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Meritve, krmiljenje in avtomatizacija v industrijskih procesih - Digitalni tovarniški okvir - 2. del: Elementi modela

Industrial-process measurement, control and automation - Digital Factory framework - Part 2: Model elements

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65/774/CDV

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IEC TC 65 : INDUSTRIAL-PROCESS MEASUREMENT, CONTROL AND AUTOMATION	
SECRETARIAT: France	SECRETARY: Mr Rudy BELLIARDI
OF INTEREST TO THE FOLLOWING COMMITTEES: SC 3D,SC 65E,SyC SM	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING **Attention IEC-CENELEC parallel voting** The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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TITLE:

Industrial-process measurement, control and automation - Digital Factory framework - Part 2: Model elements

PROPOSED STABILITY DATE: 2024

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CONTENTS

FOREWORD 7
INTRODUCTION 9
1 Scope 10
2 Normative references 10
3 Terms, definitions, (symbols,) abbreviated terms and conventions 10
3.1 Terms and definitions 10
3.2 Abbreviated terms 10
3.3 Conventions for representing the definition of a model element 11
3.3.1 Convention for names 11
3.3.2 Representation of specific DataElementTypes 11
3.3.3 Representation of the definition of model elements 12
3.3.4 Convention for UML notation 13
4 Definitions of specific DataElementTypes 14
4.1 General 14
4.2 ConceptIdentifier 14
4.3 DataValue 14
4.4 DateAndTimeOfRelease 14
4.5 Description 14
4.6 DETcategory 15
4.7 DFMdataType 15
4.8 DictionarySupplierID 15
4.9 ElementIdentifier 16
4.10 ItemCode 16
4.11 LetterSymbol 16
4.12 ParentModelElement 17
4.13 PhysicalUnit 17
4.14 PreferredName 17
4.15 PSassetIdentifier 18
4.16 ReferenceToCDEL 18
4.17 ReferenceToCDELdefinition 18
4.18 ReferenceToDataElement 19
4.19 ReferenceToDET 19
4.20 ReferenceToDFasset 19
4.21 ReferenceToDFassetClass 20
4.22 ReferenceToDFassetClassAssociation 20
4.23 ReferenceToDFassetClassDefinition 20
4.24 ReferenceToGenericAssociation 20
4.25 RoleBasedEquipmentIdentifier 21
4.26 RuleOfRelationship 21
4.27 SearchSpace 21
4.28 SupplierName 22
4.29 SynonymousName 22
4.30 TechnicalDiscipline 22
4.31 TimeCreated 24
4.32 TimeStamp 24

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(standards.iteh.ai)
SIST EN IEC 62832-2:2021
https://standards.iteh.ai/catalog/standards/sist/c73706c5-0152-40a1-84e1-b1b1f5ec7fd1/sist-en-iec-62832-2-2021

oSIST prEN IEC 62832-2:2020

4.33 ValueQuality 24
4.34 VersionIdentifier 25
4.35 VersionNumber 25
5 Definitions of model elements 26
5.1 General 26
5.2 Model elements related to dictionaries 26
5.2.1 ConceptDictionary 26
5.2.2 ConceptDictionaryEntry 27
5.2.3 Model elements related to PermissibleValues 29
5.3 Model elements related to DataElement 32
5.3.1 CollectionOfDataElements (CDEL) 32
5.3.2 DataElement 33
5.4 Model elements related to libraries 34
5.4.1 Library 34
5.4.2 LibraryEntry 35
5.5 Model elements related to DigitalFactory 42
5.5.1 DigitalFactory 42
5.5.2 DFasset 43
5.5.3 DFassetLink 44
5.5.4 DFassetLinkEndPoint 45
5.5.5 DFassetAssignment 45
Annex A (informative) Data type specification 46
Annex B (informative) Naming correspondence between IEC 62832-1 and IEC 62832-2 47
Annex C (informative) Mapping of DF model elements onto different data standards 49
C.1 Mapping onto IEC 61360 and ISO 13584-42 49
C.1.1 General 49
C.1.2 Detailed mapping for Dictionary 49
C.1.3 Detailed mapping for DFassetClassDefinition 50
C.1.4 Detailed mapping for CDELdefinition 50
C.1.5 Detailed mapping for DET 50
C.2 Mapping onto ISO 22745 51
C.2.1 General 51
C.2.2 Detailed mapping for Dictionary 51
C.2.3 Detailed mapping for DFassetClassDefinition 52
C.2.4 Detailed mapping for CDELdefinition 52
C.2.5 Detailed mapping for DET 53
C.2.6 Detailed mapping for Library 53
C.2.7 Detailed mapping for DFassetClass 53
C.2.8 Detailed mapping for DataElement 54
Annex D (informative) UML Model 55
D.1 ConceptDictionary 55
D.2 Model elements related to DataElements 56
D.3 Library 57
D.4 Digital Factory 59
Annex E (informative) UML notation 62
E.1 General 62
E.2 Class diagram 62
E.3 Object diagram 65

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(standards.iteh.ai)
SIST EN IEC 62832-2:2021
https://standards.iteh.ai/catalog/standards/sist/c73706c5-0152-40a1-84e1-b1b1bec7dd1/sist-en-iec-62832-2-2021

oSIST prEN IEC 62832-2:2020

Bibliography 67

Figure A.1 – Data types overview 46
Figure D.1 – Concept dictionary and related class definitions and type 55
Figure D.2 – Permissible values 56
Figure D.3 – Model elements related to DataElements 56
Figure D.4 – Library 57
Figure D.5 – DFassetClass 57
Figure D.6 – DFassetClass showing origin of definitions 58
Figure D.7 – Composite DFassetClass 58
Figure D.8 – DigitalFactory structure 59
Figure D.9 – Digital Factory example 59
Figure D.10 – Relationship between DFassets 60
Figure D.11 – Example: DigitalFactory with composite DFasset 60
Figure D.12 – Example: DFassetLink and DER 61
Figure D.13 – Example: DFassetAssignment 61
Figure E.1 – Note 62
Figure E.2 – Class 62
Figure E.3 – Association 63
Figure E.4 – Composition 63
Figure E.5 – Aggregation 63
Figure E.6 – Containment 63
Figure E.7 – Dependency 63
Figure E.8 – Abstract class, generalization and interface 64
Figure E.9 – Multiplicity 64
Figure E.10 – Association class 65
Figure E.11 – Class 65
Figure E.12 – Link 65
Figure E.13 – Link instantiated from composition 65
Figure E.14 – Link instantiated from aggregation 66

Table 1 – Template for representing the definition of specific DataElementTypes 11
Table 2 – Template for representing the definition of model elements 12
Table 3 – Definition of ConceptIdentifier 14
Table 4 – Definition of DataValue 14
Table 5 – Definition of DateAndTimeOfRelease 14
Table 6 – Definition of Description 15
Table 7 – Definition of DETcategory 15
Table 8 – Definition of DFMdataType 15
Table 9 – Definition of DictionarySupplierID 16
Table 10 – Definition of ElementIdentifier 16
Table 11 – Definition of ItemCode 16
Table 12 – Definition of LetterSymbol 17

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN IEC 62832-2:2021

oSIST prEN IEC 62832-2:2020

Table 13 – Definition of ParentModelElement 17
Table 14 – Definition of PhysicalUnit 17
Table 15 – Definition of PreferredName 18
Table 16 – Definition of PSassetIdentifier 18
Table 17 – Definition of ReferenceToCDEL 18
Table 18 – Definition of ReferenceToCDELdefinition 19
Table 19 – Definition of ReferenceToDataElement 19
Table 20 – Definition of ReferenceToDET 19
Table 21 – Definition of ReferenceToDFasset 19
Table 22 – Definition of ReferenceToDFassetClass 20
Table 23 – Definition of ReferenceToDFassetClassAssociation 20
Table 24 – Definition of ReferenceToDFassetClassDefinition 20
Table 25 – Definition of ReferenceToGenericAssociation 21
Table 26 – Definition of RoleBasedEquipmentIdentifier 21
Table 27 – Definition of RuleOfRelationship 21
Table 28 – Definition of SearchSpace 22
Table 29 – Definition of SupplierName 22
Table 30 – Definition of SynonymousName 22
Table 31 – Definition of TechnicalDiscipline 23
Table 32 – Definition of TimeCreated 24
Table 33 – Definition of TimeStamp 24
Table 34 – Definition of ValueQuality 24
Table 35 – Definition of VersionIdentifier 25
Table 36 – Definition of VersionNumber 25
Table 37 – Definition of ConceptDictionary 26
Table 38 – Definition of DFdictionary 27
Table 39 – Definition of ConceptDictionaryEntry 27
Table 40 – Definition of DFassetClassDefinition 28
Table 41 – Definition of CDELdefinition 28
Table 42 – Definition of DataElementType 29
Table 43 – Definition of RangeOfPermissibleValues 29
Table 44 – Definition of ListOfPermissibleValues 30
Table 45 – Definition of MaximumPermissibleValue 30
Table 46 – Definition of MinimumPermissibleValue 31
Table 47 – Definition of PermissibleValue 31
Table 48 – Definition of CollectionOfDataElements 32
Table 49 – Definition of DataElement 33
Table 50 – Definition of Library 34
Table 51 – Definition of SupplierLibrary 34
Table 52 – Definition of DFlibrary 35
Table 53 – Definition of LibraryEntry 35
Table 54 – Definition of LibraryEntryHeader 36
Table 55 – Definition of DFassetClass 36

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN IEC 62832-2:2021
https://standards.iteh.ai/catalog/standards/sist/3a0ec5c0-0153-40a1-84a1-d4e35e7561/sist-en-iec-62832-2-2021

oSIST prEN IEC 62832-2:2020

Table 56 – Definition of DFassetClassHeader 37
Table 57 – Definition of DFassetClassBody 37
Table 58 – Definition of DFassetClassAssociation 38
Table 59 – Definition of DFassetClassAssociationEndPoint 38
Table 60 – Definition of GenericAssociation 39
Table 61 – Definition of GenericAssociationEndPoint 39
Table 62 – Definition of DataElementRelationship 40
Table 63 – Definition of DERendPoint 40
Table 64 – Definition of ViewElement 41
Table 65 – Definition of DigitalFactory 42
Table 66 – Definition of DFasset 43
Table 67 – Definition of DFassetHeader 43
Table 68 – Definition of DFassetBody 44
Table 69 – Definition of DFassetLink 44
Table 70 – Definition of DFassetLinkEndPoint 45
Table 71 – Definition of DFassetAssignment 45
Table A.1 – Data types used within the DF framework 46
Table B.1 – Cross reference table 47
Table C.1 — Mapping of DF model elements onto IEC 61360 and ISO 13584-42 49
Table C.2 — Detailed mapping of Dictionary 49
Table C.3 — Detailed mapping of DFassetClassDefinition 50
Table C.4 — Detailed mapping of CDELdefinition 50
Table C.5 — Detailed mapping of DET 50
Table C.6 — Mapping of DF model elements onto ISO 22745 51
Table C.7 — Detailed mapping of Dictionary 52
Table C.8 — Detailed mapping of DFassetClassDefinition 52
Table C.9 — Detailed mapping of CDELdefinition 52
Table C.10 — Detailed mapping of DET 53
Table C.11 — Detailed mapping of Library 53
Table C.12 — Detailed mapping of DFassetClass 53
Table C.13 — Detailed mapping of DFassetClassHeader 54
Table C.14 — Detailed mapping of DFassetClassBody 54
Table C.15 — Detailed mapping of DataElement 54

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INDUSTRIAL-PROCESS MEASUREMENT, CONTROL AND AUTOMATION – Digital Factory framework

Part 2: Model elements

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The text of this International Standard is based on the following documents:

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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A list of all parts of the IEC 62832 series, published under the general title, *Industrial-process measurement, control and automation – Digital Factory framework*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The National Committees are requested to note that for this publication the stability date is 2024

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INTRODUCTION

IEC 62832 provides a framework used for establishing and maintaining the digital representations of production systems, including the representation of the elements of the production systems and of the relationships between these elements. The framework is intended also to support the exchange of information about these elements.

The framework aims at reducing the interoperability barriers for exchange of information for the various activities related to production systems. The main advantages of this method are that all information related to a production system is described in a standardized manner, and it can be used and modified through its entire life cycle. The method defined in IEC 62832 is kept as generic as possible in order to enable its use in several industrial sectors.

While IEC 62832-1 describes the general principles of the DF reference model together with its most important model elements, this part of IEC 62832 provides a technology-independent definition of all model elements of the DF reference model.

The intention of this document is to provide a common base for implementation of the DF framework using different technologies (for example different dictionary technologies and different engineering data formats).

The data type specification provided with this document is intended to allow mapping of the DF framework to different dictionaries.

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Two types of templates for representation, namely for specific DataElementTypes and for model elements, are described in 3.3. Based on these templates, definitions of specific DataElementTypes are given in Clause 4, and definitions of model elements, using the DataElementTypes are given in Clause 5.

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The requirements for these two sets of definitions are kept to as minimal as possible, in order to allow broad use of the framework.

If the concepts of DF framework are applied to provide model elements for different engineering domains, domain-specific data specifications will be used (for example based on IEC 62656-1).

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INDUSTRIAL-PROCESS MEASUREMENT, CONTROL AND AUTOMATION –

Digital Factory framework
Part 2: Model elements

1 Scope

This part of IEC 62832 specifies detailed requirements for model elements of the Digital Factory framework. It defines the nature of the information provided by the model elements, but not the format of this information.

NOTE General requirements for the main model elements of the DF reference model are specified in IEC 62832-1.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62832-1:—[1], *Industrial-process measurement, control and automation – Digital factory framework – Part 1: General principles*

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ISO TS 29002-5:2009, *Industrial automation systems and integration – Exchange of characteristic data – Part 5: Identification scheme*

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ISO/IEC 6523 (all parts), *Information technology – Structure for the identification of organizations and organization parts*

IETF RFC 3986, *Uniform Resource Identifier (URI): Generic Syntax*, available at <http://www.ietf.org>

3 Terms, definitions, (symbols,) abbreviated terms and conventions

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62832-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.2 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply.

CDEL Collection of Data Elements

DER Data Element Relationship

DET Data Element Type (see IEC 62832-1)

---

1 Under preparation

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DF	Digital Factory (as qualifier)
DLOP	Device List of Properties (see IEC 61987-10)
IC	Item Code (see IEC 62832-1)
ID	Identifier
IRDI	International Registration Data Identifier (see ISO TS 29002-5)
LOP	List of Properties (see IEC 61987-10)
OLOP	Operational List of Properties (see IEC 61987-10)
PS	Production System (as qualifier)
UML	Unified Modeling Language (see ISO/IEC 19505-1)
URI	Uniform Resource Identifier (see IETF RFC 3986)
VI	Version Identifier (see IEC 62832-1)

NOTE 1 The abbreviated term DF is only used as a qualifier for model elements specified in this document. It is not to be understood as a replacement for the Digital Factory concept defined in IEC 62832-1:—, 3.1.19.

NOTE 2 The abbreviated term PS is only used as a qualifier for model elements specified in this document. It is not to be understood as a replacement for the production system concept defined in IEC 62832-1:—, 3.1.24.

3.3 Conventions for representing the definition of a model element

3.3.1 Convention for names

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While IEC 62832-1 is using general names for describing the concepts, IEC 62832-2 and IEC 62832-3 define more formal requirements. In order to clearly identify the names of the model elements the documents IEC 62832-2 and IEC 62832-3 use ‘PascalCase’ for names.

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A help for matching the names is provided in Table B.1.

3.3.2 Representation of specific DataElementTypes

The template used in this document for representing the definition of specific DataElementTypes of the DF reference model is specified in Table 1.

NOTE Definitions in this document are independent of actual definitions of model elements in any specific dictionary.

Table 1 – Template for representing the definition of specific DataElementTypes

ItemCode	
VersionIdentifier	
PreferredName	
DFMdataType	
Description	

Table 1 shows the mandatory fields for defining a specific DataElementType. Optionally, additional fields may be provided (for example SynonymousName, LetterSymbol, PermissibleValues, PhysicalUnit and DETcategory).

Each shaded cell indicates the name of a corresponding field (the value of the field is shown as unshaded cell).

The template provides the definition of a specific DataElementType (identity and meaning). It is formatted as fields with respective values. The fields have names of model elements defined

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in this document, because the template is intended to be used accordingly when the specific DataElementTypes are registered in a ConceptDictionary.

A specific DataElementType is defined by providing data in the relevant fields (i.e. the table is filled). A "-" in an unshaded cell indicates that the field is not applicable to the definition of the specific DataElementType.

3.3.3 Representation of the definition of model elements

The template used in this document for representing the definition of model elements of the DF reference model is specified in Table 2.

Table 2 – Template for representing the definition of model elements

ItemCode				
VersionIdentifier				
PreferredName				
LetterSymbol				
Description				
ParentModelElement				
Structure				
Structure element	**I/R**	**Cardinality**	**Conditions**	**Remarks**

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The upper part of the template provides the definition of a model element (identity and meaning). It is formatted as fields with respective values. The fields use names of model elements defined in this document, because these fields are intended to be used accordingly when the model elements will be registered in a ConceptDictionary. The ItemCode and VersionIdentifier fields can be used to uniquely identify a model element within the DF framework.

The structure of the model element is represented in the lower part of the template as a list of constituent elements. Each constituent element in the template may be instantiated as a constituent of the defined model element, depending on cardinality and conditions. Constituent elements inherited from the ParentModelElement are not listed.

The field "Structure element" contains a reference to a model element definition. The constituent element is derived from the referenced model element definition.

A constituent element may be defined as an instance of a model element or as a reference to an instance of a model element.

The field "I/R" contains a text string ("I", "R" or "I/R"), which indicates whether the constituent element is defined as an instance or as a reference:

- the value "I" indicates that the structure contains an instance of the particular constituent element (or multiple instances depending on the value of the cardinality);
- the value "R" indicates that the structure contains a reference to an instance of the particular constituent element (or multiple references depending on the value of the cardinality);
- the value "I/R" indicates that the structure contains either an instance of or a reference to an instance of the particular constituent element (or multiple ones depending on the value of the cardinality).