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Industrial automation systems and integration — Parts library —

Part 511: Mechanical systems and components for general use — Reference dictionary for fasteners

Systèmes d'automatisation industrielle et intégration — Bibliothèque de composants —

Partie 511: Systèmes mécaniques et composants pour utilisation générale — Dictionnaire de référence pour éléments de fixation

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC directives, Part 2.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 13584-511 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration*, Subcommittee SC 4, *Industrial data*.

ISO 13584 consists of the following parts, under the general title *Industrial automation systems and integration — Parts library*:

— *Part 1: Overview and fundamental principles*;

— *Part 20: Logical resource: Logical model of expressions*;

— *Part 24: Logical resource: Logical model of supplier library*;

— *Part 25: Logical resource: Logical model of supplier library with aggregate values and explicit content*;

— *Part 26: Logical resource: Information supplier identification*;

— *Part 31: Implementation resource: Geometric programming interface*;

— *Part 42: Description methodology: Methodology for structuring part families*;

— *Part 101: Geometric view exchange protocol by parametric program*;

— *Part 102: View exchange protocol by ISO 10303 conforming specification*;

— *Part 501: Reference dictionary for measuring instruments: Registration procedure*;

— *Part 511: Mechanical systems and components for general use: Reference dictionary for fasteners*.

The structure of the ISO 13584 series is described in ISO 13584-1. The numbering of the parts of ISO 13584 reflects its structure:

— Parts 10 to 19 specify the conceptual descriptions;

— Parts 20 to 29 specify the logical resources;

— Parts 30 to 39 specify the implementation resources;

— Parts 40 to 49 specify the description methodology;

— Parts 100 to 199 specify the view exchange protocols;

— Parts 500 to 599 specify the reference dictionaries.

Should further parts of ISO 13584 be published, they will follow the same numbering pattern.

Introduction

ISO 13584 is an International Standard for the computer interpretable representation and exchange of parts library data. The objective is to provide a neutral mechanism capable of transferring parts library data, independent of any application that is using a parts library data system. The nature of this description makes it suitable not only for the exchange of files containing parts, but also as a basis for implementing and sharing databases of parts library data.

This International Standard is organized as a series of parts, each published separately. The parts of ISO 13854 fall into one of the following series: conceptual descriptions, logical resources, implementation resources, description methodology, view exchange protocol, and reference dictionaries. The series are described in ISO 13584-1. This part of ISO 13584 is a member of the reference dictionaries series.

The reference dictionaries series of parts of ISO 13584 specify ontologies for representing the entities of an application domain, together with their descriptive properties and domains of values. Each entity, property or domain of values constitutes an entry of a dictionary that is the formal and computer sensible representation of the specified ontology. It is associated with a computer sensible and human readable definition, and with a computer sensible identification. Identification of a dictionary entry allows for unambiguous reference from any application. Definitions and identifications of dictionary entries consist of instances of the EXPRESS entity data types defined in the common dictionary schema, or in its extensions defined in the logical series of parts of ISO 13584.

This part of ISO 13584 specifies a reference dictionary for representing fasteners with their properties and domains of values, as they are described in the various ISO mechanical fastener standards.

The definitions of classes and properties in this fastener dictionary are referenced from:

— various ISO standards (see Bibliography);

— the Federal Item Identification Guide;

— Machinery's Handbook (26th Edition).

Industrial automation systems and integration — Parts library — Part 511: Mechanical systems and components for general use: Reference dictionary for fasteners

1 Scope

This part of ISO 13584 specifies a reference dictionary for all the parts described in the various ISO mechanical fastener standards, together with their descriptive properties and domains of values.

This part of ISO 13584 specifies a reference dictionary that contains:

— definitions and identifications of the classes of fasteners as they are described in the various ISO mechanical fastener standards, with associated classification schemes;

— definitions and identifications of data element types that represents properties of fasteners, and

— definitions and identifications of domains of values that help to describe the above data element types.

Each class, property or domain of values of this application domain constitutes an entry of the reference dictionary defined in this part of ISO 13584. It is associated with a computer sensible and human-readable definition, and with a computer sensible identification. Identification of a dictionary entry allows for unambiguous reference from any application.

Definitions and identifications of dictionary entries are defined by means of standard data that consist of instances of the EXPRESS entity data types defined in the common dictionary schema, and in its extensions defined in ISO 13584-24 and ISO 13584-25.

The following are within the scope of this part of ISO 13584:

— standard data that represents the classes of fasteners;

— standard data that represents the properties of fasteners;

— standard data that represents domains of values used for properties of fasteners.

The following are outside the scope of this part of ISO 13584:

— methodology for structuring parts families used for specifying standard data defined in this part of ISO 13584;

— implementation method by which the standard data defined in this part of ISO 13584 may be exchanged.

NOTE The structure of the physical file used for exchanging the standard data defined in this part of ISO 13584 is specified in ISO 10303-21. Such a physical file containing all the fastener standard data is also provided as Annex F of this part of ISO 13584.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 1891: 1979, *Bolts, screws, nuts and accessories — Terminology and nomenclature.*

ISO/IEC 8824-1, *Information technology — Abstract Syntax Notation One (ASN.1) — Part 1: Specification of basic notation.*

ISO 10303-1:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 1: Overview and fundamental principles.*

ISO 10303-11:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 11: Description methods: The EXPRESS language reference manual.*

ISO 10303-21, *Industrial automation systems and integration — Product data representation and exchange — Part 21: Implementation methods: Clear text encoding of the exchange structure.*

ISO 13584-1:2001, *Industrial automation systems and integration — Parts library — Part 1: Overview and fundamental principles.*

ISO 13584-24:2003, *Industrial automation systems and integration — Parts library — Part 24: Logical resources: Logical model of supplier library.*

ISO 13584-25, *Industrial automation systems and integration — Parts library — Part 25: Logical resources: Logical model of supplier library with aggregate values and explicit content.*

ISO 13584-42:1998, *Industrial automation systems and integration — Parts library — Part 42: Description methodology: Methodology for structuring part families.*

IEC 61360-4:1997, *Standard data element types with associated classification scheme for electric components — Part 4: IEC reference collection of standard data element types and component classes.*

3 Terms, definitions, and abbreviations

For the purposes of this document, the following terms, definitions and abbreviations apply.

Some of these terms and definitions are repeated for convenience from:

— ISO 10303-1:1994;

— ISO 10303-11:1994;

— ISO 13584-1:2001;

— ISO 13584-24:2003;

— ISO 13584-42:1998.

3.1 Terms and definitions

3.1.1

applicable property
a property that is defined for some family of parts and that shall apply to any part that belongs to this family of parts

[ISO 13584-24:2003]

EXAMPLE For a screw generic family of parts, the thread diameter is an applicable property: this characteristic applies to any screw.

3.1.2

basic semantic unit (BSU)
the entity that provides an absolute and universal identification of certain objects of the application domain

[ISO 13584-42:1998]

EXAMPLE Classes, data element types.

3.1.3

characteristic of a part (part characteristic)
a constant property, characteristic of a part, of which the value is fixed once the part is defined

[ISO 13584-24:2003]

NOTE Changing the value of a characteristic of a part would mean changing the part.

EXAMPLE For a washer, the nominal and outside diameters are part characteristics.

3.1.4

common dictionary schema
the information model for a dictionary, using the EXPRESS modelling language, resulting from a joint effort between ISO TC184/SC4/WG2 and IEC SC3D

[ISO 13584-42:1998]

NOTE The common dictionary schema is specified in IEC 61360-2:2004, and its content is provided in ISO 13584-42:1998, Annex D.

3.1.5

data
a representation of facts, concepts or instructions in a formal manner suitable for communication, interpretation, or processing by human beings or computers

[ISO 10303-1:1994]

3.1.6

data element type (DET)
unit of data for which the identification, the description and value representation have been specified

[ISO 13584-42:1998]

3.1.7

data exchange
the storing, accessing, transferring, and archiving of data

[ISO 10303-1:1994]

3.1.8

data type
a domain of values

[ISO 10303-11:1994]

3.1.9

dictionary
a table consisting of a series of entries. One meaning corresponds to each entry in the dictionary and one dictionary entry identifies one single meaning

[ISO 13584-1:2001]

NOTE 1 In ISO 13584, a dictionary is the formal and computer sensible representation of an ontology.

NOTE 2 In ISO 13584, the kinds of meaning intended to constitute dictionary entries are: supplier, class, property, program library, type, table and document.

NOTE 3 In ISO 13584, the information that represents a dictionary entry is split into three entities: a basic_semantic_unit (BSU), that provides for reference, a dictionary_element that describes the dictionary entry by means of attributes, and, possibly, a content_item entity that describes the dictionary entry by describing its content.

3.1.10

dictionary data
the set of data that describes hierarchies of families of parts and properties of these parts

[ISO 13584-42:1998]

3.1.11

dictionary element
the set of attributes that constitutes the dictionary description of certain objects of the application domain

[ISO 13584-42:1998]

EXAMPLE Classes, data element types.

3.1.12

entity
a class of information defined by common properties

[ISO 10303-11:1994]

3.1.13

entity data type
a representation of an entity. An entity data type establishes a domain of values defined by common attributes and constraints

[ISO 10303-11:1994]

3.1.14

entity (data type) instance
a named unit of data that represents a unit of information within the class defined by an entity. It is a member of the domain established by an entity data type

[ISO 10303-11:1994]

3.1.15

family of parts
a simple or generic family of parts

[ISO 13584-42:1998]

3.1.16

generic family of parts
a grouping of simple or generic families of parts done for purposes of classification or for factoring common information

[ISO 13584-42:1998]

3.1.17

implementation method
a technique used by computers to exchange data that is described using the EXPRESS data specification language

[ISO 13584-24:2003]

3.1.18

is-case-of relationship
a relationship providing a formal expression of the fact that an object conforms to the partial specification defined by another object

[ISO 13584-24:2003]

NOTE In ISO 13584, all the families of parts that declare to be case-of the former family can import all the properties and data types visible or applicable for some family of parts. These properties and data types can then be used to describe the latter families.

3.1.19

library integrated information model (LIIM)
an EXPRESS schema that integrates resource constructs from different EXPRESS schemas for representing supplier libraries for the purpose of exchange and that is associated with conformance requirements

[ISO 13584-24:2003]

3.1.20

ontology
explicit and consensual specification of concepts of an application domain independent of any use of these concepts

NOTE In ISO 13584, a dictionary is the formal and computer sensible representation of ontology.

3.1.21

part
material or functional element that is intended to constitute a component of different products

[ISO 13584-1:2001]

3.1.22

property
information that may be represented by a data element type

[ISO 13584-42:1998]

3.1.23

simple family of parts
a set of parts of which each part may be described by the same group of properties

[ISO 13584-42:1998]

3.1.24

visible property
a property that is defined for some family of parts and that may or may not apply to the different parts of this family of parts

[ISO 13584-42:1998]

EXAMPLE For a generic family of screws, the non-threaded length is a visible property: it is clearly defined for any screw, but only those screws with a non-threaded part have a value for this property.

NOTE The code of the class where a property is defined as visible is part of the identification of the data element type that represents this property.

3.1.25

standard data
a requirement on a software system defined by means of EXPRESS entity (data type) instances that are supposed to be recognized by this software system

[ISO 13584-24:2003]

3.2 Abbreviations

For the purposes of this document, the following abbreviations apply.

AP	Applicable Property
BSU	Basic Semantic Unit
DC	Definition Class
DCR	Date of Current Revision
DCV	Date of Current Version
DET	Data Element Type
DOD	Date of Original Definition
DT	Data Type
LIIM	Library Integrated Information Model
PLS	Preferred Letter Symbol
PTC	Property Type Classification
SD	Simplified Drawing
SDD	Source Document of Definition
SSP	Sub-class Selection Properties
VF	Value Format
VP	Visible Property

4 Representation of ontology concepts as dictionaries entries

4.1 Fastener class

4.1.1 Modelled class

4.1.1.1 Fastener class and super class

In this part of ISO 13584, fastener class and thread class are located under the super class -- **mechanical component for general use (see Figure 1).**

NOTE Besides **fastener** class, some other classes, e.g. bearing or spring, will be put under '**mechanical component for general use**' in the future reference dictionary standardization.