClearOk(20)	User Defined	C
DemTypeOfDTCSupported	User Defined	C
DemTypeOfFreezeFrameRecordNumeration(22)	User Defined	C
DemVersionInfoApi(21)	User Defined	C
DemFimIntegrated(28)	User Defined	C
DemOBDSupport(29)	User Defined	C

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Parameter Name	Value	Category
DemMILIndicatorRef(30)	User Defined	C
DemMaxNumberEventEntryPermanent(31)	User Defined	C
DemObdComplaince(AutoEver specific)	User Defined	C
DemAgingCycleCounterProcessing	DEM_PROCESS_AGINGCTR_INTERN	F
DemOccurrenceCounterProcessing(14)	User Defined	C
DemStatusBitHandlingTestFailedSinceLastClear(15)	User Defined	C
DemEventClearSupport(AutoEver specific) (32)	User Defined	C
DemPTOSupport	False	N
DemEngineType(AutoEver specific)	-	N
DemTriggerDcmReports	False	N
DemTriggerDltReports	False	N
DemMaxNumberEventEntryMirror	0	N

1) DemOperationCycleStatusStorage
Operation Cycle status (Start/End) is saved in non-volatile memory.
Note: In ECU that does not have Power-latch, etc. DemOperationCycleStatusStorage should be set to True to address Aging/healing.

2) DemMaxNumberEventEntryPrimary
It means the maximum number of events that can be saved in Primary event memory.

3) DemBswErrorBufferSize
An event generated in the Bsw module (Ex. CAN BUS OFF) is sent to a queue and processed in Dem_MainFunction afterwards.
It means the size of the queue used at this time.

Note: A BSW event generated when the queue is full is dropped. Yet if the queue size is too large, it undermines system performance and consumes large memory.

4) DemClearDTCBehavior
When sending positive response of UDS service ClearDiagnosticInformation service, it defines how volatile memory and non-volatile memory will be processed.

DEM_CLRRESP_NONVOLATILE_FINISH:
Respond after deletion of volatile memory and non-volatile memory is completed.
I.e. wait until non-volatile memory is completely deleted and respond.
DEM_CLRRESP_NONVOLATILE_TRIGGER:
Respond after volatile memory is deleted and request for deletion of non-volatile memory (NvM) is sent.
DEM_CLRRESP_VOLATILE:
Respond after clearing volatile memory only.

5) DemDTCSuppressionSupport
Whether DTC suppression is supported or not

In Application, DTC suppression feature is enabled/disabld through Dem_SetDTCSuppression(via RTE API). If DTC suppression is enabled, the DTC is not shown in diagnostic service although it is saved in the event memory. Yet it does not affect event processing.

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6) DemDebounceCounterBasedSupport
Whether Counter Based Debounce is supported or not

7) DemDebounceTimeBasedSupport
Whether Counter Based Debounce is supported or not

8) DemDevErrorDetect
It checks error inside the Dem through Det.
The feature is not used for SOP and intended to detect error during development.

9) DemDtcStatusAvailabilityMask
It means UDS Status bits to be displayed in UDS service 0x19. It is also used in CallbackEventStatusChanged and DTCStatusChanged.

Ex) 0x89
Bit7 : WarningIndicatorRequested bit
Bit3 : Confirmed DTC bit
Bit0: Test Failed bit

10) DemEnableConditionSupport
If DemEnableConditionSupport is True, event processing can be controlled in application.
Through Dem_SetEnableCondition(via RTE API), processing of a specific event can be deterred.

11) DemEventDisplacementSupport
It enables/disables the preempt feature in the event memory, a limited resource.
If event memory is full, events will be deleted in the order of lower priority.

12) DemImmediateNvStorageLimit
It defines the limit number of storage when NvRam immediate storage feature is activated. The number of storage is based on the event occurrence counter. If the counter reaches the limit, any event generated afterwards is not immediately saved in NvRam. Yet it is saved in NvRam during the ECU shutdown phase after being updated in RAM.

Note: Time needed for saving can vary depending on hardware characteristic (eeprom and flash) and task periodic time, task priority, event data size, etc. when it is saved in non-volatile memory.

13) DemMaxNumberPrestoredFF:
It means the maximum number of Prestored Freeze Frame.

14) DemOccurrenceCounterProcessing
It determines how the event occurrence counter increases. Yet the maximum is 255.

DEM_PROCESS_OCCCTR_CDTC: The count increases when the following conditions are met upon generation of an event.
1) An event is saved.
2) The value of UDS DTC Status bit 3 (ConfirmedDTC) is 1.
3) The value of UDS DTC status bit 0 (TestFailed) is changed from 0 to 1.

DEM_PROCESS_OCCCTR_TF: The count increases when the following conditions are met upon generation of an event.
1) An event is saved.
2) The value of UDS DTC status bit 0 (TestFailed) is changed from 0 to 1.

15) DemStatusBitHandlingTestFailedSinceLastClear

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It determines processing method of UDS status bit 5(TestFailedSinceLastClear) when Event aging/displacement is run.

DEM_STATUS_BIT_AGING_AND_DISPLACEMENT: When Event Aging/displacement is run TestFailedSinceLastClear Status is reset to 0.

DEM_STATUS_BIT_NORMAL: When Event Aging/displacement is run TestFailedSinceLastClear status bit is not reset to 0.

16) DemStatusBitStorageTestFailed
Determines whether to save UDS TestFailed Status in non-volatile memory or not.

17) DemStorageConditionSupport
StorageCondition is a feature to determine whether to save an event in the event memory or not.
It is controlled by application and enabled/disabled by Dem_SetStorageCondtion (via RTE API).

18) DemTaskTime
Periodic cyclic task sets the task time.

Note: It should be same as the settings of Basic Software Scheduler and Dem bsw module description in the RTE module.

19) DemTriggerFiMReports
Choose this if the operation method of the FiM module is FiMEventUpdateTriggeredByDem.
Change in event status is delivered to FiM.

20) DemTriggerMonitorInitBeforeClearOk
The Dem module uses callback before or after deleting diagnostics information based on the ClearDiagnosticInformation service and
notifies the monitor application.

True: Callback before DEM_CLEAR_OK (before deletion)
False: Callback after DEM_CLEAR_OK (after deletion)

21)DemVersionInfoApi
Determines whether to use Version information API or not.

22) DemTypeOfFreezeFrameRecordNumeration
Defines how to allocate record number to Freeze frame records.

DEM_FF_RECNUM_CALCULATED : Assigns serial numbers starting from 1.
DEM_FF_RECNUM_CONFIGURED: Uses pre-set record numbers in a consecutive way.
(See DemFreezeFrameRecNumClass)

23) DemMaxNumberEventEntrySecondary
To use Secondary event memory, it is needed to specify availability of support in SRS.
Note: It is configurable if the platform was released with a value that is not 0.

24) DemMaxNumberPrestoredFF
To use Prestored freeze frame, it is needed to specify availability of support in SRS.
Note: It is configurable if the platform was released with a value that is not 0.

25) DemAgingRequieresTestedCycle
True: Aging is processed if test is reported during the operation cycle allocated to an event (Xxx_SetEventStatus) and the result is passed (no aging if failed is reported at least once).

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False: If the test (Xxx_SetEventStatus) result is not failed during the operation cycle allocated to an event, Aging is processed.

26) DemHealingRequieresTestedCycle
True: Healing is processed if test is reported during the operation cycle allocated to an event (Xxx_SetEventStatus) and the result is passed (no healing if failed is reported at least once).
False: If the test (Xxx_SetEventStatus) result is not failed during the operation cycle allocated to an event, Healing is processed.

27) DemNvRamBlockAccessOptimizationSupport
True: NvM Access optimization is in use. It can reduce the time to write on flash or Eeeprom. Yet, the size of NvM blocks used in Dem might increase.
False: NvM Access optimization is not in use.

28) DemFimIntegrated
True: If the FiM module is in use, set it to True.
False: If the FiM module is not in use, set it to False.

29) DemOBDSupport
True: Set to True if J1939 DM5, DM6, DM12, DM20, DM21, DM23, DM26, DM28, and DM29 are in use.
False: Except for the true conditions, set it to False.

30) DemMILIndicatorRef
If J1939 DM5, DM6, DM12, DM20, DM21, DM23, DM26, DM28, and DM29 are in use, users can set MIL indicator.

31) DemMaxNumberEventEntryPermanent
When using J1939 DM28 and DM29 users can set and use Permanent Event Memory.

32) DemEventClearSupport
True : If ClearDTC service is requested, provide deletion of an event to which DTC is not allocated.
False: If ClearDTC service is requested, do not provide deletion of an event to which DTC is not allocated.

6.2.1 DemAgingCycle

Parameter Name	Value	Category
DemAgingCycle Short Name		N

6.2.2 DemCallbackDTCStatusChanged

Parameter Name	Value	Category
DemCallbackDTCStatusChangedFnc (1)		C

(1)

DemCallbackDTCStatusChangedFnc :
The presence of this container indicates, that the Dem has access to a "DTCStatusChanged" callback, which the Dem will call to notify other components about the change in the status of a DTC. In case there is a DemCallbackDTCStatusChangedFnc, this parameter defines the name of the function that the Dem will call. In case there is no DemCallbackDTCStatusChangedFnc, the Dem will have an R-Port requiring the interface CallbackDTCStatusChanged whose name is generated by using the unique callback-prefix followed by the event name

6.2.3 DemDataElementClass

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Note: It is configurable if USED is specified for related features in SRS.

Sub Containers Name	0: Not Used (From SRS)	F or C
DemExternalCSDataElementClass (1)		C
DemInternalDataElementClass (3)		C
DemExternalSRDataElementClass (2)		N

(1)

DemExternalCSDataElementClass:
This container contains the configuration (parameters) for an external client/server based data element class. It defines, how the Dem can obtain the value of the data element from either a SW-C or another BSW module. Whether a client/server port or a C function-call is used, is defined by DemDataElementUsePort. DemExternalSRDataElementClass

(2) DemExternalSRDataElementClass:
This container contains the configuration (parameters) for an external sender/receiver based data element class. It defines, how the Dem can obtain the value of the data element from a SW-C, by using a sender/receiver port.

(3) DemInternalDataElementClass:
This container contains the configuration (parameters) for an internal data element class.
Note: DemInternalDataElementClass shall be used by only the Extended Data.

6.2.3.1 DemInternalDataElementClass

Parameter Name	Value	Category
DemDataElementDataSize (1)		C
DemInternalDataElement (2)		C

(1)

DemDataElementDataSize:
Defines the size of the data element in bytes.

(2) DemInternalDataElement:
This parameter defines the Dem-internal data value, which is mapped to the data element.

DEM_AGINGCTR: map Dem-internal aging counter
DEM_OCCCTR : map Dem-internal occurrence counter
DEM_OVFLIND : map Dem-internal overflow indication
DEM_SIGNIFICANCE : map (static) Dem-internal event significance (refer to

6.2.3.2 DemExternalCSDataElementClass

Parameter Name	Value	Category
DemDataElementDataSize (1)		C
DemDataElementReadFnc (2)		C
DemDataElementUsePort (3)		C

(1)

DemDataElementDataSize:
Defines the size of the data element in bytes.

(2) DemDataElementReadFnc:
In case of DemDataElementUsePort is false, this parameter defines the prototype of the C function "ReadData" used to get the according value.

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(3) DemDataElementUsePort:
If the parameter is set to True, a R-Port is generated, to obtain the data element (interface DataServices_<SyncDataElement>). If the parameter is set to False, the information is obtained by C-function-call on another BSW module specified by the parameter DemDataElementReadFnc.

6.2.3.3 DemExternalSRDataElementClass

Parameter Name	Value	Category
DemDataElementDataSize (1)		N
DemDataElementInstanceRef (2)		N

(1)

DemDataElementDataSize:
Defines the size of the data element in bits.

(2) DemDataElementInstanceRef:
Instance Reference to the actual OperationPrototype which shall be traced.

6.2.4 DemDidClass

This container contains the configuration (parameters) for a data Id class.
It is assembled out of one or several data elements(DemDidDataElementClassRef)

Note: It is configurable if USED is specified for related features in SRS.

Parameter Name	Value	Category
DemDidIdentifier(1)		C
DemDidDataElementClassRef(2)		C

(1)

DemDidIdentifier :
Identifier of the Data ID

(2) DemDidDataElementClassRef:
This reference contains the link to a data element class.

6.2.5 DemEnableCondition

If Enable Condition is True, the event reported by the monitor is processed.
Note: If current status of Enable Condition is False, it is not processed. (See Interface EnableCondition)

Note: It is configurable if USED is specified for related features in SRS.

Parameter Name	Value	Category
DemEnableConditionId(1)		C
DemEnableConditionStatus(2)		C

(1)

DemEnableConditionId:
Defines a unique enable condition Id.

(2) DemEnableConditionStatus:
Sets initial values of Enable Condition Status.

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true: acceptance of a diagnostic event enabled
false: acceptance of a diagnostic event disabled

6.2.6 DemEnableConditionGroup

DemEnableConditionGroup contains one or several DemEnableCondition

Note: It is configurable if USED is specified for related features in SRS.

Parameter Name	Value	Category
DemEnableConditionRef(1)		C

(1)

DemEnableConditionRef:
References an enable condition(DemEnableCondition)

6.2.7 DemExtendedDataClass

Extended data record means the record of additional information allocated to a diagnostic event.
Traditional way of using the extended data is as follows.

- DTC occurrence counter
- Aging counter

This class contains the combinations of DemExtendedDataRecordClass for an extended data class

Note: It is configurable if USED is specified for related features in SRS.

Parameter Name	Value	Category
DemExtendedDataRecordClassRef(1)		C

(1)

DemExtendedDataRecordClassRef:
This reference contains the link to an extended data class record.

6.2.8 DemExtendedDataRecordClass

It is assembled out of one or several data elements

Note: It is configurable if USED is specified for related features in SRS.

Parameter Name	Value	Category
DemExtendedDataRecordNumber(1)		C
DemExtendedDataRecordUpdate(2)		C
DemDataElementClassRef(3)		C

(1)

DemExtendedDataRecordNumber:
This configuration parameter specifies an unique identifier for an extended data record. One or more extended data records can be assigned to one diagnostic event/DTC. 0xFF and 0xFE are reserved by ISO (therefore the maximal value equals 253)

(2) DemExtendedDataRecordUpdate:
This parameter defines the case, when the extended data record is stored/updated.

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DEM_UPDATE_RECORD_NO – This extended data record is only captured for new event memory entries.
DEM_UPDATE_RECORD_YES – This extended data record is captured every time.

(3) DemDataElementClassRef:
This reference contains the link to a data element class.

6.2.9 DemFreezeFrameClass

Freeze frame means records of data allocated to a diagnostic event (DIDs/PIDs). It is equivalent to SnapShotRecords in ISO 14229-1.
E.g.,
DTCSnapshotRecord [data #I] = ECT (Engine Coolant Temp.)
DTCSnapshotRecord [data #2] = TP (Throttle Position)
DTCSnapshotRecord [data #3] = RPM (Engine Speed)
DTCSnapshotRecord [data #4] = RPM (Engine Speed) .
DTCSnapshotRecord [data #5] = MAP (Manifold Absolute Pressure

This container contains the combinations of DIDs for a non OBD relevant freeze frame class

Note: It is configurable if USED is specified for related features in SRS.

(1)

Parameter Name	Value	Category
DemDidClassRef(1)		C

DemDidClassRef:
Reference to the DID elements which shall be contained in the freeze frame

6.2.10 DemFreezeFrameRecNumClass

Note: It is configurable if USED is specified for related features in SRS.

(1)

Parameter Name	Value	Category
DemFreezeFrameRecordNumber(1)		C

DemFreezeFrameRecordNumber :
This container contains a list of dedicated, different freeze frame record numbers assigned to an event. The order of record numbers in this list is assigned to the chronological order of the according freeze frame records

Note: dependency: DemTypeOfFreezeFrameRecordNumeration = DEM_FF_RECNUM_CONFIGURED

6.2.11 DemGroupOfDTC

Parameter Name	Value	Category
DemGroupDTCs		F

6.2.12 DemIndicator

Note: It is configurable if USED is specified for related features in SRS.

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Parameter Name	Value	Category
DemIndicatorID(1)		C

(1)

DemIndicatorID:
Unique identifier of an indicator. It should increase in consecutive way starting from 0 without any gap.

6.2.13 DemNvRamBlockId

This container contains the configuration (parameters) for a non-volatile memory block, which is used from the Dem. If no permanent storage of event memory entries is required, no block needs to be configured

Container Name	Number of Sub Container	Category
DemPrimaryEventMemory	1-255: User Defined	C
DemSecondaryEventMemory(1)	1-255: User Defined	C
DemPermanentEventMemory(2)	1-255: User Defined	C
DemManagementBlock		C
DemEventStatusNvRamBlock		C

1)

DemSecondaryEventMemory
Note: It is configurable if USED is specified in SRS.

2) DemPeramentEventMemory
Note: It is configurable if USED is specified in SRS (if J1939 is in use).

6.2.13.1 DemManagementBlock

Parameter Name	Value	Category
DemNvRamBlockIdRef(1)		C

DemNvRamBlockIdRef:
This reference contains the link to a non-volatile memory block.

Note: The size of the set NvRamBlock and the size of Dem_EventStatusNvRamData should be same.

6.2.13.2 DemEventStatusNvRamBlock

Parameter Name	Value	Category
DemNvRamBlockIdRef(1)		C

DemNvRamBlockIdRef:
This reference contains the link to a non-volatile memory block.

Note: The size of the set NvRamBlock and the size of Dem_EventStatusNvRamDatashould be same.

6.2.13.3 DemPrimaryEventMemory

Parameter Name	Value	Category
DemNvRamBlockIdRef(1)		C

DemNvRamBlockIdRef:

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This reference contains the link to a non-volatile memory block.
Note: The size of set NvRamBlock should match the size of array elements in Dem_PrimaryEventMemory.

6.2.13.4 DemSecondaryEventMemory

Parameter Name	Value	Category
DemNvRamBlockIdRef(1)		C

DemNvRamBlockIdRef:
This reference contains the link to a non-volatile memory block.
Note: The size of set NvRamBlock should match the size of array elements in Dem_SecondaryEventMemory.
Note: It is configurable if USED is specified in SRS.

6.2.13.5 DemPermanentEventMemory

Parameter Name	Value	Category
DemNvRamBlockIdRef(1)		C

DemNvRamBlockIdRef:
This reference contains the link to a non-volatile memory block.
Note: The size of set NvRamBlock should match the size of array elements in Dem_PrimaryEventMemory.
Note: It is configurable if USED is specified in SRS.

6.2.14 DemOperationCycle

(1)

Parameter Name	Value	Category
DemOperationCycleType(1)	User Defined	C

DemOperationCycleType:
Operation cycles types for the Dem to be supported by cycle-state APIs.

6.2.15 DemStorageCondition

If Storage Condition is True, the event reported by the monitor is saved in the Event Memory.

Note: If false, the event is not saved.(See Interface StorageCondition)
Among UDS Status Bytes, other UDS Status bits than confirmed DTC bit and Warning Indicator Request bit will be processed and saved (see Interface StorageCondition).

(1)

Parameter Name	Value	Category
DemStorageConditionId(1)		C
DemStorageConditionStatus(2)		C

DemStorageConditionId:
Define a unique storage condition Id.

(2) DemStorageConditionStatus:
Set initial values of Enable Condition Status.

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True: storage of a diagnostic event enabled
False: storage of a diagnostic event disabled
Note: It is configurable if USED is specified in SRS.

6.2.16 DemStorageConditionGroup

DemStorageConditionGroup contains one or several DemEnableCondition

(1)

Parameter Name	Value	Category
DemStorageConditionRef(1)		C

DemStorageConditionRef :
References an storage condition
Note: It is configurable if USED is specified in SRS.

6.2.17 DemGeneralJ1939

This is a configuration for J1939. J1939 is supported if this is configured.

1)

Parameter Name	Value	Category
DemAmberWarningLampIndicatorRef(1)		C
DemRedStopLampIndicatorRef(2)		C
DemProtectLampIndicatorRef(3)		C
DemJ1939ClearDtcSupport(4)		C
DemJ1939Dm31Support(5)		C
DemJ1939ExpandedFreezeFrameSupport(6)		C
DemJ1939FreezeFrameSupport(7)		C
DemJ1939RatioSupport(8)		C
DemJ1939Readiness1Support(9)		C
DemJ1939 Readiness2Support(10)		C
DemJ1939 Readiness3Support(11)		C
DemJ1939ReadingDtcSupport(12)		C

DemAmberWarningLampIndicatorRef
Set the indicator that will be used as AmberWarningRedStopLam.

Note: The DemIndicatorBehaviour (DemConfigSet/DemEventParameter /DemEventClass/DemIndicatorAttribute) that references the indicator should be set as: DEM_INDICATOR_FAST_FLASH or DEM_INDICATOR_SLOW_FLASH or DEM_INDICATOR_CONTINUOUS.

2) **DemRedStopLampIndicatorRef**
Set the indicator that will be used as RedStopLamp.

Note: The DemIndicatorBehaviour (DemConfigSet/DemEventParameter /DemEventClass/DemIndicatorAttribute) that references the indicator should be set as: DEM_INDICATOR_FAST_FLASH or DEM_INDICATOR_SLOW_FLASH or DEM_INDICATOR_CONTINUOUS.

3) **DemProtectLampIndicatorRef**
Set the indicator that will be used as ProtectLamp.

Note: The DemIndicatorBehaviour (DemConfigSet/DemEventParameter /DemEventClass/DemIndicatorAttribute) that references the indicator should be set as:

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DEM_INDICATOR_FAST_FLASH or DEM_INDICATOR_SLOW_FLASH or DEM_INDICATOR_CONTINUOUS.

4) **DemJ1939ClearDtcSupport**
This configuration switch defines whether clearing J1939 DTCs (DM3 und DM11) is supported or not.
True: Set it to True if J1939 DM3 and DM11 are in use.
False: Set it to False if J1939 DM3 and DM11 are not in use.

5) **DemJ1939Dm31Support**
This configuration switch defines whether J1939 DM31 is supported or not.
True: Set it to True if J1939 DM31 is in use.
False: Set it to False if J1939 DM31 is not in use.

6) **DemJ1939ExpandedFreezeFrameSupport**
This configuration switch defines whether J1939 expanded freeze frames (DM24, DM25) are supported or not.
True: Set it to True if J1939 DM24 and DM25 are in use.
False: Set it to False if J1939 DM24 and DM25 are not in use.

7) **DemJ1939FreezeFrameSupport**
This configuration switch defines whether J1939 freeze frames(DM4) are supported or not.
True: Set it to True if J1939 DM4 is in use.
False: Set it to False if J1939 DM4 is not in use.

8) **DemJ1939RatioSupport**
This configuration switch defines whether J1939 performance ratios(DM20) are supported or not.
True: Set it to True if J1939 DM20 is in use.
False: Set it to False if J1939 DM20 is not in use.

9) **DemJ1939Readiness1Support**
This configuration switch defines whether J1939 diagnostic readiness 1 is supported or not.
True: Set it to True if J1939 DM5 is in use.
False: Set it to False if J1939 DM5 is not in use.

10) **DemJ1939 Readiness2Support**
This configuration switch defines whether J1939 diagnostic readiness 2 is supported or not.
True: Set it to True if J1939 DM21 is in use.
False: Set it to False if J1939 DM21 is not in use.

11) **DemJ1939 Readiness3Support**
This configuration switch defines whether J1939 diagnostic readiness 3 is supported or not.
True: Set it to True if J1939 DM26 is in use.
False: Set it to False if J1939 DM26 is not in use.

12) **DemJ1939ReadingDtcSupport**
This configuration switch defines whether J1939 DTC readout is supported or not.
True: Set to True if J1939 DM1, DM2, DM6, DM12, DM23, DM28, DM29, and DM35 are in use.
False: Set to False if J1939 DM1, DM2, DM6, DM12, DM23, DM28, DM29, and DM35 are in not use.

6.2.17.1 DemJ1939FreezeFrameClass

This container contains the combinations of SPNs s for a J1939 relevant freeze frame.
Set J1939FreezeFrameClass printed from J1939 DM4 and DM25.

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Parameter Name	Value	Category
DemSPNClassRef(1)		C

1) **DemSPNClassRef**
Reference to an SPN. This reference defines requiresIndex = true since it represents an ordered list of references where the order describes the order of single SPNs in the J1939 Freeze Frame.

6.2.17.2 DemSPNClass

This container contains the configuration (parameters) for a SPN.
Set up SPN to configure J1939FreezeFrameClass.

Parameter Name	Value	Category
DemSPNId(1)		C
DemSPNDataElementClassRef(2)		C

1) **DemSPNId**
Identifier of Suspect parameter number

2) **DemSPNDataElementClassRef**
This reference contains the link to a data element class.

6.2.18 DemGeneralOBD

Note: At the moment, the OBD feature is not supported. It only provides the OBD feature to use J1939.

Parameter Name	Value	Category
DemOBDTimeSinceEngineStart(1)		C
DemOBDInputAcceleratorPaddleInformation		C
DemOBDInputAmbientPressure		C
DemOBDInputAmbientTemperature		C
DemOBDInputDistanceInformation		C
DemOBDInputEngineSpeed		C
DemOBDInputEngineTemperature		C
DemOBDInputProgrammingEvent		C
DemOBDInputVehicleSpeed		C
DemSupportedObdUdsDtcSeparation (2)		C

1) **DemOBDTimeSinceEngineStart**
Set this only when J1939 DM26 is in use.
1) **DemSupportedObdUdsDtcSeparation**
Set only when using J1979-2
It needs to be set the same as DemSupportedObdUdsDtcSeparation in Dem to operate normally.

6.2.19 DemRatioId

Note: Set this only when J1939 DM20 is in use.

Parameter Name	Value	Category
DemIUMPRGroup(1)		C

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Parameter Name	Value	Category
DemRatioIdType(2)		C
DemDiagnosticEventRef(3)		C
DemFunctionIdRef(4)		C
DemSecondaryFunctionIdRef(5)		C

1)

DemIUMPRGroup
This parameter specifies the assigned denominator type which is applied in addition to the General Denominator conditions.

2) **DemRatioIdType**
This parameter defines whether the ratio will be calculated API or observer based.

3) **DemDiagnosticEventRef**
This reference contains the link to a diagnostic event.

4) **DemFunctionIdRef**
This reference contains the link to a function identifier within the FiM which is used as a primary FID.

5) **DemSecondaryFunctionIdRef**
This reference contains the link to a function identifier within the FiM which is used as a secondary FID. The "primary" and all "secondary" FID inhibitions are combined by "OR".

6.3 DemEventParameter

It is a basic unit of Dem module processing.

Parameter Name	Value	Category
DemEventId(1)		C
DemEventKind(2)		C
DemMaxNumberFreezeFrameRecords(3)		C
DemDTCClassRef(4)		C
DemExtendedDataClassRef(5)		C
DemFreezeFrameClassRef(6)		C
DemFreezeFrameRecNumClassRef(7)		C
DemEventStatusBitStorageTestFailed(AutoEver specific)(8)		C
DemEventStatusBitResetWarningIndicatorRequested(AutoEver specific) (9)		C
DemResetEventStatus(AutoEver specific) (10)		C

1)

DemEventId
An identifier of a diagnostic event. It should increase in a consecutive way starting from 1 without any gap.

2) **DemEventKind**
It represents types of diagnostic events corresponding to the layer used.

DEM_EVENT_KIND_BSW: BSW-related events
DEM_EVENT_KIND_SWC: SW-C-related events

Note: If an event is set to DEM_EVENT_KIND_BSW, Event Status(failed/passed, etc.) is not processed even if

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Monitor sends it to Dem. The event used in Monitor(Application SW-C) should be set to DEM_EVENT_KIND_SWC.

3) **DemMaxNumberFreezeFrameRecords**
Note: It is configurable if USED is specified in SRS.

4) **DemDTCClassRef**
Reference of DemDTCClass.
It is possible to set up an event without DTC (an event not reported through diagnostic communication).

5) **DemExtendedDataClassRef**
Reference of DemExtendedDataClass.
Allocate extended data to an event.
Note: It is configurable if USED is specified in SRS.

6) **DemFreezeFrameClassRef**
Reference of DemFreezeFrameClass
Allocate Freeze Frame to an event.
Note: It is configurable if USED is specified in SRS.

7) **DemFreezeFrameRecNumClassRef**
Reference of DemFreezeFrameRecNumClass
Valid if the value of DemTypeOfFreezeFrameRecordNumeration is DEM_FF_RECNUM_CONFIGURED.
Note: It is configurable if USED is specified in SRS.

8) **DemEventStatusBitStorageTestFailed**
Determine whether to save UDS TestFailed Bit0 of a specific event in non-volatile memory or not. It should be subset of DemStatusBitStorageTestFailed (DemGeneral). If DemEventStatusBitStorageTestFailed (DemEventParameter) is set for a specific event, the DemEventStatusBitStorageTestFailed (DemEventParameter) set up for the event will be used, instead of DemStatusBitStorageTestFailed (DemGeneral).

9) **DemEventStatusBitResetWarningIndicatorRequested**
Select when to initialize WarningIndicatorRequestedBit7 for a specific event.

Blank : Do not initialize WarningIndicatorRequestedBit7.
DEM_WIR_RESET_ON_OPERATIONCYCLE_END : Initialize if the operation cycle becomes End.
DEM_WIR_RESET_ON_OPERATIONCYCLE_START : Initialize if the operation cycle becomes Start.

10) **DemResetEventStatus**
Determine whether to initialize EventStatusByte which is not connected to DTC upon ClearDTC service request for a specific event.

6.3.1 DemCallbackClearEventAllowed

Parameter Name	Value	Category
DemCallbackClearEventAllowedFnc(1)	User Defined	C

1)
DemCallbackClearEventAllowedFnc
The name of Callback ClearEventAllowed function
If DTC is deleted due to diagnostic service and ClearDiagnosticInformation service, the DTC will call event(s) Callback ClearEventAllowed allocated. If true, the DTC will be deleted from event memory.

Callback ClearEventAllowed is implemented in Application and connected to Dem through RTE.

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The naming rule of Callback follows Dem specifications. See Dem specification 8.4.3.7.

6.3.2 DemCallbackEventDataChanged

Parameter Name	Value	Category
DemCallbackEventDataChangedFnc(1)	User Defined	C

1)

DemCallbackEventDataChangedFnc

The name of Callback EventDataChanged function
It is called when the value of data(Freeze Frame/extended data) allocated to an event is changed.

Callback EventDataChanged is implemented in Application and connected to Dem through RTE.
The naming rule of Callback follows Dem specifications. See Dem specification 8.4.3.6.

6.3.3 DemCallbackEventStatusChanged

Parameter Name	Value	Category
DemCallbackEventStatusChangedFnc(1)	User Defined	C

1)

DemCallbackEventStatusChangedFnc

The name of Callback EventStatusChanged function
It is called when UDS Status bits of an event is changed (TestFailed bit 0->1, etc.).

Callback DemCallbackEventStatusChangedFnc is implemented in Application and connected to Dem through RTE.
The naming rule of Callback follows Dem specifications. See Dem specification 8.4.3.4.

6.3.4 DemCallbackInitMForE

Parameter Name	Value	Category
DemCallbackInitMForEFnc(1)	User Defined	C

1)

DemCallbackInitMForEFnc

The name of Callback InitMonitorForEvent function
It is called when the ECU is initialized or an event was deleted. It is used to initialize monitor application.

Callback DemCallbackInitMForEFnc is implemented in Application and connected to Dem through RTE.
The naming rule of Callback follows Dem specifications. See Dem specification 8.4.3.4.

6.3.5 DemEventClass

Parameter Name	Value	Category
DemAgingAllowed(1)		C
DemAgingCycleCounterThreshold(2)		C
DemEventDestination(3)		C
DemEventFailureCycleCounterThreshold(4)		C
DemEventPriority(5)		C
DemEventSignificance(6)		C
DemFFPrestorageSupported(7)		C

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Parameter Name	Value	Category
DemAgingCycleRef[8]		C
DemEnableConditionGroupRef[9]		C
DemOperationCycleRef[10]		C
DemStorageConditionGroupRef[11]		C
DemEventOBDReadinessGroup		C
DemConsiderPtoStatus	False	N
DemEventFailureCycleRef		N

1) **DemAgingAllowed**
Enable/disable aging/unlearning of an event.
If false, auto-elimination cannot delete it.
It should be deleted by using the ClearDiagnosticInformation service.

2) DemAgingCycleCounterThreshold
Threshold value of aging cycles needed for aging of an event.
An event saved in the event memory is deleted from it if its state is passed during operation of the set threshold.

3) DemEventDestination
Events are located in a specific memory block called event memory.
Note: Both primary and secondary event memories are supported.
Note: If blank, it is not saved in the event memory.

4) DemEventFailureCycleCounterThreshold
The threshold value of operation cycles needed to make Confirmed DTC that is UDS Status of an event bit to 1

5) DemEventPriority
It is priority of events depending on their importance. When an event is generated while the event memory is full, events saved will be deleted in the order of lower priority to secure memory space.

NOTE: The displacement of event memory entry to secure pace works if DemEventDisplacementSupport = True.

6) DemEventSignificance
There are two types of significance as below.
Fault: Failure of a component or ECU that requires repair.
Occurrence: Unusual condition (issue) out of the control of ECU.

7) DemFFPrestorageSupported
The freeze frame allocated to an event is saved in event memory with application reading the value through Callback ReadData.

It is used for data that changes often. If debouncing is used, freeze frame is pre-stored at the time of the first Prefailed, and the pre-stored data is saved when the status is changed to Failed, completing qualification.

Application controls pre-stored freeze frame through Dem_PrestoreFreezeFrame and Dem_ClearPrestoredFreezeFrame(via RTE API).
Note: It is configurable if USED is specified in SRS.

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8) DemAgingCycleRef
Reference to operation cycle for aging

9) DemEnableConditionGroupRef
Reference to DemEnableConditionGroup

DemEnableConditionGroup contains several DemEnableConditions.
If any of DemEnableConditions gets disabled, the event processing is halted.

See DemEnableConditionSupport.
Note: It is configurable if USED is specified in SRS.

10) DemOperationCycleRef
Operation cycle of an event (e.g. power cycle, driving cycle, ...)
Reference to DemOperationCycle

11) DemStorageConditionGroupRef
Reference to DemStorageConditionGroup

DemEnableConditionGroup contains several DemEnableConditions.
If any of DemStorageConditions gets disabled, the event is not saved in the event memory.

Note: It is configurable if USED is specified in SRS.

6.3.5.1 DemDebounceAlgorithmClass

The debouncing algorithm is used to get test results of an event. If PREFAILED/ PREPASSED reported by the monitor repeats till it reaches threshold or is sustained for a specific time period, it is considered FAILED/PASSED.

If DemDebounceMonitorInternal is used, application should implement the debouncing feature and report only failed/passed to Dem.

Sub Containers	Value	Category
1) DemDebounceCounterBased		C
2) DemDebounceMonitorInternal		C
3) DemDebounceTimeBase		C

(1)DemDebounceCounterBased: Debouncing based on the number of event occurrence
(2) DemDebounceMonitorInternal : Debouncing that can be controlled in application
(3) DemDebounceTimeBase : Debouncing based on the state (failed/passed) of an event during a certain period. Select one to be used among three algorithms.
Note: It is configurable if USED is specified in SRS.

6.3.5.1.1 DemDebounceCounterBased

Parameter Name	Value	Category
1) DemDebounceCounterDecrementStepSize		C
2) DemDebounceCounterFailedThreshold		C
3) DemDebounceCounterIncrementStepSize		C
4) DemDebounceCounterJumpDown		C

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Parameter Name	Value	Category
5) DemDebounceCounterJumpDownValue		C
6) DemDebounceCounterJumpUp		C
7) DemDebounceCounterJumpUpValue		C
8) DemDebounceCounterPassedThreshold		C

1)

DemDebounceCounterDecrementStepSize:
Define the step size for decrementation of the internal debounce counter (Prepassed).

2) DemDebounceCounterFailedThreshold:
Define the value of the internal debounce counter, which indicates the failed status.

3) DemDebounceCounterIncrementStepSize:
Define the step size for incrementation of the internal debounce counter (Prefailed).

4) DemDebounceCounterJumpDown:
Switch for the activation of Jump-Down.

true: Jump-Down activated
false: Jump-Down deactivated

Note: This will only happen if the counting direction changes from incrementing to decrementing.

5) DemDebounceCounterJumpDownValue:
Jump-Down value of the internal debounce counter which is taken as initialization value for the counter when the respective step-down occurs.

6) DemDebounceCounterJumpUp:
Switch for the activation of Jump-Up.
True: Jump-Up activated
False: Jump-Up deactivated

Note: This will only happen if the counting direction changes from decrementing to incrementing.

7) DemDebounceCounterJumpUpValue:
Jump-Up value of the internal debounce counter which is taken as initialization value for the counter when the respective step-up occurs.

8) DemDebounceCounterPassedThreshold:
Defines the value of the internal debounce counter, which indicates the passed status.

6.3.5.1.2 DemDebounceTimeBase

Parameter Name	Value	Category
DemDebounceTimeFailedThreshold (1)		C
DemDebounceTimePassedThreshold (2)		C

(1)

DemDebounceTimeFailedThreshold:
Defines the time out duration for "Event Failed" qualification

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(2) DemDebounceTimePassedThreshold:
Defines the time out duration for "Event Passed" qualification.

6.3.5.1.3 DemDebounceMonitorInternal

Parameter Name	Value	Category
DemCallbackGetFDC (1)		C

(1) The presence of this container indicates, that the Dem has access to a "GetFaultDetectionCounter" callback, which the Dem will call to obtain the value of the fault detection counter.
In case the container has a DemCallbackGetFDCFnc, this parameter defines the name of the function that the Dem will call.
In case there is no DemCallbackGetFDCFnc, the Dem will have a R-Port requiring the interface CallbackGetFaultDetectionCounter, whose name is generated by using the unique callback-prefix followed by the event name.

6.3.5.2 DemindicatorAttribute

Set on/off condition of Warning indicator Status and characteristics (blinking, continuous, etc.).
Application should read the on/off state of the indicator (polling) and operate warning lights (lamp, text, etc.).

Parameter Name	Value	Category
DemIndicatorBehaviour (1)		C
DemIndicatorFailureCycleCounterThreshold		C
DemIndicatorHealingCycleCounterThreshold		C
DemIndicatorRef (7)		C

(1)

DemIndicatorBehaviour:
Behaviour of the linked indicator
DEM_INDICATOR_BLINKING - The indicator blinks when the event has status FAILED
DEM_INDICATOR_BLINK_CONT - The indicator is active and blinks when the event has status FAILED
DEM_INDICATOR_CONTINUOUS - The indicator is active when the even has status FAILED
DEM_INDICATOR_FAST_FLASH: Flash Indicator Lamp should be set to 'Fast Flash' (for J1939 only)
DEM_INDICATOR_SLOW_FLASH: Flash Indicator Lamp should be set to 'Slow Flash' (for J1939 only)

6.4 DemDTCClass

See the following configurations.

Parameter Name	Value	Category
DemDTCFunctionalUnit(1)		C
DemDTCSeverity(2)		C
DemImmediateNvStorageor(3)		C
DemUdsDTC(4)		C
DemUdsStatusAvailabilityMask(AutoEver specific)(5)		C
DemJ1939DTCValue(6)		C
DemJ1939DM1ActiveConditionConfirmedDTC(7)		C

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Parameter Name	Value	Category
DemObdDTC		C

1) DemDTCFunctionalUnit
It is a functional classification assigned to DTC. It does not affect internal functionality of Dem. It is used to compose response messages such as 0x08 reportDTCBySeverityMaskRecord and 0x09 reportSeverityInformationOfDTC, the sub service of ReadDTCInformation.

2) DemDTCSeverity
It is the severity of characteristics assigned to DTC. It indicates whether the DTC requires immediate repair or not.

DEM_DTC_SEV_CHECK_AT_NEXT_HALT: Check during the next halt
DEM_DTC_SEV_IMMEDIATELY: Check immediately
DEM_DTC_SEV_MAINTENANCE_ONLY: Maintenance is needed
DEM_DTC_SEV_NO_SEVERITY: There is no severity information available.

3) DemImmediateNvStorage
It is one of the factors that affect system load. An event saved in the event memory is immediately saved in non-volatile memory. Yet it is not literally saved in the non-volatile memory. Only request is made for saving. Actual saving is done with NvRam, etc. For time taken to save, the memory module (NvRam) should be referenced.

Note: Time needed for saving can vary depending on hardware characteristic (eeprom and flash) and task periodic time, task priority, event data size, etc. when it is saved in non-volatile memory.

4) DemUdsDTC
It means DTC value and follows ISO15031_6 in accordance with HMC ES95486.

5) DemUdsStatusAvailabilityMask
It means UDS Status bits to be displayed in UDS service 0x19.
This setting can determine whether to use UDS Status bits of an individual DTC.

Note: It should be subset of DemDtcStatusAvailabilityMask(DemGeneral). If DemUdsStatusAvailabilityMask(DemDTCClass) is set up for a specific DTC, DemUdsStatusAvailabilityMask(DemDTCClass) that is set up for the DTC is used, instead of DemDtcStatusAvailabilityMask(DemGeneral).

6) DemJ1939DTCValue
It means the fault code for J1939. It is composed of SPN and FMI.

7) DemJ1939DM1ActiveConditionConfirmedDTC: It determines whether to include ConfirmedDTC in filtering conditions of DTC that will be included in DM1 message.

True : TestFailed == 1 and ConfirmedDTC == 1
False: TestFailed == 1

6.4.1 DemCallbackInitMForF

Parameter Name	Value	Category
DemCallbackInitMForFFnc	Deleted	N

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6.5 DemPidClass

See the following configurations.

Parameter Name	Value	Category
DemPidIdentifier		C
DemPidDataElement		C

6.5.1 DemPidDataElement

Parameter Name	Value	Category
DemPidDataElementClassRef		C

6.6 DemDtr

See the following configurations.

Parameter Name	Value	Category
DemDtrCompuDenominator0		C
DemDtrCompuNumerator0		C
DemDtrCompuNumerator1		C
DemDtrUpdateKind		C
DemDtrTid		C
DemDtrId		C
DemDtrUasid		C
DemDtrMid		C
DemDtrEventRef		C

6.7 System Configuration

6.7.1 Configuration of ApplicationSwComponentType

※See AUTOSAR BSW Service API Guide.doc.

6.7.2 Configuration of CompositionSwComponentType

※See AUTOSAR BSW Service API Guide.doc.

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7 Application Programming Interface (API)

7.1 Type Definitions

7.1.1 Dem_EventIdType

Type:	uint16
Range	1...65535
Description:	Identification of an event by assigned EventId. The EventId is assigned by the Dem.

7.1.2 Dem_EventStatusType

Type:	uint8
Range:	DEM_EVENT_STATUS_PASSED 0x00 DEM_EVENT_STATUS_FAILED 0x01 DEM_EVENT_STATUS_PREPASSED 0x02 DEM_EVENT_STATUS_PREFAILED 0x03
Description:	This type contains all monitor test result values, which can be reported via Dem_ReportErrorStatus() and Dem_SetEventStatus().

7.1.3 Dem_OperationCycleStateType

Type:	uint8
Range	#define DEM_CYCLE_STATE_START 0x00 #define DEM_CYCLE_STATE_END 0x01
Description:	This type contains operation cycle state values, which can be reported via Dem_SetOperationCycleState().

7.1.4 Dem_EventStatusExtendedType

Type:	uint8
Range:	DEM_UDS_STATUS_TF 0x01 DEM_UDS_STATUS_TFTOC 0x02 DEM_UDS_STATUS_PDTC 0x04 DEM_UDS_STATUS_CDTC 0x08 DEM_UDS_STATUS_TNCSLC 0x10 DEM_UDS_STATUS_TFSLC 0x20 DEM_UDS_STATUS_TNCTOC 0x40 DEM_UDS_STATUS_WIR 0x80
Description:	In this data-type each bit has an individual meaning. The bit is set to 1 when the condition holds.

7.1.5 Dem_DTCFormatType

Type:	uint8
Range:	DEM_DTC_FORMAT_OBD 0x00 DEM_DTC_FORMAT_UDS 0x01
Description:	Selects/specifies the format of the DTC value.

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7.1.6 Dem_IndicatorStatusType

Type:	uint8
Range	#define DEM_INDICATOR_OFF 0x00 #define DEM_INDICATOR_CONTINUOUS 0x01 #define DEM_INDICATOR_BLINKING 0x02 #define DEM_INDICATOR_BLINK_CONT 0x03
Description:	This type contains operation cycle state values, which can be reported via Dem_SetOperationCycleState().

7.1.7 Dem_DTCOriginType

Type:	uint8
Range	DEM_DTC_ORIGIN_PRIMARY_MEMORY 0x01 DEM_DTC_ORIGIN_SECONDARY_MEMORY 0x04 DEM_DTC_ORIGIN_MIRROR_MEMORY 0x02 DEM_DTC_ORIGIN_PERMANENT_MEMORY 0x03
Description:	The definition and use of the different memory types is OEM-specific.

7.1.8 Dem_InitMonitorReasonType

Type:	uint8
Range	DEM_INIT_MONITOR_CLEAR 0x01 DEM_INIT_MONITOR_RESTART 0x02
Description:	(Re-)Initialization reason returned by the callback.

7.1.9 Dem_MaxDataValueType

Type:	Array uint8[n]
Range	size of largest Extended data class / Freeze frame record Elements
Description:	-

7.1.1 Dem_RatioIdType

Type:	uint8
Range	0..255
Description:	OBD specific ratio Id (related to a specific event, a FID, and an IUMPR group). This type depends on the Dem configuration.

7.1.2 Dem_IumprDenomCondIdType

Type:	uint8
Range	DEM_IUMPR_GENERAL_DENOMINATOR 0x01 DEM_IUMPR_DEN_COND_COLDSTART 0x02 DEM_IUMPR_DEN_COND_EVAP 0x03 DEM_IUMPR_DEN_COND_500MI 0x04
Description:	This type contains all possible additional IUMPR denominator conditions to be broadcasted among OBD-relevant ECUs.

7.1.1 Dem_IumprDenomCondStatusType

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Type:	uint8
Range	DEM_IUMPR_DEN_STATUS_NOT_REACHED 0x00 DEM_IUMPR_DEN_STATUS_REACHED 0x01 DEM_IUMPR_DEN_STATUS_INHIBITED 0x02 Reserved 0x03 - 0xFF
Description:	This type contains all possible states of an additional IUMPR denominator condition to be broadcasted among OBD-relevant ECUs.

7.1.2 Dem_DTRControlType

Type:	uint8
Range	DEM_DTR_CTL_NORMAL 0x00 DEM_DTR_CTL_NO_MAX 0x01 DEM_DTR_CTL_NO_MIN 0x02 DEM_DTR_CTL_RESET 0x03 DEM_DTR_CTL_INVISIBLE 0x04
Description:	Control parameter for the interpretation of the reported test results.

7.2 Interfaces

Note: Each port of the DiagnosticMonitor interface is only connected to one monitor port.

7.2.1 DiagnosticMonitor

Note: One port of this interface type is provided per diagnostic event by the Dem Service Component. It has EventId as a port-defined argument

7.2.1.1 SetEventStatus

Function Name	Xxx_SetEventStatus	
Syntax	Std_ReturnType Xxx_SetEventStatus(Dem_EventStatusType EventStatus)	
Sync/Async	Synchronous	
Re-entrancy	Non reentrant	
Parameters (IN)	EventStatus	Monitor test result: DEM_EVENT_STATUS_PASSED DEM_EVENT_STATUS_FAILED DEM_EVENT_STATUS_PREPASSED DEM_EVENT_STATUS_PREFAILED
Parameters (Inout)	None	
Parameters (Out)	None	
Possible Errors	E_OK	set of event status was successful
	E_NOT_OK	set of event status failed or could not be accepted (e.g.: the operation cycle configured for this event has not been started, an according enable condition has been disabled)
Description	Processes the events reported by SW-Cs via RTE.	
Preconditions	The Dem module shall be initialized The operation cycle related to that event shall be started	
Configuration Dependency		

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7.2.1.2 ResetEventStatus

Function Name	Xxx_ResetEventStatus	
Syntax	Std_ReturnType Xxx_ResetEventStatus(void)	
Sync/Async	Synchronous	
Re-entrancy	Reentrant for different EventIds. Non reentrant for the same EventId.	
Parameters (IN)	None	
Parameters (Inout)	None	
Parameters (Out)	None	
Possible Errors	E_OK	reset of event status was successful
	E_NOT_OK	reset of event status failed or is not allowed, because the event is already tested in this operation cycle
Description	Resets the event failed status.	
Preconditions	The Dem module shall be initialized The operation cycle related to that event shall be started	
Configuration Dependency		

7.2.1.3 PrestoreFreezeFrame

Function Name	Xxx_PrestoreFreezeFrame	
Syntax	Std_ReturnType Xxx_PrestoreFreezeFrame(void)	
Sync/Async	Synchronous	
Re-entrancy	Reentrant for different EventIds. Non reentrant for the same EventId.	
Parameters (IN)	None	
Parameters (Inout)	None	
Parameters (Out)	None	
Possible Errors	Std_ReturnType	E_OK Freeze frame prestorage was successful E_NOT_OK Freeze frame prestorage failed
Description	Captures the freeze frame data for a specific event. This API can only be used through the RTE and therefore no declaration is exported via Dem.h.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	{ecuc(Dem/DemGeneral/DemMaxNumberPrestoredFF)} > 0 * DemMaxNumberPrestoredFF: See 6.2	

7.2.1.4 ClearPrestoredFreezeFrame

Function Name	Xxx_ClearPrestoredFreezeFrame	
Syntax:	Std_ReturnType Xxx_ClearPrestoredFreezeFrame(void)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	None	
Parameters (Inout)	None	
Parameters (Out)	None	
Possible Errors	Std_ReturnType	E_OK: Clear prestored freeze frame was successful E_NOT_OK: Clear prestored

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		freeze frame failed
Description	Clears a prestored freeze frame of a specific event.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.2 OperationCycle

Note: One port of this interface type is provided per operation cycle by the Dem Service Component. It has OperationCycleId as a port-defined argument.

7.2.2.1 SetOperationCycleState

Function Name	Xxx_SetOperationCycleState	
Syntax:	Std_ReturnType Xxx_SetOperationCycleState(Dem_OperationCycleStateType CycleState)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	CycleState	New operation cycle state: (re-)start or end . DEM_CYCLE_STATE_START or DEM_CYCLE_STATE_END
Parameters (Inout)	None	
Parameters (Out)	None	
Possible Errors	Std_ReturnType	E_OK: set of operation cycle was successful E_NOT_OK: set of operation cycle failed
Description	Sets an operation cycle state.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.3 ExternalAgingCycle

7.2.3.1 SetAgingCycleCounterValue

Note: This API is not supported yet

Note: One port of this interface type is provided per operation cycle by the Dem Service Component. It has OperationCycleId as a port-defined argument.

Function Name	Xxx_SetAgingCycleCounterValue	
Syntax:	Std_ReturnType Xxx_SetAgingCycleCounterValue(uint8 CounterValue)	
Sync/Async:	Synchronous	
Re-entrancy	Non Reentrant	
Parameters (IN)	CounterValue	Current external aging cycle counter value.
Parameters (Inout)	None	
Parameters (Out)	None	
Possible Errors	Std_ReturnType	E_OK: set of aging cycle counter was successful

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		E_NOT_OK: set of aging cycle counter failed
Description	Provides the value of the external aging cycle counter. This API can only be used through the RTE, and therefore no declaration is exported via Dem.h.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.4 DiagnosticInfo

Note: One port of this interface type is provided per diagnostic event by the Dem Service Component. It has EventId as a port-defined argument

7.2.4.1 GetEventStatus

Function Name	Xxx_GetEventStatus	
Syntax:	Std_ReturnType Xxx_GetEventStatus(Dem_EventStatusExtendedType* EventStatusExtended)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	None	
Parameters (Inout)	None	
Parameters (Out)	EventStatusExtended	UDS DTC status byte of the requested event. If the return value of the function call is E_NOT_OK, this parameter does not contain valid data. DEM_UDS_STATUS_TF 0x01 DEM_UDS_STATUS_TFTOC 0x02 DEM_UDS_STATUS_PDTC 0x04 DEM_UDS_STATUS_CDTC 0x08 DEM_UDS_STATUS_TNCSLC 0x10 DEM_UDS_STATUS_TFSLC 0x20 DEM_UDS_STATUS_TNCTOC 0x40 DEM_UDS_STATUS_WIR 0x80
Possible Errors	Std_ReturnType	E_OK get of event status was successful E_NOT_OK get of event status failed
Description	Gets the current extended event status of an event.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.4.2 GetEventFailed

Function Name	Xxx_GetEventFailed	
Syntax:	Std_ReturnType Xxx_GetEventFailed(boolean* EventFailed)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	None	
Parameters (Inout)	None	
Parameters (Out)	EventFailed	TRUE – Failed since last clear FALSE – not Failed since last clear

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Possible Errors	Std_ReturnType	E_OK get of event status was successful E_NOT_OK get of event status failed
Description	Gets the event failed status of an event.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.4.3 GetEventTested

Function Name	Xxx_GetEventTested	
Syntax:	Std_ReturnType Xxx_GetEventTested(boolean* EventTested)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	None	
Parameters (Inout)	None	
Parameters (Out)	EventTested	TRUE – event tested this cycle FALSE – event not tested this cycle
Possible Errors	Std_ReturnType	E_OK set of event status was successful E_NOT_OK set of event status failed
Description	Gets the event tested status of an event.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.4.4 GetDTCOfEvent

Function Name	Xxx_GetDTCOfEvent	
Syntax:	Std_ReturnType Xxx_GetDTCOfEvent(Dem_DTCFormatType DTCFormat, uint32* DTCOfEvent)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	DTCFormat	Defines the output-format of the requested DTC value. DEM_DTC_FORMAT_OBD or DEM_DTC_FORMAT_UDS
Parameters (Inout)	None	
Parameters (Out)	DTCOfEvent	Receives the DTC value returned by the function. If the return value of the function is other than OK this parameter does not contain valid data.
Possible Errors	Std_ReturnType	E_OK get of DTC was successful E_NOT_OK get of DTC was not successful E_NO_DTC_AVAILABLE there is no DTC
Description	Gets the DTC of an event	

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Preconditions	The Dem module shall be initialized
Configuration Dependency	

7.2.4.5 GetFaultDetectionCounter

Function Name	Xxx_GetFaultDetectionCounter	
Syntax:	Std_ReturnType Xxx_GetFaultDetectionCounter(sint8* FaultDetectionCounter)	
Sync/Async:	Synchronous	
Re-entrancy	Non Reentrant	
Parameters (IN)	None	
Parameters (Inout)	None	
Parameters (Out)	FaultDetectionCounter	This parameter receives the Fault Detection Counter information of the requested EventId. If the return value of the function call is other than E_OK this parameter does not contain valid data. -128dec...127dec PASSED... FAILED according to ISO 14229-1
Possible Errors	Std_ReturnType	E_OK request was successful E_NOT_OK request failed
Description	Gets the fault detection counter of an event. This API can only be used through the RTE, and therefore no declaration is exported via Dem.h.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.4.6 GetEventExtendedDataRecord

Function Name	Xxx_GetEventExtendedDataRecord	
Syntax:	Std_ReturnType Xxx_GetEventExtendedDataRecord(uint8 RecordNumber, uint8* DestBuffer)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	RecordNumber	Identification of requested Extended data record. Valid values are between 0x01 and 0xEF as defined in ISO14229-1. 0xFF means data of all extended data records are returned
Parameters (Inout)	None	
Parameters (Out)	DestBuffer	This parameter contains a byte pointer that points to the buffer, to which the extended data shall be written to. The format is raw hexadecimal values and contains no header-information.
Possible Errors	Std_ReturnType	E_OK operation was successful E_NOT_OK operation failed

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Description	Gets the data of an extended data record by event.
Preconditions	The Dem module shall be initialized
Configuration Dependency	

7.2.4.7 GetEventFreezeFrameData

Function Name	Xxx_GetEventFreezeFrameData	
Syntax:	Std_ReturnType Xxx_GetEventFreezeFrameData(uint8 RecordNumber, boolean ReportTotalRecord, uint16 DataId, uint8* DestBuffer)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	RecordNumber	Identification of requested Extended data record. Valid values are between 0x01 and 0xEF as defined in ISO14229-1. 0xFF means data of all extended data records are returned
	ReportTotalRecord	TRUE: total freeze frame record (all PIDs/DIDs) data are requested FALSE: a dedicated PID/DID is requested by the parameter DataId
	DataId	This parameter specifies the PID (ISO15031-5) or data identifier (ISO14229-1) that shall be copied to the destination buffer. If ReportTotalRecord is TRUE, the value of DataId is ignored.
Parameters (InOut)	None	
Parameters (Out)	DestBuffer	This parameter contains a byte pointer that points to the buffer, to which the extended data shall be written to. The format is raw hexadecimal values and contains no header-information.
Possible Errors	Std_ReturnType	E_OK operation was successful E_NOT_OK operation failed
Description	Gets the data of freeze frame record by event.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.5 GeneralDiagnosticInfo

7.2.5.1 GetEventStatus

Function Name	Xxx_GetEventStatus
Syntax:	Std_ReturnType Xxx_GetEventStatus(Dem_EventIdType EventId

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	Dem_EventStatusExtendedType* EventStatusExtended)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	EventId	Identification of an event by assigned EventId
Parameters (Inout)	None	
Parameters (Out)	EventStatusExtended	UDS DTC status byte of the requested event. If the return value of the function call is E_NOT_OK, this parameter does not contain valid data. DEM_UDS_STATUS_TF 0x01 DEM_UDS_STATUS_TFTOC 0x02 DEM_UDS_STATUS_PDTC 0x04 DEM_UDS_STATUS_CDTC 0x08 DEM_UDS_STATUS_TNCSLC 0x10 DEM_UDS_STATUS_TFSLC 0x20 DEM_UDS_STATUS_TNCTOC 0x40 DEM_UDS_STATUS_WIR 0x80
Possible Errors	Std_ReturnType	E_OK get of event status was successful E_NOT_OK get of event status failed
Description	Gets the current extended event status of an event.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.5.2 GetEventFailed

Function Name	Xxx_GetEventFailed	
Syntax:	Std_ReturnType Xxx_GetEventFailed(Dem_EventIdType EventId boolean* EventFailed)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	EventId	Identification of an event by assigned EventId
Parameters (Inout)	None	
Parameters (Out)	EventFailed	TRUE – Failed since last clear FALSE – not Failed since last clear
Possible Errors	Std_ReturnType	E_OK get of event status was successful E_NOT_OK get of event status failed
Description	Gets the event failed status of an event.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.5.3 GetEventTested

Function Name	Xxx_GetEventTested
Syntax:	Std_ReturnType Xxx_GetEventTested(Dem_EventIdType EventId boolean* EventTested)

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Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	EventId	Identification of an event by assigned EventId
Parameters (Inout)	None	
Parameters (Out)	EventTested	TRUE – event tested this cycle FALSE – event not tested this cycle
Possible Errors	Std_ReturnType	E_OK set of event status was successful E_NOT_OK set of event status failed
Description	Gets the event tested status of an event.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.5.4 GetDTCOfEvent

Function Name	Xxx_GetDTCOfEvent	
Syntax:	Std_ReturnType Xxx_GetDTCOfEvent(Dem_EventIdType EventId Dem_DTCFormatType DTCFormat, uint32* DTCOfEvent)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	EventId	Identification of an event by assigned EventId
	DTCFormat	Defines the output-format of the requested DTC value. DEM_DTC_FORMAT_OBD or DEM_DTC_FORMAT_UDS
Parameters (Inout)	None	
Parameters (Out)	DTCOfEvent	Receives the DTC value returned by the function. If the return value of the function is other than OK this parameter does not contain valid data.
Possible Errors	Std_ReturnType	E_OK get of DTC was successful E_NOT_OK get of DTC was not successful E_NO_DTC_AVAILABLE there is no DTC
Description	Gets the DTC of an event	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.5.5 GetFaultDetectionCounter

Function Name	Xxx_GetFaultDetectionCounter
Syntax:	Std_ReturnType Xxx_GetFaultDetectionCounter(Dem_EventIdType EventId sint8* FaultDetectionCounter)

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Sync/Async:	Synchronous	
Re-entrancy	Non Reentrant	
Parameters (IN)	EventId	Identification of an event by assigned EventId
Parameters (Inout)	None	
Parameters (Out)	FaultDetectionCounter	This parameter receives the Fault Detection Counter information of the requested EventId. If the return value of the function call is other than E_OK this parameter does not contain valid data. -128dec...127dec PASSED... FAILED according to ISO 14229-1
Possible Errors	Std_ReturnType	E_OK request was successful E_NOT_OK request failed
Description	Gets the fault detection counter of an event. This API can only be used through the RTE, and therefore no declaration is exported via Dem.h.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.5.6 GetEventExtendedDataRecord

Function Name	Xxx_GetEventExtendedDataRecord	
Syntax:	Std_ReturnType Xxx_GetEventExtendedDataRecord(Dem_EventIdType EventId uint8 RecordNumber, uint8* DestBuffer)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	EventId	Identification of an event.
	RecordNumber	Identification of requested Extended data record. Valid values are between 0x01 and 0xEF as defined in ISO14229-1. 0xFF means data of all extended data records are returned
Parameters (Inout)	None	
Parameters (Out)	DestBuffer	This parameter contains a byte pointer that points to the buffer, to which the extended data shall be written to. The format is raw hexadecimal values and contains no header-information.
Possible Errors	Std_ReturnType	E_OK operation was successful E_NOT_OK operation failed
Description	Gets the data of an extended data record by event.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

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7.2.5.7 GetEventFreezeFrameData

Function Name	Xxx_GetEventFreezeFrameData	
Syntax:	Std_ReturnType Xxx_GetEventFreezeFrameData(Dem_EventIdType EventId uint8 RecordNumber, boolean ReportTotalRecord, uint16 DataId, uint8* DestBuffer)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	EventId	Identification of an event by assigned EventId
	RecordNumber	Identification of requested Extended data record. Valid values are between 0x01 and 0xEF as defined in ISO14229-1. 0xFF means data of all extended data records are returned
	ReportTotalRecord	TRUE: total freeze frame record (all PIDs/DIDs) data are requested FALSE: a dedicated PID/DID is requested by the parameter DataId
	DataId	This parameter specifies the PID (ISO15031-5) or data identifier (ISO14229-1) that shall be copied to the destination buffer. If ReportTotalRecord is TRUE, the value of DataId is ignored.
Parameters (InOut)	None	
Parameters (Out)	DestBuffer	This parameter contains a byte pointer that points to the buffer, to which the extended data shall be written to. The format is raw hexadecimal values and contains no header-information.
Possible Errors	Std_ReturnType	E_OK operation was successful E_NOT_OK operation failed
Description	Gets the data of freeze frame record by event.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.6 EnableCondition

Note: One port of this interface type is provided per enable condition by the Dem Service Component. It has EnableConditionId as a port-defined argument.

7.2.6.1 SetEnableCondition

Function Name	Xxx_SetEnableCondition
Syntax:	Std_ReturnType Xxx_SetEnableCondition(

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	boolean ConditionFulfilled)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	ConditionFulfilled	This parameter specifies whether the enable condition assigned to the EnableConditionID is fulfilled (True) or not fulfilled (False)
Parameters (Inout)	None	
Parameters (Out)	None	
Possible Errors	Std_ReturnType	In case the enable condition could be set successfully the API call returns E_OK. If the setting of the enable condition failed the return value of the function is E_NOT_OK.
Description	Sets the Enable condition	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.7 StorageCondition

Note: One port of this interface type is provided per storage condition by the Dem Service Component. It has StorageConditionId as a port-defined argument.

7.2.7.1 SetStorageCondition

Function Name	Xxx_SetStorageCondition	
Syntax:	Std_ReturnType Xxx_SetStorageCondition(boolean ConditionFulfilled)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	ConditionFulfilled	This parameter specifies whether the storage condition assigned to the StorageConditionID is fulfilled (True) or not fulfilled (False)
Parameters (Inout)	None	
Parameters (Out)	None	
Possible Errors	Std_ReturnType	In case the storage condition could be set successfully the API call returns E_OK. If the setting of the storage condition failed the return value of the function is E_NOT_OK.
Description	Sets the Storage condition	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.8 IndicatorStatus

Note: One port of this interface type is provided per indicator by the Dem Service

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Component. It has IndicatorId as a port-defined argument.

7.2.8.1 GetIndicatorStatus

Function Name	Xxx_ GetIndicatorStatus	
Syntax:	Std_ReturnType Xxx_GetIndicatorStatus(Dem_IndicatorStatusType* IndicatorStatus)	
Sync/Async:	Synchronous	
Re-entrancy	Non-Reentrant	
Parameters (IN)	None	
Parameters (Inout)	None	
Parameters (Out)	IndicatorStatus	Status of the indicator, like on, off, blinking. DEM_INDICATOR_OFF 0x00 DEM_INDICATOR_CONTINUOUS 0x01 DEM_INDICATOR_BLINKING 0x02 DEM_INDICATOR_BLINK_CONT 0x03
Possible Errors	Std_ReturnType	E_OK: Operation was successful E_NOT_OK: Operation failed or is not supported
Description	Gets the indicator status derived from the event status	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.9 DTCSuppression

7.2.9.1 SetDTCSuppression

Function Name	Xxx_SetDTCSuppression	
Syntax:	Std_ReturnType Xxx_SetDTCSuppression(uint32 DTC, Dem_DTCFormatType DTCFormat, boolean SuppressionStatus)	
Sync/Async:	Synchronous	
Re-entrancy	Non Reentrant	
Parameters (IN)	DTC	Diagnostic Trouble code
	SuppressionStatus	This parameter specifies whether the respective DTC shall be disabled (TRUE) or enabled (FALSE).
	DTCFormat	Defines the input-format of the provided DTC value. DEM_DTC_FORMAT_OBD or DEM_DTC_FORMAT_UDS
Parameters (Inout)	None	
Parameters (Out)	None	
Possible Errors	Std_ReturnType	E_OK operation was successful E_NOT_OK (operation failed or

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		event entry for this DTC still exists)
Description	Sets the Storage condition	
Preconditions	The Dem module shall be initialized	
Configuration Dependency		

7.2.10 EvMemOverflowIndication

Note: One port of this interface type is provided per event memory by the Dem Service Component. It has DTCOrigin as a port-defined argument

7.2.10.1 GetEventMemoryOverflow

Function Name	Xxx_GetEventMemoryOverflow	
Syntax:	Std_ReturnType Xxx_GetEventMemoryOverflow(boolean* OverflowIndication)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	None	
Parameters (Inout)	None	
Parameters (Out)	OverflowIndication	This parameter returns TRUE if the according event memory was overflowed, otherwise it returns FALSE.
Possible Errors	Std_ReturnType	E_OK: Operation was successful E_NOT_OK: Operation failed or is not supported
Description	Gets the event memory overflow indication status	
Preconditions	The Dem module shall be initialized.	
Configuration Dependency		

7.2.11 Callback InitMonitorForEvent callouts

7.2.11.1 InitMonitorForEvent

Function Name	Xxx_InitMonitorForEvent	
Syntax:	Std_ReturnType Xxx_InitMonitorForEvent(Dem_InitMonitorReasonType InitMonitorReason)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	InitMonitorReason	Specific (re-)initialization reason evaluated from the monitor to identify the initialization kind to be performed. Reason: DEM_INIT_MONITOR_CLEAR, DEM_INIT_MONITOR_RESTART
Parameters (Inout)	None	
Parameters (Out)	None	

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Possible Errors	Std_ReturnType	Return value unused – only for compatibility with according RTE operation.
Description	It is called when an event was initialized or deleted. It is used to initialize monitor application	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

7.2.12 CallbackEventStatusChange callouts

7.2.12.1 EventStatusChanged

Function Name	Xxx_EventStatusChanged	
Syntax:	Std_ReturnType Xxx_EventStatusChanged(Dem_EventStatusExtendedType EventStatusOld, Dem_EventStatusExtendedType EventStatusNew)	
Sync/Async:	Synchronous	
Re-entrancy	Non Reentrant	
	EventStatusOld	UDS DTC status byte of event before change.
	EventStatusNew	UDS DTC status byte of event after change.
Parameters (Inout)	None	
Parameters (Out)	None	
Possible Errors	None	
Description	It is called when the UDS status of an event is changed	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

7.2.13 GeneralCallbackEventStatusChange callouts

7.2.13.1 EventStatusChanged

Function Name	Xxx_EventStatusChanged	
Syntax:	Std_ReturnType Xxx_EventStatusChanged(Dem_EventIdType EventId, Dem_EventStatusExtendedType EventStatusOld, Dem_EventStatusExtendedType EventStatusNew)	
Sync/Async:	Synchronous	
Re-entrancy	Non Reentrant	
Parameters (IN)	EventId	Identification of an event by assigned EventId
	EventStatusOld	UDS DTC status byte of event before change.
	EventStatusNew	UDS DTC status byte of event after change.
Parameters (Inout)	None	
Parameters (Out)	None	
Possible Errors	None	
Description	It is called when the UDS status of an event is changed It is provided by default without any setting. It works for all the events set	

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Preconditions	The Dem module shall be initialized
Configuration Dependency	None

7.2.14 GeneralCallbackEventDataChanged callouts

7.2.14.1 EventDataChanged

Function Name	Xxx_EventDataChanged	
Syntax:	Std_ReturnType Xxx_EventDataChanged(void)	
Sync/Async:	Synchronous	
Re-entrancy	Non Reentrant	
Parameters (IN)	EventId	Identification of an event by assigned EventId
Parameters (Inout)	None	
Parameters (Out)	None	
Possible Errors	None	
Description	It is called when data (FreezeFrame or extended data) saved in the event memory is changed. It is provided by default without any setting. It works for all the events configured	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

7.2.15 CallbackDTCStatusChange callouts

7.2.15.1 DTCStatusChanged

Function Name	Xxx_DTCStatusChanged	
Syntax:	Std_ReturnType Xxx_DTCStatusChanged(uint32 DTC, uint8 DTCStatusOld, uint8 DTCStatusNew)	
Sync/Async:	Synchronous	
Re-entrancy	Non Reentrant	
Parameters (IN)	DTC	Diagnostic Trouble Code in UDS format
	DTCStatusOld	DTC status before change
	DTCStatusNew	DTC status after change
Parameters (Inout)	None	
Parameters (Out)	None	
Possible Errors	Std_ReturnType	Return value unused - only for compatibility with according RTE operation.
Description	It is called when the UDS status of DTC is changed	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

7.2.16 CallbackEventDataChanged callouts

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7.2.16.1 EventDataChanged

Function Name	Xxx_EventDataChanged
Syntax:	Std_ReturnType Xxx_EventDataChanged(void)
Sync/Async:	Synchronous
Re-entrancy	Non Reentrant
Parameters (IN)	None
Parameters (Inout)	None
Parameters (Out)	None
Possible Errors	None
Description	It is called when data saved in the event memory (FreezeFrame or extended data) is changed.
Preconditions	The Dem module shall be initialized
Configuration Dependency	None

7.2.17 CallbackClearEventAllowed callouts

7.2.17.1 ClearEventAllowed

Function Name	Xxx_ClearEventAllowed	
Syntax:	Std_ReturnType Xxx_ClearEventAllowed(boolean* Allowed)	
Sync/Async:	Synchronous	
Re-entrancy	Non Reentrant	
Parameters (IN)	None	
Parameters (Inout)	None	
Parameters (Out)	Allowed	True – clearance of event is allowed False – clearance of event is not allowed
Possible Errors	Std_ReturnType	E_OK: Operation was successful E_NOT_OK: Operation failed
Description	UDS Service ClearDiagnosticinformation is run and it is called before DTC is deleted. If the value of factor allowed is false and return value is E_OK, the event will not be deleted	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

7.2.18 DataServices_〈SyncDataElement〉 callouts

7.2.18.1 ReadData

Function Name	Xxx_ ReadData	
Syntax:	Std_ReturnType Xxx_ ReadData(uint8* Data)	
Sync/Async:	Synchronous	
Re-entrancy	Non Reentrant	
Parameters (IN)	None	
Parameters (Inout)	None	
Parameters (Out)	Data	Buffer containing the value of the data element

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Possible Errors	Std_ReturnType	E_OK: Operation was successful E_NOT_OK: Operation failed
Description	When an event is saved in the Event Memory, data is read from SWC/BSW through Callback ReadData and will be saved together in the Event Memory. Yet it is used if FreezeFrame/extended data is assigned to an event	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

7.2.19 CallbackGetFaultDetectCounter callouts

7.2.19.1 GetFaultDetectionCounter

Function Name	Xxx_GetFaultDetectionCounter	
Syntax:	Std_ReturnType Xxx_GetFaultDetectionCounter(sint8* FaultDetectionCounter)	
Sync/Async:	Synchronous	
Re-entrancy	Non Reentrant	
Parameters (IN)	None	
Parameters (Inout)	None	
Parameters (Out)	FaultDetectionCounter	This parameter receives the fault detection counter information of the requested EventId. If the return value of the function call is other than E_OK this parameter does not contain valid data. -128dec...127dec PASSED...FAILED according to ISO 14229-1
Possible Errors	Std_ReturnType	E_OK: Operation was successful E_NOT_OK: Operation failed
Description	If the debounce algorithm configured for the event is DemDebounceMonitorInternal, FaultDectectionCounter is read from SWC/BSW. It is used in UDS ReadDTCInformation service	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

7.2.20 CddIf

7.2.20.1 ClearDTC

Function Name	Xxx_ClearDTC
Syntax:	Std_ReturnType Xxx_ClearDTC (uint32 DTC, Dem_DTCFormatType DTCFormat, Dem_DTCOriginType DTCOrigin)
Sync/Async:	Asynchronous
Re-entrancy	Non Reentrant

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Parameters (IN)	DTC	Defines the DTC in respective format that shall be cleared from the event memory. If the DTC fits to a DTC group number, all DTCs of the group shall be cleared A Spefic DTC DEM_DTC_GROUP_ALL_DTCS DEM_DTC_GROUP_POWERTRAIN_DTCS, DEM_DTC_GROUP_CHASSIS_DTCS, DEM_DTC_GROUP_BODY_DTCS, DEM_DTC_GROUP_NETWORK_COM_DTCS DEM_DTC_GROUP_EMISSION_REL_DTCS: Not supported
	DTCFormat	Defines the input-format of the provided DTC value. DEM_DTC_FORMAT_UDS DEM_DTC_FORMAT_OBD : Not supported
	DTCOrigin	If the Dem supports more than one event memory this parameter is used to select the source memory the DTCs shall be read from. DEM_DTC_ORIGIN_PRIMARY_MEMORY DEM_DTC_ORIGIN_SECONDARY_MEMORY: if used
Parameters (Inout)	None	
Parameters (Out)		
Possible Errors	Std_ReturnType	RTE_E_OK: Operation was successful DEM_CLEAR_WRONG_DTC DEM_CLEAR_WRONG_DTCORIGIN DEM_CLEAR_FAILED DEM_CLEAR_PENDING See *10.5
Description	Clears single DTCs as well as groups of DTCs. This API can only be used through the RTE, and therefore no declaration is exported via Dem.h.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

7.2.21 PfcCycleQualified

7.2.21.1 Dem_SetPfcCycleQualified

Function Name	Dem_SetPfcCycleQualified	
Syntax:	Std_ReturnType Dem_SetPfcCycleQualified(void)	
Sync/Async:	Synchronous	
Re-entrancy	Non Reentrant	
Parameters (IN)	None	
Parameters (Inout)	None	
Parameters (Out)	None	
Return value	Std_ReturnType	Always E_OK is returned, as E_NOT_OK will never appear.
Description	Marks the current OBD driving cycle as having met the criteria for	

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	the PFC cycle. API is needed in OBD-relevant ECUs only.
Preconditions	The Dem module shall be initialized
Configuration Dependency	None

7.2.21.2 Dem_GetPfcCycleQualified

Function Name	Dem_GetPfcCycleQualified	
Syntax:	Std_ReturnType Dem_GetPfcCycleQualified(boolean isqualified	
Sync/Async:	Synchronous	
Re-entrancy	Non Reentrant	
Parameters (IN)	isaualified	TRUE: During the current OBD driving cycle the criteria for the PFC cycle have been met. FALSE: During the current OBD driving cycle the criteria for the PFC cycle have not been met.
Parameters (Inout)	None	
Parameters (Out)	None	
Return value	Std_ReturnType	Always E_OK is returned, as E_NOT_OK will never appear.
Description	Returns TRUE if the criteria for the PFC cycle have been met during the current OBD driving cycle. API is needed in OBD-relevant ECUs only.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

7.2.22 IUMPRDenominator

7.2.22.1 Dem_ReplUMPRDenLock

Function Name	Dem_ReplUMPRDenLock	
Syntax:	Std_ReturnType Dem_ReplUMPRDenLock(Dem_RatioIdType RatioID)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	RatioID	Ratio Identifier reporting that specific denominator is released (for physical reasons - e.g. temperature conditions or minimum activity)
Parameters (Inout)	None	
Parameters (Out)	None	
Return value	Std_ReturnType	E_OK: report of IUMPR denominator status was successfully reported E_NOK: report of IUMPR denominator status was not successfully reported
Description	Service is used to lock a denominator of a specific monitor. API is needed in OBD-relevant ECUs only.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

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7.2.22.2 Dem_ReplUMPRDenRelease

Function Name	Dem_ReplUMPRDenRelease	
Syntax:	Std_ReturnType Dem_ReplUMPRDenRelease(Dem_RatioIdType RatioID)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	RatioID	Ratio Identifier reporting that specific denominator is released (for physical reasons - e.g. temperature conditions or minimum activity)
Parameters (Inout)	None	
Parameters (Out)	None	
Return value	Std_ReturnType	E_OK: report of IUMPR denominator status was successfully reported E_NOK: report of IUMPR denominator status was not successfully reported
Description	Service is used to release a denominator of a specific monitor. API is needed in OBD-relevant ECUs only	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

7.2.23 IUMPRDenominatorCondition

7.2.23.1 Dem_SetIUMPRDenCondition

Function Name	Dem_SetIUMPRDenCondition	
Syntax:	Std_ReturnType Dem_SetIUMPRDenCondition(Dem_IumprDenomCondIdType ConditionId, Dem_IumprDenomCondStatusType ConditionStatus)	
Sync/Async:	Synchronous /Asynchronous	
Re-entrancy	Reentrant	
Parameters (IN)	ConditionId	Identification of a IUMPR denominator condition ID (General Denominator, Cold start, EVAP, 500mi).
	ConditionStatus	Status of the IUMPR denominator condition (Not-reached, reached, not reachable / inhibited)
Parameters (Inout)	None	
Parameters (Out)	None	
Return value	Std_ReturnType	E_OK: set of IUMPR denominator condition was successful E_NOT_OK: set of IUMPR denominator condition failed or could not be accepted.
Description	In order to communicate the status of the (additional) denominator conditions among the OBD relevant ECUs, the API is used to forward the condition status to a Dem of a particular ECU. API is needed in OBD-relevant ECUs only.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

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7.2.23.2 Dem_GetIUMPRDenCondition

Function Name	Dem_GetIUMPRDenCondition	
Syntax:	Std_ReturnType Dem_GetIUMPRDenCondition(Dem_IumprDenomCondIdType ConditionId, Dem_IumprDenomCondStatusType* ConditionStatus)	
Sync/Async:	Synchronous	
Re-entrancy	Reentrant	
Parameters (IN)	ConditionId	Identification of a IUMPR denominator condition ID (General Denominator, Cold start, EVAP, 500mi).
Parameters (Inout)	None	
Parameters (Out)	ConditionStatus	Status of the IUMPR denominator condition (Not-reached, reached, not reachable / inhibited)
Return value	Std_ReturnType	E_OK: get of IUMPR denominator condition status was successful E_NOT_OK: get of condition status failed
Description	In order to communicate the status of the (additional) denominator conditions among the OBD relevant ECUs, the API is used to retrieve the condition status from the Dem of the ECU where the conditions are computed. API is needed in OBD-relevant ECUs only.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

7.2.24 IUMPRNumerator

7.2.24.1 Dem_ReplUMPRFaultDetect

Function Name	Dem_ReplUMPRFaultDetect	
Syntax:	Std_ReturnType Dem_ReplUMPRFaultDetect(Dem_RatioIdType RatioID)	
Sync/Async:	Synchronous	
Re-entrancy	Non Reentrant	
Parameters (IN)	RatioID	Ratio Identifier reporting that a respective monitor could have found a fault - only used when interface option "API" is selected
Parameters (Inout)	None	
Parameters (Out)	None	
Return value	Std_ReturnType	E_OK report of IUMPR result was successfully reported
Description	Service for reporting that faults are possibly found because all conditions are fulfilled. API is needed in OBD-relevant ECUs only.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

7.2.25 SetDataOfPID21

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7.2.25.1 Dem_SetDataOfPID21

Function Name	Dem_SetDataOfPID21	
Syntax:	Std_ReturnType Dem_SetDataOfPID21(uint8* PID21value)	
Sync/Async:	Synchronous	
Re-entrancy	Non Reentrant	
Parameters (IN)	PID21value	Buffer containing the contents of PID $21. The buffer is provided by the Dcm with the appropriate size, i.e. during configuration, the Dcm identifies the required size from the largest PID in order to configure a PIDBuffer.
Parameters (Inout)	None	
Parameters (Out)	None	
Return value	Std_ReturnType	Always E_OK is returned, as E_NOT_OK will never appear.
Description	Service to set the value of PID $21 in the Dem by a software component. API is needed in OBD-relevant ECUs only.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

7.2.26 SetDataOfPID31

7.2.26.1 Dem_SetDataOfPID31

Function Name	Dem_SetDataOfPID31	
Syntax:	Std_ReturnType Dem_SetDataOfPID31(uint8* PID31value)	
Sync/Async:	Synchronous	
Re-entrancy	Non Reentrant	
Parameters (IN)	PID31value	Buffer containing the contents of PID $31. The buffer is provided by the Dcm with the appropriate size, i.e. during configuration, the Dcm identifies the required size from the largest PID in order to configure a PIDBuffer.
Parameters (Inout)	None	
Parameters (Out)	None	
Return value	Std_ReturnType	Always E_OK is returned, as E_NOT_OK will never appear.
Description	Service to set the value of PID $31 in the Dem by a software component. API is needed in OBD-relevant ECUs only.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

7.2.27 DTRCentralReport

7.2.27.1 SetDTR

Function Name	Dem_SetDTR
Syntax:	Std_ReturnType Dem_SetDataOfPID4D(uint8* PID4Dvalue)
Sync/Async:	Synchronous
Re-entrancy	Non Reentrant

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Parameters (IN)	TestResult	-
	LowerLimit	-
	UpperLimit	-
	CtrlVal	-
Parameters (Inout)	None	
Parameters (Out)	None	
Return value	Std_ReturnType	E_OK: Set DTR was successful E_NOT_OK: Set DTR was failed
Description	Service to set the value of DTR in the Dem by a software component. API is needed in OBD-relevant ECUs only.	
Preconditions	The Dem module shall be initialized	
Configuration Dependency	None	

7.2.28 Remarks

7.2.28.1 In Communication with application SW-C

For information on prototype of functions created based on RTE, see AUTOSAR BSW Service API Guide.doc.

8 Generator

8.1 Generator Option

Option	Description
-S	To create software component description
-H/-Help	To display help regarding usage of the tool.
-O/-Output	To generate the output files in the specified directory location.
-V/-Version	To display the copyright information and the tool version.
-L/-Log	To generate \"$BswConfig::Lis_File_Name\" file.
-D/-DryRun	To execute in validation mode.
-I/-Info	To disable Information Messages.
-W/-Warn	To disable Warning Messages.
-DDT	To disable the generation of Date and Time Information in the Tool Generated Output Files.

8.2 Generator Error Message

This section helps to analyze the errors or warnings displayed during the execution of the tool. It ensures conformance of input file(s) with syntax and semantics.

The Generation Tool displays errors or warnings or information when the user has configured incorrect inputs. The format of Error/Warning/Information message is as shown below:

- ERR/WRN/INF<mid><xxx>: <Error/Warning/Information Message>

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Where,
<mid>: 054 – Dem Module Id (54) for user configuration checks.
000 – for command line checks.
<xxx>: 001 – 999 – Message ID.

- File Name : Name of the file in which the error has occurred
- Path : Absolute path of the container in which the parameter is present

'File Name' and 'Path' are optional.

Below section provides the list of module specific error, warning and information messages.

8.2.1 Error Messages

The following section gives the list of error messages displayed by the Generation Tool.

ERR054001: Unexpected Error Found. Please contact AutoEver AUTOSAR Support System.

This is an Unexpected Error. On the occurrence of this error contact AutoEver AUTOSAR Support System.

ERR054002: Unexpected Error Found. This error may be due to the incorrect configuration of the element(s) 'Element Name'. If the error is not resolved, then please contact AutoEver AUTOSAR Support System.

This error occurs, if the structure fields that are to be generated in the C Source file are empty. Contact AutoEver AUTOSAR Support System.

ERR054003: 'DEM/NVM/FIM' Component is not present in the input file(s).

This error occurs, if Modules Dem, NvM and FiM are not present in input file(s).

ERR054004: Reference path is empty for the parameter 'Parameter Name' in the container 'Container Name'.

This error Occurs, if the Reference path for parameter 'Parameter Name' in the container 'Container Name' is not configured.

Container Name	Parameter Name
DemEventClass	DemOperationCycleRef
DemIndicatorAttribute	DemIndicatorHealingCycleRef
	DemIndicatorRef
DemPidDataElement	DemPidDataElementClassRef
DemDidClass	DemDidDataElementClassRef
DemEnableConditionGroup	DemEnableConditionRef
DemExtendedDataClass	DemExtendedDataRecordClassRef
DemExtendedDataRecordClass	DemDataElementClassRef
DemFreezeFrameClass	DemDidClassRef
DemRatioId	DemDiagnosticEventRef

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Container Name	Parameter Name
	DemFunctionIdRef
DemStorageConditionGroup	DemStorageConditionRef
DemNvRamBlockId	DemNvRamBlockIdRef
DemGeneralOBD	DemOBDInputAcceleratorPaddleInformation
	DemOBDInputAmbientPressure
	DemOBDInputAmbientTemperature
	DemOBDInputDistanceInformation
	DemOBDInputEngineSpeed
	DemOBDInputEngineTemperature
	DemOBDInputProgrammingEvent
	DemOBDInputVehicleSpeed

ERR054005: Parameter 'Parameter Name' in the container 'Container Name' should be configured.

This error occurs, if the parameter 'Parameter Name' in the container 'Container Name' is not configured.

Container Name	Parameter Name
BSW-IMPLEMENTATION	AR-RELEASE-VERSION
	VENDOR-ID
	SW-VERSION
BSW-MODULE-DESCRIPTION	MODULE-ID
DemDTCClass	DemImmediateNvStorage
DemEventClass	DemAgingAllowed
	DemConsiderPtoStatus
	DemEventPriority
	DemFFPrestorageSupported
DemOperationCycle	DemOperationCycleType
DemGeneral	DemAgingCycleCounterProcessing
	DemBswErrorBufferSize
	DemDTCSuppressionSupport
	DemClearDTCBehavior
	DemTypeOfFreezeFrameRecordNumeration
	DemDebounceCounterBasedSupport
	DemDebounceTimeBasedSupport
	DemDevErrorDetect

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Container Name	Parameter Name
	DemDtcStatusAvailabilityMask
	DemEnableConditionSupport
	DemEventCombinationSupport
	DemEventDisplacementSupport
	DemMaxNumberEventEntryMirror
	DemMaxNumberEventEntryPermanent
	DemMaxNumberEventEntryPrimary
	DemMaxNumberEventEntrySecondary
	DemMaxNumberPrestoredFF
	DemOBDSupport
	DemOccurrenceCounterProcessing
	DemOperationCycleProcessing
	DemOperationCycleStatusStorage
	DemStatusBitHandlingTestFailedSinceLastClear
	DemPTOSupport
	DemStatusBitStorageTestFailed
	DemStorageConditionSupport
	DemTaskTime
	DemTriggerDcmReports
	DemTriggerDltReports
	DemTriggerFiMReports
	DemTriggerMonitorInitBeforeClearOk
	DemTypeOfDTCSupported
	DemVersionInfoApi
	DemTypeOfFreezeFrameRecordNumeration
DemEventParameter	DemEventId
	DemEventKind
DemDebounceCounterBased	DemDebounceCounterDecrementStepSize
	DemDebounceCounterFailedThreshold
	DemDebounceCounterIncrementStepSize

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Container Name	Parameter Name
	DemDebounceCounterJumpDown
	DemDebounceCounterJumpDownValue
	DemDebounceCounterJumpUp
	DemDebounceCounterJumpUpValue
	DemDebounceCounterPassedThreshold
DemDebounceTimeBase(0..1)	DemDebounceTimeFailedThreshold
	DemDebounceTimePassedThreshold
DemPidClass	DemPidIdentifier
DemDidClass	DemDidIdentifier
DemEnableCondition	DemEnableConditionId
	DemEnableConditionStatus
DemFreezeFrameRecNumClass	DemFreezeFrameRecordNumber
DemIndicator	DemIndicatorID
DemIndicatorAttribute	DemIndicatorBehaviour
	DemIndicatorFailureCycleSource
	DemIndicatorHealingCycleCounterThreshold
DemExternalCSDataElementClass	DemDataElementDataSize
	DemDataElementUsePort
DemInternalDataElementClass	DemDataElementDataSize
	DemInternalDataElement
DemExternalSRDataElementClass	DemDataElementDataSize
DemExtendedDataRecordClass	DemExtendedDataRecordNumber
DemGroupOfDTC	DemGroupDTCs
DemRatioId	DemIUMPRGroup
	DemRatioIdType
DemStorageCondition	DemStorageConditionId
	DemStorageConditionStatus

ERR054006: The value configured for the parameter 'Parameter Name' in the container 'Container Name' should follow the pattern: <Pattern>.

This error occurs, if the parameter 'Parameter Name' in the container 'Container Name' does not follow the pattern 'Pattern'.

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Parameter Name	Container Name	Pattern	Example
AR-RELEASE-VERSION	BSW-IMPLEMENTATION	4.[0-9]+.[0-9]+	4.0.3
SW-VERSION			
DemCallbackInitMForFFnc	DemCallbackInitMForF	[a-zA-Z][a-zA-Z0-9₩_]*	DemInitMonitorForSWC
DemCallbackDTCStatusChangedFnc	DemCallbackDTCStatusChanged		Rte_Call_CallbackDtcStatusChanged_1_DtcStatusChanged
DemDataElementReadFn	DemExternalCSDataElementClass		Rte_Call_CallbackReadData_1_ReadData
DemCallbackClearEventAllowedFnc	DemCallbackClearEventAllowed		Rte_Call_CallbackClearEventAllowed_1_ClearEventAllowed
DemCallbackEventDataChangedFnc	DemCallbackEventDataChanged		Rte_Call_CallbackEventDataChanged_1_EventDataChanged
DemCallbackEventStatusChangedFnc	DemCallbackEventStatusChanged		Rte_Call_CallbackEventStatusChanged_1_EventStatusChanged
DemCallbackInitMForEFnc	DemCallbackInitMForE		DemInitMonitorForSWC
DemCallbackGetFDCFnc	DemCallbackGetFDC		DemInitMonitorForSWC

ERR054008: The parameter 'Parameter Name' of the container 'Container Name' should not be configured as <Value> when the parameter 'Dependent Parameter Name' of the container 'Dependent Container Name' is configured as <Dependent Value>.

This error occurs, if the parameters are configured as values when the dependent parameters are configured as dependent values in the table mentioned below.

Parameter Name	Container Name	Value	Dependent Parameter Name	Dependent Container	Dependent Value
DemCallbackDTCStatusChangedFnc	DemCallbackDTCStatusChanged	Dcm_DemTriggerOnDTCStatus	DemTriggerDcmReports	DemGeneral	true

ERR054013: The reference path <Reference Path> provided for the parameter 'Parameter Name' in the container 'Container Name', having short name <Container Short Name> is incorrect.

This error occurs, if incorrect reference path is configured for parameter 'Parameter Name' in the 'Container Name'.

Container Name	Parameter Name
DemEventClass	DemOperationCycleRef

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Container Name	Parameter Name
DemIndicatorAttribute	DemIndicatorHealingCycleRef
	DemIndicatorRef
DemPidDataElement	DemPidDataElementClassRef
DemDidClass	DemDidDataElementClassRef
DemEnableConditionGroup	DemEnableConditionRef
DemExtendedDataClass	DemExtendedDataRecordClassRef
DemExtendedDataRecordClass	DemDataElementClassRef
DemFreezeFrameClass	DemDidClassRef
DemRatioId	DemDiagnosticEventRef
	DemFunctionIdRef
DemStorageConditionGroup	DemStorageConditionRef
DemNvRamBlockId	DemNvRamBlockIdRef
DemGeneralOBD	DemOBDInputAcceleratorPaddleInformation
	DemOBDInputAmbientPressure
	DemOBDInputAmbientTemperature
	DemOBDInputDistanceInformation
	DemOBDInputEngineSpeed
	DemOBDInputEngineTemperature
	DemOBDInputProgrammingEvent
	DemOBDInputVehicleSpeed

ERR054023: Parameter 'Dependent Parameter Name' in the container 'Dependent Container Name' should be configured, since value of the parameter 'Parameter Name' in the container 'Container Name' is configured as <Original Value>.

This error occurs if, Dependent parameters are configured and parameters are configured as values as mentioned in the below table.

Dependent Parameter Name	Dependent Container Name	Parameter Name	Container Name	Original
DemAgingCycleCounterThreshold	DemEventClass	DemAgingAllowd	DemEventClass	1
DemAgingCycleRef		DemAgingAllowd		
DemMILIndicatorRef	DemGeneral	DemOBDSupport	DemGeneral	
DemImmediateNvStorageLimit		DemImmediateNvStorage	DemDTCClass	

ERR054051: Value configured for the parameter 'DemEventId' of the container 'DemEventParameter' should start with <1> and should be sequential with in a configuration set.

This error occurs if, Value configured for the parameter 'DemEventId' of the container 'DemEventParameter' does not start with <1> and is not sequential with in a configuration set.

ERR054052: Value configured for the parameter 'DemFreezeFrameRecordNumber' should be unique within the container 'DemFreezeFrameRecNumClass'.

This error occurs if, value of the parameter DemFreezeFrameRecordNumber is repeated.

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ERR054053: Parameter 'Dependent Parameter Name' of the container 'Dependent Container Name' should be configured, since value of the parameter 'Parameter Name' of the container 'Container Name' is configured as <Value>.

This error occurs if, Dependent Parameters are not configured and Parameters are configured as values as mentioned in the below table.

Dependent Parameter Name	Dependent Container Name	Parameter Name	Container Name	Value
DemMaxNumberFreezeFrameRecords	DemEventParameter	DemTypeOfFreezeFrameRecordNumeration	DemGeneral	DEM_FF_RECNUM_CALCULATED
DemFreezeFrameRecNumClassRef				DEM_FF_RECNUM_CONFIGURED

ERR054054: Parameter 'Dependent Parameter Name' of the container 'Dependent Container Name' should be configured, since the parameter 'Parameter Name' of the container 'Container Name' is configured.

This error occurs if, Dependent Parameters are not configured and Parameters are configured as mentioned in the below table.

Dependent Parameter Name	Dependent Container Name	Parameter Name	Container Name
DemExtendedDataCapture	DemGeneral	DemExtendedDataClassRef	DemEventParameter
DemFreezeFrameCapture		DemFreezeFrameClassRef	

ERR054055: The container 'Container Name' should be configured when the parameter 'DemOBDSupport' of the container 'DemGeneral' is configured as true.

This error occurs if, DemPidClass or DemGeneralOBD is not configured and DemOBDSupport is equal to true.

Container Name
DemGeneralOBD
DemPidClass

ERR054056: Value configured for the parameter 'Parameter Name' of the container 'Container Name' should be unique.

This error occurs if, value of the parameters mentioned in the below table are repeated.

Parameter Name	Container Name
DemEventId	DemEventParameter

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Parameter Name	Container Name
DemIndicatorID	DemEventClass
DemObdDTC	DemDTCClass
DemUdsDTC	DemDTCClass
DemEnableConditionId	DemEnableCondition
DemStorageConditionId	DemStorageCondition
DemOperationCycleType	DemOperationCycle

ERR054057: Value configured for the parameter 'DemDTCClassRef' in the container 'DemEventParameter' should be unique, when the parameter 'DemEventCombinationSupport' is configured as 'DEM_EVCOMB_DISABLED'.

This error occurs if, value of the parameter DemDTCClassRef is repeated and DemEventCombinationSupport is configured as DEM_EVCOMB_DISABLED.

ERR054058: Value configured for the parameter 'DemGroupDTCs' in the container 'DemGroupOfDTC' should not be the same as the value configured for parameters 'DemObdDTC' and 'DemUdsDTC' in the container 'DemDTCClass'.

This error occurs if, value of the parameter DemGroupDTCs is same as value of DemObdDTC or value of DemUdsDTC

ERR054059: Value configured for the parameter 'Parameter Name' of the container 'Container Name' should start with <0> and should be sequential with in a configuration set.

This error occurs if, value of the parameters mentioned in the below table are not sequential and does not start from 0.

Parameter Name	Container Name
DemEnableConditionId	DemEnableCondition
DemStorageConditionId	DemStorageCondition

ERR054060: Number of GroupOfDtc's configured should be four.

This error occurs if, Number of GroupOfDtc's configured should is other than 4.

ERR054061: The Parameter 'DemMainEvent' in the container 'DemEventParameter' should not be configured as <true/1>, for more than one event when, two or more events refer to same DTCClass.

This error occurs if, The Parameter 'DemMainEvent' in the container 'DemEventParameter' is configured as <true/1>, for more than one event when, two or more events refer to same DTCClass.

ERR054062: Parameter 'DemMainEvent' in the container 'DemEventParameter' should be configured as

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<true/1> for at least one event per DTCClass when, parameter 'DemEventCombinationSupport' is configured as DEM_EVCOMB_TYPE1 or DEM_EVCOMB_TYPE2.

This error occurs if, Parameter 'DemMainEvent' in the container 'DemEventParameter' is not configured as <true/1> for at least one event per DTCClass when, parameter 'DemEventCombinationSupport' is configured as DEM_EVCOMB_TYPE1 or DEM_EVCOMB_TYPE2.

ERR054063: Parameter DemFreezeFrameClassRef in the container 'DemEventParameter' should be configured, when parameter 'DemMainEvent' is configured as <true/1>, in the container 'DemEventParameter' having short name <Container Short Name>. MainEvent should contain FreezeFrames.

This error occurs if, Parameter DemFreezeFrameClassRef in the container 'DemEventParameter' is not configured, when parameter 'DemMainEvent' is configured as <true/1>, in the container 'DemEventParameter' having short name <Container Short Name>.

ERR054064: Parameter DemFreezeFrameClassRef in the container 'DemEventParameter' should not be configured, when parameter 'DemMainEvent' is configured as <false/0>, in the container 'DemEventParameter' having short name <Container Short Name>. SubEvent should not contain FreezeFrames.

This error occurs if, Parameter DemFreezeFrameClassRef in the container 'DemEventParameter' is configured, when parameter 'DemMainEvent' is configured as <false/0>, in the container 'DemEventParameter' when, DemEventCombinationSupport is set as DEM_EVCOMB_TYPE1.

ERR054065: Parameter DemFreezeFrameClassRef in the container 'DemEventParameter' should not be configured, when parameter 'DemMainEvent' is configured as <true/1>, in the container 'DemEventParameter' having short name <Container Short Name>. MainEvent should not contain FreezeFrames.

This error occurs if, Parameter DemFreezeFrameClassRef in the container 'DemEventParameter' is configured, when parameter 'DemMainEvent' is configured as <true/1>, in the container 'DemEventParameter' when, DemEventCombinationSupport is set as DEM_EVCOMB_TYPE2.

ERR054066: Parameter DemFreezeFrameClassRef in the container 'DemEventParameter' should be configured, when parameter 'DemMainEvent' is configured as <false/0>, in the container 'DemEventParameter' having short name <Container Short Name>. SubEvent should contain FreezeFrames.

This error occurs if, Parameter DemFreezeFrameClassRef in the container 'DemEventParameter' is not configured, when parameter 'DemMainEvent' is configured as <false/0> when, DemEventCombinationSupport is set as DEM_EVCOMB_TYPE2.

ERR054069: In Dem related NvM blocks, parameter 'NvMSelectBlockForReadAll' in the container 'NvMBlockDescriptor' should be all 'true' or all 'false'.

This error occurs if, Parameter 'NvMSelectBlockForReadAll' in the container ''NvMBlockDescriptor' is configured 'true' and 'false' together in Dem related NvM blocks. Parameter 'NvMSelectBlockForReadAll' of these blocks should be all 'true' or all 'false'.

ERR054069: Value configured for the parameter 'IndicatorId' of the container 'Indicator' should start with <0> and should be sequential with in a configuration set.

This error occurs if, values of the IndicatorId are not sequential and does not start from 0.

ERR054070: When Parameter 'Parameter Name' reference to 'Container Name'. Parameter 'NvMRamBlockDataAddress' in container 'Container Name' of NvM module must be configured."

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Parameter Name	Container Name
DemPrimaryEventMemoryNvBlockIdRef	NvMBlockDescriptor
DemSecondaryEventMemoryNvBlockIdRef	NvMBlockDescriptor
DemPermanentEventMemoryNvBlockIdRef	NvMBlockDescriptor

This error occurs if, values of NvMRamBlockDataAddress in NvM module is not configured.

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8.2.2 Warning Messages

WRN054004: Parameter 'Dependent Parameter Name' in the container 'Dependent Container Name' should be configured, since value of the parameter 'Parameter Name' in the container 'Container Name' is configured as <Original Value>.

This warning occurs, if Dependent parameters in the below mentioned table are not configured and parameters in the below mentioned table are configured as true.

Dependent Parameter Name	Dependent Container Name	Parameter Name	Container Name	Original Value
DemEnableConditionGroupRef	DemEventClass	DemEnableConditionSupport	DemGeneral	1
DemStorageConditionGroupRef		DemStorageConditionSupport		

WRN054051: Parameter 'DemTypeOfDTCSupported' of the container 'DemGeneral' should be configured as either DEM_DTC_TRANSLATION_ISO15031_6 or DEM_DTC_TRANSLATION_ISO14229_1, since the parameter 'DemOBDSupport' of the container 'DemGeneral' is configured as true.

This warning occurs, if DemTypeOfDTCSupported' is neither configured as DEM_DTC_TRANSLATION_ISO15031_6 nor DEM_DTC_TRANSLATION_ISO14229_1 and DemOBDSupport is true.

WRN054052: The container 'Container Name' should not be configured when the parameter 'DemOBDSupport' in the container 'DemGeneral' is configured as false.

This warning occurs, if DemPidClass or DemGeneralOBD is configured and DemOBDSupport is false.

Container Name
DemPidClass
DemGeneralOBD

WRN054053: Parameter 'Dependent Parameter Name' of the container 'Dependent Container Name' should not be configured, since value of the parameter 'Parameter Name' of the container 'Container name' is configured as false.

This warning occurs, if Dependent parameters in the below mentioned table are configured and parameters in the below mentioned table are configured as false.

Dependent Parameter Name	Dependent Container Name	Parameter Name	Container Name
DemAgingCycleCounterThreshold	DemEventClass	DemAgingAllowed	DemEventClass
DemAgingCycleRef			

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Dependent Parameter Name	Dependent Container Name	Parameter Name	Container Name
DemEnableConditionGroupRef		DemEnableConditionSupport	DemGeneral
DemStorageConditionGroupRef		DemStorageConditionSupport	
DemMILIndicatorRef	DemGeneral	DemOBDSupport	

WRN054054: Parameter 'Dependent Parameter Name' of the container 'Dependent Container Name' should not be configured, since value of the Parameter 'Parameter Name' of the container 'Container Name' is configured as <Value>.

This warning occurs, if Dependent Parameters are configured and Parameters are not configured as values as mentioned in the below table.

Dependent Parameter Name	Dependent Container Name	Parameter Name	Container Name	Value
DemMaxNumberFreezeFrameRecords	DemEventParameter	DemTypeOfFreezeFrameRecordNumeration	DemGeneral	DEM_FF_RECNUM_CALCULATED
DemFreezeFrameRecNumClassRef				DEM_FF_RECNUM_CONFIGURED

WRN054055: Parameter 'Dependent Parameter Name' of the container 'Dependent Container Name' should not be configured, since value of the parameter 'Parameter Name' of the container 'Container Name' is not configured.

This warning occurs, if Dependent Parameters are configured and Parameters are not configured as mentioned in the below table.

Dependent Parameter Name	Dependent Container Name	Parameter Name	Container Name
DemExtendedDataCapture	DemGeneral	DemExtendedDataClassRef	DemEventParameter
DemFreezeFrameCapture		DemFreezeFrameClassRef	

WRN054057: The number of instances configured for the container DemNvRamBlockId should be greater than or equal to two.

This warning occurs, the number of instances configured for the container DemNvRamBlockId is less than two.

WRN054067: Parameter 'DemEventFailureCycleRef' should be configured since, parameter 'DemEventFailureCycleCounterThreshold' is configured in the container 'DemEventClass'.

This error occurs if, Parameter 'DemEventFailureCycleRef' is not configured when parameter 'DemEventFailureCycleCounterThreshold' is configured in the container 'DemEventClass'.

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8.2.3 Information Messages

INF054015: AUTOSAR Release version <value of the element AR-RELEASE-VERSION> configured for the parameter 'AR-RELEASE-VERSION' in provided MDT file is not correct. AUTOSAR Release version should be one of the following: 4.0.3.
This information message occurs, if the value of the element AR-RELEASE-VERSION present in the BSW Module Description template is configured other than 4.0.3.

INF054016: 'Container Name' sorting wrong in configuration file. Dem generator sort 'Container Name' itself.
For example: When 'Container Name' refer to 'NvM Container Name'. Index of 'Container Name' should be configured same with index value of configuration array in parameter 'NvMRamBlockDataAddress' of NvM module.

Parameter Name	Container Name	NvM Container Name
DemPrimaryEventMemoryNvBlockIdRef	DemPrimaryEventMemory	NvMBlockDescriptor
DemSecondaryEventMemoryNvBlockIdRef	DemSecondaryEventMemory	NvMBlockDescriptor
DemPermanentEventMemoryNvBlockIdRef	DemPermanentEventMemory	NvMBlockDescriptor

This information message occurs, if the 'Container Name' is not configuration sequential and mismatch with the configuration index in NvM module.

9 Det Error

Detected development errors shall be reported to the Det_ReportError() service of the Development Error Tracer (DET) if Det error detection is enabled.

There is only one operation used as service from Development Error Tracer. In C-style, it looks as follows:
Std_ReturnType Xxx_ReportError(uint8 InstanceId, uint8 ApiId, uint8 ErrorId);
Note: ModuleId can be used in "port defined argument value".

9.1 Error classification

The following errors shall be detectable by the Dem module depending on its configuration (development / production mode

Type or error	*Relevance*	*Related error code*	*Value [hex]*
API function called with a parameter value, which is not allowed by active configuration	Development	DEM_E_PARAM_CONFIG	0x10
API function called with a NULL pointer	Development	DEM_E_PARAM_POINTER	0x11
API function called with wrong parameter value	Development	DEM_E_PARAM_DATA	0x12
API function called with wrong length parameter value	Development	DEM_E_PARAM_LENGTH	0x13
API function called before the Dem module has been full initialized (refer to Dem124, Dem364)	Development	DEM_E_UNINIT	0x20
No valid data available by the SW-C	Development	DEM_E_NODATAAVAILABLE	0x30

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Type or error	*Relevance*	*Related error code*	*Value [hex]*
Required conditions for the respective API call are not fulfilled (e.g. an invalid status change was initiated, or a filter was not set correctly, etc. – refer to Dem518).	Development	DEM_E_WRONG_CONDITION	0x40

9.2 Service ID

Dem Function Name	*Serivce ID[hex]*
Dem_GetVersionInfo	0x00
Dem_Init	0x02
Dem_Shutdown	0x03
Dem_SetEventStatus	0x04
Dem_ResetEventStatus	0x05
Dem_PrestoreFreezeFrame	0x06
Dem_ClearPrestoredFreezeFrame	0x07
Dem_SetOperationCycleState	0x08
Dem_GetEventStatus	0x0a
Dem_GetEventFailed	0x0b
Dem_GetEventTested	0x0c
Dem_GetDTCOfEvent	0x0d
Dem_GetSeverityOfDTC	0x0e
Dem_ReportErrorStatus	0x0f
Dem_SetDTCFilter	0x13
Dem_GetStatusOfDTC	0x15
Dem_GetDTCStatusAvailabilityMask	0x16
Dem_GetNumberOfFilteredDTC	0x17
Dem_GetNextFilteredDTC	0x18
Dem_GetDTCByOccurrenceTime	0x19
Dem_DisableDTCRecordUpdate	0x1a
Dem_EnableDTCRecordUpdate	0x1b
Dem_GetFreezeFrameDataByDTC	0x1d
Dem_GetExtendedDataRecordByDTC	0x20
Dem_GetSizeOfExtendedDataRecordByDTC	0x21
Dem_ClearDTC	0x22
Dem_GetIndicatorStatus	0x29
Dem_MainFunction	0x55
Dem_SetEnableCondition	0x39
Dem_GetNextFilteredRecord	0x3a
Dem_GetNextFilteredDTCAndFDC	0x3b
Dem_GetNextFilteredDTCAndSeverity	0x3d
Dem_GetTranslationType	0x3c

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Dem Function Name	*Serivce ID[hex]*
Dem_GetFaultDetectionCounter	0x3e
Dem_SetEventDisabled	0x51
Dem_GetEventMemoryOverflow	0x32
Dem_SetStorageCondition	0x38
Dem_GetEventExtendedDataRecord	0x30
Dem_GetEventFreezeFrameData	0x31
Dem_SetDTCSuppression	0x33
Dem_SetFreezeFrameRecordFilter	0x3f
Dem_GetFunctionalUnitOfDTC	0x34
Dem_GetFreezeFrameDataByRecord	0x1c

10 Appendix

10.1 Diagnostic Monitor

It is a test module (user application) to determine if a component or a system works properly.
It classifies errors/manfunctioning in components and systems (circuits, etc) into specific fault types (bus off, oped load, etc.). It is connected to one diagnostic event.

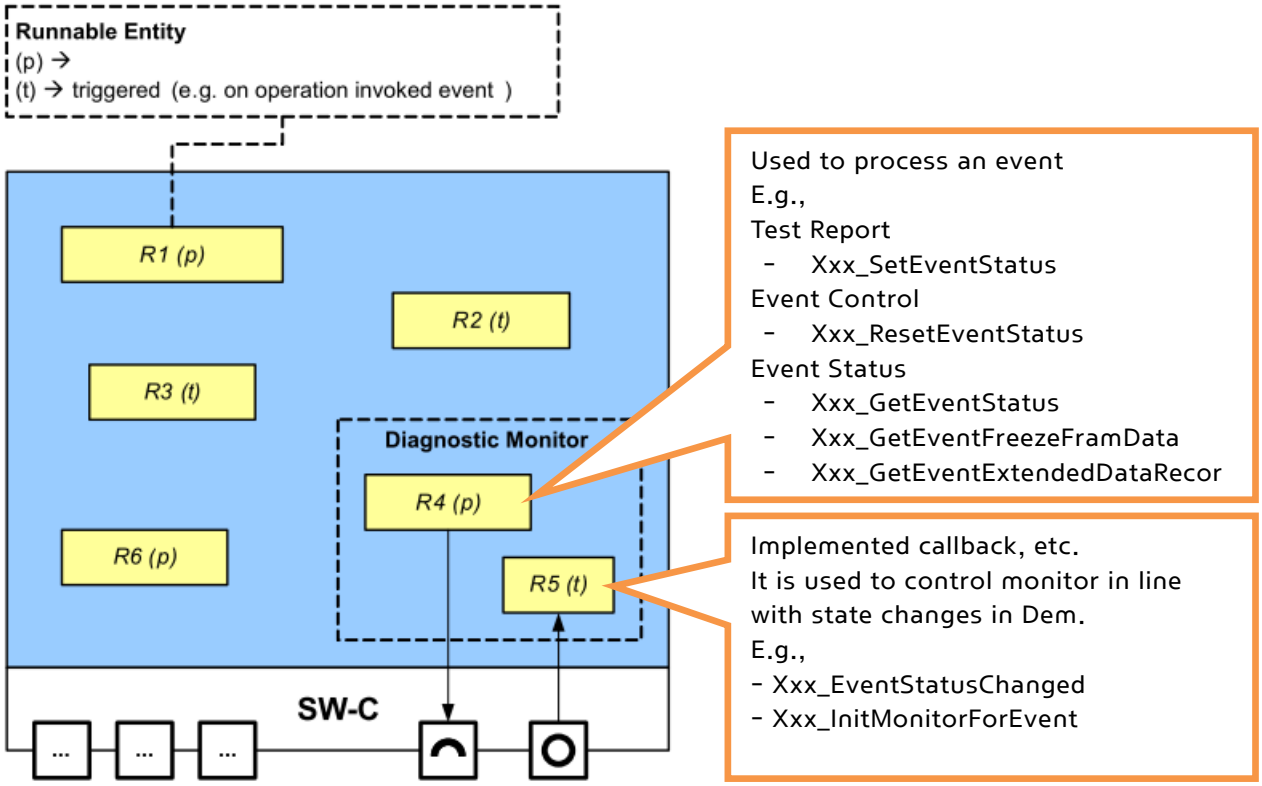

Figure 1 : Example for a monitor embedded within a SW-C(from the Dem specification)

10.2 Operation Cycle

It is a unit of period to process an diagnostic event. ECU can support several operation cycles and the start and the end of each cycle are controlled in application. An operation cycle connected to a diagnostic event is controlled through RTE (start/end).

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The default operation cycle types are defined as follows.

- Ignition on/off cycle (DEM_OPCYC_IGNITION)
- Power up/power down cycle(DEM_OPCYC_POWER)
- OBD driving cycle(DEM_OPCYC_OBD_DCY)
- Engine warm up cycle(DEM_OPCYC_WARMUP)
- Time based operation cycle (DEM_OPCYC_TIME)

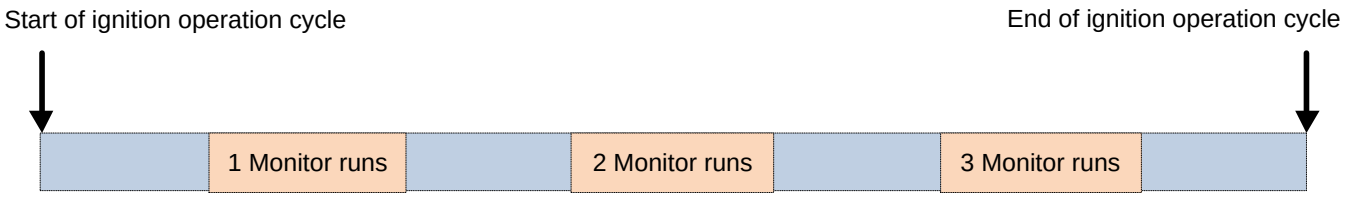

Figure 2: Relationship between Operation Cycle and Monitor Application

Dem makes the following processing considering the state of operation cycle allocated to a diagnostic event.

After start of Operation cycle, the diagnostic event reported in SW-Cs(SetEventStatus Operation)/BSW module (Dem_ReportErrorStatus API) is processed. If the operation cycle ends, a diagnostic event will be ignored even if it is reported.

<pseudo code>

```
void IGN_ON(void)
{
    Rte_Call_OpCycle_IGN_SetOperationCycleState(DEM_CYCLE_STATE_START);
}
void IGN_OFF(void)
{
    Rte_Call_OpCycle_IGN_SetOperationCycleState(DEM_CYCLE_STATE_END);
}
```

10.3 UDS DTC status

UDS DTC status bits defined in ISO 14229-1 [17]

Bit	Status	Description
0	TestFailed	Result of the latest test. Or it also indicates the current status of failure. 1: Failed, 0: Passed
1	TestFailedThisOperationCycle	1: Test was run during the current operation cycle and it has been failed at least once. 0: It has never been failed during the current operation cycle. Yet bit 1 does not indicate whether testing has been done or not. TestNotCompletedThisOperationCycle should be checked to see whether testing was done or not.

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2	PendingDTC	It has been reported as Failed during the current or the latest Operation Cycle. The criteria for pendingDTC bit and TestFailedThisOperationCycle bit to be 1 are same. Difference: (1) TestFailedThisOperationCycle is initialized when operation starts. (2) pendingDTC is initialized when operation ends with no record of failed during the operation.
3	ConfirmedDTC	It becomes 1 if the diagnostic event repeatedly fails during several operation cycles. Or it can also indicate past failure. It can be 1 immediately upon reporting of failed depending on the configuration.
4	TestNotCompletedSinceLastClear	Whether the test is run after ClearDiagnosticInformation or not 1: Never tested 0: Tested at least once
5	TestFailedSinceLastClear	After ClearDiagnosticInformation 1: Test was failed at least once 0: Never failed. Yet bit 5 does not indicate whether testing has been done or not. Execution of test should be checked through TestNotCompletedSinceLastClear.
6	TestNotCompletedThisOperationCycle	Whether test was executed during the current operation cycle or not 1: Never tested 0: Tested at least once
7	WarningIndicatorRequested	Status of Indicator (lamp, etc.) allocated to DTC It becomes 1 if the diagnostic event repeatedly fails during several operation cycles. It can be 1 immediately upon reporting of failed depending on the configuration.

10.4 Cautions in using Operation(API)

10.4.1 Operation SetOperationCycleState(Dem_OperationCycleStateType CycleState)

When SetOperationCycleState is called, the followings should not be in action.

- SetEventStatus
- ResetEventStatus

10.4.2 Operation SetEventStatus(Dem_EventStatusType EventStatus)

SetEventStatus does not guarantee Reentrancy.

10.4.3 Check return value of operation

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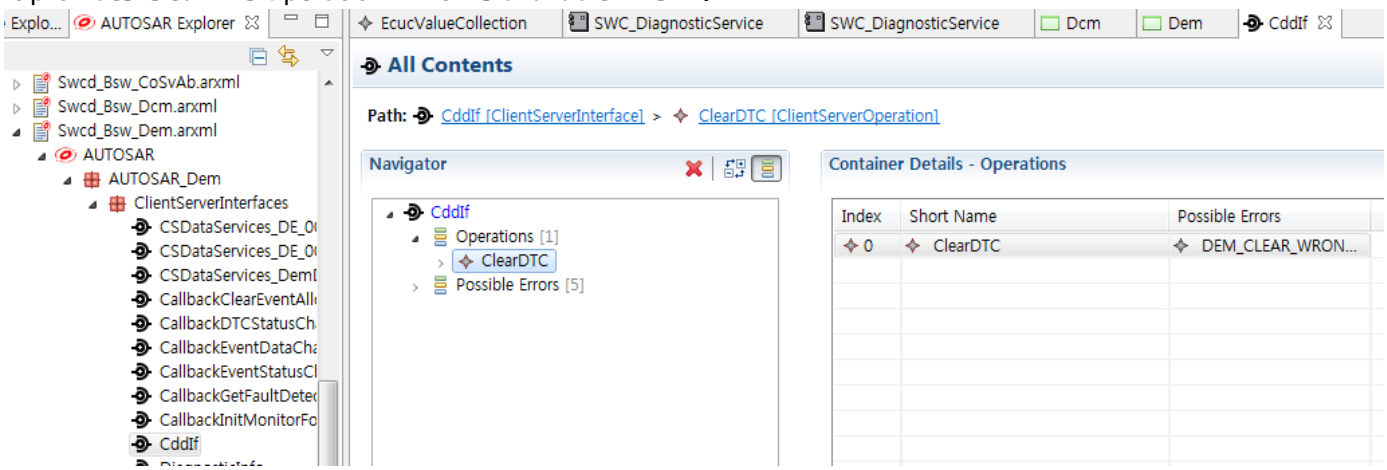
Operation SetEventStatus, Operation SetOperationCycleState, etc. may return Xxx_E_NOT_OK depending on circumstances.
Therefore, return value should be checked all the time.

(1) When Operation SetEventStatus returns Xxx_E_NOT_OK
- EnableCondition
- When DisableDTCSetting is in service
- When ClearDiagnosticInformation is in service
- When OperationCycle is not started yet
- When the value of a factor is not valid
- When the Dem module is not initialized yet

(3) When Operation SetOperationCycleState returns Xxx_E_NOT_OK
- When ClearDiagnosticInformation is in service
- When the value of a factor is not valid
- The Dem module is not initialized yet

10.5 ClearDTC Operation(API)

It provides ClearDTC Operation which is available in CDD.



How to use:

(1) Set up Require Port, Assembly Sw Connector, etc.
*See RTE and Tool manual for port setting and connection

(2) See Chapter 7.2.20.1 for operation prototype

(3) After calling API, return value should be checked and if it is DEM_CLEAR_PENDING, the ClearDTC function should be kept calling with the same parameters until completion. Do not call the ClearDTC function with new parameters until the previous ClearDTC operation is completed.

(4) Pseudo Code
*The following codes are samples and only for reference to ease users understanding.

```
Boolean RequestClearDTC = true;

Void PeriodicTask_ClearDTC(void)
{
    If ( true == RequestClearDTC)
    {
        Std_ReturnType returnValue;
        /*
```

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```
        DEM_CLEAR_WRONG_DTC : Wrong DTC was used as input parameter
        DEM_CLEAR_WRONG_DTCORIGIN : Wrong DTCOrigin was used as Input parameter
        DEM_CLEAR_FAILED:* Failed to clear DTC
        DEM_CLEAR_PENDING
          1. As ClearDTC is an asynchronous function, it returns DEM_CLEAR_PENDING until the operation is
             complete.
          2. DTC is being cleared by the ClearDiagnosticInformation service.
        */
        returnValue = Rte_Call_Xxx_ClearDTC(DEM_DTC_GROUP_ALL_DTCS, DEM_DTC_FORMAT_UDS,
        DEM_DTC_ORIGIN_PRIMARY_MEMORY);

        if (DEM_CLEAR_PENDING == returnValue)
        {
            /* if the return value is DEM_CLEAR_PENDING
             Xxx_ClearDTC Operation should be called until completion. */
        }
        else
        {
          RequestClearDTC = 0;
        }
    }
}
```

10.6 NvM Block Length Validation

This feature validates the NvBlockLength setting in the NvM Block used in Dem.

Structured variables Dem_EventStatusNvRamData , Dem_NonVolatileData, Dem_PrimaryEventMemory[n], Dem_SecondaryEventMemory[n], etc. are supposed to have different sizes depending on Dem settings.
Therefore the length of the corresponding NvM Block should be changed, too.

If the actual size of the structured variable and the length of the corresponding NvM Block do not match in Dem,
compiler error will occur.

Users should modify the NvBlockLength referring to the following code **[Dem_Cfg.c]**.

```
/*******************************************************************************
 * Checks the length of th NvM Block NvMBlock_ManagementBlock
 * Configured NvBlockLength : 10
 * Valid NvBlockLength      : 10
 *******************************************************************************/
DEM_STATIC_ASSERT(offsetof(Dem_GenericNvRamDataType, endOfStructure) == 10, Invalid_NvBlockLength);
/*******************************************************************************
 * Checks the length of th NvM Block NvMBlock_EventStatusNvRamBlock
 * Configured NvBlockLength : 412
 * Valid NvBlockLength      : 411
 *******************************************************************************/
DEM_STATIC_ASSERT(offsetof(Dem_EventStatusNvRamDataType, endOfStructure) == 412, Invalid_NvBlockLength);
/*******************************************************************************
 * Checks the length of th NvM Block NvMBlock_PrimaryEventMemory0
 * Configured NvBlockLength : 18
 * Valid NvBlockLength      : 15
 *******************************************************************************/
DEM_STATIC_ASSERT(offsetof(Dem_EventMemoryEntryType, endOfStructure) == 18, Invalid_NvBlockLength);
```

* **Configured NvBlockLength** : 10
-> Indicate the current length set.
* **Valid NvBlockLength** : 10
-> Indicate the size of the actual structured variable. The NvBlockLength should be changed to this value.

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The size presented in **[Valid NvBlockLength]** may differ from map file, etc. This is because the following calculation formula is used to respond to various MCU and compilers.

```
/*******************************************************************************
 * Numeration
 *
 * [Example]
 *
 * struct s2 {
 *   uint32 a;
 *   uint16 b;
 *   uint8  c[2];
 *   uint8  end; 'end' of structure s2 uses to calculate the length.
 * } x;
 *
 * The following diagram shows how the compiler will allocate x using
 * its 4 bytes alignment.
 * +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
 * |  0  |  1  |  2  |  3  |  4  |  5  |  6  |  7  |  8  |  9  |  10 |  11 |
 * +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
 * |       a               |     b     | c[0]| c[1]| end |padding bytes(*1)|
 * +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
 * |      real length                              |     not used bytes    |
 * +-----------------------------------------------+-----------------------+
 * *1) Depending on the compiler and the machine, Padding bytes may vary.
 *
 * real length of s2 = offsetof(struct s2, end) = 8.
 * Note : This value differs from the value of a map file.
 *******************************************************************************/
```

10.7 Recommendations related to NvM Block

10.7.1 Re-run of BswM Harmonize upon change to NvM ReadAll/WriteAll properties in NvM settings

If ReadAll/WriteAll properties in NvM block used in Dem are changed, BswM Harmonize should be run again.

10.7.2 Recommendation to use the NvM ReadAll/WriteAll feature

It is recommended to use ReadAll/WriteAll for all NvM blocks used in Dem.

10.7.3 Recommendation to use NvM CRC and Redundant block

It is recommended to use CRC and Redundant data block for all NvM blocks used in Dem.

If ECU power is off before NvM writes all data in NvRam, validity of the data is not guaranteed.
For this reason, it is recommended to use Redundant data block.

Also, it is recommended to use CRC for validation of the data.

10.8 Cautions related to NvM Block

10.8.1 Cautions when using NvM ReadAll

If ReadAll is used, startup time may increase if ReadAll is set up only for some blocks. Therefore, it should be set up for all blocks.

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10.8.2 Cautions when setting Event Memory NvM

The NvRam Block Id set in the Dem Event Memory will be successfully saved and read in NvRam only when Ram Block Data Addresses is set with the same event memory in the NvM settings.

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