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|  | | AEE-C | Mihai Ianos, Daniel Andris, | 2 |  |  |  |
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**SW Architecture Design & Interface Description :**

**EOL sw UNIT**

OBJECT: This document is the description of the design & interfaces for *EOL* SW unit.

SUMMARY: This document provides a high-level view of the *EOL* SW unit. The inputs of this document are provided by the software requirement. It is linked to the *DAIMLER\_MMA*\_SWarchitectureDesignInterfaceDescription document.

CONCLUSION: Applicable from **R02.0** SW release

**THIS DOCUMENT CONTAINS HIDDEN TEXT**

EVOLUTION OF THE DOCUMENT

|  |  |  |  |
| --- | --- | --- | --- |
| **Revision** | **Date** | **Author** | **Motive and nature of the modifications** |
| 1 | 31/08/2016 | C. Redon | First release (extract from the full PP4G architecture document) |
| Start extended description based on mainstream document | | | | |
| 1.1.1.2 | 11/07/2019 | A. Vaché | Update traceability to match PP4G extended platform requirements IDs |
| 1.1.1.3 | 08/08/2019 | A. Vaché | Solve some traceability issues highlighted by reqtify |
| Start DAI MMA description based on extended document | | | | |
| 1.1.1.4.2 | 06/06/2022 | S. Dominte | Initial revision |
| 1.1.1.4.3 | 14/06/2022 | S. Dominte | Document updated after review |
| 1.1.1.4.4 | 15/06/2022 | S. Dominte | Added NVP thresholds and their values |
| 1.1.1.4.5 | 15/06/2022 | S. Dominte | Updated chapter 1.2 and 1.3. |
| 1.1.1.4.6 | 22/08/2022 | S. Dominte | Updated for 3.0 release |
| 1.1.1.4.7 | 22/08/2022 | S. Dominte | Original Id for DES requirement updated. |
| 1.1.1.4.8 | 26/08/2022 | S. Dominte | Traceability updated. |
| 1.1.1.4.9 | 08/11/2022 | A. Negrea | Update for 4.0 release |
| 1.1.1.4.10 | 18/11/2022 | A. Negrea | Update after review |
| 1.1.1.4.11 | 13/12/2022 | S. Dominte | Update for 5.0 release |
| 1.1.1.4.12 | 06/02/2023 | S. Dominte | Update the called function list. |
| 1.1.1.4.13 | 08/02/2023 | S. Dominte | Runnable list updated |
| 1.1.1.4.14 | 08/02/2023 | S. Dominte | Static description updated |
| 1.1.1.4.15 | 27/04/2023 | S. Dominte | Update for 6.0 release |
| 1.1.1.4.16 | 21/06/2023 | M. Serban | Update for 6.1 release |
| 1.1.1.4.17 | 21/06/2023 | M. Serban | Updated traceability |

This document contains **17** pages.

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# Documentation

## Upper Level Relevant Documents

This section presents all the documents needed to write the software architecture design document.

|  |  |  |  |
| --- | --- | --- | --- |
| Nb | **Document** | **Reference** | **Company** |
|  | TF-A: To Manage the power supply | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_A\_To\_Manage\_The\_Power\_Supply | RBE/FCE |
|  | TF-B: To Manage the communication | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_B\_To\_Manage\_The\_Communication | RBE/FCE |
|  | TF-C: To Secure PP ECU functioning using Pictus MCU | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_C\_To\_Secure\_PP\_ECU\_Functioning\_Pictus | RBE/FCE |
|  | TF-E: To Manage Diagnostic Requests | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_E\_To\_Manage\_Diagnostic\_Requests | RBE/FCE |
|  | TF-F: To Perform Measurements | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_F\_To\_Perform\_Measurements | RBE/FCE |
|  | TF-G: To Drive the Motor | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_G\_To\_Drive\_the\_Motor | RBE/FCE |
|  | TF-H: To Perform Autotests | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_H\_To\_Perform\_Autotests | RBE/FCE |
|  | TF-I: To Manage the Failure | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_I\_To\_Manage\_The\_Failure | RBE/FCE |
|  | TF-J: To Manage NVM - NVP (Non Volatile Parameters) | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_J\_To\_Manage\_NVM | RBE/FCE |
|  | TF-K: To Ensure ECU Protection and Integration | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_K\_To\_Ensure\_ECU\_Protection\_And\_Integration | RBE/FCE |
|  | TF-L: To Ensure ECU Integration in Environment EMC ESD | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_L\_To\_Ensure\_ECU\_Integration\_In\_Environment\_EMC\_ESD | RBE/FCE |
|  | TF-N: To evaluate belt data | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_N\_To\_Evaluate\_Belt\_Data | RBE/FCE |
|  | TF-O: To schedule the SW | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_O\_To\_Run\_SW | RBE/FCE |
|  | TF-Q: To Provide Data For Expertise | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_Q\_To\_Provide\_Data\_For\_Expertise | RBE/FCE |
|  | TF-R: To Decide Belt Function Execution | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_R\_To\_Decide\_Belt\_Function\_Execution | RBE/FCE |
|  | TF-D: To Program MCU | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_D\_To\_Program\_MCU | RBE/FCE |
|  | TF-P: To handle network management | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_P\_To Handle\_Network\_Management | RBE/FCE |
|  | TF-S: To drive the boost | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_S\_To\_Drive\_Boost | RBE/FCE |
|  | TF-Q: To connect ECU | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_X\_To\_Connect\_ECU | RBE/FCE |
|  | TF-M: To generate time base | /RevAS/30\_DES\_Requirements/Technical Functions/  DES\_TF\_M\_To\_Generate\_Time\_Base | RBE/FCE |

## Design interface description Documents

This section presents all the documents that are linked to this software architecture design document.

Note: All links are related to S:\drive, to have them functional, please mount the S:\drive on your sandbox.

|  |  |  |  |
| --- | --- | --- | --- |
| **Nb** | **Document** | **Reference** | **Company** |
|  | EEPROM parameters | SBE\_4G\_NVP\_layout.xls | RBE/FCE |
|  | Design Interface description of AdcIf | N/A | RBE/FCE |
|  | Design Interface Description of Auto Tests Manager | [ATM-Design Interface Description.docx](ATM%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design Interface Description of Belt Function Decision | N/A | RBE/FCE |
|  | Design Interface Description of Belt Function Execution | [BFE - Design Interface Description.docx](file:///S:\Architectures\Application\Description\Associated_Documents\BFE%20-%20Design%20Interface%20Description%20.docx) | RBE/FCE |
|  | Design Interface Description of Belt Function Selection | [BFS - Design Interface Description.docx](file:///S:\Architectures\Application\Description\Associated_Documents\BFS%20-%20Design%20Interface%20Description%20.docx) | RBE/FCE |
|  | Design Interface Description of Belt Movement Monitoring | N/A | RBE/FCE |
|  | Design Interface Description of Belt Parking Algorithm | N/A | RBE/FCE |
|  | Design Interface Description of Belt Slack Reduction | [BSR - Design Interface Description.docx](file:///S:\Architectures\Application\Description\Associated_Documents\BFS%20-%20Design%20Interface%20Description%20.docx) | RBE/FCE |
|  | Design Interface Description of Basic Software Manager | N/A | RBE/FCE |
|  | Design Interface Description of Basic Software Manager Interface | N/A | RBE/FCE |
|  | Design Interface Description of Can Tranceiver Interface | N/A | RBE/FCE |
|  | Design Interface Description of Communication Interaction Layer | [CIL - Design Interface Description.docx](file:///S:\Architectures\Application\Description\Associated_Documents\CIL%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design Interface Description of Diagnostic Communication Manager Interface | N/A | RBE/FCE |
|  | Design Interface Description of Diagnostic Event Manager Interface | N/A | RBE/FCE |
|  | Design Interface Description of DiagOnCAN services management | [DIA - Design Interface Description.docx](file:///S:\Architectures\Application\Description\Associated_Documents\DIA%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design Interface Description of Electronic Control Unit Manager | N/A | RBE/FCE |
|  | Design Interface Description of Electronic Control Unit Manager Interface | N/A | RBE/FCE |
|  | Design Interface Description of End of life | [EOL - Design Interface Description.docx](file:///S:\Architectures\Application\Description\Associated_Documents\DIA%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design Interface Description of Error Handler | [ERH-Design Interface Description.docx](ERH%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design Interface Description of Haptic Warning | [HWA - Design Interface Description.docx](file:///S:\Architectures\Application\Description\Associated_Documents\DIA%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design Interface Description of Memory Integrity Control | N/A | RBE/FCE |
|  | Design Interface Description of Mode Management | [MMG - Design Interface Description.docx](file:///S:\Architectures\Application\Description\Associated_Documents\MMG%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design Interface Description of Network Management Interface | N/A | RBE/FCE |
|  | Design Interface Description of Non-Volatile Memory Interface | N/A | RBE/FCE |
|  | Design Interface Description of Non-Volatile Parameters | [NVP - Design Interface Description.docx](file:///S:\Architectures\Application\Description\Associated_Documents\NVP%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design Interface Description of Operating System Interface | N/A | RBE/FCE |
|  | Design Interface Description of Power Abstraction Layer | [PAL - Design Interface Description.docx](file:///S:\Architectures\Application\Description\Associated_Documents\PAL%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design Interface Description of Pre-Crash Master | N/A | RBE/FCE |
|  | Design Interface Description of Physical Measures Provider | [PMP - Design Interface Description.docx](file:///S:\Architectures\Application\Description\Associated_Documents\PMP%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design Interface Description of Port Interface | N/A | RBE/FCE |
|  | Design Interface Description of Pre Pre-Tensioning | [PRE - Design Interface Description.docx](file:///S:\Architectures\Application\Description\Associated_Documents\PMP%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design Interface Description of Production cycle function | N/A | RBE/FCE |
|  | Design Interface Description of Pulse Width Modulation Interface | N/A | RBE/FCE |
|  | Design Interface Description of Reset Cause Management | NA | RBE/FCE |
|  | Design Interface Description of SBC | N/A | RBE/FCE |
|  | Design Interface Description of System Context Management | N/A | RBE/FCE |
|  | Design Interface Description of Standard Function Recovery (releasing function) | [SFR - Design Interface Description.docx](file:///S:\Architectures\Application\Description\Associated_Documents\SFR%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design Interface Description of Serial Peripheral Interface Interface | N/A | RBE/FCE |
|  | Design Interface Description of Startup | N/A | RBE/FCE |
|  | Design Interface Description of System Time Management | N/A | RBE/FCE |
|  | Design Interface Description of Vehicle Dynamics algorithm | N/A | RBE/FCE |

## Design Specification Documents

This section presents all the documents that complete this software architecture design document.

Note: All links are related to S:\drive, to have them functional, please mount the S:\drive on your sandbox.

|  |  |  |  |
| --- | --- | --- | --- |
| **Nb** | **Document** | **Reference** | **Company** |
|  | Design document of AdcIf | N/A | RBE/FCE |
|  | Design document of Auto Tests Manager | [ATM - Detailed Design Document.docx](file:///S:\Architectures\Application\Description\Associated_Documents\BFE%20-%20Design%20Interface%20Description%20.docx) | RBE/FCE |
|  | Design document of Belt Function Decision | N/A | RBE/FCE |
|  | Design document of Belt Function Execution | [BFE - Detailed Design Document.docx](file:///S:\Architectures\Application\Description\Associated_Documents\BFE%20-%20Design%20Interface%20Description%20.docx) | RBE/FCE |
|  | Design document of Belt Function Selection | [BFS - Detailed Design Document.docx](file:///S:\Architectures\Application\Description\Associated_Documents\BFS%20-%20Design%20Interface%20Description%20.docx) | RBE/FCE |
|  | Design document of Belt Movement Monitoring | [BMM - Detailed Design Document.docx](file:///S:\Architectures\Application\Description\Associated_Documents\BFE%20-%20Design%20Interface%20Description%20.docx) | RBE/FCE |
|  | Design document of Belt Parking Algorithm | N/A | RBE/FCE |
|  | Design document of Basic Software Manager Interface | N/A | RBE/FCE |
|  | Design document of Communication Interaction Layer | [BSR - Detailed Design Document.docx](file:///S:\Architectures\Application\Description\Associated_Documents\BFS%20-%20Design%20Interface%20Description%20.docx) | RBE/FCE |
|  | Design document of Diagnostic Communication Manager Interface | [CIL - Detailed Design Document.docx](file:///S:\Architectures\Application\Description\Associated_Documents\CIL%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design document of Diagnostic Event Manager Interface | N/A | RBE/FCE |
|  | Design document of DiagOnCAN services management | [DIA - Detailed Design Document.docx](file:///S:\Architectures\Application\Description\Associated_Documents\DIA%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design document of End of life | [EOL - Detailed Design Document.docx](file:///S:\Architectures\Application\Description\Associated_Documents\BFS%20-%20Design%20Interface%20Description%20.docx) | RBE/FCE |
|  | Design document of Error Handler | [ERH - Detailed Design Document.docx](file:///S:\Architectures\Application\Description\Associated_Documents\BFS%20-%20Design%20Interface%20Description%20.docx) | RBE/FCE |
|  | Design document of Haptic Warning | N/A | RBE/FCE |
|  | Design document of Memory Integrity Control | [HWA - Detailed Design Document.docx](file:///S:\Architectures\Application\Description\Associated_Documents\BFS%20-%20Design%20Interface%20Description%20.docx) | RBE/FCE |
|  | Design document of Mode Management | N/A | RBE/FCE |
|  | Design document of Network Management Interface | [MMG - Detailed Design Document.docx](file:///S:\Architectures\Application\Description\Associated_Documents\MMG%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design document of Non-Volatile Memory Interface | N/A | RBE/FCE |
|  | Design document of Non-Volatile Parameters | SBE\_4G\_NVP\_layout.xls | RBE/FCE |
|  | Design document of Power Abstraction Layer | [NVP - Detailed Design Document.docx](file:///S:\Architectures\Application\Description\Associated_Documents\NVP%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design document of Physical Measures Provider | [PAL - Detailed Design Document.docx](file:///S:\Architectures\Application\Description\Associated_Documents\PAL%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design document of Port Interface | [PMP - Detailed Design Document.docx](file:///S:\Architectures\Application\Description\Associated_Documents\PMP%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design document of Production cycle function | N/A | RBE/FCE |
|  | Design document of Reset Cause Management | N/A | RBE/FCE |
|  | Design document of RTE If | [RCM - Detailed Design Document.docx](file:///S:\Architectures\Application\Description\Associated_Documents\PMP%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  | Design document of System Context Management | N/A | RBE/FCE |
|  | Design document of Standard Function Recovery (releasing function) | N/A | RBE/FCE |
|  | Design document of Serial Peripheral Interface Interface | [SFR - Detailed Design Document.docx](file:///S:\Architectures\Application\Description\Associated_Documents\SFR%20-%20Design%20Interface%20Description.docx) | RBE/FCE |
|  |  | N/A |  |

## Tier2 Documents

This section presents all the documents that complete this software architecture design document.

|  |  |  |  |
| --- | --- | --- | --- |
| Nb | **Document** | **Reference** | **Company** |
|  |  |  |  |
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## HW Datasheet

This section presents all the documents related to the HW components that complete this software architecture design document.

|  |  |  |  |
| --- | --- | --- | --- |
| Nb | **Document** | **Reference** | **Company** |
|  | |  |  |  | | --- | --- | --- | | Infineon-TLE9471-3ES datasheet | TLE9461-3ES-Infineon.pdf | Infineon | | |  |  |  | | --- | --- | --- | | Infineon-TLE9471-3ES datasheet | TLE9461-3ES-Infineon.pdf | Infineon | | |  |  |  | | --- | --- | --- | | Infineon-TLE9471-3ES datasheet | TLE9461-3ES-Infineon.pdf | Infineon | |
|  |  |  |  |
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## Other Documents

This section presents all the documents that also have been needed to write this software architecture design document.

|  |  |  |  |
| --- | --- | --- | --- |
| Nb | **Document** | **Reference** | **Company** |
|  | Unified Modelling Language | 2.1.1 | OMG |
|  |  |  |  |
|  |  |  |  |

## Glossary And Definition

This section presents all the definitions and/or abbreviations used in this document.

*List of terms in alphabetical order:*

|  |  |
| --- | --- |
| ***Term*** | ***Meaning*** |
| ADC | Analog Digital Converter |
| AEC | Autoliv Error Code |
| API | Application Programming Interface |
| ASDM | Active Safety Domain Master |
| ASIC | Application Specific Integrated Circuit |
| ASY | Active SafetY |
| BSW | Basic SW modules |
| CAN | Controller Area Network |
| C/S | Chip Select |
| COP | Computer Operating Properly |
| eCPL | Electronic Crash Pole Locking |
| DART | Ditch - Airborne - Rough Terrain |
| DFLASH | Data FLASH |
| ECC | Error Code Correction |
| ECU | Electronic Control Unit |
| EOL | End Of Life |
| EEPROM | Electric Erasable and Programmable Read only Memory |
| HFPP | High Force Pre-Pre-Tensioning belt function |
| HF-PRE | High Force PRE pre-tensioning |
| HR | Hard Releasing |
| I/O | Input/Output |
| IMU | Inartial Measurements Unit |
| ISS | Integrated Safing System |
| LFPP | Low Force Pre-Pre-Tensioning belt function |
| MSA | Motor Start/Stop Automatic |
| MCAL | Micro-Controller Abstraction Layer |
| MCU | Micro-controller Unit |
| NMG | Mode ManaGement |
| NVM | Non Volatile Memory |
| OS | Operating System |
| PCM | Pre-Crash Master |
| PFLASH | Program FLASH |
| PIT | Periodic Interrupt Timer |
| PLL | Phase-locked loop |
| RAM | Random Access Memory |
| RCWM | Rear Collision Warning and Mitigation |
| RML | Left PP ECU |
| RMR | Right PP ECU |
| RMx | Both PP ECU |
| ROM | Read Only Memory |
| RSU | Remote Sensor Unit |
| RTE | Real Time Environment |
| RTOS | Real Time Operating System |
| SFR | Standard Function Recovery |
| SODL | Side Obstacle Detection Left |
| SPI | Serial Peripheral Interface |
| SRS | Supplementary Restraint System |
| TBC | To be confirmed |
| TBD | To be defined |
| TF | Technical Function |
| TFLASH | Test FLASH of the Pictus MCU (“one time programmable” memory) |
| W/D | Watchdog |

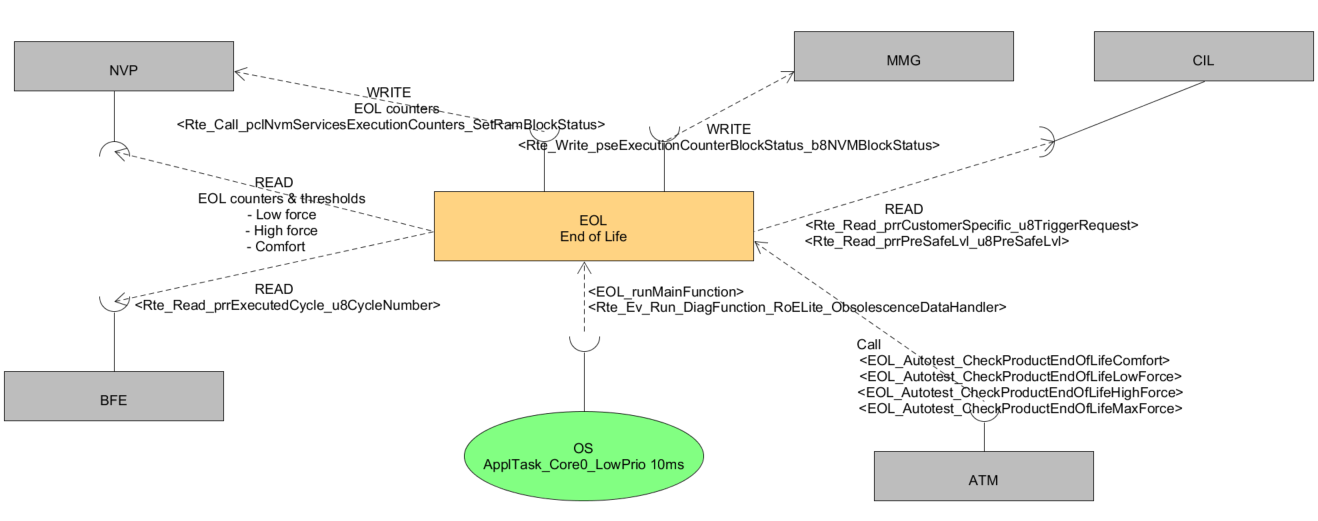
# Description

EOL (End Of Life) is a very small SW unit intended to count the number of times belt functions are triggered and to notify that the end of life of a belt function (or a group of belt functions) is reached.

This SW unit is very close to the ANG requirements who specifies the limit of the retractor system.

From a static point of view, EOL is connected to 3 SW units:

* BFE: To read/detect any cycles start (based on executed cycle data)
* NVP: To load EOL threshholds, to record EOL counters
* CIL: To read / detect any PreSafe request and the specific level requested



**Figure 1: EOL - Static description**

# Tehnical Functions

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirements** | **Criteria** | **Linked Runnable** | **Source** |
| ARCH\_SW\_EOL\_0001 | The EOL\_runMainFunction function shall update the high force cycle counter when tensioning cycles 2 and 3 are executed. | void EOL\_runMainFunction (void) | DAI\_EXT\_TF\_R\_2474; DAI\_EXT\_TF\_R\_2475 |
| ARCH\_SW\_EOL\_0002 | The EOL\_runMainFunction function shall update the low force cycle counter when HWA profiles (cycles 18, 20, 22 and 24) or tensioning cycles 0 and 1 are executed. | void EOL\_runMainFunction (void) | DAI\_EXT\_TF\_R\_2471; DAI\_EXT\_TF\_R\_2473; DAI\_EXT\_TF\_R\_2559; DAI\_EXT\_TF\_R\_2897; DAI\_EXT\_TF\_R\_2898; DAI\_EXT\_TF\_R\_2899 |
| ARCH\_SW\_EOL\_0003 | The EOL\_runMainFunction function shall update the comfortcycle counter when BSR profiles (cycles 26,27 and 28) and PRE-SAFE CURVE 1-4 profiles are executed. | void EOL\_runMainFunction (void) | DAI\_EXT\_TF\_R\_2470;  DAI\_EXT\_TF\_R\_2734; DAI\_EXT\_TF\_R\_2735; DAI\_EXT\_TF\_R\_2736; DAI\_EXT\_TF\_R\_2737; DAI\_EXT\_TF\_H\_1646; DAI\_EXT\_TF\_R\_2704 |
| ARCH\_SW\_EOL\_0004 | EOL\_Autotest\_CheckProductEndOfLifeLowForce function shall verify if the Low Force counter has exceeded the Low Force EOL threshold(NVP\_u32LowForceEOLThrs = 10000). | EOL\_Autotest\_CheckProductEndOfLifeLowForce() | DAI\_EXT\_TF\_R\_2526; ALV\_EXT\_TF\_H\_1641; ALV\_EXT\_TF\_H\_1643; DAI\_EXT\_TF\_H\_2397; DAI\_EXT\_TF\_J\_146 |
| ARCH\_SW\_EOL\_0005 | EOL\_Autotest\_CheckProductEndOfLifeHighForce function shall verify if the High Force counter has exceeded the High Force EOL threshold(NVP\_u32HighForceEOLThrs = 1500). | EOL\_Autotest\_CheckProductEndOfLifeHighForce() | DAI\_EXT\_TF\_R\_2526; ALV\_EXT\_TF\_H\_1636; ALV\_EXT\_TF\_H\_1638; DAI\_EXT\_TF\_H\_2400; DAI\_EXT\_TF\_J\_147 |
| ARCH\_SW\_EOL\_0006 | EOL\_Autotest\_CheckProductEndOfLifeComfort function shall verify if the Comfort counter has exceeded the Comfort EOL threshold(NVP\_u32ComfortCyclesEOLThrs = 60000). | EOL\_Autotest\_CheckProductEndOfLifeComfort() | ALV\_EXT\_TF\_H\_1646; ALV\_EXT\_TF\_H\_1648; DAI\_EXT\_TF\_H\_2398; DAI\_EXT\_TF\_J\_145 |
| ARCH\_SW\_EOL\_0010 | The EOL\_runMainFunction function shall update the max force cycle counter when tensioning cycles 4 5 and 6 are executed. | void EOL\_runMainFunction (void) | DAI\_EXT\_TF\_R\_2729; DAI\_EXT\_TF\_R\_2730; DAI\_EXT\_TF\_R\_2731 |
| ARCH\_SW\_EOL\_0011 | The EOL\_runMainFunction function shall update the request counter when HWA profile or tensioning cycles 0-6 are executed. | void EOL\_runMainFunction (void) | DAI\_EXT\_TF\_R\_2733 |
| ARCH\_SW\_EOL\_0012 | EOL\_Autotest\_CheckProductEndOfLifeMaxForce function shall verify if the Max Force counter has exceeded the Max Force EOL threshold(NVP\_u32MaxForceEOLThrs = 50). | EOL\_Autotest\_CheckProductEndOfLifeMaxForce() | ALV\_EXT\_TF\_H\_2307; DAI\_EXT\_TF\_H\_2310; DAI\_EXT\_TF\_H\_2399; DAI\_EXT\_TF\_H\_2307; DAI\_EXT\_TF\_J\_148 |
| ARCH\_SW\_EOL\_0017 | The EOL\_runMainFunction function shall update the associated cycle counter (low, high, max, comfort) when tensioning cycles 7, 8, 9, 10, 11, 12 and 13 are executed. | void EOL\_runMainFunction (void) | DAI\_EXT\_TF\_R\_2907 |
| ARCH\_SW\_EOL\_0018 | If the associated cycle counter configuration value is 1 then the low force counter will be incremented. | void EOL\_runMainFunction (void) | DAI\_EXT\_TF\_R\_2910 |
| ARCH\_SW\_EOL\_0019 | If the associated cycle counter configuration value is 2 then the high force counter will be incremented. | void EOL\_runMainFunction (void) | DAI\_EXT\_TF\_R\_2910 |
| ARCH\_SW\_EOL\_0020 | If the associated cycle counter configuration value is 4 then the max force counter will be incremented. | void EOL\_runMainFunction (void) | DAI\_EXT\_TF\_R\_2910 |
| ARCH\_SW\_EOL\_0021 | If the associated cycle counter configuration value is 8 then the comfort force counter will be incremented. | void EOL\_runMainFunction (void) | DAI\_EXT\_TF\_R\_2910 |
| ARCH\_SW\_EOL\_0022 | If the associated cycle counter configuration value is different than 1,2,4,8 the low force counter will be incremented. | void EOL\_runMainFunction (void) | DAI\_EXT\_TF\_R\_2910 |
| ARCH\_SW\_EOL\_0023 | After every incrementation of each execution counter  NVP\_BLOCK\_ID\_EXECUTION\_COUNTERS block shall be saved in NVM. | void EOL\_runMainFunction (void) | DAI\_EXT\_TF\_J\_161 |

# Runnables

## EOL\_runMainFunction

### Definition

|  |  |  |  |
| --- | --- | --- | --- |
| **Prototype** | | | |
| void EOL\_runMainFunction (void) | | | |
| **Object** | | | |
| This function shall monitor the cycles in order to count the number of times belt function (or group of belt functions) has been triggered. | | | |
| **Parameters** | | | |
| Name | Type | Direction | Description |
| NA | NA | NA | NA |
| **Returned value** | | | |
| Name | Description | | |
| NA | NA | | |
| **Dynamic aspect** | | | |
| Called every 10 ms | | | |
| **Requirements** | | | |
| ARCH\_SW\_EOL\_0001; ARCH\_SW\_EOL\_0002; ARCH\_SW\_EOL\_0003; ARCH\_SW\_EOL\_0007; ARCH\_SW\_EOL\_0008; ARCH\_SW\_EOL\_0009; ARCH\_SW\_EOL\_0010; ARCH\_SW\_EOL\_0011; ARCH\_SW\_EOL\_0013; ARCH\_SW\_EOL\_0014;  ARCH\_SW\_EOL\_0015; ARCH\_SW\_EOL\_0016; ARCH\_SW\_EOL\_0017; ARCH\_SW\_EOL\_0018; ARCH\_SW\_EOL\_0019; ARCH\_SW\_EOL\_0020; ARCH\_SW\_EOL\_0021; ARCH\_SW\_EOL\_0022; ARCH\_SW\_EOL\_0017; ARCH\_SW\_EOL\_0023 | | | |

### Data flow / Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirements** | **Criteria** | **Levels/Tolerances** | **Source** |
| ARCH\_SW\_EOL\_0007 | In order to increment the corresponding counter the current executed cycle from BFE shall be an input. | NVP\_au32ExecutedCycleCounters NVM parameter shall be used. | DAI\_EXT\_TF\_R\_2474; DAI\_EXT\_TF\_R\_2475; DAI\_EXT\_TF\_R\_2471; DAI\_EXT\_TF\_R\_2473; DAI\_EXT\_TF\_R\_2559; DAI\_EXT\_TF\_R\_2470; |
| ARCH\_SW\_EOL\_0008 | The Low Force Counter shall be incremented if High Force Counter is incremented. | NVP\_au32ExecutedCycleCounters NVM parameter shall be used. | DAI\_EXT\_TF\_R\_2472; |

### Called functions

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirements** | **Criteria** | **Linked Runnable** | **Source** |
| **ARCH\_SW\_EOL\_0009** | Rte\_BFE\_psrExecutedCycle\_u8CycleNumber shall be read to get executed cycle number. | EOL\_runMainFunction() | DAI\_EXT\_TF\_R\_2474; DAI\_EXT\_TF\_R\_2475; DAI\_EXT\_TF\_R\_2471; DAI\_EXT\_TF\_R\_2473; DAI\_EXT\_TF\_R\_2559; DAI\_EXT\_TF\_R\_2470; |
| **ARCH\_SW\_EOL\_0013** | Rte\_Read\_prrCustomerSpecific\_u8TriggerRequest shall be read to get the status of a requested presafe level. | EOL\_runMainFunction() | DAI\_EXT\_TF\_R\_2733 |
| **ARCH\_SW\_EOL\_0014** | Rte\_Read\_prrPreSafeLvl\_u8PreSafeLvl shall be read to get the actual level of a requested presaf. | EOL\_runMainFunction() | DAI\_EXT\_TF\_R\_2733 |
| **ARCH\_SW\_EOL\_0015** | Rte\_Write\_pseExecutionCounterBlockStatus\_b8NVMBlockStatus shall be called in order to write the updated block status for Execution Counters | EOL\_runMainFunction() |  |
| **ARCH\_SW\_EOL\_0016** | Rte\_Write\_EOL\_AC\_EndOfLifeManagement\_ObsolescenceDataBlockNumber\_BlockNumber shall be called in order to write the obsolence data block number. | EOL\_runMainFunction() |  |

## EOL\_Get\_Obsolescence\_Data

### Definition

|  |  |  |  |
| --- | --- | --- | --- |
| **Prototype** | | | |
| FUNC(void, EOL\_AC\_EndOfLifeManagement\_CODE) EOL\_Get\_Obsolescence\_Data(P2CONST(Impl\_Obsolescense\_Data, AUTOMATIC, RTE\_EOL\_AC\_ENDOFLIFEMANAGEMENT\_APPL\_DATA) pObsData) | | | |
| **Object** | | | |
| This function shall get the obsolescence data | | | |
| **Parameters** | | | |
| Name | Type | Direction | Description |
| pObsData | Impl\_Obsolescense\_Data | Out | Pointer to get obsolescence data |
| **Returned value** | | | |
| Name | Description | | |
| NA | NA | | |
| **Dynamic aspect** | | | |
|  | | | |
| **Requirements** | | | |
|  | | | |

## EOL\_Write\_Obsolescence\_Data

### Definition

|  |  |  |  |
| --- | --- | --- | --- |
| **Prototype** | | | |
| FUNC(void, EOL\_AC\_EndOfLifeManagement\_CODE) EOL\_Write\_Obsolescence\_Data (P2CONST(Impl\_Obsolescense\_Data, AUTOMATIC, RTE\_EOL\_AC\_ENDOFLIFEMANAGEMENT\_APPL\_DATA) pObsData) | | | |
| **Object** | | | |
| This function shall write the obsolescence data | | | |
| **Parameters** | | | |
| Name | Type | Direction | Description |
| pObsData | Impl\_Obsolescense\_Data | Out | Pointer to set obsolescence data |
| **Returned value** | | | |
| Name | Description | | |
| NA | NA | | |
| **Dynamic aspect** | | | |
|  | | | |
| **Requirements** | | | |
|  | | | |

# Runnables – Auto-tests

## EOL\_Autotest\_CheckProductEndOfLifeLowForce

### Definition

|  |  |  |  |
| --- | --- | --- | --- |
| **Prototype** | | | |
| void **EOL\_Autotest\_CheckProductEndOfLifeLowForce** (u8TestResultType\* pu8TestResult) | | | |
| **Object** | | | |
| This function shall check if the end of life of the “low force” belt functions is reached. | | | |
| **Parameters** | | | |
| Name | Type | Direction | Description |
| NA | NA | NA | NA |
| **Returned value** | | | |
| Name | Description | | |
| u8TestResultType | Status of the test | | |
| **Dynamic aspect** | | | |
| Server operation  Non Reentrant | | | |
| **Requirements** | | | |
| ARCH\_SW\_EOL\_0004; | | | |

## EOL\_Autotest\_CheckProductEndOfLifeHighForce

### Definition

|  |  |  |  |
| --- | --- | --- | --- |
| **Prototype** | | | |
| void **EOL\_Autotest\_CheckProductEndOfLifeHighForce** (u8TestResultType\* pu8TestResult) | | | |
| **Object** | | | |
| This function shall check if the end of life of the “high force” belt functions is reached. | | | |
| **Parameters** | | | |
| Name | Type | Direction | Description |
| NA | NA | NA | NA |
| **Returned value** | | | |
| Name | Description | | |
| u8TestResultType | Status of the test | | |
| **Dynamic aspect** | | | |
| Server operation  Non Reentrant | | | |
| **Requirements** | | | |
| ARCH\_SW\_EOL\_0005; | | | |

## EOL\_autotest\_CheckProductEndOfLifeComfort

### Definition

|  |  |  |  |
| --- | --- | --- | --- |
| **Prototype** | | | |
| void **EOL\_Autotest\_CheckProductEndOfLifeComfort** (u8TestResultType\* pu8TestResult) | | | |
| **Object** | | | |
| This function shall check if the end of life of the “comfort” belt functions is reached. | | | |
| **Parameters** | | | |
| Name | Type | Direction | Description |
| NA | NA | NA | NA |
| **Returned value** | | | |
| Name | Description | | |
| u8TestResultType | Status of the test | | |
| **Dynamic aspect** | | | |
| Server operation  Non Reentrant | | | |
| **Requirements** | | | |
| ARCH\_SW\_EOL\_0006; | | | |

## EOL\_Autotest\_CheckProductEndOfLifeMaxForce

### Definition

|  |  |  |  |
| --- | --- | --- | --- |
| **Prototype** | | | |
| void **EOL\_Autotest\_CheckProductEndOfLifeMaxForce** (u8TestResultType\* pu8TestResult) | | | |
| **Object** | | | |
| This function shall check if the end of life of the “max” belt functions is reached. | | | |
| **Parameters** | | | |
| Name | Type | Direction | Description |
| NA | NA | NA | NA |
| **Returned value** | | | |
| Name | Description | | |
| u8TestResultType | Status of the test | | |
| **Dynamic aspect** | | | |
| Server operation  Non Reentrant | | | |
| **Requirements** | | | |
| ARCH\_SW\_EOL\_0010 | | | |

# MCU resources

The following requirements on resource consumption objectives apply to the module/package:

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirements** | **Criteria** | **Levels/Tolerances** | **Source** |
| ARCH\_SW\_EOL\_9997 | The ROM size consumed by this component shall not exceed 1.0K bytes. |  |  |
| ARCH\_SW\_EOL\_9998 | The RAM size consumed by this component shall be 100 bytes. |  |  |