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Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations — Part 101: Modelling concepts and guidelines for power supply systems

DTS stage

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Part 101: Modelling concepts, guidelines and requirements for power supply systems

Systèmes industriels, installations et appareils et produits industriels — Principes de structuration et désignation de référence —

Partie 101: Concepts de modélisation, lignes directrices et exigences pour les systèmes d'alimentation électrique

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Foreword

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This document was prepared jointly by Technical Committee ISO/TC 10, *Technical product documentation,* Subcommittee SC 10, *Process plant documentation*, ~~in cooperation with the~~and Technical Committee IEC/TC 3, *Information structures and elements, identification and marking principles, documentation and graphical symbols*.

A list of all parts in the ISO ~~81346 and~~ /IEC 81346 series can be found on the ISO ~~website~~and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at ~~www.iso.org/members.html.~~www.iso.org/members.html and www.iec.ch/national-committees.

Introduction

This document provides guidelines for the understanding and application of the ISO 81346 and IEC 81346 reference designation system (RDS) for ~~Power~~power supply ~~Systems~~systems (PS). It was developed in response to ~~a demand~~demands by the power supply sector for guidelines to the application of the ISO 81346 and IEC 81346 series, in particular ISO 81346~~-~~-10:2022.

Power supply systems, and the target industries of this document, include but are not limited to: wind, photovoltaic, thermal, nuclear and hydropower production.

The very basics of the RDS are not explained in this document. It is assumed that the user of this document already is familiar with the major concepts detailed in IEC 81346-1:2022 and IEC 81346~~-~~-2:2019. These concepts include the four RDS aspects, the basic RDS semantics and basic RDS classification rules.

Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations — Part 101: Modelling concepts and guidelines for power supply systems

Part 101: Modelling concepts, guidelines and requirements for power supply systems

1 Scope

This guide supportsdocument gives guidelines to support the user in the understandingapplication of the ISO 81346 and IEC 81346 series. to power supply systems. It also proposes guidelines andspecifies best practice tofor its use and implementation depending on the user and situation. By following the suggestions in these supporting documents, theThe application of this document will be harmonizedsupports harmonization within and between the power supply technical domains and industries.

No part of this document is normative, only rules of thumb, proposed solutions and general guidelines on the application of the ISO 81346 and IEC 81346 series on power supply systems are given.

Introductory examples of the use of reference designation systems (RDS) can be found in Annex A (informative) and Annex B (informative). Annex C (informative)Annex A and Annex B. Annex C provides an example of a conversion table between the proposed classes of aan example structuring system in this document and the classes specified in this document and other parts of the ISO 81346 and IEC 81346 series.

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.

ISOIEC 81346-10:2022, *Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations — Part 10: Power supply systems*

ISO 81346-12, *Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations — Part 12: Construction works and building services*

ISO 26324, *Information and documentation — Digital object identifier system*

IEC 61360-4, *Standard data element types with associated classification scheme for electric components — Part 4: IEC reference collection of standard data element types and component classes*[1]

IEC 81346- 1:2022, *Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations — — Part 1: Basic rules*

IEC 81346- 2:2019, *Industrial systems, installations and equipment and industrial products — — Structuring principles and reference designations — — Part 2: Classification of objects and codes for classes*

IEC/TR 63213, *Power measurement applications within electrical distribution networks and electrical installations*

[1] Component Data Dictionary (CDD - V2.0011.0002). Online database featuring 440 classes and 1400 characteristic properties for electric/electronic components and materials. Free access to database: http://std.iec.ch/iec61360

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 81346--1:2022, IEC 81346--2:2019 and the following apply.

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

— ——ISO onlineOnline browsing platform: available at https://www.iso.org/obphttps://www.iso.org/obp

— ——IEC electropediaElectropedia: available at http://www.electropedia.org/https://www.electropedia.org/

3.1
horizontal system
system which has an impact or supports one or more *vertical systems* (3.3)(3.3) without being one

EXAMPLE Managing systems (e.g. =F1) or supporting systems (e.g. =D1)

Note 1- to- entry:- There can be supporting systems within core process (vertical) systems (e.g. the monitoring system of the generator =A1.RA1.LE1).

3.2
preferred reference designation
PRD
reference designation (RD) used as the main key to identify an object within a database

3.3
vertical system
system that is a part of the core process of the power production, distribution or transmission for power supply systems

EXAMPLE Production unit systems (e.g. =A1) or energy transport systems (e.g. =C1).-

1 Basic semantics and abbreviations

Throughout this document, the basic semantics and classification rules for reference designation systems according to IEC 81346-1:2022 and IEC 81346-2:2019 are used.

4 Abbreviated terms

For the purposes of this document, the abbreviationsabbreviated terms listed in Table 1 Table 1 apply.

Table 1 — List of abbreviations

Abbreviation	Meaning
BIM	Building Information Modellingbuilding information modelling
CB	Circuitcircuit breaker-
CDD	IEC Common Data Dictionarycommon data dictionary
CID	Construction Identifierconstruction identifier

Abbreviation	Meaning
CW	~~Construction Works~~ construction works
DOI	~~Digital Object Identifier~~digital object identifier
GIS	~~Geographic Information System~~geographic information system
HSE	~~Health Security~~health security and ~~Environment~~environment
IOD	~~Individual Object Database~~individual object database
P&ID	~~Piping~~piping and ~~Instrumentation Diagram~~instrumentation diagram
PRD	~~Preferred Reference Designation~~preferred reference designation
PS	~~Power~~power supply ~~Systems~~ systems
RD	~~Reference Designation~~ reference designation
RDS	~~Reference Designation System~~reference designation system
SCADA	~~Supervisory Control And Data Acquisition~~supervisory control and data acquisition
SSOT	~~Single Source~~single source of ~~Truth~~truth

~~4~~5 Modelling principles

~~4.1~~5.1 Design for purpose

A system can be a constituent of a large and complex system. If so, it will often have a multi-levelled reference designation (RD). Or it can be such a simple overall system, and the constituents will be represented by a single level RD. It is the designer's responsibility to select the appropriate structure to reflect the complexity of the system in question.

The depth and complexity of a structured representation will be influenced by the innate complexity of the overall system in question. A nuclear power plant ~~will need~~needs many levels to correctly represent and model all the functionality within it. Not all systems ~~will~~ need that level of detail. The representation of highly complex systems can often benefit from simplifications. It would ~~probably~~likely not make sense to include every single system down to individual bolts and screws when modelling a complete nuclear power plant.

The purpose of creation of the structure (also called model in this document) should also influence the complexity and granulation of the representation of the system. A model designed to provide an overview of a chemical park main processes, for example, does not need to include a detailed overview of the layers in the roof construction of the gardening equipment shed.

~~Also keep in mind the~~The framework set by the selection of aspect should be considered when designing a structure. When structuring a system based on the functional aspect, the system functional complexity and process criticality should be looked at, not physical size or cost. Large ~~and/~~or costly objects, or both, are not always complex from a functional point of view. A transformer could be considered quite simple in the functional aspect, no matter what physical size, complexity of construction or costs it has. It usually has few functional sub-systems, and a simple functionality. With an RD-based model, depth and level of details should be influenced by its intended use. The structure should be a tool to benefit the user, not an absolute mirror of reality and all its ~~tiny~~ details.

EXAMPLE 1 A component in the lower levels of a complex structure (e.g. a motor within a critical sub-system for the process, =A1.KA1.KK1.MAA1) can be of such importance to the process that a data collecting system could be required and of interest to the operating party (e.g. =A1.KA1.KK1.MAA1.KED1). Even the sensors connected ~~could~~can be of interest and could be represented (e.g. =A1.KA1.KK1.MAA1.KED1.BTA1) if useful.

EXAMPLE 2 A simple gate can be represented by a simple structure e.g. only two levels, all within the component system:

=C1.QQF1 – Gate system

=C1.QQF1.MAA1 – Gate motor

or it could be a complex system with heating system, auxiliary power supply, monitoring systems and so on:

~~or it could be a complex system with heating system, auxiliary power supply, monitoring systems and so on:~~

=C1.KA1 – Gate system

=C1.KA1.LE1 – Gate system monitoring system

=C1.KA1.LE1.BPA1 – Upstream pressure monitoring system

=C1.KA1.LE1.BPA1.BPA1 – Upstream pressure monitoring 1

= C1.KA1.LE1.BPA1.BPA2 – Upstream pressure monitoring 2

= C1.KA1.LE1.BPA1.BPA3 – Upstream pressure monitoring 3

=C1.KA1.HE1 – Gate heating system

...

The structure gives the proper representation of the system~~,~~ and lets the user of this document understand the system complexity through the model complexity.

Throughout this document, the basic semantics and classification rules for reference designation systems in accordance with IEC 81346-1:2022 and IEC 81346-2:2019 are used.

~~4.2~~5.2 Receiver's ownership principle

According to the receiver's ownership principle shown in ~~Figure 1~~Figure 1 and the example in ~~Figure 2~~Figure 2, when a system is intended to link two other systems on the same hierarchical level, and when it is unclear to which system it belongs, the linking system should be part of the receiving system (in terms of information, matter or energy of any kind).

