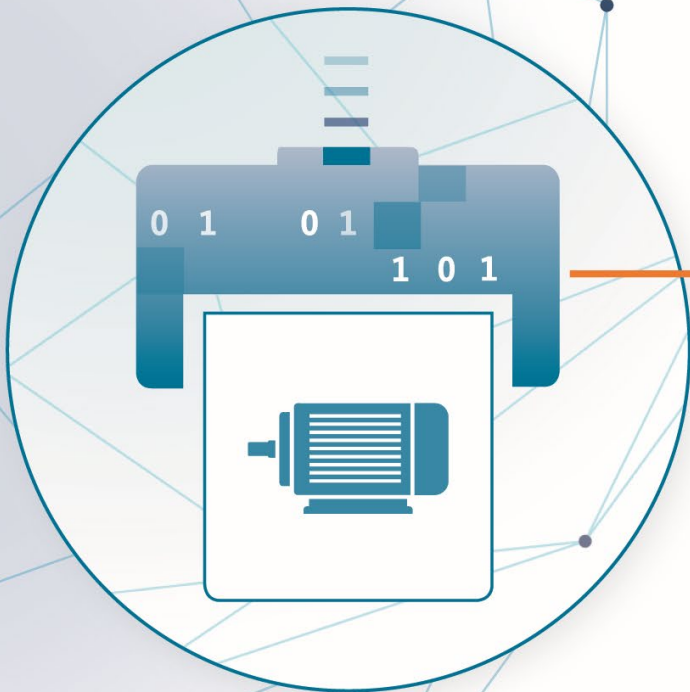


SPECIFICATION

Submodel Templates of the Asset Administration Shell



- Serial Number

Submodel TECHNICAL DATA

- Max. Rotation Speed = 5000 [1/min]
- Max. Torque = 200 [Nm]
- Cooling Type = BAB657

Submodel OPERATIONAL DATA

- Rotation Speed = 4370 [1/min]
- Torque = 117.4 [Nm]

Submodel DOCUMENTATION

- Title = Operating Manual
- Digital File PDF →
/aasx/OperatingManual.PDF
- Document Class ID = 03-02
- Document Class P

Article of trade information for
engineering authoring systems (v0.8)

in cooperation with

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1 General

1.1 About this document

This document is a part of a specification series. Each part specifies the contents of a Submodel template for the Asset Administration Shell (AAS). The AAS is described in [1], [2], [3] and [6]. First exemplary Submodel contents were described in [4], while the actual format of this document was derived by the "Administration Shell in Practice" [5]. The format aims to be very concise, giving only minimal necessary information for applying a Submodel template, while leaving deeper descriptions and specification of concepts, structures and mapping to the respective documents [1] to [6]. Common terms and abbreviations can be found in [8].

This document is actually a proposal for such a Submodel template specification. It has been jointly worked out by experts of the VDMA working group "digitalization for fluid power systems" together with members of the ECLASS segment group 51, based on collection used experience of industrial users.

The target audience of the specification are developers and editors of technical documentation and manufacturer information, which are describing assets in smart manufacturing by means of the Asset Administration Shell (AAS) and therefore need to create a Submodel instance with a hierarchy of SubmodelElements. This document especially details on the question, which SubmodelElements with which semantic identification shall be used for this purpose.

1.2 Scope of the Submodel

This Submodel template aims at an interoperable provision of information on articles of trade. These articles of trade are typically provided by manufacturers and suppliers, including dealers, and used by industrial users, e.g. original equipment manufacturers (OEMs), system integrators and producing enterprises (industrial end users). Articles of trade are typically described on type level, as typically provided in larger and repeatable manner to the market. Articles of trade could be seen as items (see 1.3.2).

This Submodel template specifies a basic set of SubmodelElements in order to bring about the necessary information according to this use-case.

1.3 Relevant standards and sources of concepts for the Submodel template

1.3.1 Concept repositories

So called concept repositories or (property) dictionaries are used identify information elements (see Terms and Definitions of [6]). Such property dictionaries include:

- ECLASS, see: <https://www.eclasscontent.com/>
- IEC CDD, see: <https://cdd.iec.ch/cdd/iec61987/iec61987.nsf> and <https://cdd.iec.ch/cdd/iec62683/cdddev.nsf>

In this document, properties are aimed to be described by ECLASS.

1.3.2 Terms and definitions with respect to Article of trade

Editorial Note: the following terms could be discussed in addition/ substituting the term title

item

thing that can be characterized by means of a characterization class to which it belongs and a set of property value pairs

Note 1 to entry: This definition supersedes the definition given in ISO 13584-24:2003, that was the following: "a thing that can be captured by a class structure and a set of properties".

Note 2 to entry: In the ISO 13584 standard series, both products and features of products that correspond to composite properties are items.

→ Source: IEC 61360-2, ed. 3.0 (2012-10), 3.25

41 **goods**

42 those items or materials, or “sales articles”, that, upon the placement of a purchase order, are being manufactured,
43 processed, handled or transported within the supply chain for usage or consumption by the purchaser

44 **1.4 Relevant existing Submodel specifications**

45 **1.4.1 Submodel Digital Nameplate**

46 The Submodel (IDTA-2006) aims at interoperable provision of information which is conveyed also by the nameplate of
47 an industrial equipment. Often, this information is required by regulatory guidelines such as the EU directive
48 2006/42/EC. It clearly identifies the described asset of the Asset Administration Shell, the manufacturer, basic
49 identification information, markings on the nameplate and further properties, e.g. for explosion safety.

50 See: <https://industrialdigitaltwin.org/en/content-hub/submodels>

51

2 Approaches

52

2.1 Assets

53

Asset Administration Shells provide information with respect to well-identified assets. For this document, suitable

54

assets are typically product types:

Asset	Description
Product types, such as model series of industrial components, systems	Typical application of this Submodel template. Information for engineering authoring systems is provided.
Product instances, such as sold individual products, industrial components, systems	No typical application.

55

2.2 Use-Cases

56

The following use-cases are applicable.

no.	Use case	Description
1	Procurement of articles in order to build up a planned industrial equipment	An industrial equipment is planned and engineered. Many different articles from different suppliers are selected, bills of materials need to be created. Once an order for the planned industrial equipment, procurement of all required articles need to be executed. Multiple orders might be scheduled together in order to achieve better purchasing condition from suppliers.
2	n/a	n/a

57

2.3 Information structuring

58

The SubmodelElements described in clause 3 are structured in the following way (see Figure 1).

«Submodel» ArticleInformation
+ProductGroup : Property +ProductDescription : MLP +IdentifyingOrderNumber : string +UnitOfContent : string +Weight : double +GrossWeight : double [0..1]

59

60

Figure 1 – Elements of the Submodel

61

3 Element specifications

62

3.1 Attributes of ArticleInformation

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The following properties are defined:

idShort:	ArticleInformation		
Class:	Submodel		
semanticId:	[IRI] https://admin-shell.io/sandbox/idta/ArticleInformation/0/8/		
Parent:	ArticleInformation		
Explanation:	This Submodel describes an asset as product instance which is marketed between partners of a value chain		
[SME type] idShort	semanticId = [idType]value Description@en	[valueType] example	card.
[Property] ProductGroup	[IRDI]0173-1#02-AAV283#001 Product group Identification of product group The article must be assigned to a meaningful and correct product group category. This classification is very important, because based on the selected product group certain properties are available in the article management and therefore also certain functions in the platform.	[string] 27-01-02-01	
[MLP] ProductDescription	[IRDI]0173-1#02-AAO240#002 product description detailed description of the product used in detailed views on the product -	Universell einsetzbarer Servoantriebsregler für PM-Synchron-Servomotoren bis 6000 W Dauerleistung@de	
[Property] IdentifyingOrderNumber	[IRDI]0173-1#02-AAO689#001 identifying order number unique classifying number that enables to name an object and to order it from a supplier or manufacturer -	[string] 5340815	
[Property] UnitOfContent	[IRDI]0173-1#02-AAO250#002 Unit of product within an order packing This concept has a particular unit of measure: 0173-1#02-ABC475#001. This allows coding the following units: l, m, square meter, piece	[string] 3 piece	
[Property] Weight	[IRDI]0173-1#02-AAB713#006 Mass of weight without packaging and transport unit.	[double] 0.783	
[Property] GrossWeight	[IRDI]0173-1#02-BAF368#004 Gross weight. Quantitative statement of the mass of an object, including packaging. Note: This property is optional, as packaging might be not applicable.	[double] 0.865	0..1

64

Annex A. Explanations on used table formats

1. General

The used tables in this document try to outline information as concise as possible. They do not convey all information on Submodels and SubmodelElements. For this purpose, the definitive definitions are given by the following annex in form of an XML mapping of the Submodel template and its elements.

2. Tables on Submodels and SubmodelElements

For clarity and brevity, a set of rules is used for the tables for describing Submodels and SubmodelElements.

- The tables follow in principle the same conventions as in [5].
- The table heads abbreviate 'cardinality' with 'card'.
- The tables often place two informations in different rows of the same table cell. In this case, the first information is marked out by sharp brackets [] from the second information. A special case are the semanticIds, which are marked out by the format: (type)(local)[idType]value.
- The types of SubmodelElements are abbreviated:

SME type	SubmodelElement type
Property	Property
MLP	MultiLanguageProperty
Range	Range
File	File
Blob	Blob
Ref	ReferenceElement
Rel	RelationshipElement
SMC	SubmodelElementCollection
SME, SubmodelElement	SubmodelElement

- If an idShort ends with '{00}', this indicates a suffix of the respective length (here: 2) of decimal digits, in order to make the idShort unique. A different idShort might be chosen, as long as it is unique in the parents context.
- The Keys of semanticId in the main section feature only idType and value, such as: [IRI]https://admin-shell.io/vdi/2770/1/0/DocumentId/Id. The attributes "type" and "local" (typically "ConceptDescription" and "(local)" or "GlobalReference" and (no-local)) need to be set accordingly; see [6].
- If a table does not contain a column with "parent" heading, all represented attributes share the same parent. This parent is denoted in the head of the table.
- Multi-language strings are represented by the text value, followed by '@'-character and the ISO639 language code: example@EN.
- The [valueType] is only given for Properties.

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Annex C. Future discussions

The following further properties were proposed:

cdd.iec.ch/cdd/iec61987/cdddev.nsf/2e3513b55c903422c12584c70038f54a/ce7bdcfd92385b6fc12581ef00271a1b?OpenDocument&Highlight=0,transport*

Properties:	0112/2///61987#ABI445 - reference to Gross dimensions and weight 0112/2///61987#ABI420 - number of packing informations 0112/2///61987#ABI448 - reference to Packing information 0112/2///61987#ABI419 - number of special packing informations 0112/2///61987#ABI447 - reference to Special packing information
Properties tree: Open all Close all	<ul style="list-style-type: none"> 0112/2///61987#ABI413 - Packaging and transportation 0112/2///61987#ABI414 - Gross dimensions and weight (Ref: 0112/2///61987#ABI445 - reference to Gross dimensions and weight) <ul style="list-style-type: none"> 0112/2///61987#ABA553 - weight 0112/2///61987#ABA640 - length 0112/2///61987#ABA573 - width 0112/2///61987#ABA574 - height 0112/2///61987#ABI423 - volume 0112/2///61987#ABI420 - number of packing informations 0112/2///61987#ABI417 - Packing information (Ref: 0112/2///61987#ABI448 - reference to Packing information) <ul style="list-style-type: none"> 0112/2///61987#ABI432 - packing unit 0112/2///61987#ABI421 - minimum packing unit 0112/2///61987#ABI422 - maximum packing unit 0112/2///61987#ABA553 - weight 0112/2///61987#ABA640 - length 0112/2///61987#ABA573 - width 0112/2///61987#ABA574 - height 0112/2///61987#ABI423 - volume 0112/2///61987#ABI433 - material of packing 0112/2///61987#ABI434 - type of packing 0112/2///61987#ABH827 - packing group 0112/2///61987#ABH828 - reference standard for packing group 0112/2///61987#ABI419 - number of special packing informations 0112/2///61987#ABI416 - Special packing information (Ref: 0112/2///61987#ABI447 - reference to Special packing information) <ul style="list-style-type: none"> 0112/2///61987#ABI430 - class of special treatment 0112/2///61987#ABI431 - system of special treatment 0112/2///61987#ABI418 - number of types of transportation 0112/2///61987#ABI415 - Type of transportation (Ref: 0112/2///61987#ABI446 - reference to Type of transportation) <ul style="list-style-type: none"> 0112/2///61987#ABI436 - designation of transportation 0112/2///61987#ABI437 - description of transportation 0112/2///61987#ABI438 - restrictions of transportation means 0112/2///61987#ABI435 - special transportation requirements 0112/2///61987#ABI439 - transportation regulations 0112/2///61987#ABI441 - shock test standard for transportation 0112/2///61987#ABH812 - number of hazardous goods 0112/2///61987#ABH813 - Hazardous goods (Ref: 0112/2///61987#ABH832 - reference to Hazardous goods) <ul style="list-style-type: none"> 0112/2///61987#ABI443 - commercial designation 0112/2///61987#ABI442 - customs tariff number 0112/2///61987#ABJ603 - country/organization for customs tariff number 0112/2///61987#ABI440 - drop test standard 0112/2///61987#ABH829 - storage/transport position 0112/2///61987#ABH810 - maximum altitude above mean sea level 0112/2///61987#ABI424 - minimum limiting value of transportation temperature 0112/2///61987#ABI425 - maximum limiting value of transportation temperature 0112/2///61987#ABI426 - minimum limiting value of transportation air pressure 0112/2///61987#ABI427 - maximum limiting value of transportation air pressure 0112/2///61987#ABI428 - minimum limit of transportation relative humidity 0112/2///61987#ABI429 - maximum limit of transportation relative humidity

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