VDA	Harness Description List (KBL)	4964

This current recommendation is not binding and describes the information needed to exchange harness design data within car manufacturers and suppliers. The recommendation defines the required objects with their descriptions and attributes, a formal information model, and the representation in XML.

The recommendation deals with the following subject areas:

- Harness, variants and modules
- Components like connectors or wires
- Part lists
- Connectivity lists
- Topology

2nd edition (KBL 2.4), November 2014

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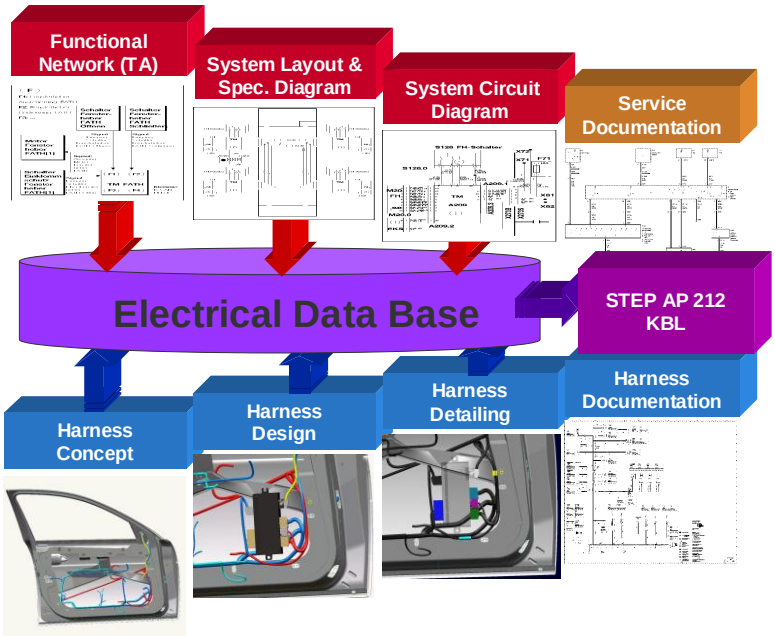
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1 General

1.1 Preamble

Innovations in automotive industry like adaptive cruise control or multi media passenger entertainment systems nowadays define themselves by electric and electronic components. As the electrical wiring system builds the essential infrastructure for automobile electronics, the wire harness becomes increasingly complex. This need for increased complexity comes along with the minimizing of design time and shortening of lead times.

Therefore the collaboration of car manufacturers and harness suppliers is a challenge. The traditional way that a supplier receives harness design data from the car manufacturer has to change. Instead of various drawings and lists in proprietary formats he needs a specification, which describes the wire harness in its entirety so that the manufacturer can plan the manufacturing and build the harness, based on the data he receives. Such a specification should be based on standards to fulfil the requirements for open development partnerships.



Source: © BMW AG

Figure 1: Harness Design Process

The objectives of the VDA Working Group “Car Electric” are the harmonization of requirements and the development of recommendations for the exchange of product data in the area of car electrical systems.

This recommendation is a result of the working group and has been developed with the participation of major OEMs and harness suppliers: The “Harness Description

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List". This specification is also known under the name "KBL", which stands for "Kabelbaumliste", the German translation for "Harness Description List".

The recommendation defines how harness design data coming from various sources like 3D CAD systems or CAE system can be represented in an aggregated view.

This version of the recommendation, also called KBL 2.4, is a bridge release. Its objective is to enable a smooth migration from KBL to VEC:

- Lower the implementation hurdle for VEC, especially for the supplier interface
- Define the migration path to VEC
- Extensions to KBL 2.4 to enable the interoperation with VEC modeling
- All new KBL concepts are addressed by VEC, too
- Keep KBL scope (physical harness)

1.2 Objectives of the recommendation

The goal of this recommendation is to specify the information that an OEM should make available on harness design for suppliers or other down-stream processes like EMC (Electro-magnetic compatibility).

The specification abstracts from OEM specific processes. By that it provides the basis for

- Reference standards for data quality
- Standardized viewing solutions
- Independency of harness data from proprietary software tools
- Simple comparability of development status and variants
- Standardized data exchange processes

It further avoids thereby the repeated development of engineering data.

1.3 Scope and responsibilities

The typical harness development process starts with the system design where the functionality of the new developed system will be described. The top level view gives the overview of all items needed. With wiring diagrams engineers start to define the parts needed to fulfil the expected functions. Components are selected according to the required specification and are documented in part lists. Connections are defined to combine the components logically. The first harness concept takes place, the position of the components and paths for wires are planned and described in wire lists and harness layouts. The netlist (connection list) can be used to start the harness routing.

This recommendation defines how electrical/logical data coming from CAE systems (usages of components, connections, etc.) and topological data coming from 3D CAD systems (routing of cables and bundles) should be represented in an integrated way:

- Part identification including versioning, references to car projects or supplier information

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- Harness, variants and options
- Modules to support modular design
- Harness components like connectors, wires, fixings, grommets or accessories
- Connectivity lists
- Part usage lists
- Topology and routing
- References to drawings or manufacturing documents

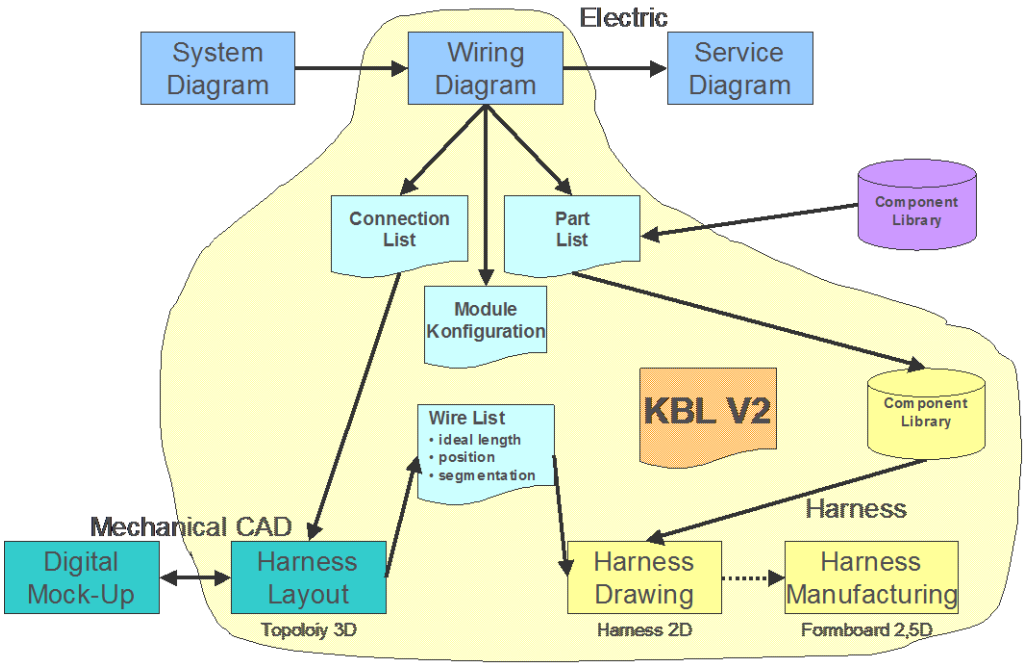


Figure 2: Scope of the KBL within the harness design process

This recommendation is directed to the harness design and IT departments of the OEMs and to the harness suppliers. The target auditoriums are the persons responsible for data exchange, IT systems and implementers of interfaces.

1.4 Changes to preceding versions

The following section lists the main subjects that have been changed, improved or added. A complete and detailed change history is available in the related issue tracking system.

Version	Change
2.4	Representation of multiple wire types, representing the same electrical connection (KBLFRM-551)
2.4	Classification of wires in a multi-voltage electrical network (KBLFRM-547)
2.4	Representation of slots for fuses and relais (KBLFRM-490)
2.4	Orientation of fixings (KBLFRM-483)

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2.4	Insertion point for ring terminals and ring terminal families (KBLFRM-464)
2.4	Localization (KBLFRM-545)
2.4	Mapping of fuse boxes with internal connections (KBLFRM-543)
2.4	Accessory for further occurrences (KBLFRM-489)
2.4	Additional objects with Installation_instruction (KBLFRM-488)
2.4	Change history (KBLFRM-487)
2.4	Position information with absolute measure (KBLFRM-486)
2.4	Specifying default tolerances (KBLFRM-485)
2.4	Extended dimensioning (KBLFRM-484)
2.4	Id for all occurrences (KBLFRM-555)
2.4	Attributes for fuse slots (KLFRM-554)
2.4	Application of pressure plates (KBLFRM-449)
2.4	Wires at connector with multiple entry points (KBLFRM-448)
2.4	Processing instructions for absolute position information (KBLFRM-550)

1.5 Compatibility to preceding versions

KBL version 2.4 is a scope extension of version 2.3. That means all the information, which was in the scope of version 2.3 is still supported by version 2.4. The XML schema is downward compatible.

1.6 Document structure

This document is structured in the following chapters:

- Overview meta model of the KBL data format
- Glossary of terms
- Detailed meta model specification with a definition of all classes, attributes and relationships in alphabetical arrangement
- XML representation of the Harness Description List: The KBL Schema

1.7 Abbreviations, terms and definitions

See Chapter 3 for a list of relevant abbreviations, terms and definitions.

1.8 Reference

Further information about this recommendation and related documents and specifications (e.g. the KBL24.xsd) are available from

- The VDA and its working party PLM respectively the project group “car electric” (see http://www.vda.de)
- The ProSTEP iViP respectively the project group ECAD-IF (ECAD-implementer forum, see http://ecad-wiki.prostep.org)

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2 KBL Model Description and XML Representation

2.1 Connection Overview

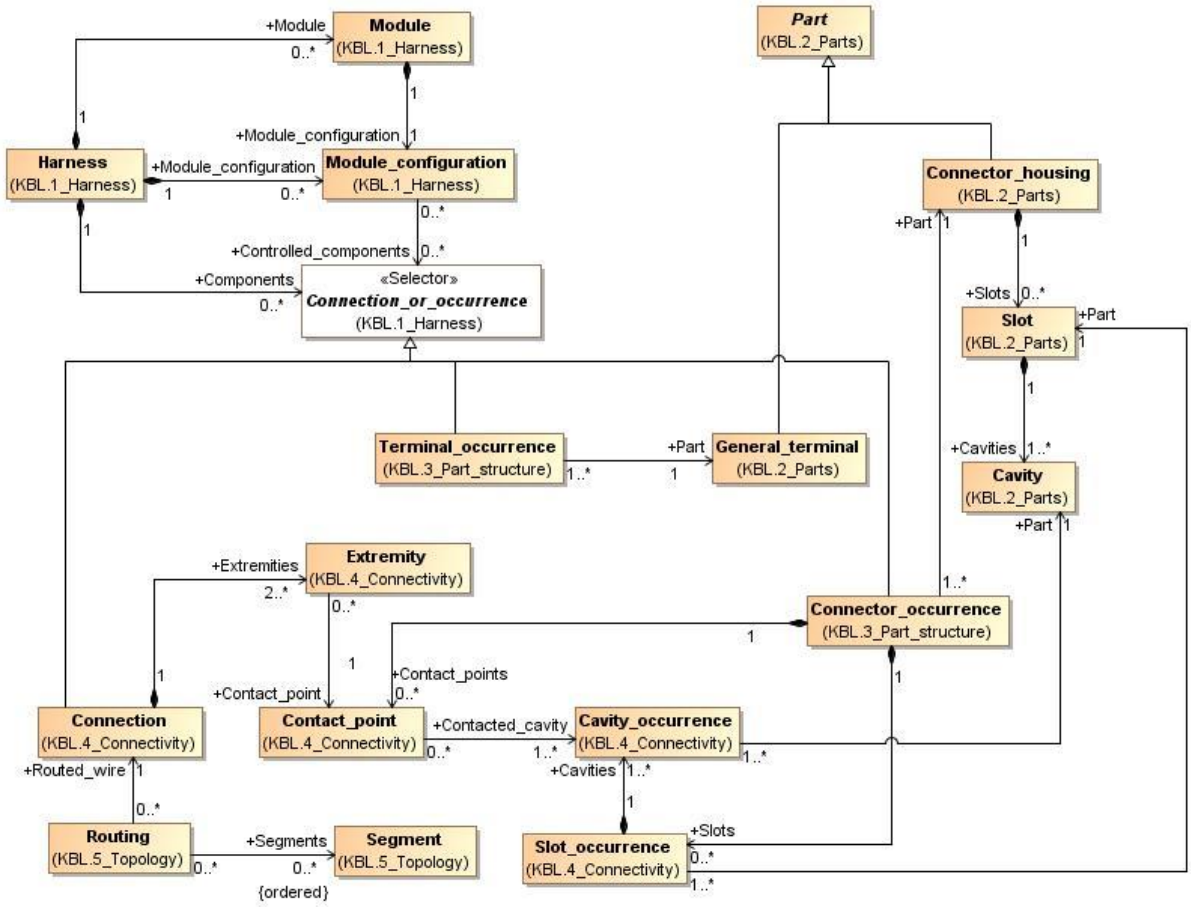


Figure 3: Connection Overview

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2.2 Common part attributes and properties

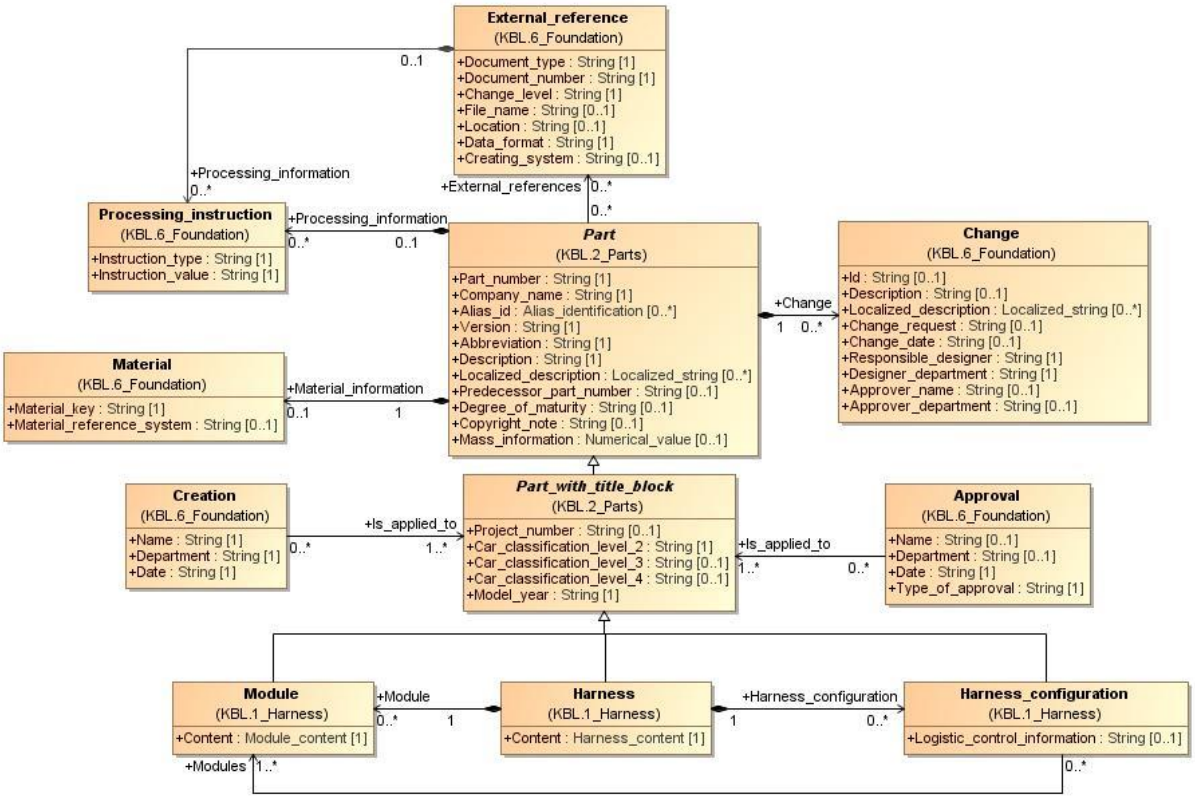


Figure 4: Common part attributes and properties

2.3 Part specializations

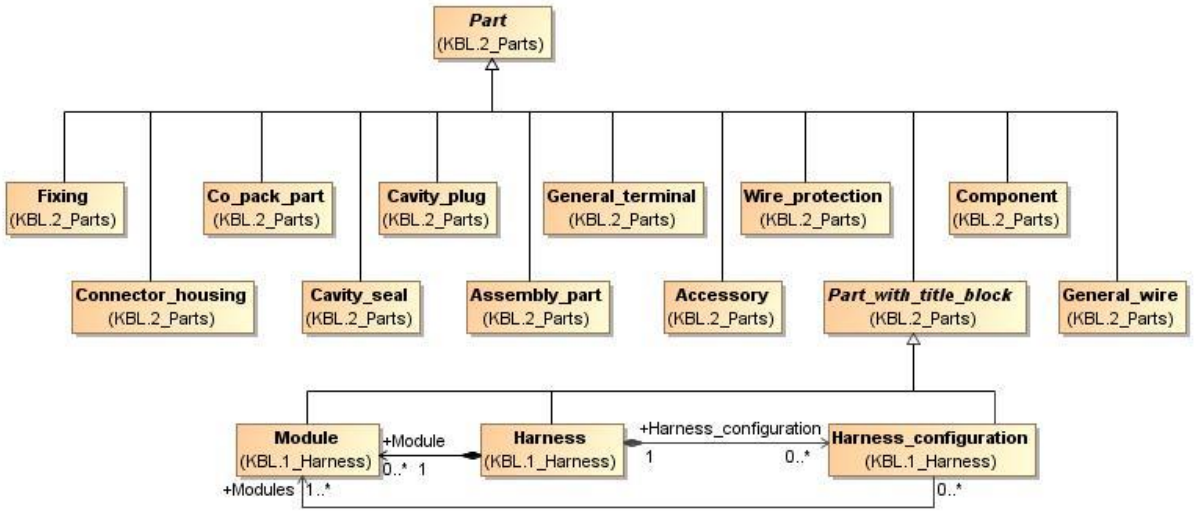


Figure 5: Part specializations

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2.4 Harness and Modules

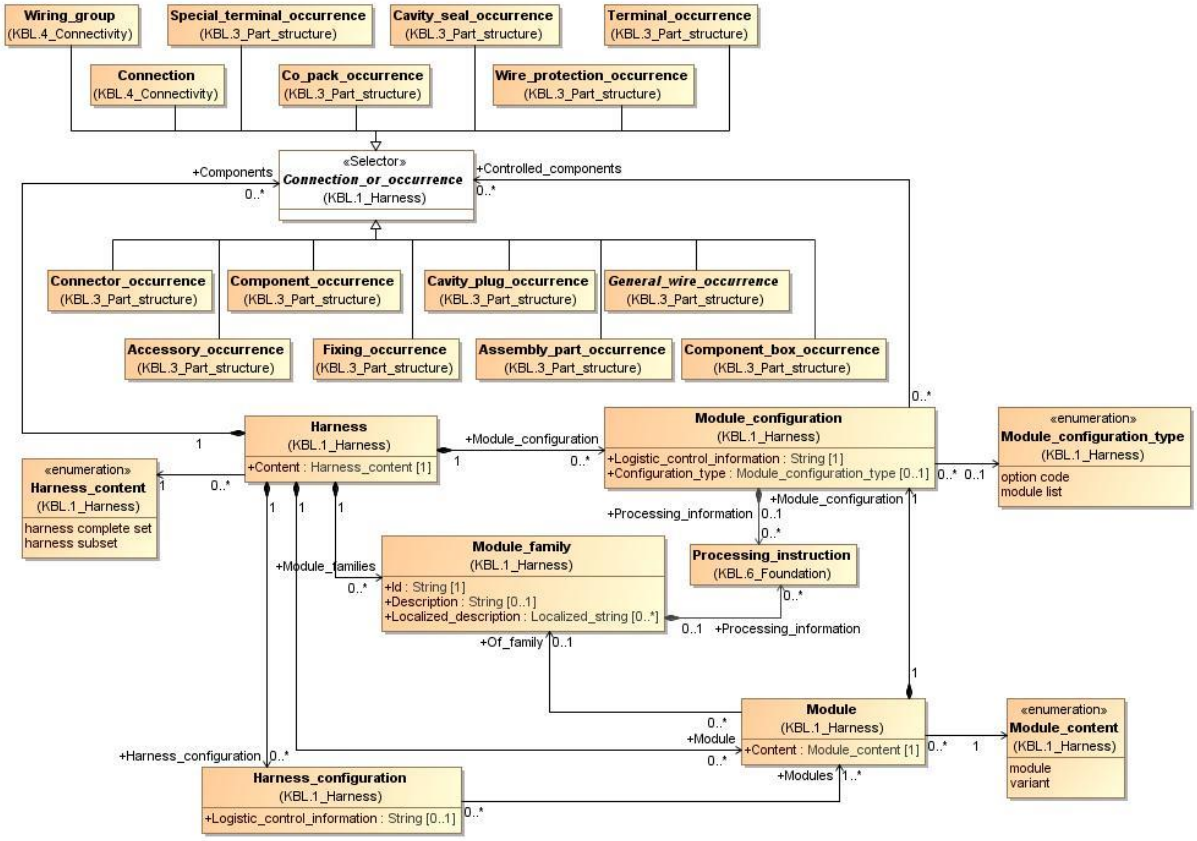


Figure 6: Harness and Modules

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2.5 Part master data (1)

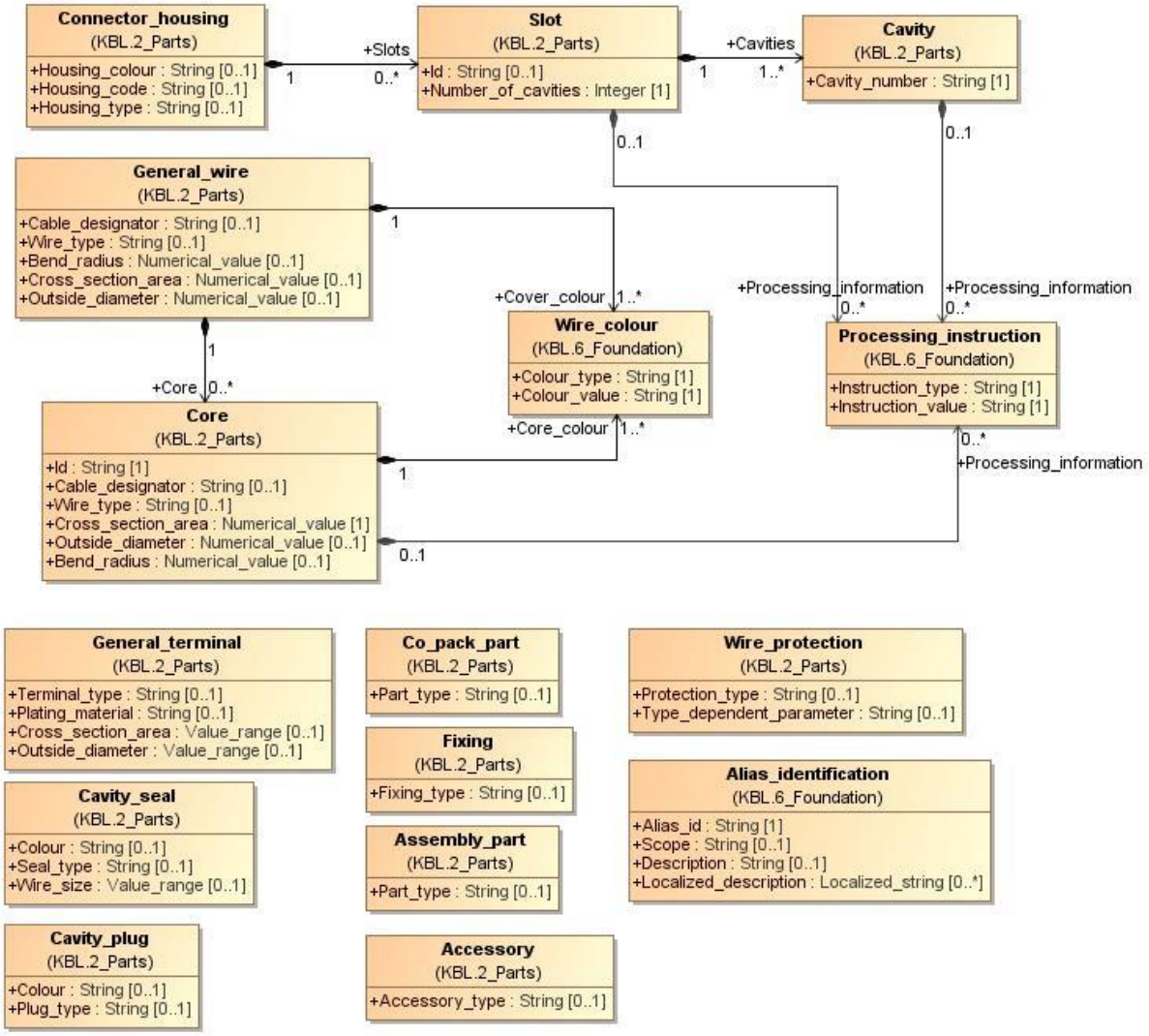


Figure 7: Part master data (1)

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2.6 Part master data (2)

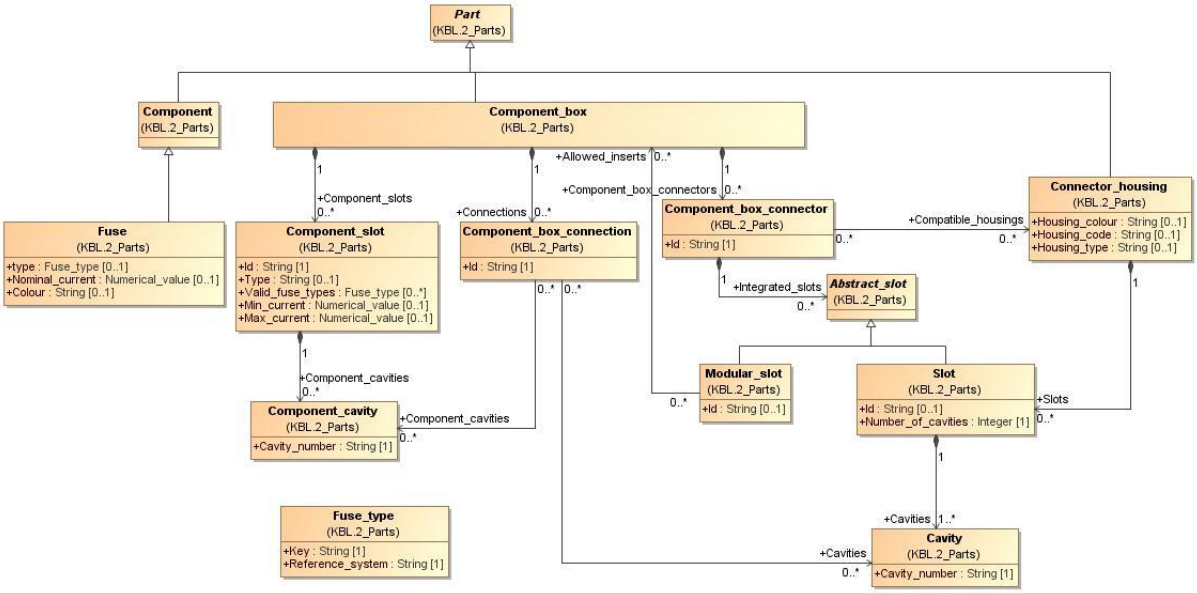


Figure 8: Part master data (2)

This diagram illustrates the part master data of component boxes. A component box is used to mount components (e.g. relais and fuses). Component boxes exist in a great variety from rather simple to quite complex.

Basically a component box consists of Component_slots & Component_cavities. These can be used to mount components.

The harness can be attached to a component box in two ways. Either with a connector or directly with wires that are mounted into cavities (with terminals) or attached to bolts (with ring terminals). Both aspects are covered by the Component_box_connector.

A Component_box_connector consist of both Slots (the same class that is used for Connector_housings) and Modular_slots. A Modular_slot is used if the Component_box itself is modular and consists of one more insets.

The Component_box_connection can be used to define the internal connectivity of a component box.

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2.7 Connectivity

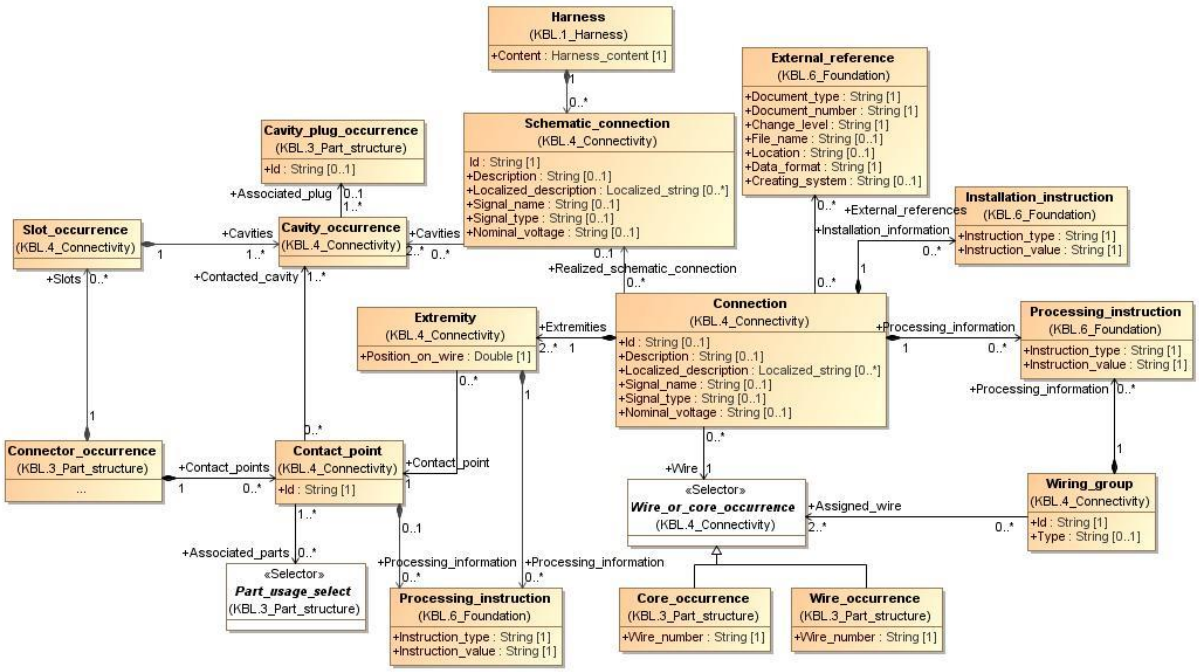


Figure 9: Connectivity

2.8 Part usage list (1)

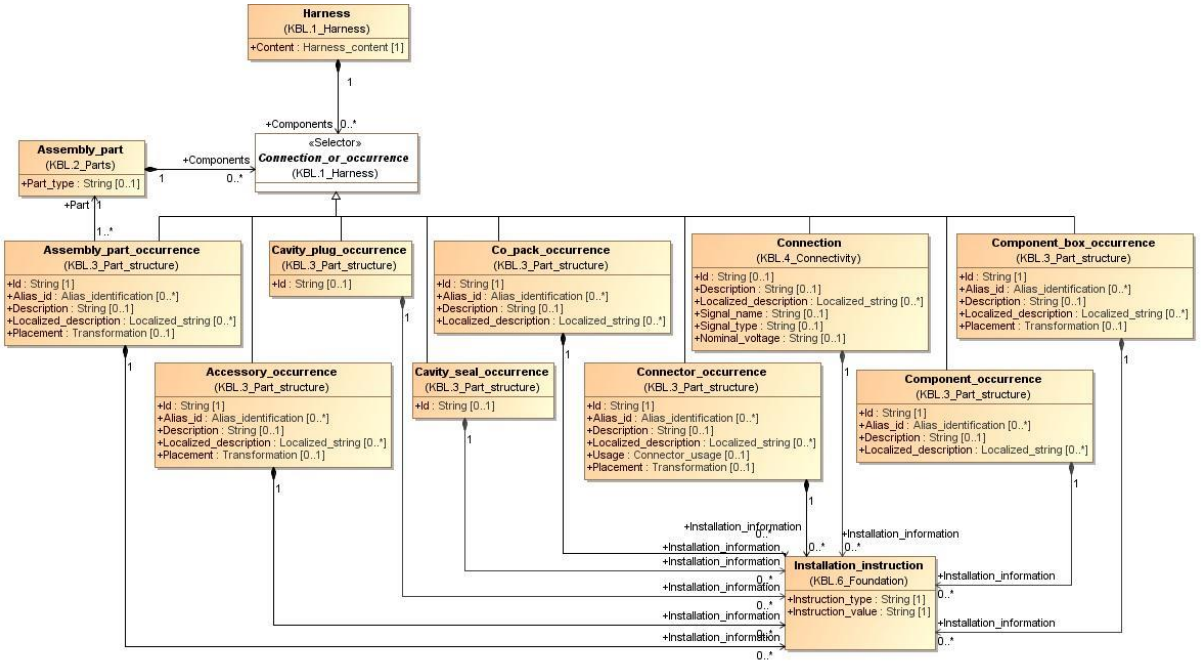


Figure 10: Part usage list (1)

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2.9 Part usage list (2)

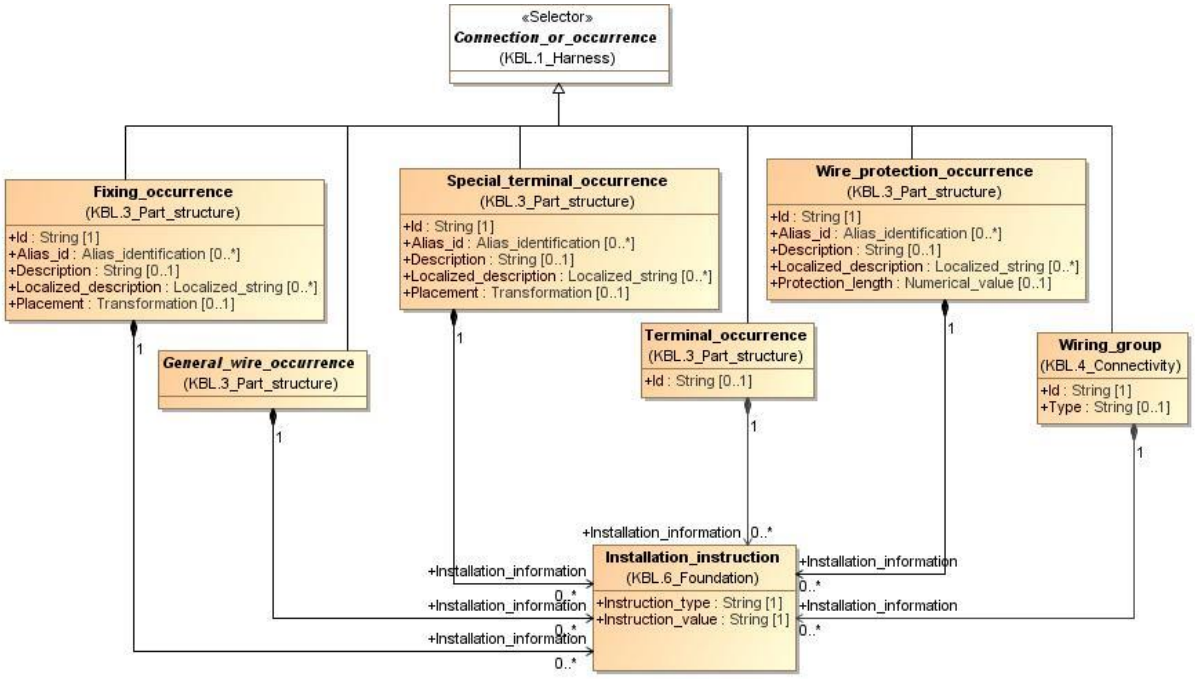


Figure 11: Part usage list (2)

2.10 Part usage list (3)

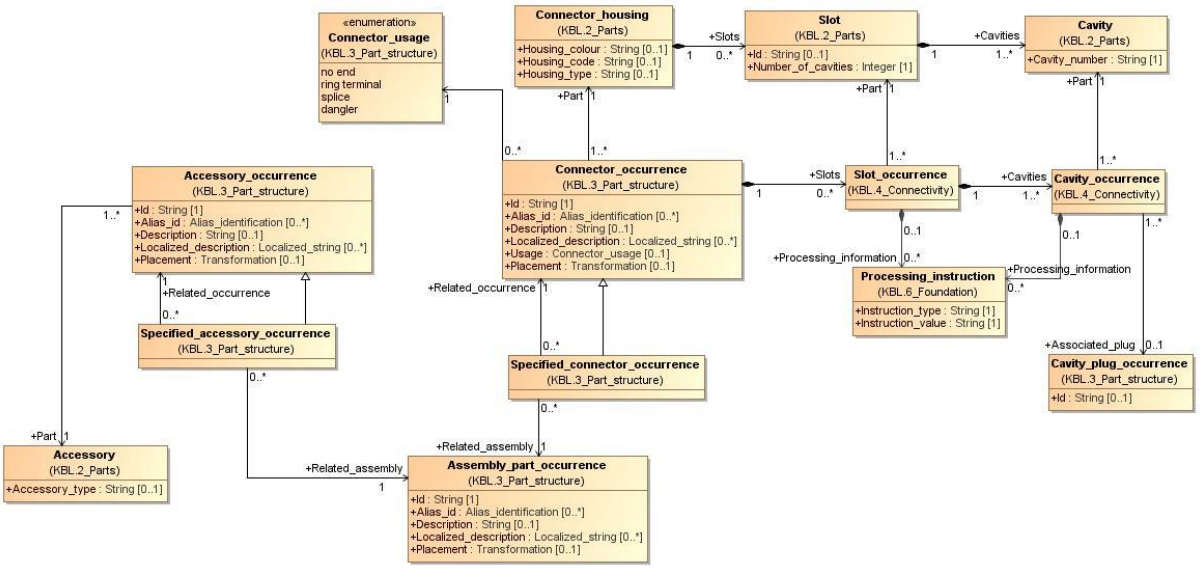


Figure 12: Part usage list (3)

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2.11 Part usage list (4)

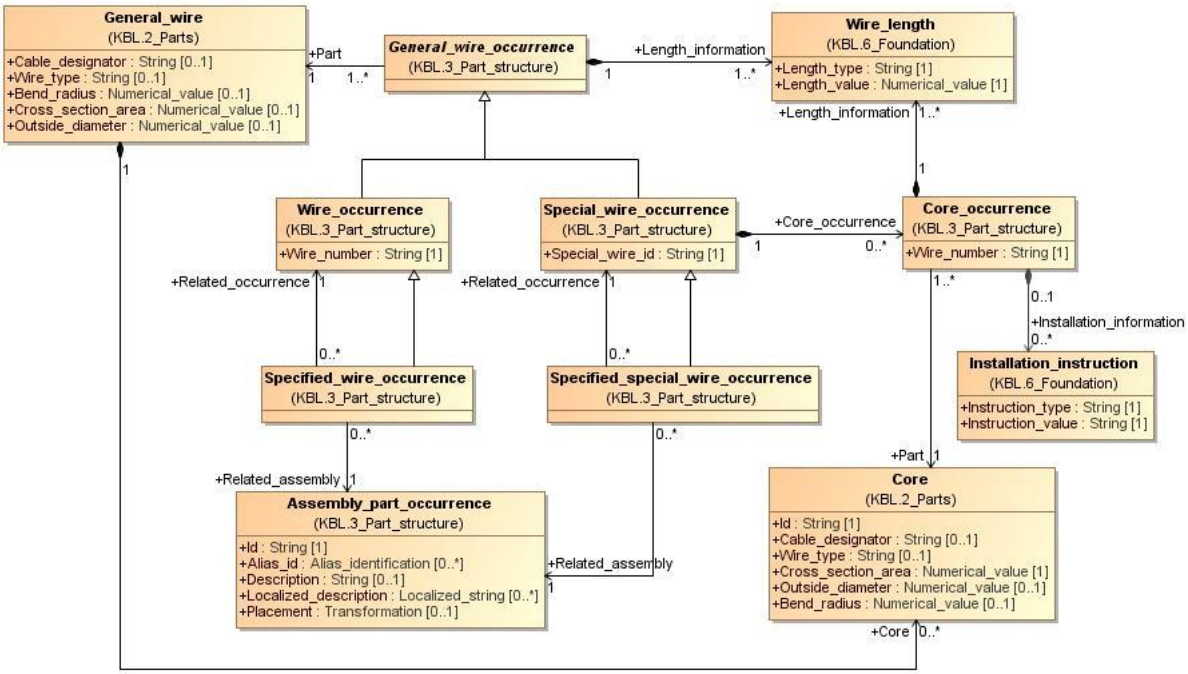


Figure 13: Part usage list (4)

2.12 Part usage list (5)

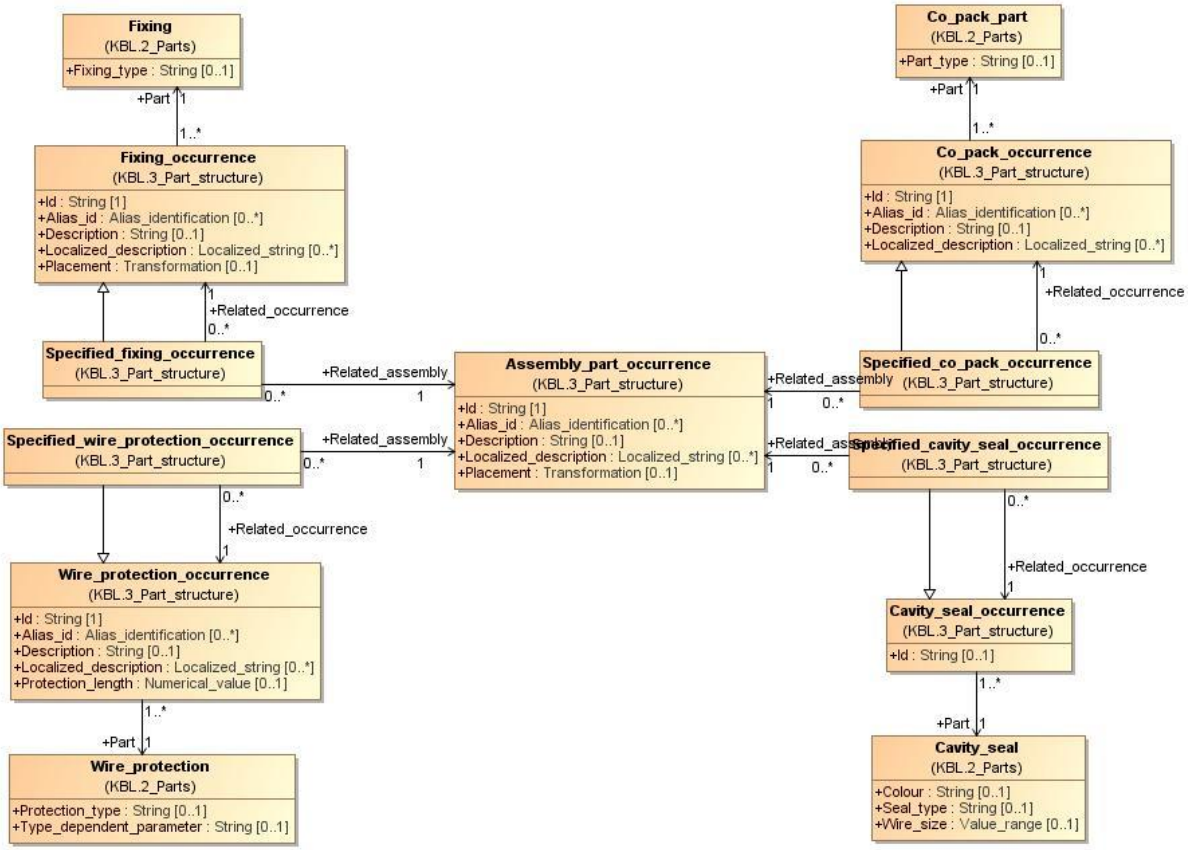


Figure 14: Part usage list (5)

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2.13 Part usage list (6)

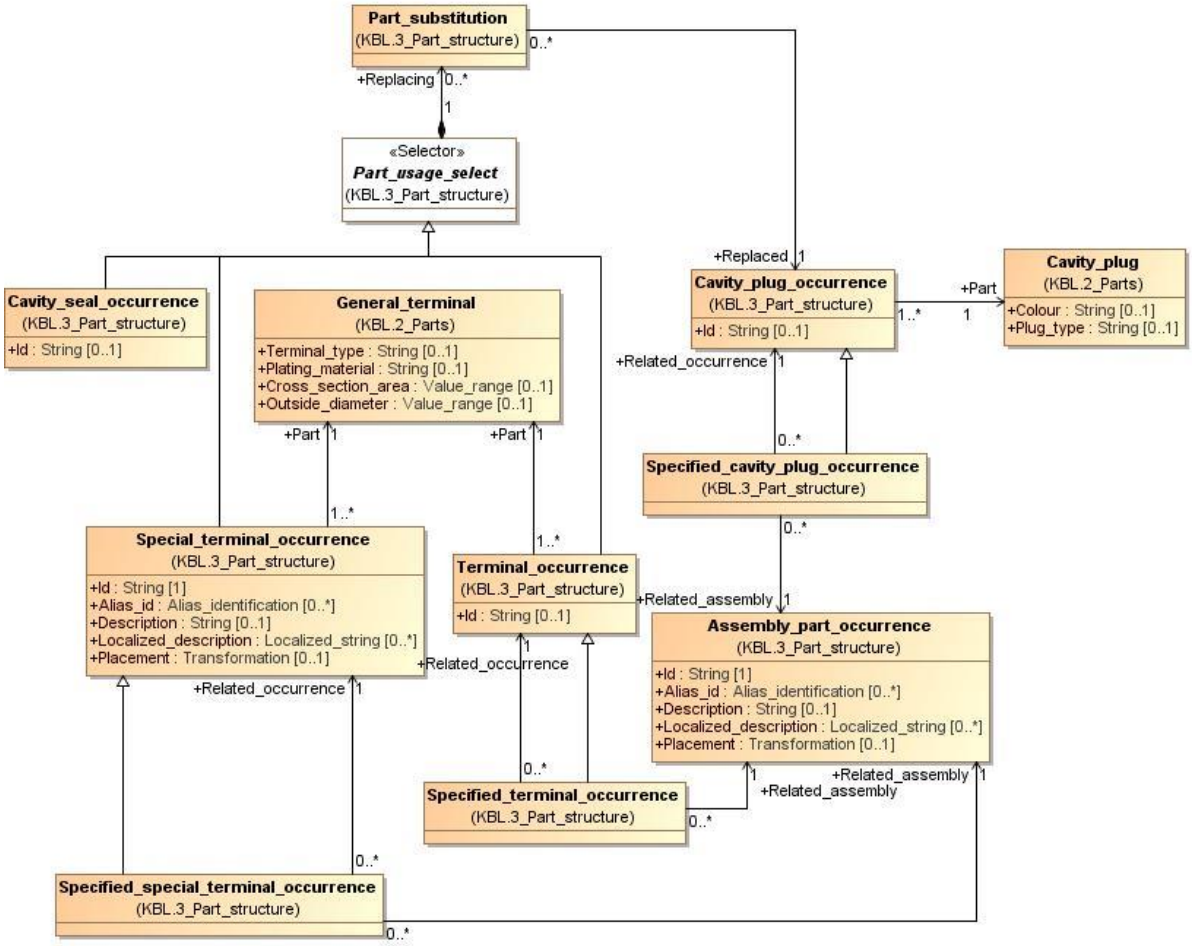


Figure 15: Part usage list (6)

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2.14 Part usage list (7)

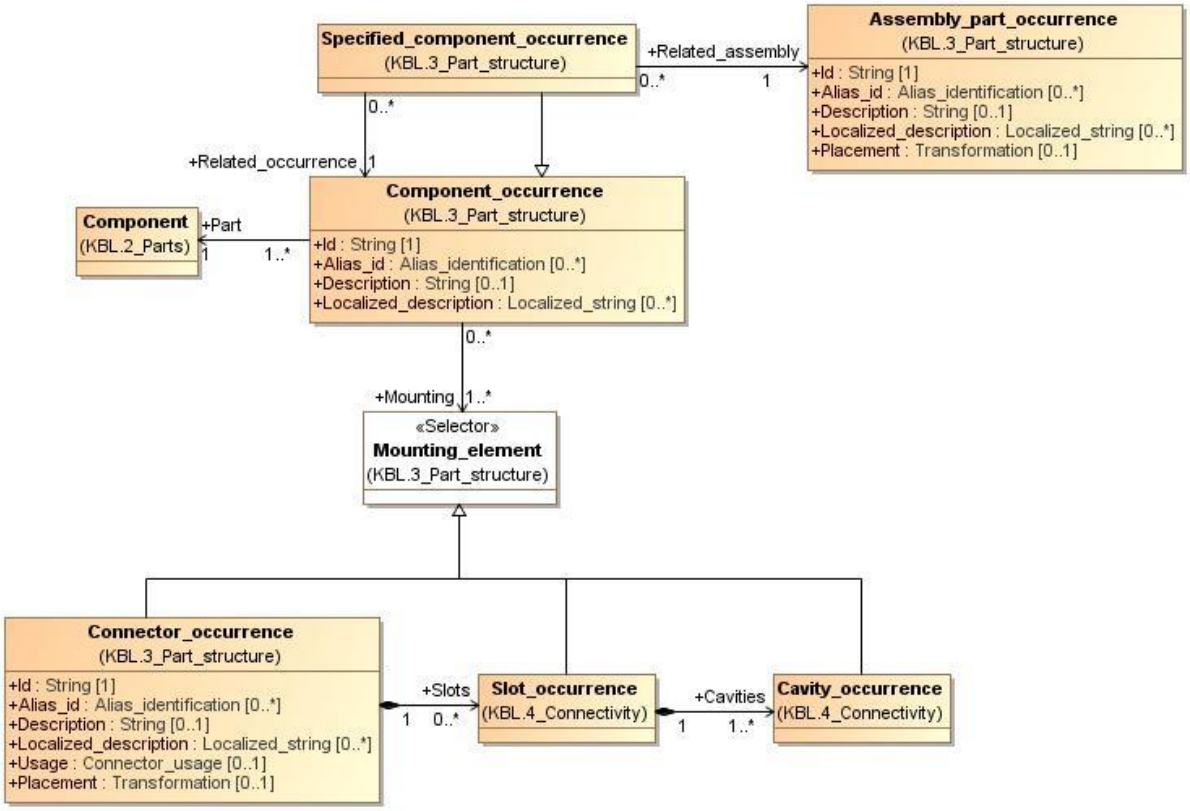


Figure 16: Part usage list (7)

2.15 Part usage list (8)

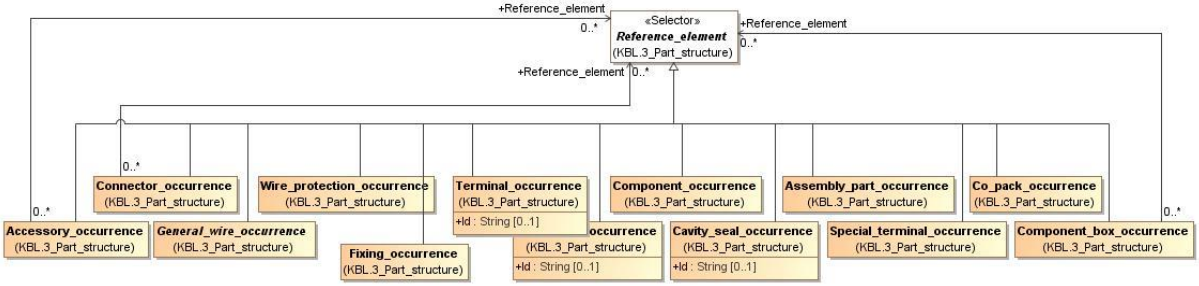


Figure 17: Part usage list (8)

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2.16 Part usage list (9)

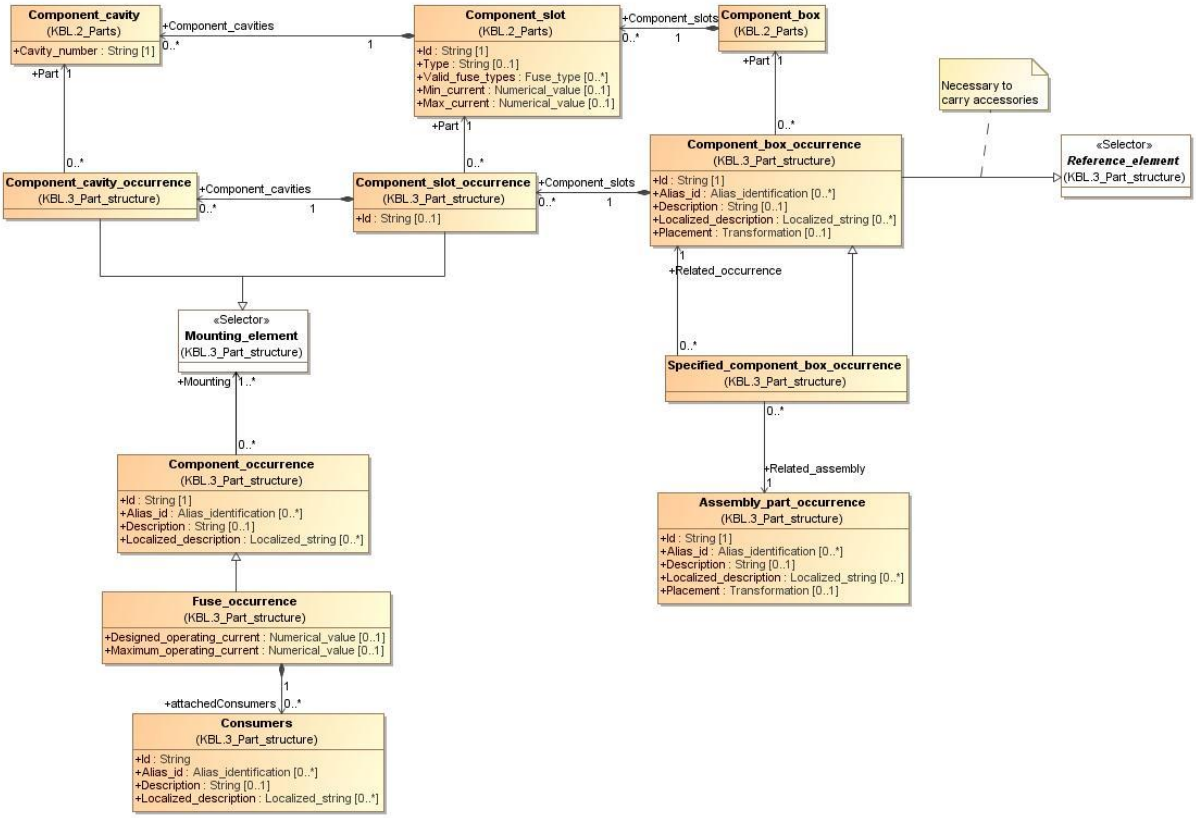
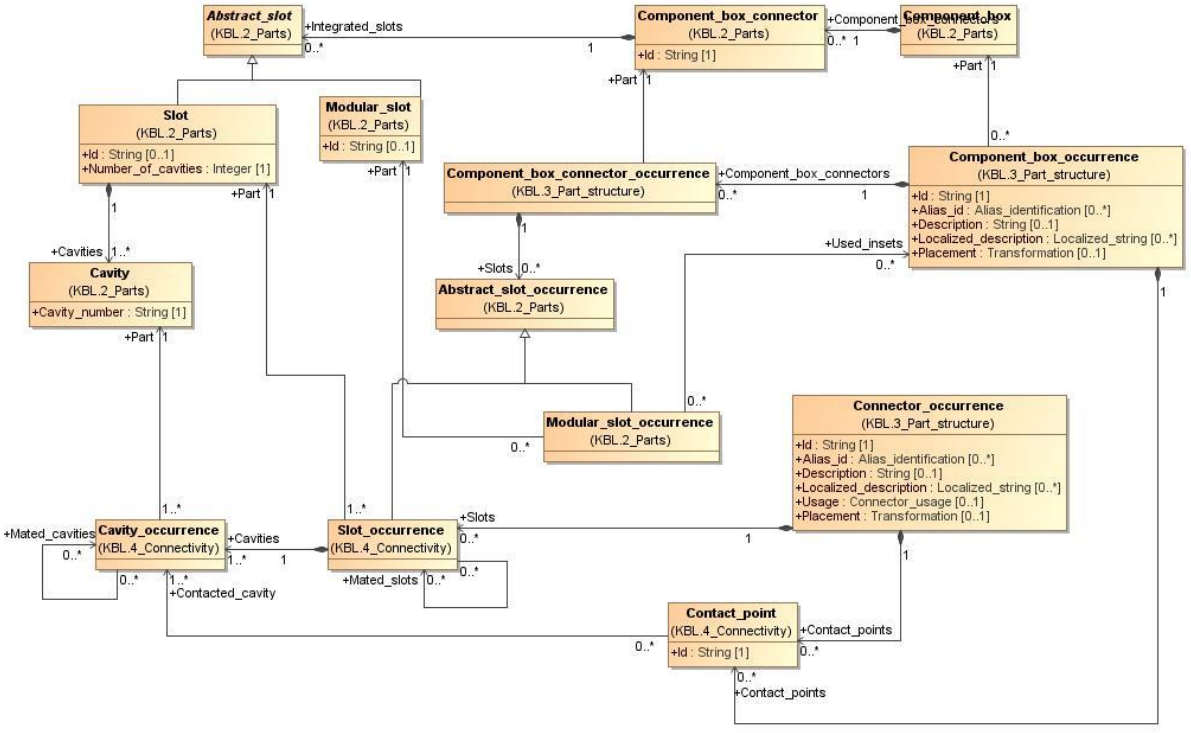


Figure 18: Part usage list (9)

The diagram illustrates the instantiation of a component box. For tan explanation see the part master data description of the Component_box.

2.17 Part usage list (10)



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Figure 19: Part usage list (10)

The diagram illustrates the instantiation of a component box. For tan explanation see the part master data description of the Component_box. Additionally a Component_box_occurrence can define its own Contact_points. This is necessary when wires are attached directly (without a harness connector) to the Component_box.

2.18 Topology and routing (1)

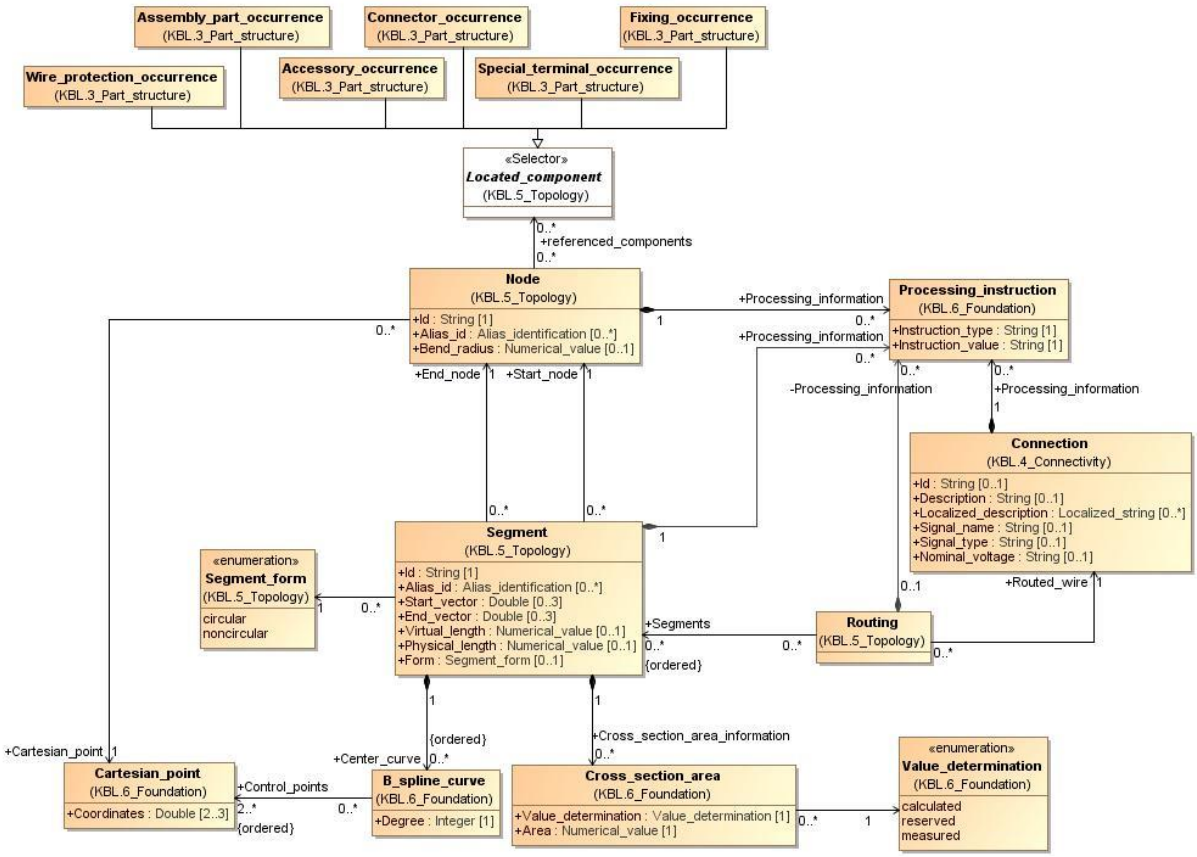


Figure 20: Topology and routing (1)

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2.19 Topology and routing (2)

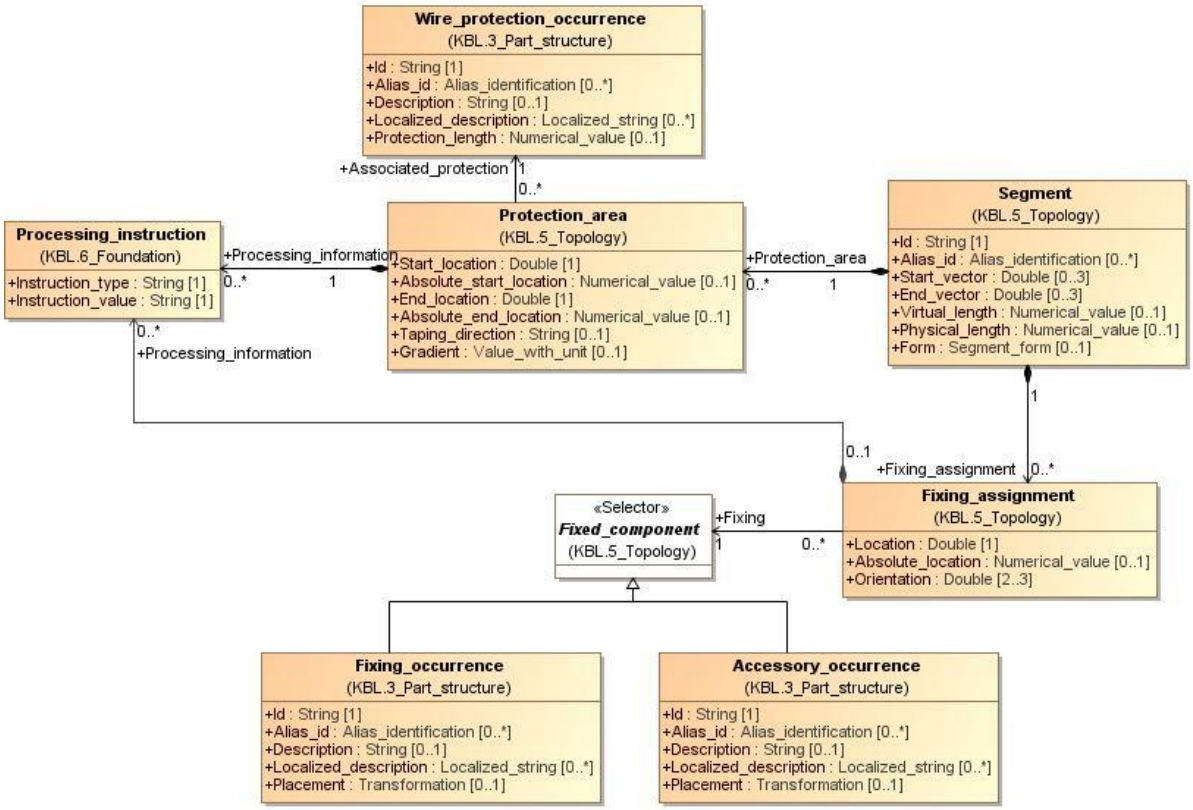


Figure 21: Topology and routing (2)

2.20 Topology and routing (3)

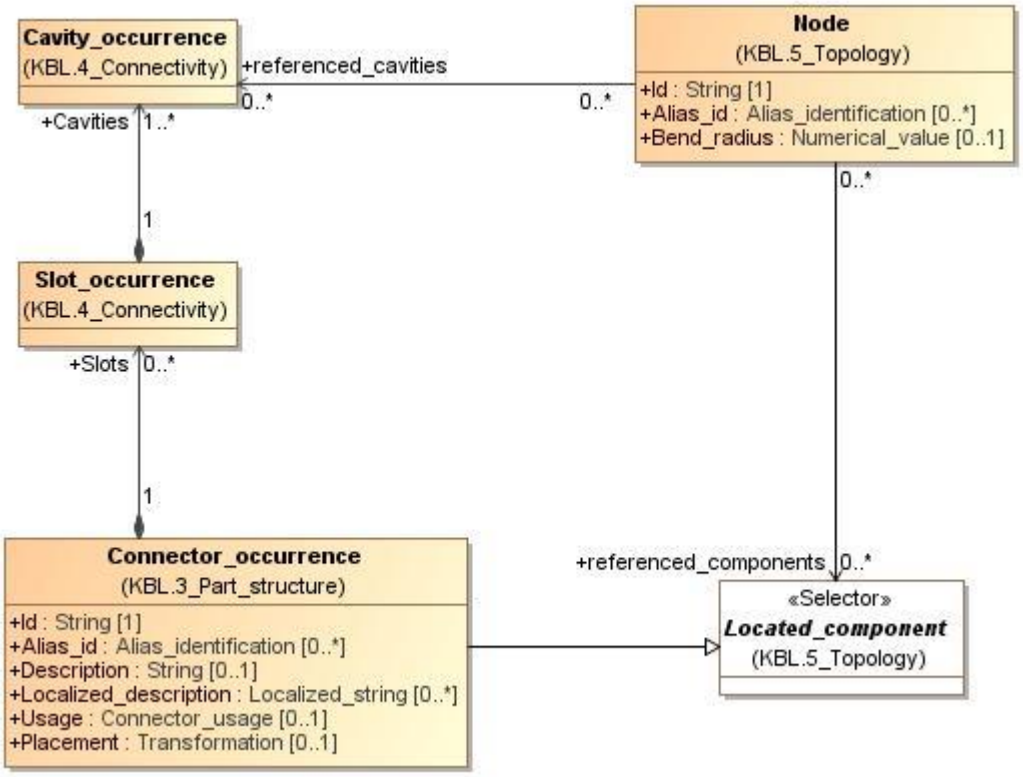


Figure 22: Topology and routing (3)

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This diagram displays the necessary information to support connectors with multiple segment connection points (since KBL2.4).

A Connector_occurrence with multiple segment connection points is still placed as "referenced components" on Nodes. In difference to a "normal" Connector_occurrence it is placed on multiple Nodes (this was already possible in KBL2.3-SR1). In order to support routing algorithms an addition reference between Nodes and Cavities was introduced. This reference can be used to detail the information defined by the "referenced_components" association. This means, if a Connector_occurrence is placed on multiple Nodes, the Nodes can reference which cavities of this Connector_occurrence can be reached via the Node.

2.21 Dimensions

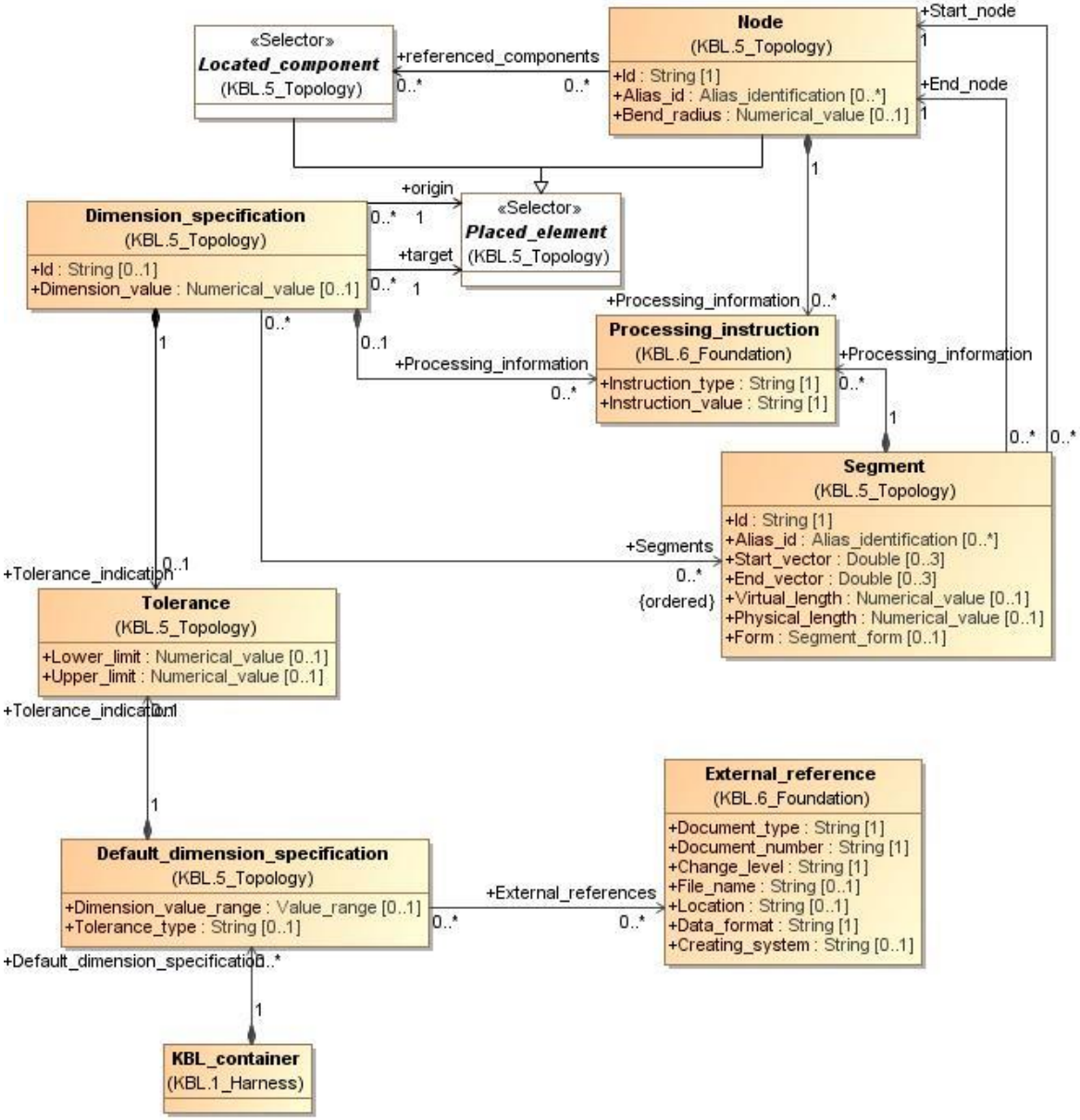


Figure 23: Dimensions

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2.22 Change Description

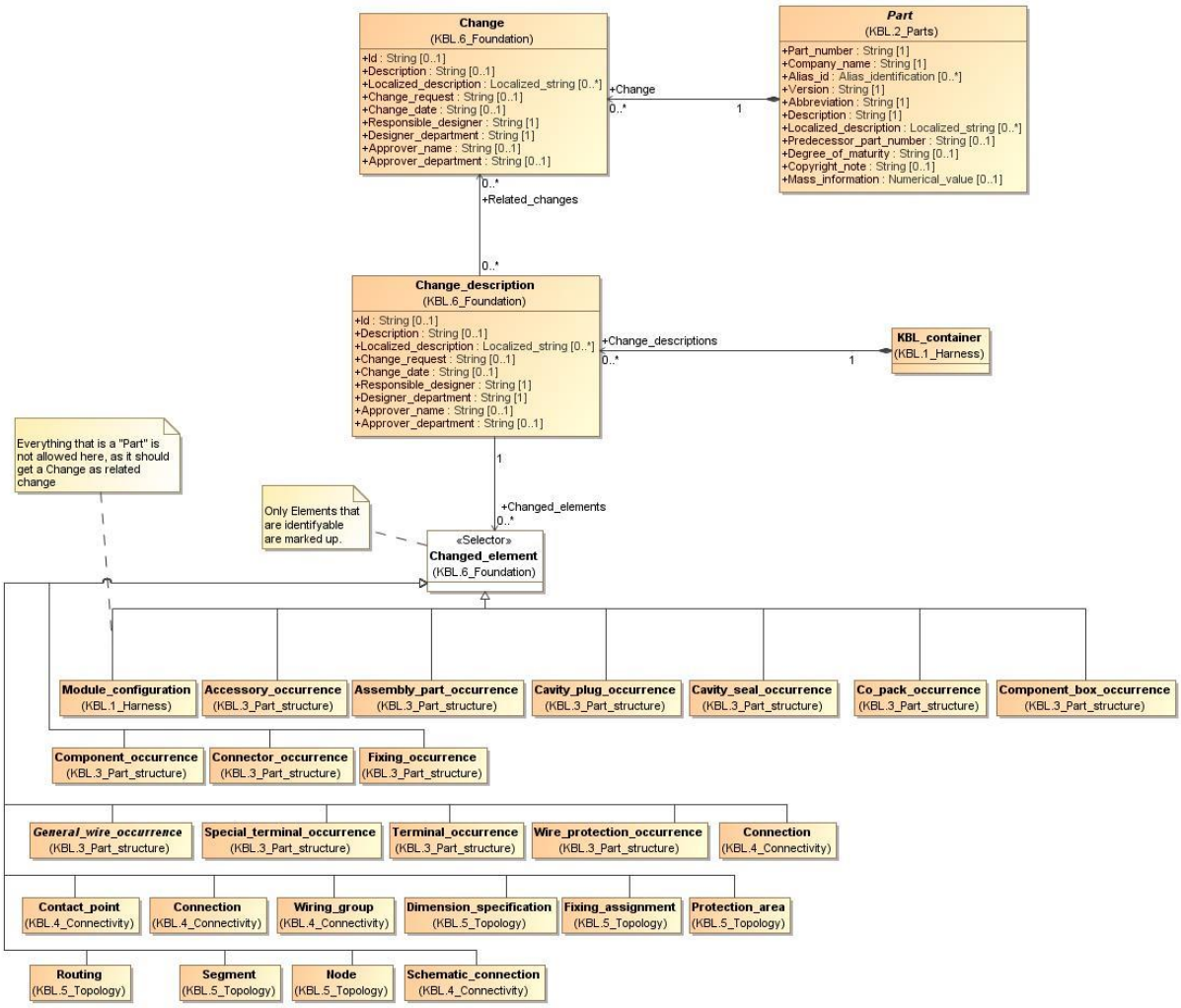


Figure 24: Change Description

The Change_description can be used to define / highlight the actual content of a Change. Therefore the Change_description can reference a set of Changed_elements in order to highlight that these elements have been affected by the change (in a paper based process this would have been done with "red circles"). However, deleted elements cannot be highlighted with this mechanism.

Since a physical change (the Change_description) can result in multiple changed parts (e.g. Modules) with different meta data, a Change_description can have a number of "related_changes". For example if a segment length is changed, all Modules that have wires through this segment will be changed. So the initial Change_description is the same for all Modules, but the meta data of the Change might be different for each Module (e.g. change index, approver ...)

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2.23 Miscellaneous

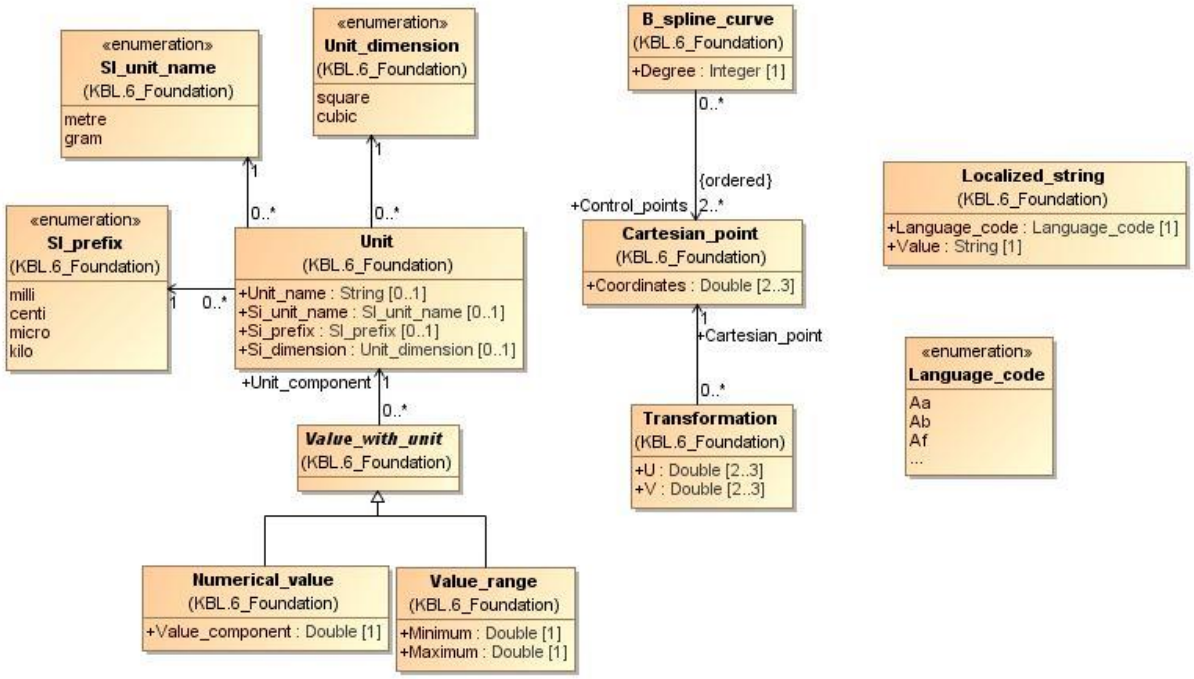


Figure 25: Miscellaneous

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2.24 KBL_Container

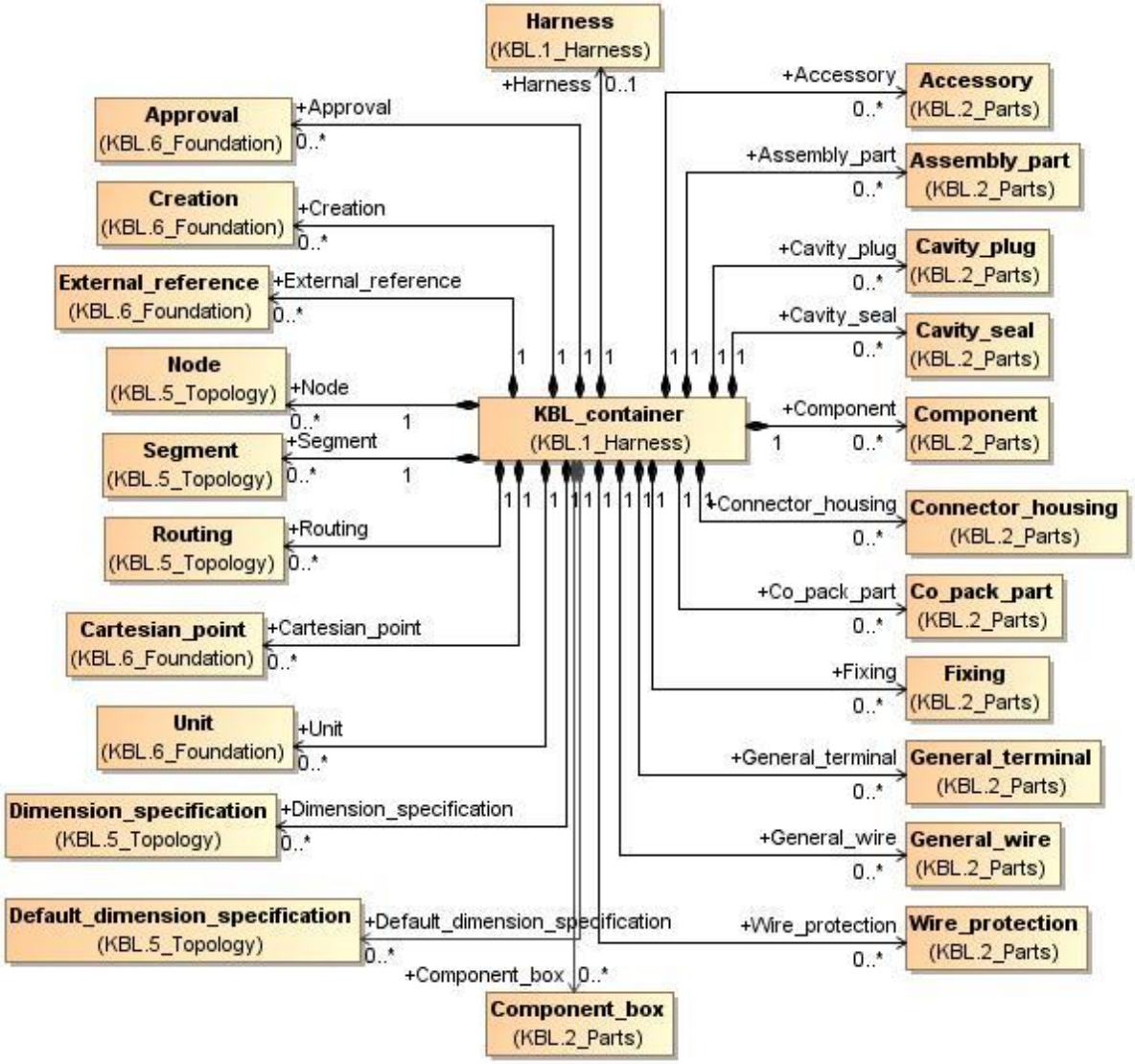


Figure 26: KBL_Container

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3 Glossary

3.1 Accessory (Zubehör)

Components, which may be used with connectors to facilitate their use in a wide range of applications. Accessories perform no electrical function and include such items as caps, covers, gaskets washers and boots.

3.2 Alias part (Alternativ Sachnummer)

Used to describe the part number of the part in another company

My part number: my123, alias part: your_part123

3.3 Assembly part (Baugruppe)

An assembly of multiple parts identified by a common part number

3.4 Block Diagram (Blockschaltbild)

Top-level function view of a complex infrastructure

3.5 Bundle (Leitungsbündel)

Multiple wires or cables sharing the same route can be combined to a bundle. A bundle is normally bound together mechanically by tape.

3.6 Cavity (Kontaktkammer)

Location for the contact in the housing, housings can contain 1-n cavities. Cavities can be grouped to slots.

3.7 Cavity Plug (Blindstopfen)

Connector accessory to fill and seal empty cavities

3.8 Cavity Seal (Kontaktkammerdichtung)

Connector accessory to fill and seal a populated cavity

3.9 Cable (Leitung)

Multiple physical conductors (-> Cores) can be combined in a cable. Cables are available in various technologies like twisted-pair, shielded, coax, etc.

3.10 Cable Drawing (Kabelzeichnung)

2D view of a single cable

3.11 Circuit Diagram (Funktionszeichnung)

Diagram of functionality with all needed parts and their connections

3.12 Connection (Verbindung)

A connection specifies the electrical connectivity between two or more contacts.

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3.13 Connection Diagram (Verbindungszeichnung)

Diagram with all connections, cables and bundles are shown with individual conductors.

3.14 Connector (Steckverbinder)

CONNECTORS are components, which terminate conductors for the purpose of providing connection and disconnection to a suitable mating component.

3.15 Connector housing (Steckergehäuse)

Body of the connector with 1-m slots containing 1-n cavities

3.16 Connector list (Steckerliste)

The tabular representation of a circuit diagram. The table shows all point to point connections and the connector pins.

3.17 Contact (Kontakt)

Active part of the connector, which connects electrical --- equal to “terminal”

3.18 Co pack part (Kabelbaumzubehör)

A part, which is supplied and installed together with the wiring harness, but without any electrical connection.

3.19 Core (Kabelader)

A core is part of a cable. A cable consists of 1-n cores

3.20 Extremity (Kabelende)

The endpoints of the wire or core.

3.21 Fixing (Kabelbefestigung)

Accessory part of the harness, used to fix the position.

3.22 Function Diagram (Funktionsplan)

Diagram that describes the functionality of a complex environment.

3.23 Harness (Kabelbaum)

The assembly of all wires and parts needed to connect the ECU’s, sensors, switches, and actuators. The extent of the harness depends on the car configuration. Harnesses can be defined as variants with individual part numbers for each configuration or as modular Harness (a brick box system) that can be configured by the specific selection of a set of modules.

3.24 Harness configuration (Kabelbaumvariante)

A superset of all available functions (150%) is described in function diagram. The harness configuration describes the harness of useful car configurations.

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3.25 Housing (Steckergehäuse)

Body of the connector

3.26 Form board (Formbrett)

2D representation of the 3D car topology; used in harness manufacturing

3.27 Module (Leitungsstrangmodul)

A defined set of parts (e.g. wires, connectors …), which is grouped to serve the connectivity for a certain range of functionality. A module is a brick stone of a modular Harness and has an individual part number.

Option: Audio System with CD Changer

The module contains the harness and the harness accessories used to install and use this option.

3.28 Module configuration (Modulumfang)

The set of attributes and the parts list of an individual module.

3.29 Module family (Modulfamilie)

A group of modules that cover similar functionality, which may have a partially redundant module part list. The Module family exists for logistical reasons.

3.30 Netlist (Verbindungsliste)

List of all connections and connectors

3.31 Node (Knotenpunkt)

A named position that is of interest for the placement of equipment

3.32 Part (Bauteil, Komponente)

An object with a part number.

3.33 Part master data (Stammdaten eines Bauteils)

Database with the description of the part, metadata, datasheet, CAD drawings, etc.

3.34 Part list (Stückliste)

List of all parts used in the design

3.35 Part substitution (Bauteiltausch)

A mechanism that describes the replacement of a sealing plug with a terminal. Typically usage: an optional module is added to a harness and a common connector will be used.

3.36 Plug (Steckeraufnahme)

Opposite contact side of a connector or terminal

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3.37 Protection area (Geschützter Bereich)

Area on a bundle where a protection element is attached. Some segments of a harness are crossing areas with critical conditions like higher temperatures, higher humidity, etc. To prevent the damage of the cable, protect shields are mounted for that segment.

3.38 Schematic Design (Schaltplan)

Graphical description of the functions, the configuration and the connections

3.39 Segment (Verbindungsabschnitt)

A topological subdivision of the harnesses route. By definition a wire can enter or leave a segment only on its start and end node. In-between there can be no change of the wire content.

3.40 Slot (Steckplatz)

A slot is a group of cavities within a connector housing, fitting to a mating housing or an electrical component

3.41 Special wire occurrence (Mehrdrahtleitung)

Mechanism to describe multi core cables in a module part list.

3.42 System Design (Systemschaltplan)

Top-level view of a complex environment

3.43 Terminal (Kontakt)

Active part of the connector, which connects electrical --- equal to “contact”

3.44 Topology (3D Bauraum)

Abstraction from the harnesses 3D geometry into nodes and segments to transform the complex 3D shape of the harness e.g. into an outstretched 2D view, a data model for routing calculation or for other purposes.

3.45 Wire (Leitung)

A solid or stranded group of solid cylindrical conductors, together with any associated insulation.

3.46 Wire length (Leitungslänge)

Wire attribute, which describes the length of the wire

3.47 Wire protection (Leitungsschutz)

Shield to prevent the wire bundle from damage.

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4 Data Model Description

4.1 Module 1_Harness

4.1.1 Class Connection_or_occurrence

A Connection_or_occurrence is an object that is controlled by a Module or a Harness.

General Information

Base Classifier	
Applied Stereotype	Selector
Is Abstract	true

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Module_configuration	0..*	Controlled_components	0..*	N	
Assembly_part	1	Components	0..*	Y	
Harness	1	Components	0..*	Y	

4.1.2 Class Harness

Kabelbaum

All wires in the car need to connect the ECU's, sensors, switches, and actuators. The harness depends on the car configuration.

A Harness is an assembly of insulated conductors formed to a predetermined pattern or configuration.

General Information

Base Classifier	Part_with_title_block
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Content	Harness_content	1	The content specifies the information covered by the Harness. The following values shall be used: - 'Harness Complete Set' - 'Harness Subset'

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Module	Module	0..*	1	Y	
Schematic_connection		0..*	1	Y	
Module_configuration	Module_configuration	0..*	1	Y	

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Harness_configuration	Harness_configuration	0..*	1	Y	
Module_family	Module_families	0..*	1	Y	
Connection_or_occurrence	Components	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
KBL_container	1	Harness	0..1	Y	

4.1.3 Class Harness_configuration

Kabelbaumvariante A superset of all available functions (150%) is described in function diagram. The harness configuration describes the harness of useful car configurations. A Harness_configuration is a variant of a harness.

General Information

Base Classifier	Part_with_title_block
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Logistic_control_information	String	0..1	The logistic_control_information specifies the calculated combination of the configuration codes reflecting customer, market or country requirements associated with a Harness_configuration. Example: 'LOL/LOR+CFL'

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Module	Modules	1..*	0..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Harness	1	Harness_configuration	0..*	Y	

4.1.4 Class KBL_container

The KBL_container is introduced to specify the information which can be exchanged by one file.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End	This	General

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Type	Role	Mult	Mult	Agg	Comment
Fixing	Fixing	0..*	1	Y	
Unit	Unit	0..*	1	Y	
Cavity_plug	Cavity_plug	0..*	1	Y	
Harness	Harness	0..1	1	Y	
General_wire	General_wire	0..*	1	Y	
General_terminal	General_terminal	0..*	1	Y	
Cartesian_point	Cartesian_point	0..*	1	Y	
Component_box	Component_box	0..*		Y	
Connector_housing	Connector_housing	0..*	1	Y	
Wire_protection	Wire_protection	0..*	1	Y	
Creation	Creation	0..*	1	Y	
Approval	Approval	0..*	1	Y	
Assembly_part	Assembly_part	0..*	1	Y	
Co_pack_part	Co_pack_part	0..*	1	Y	
Accessory	Accessory	0..*	1	Y	
Node	Node	0..*	1	Y	
Cavity_seal	Cavity_seal	0..*	1	Y	
Routing	Routing	0..*	1	Y	
Component	Component	0..*	1	Y	
Change_description	Change_descriptions	0..*	1	Y	
Dimension_specification	Dimension_specification	0..*	1	Y	
External_reference	External_reference	0..*	1	Y	
Default_dimension_specification	Default_dimension_specification	0..*	1	Y	
Segment	Segment	0..*	1	Y	

4.1.5 Class Module

A Module is a physical part of harness electrically defined by one or more module groups including required harness furniture.

General Information

Base Classifier	Part_with_title_block
Applied Stereotype	

Copyright: VDA

Is Abstract	false

Attributes

Name	Type	Mult	Comment
Content	Module_content	1	The content specifies the information covered by the Module. The following values shall be used: - 'variant' - 'module'

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Module_configuration	Module_configuration	1	1	Y	
Module_family	Of_family	0..1	0..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Harness	1	Module	0..*	Y	
Harness_configuration	0..*	Modules	1..*	N	

4.1.6 Class Module_configuration

A Module_configuration is a grouping of wires and components fulfilling a specific functionality of a harness. Example: Option: Audio System with CD Changer

General Information

Base Classifier	Changed_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Logistic_control_information	String	1	The logistic_control_information specifies the calculated combination of the configuration codes reflecting customer, market or country requirements, or a list of modules associated with a Module_configuration. The meaning of the string is further described by the configuration_type. Example: 'LOL/LOR+CFL'
Configuration_type	Module_configuration_type	0..1	The configuration_type specifies further information on the type of the logistic_control_information. Note: To control completion parts which are only used if a specific combination of modules occur, a Module_configuration can be used with a logistic_control_information containing the Boolean expression for the combination and a configuration_type 'module list'. Where applicable the following values shall be used: - 'option code': the logistic_control_information contains configuration codes reflecting customer, market or country requirements - 'module list': the logistic_control_information contains a list of modules, to which a completion part controlled by the Modul_configuration belongs to

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**

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Connection_or_occurrence	Controlled_components	0..*	0..*	N	
Processing_instruction		0..*	0..1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Module	1	Module_configuration	1	Y	
Harness	1	Module_configuration	0..*	Y	

4.1.7 Class Module_family

Funktionsfamilie Description of a set of modules. A Module_family is a mechanism to group mutually exclusive modules. EXAMPLE "audio equipment"

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	1	The id specifies the identifier of the Module_family.
Description	String	0..1	The description specifies additional information about the Module_family.
Localized_description	Localized_string	0..*	The description specifies additional information about the object. The Localized_description provides the possibility to define descriptions for different language codes.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Processing_instruction	Processing_information	0..*	0..1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Module	0..*	Of_family	0..1	N	
Harness	1	Module_families	0..*	Y	

4.1.8 Enumeration Harness_content

General Information

Applied Stereotype	

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Enumeration Literals

Name		Comment
harness complete set		
harness subset		

4.1.9 Enumeration Module_configuration_type

General Information

Applied Stereotype	

Enumeration Literals

Name		Comment
option code		
module list		

4.1.10 Enumeration Module_content

General Information

Applied Stereotype	

Enumeration Literals

Name		Comment
module		
variant		

4.2 Module 2_Parts

4.2.1 Class Abstract_slot

An abstract Slot, which is either a Slot or a Modular_slot.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	true

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Component_box_connector	1	Integrated_slots	0..*	Y	

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4.2.2 Class Abstract_slot_occurrence

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Component_box_connector_occurrence	1	Slots	0..*	Y	

4.2.3 Class Accessory

Zubehör Components which may be used with connectors to facilitate their use in a wide range of applications. Accessories perform no electrical function and include such items as caps, covers, gaskets washers and boots. An Accessory is any supplementary portion of a connector with the obligation to help a Harness to perform its function. Example: An Accessory may be a sleeve, a cap, a cable strap or comparable parts, which are installed to a plug.

General Information

Base Classifier	Part
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Accessory_type	String	0..1	The accessory_type specifies the type of an Accessory. Note: There are no values pre-defined. Special values have to be negotiated between exchange partners.

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
KBL_container	1	Accessory	0..*	Y	
Accessory_occurrence	1..*	Part	1	N	

4.2.4 Class Assembly_part

Teilmontiertes Bauteil An assembly of multiple parts identified by a common part number. An Assembly_part is a component that contains other subordinate objects. An Assembly_part is ordered as a part to be bought under a part number, due to limited functionalities of the CAD systems these must be described however with several individual parts.

General Information

Base Classifier	Part
Applied Stereotype	
Is Abstract	false

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Attributes

Name	Type	Mult	Comment
Part_type	String	0..1	The part_type specifies the type of an Assembly_part. Note: There are no values pre-defined. Special values have to be negotiated between exchange partners.

Outgoing Relations

Other End			This	General	
Type	Role	Mult	Mult	Agg	Comment
Connection_or_occurrence	Components	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	Mult	Role	Mult	Agg	Comment
Assembly_part_occurrence	1..*	Part	1	N	
KBL_container	1	Assembly_part	0..*	Y	

4.2.5 Class Cavity

Kontaktkammer A cavity is a defined space in a housing for location of an electrical terminal or cavity plug/seal (can be empty).

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Cavity_number	String	1	The cavity_number specifies the identifier of the Cavity. Note: The uniqueness of a cavity id within a harness is fulfilled by the concatenation of the connector id, the slot id, and the cavity id.

Outgoing Relations

Other End			This	General	
Type	Role	Mult	Mult	Agg	Comment
Processing_instruction	Processing_information	0..*	0..1	Y	

Incoming Relations

Other End		This End		General	
Type	Mult	Role	Mult	Agg	Comment
Component_box_connection	0..*	Cavities	0..*	N	
Cavity_occurrence	1..*	Part	1	N	
Slot	1	Cavities	1..*	Y	

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4.2.6 Class Cavity_plug

Blindstopfen Connector accessory to fill and seal empty cavities A Cavity_plug is a water tight non-electrical object to fill an empty cavity.

General Information

Base Classifier	Part
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Colour	String	0..1	The colour specifies the colour of the Cavity_plug.
Plug_type	String	0..1	The plug_type specifies the type of a Cavity_plug. Note: There are no values pre-defined. Special values have to be negotiated between exchange partners.

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
KBL_container	1	Cavity_plug	0..*	Y	
Cavity_plug_occurrence	1..*	Part	1	N	

4.2.7 Class Cavity_seal

Kontaktkammerversiegelung Connector accessory to fill and seal a populated cavity. A Cavity_seal is a water tight non-electrical object to fill a populated Cavity.

General Information

Base Classifier	Part
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Colour	String	0..1	The colour specifies the colour of the Cavity_seal.
Seal_type	String	0..1	The seal_type specifies the type of a Cavity_seal. Note: There are no values pre-defined. Special values have to be negotiated between exchange partners.
Wire_size	Value_range	0..1	The wire_size specifies the size range of the wires the seal fits.

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
KBL_container	1	Cavity_seal	0..*	Y	
Cavity_seal_occurrence	1..*	Part	1	N	

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4.2.8 Class Co_pack_part

Kabelbaumzubehör A Co_pack_part is a Part which is supplied and installed with the wiring harness, but without any electrical connection.

General Information

Base Classifier	Part
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Part_type	String	0..1	The part_type specifies the type of a Co_pack_part. Note: There are no values pre-defined. Special values have to be negotiated between exchange partners.

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Co_pack_occurrence	1..*	Part	1	N	
KBL_container	1	Co_pack_part	0..*	Y	

4.2.9 Class Component

A Component is an object which belongs to the harness. Example: Fuse, fuse box, relay sockets

General Information

Base Classifier	Part
Applied Stereotype	
Is Abstract	false

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Component_occurrence	1..*	Part	1	N	
KBL_container	1	Component	0..*	Y	

4.2.10 Class Component_box

A component box is a part that can hold components (e.g. relais, fuses etc.).

General Information

Base Classifier	Part
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End	This	General

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Type	Role	Mult	Mult	Agg	Comment
Component_slot	Component_slots	0..*	1	Y	
Component_box_connector	Component_box_connectors	0..*	1	Y	
Component_box_connection	Connections	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Modular_slot	0..*	Allowed_inserts	0..*	N	
Component_box_occurrence	0..*	Part	1	N	
KBL_container		Component_box	0..*	Y	

4.2.11 Class Component_box_connection

Defines the internal connectivity of a Component_box.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	1	

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Component_cavity	Component_cavities	0..*	0..*	N	
Cavity	Cavities	0..*	0..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Component_box	1	Connections	0..*	Y	

4.2.12 Class Component_box_connector

A connector in the component_box where either a harness connector is attached to or where wires from the harness are attached directly.

General Information

Base Classifier	
Applied Stereotype	

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Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	1	

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Connector_housing	Compatible_housings	0..*	0..*	N	
Abstract_slot	Integrated_slots	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Component_box_connector_occurrence		Part	1	N	
Component_box	1	Component_box_connectors	0..*	Y	

4.2.13 Class Component_cavity

A slot in the Component_box where a Component can be mounted.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Cavity_number	String	1	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Component_box_connection	0..*	Component_cavities	0..*	N	
Component_cavity_occurrence	0..*	Part	1	N	
Component_slot	1	Component_cavities	0..*	Y	

4.2.14 Class Component_slot

A slot in the Component_box where a Component can be mounted.

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General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	1	
Type	String	0..1	
Valid_fuse_types	Fuse_type	0..*	
Min_current	Numerical_value	0..1	Defines the minimum current that is valid in this component slot.
Max_current	Numerical_value	0..1	Defines the maximum current that is valid in this component slot.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Component_cavity	Component_cavities	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Component_slot_occurrence	0..*	Part	1	N	
Component_box	1	Component_slots	0..*	Y	

4.2.15 Class Connector_housing

Body of the connector with 1-n cavities. A Connector_housing is a non populated connector, i.e. without addressed/populated cavities. A Connector_housing without any slot allows for the representation of a connector shell (Mehrfachstecker)

General Information

Base Classifier	Part
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Housing_colour	String	0..1	The housing_colour specifies the colour of the Connector_housing.
Housing_code	String	0..1	The housing_code specifies a coding for the type of the Connector_housing.
Housing_type	String	0..1	The housing_type specifies the type of a Connector_housing. Example: family series type like 'MQS2.8' Note: There are no values pre-defined. Special values have to be negotiated between

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			exchange partners.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Slot	Slots	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Connector_occurrence	1..*	Part	1	N	
Component_box_connector	0..*	Compatible_housings	0..*	N	
KBL_container	1	Connector_housing	0..*	Y	

4.2.16 Class Core

Kabelader A core is part of a cable. A cable consists of 1-n cores A Core is a single conductor of a multi-core wire including its isolation.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	1	The id specifies the identifier of the Core.
Cable_designator	String	0..1	The cable_designator specifies additional information to refer to a Core.
Wire_type	String	0..1	The wire_type specifies the type of a Core. Note: There are no values pre-defined. Special values have to be negotiated between exchange partners. Example: 'protected wire', 'flat band'.
Cross_section_area	Numerical_value	1	The cross_section_area specifies the electrical cross section of the Core.
Outside_diameter	Numerical_value	0..1	The outside_diameter specifies the outer width of the Core.
Bend_radius	Numerical_value	0..1	The bend_radius specifies the bend radius of a core.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Processing_instruction	Processing_information	0..*	0..1	Y	
Wire_colour	Core_colour	1..*	1	Y	

Incoming Relations

Other End	This End	General

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Type	Mult	Role	Mult	Agg	Comment
General_wire	1	Core	0..*	Y	
Core_occurrence	1..*	Part	1	N	

4.2.17 Class Fixing

Kabelbefestigung A Fixing is an accessory part of the harness, used to fix the position. Fixing elements cover all parts that are used in cable section. Example: clips, sleeves, cable ducts, grommet, etc.

General Information

Base Classifier	Part
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Fixing_type	String	0..1	The fixing_type specifies the type of a Fixing. Note: There are no values pre-defined. Special values have to be negotiated between exchange partners. Example: Examples are 'fastening part', 'channel', 'sleeve', 'shaft', 'conduct', 'pine-tree'

Incoming Relations

Other End		This End		General	
Type	Mult	Role	Mult	Agg	Comment
KBL_container	1	Fixing	0..*	Y	
Fixing_occurrence	1..*	Part	1	N	

4.2.18 Class Fuse

General Information

Base Classifier	Component
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
type	Fuse_type	0..1	Defines the type of the fuse.
Nominal_current	Numerical_value	0..1	
Colour	String	0..1	

4.2.19 Class Fuse_type

Allows the definition of fuse type information.

General Information

Base Classifier	

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Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Key	String	1	The key of the fuse type in the corresponding fuse type reference system.
Reference_system	String	1	The identification of the fuse type reference system, which is defining possible values and the semantic of fuse type keys.

4.2.20 Class General_terminal

Kontakt A General_terminal is a device designed to terminate a conductor to be affixed usually to a post, stud, chassis, or other conductor or the like in order to establish electrical connection. Note: A General_terminal describes the active part of the connector, which connects electrical, equal to "contact".

General Information

Base Classifier	Part
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Terminal_type	String	0..1	The terminal_type specifies the type of a General_terminal. Note: There are no values pre-defined. Special values have to be negotiated between exchange partners. Example: 'pin', 'Blade', 'male', 'female', 'grease', 'FL - flat contact', 'KK - box contact', 'SK - ring wire', 'RK - ring lug', 'KS - lug', 'BK - battery clamp', 'OL - open line end of frame', 'SP - splice', 'MK - multiple contact'
Plating_material	String	0..1	The plating_material specifies the overlaying of a thin coating of metal on components to improve conductivity, provide for easy soldering or prevent rusting or corrosion.
Cross_section_area	Value_range	0..1	The cross_section_area specifies the electrical cross section, which can be accommodated by the General_terminal.
Outside_diameter	Value_range	0..1	The outside_diameter specifies the outer width of the isolation, which can be accommodated by the General_terminal.

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
KBL_container	1	General_terminal	0..*	Y	
Terminal_occurrence	1..*	Part	1	N	
Special_terminal_occurrence	1..*	Part	1	N	

4.2.21 Class General_wire

A General_wire is a physical wire, performing electrical connection. A General_wire can either be used to define a single wire or a multi-core wire.

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General Information

Base Classifier	Part
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Cable_designator	String	0..1	The cable_designator specifies additional information to refer to a General_wire.
Wire_type	String	0..1	The wire_type specifies the type of a General_wire. Note: There are no values pre-defined. Special values have to be negotiated between exchange partners. Example: 'individual wire', 'multi-core wire', 'protected wire', 'flat band'.
Bend_radius	Numerical_value	0..1	The bend_radius specifies the bend radius of a wire.
Cross_section_area	Numerical_value	0..1	The cross_section_area specifies the electrical cross section of the General_wire.
Outside_diameter	Numerical_value	0..1	The outside_diameter specifies the outer width of the General_wire.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Core	Core	0..*	1	Y	
Wire_colour	Cover_colour	1..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
KBL_container	1	General_wire	0..*	Y	
General_wire_occurrence	1..*	Part	1	N	

4.2.22 Class Modular_slot

A Modular_slot can hold Component_boxes as inserts in order to describe modular component boxes recursively.

General Information

Base Classifier	Abstract_slot
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	0..1	

Outgoing Relations

Other End	This	General

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Type	Role	Mult	Mult	Agg	Comment
Component_box	Allowed_inserts	0..*	0..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Modular_slot_occurrence	0..*	Part	1	N	

4.2.23 Class Modular_slot_occurrence

General Information

Base Classifier	Abstract_slot_occurrence
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Component_box_occurrence	Used_insets	0..*	0..*	N	
Modular_slot	Part	1	0..*	N	

4.2.24 Class Part

Bauteil, Komponente A part is an element of a product relevant for a bill-of material.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	true

Attributes

Name	Type	Mult	Comment
Part_number	String	1	The part_number specifies the identifier of the Part. The format of the part number is user defined (OEM specific).
Company_name	String	1	The company_name specifies the name of the organizational context in which the Part_number is defined.
Alias_id	Alias_identification	0..*	The alias_id specifies an additional part_number that is used to identify the Part in another organizational context (e.g. company).
Version	String	1	The version specifies the version identifier of the Part. A version cumulates and consolidates one or more single changes.
Abbreviation	String	1	The abbreviation specifies a short name for a Part.
Description	String	1	The description specifies additional information about the Part.
Localized_description	Localized_string	0..*	The description specifies additional information about the object. The Localized_description provides the possibility to define descriptions for different language codes.

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Predecessor_part_number	String	0..1	The predecessor_part_number specifies the part number of the predecessor of the Part.
Degree_of_maturity	String	0..1	The degree_of_maturity specifies the degree of maturity of a Part. Where applicable the following values shall be used: - 'draft' - 'planning' - 'equipment order' - 'disposition'
Copyright_note	String	0..1	The copyright_note specifies copyright information for a Part.
Mass_information	Numerical_value	0..1	The mass_information specifies the mass of a Part. Example: Valid values for the unit of the Numerical_value specifying the mass are 'gram', 'kilogram', or also 'kg/piece', 'gram/meter'

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Material	Material_information	0..1	1	Y	
Processing_instruction	Processing_information	0..*	0..1	Y	
External_reference	External_references	0..*	0..*	N	
Change	Change	0..*	1	Y	

4.2.25 Class Part_with_title_block

A Part_with_title_block is a mechanism to assign additional information to a Harness, a Harness_configuration or a Module.

General Information

Base Classifier	Part
Applied Stereotype	
Is Abstract	true

Attributes

Name	Type	Mult	Comment
Project_number	String	0..1	The project_number specifies the development order number (car or engine project)
Car_classification_level_2	String	1	The car_classification_level_2 provides a classification according to "CC8 Recommended Practices Specification and Configuration, Product Structures". Car classification is the identification of a set of similar cars to be offered to the market. Level 2 stands for "Technical information / platform" and reflects the level of a product class in a BoM system which represents a main technical product base (e.g. project, platform, engineering series etc.). In some cases this level carries a complete BoM ("Maximum BoM") for a project, platform, engineering series etc. This level is in some cases called technical documentation.
Car_classification_level_3	String	0..1	The car_classification_level_3 provides a classification according to "CC8 Recommended Practices Specification and Configuration, Product Structures". Car classification is the identification of a set of similar cars to be offered to the market. Level 3 stands for "Configuration information / product family" where all variant control mechanisms are attached.
Car_classification_level_4	String	0..1	The car_classification_level_4 provides a classification according to "CC8 Recommended Practices Specification and Configuration, Product Structures". Car classification is the identification of a set

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			of similar cars to be offered to the market. Level 4 stands for "Furthest pre-configured abstract product class" and represents the furthest configured class of a product, which is not yet a real product. E.g. this could be a complete vehicle, engine, gear-box etc. which has not been evaluated against customer special choices or an abstract vehicle, engine, gear-box etc. which could become a real one after the associated BoM is evaluated. The purpose of this level of a product class instance is in any case to reflect that level of product class of a BoM system which leads to the individual BoM for a single product.
Model_year	String	1	The model_year specifies the year of the car model.

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Creation	0..*	Is_applied_to	1..*	N	
Approval	0..*	Is_applied_to	1..*	N	

4.2.26 Class Slot

A Slot is a mechanism to group the Cavity objects of a Connector_housing.

General Information

Base Classifier	Abstract_slot
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	0..1	The id specifies the identifier of the Slot.
Number_of_cavities	Integer	1	The number_of_cavities specifies the number of cavities associated with the Slot.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Processing_instruction	Processing_information	0..*	0..1	Y	
Cavity	Cavities	1..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Slot_occurrence	1..*	Part	1	N	
Connector_housing	1	Slots	0..*	Y	

4.2.27 Class Wire_protection

Kabelschutzmantel A Wire_protection is a mechanism to describe harness wrappings, a shield to prevent the wire from damaging. It covers all kinds of wrappings modeled by CAD systems.

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General Information

Base Classifier	Part
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Protection_type	String	0..1	The protection_type specifies the type of the Wire_protection. Note: There are no values pre-defined. Special values have to be negotiated between exchange partners. Example: 'coil', 'corrugated pipe', 'foam rubber strip'
Type_dependent_parameter	String	0..1	The type_dependent_parameter specifies further information dependent on the type of the Wire_protection. Note: There are no values pre-defined. Special values have to be negotiated between exchange partners. Example: for corrugated pipe: wave shape, for pull-push rule: width.

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Wire_protection_occurrence	1..*	Part	1	N	
KBL_container	1	Wire_protection	0..*	Y	

4.3 Module 3_Part_structure

4.3.1 Class Accessory_occurrence

An Accessory_occurrence is the occurrence of an Accessory in a module part list.

General Information

Base Classifier	Changed_element Connection_or_occurrence Fixed_component Located_component Reference_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	1	The id specifies the identifier of the Accessory_occurrence.
Alias_id	Alias_identification	0..*	The alias_id specifies additional identifiers for the Accessory_occurrence.
Description	String	0..1	The description specifies additional information about the object.
Localized_description	Localized_string	0..*	The description specifies additional information about the object. The Localized_description provides the possibility to define descriptions for different language codes.

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Placement	Transformation	0..1	The placement specifies the transformation information, which is used to locate and orient the occurrence in the car coordinate system. For further information see [CESAK].

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Installation_instruction	Installation_information	0..*	1	Y	
Reference_element	Reference_element	0..*	0..*	N	
Accessory	Part	1	1..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Specified_accessory_occurrence	0..*	Related_occurrence	1	N	

4.3.2 Class Assembly_part_occurrence

An Assembly_part_occurrence is the occurrence of an Assembly_part in a module part list.

General Information

Base Classifier	Changed_element Connection_or_occurrence Located_component Reference_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	1	The id specifies the identifier of the Assembly_part_occurrence.
Alias_id	Alias_identification	0..*	The alias_id specifies additional identifiers for the Assembly_part_occurrence.
Description	String	0..1	The description specifies additional information about the object.
Localized_description	Localized_string	0..*	The description specifies additional information about the object. The Localized_description provides the possibility to define descriptions for different language codes.
Placement	Transformation	0..1	The placement specifies the transformation information, which is used to locate and orient the occurrence in the car coordinate system. For further information see [CESAK].

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Installation_instruction	Installation_information	0..*	1	Y	

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Assembly_part	Part	1	1..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Specified_fixing_occurrence	0..*	Related_assembly	1	N	
Specified_special_terminal_occurrence	0..*	Related_assembly	1	N	
Specified_cavity_plug_occurrence	0..*	Related_assembly	1	N	
Specified_component_box_occurrence	0..*	Related_assembly	1	N	
Specified_co_pack_occurrence	0..*	Related_assembly	1	N	
Specified_connector_occurrence	0..*	Related_assembly	1	N	
Specified_terminal_occurrence	0..*	Related_assembly	1	N	
Specified_wire_occurrence	0..*	Related_assembly	1	N	
Specified_accessory_occurrence	0..*	Related_assembly	1	N	
Specified_component_occurrence	0..*	Related_assembly	1	N	
Specified_cavity_seal_occurrence	0..*	Related_assembly	1	N	
Specified_wire_protection_occurrence	0..*	Related_assembly	1	N	
Specified_special_wire_occurrence	0..*	Related_assembly	1	N	

4.3.3 Class Cavity_plug_occurrence

A Cavity_plug_occurrence is the occurrence of a Cavity_plug in a module part list. Note: Cavity_plugs do not show up in a module bill of material.

General Information

Base Classifier	Changed_element Connection_or_occurrence Reference_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment

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Id	String	0..1	The id specifies the identifier of the Cavity_plug_occurrence.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Cavity_plug	Part	1	1..*	N	
Installation_instruction	Installation_information	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Part_substitution	0..*	Replaced	1	N	
Cavity_occurrence	1..*	Associated_plug	0..1	N	
Specified_cavity_plug_occurrence	0..*	Related_occurrence	1	N	

4.3.4 Class Cavity_seal_occurrence

A Cavity_seal_occurrence is the occurrence of a Cavity_seal in a module. Note: The number of occurrences used in a specific module or harness can be calculated by the individual occurrences. Note: The usage of a Cavity_seal_occurrence for a particular Cavity is specified by the Part_usage object.

General Information

Base Classifier	Changed_element Connection_or_occurrence Part_usage_select Reference_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	0..1	The id specifies the identifier of the Cavity_seal_occurrence.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Cavity_seal	Part	1	1..*	N	
Installation_instruction	Installation_information	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Specified_cavity_seal_occurrence	0..*	Related_occurrence	1	N	

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4.3.5 Class Co_pack_occurrence

A Co_pack_occurrence is the occurrence of a Co_pack_part in a module part list.

General Information

Base Classifier	Changed_element Connection_or_occurrence Reference_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	1	The id specifies the identifier of the Co_pack_occurrence.
Alias_id	Alias_identification	0..*	The alias_id specifies additional identifiers for the Co_pack _occurrence.
Description	String	0..1	The description specifies additional information about the object.
Localized_description	Localized_string	0..*	The description specifies additional information about the object. The Localized_description provides the possibility to define descriptions for different language codes.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Co_pack_part	Part	1	1..*	N	
Installation_instruction	Installation_information	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Specified_co_pack _occurrence	0..*	Related_occurrence	1	N	

4.3.6 Class Component_box_connector_occurrence

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Abstract_slot_occurrence	Slots	0..*	1	Y	
Component_box_connector	Part	1		N	

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Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Component_box_occurrence	1	Component_box_connectors	0..*	Y	

4.3.7 Class Component_box_occurrence

General Information

Base Classifier	Changed_element Connection_or_occurrence Reference_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	1	
Alias_id	Alias_identification	0..*	
Description	String	0..1	
Localized_description	Localized_string	0..*	
Placement	Transformation	0..1	

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Component_slot_occurrence	Component_slots	0..*	1	Y	
Component_box	Part	1	0..*	N	
Component_box_connector_occurrence	Component_box_connectors	0..*	1	Y	
Contact_point	Contact_points	0..*	1	Y	
Installation_instruction	Installation_information	0..*	1	Y	
Reference_element	Reference_element	0..*	0..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Specified_component_box_occurrence	0..*	Related_occurrence	1	N	

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Modular_slot_occurrence	0..*	Used_insets	0..*	N	

4.3.8 Class Component_cavity_occurrence

General Information

Base Classifier	Mounting_element
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Component_cavity	Part	1	0..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Component_slot_occurrence	1	Component_cavities	0..*	Y	

4.3.9 Class Component_occurrence

A Component_occurrence is the occurrence of a Component in a module part list.

General Information

Base Classifier	Changed_element Connection_or_occurrence Reference_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	1	The id specifies the identifier of the Component.
Alias_id	Alias_identification	0..*	The alias_id specifies additional identifiers for the Component.
Description	String	0..1	The description specifies additional information about the object.
Localized_description	Localized_string	0..*	The description specifies additional information about the object. The Localized_description provides the possibility to define descriptions for different language codes.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Component	Part	1	1..*	N	
Mounting_element	Mounting	1..*	0..*	N	

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Installation_instruction	Installation_information	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Specified_component_occurrence	0..*	Related_occurrence	1	N	

4.3.10 Class Component_slot_occurrence

General Information

Base Classifier	Mounting_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	0..1	

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Component_slot	Part	1	0..*	N	
Component_cavity_occurrence	Component_cavities	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Component_box_occurrence	1	Component_slots	0..*	Y	

4.3.11 Class Connector_occurrence

Steckverbinder A Connector_occurrence is the occurrence of a Connector_housing in a module part list.

General Information

Base Classifier	Changed_element Connection_or_occurrence Located_component Mounting_element Reference_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment

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Id	String	1	The id specifies the identifier of the Connector_occurrence.
Alias_id	Alias_identification	0..*	The alias_id specifies additional identifiers for the Connector_occurrence.
Description	String	0..1	The description specifies additional information about the object.
Localized_description	Localized_string	0..*	The description specifies additional information about the object. The Localized_description provides the possibility to define descriptions for different language codes.
Usage	Connector_usage	0..1	The usage specifies the way how a Connector_occurrence is used in a connection. Where applicable the following values shall be used: - 'no end': end of wire without any connector ("blunt cut") - 'ring terminal': - 'splice': - 'dangler': terminal without any connector housing.
Placement	Transformation	0..1	The placement specifies the transformation information, which is used to locate and orient the occurrence in the car coordinate system. For further information see [CESAK].

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Connector_housing	Part	1	1..*	N	
Slot_occurrence	Slots	0..*	1	Y	
Contact_point	Contact_points	0..*	1	Y	
Reference_element	Reference_element	0..*	0..*	N	
Installation_instruction	Installation_information	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Specified_connector_occurrence	0..*	Related_occurrence	1	N	

4.3.12 Class Consumers

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String		
Alias_id	Alias_identification	0..*	The alias_id specifies additional identifiers for the Component.
Description	String	0..1	The description specifies additional information about the object.

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Localized_description	Localized_string	0..*	The description specifies additional information about the object. The Localized_description provides the possibility to define descriptions for different language codes.

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Fuse_occurrence	1	attachedConsumers	0..*	Y	

4.3.13 Class Core_occurrence

A Core_occurrence is the occurrence of a Core within a Special_wire_occurrence.

General Information

Base Classifier	Wire_or_core_occurrence
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Wire_number	String	1	The wire_number specifies the identification of a wire. This number is unique within a vehicle and usually automatically generated (dependent on "from- to" information). Note: Each interior conductor of a multi-core wire produces an own wire number.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Installation_instruction	Installation_information	0..*	0..1	Y	
Wire_length	Length_information	1..*	1	Y	
Core	Part	1	1..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Special_wire_occurrence	1	Core_occurrence	0..*	Y	

4.3.14 Class Fixing_occurrence

A Fixing_occurrence is the occurrence of a Fixing in a module part list.

General Information

Base Classifier	Changed_element Connection_or_occurrence Fixed_component Located_component Reference_element

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Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	1	The id specifies the identifier of the Fixing_occurrence.
Alias_id	Alias_identification	0..*	The alias_id specifies additional identifiers for the Fixing _occurrence.
Description	String	0..1	The description specifies additional information about the object.
Localized_description	Localized_string	0..*	The description specifies additional information about the object. The Localized_description provides the possibility to define descriptions for different language codes.
Placement	Transformation	0..1	The placement specifies the transformation information, which is used to locate and orient the occurrence in the car coordinate system. For further information see [CESAK].

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Fixing	Part	1	1..*	N	
Installation_instruction	Installation_information	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Specified_fixing_occurrence	0..*	Related_occurrence	1	N	

4.3.15 Class Fuse_occurrence

General Information

Base Classifier	Component_occurrence
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Designed_operating_current	Numerical_value	0..1	The designed operating current is calculated / specified by the consumers available in the network.
Maximum_operating_current	Numerical_value	0..1	The maximum operating current is calculated / specified by the weakest used wires.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Consumers	attachedConsumer	0..*	1	Y	

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4.3.16 Class General_wire_occurrence

A General_wire_occurrence is the occurrence of a Wire_occurrence or a Special_wire_occurrence in a module part list.

General Information

Base Classifier	Changed_element Connection_or_occurrence Reference_element
Applied Stereotype	
Is Abstract	true

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Wire_length	Length_information	1..*	1	Y	
General_wire	Part	1	1..*	N	
Installation_instruction	Installation_information	0..*	1	Y	

4.3.17 Class Mounting_element

A Mounting_element is an object which is associated with a Component_occurrence.

General Information

Base Classifier	
Applied Stereotype	Selector
Is Abstract	false

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Component_occurrence	0..*	Mounting	1..*	N	

4.3.18 Class Part_substitution

Austauschbauteil A Part_substitution is a mechanism that describes the replacement of a sealing plug with a terminal. Typically usage: an optional module is added to a harness and a common connector will be used.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End	This	General

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Type	Role	Mult	Mult	Agg	Comment
Cavity_plug_occurrence	Replaced	1	0..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Part_usage_select	1	Replacing	0..*	Y	

4.3.19 Class Part_usage_select

A Part_usage is an object which replaces a Cavity_occurrence.

General Information

Base Classifier	
Applied Stereotype	Selector
Is Abstract	true

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Part_substitution	Replacing	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Contact_point	1..*	Associated_parts	0..*	N	

4.3.20 Class Reference_element

General Information

Base Classifier	
Applied Stereotype	Selector
Is Abstract	true

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Accessory_occurrence	0..*	Reference_element	0..*	N	
Connector_occurrence	0..*	Reference_element	0..*	N	
Component_box_occurrence	0..*	Reference_element	0..*	N	

4.3.21 Class Special_terminal_occurrence

A Special_terminal_occurrence is the occurrence of a General_terminal with an identifier in a module part list.

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General Information

Base Classifier	Changed_element Connection_or_occurrence Located_component Part_usage_select Reference_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	1	The id specifies the identifier of the Special_terminal_occurrence.
Alias_id	Alias_identification	0..*	The alias_id specifies additional identifiers for the Special_terminal_occurrence
Description	String	0..1	The description specifies additional information about the object.
Localized_description	Localized_string	0..*	The description specifies additional information about the object. The Localized_description provides the possibility to define descriptions for different language codes.
Placement	Transformation	0..1	The placement specifies the transformation information, which is used to locate and orient the occurrence in the car coordinate system. For further information see [CESAK].

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Installation_instruction	Installation_information	0..*	1	Y	
General_terminal	Part	1	1..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Specified_special_terminal_occurrence	0..*	Related_occurrence	1	N	

4.3.22 Class Special_wire_occurrence

Mehrdrahtleitung A Special_wire_occurrence is the occurrence of a multi-core wire in a module part list.

General Information

Base Classifier	General_wire_occurrence
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment

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Special_wire_id	String	1	A special_wire_id specifies the identifier of the individual occurrence of multi-core wire. In contrast to the occurrence of a single wire which does not need to be identified in the module part list, each multi-core wire occurrence must be identified.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Core_occurrence	Core_occurrence	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Specified_special_wire_occurrence	0..*	Related_occurrence	1	N	

4.3.23 Class Specified_accessory_occurrence

A Specified_ accessory _occurrence is the occurrence of an accessory_occurrence within an Assembly_part_occurrence.

General Information

Base Classifier	Accessory_occurrence
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Assembly_part_occurrence	Related_assembly	1	0..*	N	
Accessory_occurrence	Related_occurrence	1	0..*	N	

4.3.24 Class Specified_cavity_plug_occurrence

A Specified_ cavity _plug _occurrence is the occurrence of Cavity_plug_occurrence within an Assembly_part_occurrence.

General Information

Base Classifier	Cavity_plug_occurrence
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Assembly_part_occurrence	Related_assembly	1	0..*	N	
Cavity_plug_occurrence	Related_occurrence	1	0..*	N	

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4.3.25 Class Specified_cavity_seal_occurrence

A Specified_ cavity_seal _occurrence is the occurrence of a Cavity_seal_occurrence within an Assembly_part_occurrence.

General Information

Base Classifier	Cavity_seal_occurrence
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Cavity_seal_occurrence	Related_occurrence	1	0..*	N	
Assembly_part_occurrence	Related_assembly	1	0..*	N	

4.3.26 Class Specified_co_pack_occurrence

A Specified_ co_pack _occurrence is the occurrence of a Co_pack_occurrence within an Assembly_part_occurrence.

General Information

Base Classifier	Co_pack_occurrence
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Assembly_part_occurrence	Related_assembly	1	0..*	N	
Co_pack_occurrence	Related_occurrence	1	0..*	N	

4.3.27 Class Specified_component_box_occurrence

General Information

Base Classifier	Component_box_occurrence
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Assembly_part_occurrence	Related_assembly	1	0..*	N	

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Component_box_occurrence	Related_occurrence	1	0..*	N	

4.3.28 Class Specified_component_occurrence

A Specified_component_occurrence is the occurrence of a Component within an Assembly_part_occurrence.

General Information

Base Classifier	Component_occurrence
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Assembly_part_occurrence	Related_assembly	1	0..*	N	
Component_occurrence	Related_occurrence	1	0..*	N	

4.3.29 Class Specified_connector_occurrence

A Specified_connector_occurrence is the occurrence of a Connector_occurrence within an Assembly_part_occurrence.

General Information

Base Classifier	Connector_occurrence
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Assembly_part_occurrence	Related_assembly	1	0..*	N	
Connector_occurrence	Related_occurrence	1	0..*	N	

4.3.30 Class Specified_fixing_occurrence

A Specified_ fixing_occurrence is the occurrence of a Fixing_occurrence within an Assembly_part_occurrence.

General Information

Base Classifier	Fixing_occurrence
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End	This	General

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Type	Role	Mult	Mult	Agg	Comment
Assembly_part_occurrence	Related_assembly	1	0..*	N	
Fixing_occurrence	Related_occurrence	1	0..*	N	

4.3.31 Class Specified_special_terminal_occurrence

A Specified_ special_terminal _occurrence is the occurrence of a Special_terminal_occurrence within an Assembly_part_occurrence.

General Information

Base Classifier	Special_terminal_occurrence
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Special_terminal_occurrence	Related_occurrence	1	0..*	N	
Assembly_part_occurrence	Related_assembly	1	0..*	N	

4.3.32 Class Specified_special_wire_occurrence

A Specified_ special_wire _occurrence is the occurrence of a Special_wire_occurrence within an Assembly_part_occurrence.

General Information

Base Classifier	Special_wire_occurrence
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Special_wire_occurrence	Related_occurrence	1	0..*	N	
Assembly_part_occurrence	Related_assembly	1	0..*	N	

4.3.33 Class Specified_terminal_occurrence

A Specified_ terminal _occurrence is the occurrence of a Terminal_occurrence within an Assembly_part_occurrence.

General Information

Base Classifier	Terminal_occurrence
Applied Stereotype	

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Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Assembly_part_occurrence	Related_assembly	1	0..*	N	
Terminal_occurrence	Related_occurrence	1	0..*	N	

4.3.34 Class Specified_wire_occurrence

A Specified_wire_occurrence is the occurrence of a Wire_occurrence within an Assembly_part_occurrence.

General Information

Base Classifier	Wire_occurrence
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Assembly_part_occurrence	Related_assembly	1	0..*	N	
Wire_occurrence	Related_occurrence	1	0..*	N	

4.3.35 Class Specified_wire_protection_occurrence

A Specified_wire_protection_occurrence is the occurrence of a Wire_protection_occurrence within an Assembly_part_occurrence.

General Information

Base Classifier	Wire_protection_occurrence
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Wire_protection_occurrence	Related_occurrence	1	0..*	N	
Assembly_part_occurrence	Related_assembly	1	0..*	N	

4.3.36 Class Terminal_occurrence

A Terminal_occurrence is the occurrence of a General_terminal in a module part list. Note: The number of occurrences used in a specific module or harness can be calculated by the individual occurrences. Note: The usage of a Terminal_occurrence for a particular Cavity is specified by the Part_usage object.

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General Information

Base Classifier	Changed_element Connection_or_occurrence Part_usage_select Reference_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	0..1	The id specifies the identifier of the Terminal_occurrence.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Installation_instruction	Installation_information	0..*	1	Y	
General_terminal	Part	1	1..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Specified_terminal_occurrence	0..*	Related_occurrence	1	N	

4.3.37 Class Wire_occurrence

A Wire_occurrence is the occurrence of a single wire in a module part list.

General Information

Base Classifier	General_wire_occurrence Wire_or_core_occurrence
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Wire_number	String	1	The wire_number specifies the identification of a wire. This number is unique within a vehicle and usually automatically generated (dependent on "from-to" information).

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Specified_wire_occurrence	0..*	Related_occurrence	1	N	

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4.3.38 Class Wire_protection_occurrence

A Wire_protection_occurrence is the occurrence of a Wire_protection in a module part list.

General Information

Base Classifier	Changed_element Connection_or_occurrence Located_component Reference_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	1	The id specifies the identifier of the Wire_protection.
Alias_id	Alias_identification	0..*	The alias_id specifies additional identifiers for the Wire_protection_occurrence.
Description	String	0..1	The description specifies additional information about the object.
Localized_description	Localized_string	0..*	The description specifies additional information about the object. The Localized_description provides the possibility to define descriptions for different language codes.
Protection_length	Numerical_value	0..1	The protection_length specifies the length of the Wire_protection_occurrence with respect to the wrapping. Note: The protection_length may differ from the real length of the material. E.g. for a tube, the protection_length and the real length are same, whereas for a tape they are different.

Outgoing Relations

Other End			This	General	
Type	Role	Mult	Mult	Agg	Comment
Wire_protection	Part	1	1..*	N	
Installation_instruction	Installation_information	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	Mult	Role	Mult	Agg	Comment
Specified_wire_protection_occurrence	0..*	Related_occurrence	1	N	
Protection_area	0..*	Associated_protection	1	N	

4.3.39 Enumeration Connector_usage

General Information

Applied Stereotype	

Enumeration Literals

Name		Comment

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no end		
ring terminal		
splice		
dangler		

4.4 Module 4_Connectivity

4.4.1 Class Cavity_occurrence

A Cavity_occurrence is the occurrence of a Cavity in the context of a connector_occurrence.

General Information

Base Classifier	Mounting_element
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Cavity_plug_occurrence	Associated_plug	0..1	1..*	N	
Cavity	Part	1	1..*	N	
Processing_instruction	Processing_information	0..*	0..1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Contact_point	0..*	Contacted_cavity	1..*	N	
Node	0..*	referenced_cavities	0..*	N	
Slot_occurrence	1	Cavities	1..*	Y	
Cavity_occurrence	0..*	Mated_cavities	0..*	N	
Schematic_connection	0..*	Cavities	2..*	N	

4.4.2 Class Connection

A Connection is a mechanism to specify the electrical connectivity between two or more contact points. A connection describes the connectivity of a Wire_occurrence or a Core_occurrence. It shall not be confused with the connections defined in the electrical design (schematic or wiring).

General Information

Base Classifier	Changed_element Connection_or_occurrence

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Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	0..1	The id specifies the identifier of the Connectivity. The values are company specific. They can depend also on wire parameters. Example: electrical potential, start->destination
Description	String	0..1	The description specifies additional information about the object.
Localized_description	Localized_string	0..*	The description specifies additional information about the object. The Localized_description provides the possibility to define descriptions for different language codes.
Signal_name	String	0..1	The signal_name specifies logical information on a Connection. Example: packet on a bus, analogue voltage (high/low, waved) on a wire.
Signal_type	String	0..1	Defines the type of a signal like (BUS, ENERGY, GROUND ...). Special values have to be negotiated between exchange partners.
Nominal_voltage	String	0..1	Defines the nominal voltage of a signal like (12V, 24V, 48V, HV ...). Special values have to be negotiated between exchange partners.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Wire_or_core_occurrence	Wire	1	0..*	N	
Installation_instruction	Installation_information	0..*	1	Y	
Schematic_connection	Realized_schematic_connection	0..1	0..*	N	
Processing_instruction	Processing_information	0..*	1	Y	
External_reference	External_references	0..*	0..*	N	
Extremity	Extremities	2..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Routing	0..*	Routed_wire	1	N	

4.4.3 Class Contact_point

A Contact_point defines the positions where electrical connectivity takes place.

General Information

Base Classifier	Changed_element
Applied Stereotype	
Is Abstract	false

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Attributes

Name	Type	Mult	Comment
Id	String	1	The id specifies the identifier of the Contact_point.

Outgoing Relations

Other End			This	General	
Type	Role	Mult	Mult	Agg	Comment
Cavity_occurrence	Contacted_cavity	1..*	0..*	N	
Part_usage_select	Associated_parts	0..*	1..*	N	
Processing_instruction	Processing_information	0..*	0..1	Y	

Incoming Relations

Other End		This End		General	
Type	Mult	Role	Mult	Agg	Comment
Extremity	0..*	Contact_point	1	N	
Connector_occurrence	1	Contact_points	0..*	Y	
Component_box_occurrence	1	Contact_points	0..*	Y	

4.4.4 Class Extremity

The Extremity specifies the Contact_point which is connected by a specific Connection.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Position_on_wire	Double	1	The Position_on_wire describes the position where the contacting takes place. That is important for contacts like IDC, where the contacting is not at the beginning or end of the wire. Note: A value of 0.0 designates the beginning of the wire, a value of 1.0 the end. Intermediate contact_points are defined relative to the first one by a value between 0.0 and 1.0. The position_on_wire defines the ordering of the Extremities within a Connection.

Outgoing Relations

Other End			This	General	
Type	Role	Mult	Mult	Agg	Comment
Processing_instruction	Processing_information	0..*	1	Y	
Contact_point	Contact_point	1	0..*	N	

Incoming Relations

Other End		This End		General	
Type	Mult	Role	Mult	Agg	Comment

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Connection	1	Extremities	2..*	Y	

4.4.5 Class Schematic_connection

The Schematic_connection represents a logical connection. It can be referenced by the physical connections (Connection) and be used to transfer the information of the logical connection, if it is realized by multiple Connections (e.g. different routings, different wire types).

General Information

Base Classifier	Changed_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	1	The Id specifies the identifier of the Schematic_connection. The values are company specific.
Description	String	0..1	The description specifies additional information about the object.
Localized_description	Localized_string	0..*	The description specifies additional information about the object. The Localized_description provides the possibility to define descriptions for different language codes.
Signal_name	String	0..1	The signal_name specifies logical information on a Connection. Example: packet on a bus, analogue voltage (high/low, waved) on a wire.
Signal_type	String	0..1	Defines the type of a signal like (BUS, ENERGY, GROUND ...). Special values have to be negotiated between exchange partners.
Nominal_voltage	String	0..1	Defines the nominal voltage of a signal like (12V, 24V, 48V, HV ...). Special values have to be negotiated between exchange partners.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Cavity_occurrence	Cavities	2..*	0..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Harness	1		0..*	Y	
Connection	0..*	Realized_schematic_connection	0..1	N	

4.4.6 Class Slot_occurrence

A Slot_occurrence is the occurrence of a Slot in a module part list.

General Information

Base Classifier	Abstract_slot_occurrence Mounting_element

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Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Slot	Part	1	1..*	N	
Processing_instruction	Processing_information	0..*	0..1	Y	
Cavity_occurrence	Cavities	1..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Connector_occurrence	1	Slots	0..*	Y	
Slot_occurrence	0..*	Mated_slots	0..*	N	

4.4.7 Class Wire_or_core_occurrence

A Wire_or_core_occurrence is an occurrence of a single wire, a multi-core wire, or an individual core of a multi-core wire.

General Information

Base Classifier	
Applied Stereotype	Selector
Is Abstract	true

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Wiring_group	0..*	Assigned_wire	2..*	N	
Connection	0..*	Wire	1	N	

4.4.8 Class Wiring_group

A Wiring_goup is a mechanism to group wire or core occurrences together. Example: Twisted pairs.

General Information

Base Classifier	Changed_element Connection_or_occurrence
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment

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Id	String	1	The id specifies the identifier of the Wiring_group.
Type	String	0..1	The type specifies the type of the grouping. Example: twisted-pair.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Wire_or_core_occurrence	Assigned_wire	2..*	0..*	N	
Processing_instruction	Processing_information	0..*	1	Y	
Installation_instruction	Installation_information	0..*	1	Y	

4.5 Module 5_Topology

4.5.1 Class Default_dimension_specification

A Default_dimension_specification defines tolerance values that shall be applied to the harness, if no explicit tolerance value has been defined.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Dimension_value_range	Value_range	0..1	Dimension_value_range defines the magnitude of measurements for which the tolerance applies (e.g. length from 500mm - 1500mm).
Tolerance_type	String	0..1	The Tolerance_type defines to which measurements this Default_dimension_specification applies (e.g. segment lengths, wire lengths).

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Tolerance	Tolerance_indication	0..1	1	Y	The Tolerance_indication, which defines the values of the tolerance (e.g. +-5mm).
External_reference	External_references	0..*	0..*	N	An External_reference which can be used to reference an external document in which the default values are defined (e.g. a company standard).

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
KBL_container	1	Default_dimension_specification	0..*	Y	

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4.5.2 Class Dimension_specification

A Dimension_specification is the definition of the distance between two elements.

General Information

Base Classifier	Changed_element Placed_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	0..1	The id specifies the identifier of the Dimension_specification. This shall be unique within a single KBL-File. For reasons of backwards compatibility to KBL Version 2.3 SR-1 this new attribute is optional.
Dimension_value	Numerical_value	0..1	Defines the value of the dimension. This field can be used to define a user defined value for the dimension, which overrides the normal value of the dimension. The normal value of a dimension is calculated from the topology information (e.g. segment length and placements)

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Tolerance	Tolerance_indication	0..1	1	Y	
Placed_element	target	1	0..*	N	
Processing_instruction	Processing_information	0..*	0..1	Y	
Placed_element	origin	1	0..*	N	
Segment	Segments	0..*	0..*	N	Defines an ordered list of segments along which the dimension specification is defined.

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
KBL_container	1	Dimension_specification	0..*	Y	

4.5.3 Class Fixed_component

A Fixed_component is an object that can be assigned by a fixing.

General Information

Base Classifier	
Applied Stereotype	Selector
Is Abstract	true

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**

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Fixing_assignment	0..*	Fixing	1	N	

4.5.4 Class Fixing_assignment

A Fixing_assignment assigns a Fixing_occurrence or an Accessory_occurrence to a Segment.

General Information

Base Classifier	Changed_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Location	Double	1	The location specifies the position of the fixing on the Segment. The value is given in curve parameters running from 0.0 to 1.0.
Absolute_location	Numerical_value	0..1	The absolute location defines the location of a fixing with an absolute value. This is an extension to the relative value of the "location" attribute. The absolute value is necessary to prevent unintended changes due to segment length changes or rounding errors. A creating system is responsible to generate this redundant information in a consistent way. If both values are present, the absolute value is the more binding value.
Orientation	Double	2..3	The orientation specifies the direction of the z-axis and is given by 2 or 3 values. The y-axis is defined by the tangent of the center curve at the location.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Processing_instruction	Processing_information	0..*	0..1	Y	
Fixed_component	Fixing	1	0..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Segment	1	Fixing_assignment	0..*	Y	

4.5.5 Class Located_component

Positionierbare Komponenten der KBL: z.B. Connector_occurrence, Accessory_occurrence, Fixing_occurrence, ... A Located_component is a component which can get a position in the topology by a node.

General Information

Base Classifier	Placed_element
Applied Stereotype	Selector
Is Abstract	true

Incoming Relations

Other End	This End	General

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Type	Mult	Role	Mult	Agg	Comment
Node	0..*	referenced_components	0..*	N	

4.5.6 Class Node

A node forms begin and end of a Segment.

General Information

Base Classifier	Changed_element Placed_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	1	The id specifies the identifier of the Node.
Alias_id	Alias_identification	0..*	The alias_id specifies additional identifiers for the Node. Example: Node Ids may vary from one CAD system export to another. Therefore the CAD system Id is improper for Id attribute. Id shall have a value which is unique within the harness. Alias_id may be used for the CAD system Id.
Bend_radius	Numerical_value	0..1	The bend_radius specifies the maximum bend radius at the Node. Example: May be used for the routing of fibre-optics.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Processing_instruction	Processing_information	0..*	1	Y	
Located_component	referenced_components	0..*	0..*	N	
Cavity_occurrence	referenced_cavities	0..*	0..*	N	
Cartesian_point	Cartesian_point	1	0..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Segment	0..*	End_node	1	N	
KBL_container	1	Node	0..*	Y	
Segment	0..*	Start_node	1	N	

4.5.7 Class Placed_element

A Placed_element is an element where a Dimension_specification can apply.

General Information

Base Classifier	

Copyright: VDA

Applied Stereotype	Selector
Is Abstract	true

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Dimension_specification	0..*	target	1	N	
Dimension_specification	0..*	origin	1	N	

4.5.8 Class Protection_area

Schutzzone A Protection_area is a mechanism to describe the area on a Segment covered by a Wire_protection_occurrence. Some segments of a harness are crossing areas with critical conditions like higher temperatures, higher humidity, etc. To prevent the damage of the cable, protect shields are mounted for that segment. Note: For each Segment covered by a particular Wire_protection_occurrence a separate Protection_area has to be instantiated.

General Information

Base Classifier	Changed_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Start_location	Double	1	The start_location specifies the start position of the Wire_protection_occurrence on the Segment. The value is given in curve parameters running from 0.0 to 1.0.
Absolute_start_location	Numerical_value	0..1	The absolute start location defines the start position of a wire protection with an absolute value. This is an extension to the relative value of the "location" attribute. The absolute value is necessary to prevent unintended changes due to segment length changes or rounding errors. A creating system is responsible to generate this redundant information in a consistent way. If both values are present, the absolute value is the more binding value.
End_location	Double	1	The end_location specifies the end position of the Wire_protection_occurrence on the Segment. The value is given in curve parameters running from 0.0 to 1.0.
Absolute_end_location	Numerical_value	0..1	The absolute end location defines the end position of a wire protection with an absolute value. This is an extension to the relative value of the "location" attribute. The absolute value is necessary to prevent unintended changes due to segment length changes or rounding errors. A creating system is responsible to generate this redundant information in a consistent way. If both values are present, the absolute value is the more binding value.
Taping_direction	String	0..1	The taping_direction specifies the direction of the taping (left/right) regarding to the Segment direction.
Gradient	Value_with_unit	0..1	The gradient specifies the gradient of the protection. Note: The gradient is defined in mm. Gradient 15 mms means that the winding screws within a turn 15 mms along the bundle.

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Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Processing_instruction	Processing_information	0..*	1	Y	
Wire_protection_occurrence	Associated_protection	1	0..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Segment	1	Protection_area	0..*	Y	

4.5.9 Class Routing

A Routing is a course taken to get from a starting point to a destination.

General Information

Base Classifier	Changed_element
Applied Stereotype	
Is Abstract	false

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Segment	Segments	0..*	0..*	N	
Processing_instruction	Processing_information	0..*	0..1	Y	
Connection	Routed_wire	1	0..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
KBL_container	1	Routing	0..*	Y	

4.5.10 Class Segment

Verbindungsabschnitt A Segment is a section of a Connection where no intermediate electrical contacts appear. At the beginning and at the end the same wires go in and out. Cables and wires are divided in segments. Every segment has its conditions like length, temperature range, etc.

General Information

Base Classifier	Changed_element
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment

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Id	String	1	The id specifies the identifier of the Segment.
Alias_id	Alias_identification	0..*	The alias_id specifies additional identifiers for the Segment. Example: Segment Ids may vary from one CAD system export to another. Therefore the CAD system Id is improper for Id attribute. Id shall have a value which is unique within the harness. Alias_id may be used for the CAD system Id.
Start_vector	Double	0..3	The start_vector specifies the tangent of the center curve at the start position. Note: The value can be derived from the center_curve. To avoid that the receiving system has to calculate the value, it can be explicitly specified.
End_vector	Double	0..3	The end_vector specifies the tangent of the center curve at the end position. Note: The value can be derived from the center_curve. To avoid that the receiving system has to calculate the value, it can be explicitly specified.
Virtual_length	Numerical_value	0..1	The virtual_length specifies the represented length of the neutral phase of the segment in 3D.
Physical_length	Numerical_value	0..1	The physical_length specifies the arc length of the neutral phase of the segment in 3D.
Form	Segment_form	0..1	The form specifies information on the geometric shape of the Segment. The following values shall be used: - 'circular' - 'noncircular'

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Node	End_node	1	0..*	N	
Processing_instruction	Processing_information	0..*	1	Y	
Protection_area	Protection_area	0..*	1	Y	
B_spline_curve	Center_curve	0..*	1	Y	
Fixing_assignment	Fixing_assignment	0..*	1	Y	
Node	Start_node	1	0..*	N	
Cross_section_area	Cross_section_area_information	0..*	1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Routing	0..*	Segments	0..*	N	
Dimension_specification	0..*	Segments	0..*	N	Defines an ordered list of segments along which the dimension specification is defined.
KBL_container	1	Segment	0..*	Y	

4.5.11 Class Tolerance

A Tolerance is the specification of the allowable range for a dimension.

General Information

Base Classifier	

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Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Lower_limit	Numerical_value	0..1	The lower_limit specifies the minimum allowed value.
Upper_limit	Numerical_value	0..1	The upper_limit specifies the maximum allowed value.

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Default_dimension_specification	1	Tolerance_indication	0..1	Y	The Tolerance_indication, which defines the values of the tolerance (e.g. +-5mm).
Dimension_specification	1	Tolerance_indication	0..1	Y	

4.5.12 Enumeration Segment_form

General Information

Applied Stereotype	

Enumeration Literals

Name		Comment
circular		
noncircular		

4.6 Module 6_Foundation

4.6.1 Class Alias_identification

Alternative Identifikation An Alias_identification is a mechanism to associate an object with an additional identifier that is used to identify the object of interest in a different context, either in another Organization, or in some other context. The scope of the Alias_identification shall be specified by the attributes 'Scope' and/or by the attribute 'Description'.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Alias_id	String	1	The alias_id specifies the identifier used in the context specified by scope and description.
Scope	String	0..1	The scope specifies the organization in which the Alias_identification is valid.

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Description	String	0..1	The description specifies the type of the Alias_identification. Example: The description may be, e.g., 'inventory number'.
Localized_description	Localized_string	0..*	The description specifies additional information about the object. The Localized_description provides the possibility to define descriptions for different language codes.

4.6.2 Class Approval

An Approval is a judgment concerning the quality of those modules or harnesses that are subject of the Approval. An Approval represents a statement made by technical personnel or management personnel whether certain requirements are met. The absence of approval information does not imply any approval status by default.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Name	String	0..1	The name specifies the name of the personnel responsible for the Approval.
Department	String	0..1	The department specifies the department name of the personnel responsible for the Approval.
Date	String	1	The date specifies the date when the Approval actually became valid.
Type_of_approval	String	1	The type_of_approval specifies the terms characterizing the Approval. Note: There are no values pre-defined. Special values have to be negotiated between exchange partners.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Part_with_title_block	Is_applied_to	1..*	0..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
KBL_container	1	Approval	0..*	Y	

4.6.3 Class B_spline_curve

A B-spline curve is a piecewise parametric polynomial or rational curve described in terms of control points and basis functions. The B-spline curve has been selected as the most stable format to represent all types of polynomial or rational parametric curves. With appropriate attribute values it is capable of representing single span or spline curves of explicit polynomial, rational, Bezier or B-spline type. Within the Harness Engineering Information Model the definition has been restricted to a uniform B_spline_curve, where the knots are evenly spaced. Suitable default values for the knots and knot multiplicities are derived in this case. A B-spline is uniform if and only if all knots are of multiplicity 1 and they differ by a positive constant from the preceding knot. In this case the knot spacing is 1.0, starting at -d, where d is the degree. Note: If the B-spline curve is uniform and degree=1, the B-spline is equivalent to a polyline.

General Information

Base Classifier	

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Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Degree	Integer	1	The algebraic degree of the basic functions.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Cartesian_point	Control_points	2..*	0..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Segment	1	Center_curve	0..*	Y	

4.6.4 Class Cartesian_point

A Cartesian_point is a point that is defined by its coordinates in a rectangular Cartesian coordinate system.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Coordinates	Double	2..3	The coordinates specify the coordinates of the Cartesian_point. The third coordinate will not exist in the case of a two-dimensional point.

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
B_spline_curve	0..*	Control_points	2..*	N	
KBL_container	1	Cartesian_point	0..*	Y	
Transformation	0..*	Cartesian_point	1	N	
Node	0..*	Cartesian_point	1	N	

4.6.5 Class Change

A Change is a mechanism to keep track of the change history. The set of changes assigned to a Part covers all modification numbers up to the last modification level of the version of the Part.

General Information

Base Classifier	
Applied Stereotype	

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Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	0..1	The id specifies the identifier by which a certain change can be referenced. Example: reference of a fax, note, etc.
Description	String	0..1	The description specifies additional information about the change.
Localized_description	Localized_string	0..*	The description specifies additional information about the object. The Localized_description provides the possibility to define descriptions for different language codes.
Change_request	String	0..1	The change_request specifies the activity which triggers one or more changes. Example: change request, AEKO, VV; "Modellpflegepunkt"
Change_date	String	0..1	The change_date specifies the date the change was performed.
Responsible_designer	String	1	The responsible_designer specifies the responsible design engineer.
Designer_department	String	1	The designer_department specifies the department of the responsible design engineer.
Approver_name	String	0..1	The approver_name specifies the name of the personnel who approved the Part.
Approver_department	String	0..1	The approver_department specifies the department of the personnel who approved the Part.

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Change_description	0..*	Related_changes	0..*	N	
Part	1	Change	0..*	Y	

4.6.6 Class Change_description

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Id	String	0..1	The id specifies the identifier by which a certain change can be referenced. Example: reference of a fax, note, etc.
Description	String	0..1	The description specifies additional information about the change.
Localized_description	Localized_string	0..*	The description specifies additional information about the object. The Localized_description provides the possibility to define descriptions for different language codes.
Change_request	String	0..1	The change_request specifies the activity which triggers one or more changes. Example: change request, AEKO, VV; "Modellpflegepunkt"

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Change_date	String	0..1	The change_date specifies the date the change was performed.
Responsible_designer	String	1	The responsible_designer specifies the responsible design engineer.
Designer_department	String	1	The designer_department specifies the department of the responsible design engineer.
Approver_name	String	0..1	The approver_name specifies the name of the personnel who approved the Part.
Approver_department	String	0..1	The approver_department specifies the department of the personnel who approved the Part.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Change	Related_changes	0..*	0..*	N	
Changed_element	Changed_elements	0..*	1	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
KBL_container	1	Change_descriptions	0..*	Y	

4.6.7 Class Changed_element

General Information

Base Classifier	
Applied Stereotype	Selector
Is Abstract	false

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Change_description	1	Changed_elements	0..*	N	

4.6.8 Class Creation

A Creation assigns creation information to a Module or Harness.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Name	String	1	The name specifies the name of the creator.

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Department	String	1	The department specifies the department the creator belongs to.
Date	String	1	The date specifies the creation date.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Part_with_title_block	Is_applied_to	1..*	0..*	N	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
KBL_container	1	Creation	0..*	Y	

4.6.9 Class Cross_section_area

A Cross_section_area

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Value_determination	Value_determination	1	The value_determinates specifies whether the value is calculated, reserved, or measured.
Area	Numerical_value	1	The area specifies the value of the Cross_section_area.

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Segment	1	Cross_section_area_information	0..*	Y	

4.6.10 Class External_reference

An External_reference is a mechanism to provide information of the documents associated with the Part. Example: 3D model, form board drawings, etc.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Document_type	String	1	The document_type specifies the kind of the document. Where applicable the following values shall be used: - 3D-Data set (wiring,

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			construction unit) - 2D-Data set (Ltgs design, symbol, plug face) - cable connection diagram - set of cables database (VW: LCS-Container) - specification of set of cables - standards, technical guidelines
Document_number	String	1	The document_number specifies the identifier of the document.
Change_level	String	1	The change_level specifies the version of the document.
File_name	String	0..1	The file_name specifies the name which is used to locate the file either on a computer system or in a repository of paper documents.
Location	String	0..1	The location specifies where a document can be found in a digital or physical data storage system.
Data_format	String	1	The data_format specifies the convention that was used to structure the information in the document.
Creating_system	String	0..1	The creating_system specifies the computer application or the machine which is used to create the document.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Processing_instruction	Processing_information	0..*	0..1	Y	

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
KBL_container	1	External_reference	0..*	Y	
Default_dimension_specification	0..*	External_references	0..*	N	An External_reference which can be used to reference an external document in which the default values are defined (e.g. a company standard).
Connection	0..*	External_references	0..*	N	
Part	0..*	External_references	0..*	N	

4.6.11 Class Installation_instruction

An Installation_instruction is the description of the methods that can be used to install a Part.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Instruction_type	String	1	
Instruction_value	String	1	The instruction_value specifies the value for the kind of the Installation_instruction defined by instruction_type.

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Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Core_occurrence	0..1	Installation_information	0..*	Y	
Wire_protection_occurrence	1	Installation_information	0..*	Y	
Assembly_part_occurrence	1	Installation_information	0..*	Y	
Cavity_seal_occurrence	1	Installation_information	0..*	Y	
Component_box_occurrence	1	Installation_information	0..*	Y	
Wiring_group	1	Installation_information	0..*	Y	
Cavity_plug_occurrence	1	Installation_information	0..*	Y	
Component_occurrence	1	Installation_information	0..*	Y	
Co_pack_occurrence	1	Installation_information	0..*	Y	
Special_terminal_occurrence	1	Installation_information	0..*	Y	
Connection	1	Installation_information	0..*	Y	
Terminal_occurrence	1	Installation_information	0..*	Y	
Accessory_occurrence	1	Installation_information	0..*	Y	
Fixing_occurrence	1	Installation_information	0..*	Y	
Connector_occurrence	1	Installation_information	0..*	Y	
General_wire_occurrence	1	Installation_information	0..*	Y	

4.6.12 Class Localized_string

Allows the internationalization of text contents. Attributes of the type LocalizedString normally have the multiplicity [0..*]. This means that such an attribute can have multiple values for different locales. It must not have multiple values for the same locale.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

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Attributes

Name	Type	Mult	Comment
Language_code	Language_code	1	References the corresponding languageCode of the value.
Value	String	1	The value of the LocalizedString in language defined by the languageCode.

4.6.13 Class Material

A Material is the substance out of which a Part is or can be made.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Material_key	String	1	The material_key specifies a code by which the material can be identified.
Material_reference_system	String	0..1	The material_reference_system specifies the system in which the material_key and its meaning are defined. Example: 'IMDS' for the International Material Database System.

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Part	1	Material_information	0..1	Y	

4.6.14 Class Numerical_value

A Numerical_value is a quantity expressed with a numerical value and a unit.

General Information

Base Classifier	Value_with_unit
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Value_component	Double	1	The value_component specifies the quantity of the Numerical_value.

4.6.15 Class Processing_instruction

A Processing_instruction is the description of the methods that can be used to process a Part.

General Information

Base Classifier	
Applied Stereotype	

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Is Abstract	false

Attributes

Name	Type	Mult	Comment
Instruction_type	String	1	The instruction_type specifies the kind of the Processing_instruction. Note: There are no values pre-defined. Special values have to be negotiated between exchange partners.
Instruction_value	String	1	The instruction_value specifies the value for the kind of the Processing_instruction defined by instruction_type.

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Node	1	Processing_information	0..*	Y	
Segment	1	Processing_information	0..*	Y	
Extremity	1	Processing_information	0..*	Y	
Protection_area	1	Processing_information	0..*	Y	
Dimension_specification	0..1	Processing_information	0..*	Y	
Slot	0..1	Processing_information	0..*	Y	
Wiring_group	1	Processing_information	0..*	Y	
Fixing_assignment	0..1	Processing_information	0..*	Y	
Core	0..1	Processing_information	0..*	Y	
Routing	0..1	Processing_information	0..*	Y	
Cavity	0..1	Processing_information	0..*	Y	
Cavity_occurrence	0..1	Processing_information	0..*	Y	
Connection	1	Processing_information	0..*	Y	
Module_configuration	0..1		0..*	Y	
External_reference	0..1	Processing_information	0..*	Y	
Slot_occurrence	0..1	Processing_information	0..*	Y	
Part	0..1	Processing_information	0..*	Y	

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Module_family	0..1	Processing_information	0..*	Y	
Contact_point	0..1	Processing_information	0..*	Y	

4.6.16 Class Transformation

A Transformation is a geometric transformation composed of translation and rotation. Scaling is not included.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
U	Double	2..3	The u specifies the rotation by means of the y-axis.
V	Double	2..3	The v specifies the rotation by means of the z-axis.

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Cartesian_point	Cartesian_point	1	0..*	N	

4.6.17 Class Unit

A Unit is a quantity chosen as a standard in terms of which other quantities may be expressed. Example: A unit of square millimetre is defined as a SI_unit with Si_unit_name "metre", Si_prefix "milli" and Si_dimension "square".

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Unit_name	String	0..1	The unit_name specifies the name for a non SI unit. Note: This attribute shall be used to specify units like 'kg/100 pieces'
Si_unit_name	SI_unit_name	0..1	The si_ unit_name specifies the name for a SI unit. Example: 'gram', 'metre'
Si_prefix	SI_prefix	0..1	The si_prefix specifies the prefix for a SI unit. Example: 'milli', 'kilo'
Si_dimension	Unit_dimension	0..1	The Dimension specifies the dimension of a SI_unit. Example: "square", "cubic".

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
KBL_container	1	Unit	0..*	Y	

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Value_with_unit	0..*	Unit_component	1	N	

4.6.18 Class Value_range

A Value_range is a pair of numerical values representing the range in which the value shall lie.

General Information

Base Classifier	Value_with_unit
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Minimum	Double	1	The minimum specifies the minimum acceptable value that is constrained by the Value_range.
Maximum	Double	1	The maximum specifies the maximum acceptable value that is constrained by the Value_range.

4.6.19 Class Value_with_unit

A Value_with_unit is either a single numerical measure, or a range of numerical measures with upper, lower, or upper and lower bounds.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	true

Outgoing Relations

Other End			This	General	
Type	**Role**	**Mult**	**Mult**	**Agg**	**Comment**
Unit	Unit_component	1	0..*	N	

4.6.20 Class Wire_colour

A Wire_colour is a mechanism to define a colour for a wire together with a description of the kind of the colour.

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Colour_type	String	1	The colour_type specifies the type of the colour. Note: There are no values pre-defined. Special values have to be negotiated between exchange partners. Example: 'base colour', 'second', 'third'
Colour_value	String	1	The colour_value specifies the value of the colour. Note: There are no values pre-defined. Special values have to be negotiated between exchange partners. Example: 'red'

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Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
Core	1	Core_colour	1..*	Y	
General_wire	1	Cover_colour	1..*	Y	

4.6.21 Class Wire_length

Kabellänge A Wire_length is a mechanism to define a length for a wire together with a description of the kind of the length (e.g. for DMU, for manufacturing).

General Information

Base Classifier	
Applied Stereotype	
Is Abstract	false

Attributes

Name	Type	Mult	Comment
Length_type	String	1	The length_type specifies the type of the length. Note: There are no values pre-defined. Special values have to be negotiated between exchange partners.
Length_value	Numerical_value	1	The length_value specifies the length of the wire.

Incoming Relations

Other End		This End		General	
Type	**Mult**	**Role**	**Mult**	**Agg**	**Comment**
General_wire_occurrence	1	Length_information	1..*	Y	
Core_occurrence	1	Length_information	1..*	Y	

4.6.22 Enumeration Language_code

Enumeration for the definition of ISO language codes.

General Information

Applied Stereotype	

Enumeration Literals

Name		Comment
Aa		Afar
Ab		Abkhazian
Af		
Am		
Ar		
As		

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Ay		
Az		
Ba		
Be		
Bg		
Bh		
Bi		
Bn		
Bo		
Br		
Ca		
Co		
Cs		
Cy		
Da		
De		
Dz		
El		
En		
Eo		
Es		
Et		
Eu		
Fa		
Fi		
Fj		
Fo		
Fr		

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Fy		
Ga		
Gd		
Gl		
Gn		
Gu		
Ha		
Hi		
He		
Hr		
Hu		
Hy		
Ia		
Id		
Ie		
Ik		
In		
Is		
It		
Iu		
Iw		
Ja		
Ji		
Jw		
Ka		
Kk		
Kl		
Km		

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Kn		
Ko		
Ks		
Ku		
Ky		
La		
Ln		
Lo		
Lt		
Lv		
Mg		
Mi		
Mk		
Ml		
Mn		
Mo		
Mr		
Ms		
Mt		
My		
Na		
Ne		
Nl		
No		
Oc		
Om		
Or		
Pa		

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Pl		
Ps		
Pt		
Qu		
Rm		
Rn		
Ro		
Ru		
Rw		
Sa		
Sd		
Sg		
Sh		
Si		
Sk		
Sl		
Sm		
Sn		
So		
Sq		
Sr		
Ss		
St		
Su		
Sv		
Sw		
Ta		
Te		

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Tg		
Th		
Zi		
Tk		
Tl		
Tn		
To		
Tr		
Ts		
Tt		
Tw		
Ug		
Uk		
Ur		
Uz		
Vi		
Vo		
Wo		
Xh		
Yi		
Yo		
Za		
Zh		Chinese
Zu		Zulu

4.6.23 Enumeration SI_prefix

General Information

Applied Stereotype	

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Enumeration Literals

Name		Comment
milli		
centi		
micro		
kilo		

4.6.24 Enumeration SI_unit_name

General Information

Applied Stereotype	

Enumeration Literals

Name		Comment
metre		
gram		

4.6.25 Enumeration Unit_dimension

General Information

Applied Stereotype	

Enumeration Literals

Name		Comment
square		
cubic		

4.6.26 Enumeration Value_determination

General Information

Applied Stereotype	

Enumeration Literals

Name		Comment
calculated		
reserved		
measured		

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5 XML Representation of the Harness Description List

This recommendation specifies an XML schema for the XML based exchange of harness design data. The XML schema has been derived from the objects defined in chapter 4.

A complete listing of the XML Schema is given in Annex A.

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Annex A KBL XML Schema

This annex is distributed as a separate document.

Annex B References

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[Fowler] Fowler, Martin: UML Distilled, Second Edition: A brief Guide to the Standard Object Modeling Language; Addison-Wesley, 2003.

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[OMGPLM] N.N.: Product Lifecycle Management Services Specification. OMG Adopted Specification dtc/04-11-04, November 2004

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