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Application integration at electric utilities - System interfaces for distribution management - Part 13: Common distribution power system model profiles

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 07/21

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April 2021

ICS 33.200

Supersedes EN 61968-13:2008 and all of its amendments and corrigenda (if any)

English Version

# Application integration at electric utilities - System interfaces for distribution management - Part 13: Common distribution power system model profiles (IEC 61968-13:2021)

Intégration d'applications pour les services électriques - Interfaces système pour la gestion de la distribution - Partie 13: Profils de modèle commun de système électrique de distribution (IEC 61968-13:2021)

Integration von Anwendungen in Anlagen der Elektrizitätsversorgung - Systemschnittstellen für Netzführung - Teil 13: Allgemeine Profile zur Modellierung von Verteilnetzen (IEC 61968-13:2021)

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The text of document 57/2311/FDIS, future edition 2 of IEC 61968-13, prepared by IEC/TC 57 "Power systems management and associated information exchange" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61968-13:2021.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022-01-20
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024-04-20

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

| | | |
|---|---|---|
| IEC 61970-600-1[1] | NOTE | Harmonized as EN IEC 61970-600-1[2] |
| IEC 61970-600-2[3] | NOTE | Harmonized as EN IEC 61970-600-2[4] |
| IEC 61968-1 | NOTE | Harmonized as EN IEC 61968-1 |
| IEC 61970-456 | NOTE | Harmonized as EN IEC 61970-456 |
| IEC 61970-453 | NOTE | Harmonized as EN 61970-453 |
| IEC 61968-4:2019 | NOTE | Harmonized as EN IEC 61968-4:2019 (not modified) |
| IEC 61968-8:2015 | NOTE | Harmonized as EN 61968-8:2016 (not modified) |
| IEC 60909 (series) | NOTE | Harmonized as EN 60909 (series) |
| IEC 61850-7-3 | NOTE | Harmonized as EN 61850-7-3 |
| IEC 61968-3 | NOTE | Harmonized as EN IEC 61968-3 |
| IEC 62559-2:2015 | NOTE | Harmonized as EN 62559-2:2015 (not modified) |

[1] Under preparation. Stage at the time of publication: IEC PRVC 61970-600-1:2020.

[2] Under preparation. Stage at the time of publication: FprEN IEC 61970-600-1:2021.

[3] Under preparation. Stage at the time of publication: IEC PRVC 61970-600-2:2020.

[4] Under preparation. Stage at the time of publication: FprEN IEC 61970-600-2:2021.

# Annex ZA
(normative)

# Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC/TS 61968-2 | - | Application integration at electric utilities - System interfaces for distribution management - Part 2: Glossary | - | - |
| IEC 61968-11 | 2013 | Application integration at electric utilities - System interfaces for distribution management - Part 11: Common information model (CIM) extensions for distribution | EN 61968-11 | 2013 |
| IEC 61970-301 | 2020 | Energy management system application program interface (EMS-API) - Part 301: Common information model (CIM) base | EN IEC 61970-301 | 2020 |
| IEC 61970-452 | - | Energy management system application program interface (EMS-API) - Part 452: CIM static transmission network model profiles | EN 61970-452 | - |
| IEC 61970-501 | 2006 | Energy management system application program interface (EMS-API) - Part 501: Common Information Model Resource Description Framework (CIM RDF) schema | EN 61970-501 | 2006 |
| IEC 61970-552 | 2016 | Energy management system application program interface (EMS-API) - Part 552: CIMXML Model exchange format | EN 61970-552 | 2016 |
| IEC 62325-301 | - | Framework for energy market communications - Part 301: Common information model (CIM) extensions for markets | EN IEC 62325-301 | - |

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## Application integration at electric utilities – System interfaces for distribution management –
## Part 13: Common distribution power system model profiles

## Intégration d'applications pour les services électriques – Interfaces système pour la gestion de la distribution –
## Partie 13: Profils de modèle commun de système électrique de distribution

IEC 61968-13:2021-03(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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# APPLICATION INTEGRATION AT ELECTRIC UTILITIES – SYSTEM INTERFACES FOR DISTRIBUTION MANAGEMENT –

## Part 13: Common distribution power system model profiles

## FOREWORD

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International Standard IEC 61968-13 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

This second edition cancels and replaces the first edition published in 2008. This edition constitutes a technical revision. This edition was pre-tested during 2016 ENTSO-E interoperability tests [1][1]. The interoperability test report mentions: "Some vendors demonstrated that the transformation between distribution network and CGMES is possible. This is a first step towards the efforts to have closer integration between CGMES and profiles for exchanging distribution data (CDPSM)."

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1 Numbers in square brackets refer to the bibliography.

This edition includes the following significant technical changes with respect to the previous edition:

a) Alignment with "CIM100" UML version fixed in July 2018:
iec61970cim17v24_iec61968cim13v05_iec62325cim03v14.eap
Namespace associated to this version was: http://iec.ch/TC57/2017/CIM-schema-cim100#

b) Test of Data Sets against "CIM100" version given in a).

c) Test of Data Sets against a newer "CIM100" version of May 2019:
iec61970cim17v34_iec61968cim13v12_iec62325cim03v17a.eap
Namespace associated to this version was: http://iec.ch/TC57/CIM100#

d) Alignment with "CIM100" after CDV stage in order to align 61968-13 with the latest CIM version iec61970cim17v38_iec61968cim13v12_iec62325cim03v17a. A new alignment was done in March/April 2020 on a new CIM100:
iec61970cim17v38_iec62968cim13v13_iec62325cim03v17a.eap. This document has been properly updated with latest developments to minimize the need for any convergence.

e) Test of Data Sets were validated against the profiles derived from these two newer versions of CIM100 in order to guarantee consistency. Validation include syntax validation, and load flow calculation.

f) Informative extensions included (NEK, EDF) which are based on some utility needs, which shall be discussed and which could be integrated in the IEC CIM model. These extensions have been put in a dedicated annex. These extensions will be discussed in IEC TC 57, and eventually be put in the official CIM Model. These extensions are managed through specific namespaces and do not block any interoperability test. Amendments to IEC 61968-13 or new parts to IEC 61968-13 will potentially address these "extensions" in the near future (when integrated into the IEC CIM Model).

g) Namespaces and associated URI modified.

h) Use of last CIM Feeder modelling and unbalanced networks modelling artefacts.

i) New annex illustrating CDPSM usage by EDF in H2020 TDX-ASSIST European project.

j) New annex illustrating CDPSM usage by the Norwegian AutoFOS project. The extension is governed by the Norwegian National Committee (NEK).

k) New paragraph and annex illustrating Observability Area concept.

l) Tools that were used are MODSARUS®[2] (Copyright © 2019, EDF R&D contact: modsarus@edf.fr) for Use Case definition (according to IEC 62559-2, IEC SRD 62913-1 methodology) and CDPSM UML profiling. Riseclipse tool was used for Data Set Validation (RiseClipse Web https://rise-clipse.pam-retd.fr/ Rise Clipse Code: https://wdi.supelec.fr/software/RiseClipse/). CIMTool (https://wiki.cimtool.org/) was also used to verify tools compatibility (profiling and data set validation). A modified version of jCleanCim (http://www.tanjakostic.org/jCleanCim/) was used to generate this documentation. Other tools like CimConteXtor and CimSyntaxGen could be used to produce the profiles and documentation. (https://www.cimcontextor.net/).

m) Replacement of Figure 6 on Network Model Management. Introduction of a new informative annex on CDPSM to CGMES conversion, replacing Figure 7 of the CDV document.

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2 MODSARUS is the trademark of a product supplied by EDF. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named.

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

| FDIS | Report on voting |
|---|---|
| 57/2311/FDIS | 57/2336/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.

A list of all parts in the IEC 61968 series, published under the general title *Application integration at electric utilities – System interfaces for distribution management*, can be found on the IEC website.

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

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

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

# INTRODUCTION

The organization of IEC 61968-13 is described in Table 1.

**Table 1 – Document overview for IEC 61968-13**

| Clause | Title | Purpose |
|---|---|---|
| 1 | Scope | Scope of IEC 61968-13. |
| 2 | Normative references | Define the normative references that the document depends on. |
| 3 | Terms and definitions | Define the terms and defintions that are used in the document. |
| 4 | Use Case list | Use cases related to CDPSM. |
| 5 | Distribution network modelling and CIM related issues resolved | Feeder modelling<br>Partial-phase devices modelling<br>Manage LV cable in Catalog |
| 6 | CIM Distribution Network Static Model Profiles | |
| Informative Annex A | Use Cases | |
| Informative Annex C | Example of a European CDPSM MV/LV urban and rural network | CDPSM usage and associated satellite image. |
| Informative Annex D | Example of a European CDPSM MV/LV urban network | CDPSM usage and associated satellite image. |
| Informative Annex E | Example of a European CDPSM MV Urban and Rural Network | CDPSM usage and associated satellite image. |
| Informative Annex F | Example of CDPSM usage in H2020 TDX-ASSIST project | CDPSM usage in European project H2020 TDX-ASSIST project. |
| Informative Annex G | Example of a nuclear distribution network | CDPSM was leveraged to model internal distribution network of Nuclear Power Plant. |
| Informative Annex H | Observability area concept | The CIM modelling should be able to represent the concept of observability area. |
| Informative Annex I | CDPSM to CGMES conversion | Illustrates how CDSPM data sets could be transformed in CGMES data sets. |
| Informative Annex J | Norwegian Electrotechnical Committee (NEK) CDPSM related Use Cases | Describe the use of CDPSM in the context of Autofos project. |

# APPLICATION INTEGRATION AT ELECTRIC UTILITIES – SYSTEM INTERFACES FOR DISTRIBUTION MANAGEMENT –

## Part 13: Common distribution power system model profiles

## 1 Scope

This part of IEC 61968 specifies profiles that can be used to exchange Network Models in a Utility or between a Utility and external applications to the utility. This document provides a list of profiles which allow to model balanced and unbalanced distribution networks in order to conduct network analysis (Power flow calculation). Therefore, it leverages already existing profiles (IEC 61970-45x based on IEC 61970-301 (CIM base) or profiles based on IEC 61968-11 CIM extension for Distribution). This document reuses some profiles without any change, or eventually extends them or restricts them. Moreover, it proposes other profiles to reflect Distribution needs.

Use of CIM in Distribution is not a new topic. Several documents can be of interest [13][17][18][19][20]. This document includes informative parts, as CIM model extensions, which could be integrated in future versions of the IEC CIM Model. These extensions have been used by some utilities for utility internal information exchange use cases and to support information exchanges between different market participants like Transmisstion System Operators (TSO), Distributed System Operators (DSO), Distributed Network Operators (DNO) and Significant Grid Users (SGU) including generators and industry (see Annex J for example).

## 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 TS 61968-2, *Application integration at electric utilities – System interfaces for distribution management – Part 2: Glossary*

IEC 61968-11:2013, *Application integration at electric utilities – System interfaces for distribution management – Part 11: Common information model (CIM) extensions for distribution*

IEC 61970-301:2020, *Energy management system application program interface (EMS-API) – Common information model (CIM) base*

IEC 61970-452, *Energy management system application program interface (EMS-API) – Part 452: CIM static transmission network model profiles*

IEC 61970-501:2006, *Energy management system application program interface (EMS-API) – Part 501: Common Information Model Resource Description Framework (CIM RDF) schema*

IEC 61970-552:2016, *Energy management system application program interface (EMS-API) – Part 552: CIMXML Model exchange format*

IEC 62325-301, *Framework for energy market communications – Part 301: Common information model (CIM) extensions for markets*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN