Hazard Analysis and Risk Assessment (HARA)
<VORLAGE>

<Makros müssen aktiviert sein, damit die Revision und das Datum in den Fußzeilen automatisch geändert wird!>

Revision - Date:	1.1 - 28.06.2018
Document-State:	DRAFT
Project-Name:	
Release / Sample phase:	<X sample>

	Date:	Prename Surname:	Signature:
Created by:	17.08.2015	Jörg Schacht	
Reviewed by:			
Released by:			

Change History:

Version:	Date:	Change:	Responsible:
0.0	17.08.2015	Document created	Jörg Schacht
1.0	14.05.2016	Document released	Jörg Schacht
1.1	27.06.2018	minor changes	Jörg Schacht

References:

Document Name:	Description:
ISO 26262, part 3	Description on system level

HARA: Content

Work Sheet	Description of the Content
Coversheet	Information about this file (work product)
Content	This sheet
Instructions for Use	How to use this file. In addition see file: i-Q_ISO26262_FuSi0120_HARA_Bedienungsanleitung.pdf
Definitions	Definition of: - Severity - AIS stages - Exposure (duration and frequency) - Controllability
Item Definition	The most important information of the item definition
HARA	Description of the situation and the resulting ASUL classification
MalFunctions+ASIL	Summary of the mal functions and the resulting ASIL classification
SafetyGoals	Derived Safety Goals for every ASIL classification
Features	List from the AK-L (Arbeitskreis - Lieferanten des VDA)
VehicleSituations	Possible situations of a vehicle, can be used for brain storming
OperationalConditions	Summary of table B2 and B3 from part 3 of the standard - classification for exposure
Auxiliary	Definition for the drop down menues
Kauf-Angebot	Wenn Sie an der editierbaren Datei interessiert sind, dann schauen Sie bitte hier.

HARA: Instructions for Use

	ATTENTION!	ISO 26262:2011, part **3-7.4.1.2** The **item without internal safety mechanisms shall be evaluated** during the hazard analysis and risk assessment, i.e. safety mechanisms intended to be implemented or that have already been **implemented in predecessor items shall not be considered** in the hazard analysis and risk assessment.
		The hazard analysis uses a structure that lists all possible combinations of use case, kind of malfunction and operational condition on the sheet "HARA". Inconsistent and futile combinations (i.e. driver wants to accelerate and brake simultaneously) are indicated using strikethrough.

Column	**Head Line**	**Description**
Column A	ID	In this column a unique number for every incident has to be shown.
Column B	Funktionsgruppe / Functional group	According to the AK-L we have 18 different functional groups. All groups and the corresponding features you can find on work sheet "Features". You can choose one from the drop down list or add a new one.
Column C	Ausstattungsmerkmal / Feature	About which technical system we will talk.
Column D	Funktion / Function	Which function of the technical system should be discussed in this row. Please be very precise. It will be better and easier to discribe 3 situation in 3 different lines than to try to combine those situations.
Column E	Fehlfunktion / Mal function	What is the failure of the described system?
Column F	Fehlerauswirkung / Consequences of the failure	What are the technical consequences of the described failure? What is the behaviour of the vehicle? The consequences for the driver or other persons will be described in column I.
Column G	Betrachtetes Szenario / Scenario considered	Please describe the situation which you want to rank later on with severity, exposure and controllability. As a hint the sheet "VehicleSituations" can be helpful.
Column H	S	Severity ranking (S0 / S1 / S2 / S3). Definitions please see work sheet "Definitions". Select from drop down.
Column I	Bemerkung zur Bedeutung / Comment for Severity	The base descriptions of the severity is shown on sheet "Definitions". Please try to be a bit more precise for the current situation.
Column J	E	Exposure ranking (E0 / E1 / E2 / E3 / E4). Definitions please see work sheet "Definitions". Select from drop down.

HARA: Instructions for Use

Column	Head Line	Description
Column K	Bemerkung zur Zeit der Ausgesetztheit / Comment for Exposure Time	The base descriptions of the exposure is shown on sheet "Definitions". Please try to be a bit more precise for the current situation.
Column L	C	Controllability ranking (C0 / C1 / C2 / C3). Definitions please see work sheet "Definitions". Select from drop down.
Column M	Bemerkung zur Beherrschbarkeit / Comment for Controllability	The base descriptions of the controllability is shown on sheet "Definitions". Please try to be a bit more precise for the current situation.
Column N	ASIL	The ASIL classification is calculated automatically with S, E and C. Please do not change the column by hand!
Column O	Sicherheitsziel / Safety Goal	For each classifikation with ASIL A, B, C or D a safety goals has to be defined. At this step of the process only non decomposed ASIL classifications exist. One safety goal can covers different ASIL classifications (rows), but the highest ASIL classification will set the over all classification for this safety goal.
Column P	Sicherer Zustand / Safe State	For each safety goal a Safe State has to be defined.
Column Q	Fehlertoleranzzeit / Fault tolerance time	For each safety goal a Fault Tolerance Time has to be defined.
Column R	Bemerkung / Comment	Can be used for additional comments of the actual row.

HARA: Definitions

Severity:	according IOS26262, part3, table B.1	**Examples:**
S0	No injuries AIS 0 and less than 10 % probability of AIS 1-6 Damage that cannot be classified safety-related	- Bumps with roadside infrastructure - Pushing over roadside post, fence, etc. - Light collision - Light grazing damage - Damage entering/exiting parking space - Leaving the road without collision or rollover
S1	Light and moderate injuries More than 10 % probability of AIS 1-6 (and not S2 or S3)	- Side impact with a narrow stationary object, e.g. crashing into a tree (impact to passenger cell) with very low speed - Side collision with a passenger car (e.g. intrudes upon passenger compartment) with very low speed - Rear/front collision with another passenger car with very low speed - Collision with minimal vehicle overlap (10 % to 20 %) - Front collision (e.g. rear-ending another vehicle, semi-truck, etc.) without passenger compartment deformation
S2	Severe and life-threatening injuries (survival probable) More than 10 % probability of AIS 3-6 (and not S3)	- Side impact with a narrow stationary object, e.g. crashing into a tree (impact to passenger cell) with low speed - Side collision with a passenger car (e.g. intrudes upon passenger compartment) with low speed - Rear/front collision with another passenger car with low speed - Pedestrian/bicycle accident while turning (city intersection and streets)
S3	Life-threatening injuries (survival uncertain), fatal injuries More than 10 % probability of AIS 5-6	- Side impact with a narrow stationary object, e.g. crashing into a tree (impact to passenger cell) with medium speed - Side collision with a passenger car (e.g. intrudes upon passenger compartment) with medium speed - Rear/front collision with another passenger car with medium speed - Pedestrian/bicycle accident (e.g. 2-lane road) - Front collision (e.g. rear-ending another vehicle, semi-truck, etc.) with passenger compartment deformation

HARA: Definitions

AIS stage	Description of the AIS stages according IOS26262, part3, B.2.2
AIS 0	no injuries;
AIS 1	light injuries such as skin-deep wounds, muscle pains, whiplash, etc.;
AIS 2	moderate injuries such as deep flesh wounds, concussion with up to 15 minutes of unconsciousness, uncomplicated long bone fractures,
AIS 3	severe but not life-threatening injuries such as skull fractures without brain injury, spinal dislocations below the fourth cervical vertebra without
AIS 4	severe injuries (life-threatening, survival probable) such as concussion with or without skull fractures with up to 12 hours of unconsciousness,
AIS 5	critical injuries (life-threatening, survival uncertain) such as spinal fractures below the fourth cervical vertebra with damage to the spinal cord, intestinal
AIS 6	extremely critical or fatal injuries such as fractures of the cervical vertebrae above the third cervical vertebra with damage to the spinal cord, extremely

HARA: Definitions

Exposure:	according IOS26262, part3, table B.2 - Classes of probability of exposure regarding **DURATION** in operational situations	
E0	**Incredible**	No examples found in ISO 26262
E1	**Very low probability** not specified	**Nearby elements:** - Lost cargo or obstacle in lane of travel (highway) **Vehicle stationary state:** - Vehicle during jump start - In repair garage (on roller rig) **Manoeuvre:** - Driving downhill with engine off (mountain pass)
E2	**Low probability** <1 % of average operating time	**Road layout:** - Mountain pass with unsecured steep slope - Country road intersection - Highway entrance ramp / Highway exit ramp **Road surface:** - Snow and ice on road - Slippery leaves on road **Nearby elements:** - In car wash - Nearing end of congestion (highway) **Vehicle stationary state:** - Trailer attached - Roof rack attached - Vehicle being refuelled - In repair garage (during diagnosis or repair) - On hoist **Manoeuvre:** - Driving in reverse (from parking spot) - Driving in reverse (city street) - Overtaking - Parking (with sleeping person in vehicle) - Parking (with trailer attached)

HARA: Definitions

E3	**Medium probability** 1 % to 10 % of average operating time	**Road layout:** - One-way street (city street) **Road surface:** -wet road **Nearby elements:** - In tunnel - Traffic congestion **Vehicle stationary state:** - Vehicle on a hill (hill hold) **Manoeuvre:** - Heavy traffic (stop and go) **Visibility:** - Unlighted roads at night
E4	**High probability** >10 % of average operating time	**Road layout:** - Highway - Secondary road - Country road **Manoeuvre:** - Accelerating - Decelerating - Executing a turn (steering) - Parking (parking lot) - Lane change (city street) - Stopping at traffic light (city street) - Lane change (highway)

HARA: Definitions

	Classes of probability of exposure regarding ***FREQUENCY*** *in operational situations*	
E0	**Incredible**	No examples found in ISO 26262
E1	Occurs **less often than once a year** for the great majority of drivers	**Vehicle stationary state:** - Stopped, requiring engine restart (at railway crossing) - Vehicle being towed - Vehicle
E2	Occurs a **few times a year** for the great majority of drivers	**Road layout:** - Mountain pass with unsecured steep slope **Road surface:** - Snow and ice on road **Vehicle stationary state:** - Trailer attached - Roof rack attached **Manoeuvre:** - Evasive manoeuvre, deviating from desired path
E3	Occurs **once a month** or more often for an average driver	**Road surface:** - Wet road **Nearby elements:** - In tunnel - In car wash - Traffic congestion **Vehicle stationary state:** - Vehicle being refuelled - Vehicle on a hill (hill hold) **Manoeuvre:** - Overtaking

HARA: Definitions

E4	Occurs during **almost every drive** on average	**Manoeuvre:** - Starting from standstill - Shifting transmission gears - Accelerating - Braking - Executing a turn (steering) - Using indicators - Manoeuvring vehicle into parking position - Driving in reverse

HARA: Definitions

Controllability:	according IOS26262, part3, table B.3	
C0	**Controllable in general**	- Situations that are considered distracting - Unexpected radio volume increase - Warning message - gas low - Unavailability of a driver assisting system
C1	**Simply controllable** - 99 % or more of all drivers or other traffic participants are usually able to avoid harm	- Faulty adjustment of seat position while driving - Blocked steering column when starting the vehicle
C2	**Normally controllable** - 90 % or more of all drivers or other traffic participants are usually able to avoid harm	- Failure of ABS during emergency braking - Headlights fail while night driving at medium/high speed on unlighted road - Motor failure at high lateral acceleration (motorway exit)
C3	**Difficult to control or uncontrollable** - Less than 90 % of all drivers or other traffic participants are usually able, or barely able, to avoid harm	- Failure of ABS when braking on low friction road surface while executing a turn - Failure of brakes - Incorrect steering angle with high angular speed at medium or high vehicle speed (steering angle change not aligned to driver intent) - Faulty driver airbag release when travelling at high speed
NOTE 1:	For C2, a feasible test scenario in accordance with RESPONSE 3 (see Reference [3]) is accepted as adequate: “Practical testing experience revealed that a number of 20 valid data sets per scenario can supply a basic indication of validity”. If each of the 20 data sets complies with the pass-criteria for the test, a level of controllability of 85 % (with a level of confidence of 95 % which is generally accepted for human factors tests) can be proven. This is appropriate evidence of the rationale for a C2-estimate.	
NOTE 2:	For C1 a test to provide a rationale that 99 % of the drivers “pass” the test in a certain traffic scenario might not be feasible because a huge number of test subjects would be necessary as the appropriate evidence for such a rationale.	
NOTE 3:	As no controllability is assumed for category C3, it is not relevant to have appropriate evidence of the rationale for such a classification.	

HARA: Definitions

ISO 26262, part 3 - chapter: 7.4.1.2	The item without internal safety mechanisms shall be evaluated during the hazard analysis and risk assessment, i.e. safety mechanisms intended to be implemented or that have already been implemented in predecessor items shall not be considered in the hazard analysis and risk assessment.

Speed-Definitions	
very low speed	max. 15 km/h - Definition from: ISO 26262, part 10, page 11 (pure electric drive)
low speed	16km/h - 50 km/h (pure electric drive)
medium speed	51 km/h - 90 km/h - Definition from: ISO 26262, part 10, page 12 (in this speed range the combustion engine is running)
high speed	> 90 km/h (in this speed range the combustion engine is running)
accelerating	at low / medium speed
executing a turn	Driving along curves at low / medium speed
pure electric drive	Driving at low or very low speed
driver does not want to accelerate and does not want to brake	Vehicle commands exactly the torque/negative torque to maintain current speed (like cruise control functionality)
wet road	country road being considered, because of sharp bends and opposing traffic possible.
highway entrance ramp	normal behaviour of the driver is to accelerate on this ramp
highway exit ramp	normal behaviour of the driver is to decelerate on this ramp
Snow and ice on road / Slippery leaves on road	the µ value of the road is 0,1 only
Vehicle on a hill (hill hold)	vehicle is facing uphill
Mountain pass with unsecured steep slope	vehicle is facing downhill

HARA: Item Definition

HARA: ASIL Classification

ID	Funktionsgruppe / Functional group	Ausstattungsmerkmal / Feature	Funktion / Function	Fehlfunktion / Mal function	Fehlerauswirkung / Consequences of the failure	Betrachtetes Szenario / Scenario considered	S	Bemerkung zur Bedeutung / Comment for Severity	E	Bemerkung zur Zeit der Ausgesetztheit / Comment for Exposure Time	C
							0		0		0
							0		0		1
							0		0		2
							0		0		3
							0		1		0
							0		1		1
							0		1		2
							0		1		3
							0		2		0
							0		2		1
							0		2		2
							0		2		3
							0		3		0
							0		3		1
							0		3		2
							0		3		3
							0		4		0
							0		4		1
							0		4		2
							0		4		3
							1		0		0

HARA: ASIL Classification

ID	Bemerkung zur Beherrschbarkeit / Comment for Controllability	ASIL	Sicherheitsziel / Safety Goal	Sicherer Zustand / Safe State	Fehler-toleranzzeit / Fault tole-rance time	Bemerkung / Comment
		QM				
		QM				
		QM				
		QM				
		QM				
		QM				
		QM				
		QM				
		QM				
		QM				
		QM				
		QM				
		QM				
		QM				
		QM				
		QM				
		QM				
		QM				
		QM				
		QM				
		QM				

HARA: Mal Functions

ID	Fehlfunk□on / Mal func□on	S	E	C	ASIL
0	0	S0	E0	C0	QM
0	0	S0	E0	C1	QM
0	0	S0	E0	C2	QM
0	0	S0	E0	C3	QM
0	0	S0	E1	C0	QM
0	0	S0	E1	C1	QM
0	0	S0	E1	C2	QM
0	0	S0	E1	C3	QM
0	0	S0	E2	C0	QM
0	0	S0	E2	C1	QM
0	0	S0	E2	C2	QM
0	0	S0	E2	C3	QM
0	0	S0	E3	C0	QM
0	0	S0	E3	C1	QM
0	0	S0	E3	C2	QM
0	0	S0	E3	C3	QM
0	0	S0	E4	C0	QM
0	0	S0	E4	C1	QM
0	0	S0	E4	C2	QM

HARA: Safety Goals

Safety Goal	Description	ASIL (maximum)	Comment
SG01		FALSCH	
SG02		FALSCH	
SG03		FALSCH	
SG04		FALSCH	
SG05		FALSCH	
SG06		FALSCH	
SG07		FALSCH	
SG08		FALSCH	
SG09		FALSCH	
SG10		FALSCH	
SG11		FALSCH	
SG12		FALSCH	
SG13		FALSCH	
SG14		FALSCH	
SG15		FALSCH	
SG16		FALSCH	
SG17		FALSCH	
SG18		FALSCH	
SG19		FALSCH	
SG20		FALSCH	

HARA: Functional Groups

Funktionsgruppe / Functional Group	Ausstattungsmerkmal / Feature
Antriebstrang	Automatikgetriebe (inkl. Halbautomat)
	Parksperre bei Automatik
Anzeigefunktionen	Blinker-Kontrollleuchte
	Geschwindigkeitsanzeige
	Motordrehzahlanzeige
	Tankanzeige
Body Elektronik - diverse	Anhängerkupplung
	Aussenspiegel links
	Aussenspiegel rechts
	Heckrollo
	Heckspoiler
	Seitenrollo, hinten
	Verdeckansteuerung
	Reifendrucküberwachung
	Wischer, Frontscheibe
Bremssysteme	Elektrisch aktivierbare Hydraulikbremse
	EMF (Elektro mechanische Feststellbremse) / EPB (Elektro pneumatische Feststellbremse)
Crash / Kollision	Post-Crash-Funktionen
	Warnblinker
	Warnblinker für Anhänger
Elektrische Lenksäulenverriegelung	Diebstahlschutz
Fahrberechtigungssysteme	elektrischer Schlüssel, Karte, Keyless go
	Keyless go ohne Schacht (Karte, Funk)
	Start - / Stop Knopf
Fahrdynamik	ABS
	EBV
	Anhängerstabilisierung
	ASR (Antriebsschlupf-Regelung)
	Bremsassistent
	ESP
	Rollover-protection
Fahrer-Assistenz-Systeme	ACC (Abstandsregelung)
Fenster/ Schiebedach	Elektrischer Fensterheber
Hybrid	Airbag Fahrer / Beifahrer
	Airbag, Kopf
	Airbag, OOP (Out of Position Erkennung)
	Airbag, Seite
	Gurtstraffer, pyrotechnisch
	Crash-Severity-Sensor, Sitzpositionserkennung
Lenksystem	Elektronisch gesteuerte Servolenkung
	Elektronisch gesteuerte Überlagerungslenkung
Lichtfunktionen	Blinker
	Bremslicht
	Fahrlicht
	Fernlicht

HARA: Functional Groups

Funktionsgruppe / Functional Group	Ausstattungsmerkmal / Feature
	Rücklicht
	Warnblinker
Motorsteuerung (Mot)	Motorantriebsdrehmoment (u.a. Hybrid)
Motorsystem	Abgasnachbehandlung
	Kühlsystem
Sitze	Lordosenstütze
	Fahrdynamiksitz (FDS)
	Sitzheizung
	Sitzverstellung
	Sitzpositionssensor (mehrstufiger Airbag)
Zugangsberechtigungssysteme	Zentralverriegelung

1 Common driving situations	
1.1 Direction of driving	
	• turn
	• straight ahead
	• uphill
	• downhill / pass
	• standstill
	• driving backwards
1.2 Acceleration	
	• slightly accelerating
	• strongly accelerating
	• coasting with running engine
	• coasting with engine OFF, ignition ON
	• coasting with engine OFF, ignition OFF
	• constant speed
1.3 Deceleration	
	• partial braking
	• full brake application
	• automatic brake
	• application of parking brake (emergency brake)
1.4 Traffic	
	• platoon
	• opposing traffic
	• traffic jam
	• urban traffic
1.5 Parking	
	• Parking with strong tilt (transport on a ship, double carport, carpark, ...)
	• Parking at a slope (downhill)
	• Parking at a slope (uphill)
	• getting into a parking lot
1.6 Special driving situations	
	• circular path
	• steep turn
	• bridge
	• tunnel
	• racing circuit
	• crest [Berggipfel]
	• wash tunnel, carwash
	• lateral inclination
	• jerky [ruckartig] steering (steering angle sensor step / staggered)
	• elk test
	• chassis dynamometer test bench
	• automatic gearbox emergency program
	• engine emergency program
	• engine failure (coasting to standstill) ignition ON
	• car / trailer combination
	• driving with roof rack
	• towing vehicle away, ignition and engine ON
	• towing rope

	• tow bar
	• on a ferry / motor rail train
	• on a rotary disc in car park
	• stay in a garage
	○ common work in a garage
	○ diagnosis interface operation
	• getting started with a battery jumper cable
	• seasonal operation (e.g. for six month)
	• u-turn using the hand brake
1.7 Velocity	
	• low velocity
	• high velocity
	• parken / rangieren
	• Autobahn
	• Landstraße
2 Environmental conditions	
2.1 Temperature	
	• heat
	• coldness
	• change of temperature
	• room temperature
	• heat emission
	• irradiation
	• refrigeration, cooling
2.2 Air pressure	
	• high mountains
	• Dead See
2.3 Humidity	
	• tropics
	• desert
2.4 Dirtiness conditions	
	• desert sand
	• dust
	• salt spray
	• agriculture
	• droppings
2.5 Lane characteristics	
	• friction factor
	• low µ
	• high µ
	• µ split
	• chess board (alternating friction)
	• rough / breakneck road
	• potholes
	• bumpy road
	• cobble stone pavement
	• summit
	• railroad crossing
	• aquaplaning

	• single damages
	• off road
	• mud
	• wet grassland
	• snow
	• transversal slope
	• interconnection
	• passing a creek
	• boulders, gravel, sand
	• bedrock
	• racing circuit
	• take off due to curbs
2.6. Visibility and whether conditions	
	• fog
	• night
	• day
	• thunderbolt
	• storm
	• rain
	• hail
	• sun
	• blinding
	• ultraviolet radiation
	• heating of passenger compartment
3 driver's activities	
3.1 Pedal activities	
	• braking pedal
	• braking pedal slightly pressed
	• braking pedal strongly pressed
	• releasing brake pedal
	• braking pedal not pressed
	• braking pedal touched
	• accelerator pedal
	• accelerator pedal slightly pressed
	• accelerator pedal strongly pressed
	• releasing accelerator pedal
	• accelerator pedal not pressed
	• accelerator pedal touched
	• clutch pedal
	• clutch pedal pressed completely
	• clutch pedal slightly pressed
	• clutch pedal slipped (no complete release)
	• clutch pedal released
	• clutch pedal not pressed
	• clutch pedal touched
3.2 Hand brake	
	• hand brake lever operated
	• EPB control element operated
4 Miscellaneous situations and criteria	

4.1 Passengers	
	• playing children in passenger compartment
	• driver leaves vehicle via passenger door
	• children seat on front passenger seat
	• animals in passenger compartment
4.2 Convertible	
	• driver enters vehicle without opening the door
	• driver leaves vehicle without opening the door
	• humidity in passenger compartment
4.3 Driving with trailer	
4.4 crash situation	
	• rear collision
	• frontal collision
	• lateral collision
	• rollover
	• fire brigade at work

HARA: Operational Conditions

	Conditions according IOS26262, part3, table B.2 and B.3	B2	B3	Exp.:	Remarks:
Road layout	Highway	x		**E4**	
	Secondary Road	x		**E4**	
	Country Road (Landstraße)	x		**E4**	may be combined with secondary road (E4)
	City Street			**E4**	
	One-Way Street (city street)	x		**E3**	may be combined with city street (E4)
	Mountain pass with unsecured steep slope (steiles Gefälle)	x	x	**E2**	
	Country Road Intersection (Landstraßenkreuzung)	x		**E2**	may be combined with secondary road (E4)
	Highway Entrance Ramp (beschleunigen)	x		**E2**	
	Highway Exit Ramp (verzögern)	x		**E2**	
Road Surface	Wet Road	x	x	**E3**	low speed or medium speed
	Snow and ice on road	x	x	**E2**	very low speed or low speed
	Slippery leaves on road	x		**E2**	may be combined with snow and ice (E2)
Nearby Elements	In tunnel	x	x	**E3**	medium speed, unligthed tunnel
	Traffic congestion (Stau)	x	x	**E3**	may be combined with heavy traffic (stop and go)
	Nearing end of congestion (highway)	x		**E2**	
	In car wash	x		**E2**	
	In car wash		x	**E3**	
	Lost cargo or obstacle in lane of travel (highway)	x		**E1**	may be combined with evasive manoeuvre
Vehicle stationary state	Vehicle on a hill (hill hold)	x		**E3**	
	Vehicle being refuelled	x		**E2**	may be combined with standstill (E4)
	Vehicle being refuelled		x	**E3**	
	Vehicle on a hill (hill hold)		x	**E3**	
	Trailer attached	x	x	**E2**	
	Roof rack attached	x	x	**E2**	no influence to power electronics
	In repair garage (during diagnosis or repair)	x		**E2**	
	On hoist (Aufzug)	x		**E2**	may be combined with standstill (E4)
	Vehicle during jump start	x	x	**E1**	jump start not possible

HARA: Operational Conditions

	Conditions according IOS26262, part3, table B.2 and B.3	B2	B3	Exp.:	Remarks:
	In repair garage (on roller rig)	x		E1	may be combined with repair garage during diagnosis or repair (E2)
	Stopped, requiring engine restart (at railway crossing)		x	E1	
	Vehicle being towed		x	E1	
	Vehicle after crash (crash signal triggered, vehicle inoperable)			E1	less than once a year!
Manoeuvre	Accelerating	x	x	E4	
	Decelerating	x		E4	
	Braking		x	E4	
	Starting from Standstill		x	E4	
	Shifting transmission gears		x	E4	no negative influence with automatic or DSG transmission
	Using indicators		x	E4	no influence to power electronics
	Executing a turn (steering)	x	x	E4	medium speed
	Parking (driving within parking lot)	x		E4	
	Manoeuvring vehicle into parking position		x	E4	
	Lane change (city street)	x		E4	may be combined with city street (E4)
	Stopping at traffic light (city street)	x		E4	low speed (not very low speed)
	Lane change (highway)	x		E4	may be combined with highway (E4)
	Driving in reverse		x	E4	
	Heavy traffic (stop and go)	x		E3	
	Overtaking		x	E3	
	Driving in reverse (from parking spot)	x		E2	may be combined with Parking (parking lot) (E4)
	Driving in reverse (city street)	x		E2	
	Overtaking	x		E2	
	Parking (with sleeping person in vehicle)	x		E2	
	Parking (with trailer attached)	x		E2	may be combined with parking (E4)
	Evasive manoeuvre (ausweichen), deviating from desired path		x	E2	

HARA: Operational Conditions

	Conditions according IOS26262, part3, table B.2 and B.3	B2	B3	Exp.:	Remarks:
	Driving downhill with engine off (mountain pass)	x		**E1**	may be combined with Mountain pass with unsecured steep slope (E2)
Visibility	Unlighted roads at night	x		**E3**	at medium / high speed

HARA: Operational Conditions

	Conditions according IOS26262, part3, table B.2 and B.3	B2	B3	Exp.:	Remarks:
	Compressed and Sorted Version for Hazard Analysis:				
	Accelerating			E4	Electric drive supports, at low speed e-drive only
	Decelerating			E4	
	Highway			E4	combustion engine running, high speed
	Highway Entrance Ramp (beschleunigen)			E2	medium speed or high speed
	Highway Exit Ramp (verzögern)			E2	medium speed
	Nearing end of congestion (highway)			E2	medium speed
	Country / Secondary Road			E4	medium speed
	Overtaking			E2	on country road, combustion engine running
	Executing a turn (steering)			E4	medium speed
	Evasive manoeuvre (ausweichen), deviating from desired path			E2	
	Unlighted roads at night			E3	at medium / high speed.
	In tunnel			E3	medium speed, unlighted tunnel
	City Street			E4	
	Stopping at traffic light (city street)			E4	low speed (not very low speed)
	Heavy traffic (stop and go)			E3	
	Driving in reverse			E2	
	Parking (parking lot)			E4	parking action (movement)
	Parking (with sleeping person in vehicle)			E2	vehicle standstill
	Standstill			E4	
	Vehicle on a hill (hill hold)			E3	the vehicle is facing uphill
	Stopped, requiring engine restart (at railway crossing)			E1	
	Wet Road			E3	low speed or medium speed
	Snow and ice on road / Slippery leaves on road			E2	very low speed or low speed
	Trailer attached			E2	
	Vehicle being towed			E1	
	Mountain pass with unsecured steep slope (steiles Gefälle)			E2	the vehicle is facing downhill
	Vehicle after crash (crash signal triggered, vehicle inoperable)			E1	

HARA: Operational Conditions

	Conditions according IOS26262, part3, table B.2 and B.3	B2	B3	Exp.:	Remarks:
	In repair garage (during diagnosis or repair)			E2	no driver, standstill

HARA: Unfallstatistiken

Auf dieser Seite können als Referenz Auszüge aus der offiziellen Unfallstatistik angegeben werden.
Diese Unfallstatistiken sind frei zugänglich auf den Seiten des Statistischen Bundesamtes.

Übersichtsseite:
https://www.destatis.de/DE/ZahlenFakten/Wirtschaftsbereiche/TransportVerkehr/Verkehrsunfaelle/Verkehrsunfaelle.html#Tabellen

Statistische Daten aus dem Jahr **2017:**
Die Daten für das Jahr 2017 müssten etwa Ende Juli 2018 veröffentlicht werden.

Statistische Daten aus dem Jahr **2016:**
https://www.destatis.de/DE/Publikationen/Thematisch/TransportVerkehr/Verkehrsunfaelle/VerkehrsunfaelleJ2080700167004.pdf;jsessionid=FC58E864C4A3CCE5EB2C4ECC19B23B8C.InternetLive2?__blob=publicationFile

Statistische Daten aus dem Jahr **2015:**
https://www.destatis.de/DE/Publikationen/Thematisch/TransportVerkehr/Verkehrsunfaelle/VerkehrsunfaelleJ2080700157004.pdf?__blob=publicationFile

Statistische Daten aus dem Jahr **2014:**
https://www.destatis.de/DE/Publikationen/Thematisch/TransportVerkehr/Verkehrsunfaelle/VerkehrsunfaelleJ2080700147004.pdf?__blob=publicationFile

Statistische Daten aus dem Jahr **2013:**
https://www.destatis.de/DE/Publikationen/Thematisch/TransportVerkehr/Verkehrsunfaelle/VerkehrsunfaelleJ2080700137004.pdf?__blob=publicationFile

Ranking Scales for S / E / C

0
1
2
3
4

Funktionsgruppe / Functional group

Antriebstrang
Anzeigefunktionen
Body Elektronik - diverse
Bremssysteme
Crash / Kollision
Elektrische Lenksäulenverriegelung
Fahrberechtigungssysteme
Fahrdynamik
Fahrer-Assistenz-Systeme
Fenster/ Schiebedach
Hybrid
Lenksystem
Lichtfunktionen
Motorsteuerung (Mot)
Motorsystem
Sitze
Zugangsberechtigungssysteme

HARA: Kaufangebot

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Wir würden uns sehr freuen, wenn Sie uns anfragen, denn wir haben mittlerweile mehr als 7 Jahre konkrete Erfahrung in der Umsetzung der ISO 26262:2011 und wir wissen wirklich, worüber wir reden!